Regina's 2023 Energy and Emissions Inventory

Moving Toward a Renewable Regina

Renewable Regina is Regina's community plan to help slow climate change and create a more resilient, healthy, and wealthy community for current and future generations.

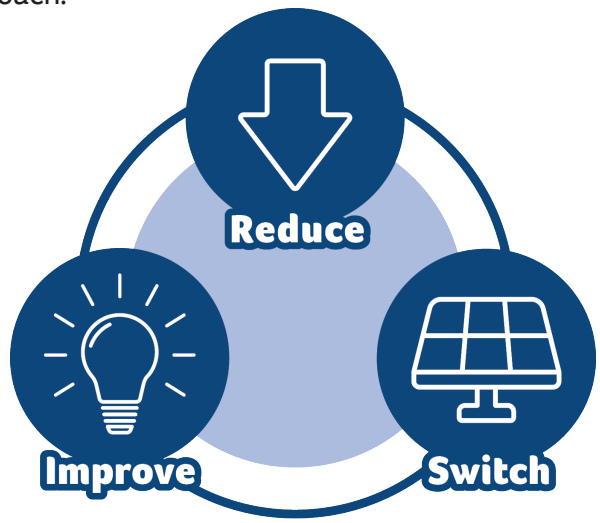
The plan outlines the pathway to achieve our community-wide goal of net-zero carbon emissions and sourcing net-zero energy from renewable sources by 2050.

To meet this target, we need to reduce our community's greenhouse gas (GHG) emissions by 52 per cent by 2030, working together through a three-pronged approach:

Reduce energy use

Improve energy efficiency

Switch to renewable or low-carbon energy sources



Currently, most energy used involves burning fossil fuels. This means that energy consumption and greenhouse gas (GHG) emissions are closely related and that generally, reducing energy use will reduce GHG emissions. Reducing energy use is also important for enabling the switch to renewable energy.

However, some fuel sources produce more emissions than others, and some activities or processes use more energy than others. This is why tracking both energy and GHG emissions is important.

Net zero renewable community = **Greenhouse Gas (GHG) removed from air & Renewable Energy Used** ≥ **GHG Emissions & Non-Renewable Energy Used**

Background

Measurement and reporting of energy consumption and GHG emissions is important for assessing progress towards our community and corporate GHG and energy reduction targets.

Corporate Energy and Emissions Inventory

Corporate energy use and GHG emissions are generated or consumed directly through the operations of the City of Regina as a corporation, such as:

- Fuel used to operate Transit busses and City vehicles
- Heating and cooling city-owned buildings, like recreation centers and office buildings
- Operating major City facilities, like the Wastewater Treatment Plant and Asphalt Plant

Community Energy and Emissions Inventory

The community inventory includes all the energy and emissions consumed and generated within Regina's city limits, such as:

- Residential, commercial or industrial transportation
- Heating and cooling of all houses, apartments, businesses
- Industrial operations that take place within city limits

Disclaimer:

The Energy and Emissions inventory is a snapshot of energy use and GHG emissions. Wherever possible, actual data is used. In some cases where data is not available, estimations or assumptions have been made based on other data sources or previous trends.

While Corporate emissions have been directly measured and reported for several years, 2023 is the first time the City has measured the community energy and emissions since the baseline measurement in the Energy and Sustainability Framework. The reliability of this inventory depends on the availability, completeness, and accuracy of data from multiple external sources. Future inventories will benefit from improved data collection and reporting methods.

Acronyms

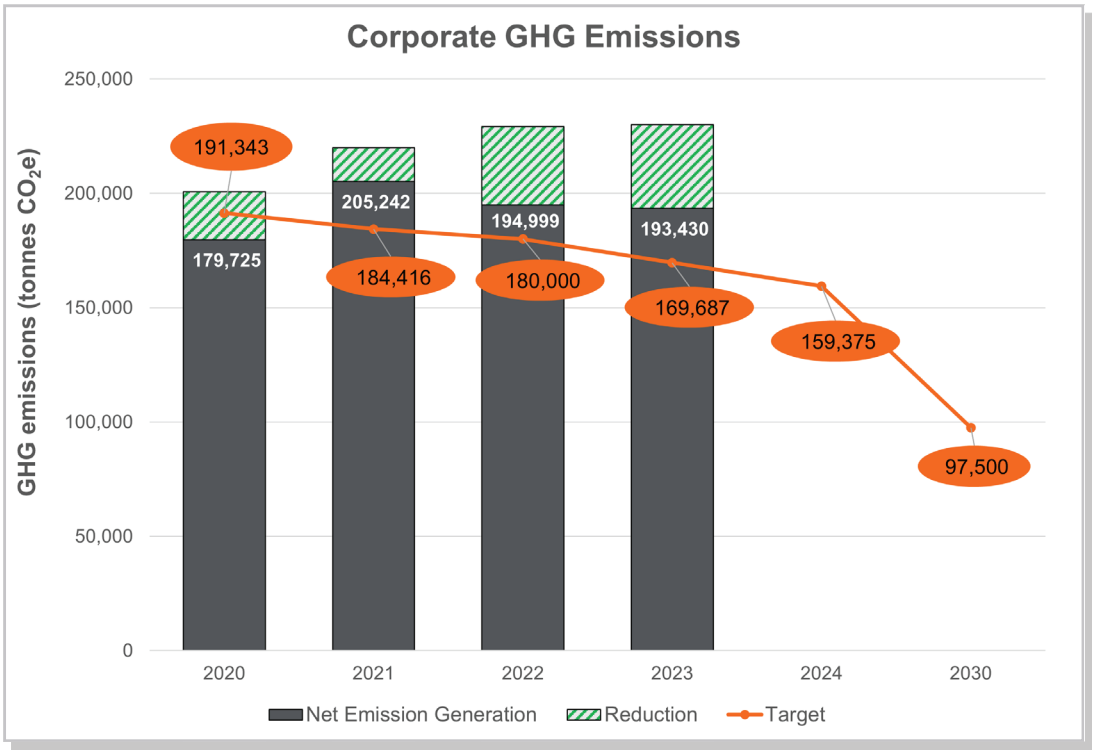
RPS	Regina Police Service
RPL	Regina Public Library
WWTP	Wastewater Treatment Plant
BPWTP	Buffalo Pound Water Treatment Plant
GHG	Greenhouse Gas
LFG	Landfill gas (methane)
LFGTE	Landfill Gas to Energy

Corporate Energy and GHG Emissions

Corporate Emissions

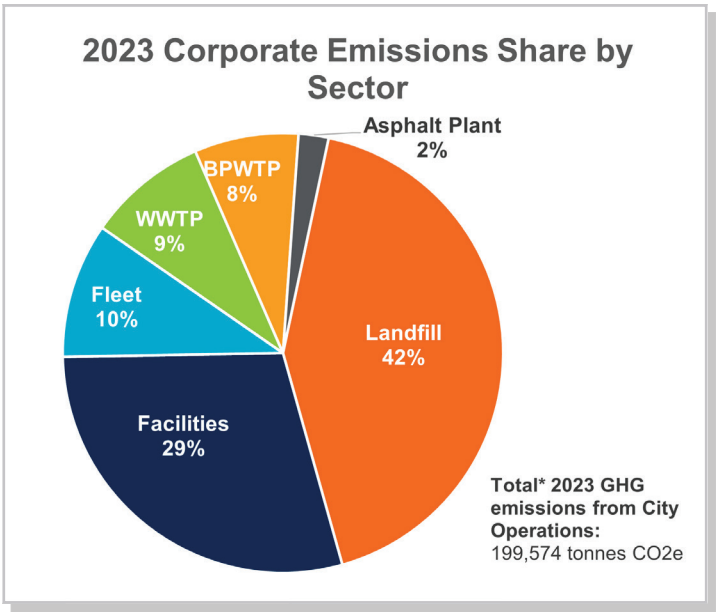
Meeting Our GHG Reduction Target

Setting a target for Corporate GHG emissions is important for the City to be able to measure the progress of emission reduction efforts and show accountability when it comes to communicating the success of these efforts.



Corporate emissions in 2023 were 1% lower than in 2022, reflecting the City's commitment to sustainability. Despite this, the gap between the target and actual emissions grew from 10% to 12%.

Meeting future targets is possible with increased efforts. However, past gaps may require setting higher targets, making it more challenging.



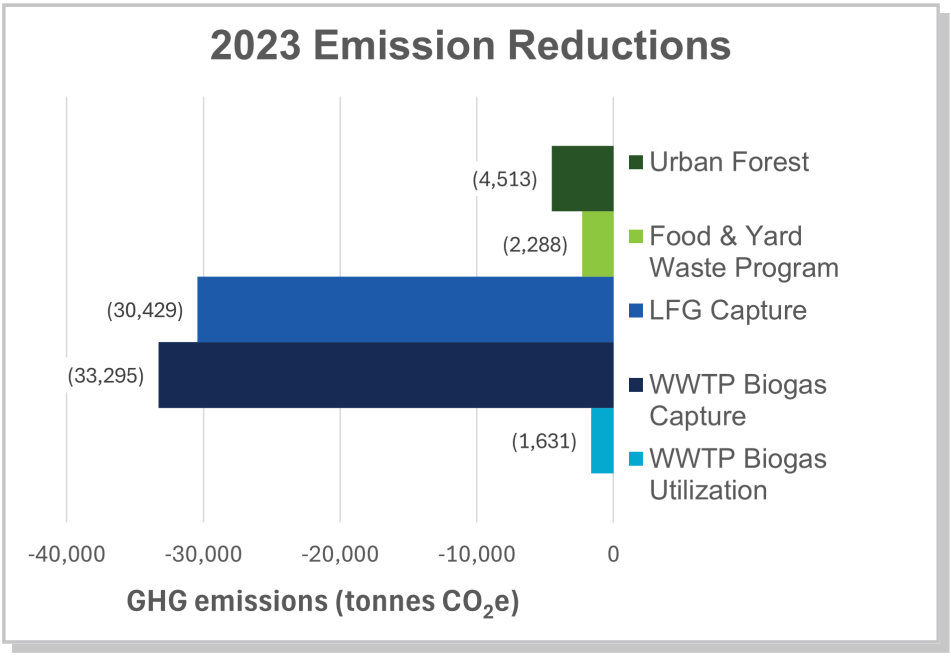
2023 Emission Reductions Highlights

The Urban Forest sequesters carbon and reduced 4,513 tonnes of GHG emissions or 2.3% of total corporate emissions.

The Food and Yard Waste Program fully rolled out in 2023, diverting 2,288 tonnes of emissions in the first year with only 4 active collection months.

The Landfill Gas Capture system reduced 30,429 tonnes of GHG emissions by capturing and flaring/combusting methane in the landfill gas.

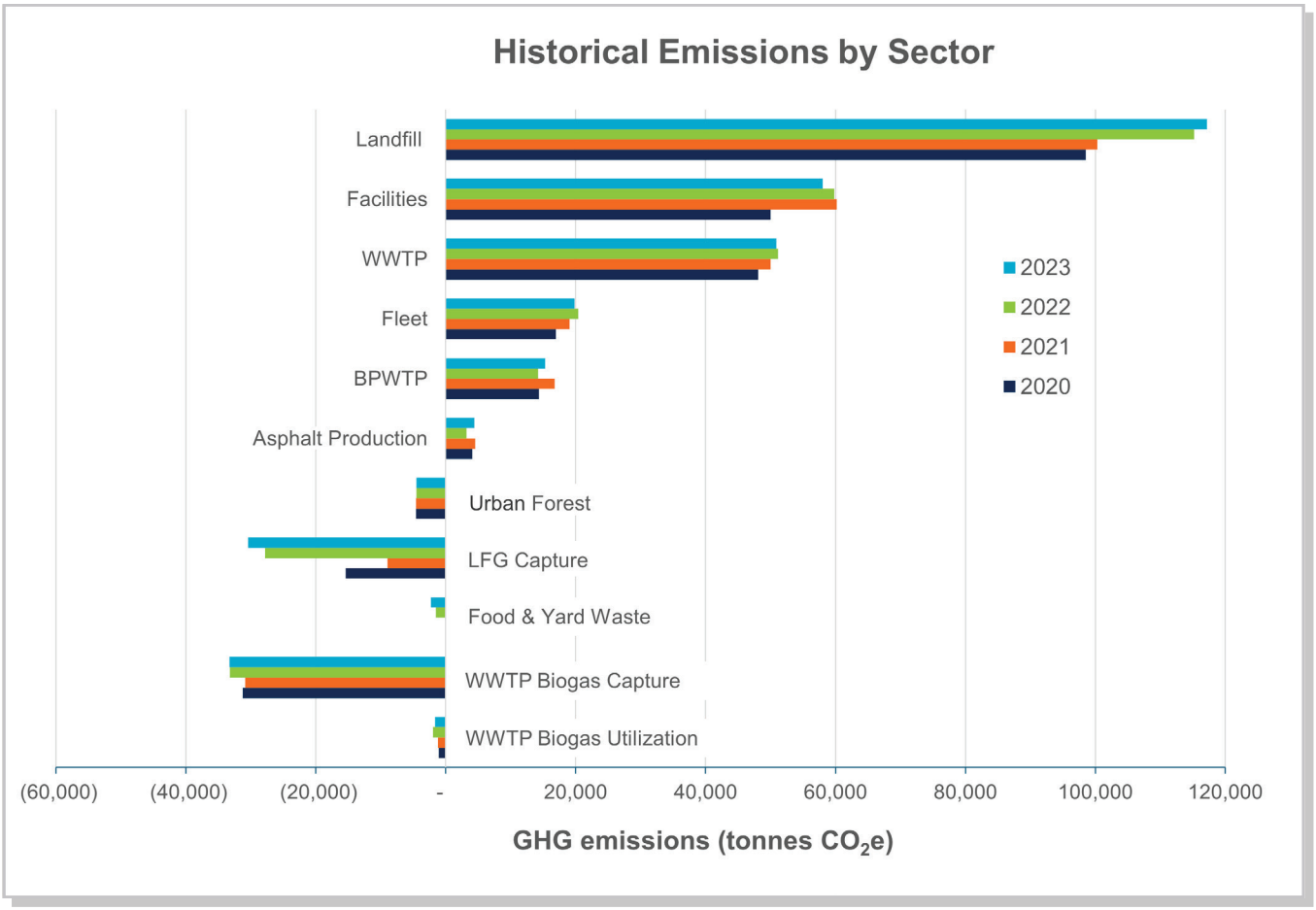
The Wastewater Treatment Plant (WWTP) reduced 33,295 tonnes of emissions through capturing biogas and an additional 1,631 tonnes by using the captured biogas instead of natural gas for heating the facility.



Breakdown by Sector

The City tracks and reports emissions by sector, with most emissions being generated by the Regina Landfill, municipal buildings and facilities, and the municipal vehicle fleet. Progress towards achieving the City's corporate emission target requires targeted emission reduction strategies in these key sectors.

Total historical GHG emissions trends are displayed by each sector, as well as results of efforts to reduce emissions through major projects such as WWTP biogas boiler system and landfill gas capture and utilization.

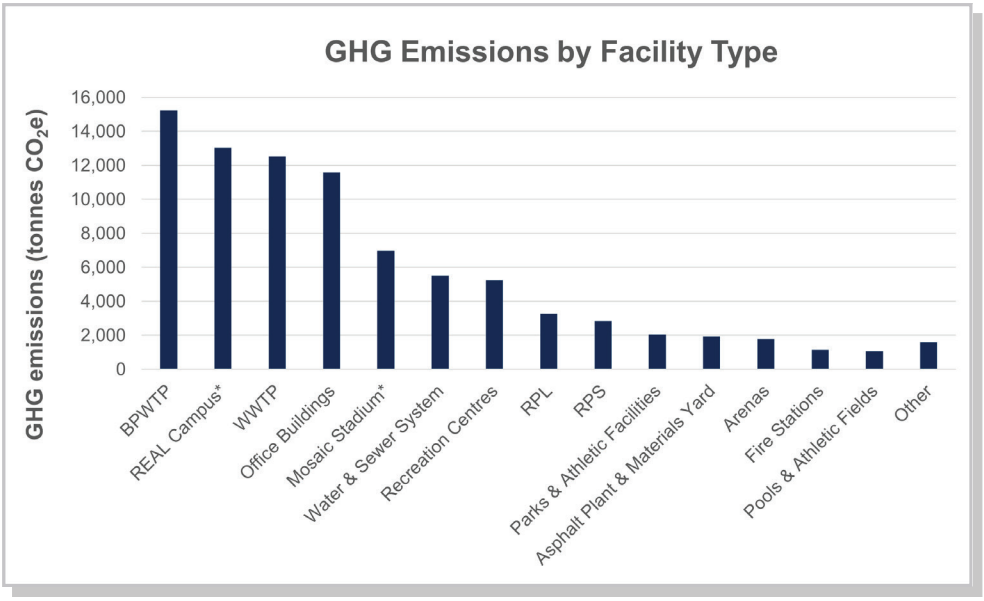


Note: The significant increase in landfill emissions in 2022 is attributed to ECCC's adjustment in methane's global warming potential (GWP) by 12% and highlights the necessity for ongoing and enhanced emission reduction strategies across all sectors to meet future emissions reduction targets.

Emissions from City Facilities

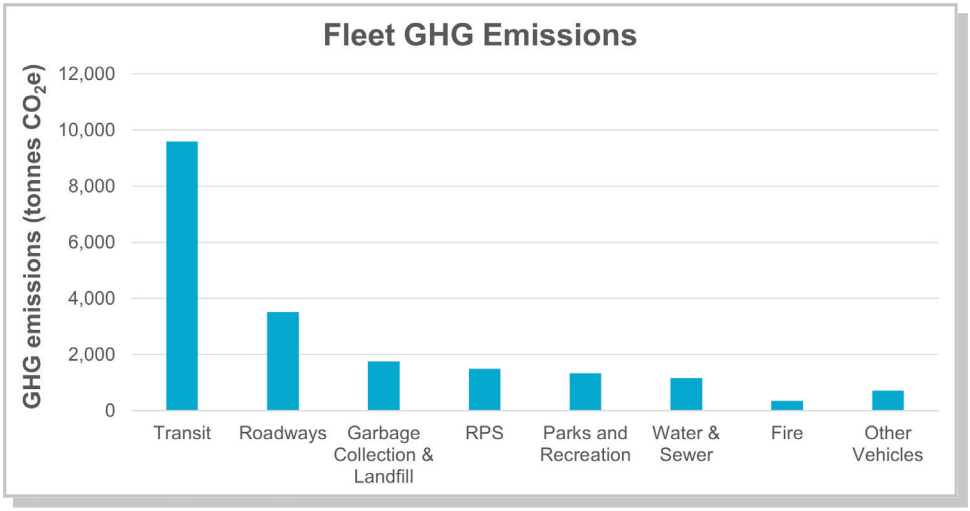
Building emissions result from the use of energy – such as electricity, natural gas, and propane – used for heating and cooling, lighting, and powering equipment in municipal buildings. The City is planning on adopting new standards for new facilities as well as building retrofits to improve the energy efficiency of existing City facilities.

Emissions associated with water and wastewater treatment, water distribution, and wastewater and stormwater collection systems are also included in this category, as the equipment used to treat and transport water has significant energy use and related emissions.



Emissions from Vehicle Fleet

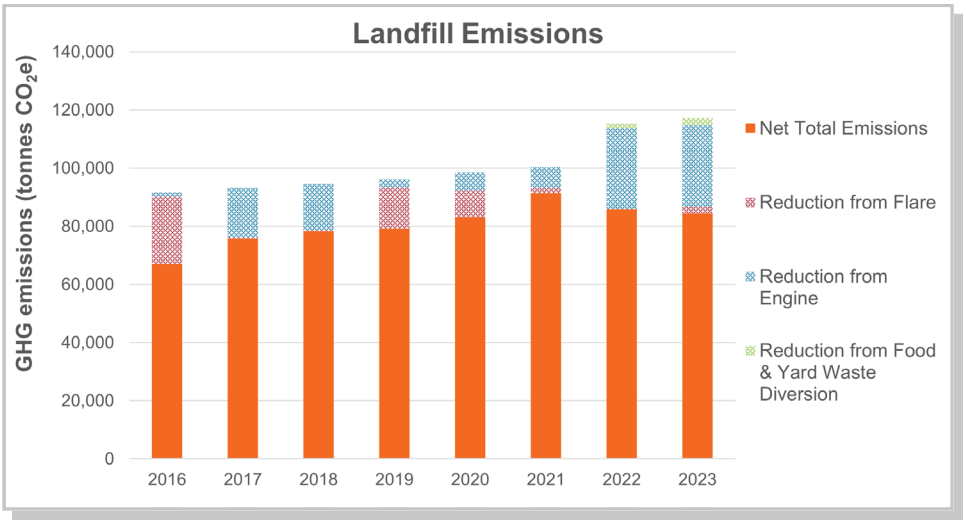
Fleet emissions result from the combustion of fossil fuels used to power the city's buses, vehicles, and mobile equipment. The City is making investments in fleet electrification and anti-idling programs to reduce emissions from the municipal fleet.



Emissions from Landfill

The landfill sector is the biggest emitter of greenhouse gases from corporate operations. As biodegradable waste breaks down in landfills, gases (primarily methane and carbon dioxide) are released. This process spans many years, meaning that the GHGs emitted from the landfill today is the result of decades of disposing biodegradable waste.

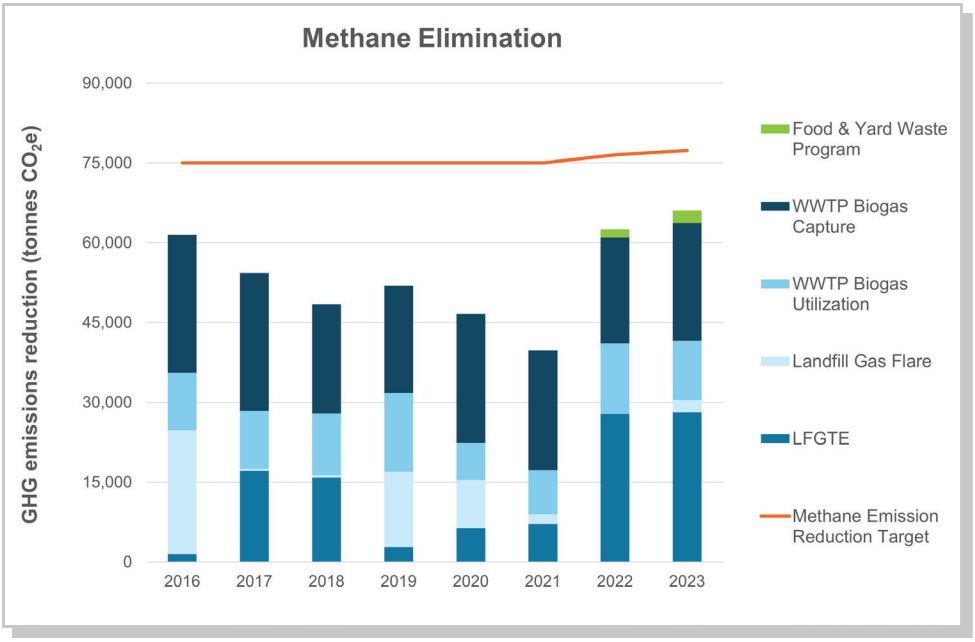
The City is actively working to reduce GHG emissions associated with the landfill, such as by operating a landfill gas recovery system and rolling out a food and yard waste program in 2023.



Methane Elimination

Methane is generated at both the Landfill and the Wastewater Treatment Plant (WWTP). Methane is a GHG 28 times more potent than carbon dioxide and is produced when organic matter breaks down in the absence of oxygen.

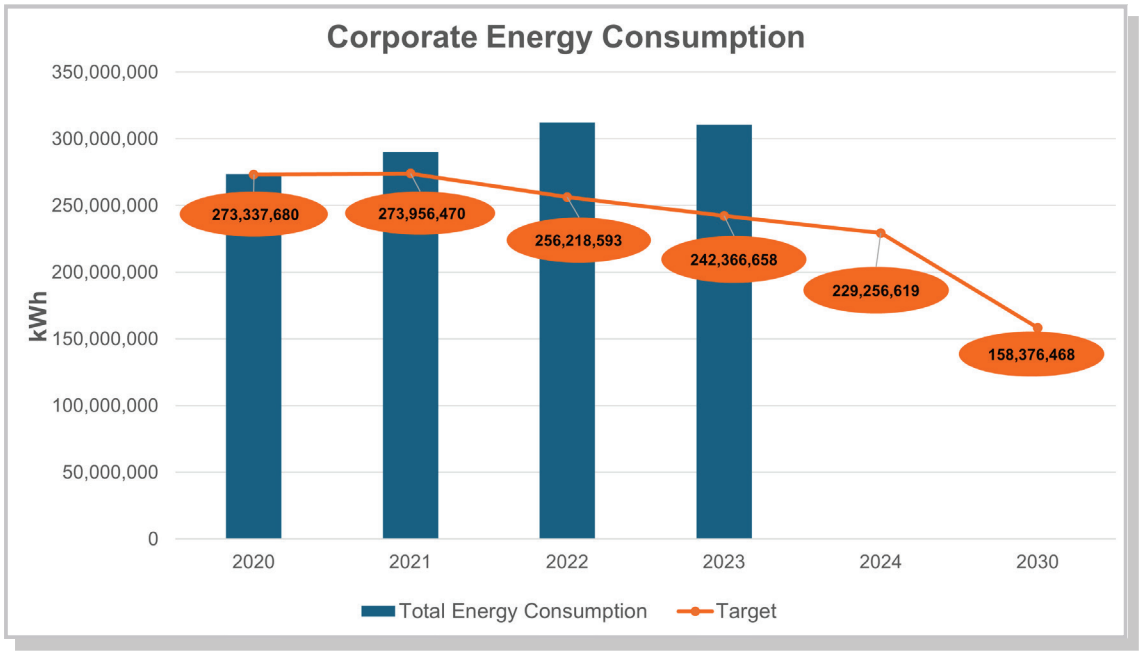
The most significant opportunities for reducing corporate GHG emissions is through eliminating methane in the City's operations by preventing it from being created or by burning (flaring) it. In addition, the City can convert this gas into electricity or natural gas.



Corporate Energy Consumption

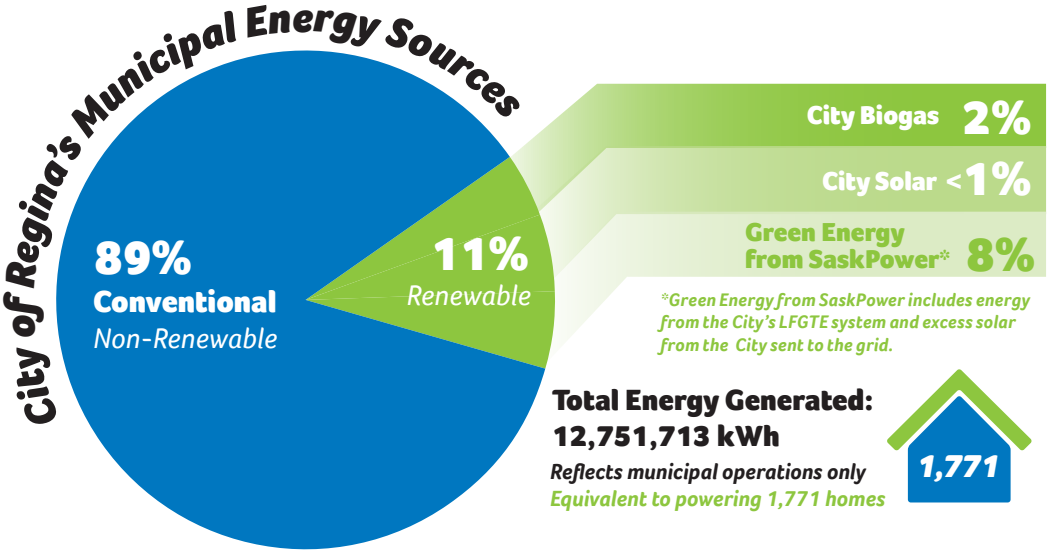
Meeting Our Energy Reduction Target

Setting a target for corporate energy use is important for measuring progress towards our corporate and community objectives. Measuring energy use also helps identify opportunities for improving energy efficiency in different operational areas and for switching to renewable sources and fuels.



Meeting Our Renewable Energy Target

Achieving the Renewable Regina target of a net-zero, renewable community means transitioning to 100% renewable energy sources by 2050 or earlier. The City can accelerate this transition by producing its own renewable energy when possible.

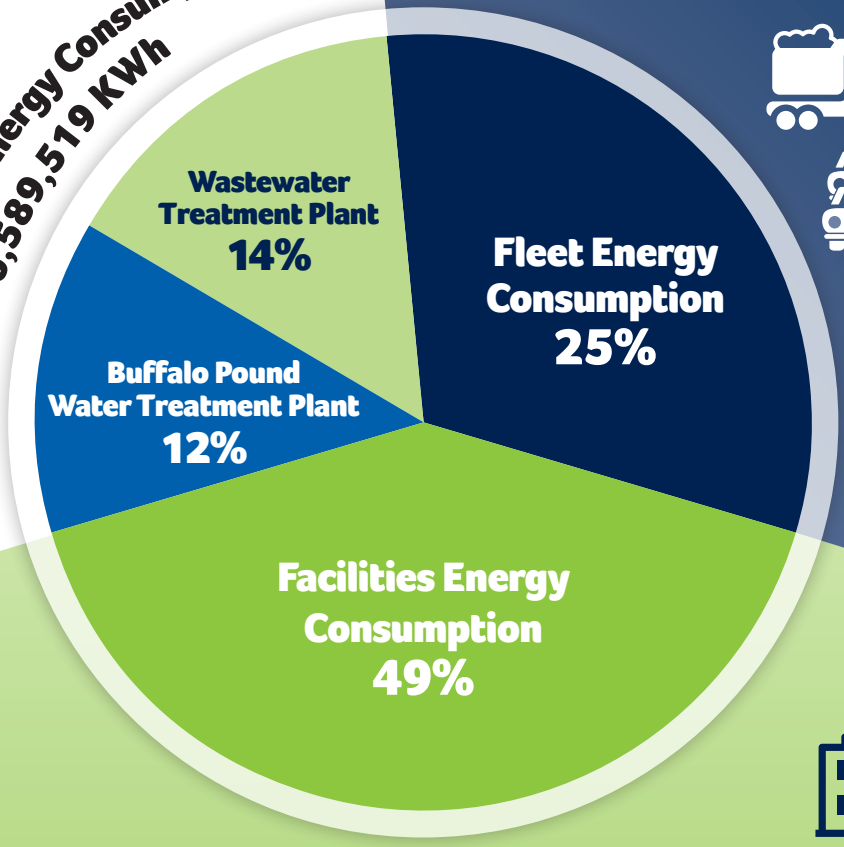


In 2023, 89% of the energy used by the City of Regina was generated from non-renewable sources such as coal, natural gas, and oil. The remaining 11% came from renewable sources, including solar, wind, biogas and hydroelectric power.

2023 Energy Consumption at a Glance

Most energy used by the City comes from the operation of facilities, including City office buildings, recreation centers, community facilities, and major facilities like the BPWTP and the WWTP.

TOTAL Municipal Energy Consumption: 310,589,519 KWh



- Transit 48%
- Police 8%
- Asphalt & Concrete 8%
- Water & Sewer 6%
- Parks & Recreation 7%
- Landfill Operations 5%
- Sweeping and Alleys 3%
- Garbage Collection 4%
- Winter Maintenance 4%
- Fleet Services 4%
- Fire 2%
- Other Light Vehicles 4%

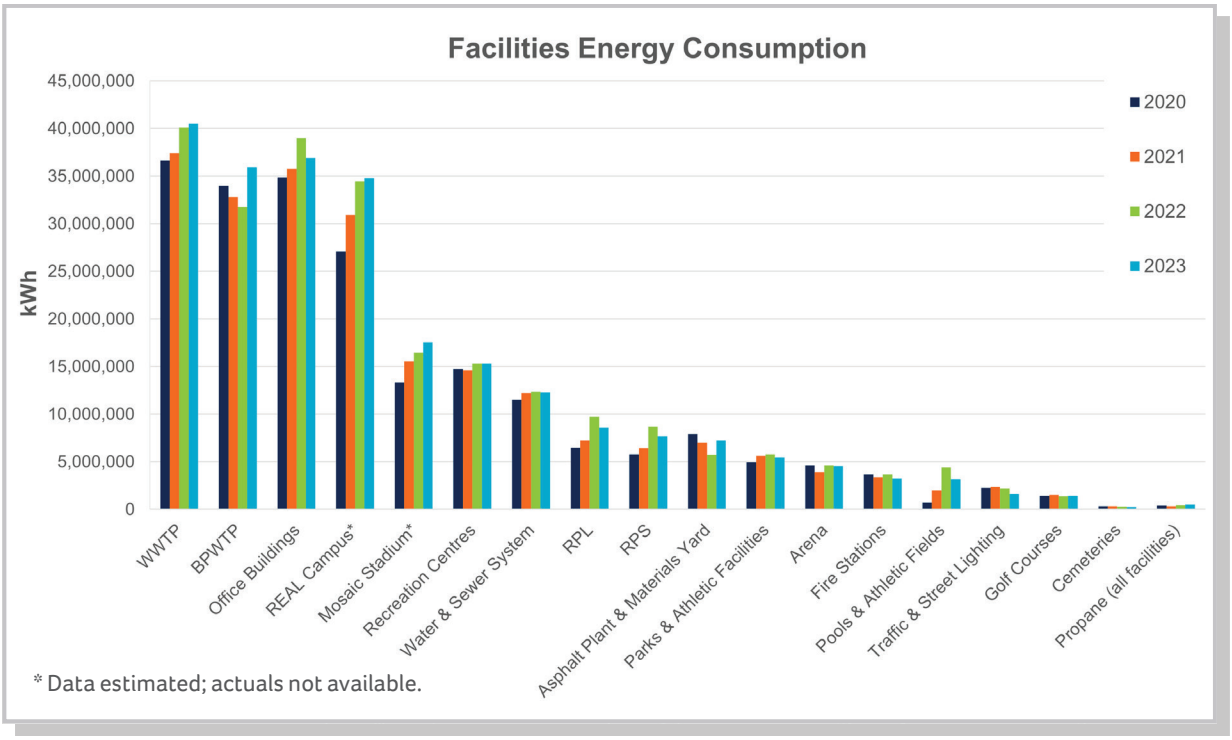
- Cemeteries <1%
- Fire Stations 1%
- Golf Courses 1%
- Traffic Lights/ Street Lights 1%
- Outdoor Pools/ Athletic Fields 2%
- Arenas 2%
- Sport Parks/ Parks 2%
- Regina Police Service 3%
- Asphalt Plant 3%
- Rec Centres 6%
- Offices 16%
- Regina Public Library 4%
- City Water & Sewer System 37%
- REAL Campus 15%*
- Mosaic Stadium 7%*

* Data estimated; actuals not available.

Facility Energy Consumption Trends

The WWTP and BPWTP have consistently been top energy consumers, which is consistent with energy consumption from other municipalities. Other major energy consumers in the City's portfolio include office buildings, the REAL Campus, and Mosaic Stadium.

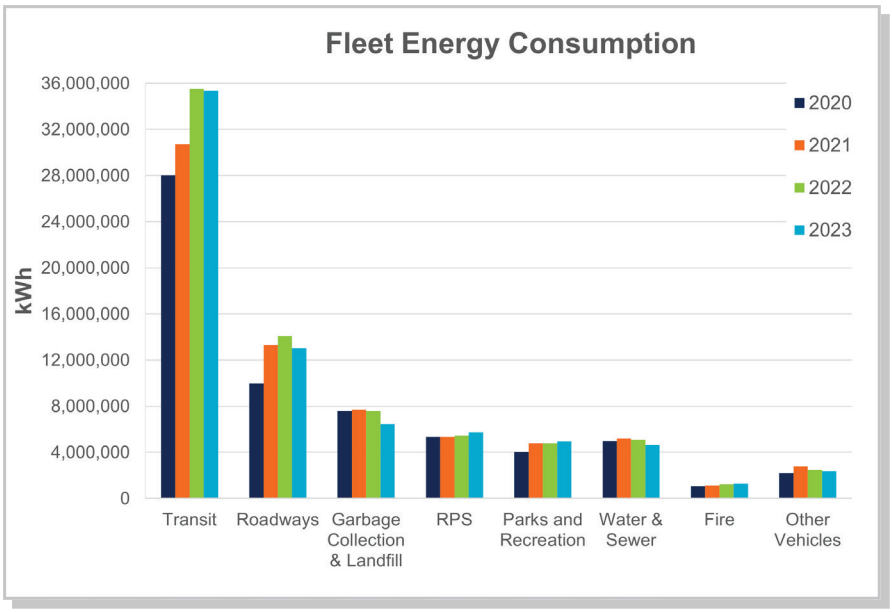
Initiatives to improve energy efficiency in these sectors are underway and can help demonstrate opportunities for other building and facility operators in Regina to adopt their own net-zero building standards and energy efficiency measures.



Fleet Energy Consumption Trends

The municipal vehicle fleet primarily consumes fuel from fossil fuels like gasoline and diesel. Transit has consistently been the largest fuel consumer, followed by Roadways, Garbage Collection & Landfill and RPS.

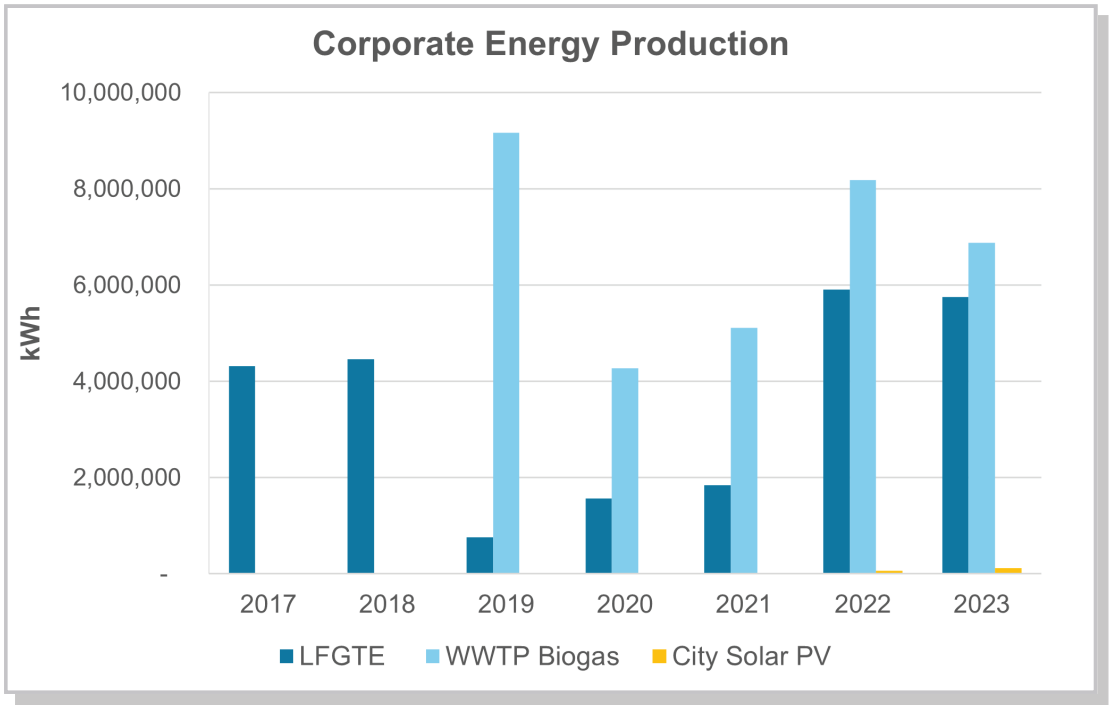
Electrifying transit will have a major impact on supporting the City's energy transition, as a significant amount of energy from diesel combustion will be transitioned to electricity.



City of Regina Renewable Energy Production

The City also produces renewable energy on-site, which is used directly through City operations or sold to SaskPower for use in the electricity grid. In 2023, the City generated 12,751,713 kWh of renewable energy, which is equivalent to the energy needed to power 1,771 homes.

The City has significantly increased renewable energy generation over the last seven years, primarily by improving methane capture and utilization through the Landfill Gas to Energy (LFGTE) system and biogas utilization at the Wastewater Treatment Plant (WWTP).



2022 saw the highest energy production levels, with a notable contribution from solar energy, although it still represents a smaller portion compared to LFGTE and WWTP Biogas.

Looking ahead, the City aims to increase the proportion of renewable energy coming from solar power, aligning with our goal of diversifying and expanding the City's renewable energy sources.

Further opportunities for improving biogas capture and utilization at the landfill and WWTP are being explored and will be advanced wherever possible.

Community Energy and GHG Emissions

Currently, most energy used involves burning fossil fuels. This means that energy consumption and greenhouse gas (GHG) emissions are closely related and that generally, reducing energy use will reduce GHG emissions. Reducing energy use is also important for enabling the switch to renewable energy.

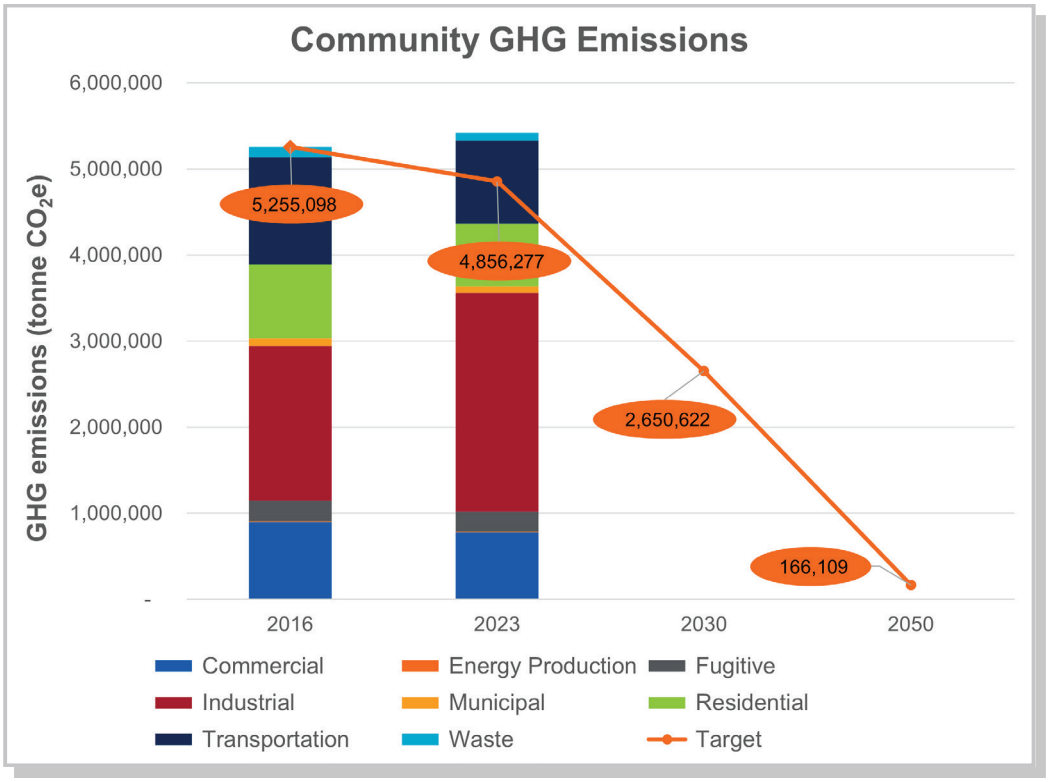
However, some fuel sources produce more emissions than others, and some activities or processes use more energy than others. This is why tracking both energy and GHG emissions is important.

Community Emissions

The community emissions inventory shows greenhouse gas (GHG) emissions for the city (community), comparing the 2016 baseline year from the Energy and Sustainability Framework with actual estimated emissions in 2023.

In 2023, a total of 5,422,254 tonnes of GHG emissions were generated within the community, marking a 3% increase from the 2016 baseline. This rise is primarily seen in the industrial sector, which increased by 4%. Industrial activities are emission-intensive, and are related to significant energy use for industrial processes and activities.

Other major sectors, including commercial, transportation, residential, and municipal saw reductions in emissions. Continued efforts in industrial emission controls, energy efficiency, and renewable energy adoption will be key to achieving future emission reduction goals.



Community Energy Consumption

The following graph illustrates community energy consumption. In 2023, there was a 5% decrease in community energy consumption compared to the 2016 baseline, slightly exceeding the energy reduction target. The transportation sector, especially through reduced retail gasoline sales, has contributed the most to this reduction, while energy use from industrial activities increased by 1.5%.

This overall decrease demonstrates improvements in energy efficiency and reduced energy use in many areas. However, to reach our community emissions reduction goals and make switching to renewable energy at the community scale possible, larger reductions in energy use across all sectors will be needed to meet the targets moving forward.