Guelph's

Community Call to Climate Action

Backgrounder

CITY OF Guelph

Making a Difference

Global Warming and Climate Change

Temperature measurements of earth have been taken across the world for a long time, with records going back as far as the 1880s. There are two very clear and alarming trends:

1. The earth's temperature is increasing
2. The increase in the earth's temperature has been going up at a much faster rate since the 1970s

It is this heating of the earth's surface that is called global warming. At a global level, 2024 was reported to be the hottest year on record, beating out the previous record that was set in 2023. Just as global temperatures are rising, temperatures in Canada are increasing twice as fast compared to the rest of the world. The average annual temperature increased in Canada by 2.0°C from 1948 to 2023.

It is well established by scientists that global warming is driven by human activity and largely when people use fossil fuels like coal, natural gas, gasoline or diesel. We burn fossil fuels for energy to do things like heat our buildings, run our businesses, and drive our cars, and in doing so, this releases different harmful gases called greenhouse gases (GHGs). These GHGs go up into the air and build up in the earth's atmosphere. As more and more GHGs build up, they act like a blanket trapping in heat and making the earth hotter and hotter.

As global warming gets worse, we are seeing more extreme weather and climate events. These include heatwaves, heavy rainfall, droughts, rapid glacial melting and warmer oceans. These long-term weather pattern changes are referred to as climate change. Climate change has serious impacts on people, the environment and the economy. As the intensity of global warming increases, driven by rising GHG emissions, the impacts and risks of climate change become worse for everybody. Climate change is happening right here in Guelph, as we live through more extreme temperatures, flash flooding, and severe storms.

Show me the data!

Here are a few useful climate data references:

- Copernicus Climate Change Service–global climate data
- Government of Canada–temperature change in Canada
- City of Guelph Climate Adaptation Plan

The Paris Agreement and Net Zero Goal

The Paris Agreement is a legally binding international agreement on climate change that was reached in 2015. Canada and 193 other countries have joined the agreement. One of the long-term goals of the agreement is to not have global temperatures increase by more than 1.5°C when compared to temperatures before the industrial revolution (in the 1850s). To not go past this temperature limit, global emissions of GHGs need to come down.

The Intergovernmental Panel on Climate Change (IPCC) is the United Nations international body for assessing climate change science. According to **analysis by the IPCC**, to limit global temperature increase to the threshold established in the Paris Agreement, global greenhouse gas emissions will need to reduce at a drastic rate declining by 45 per cent from 2010 levels by 2030 and reaching "net zero" around 2050.

Federal and Provincial greenhouse gas targets

Canada and Ontario have made commitments towards reducing greenhouse gas emissions

For the Paris Agreement, Canada has committed to reducing GHG emissions by 40-45 per cent below 2005 levels by 2030. In 2021, the federal government also passed the Canadian Net-Zero Emissions Accountability Act. This Act formalized Canada's commitment to the following:

- Achieving a net zero carbon economy by 2050
- Introducing 5-year interim greenhouse gas reduction targets from 2030 until 2050

The Ontario government released the Made-in-Ontario Environment Plan in 2018, committing to reducing provincial greenhouse emissions to 30 per cent below 2005 levels by 2030.

Learn more about the plans:

- International–The Paris Agreement
- Canada–Canadian Net-Zero Emissions Accountability Act
- Ontario–Made-in-Ontario Environment Plan

City of Guelph greenhouse gas targets

Guelph's
Race-to-Zero
Community GHG Emissions

Guelph has made a commitment to reduce community greenhouse gas emissions

Guelph released a Community Energy Plan (CEP) in 2007, the first such plan in Canada. In 2010, the CEP was renamed the Community Energy Initiative (CEI) to represent a transition to implementation aspects. The CEI was updated in 2018 with a new target set for Guelph to be a net zero carbon community by 2050.

In 2021, Guelph reaffirmed its commitment to fighting climate change by declaring support for the United Nation's Cities Race To Zero campaign.

Guelph's Race to Zero targets build on past Community Energy Plans and use science-based methods to define Guelph's fair share of global GHG emissions reduction.

Guelph's Race To Zero targets are as follows:

- Reduce per capita greenhouse gas emissions by 63 per cent against the 2018 baseline by 2030
- Be a net zero carbon community by 2050

Guelph's community greenhouse gas emissions

Greenhouse Gas Emission Categories

Community GHG emissions can be grouped into scope 1, scope 2 or scope 3 emissions.

Scope 1: GHG emissions that come from burning fossil fuels within Guelph's city boundary. Examples include houses or offices burning natural gas for heating.

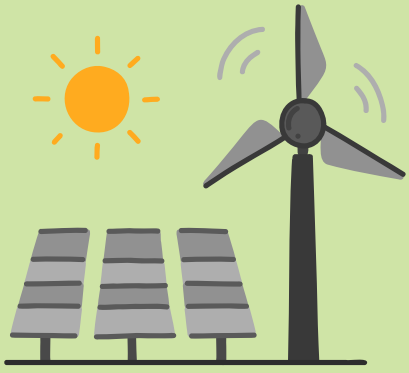
Scope 2: GHG emissions tied to electricity used within Guelph's city boundary. These GHG emissions account for the electrical generation that happens outside of Guelph and delivery of this electricity from the generators to Guelph.

Scope 3: GHG emissions that are released outside of Guelph's city boundary because of activities within the city boundary. Examples include using products like food, coffee cups, clothes, building materials, etc. in Guelph, but manufacturing and disposal of these products release GHG emissions and are done outside of Guelph.

Where does our electricity come from?

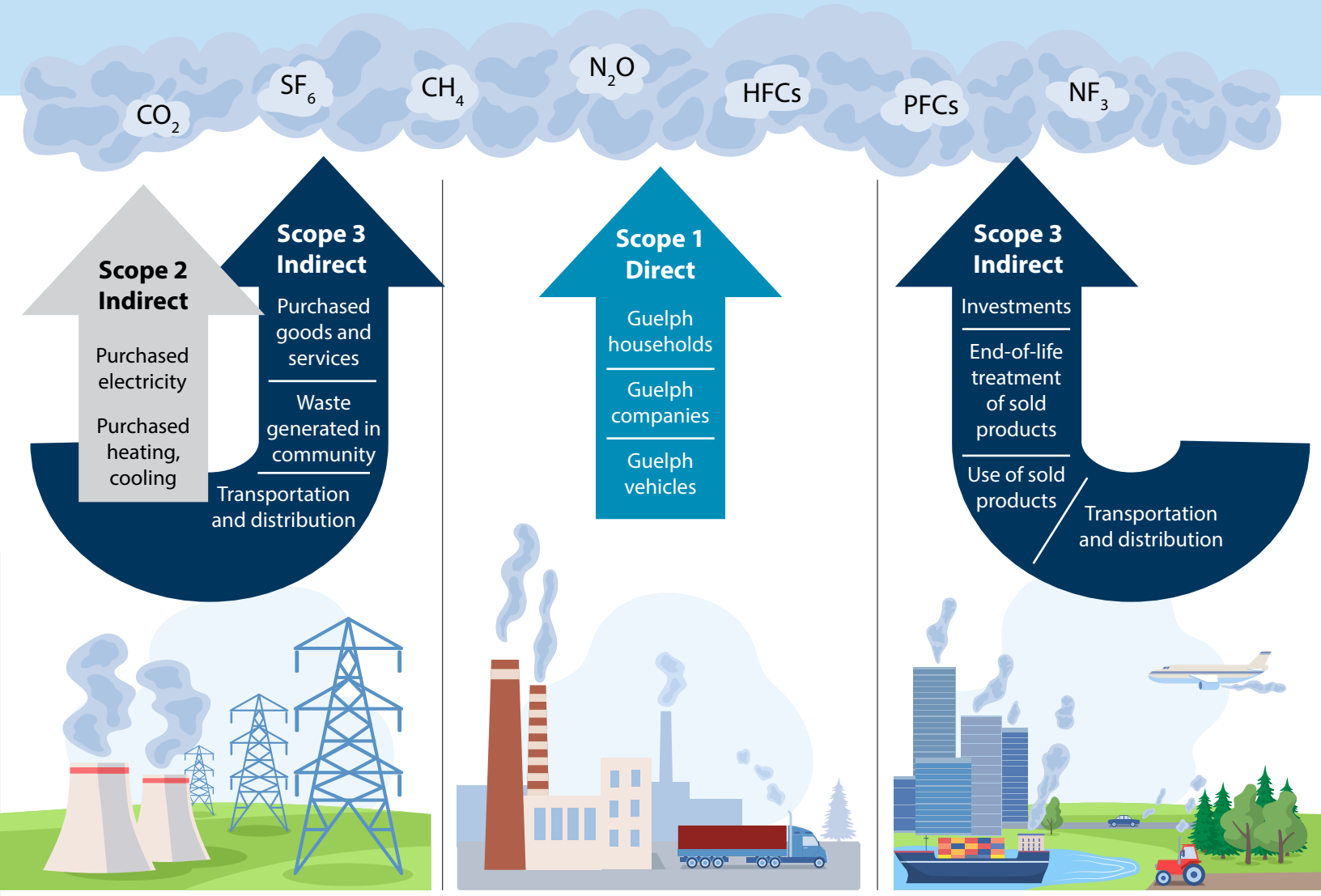
Ontario's electricity is generated using both fossil fuel sources (example, natural gas) and non-fossil fuel sources (example, nuclear, hydro, wind, solar, etc.). As of 2024, 72% of Ontario's electrical generation capacity uses non-fossil fuel sources. Since we use non-fossil fuel generators more of the time, the non-fossil fuel generation produced 87% of Ontario's electrical energy, of which around a third of the energy was produced using renewable energy sources such as hydro, wind, solar, or biomass.

More information can be found at the Independent Electricity System Operator website.



? Where do most GHG emissions in the community come from?

- Using gasoline or diesel to drive our vehicles
- Burning natural gas for heating building spaces, water, cooking, manufacturing processes
- Natural gas leaks
- Refrigerant leaks
- Electricity usage
- Emissions from landfills and sewage



Reporting Guelph's Greenhouse Gas Emissions

How we get the numbers:

Find more information here on the method used for the community GHG inventory:

- Protocol for Community-Scale Greenhouse Gas Inventories (GPC Protocol)

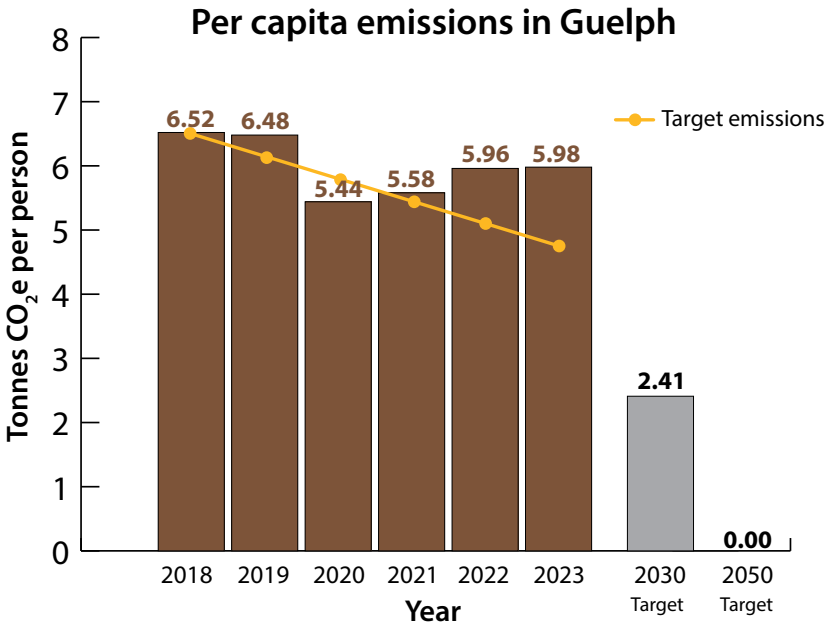
What is a tonne of carbon dioxide equivalent?

When we do things like burn fossil fuels, we release different harmful gases that make up GHG emissions. These different gases each cause different levels of global warming harm. To simplify reporting on all the different harmful gases, each different gas impact is translated to the equivalent impact that carbon dioxide causes.

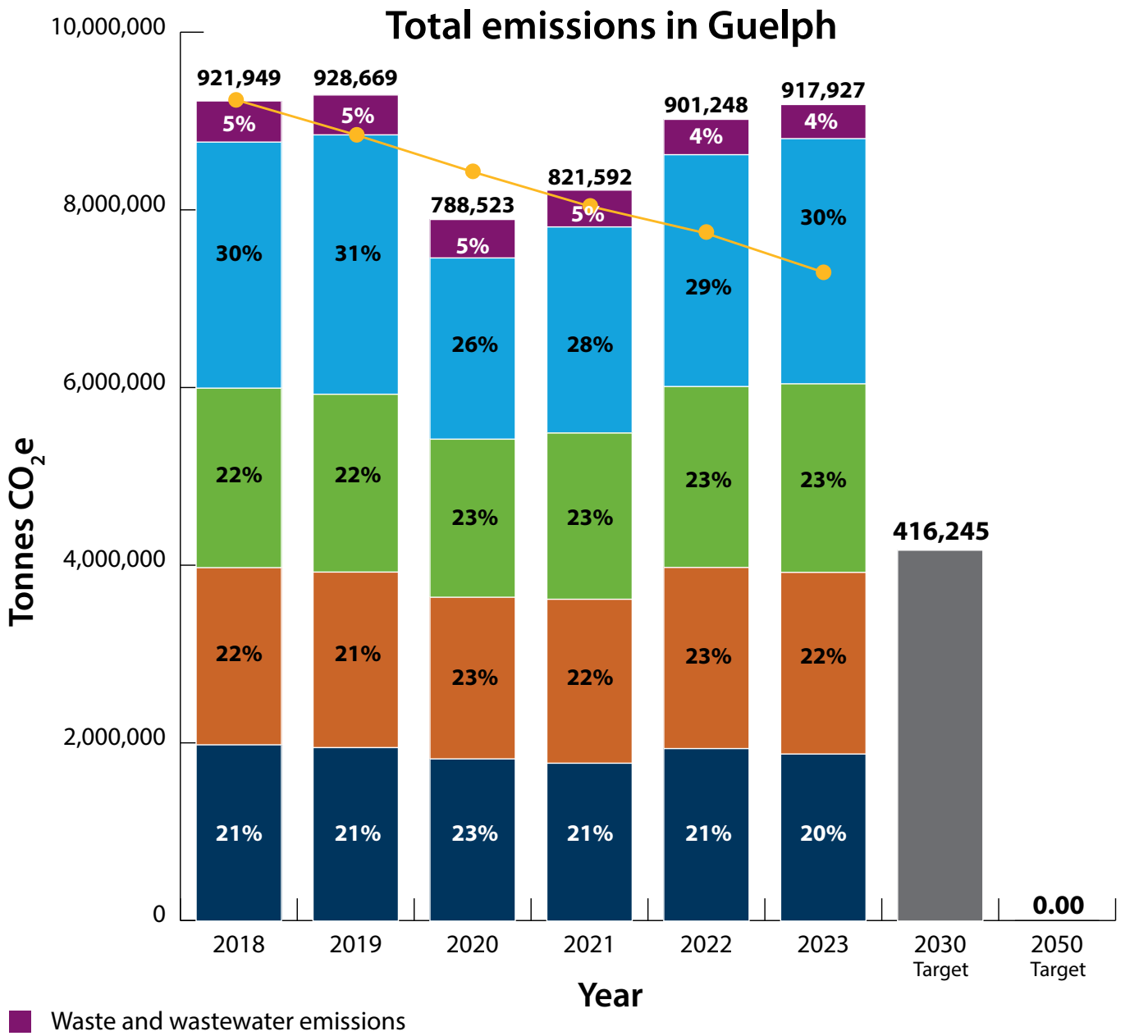
A VW buggy weighs about the same as a tonne of carbon dioxide equivalent.

An inventory of Guelph's GHG emissions are taken each year to track progress against the Race To Zero targets. Guelph's annual GHG reporting is prepared annually following the Protocol for Community-Scale Greenhouse Gas Inventories (GPC Protocol) and using various data sources (such as energy consumption data from the local utilities Alectra Utilities and Enbridge) and calculation factors. Scope 1 and 2 GHG emissions are included in Guelph's GHG emissions inventory. Scope 3 emissions are very difficult to track for the community and only some are included in the inventory.

The charts below present Guelph's per capita and total annual GHG emissions from 2018 to 2023 and the Race To Zero targets set for 2030 and 2050. GHG emissions are reported using a unit called 'tonnes of carbon dioxide equivalent' (tCO_2e). Per capita emissions are calculated for each year by dividing the total annual GHG emissions by Guelph's population. Per capita emissions are reported in the unit called tCO_2e per person.



We need to reduce our annual emissions by roughly **500,000 tonnes of CO_2e** by 2030!



Ways we can act to reduce community GHG emissions

To reduce GHG emissions in Guelph, we need to focus on a few key areas

Based on total GHG emissions remaining near 2018 levels and per capita emissions only decreasing slightly, it is clear that drastic and collective action by the Guelph community is required to address what the climate science is telling us and meet the Race To Zero interim target of 63% per capita emissions reduction by 2030, against the 2018 baseline.

Informed by the community GHG inventory data the following areas emerge as key focus areas where we can all act together to reduce community GHG emissions:

Energy efficient and low carbon buildings

All the different buildings in Guelph (for example houses, stores, offices, restaurants, hotels, recreation centres, hospitals, schools, warehouses) are a big contributor to Guelph's community GHG emissions. These buildings use energy for various needs. These needs include heating or cooling the building space, heating hot water, lighting, and powering appliances and equipment.

In the case of residential, commercial and institutional buildings, heating building interior spaces and heating water account for a large portion (>50 per cent) of energy consumption. In Guelph, almost all the energy used for building space heating and water heating is by burning natural gas.

It is also important to consider new building construction. On the residential side, the total number of households in Guelph is estimated to reach 85,700 by 2051. In the near term, Guelph has

Climate action tips:

There are several actions, big or small, that community members can take to reduce GHG emissions and support Guelph's Race To Zero. Some examples are as below:

- Use heat pumps to heat more efficiently and with a much cleaner energy source
- Invest in renewable solar power to bolster electricity grid to enable electrification
- Reduce car trips and use sustainable transportation alternatives (walking, rolling, biking, public transit, etc.)
- Eliminate tailpipe emissions by using electric vehicles
- Reduce material waste because it takes a lot of resources and energy to make stuff and get rid of stuff
- Properly sort waste to increase ability to reuse and recycle materials
- Process organic waste properly by keeping it out of landfill and sending it to composting or anaerobic digestion facilities to produce soil amendment and renewable natural gas
- Build more energy efficient buildings, new and existing
- Complete process equipment upgrades to reduce GHG emissions and make the industrial, commercial and institutional sector more energy efficient
- Learn more about and always encourage adoption of energy efficiency and GHG emissions reduction

committed to supporting the construction of 18,000 new homes by 2031 through the Municipal Housing Pledge made in 2023. Additionally, Guelph's population is expected to rise to 208,000 people by 2051. The growth in population will likely require more buildings. These new buildings will use energy and will add to the community's GHG emissions. By how much, depends on what type of energy and how energy efficient the buildings are.

Decarbonized business operations

Guelph is home to over 3,000 businesses. These local businesses have various business operations that use energy (for example manufacturing processes, refrigeration, cooking, etc.) with some operations that use energy sources such as natural gas or propane.

The industrial sector alone represents around 20 per cent of Guelph's community greenhouse gas emissions. Energy is consumed for various end-uses within manufacturing facilities. In Guelph, manufacturing is the largest industry employing Guelph residents. Manufacturers in Guelph produce a variety of products including casting and forgings, machined parts, formed and stamped metals, polymers, precision tools, automotive interior parts, cabinetry and millwork, corrugated packaging, antennas, beer, milk products, fiberglass composites, vaccines, agricultural equipment, lifts for aerial work and dump trucks. Various processes in manufacturing plants involve the use of equipment such as infrared heaters, industrial steam boilers and water heaters, combined heat and power systems, furnaces, curing ovens, dryers, and pasteurizers, most of which typically burn fossil fuels like natural gas for producing heat.

Sustainable transportation

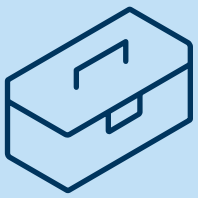
Transporting people and goods within Guelph involves using passenger cars, commercial vehicles, tractor-trailers and buses, and represents around 30 per cent of Guelph's community greenhouse gas emissions. Most of these vehicles burn either gasoline or diesel fuel resulting in GHG emissions. The use of privately-owned passenger vehicles by Guelph residents accounts for a large portion of transportation related energy consumption and in Guelph, more than 75 per cent of the trips that have a start point and end point within the city are completed by car. Guelph's existing vehicle count is estimated to be around 100,000. With Guelph's population growth, vehicle counts will rise unless there is a shift to more sustainable modes of transportation such as cycling and public transit. Any new vehicles added to Guelph's current vehicle count will result in adding GHG emissions unless the new vehicle uses clean energy.

Renewable energy

Most of the City's current energy demand is met by natural gas, electricity, gasoline, and diesel. Energy from resources such as hydro, wind, solar, biomass and geothermal are termed renewable energy and

Cool tools:

Use Google's Environmental Insights Explorer to check out estimates of activity, emissions and reduction opportunities (like solar potential) for different places and cities like Guelph.



do not produce greenhouse gas emissions. Therefore, renewable energy plays an important role in Guelph's Race To Zero journey.

Presently, the electricity generated by solar systems in Guelph adds up to less than 1 per cent of the City's total annual electricity consumption. Estimates indicate that if solar panels are installed on all buildings in Guelph, this can generate an amount of electricity equal to 65 per cent of the City's total annual electricity consumption.

Circular economy

Resources such as raw materials, water, energy, land, buildings, and equipment are needed to produce various goods used by the community. There are many stages in producing things, such as resource extraction, pumping, treating and distributing water, transporting materials, operating process equipment, manufacturing, delivery, waste disposal. All of these production stages require energy and emits GHGs. In the typical production-consumption way of doing things, raw materials are gathered and converted to products that can be used by consumers. After the consumers have no more use for the products, they are thrown away as waste. An example of the production-consumption model is when people buy too much food and waste the extra food. The circular economy approach is a different way of doing things, with the aim to reduce waste by keeping materials and goods in circulation for as long as possible. This is done through reusing, repairing, refurbishing, repurposing, recycling, and recovering as much material and/or energy from any residual waste stream. Going back to the example with food, the circular economy model would take the extra food and save it for the next meal or share it with others. Any of the food that doesn't get eaten, say like fruit peels and egg shells, gets composted and reused for planting so that nothing is wasted.

Natural environment

Guelph has natural assets such as land, soil, water, air, renewable resources, vegetation and trees. The natural environment offers an important climate solution as it can absorb and store large amounts of carbon dioxide (CO_2) from the atmosphere.

Trees along with other vegetation can provide shading and cooling during warm weather seasons. It is estimated there are around three million trees in Guelph with the tree canopy covering around 23 per cent of Guelph's total land area. Guelph has set the goal of increasing the tree canopy cover to 40 per cent by 2070.

Nature's remedy:

Along with removing CO_2 from the atmosphere, the natural environment helps us in so many ways:

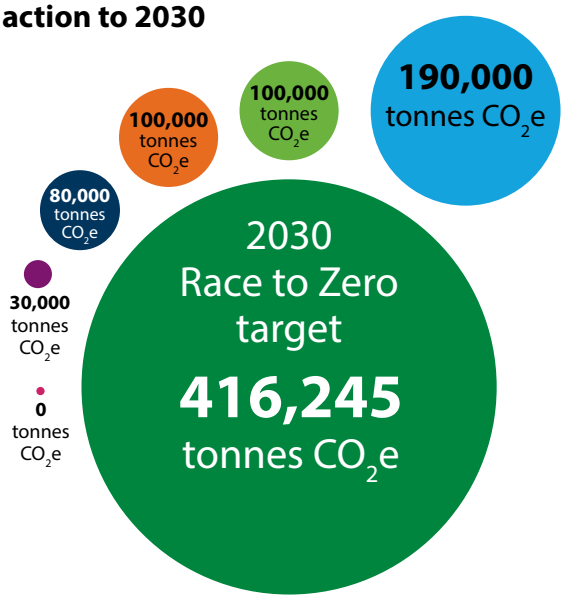
- Provides shade and keeps things cooler
- Prevents flooding by absorbing water
- Supports biodiversity and wildlife
- Offers a place for people to explore and play

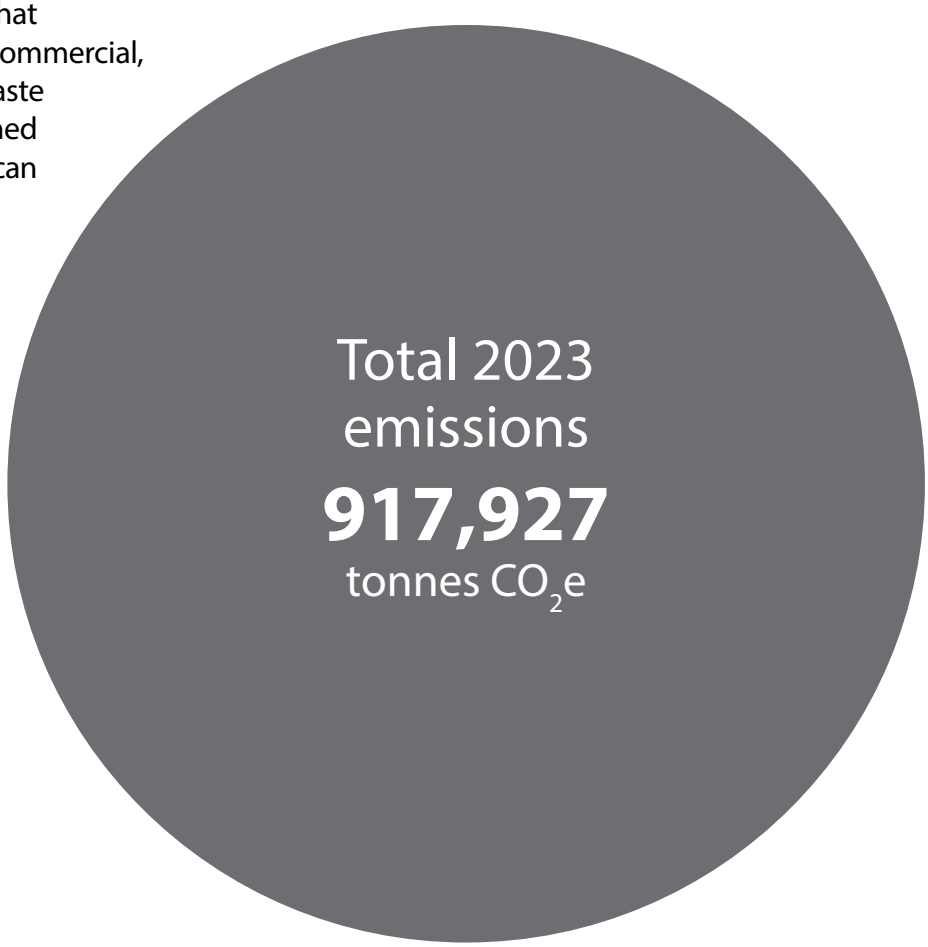
What do we need to do?

Guelph's Priority Climate Actions

The community GHG inventory data tells us that emissions come from all sectors: residential, commercial, institutional, industrial, transportation and waste management. Of the key focus areas mentioned earlier, there are priority climate actions that can result in a big drop to Guelph's GHG emissions.

Carbon reduction potential of each priority climate action to 2030





Homeowners:

- Have **40,000** homes in Guelph change their heating systems to low carbon heat pumps

Builders and Developers:

- Design and build **all** new buildings that are more energy efficient and be net zero carbon

Vehicle owners:

- Replace **60,000** internal combustion vehicles with sustainable transport modes or electric vehicles

City:

- Manage and maintain fugitive emissions from waste management and wastewater treatment to reduce emissions by **30,000** tCO_2e

Companies:

- All industrial companies in Guelph must work together and focus resources to reduce sector emissions by **100,000** tCO_2e
- All commercial and institutional companies in Guelph must work together and focus resources to reduce sector emissions by **100,000** tCO_2e

Homeowners: Have 40,000 homes in Guelph change their heating systems to low carbon heat pumps

A heat pump is an energy-efficient and low GHG emissions alternative to natural gas furnaces and hot water heaters. There are nearly 60,000 homes in Guelph. If 40,000 of these homes switched to a heat pump system for space heating and water heating it is estimated this collective action will reduce community GHG emissions by approximately 80,000 tCO_2e. Several homes in Guelph have already made the switch. This is a great start and more climate action like this is needed.

Builders and Developers: Design and build all new buildings that are more energy efficient and be net zero carbon

In Ontario, the law requires building construction to meet the Ontario Building Code (OBC). The OBC covers technical requirements for building design and construction such as heating, ventilation and air conditioning, plumbing, and energy efficiency. The OBC sets minimum requirements for buildings and if new buildings in Guelph are designed and built to only meet the OBC minimum, they will add more GHG emissions to the inventory.

There are other building standards that meet and go beyond the OBC when it comes to energy efficiency. These higher standards are an opportunity to make buildings more comfortable, have lower utility costs, and be better at withstanding climate change. There are many examples of buildings in Guelph that used higher standards. If all new buildings in Guelph are designed and constructed to these higher building standards and have a net zero GHG emissions footprint, then new buildings will not add to the community GHG emissions.

Companies: All industrial companies in Guelph must work together and focus resources to reduce sector emissions by 100,000 tCO_2e

Reducing by 100,000 tCO_2e amounts to approximately 50% of the industrial emissions. Industrial

Get pumped about heat pumps!

Here are a few online resources for information on heat pumps:

- Heating and cooling heat pumps–Natural Resources Canada
- Water heater guide–Natural Resources Canada

Better building standards:

Here are a few resources for green buildings standards:

- Zero Carbon Building Standard
- Canadian Home Builders' Association Net Zero Homes
- Energy Star Buildings
- Passive House Standard

companies in Guelph are already working to reduce energy usage and continue to implement energy efficiency and renewable energy measures because of the strong business case and environmental benefits. Many of these companies have also set their own climate targets to meet social responsibilities to communities and their customers. However, industrial processes can be very complex and can take significant resources. Continued effort is needed by the different industrial companies to further reduce emissions in the sector.

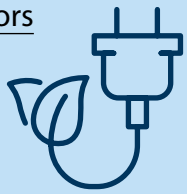
Companies: All commercial and institutional companies in Guelph must work together and focus resources to reduce sector emissions by 100,000 tCO_2e

Similar to the industrial sector, the commercial and institutional companies in Guelph contribute a big portion of GHG emissions to the community inventory. Reducing by 100,000 tCO_2e amounts to approximately 50% of commercial and institutional sector emissions. Among the varying scale of companies within the sector, many organizations in the sector have set company-based climate targets and climate plans. Continued work is needed to further progress these plans and help motivate other companies that have yet to prioritize climate action.

Smart money:

There are energy efficiency rebates on offer, because it makes good business sense to save energy and reduce GHG emissions. Here are a few resources to learn more about energy rebate programs for businesses in Ontario:

- Save On Energy
  - » For your small business
  - » For business and contractors
- Enbridge Incentives and Conservation Programs



Vehicle owners: Replace 60,000 internal combustion vehicles with sustainable transport modes or electric vehicles

Transportation within Guelph is the largest contributor of emissions among the different sectors. Using alternative ways to get around the city, such as cycling or taking public transit, greatly reduce transportation GHG emissions. Transitioning to electric vehicles is also an effective way to lower emissions by improving energy efficiency and using a cleaner energy source. There are roughly 100,000 vehicles in Guelph, and by replacing 60,000 of these internal combustion vehicles, reduce community emissions by approximately 190,000 tCO_2e

Electrify your ride:

Here are a few online resources for more information on electric vehicles:

- Buying an Electric Vehicle—Natural Resources Canada
- Plug N Drive

City: Manage and maintain fugitive emissions from waste management and wastewater treatment to reduce emissions by 30,000 tCO_2e

The community makes different kinds of waste, such as wastewater and solid waste, that must be treated and processed. All of the wastewater from Guelph homes and businesses goes to the Water Resource Recovery Centre (WRRC) in Guelph, where it gets cleaned before going to the river to keep the environment healthy. Different wastewater treatment processes release GHG emissions. Guelph homes and businesses also create solid waste, with some of this waste being organic materials, such as food scraps and food waste. We separate organic waste by putting it in green bins, which are collected and sent to the Organic Waste Processing Facility (OWPF) in Guelph. This is where the organic waste is turned into compost and sold to farms, which improves soil and helps grow crops. GHG emissions are also released from different processes at the OWPF. In the past, organics were not separated from other solid waste. Because of this, more organic waste ended up in landfills, including at the Eastview Landfill in Guelph, which operated between 1961 and 2003. As organic waste sits in landfills, they break down and release landfill gas which contains methane, a more harmful type of greenhouse gas. At the Eastview Landfill, systems are maintained to gather as much of the landfill gas as possible and break it down further by burning it to make it less harmful.

Annual greenhouse gas emissions from processes at WRRC, OWPF and the Eastview Landfill site combined are around 38,000 tCO_2e. It is important that these sites continue to be maintained and managed to reduce the release of GHG emissions.

Learn more about how Guelph manages waste:

- Wastewater Management in Guelph
- What happens to Guelph's waste?

Community Call to Climate Action

The climate science is clear: the earth's temperature is rising and we are in a climate crisis. All of us need to take action to reduce GHG emissions now.

This Community Call to Climate Action urges everyone in the community including residents, neighborhood groups, businesses, developers, public and non-governmental organizations and the local government to unite, focus and act on important local climate issues. We can all do our part to reduce GHG emissions to help meet our Race To Zero commitments.

For more information

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Accessible formats available upon request.