



Report of the Commissioner of Public Works
**2024 Update to York Region's Energy Conservation and Demand
Management Plan**

1. Recommendations

1. Council approve the 2024 update to York Region's Energy Conservation and Demand Management Plan (Attachment 1) and associated corporate greenhouse gas emissions targets.
2. The Regional Clerk forward this report to the local municipalities, Ontario Minister of Energy and the Independent Electricity System Operator Chief Executive Officer for information.

2. Purpose

Ontario Regulation 25/23 of the *Electricity Act, 1998* requires public agencies, including municipalities, to update their Energy Conservation and Demand Management Plans every five years. The 2024 update to York Region's Energy Conservation Demand Management Plan (the Energy Plan) must be approved by Council and made publicly available by July 1, 2024. Appendix A summarizes key initiatives detailed in the Energy Plan.

Key Points:

- An 81% reduction below 2014 direct corporate emission levels by 2050 is achievable based on a conservation focused approach, electrification and a zero-emissions electricity grid
- Long-term initiatives identified in the Energy Plan have high-impact emission reduction potential and may require allowance for payback periods longer than ten years for projects where external funding is unavailable

- The 2024 Energy Plan expands emissions reporting to include wastewater emissions from the Region’s wastewater infrastructure and resource recovery plants, and provides credit for carbon sequestration from Region-owned forests and street trees
- Looking ahead to the 2029 update, York Region will examine opportunities and financial implications to mitigate emissions that occur through delivering York Region contracted services

3. Background

2024 Energy Plan is linked to global, federal and provincial commitments to mitigate climate change

Measures in the 2024 Energy Plan are prioritized in alignment with [United Nations’ Sustainable Development Goals](#) and [Stockholm Resiliency Centre’s Planetary Boundaries](#) whose guidance ensures local efforts make the greatest global impact. The Energy Plan supports federal and provincial commitments toward the 2015 Paris Accord and emissions reduction targets.

[Canadian Net-Zero Emissions Accountability Act](#), which became law in June 2021, binds in legislation Canada's commitment to achieve net-zero emissions by 2050. Since then, the Federal Government has worked on a framework to share associated responsibilities with provincial and local governments. At a provincial level, Ontario has committed to reducing emissions to 30% below 2005 levels by 2030 in its [Made-in-Ontario Environment Plan](#).

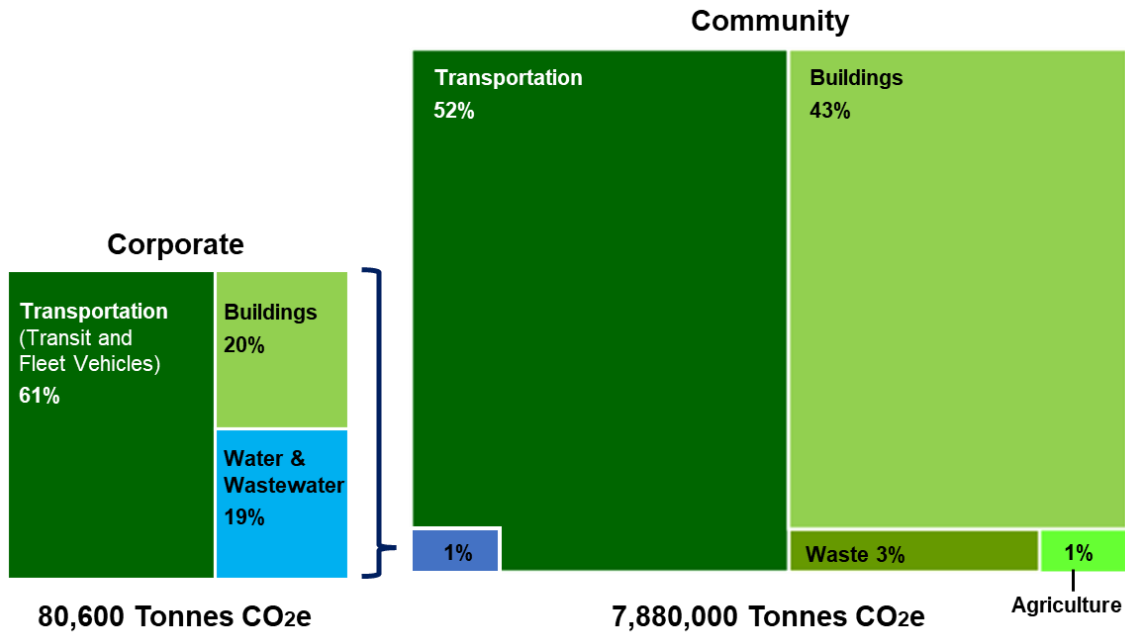
Initiatives from the Energy Plan will be reflected in York Region’s Environmental, Social and Governance reporting

Environmental, Social and Governance (ESG) reporting, using a consistent reporting framework, informs residents, investors and others on how York Region is addressing environmental and social challenges while ensuring good governance through its strategic, financial and operational plans. Corporate Finance and Public Works continue to collaborate to ensure initiatives and measures from the Energy Plan are incorporated into the Region’s future ESG reporting.

2024 Energy Plan focuses on corporate portion of community emissions

Ontario Regulation 25/23 of the *Electricity Act, 1998* requires public agencies to develop Energy Plans that outline strategies to reduce emissions associated with corporate service delivery. Figure 1 provides context and illustrates the relative size and shared emissions sources between the Region as a corporate entity and the community at large which include emissions from all sources within the Region’s geographic boundary. Transportation and buildings are the two largest categories for both corporate and community emissions. Small in comparison to the community (80,600 tonnes compared to 7,880,000 tonnes), it’s a strategic priority for the Region to demonstrate leadership to advance climate action for its emissions so that similar measures can be implemented at a community level.

Figure 1
York Region Corporate and Community Emissions



This and previous Energy Plans have summarized achievements and future commitments that align with and form part of the Region’s overall [Climate Change Action Plan](#). These initiatives and emission targets have been limited to onsite renewable energy generation and emissions directly from onsite operations or assets including: transit buses, Region owned and operated buildings, police and ambulance vehicles, and traffic signals and street lighting.

York Region’s Energy Plan highlights long-term projects with high-impact emission reduction potential

The 2024 Energy Plan lists initiatives with varying capital requirements resulting in short, medium and long-term payback periods. Examples include application of building temperature and humidity standards (short-term), variable speed drives for water and wastewater pumps (medium-term) and decarbonization of existing buildings through progressive retrofits (long-term). Long-term projects are characterized by high-impact emission reduction potential and a requirement for external funding support to recover initial capital investments within a reasonable time frame. York Region continuously seeks opportunities to apply for available funding when feasible.

Business case analysis performed for 2024 Energy Plan emphasizes importance of federal carbon pricing to incentivize electrification

Achieving positive financial results for switching to low-emission fuels (such as electricity) are dependent upon the long-term viability of federal carbon pricing. Elimination of, or reductions in

carbon pricing in the future will favour fossil fuels (natural gas, gasoline, and diesel fuels) and may extend capital recovery beyond acceptable terms.

York Region's emissions from wastewater processes and carbon sequestration by forests and street trees are included in the Energy Plan

Nitrous oxides and methane are greenhouse gases that naturally occur in wastewater and escape into the atmosphere during conveyance and treatment (wastewater emissions). These wastewater emissions released from York Region's infrastructure and Water Resource Recovery Facilities are classified as Scope 1 direct on-site emissions. York Region treats about 5% of its total wastewater and the rest is processed by partner municipalities (Durham and Peel).

As industry knowledge and understanding evolve, it delivers improved measurement and mitigation technologies enhancing accuracy and precision of emission modeling and accounting. With each five-year iteration of the Energy Plan, York Region has expanded the emission sources and boundary of the report based on advancing research and understanding emissions associated with corresponding sources. Wastewater emissions and carbon sequestration by Region owned forests and street trees have been added to the 2024 Energy Plan boundary of corporate emissions. As a result, adjusted 2022 corporate emissions totaled 82,600 tonnes. An illustration of emission sources is provided in Appendix B.

The Region will begin to lay the foundations for including emissions from contracted services in the 2029 update to the Energy Plan

Cities of Toronto and New York have started to report emissions resulting from contracted services. These emissions are categorized as Scope 3 and defined as indirect emissions from off-site processes. Scope 3 emissions are typically an entity's largest source of emissions because it includes all emissions from before acquisition and after disposal. York Region examples are emissions from contracted water and wastewater treatment, construction and maintenance equipment, sludge and solid waste haulage, energy from waste and landfill gases that escape after disposal of the Region's solid waste. A recommendation to incorporate and communicate Scope 3 emissions will be developed in time for the 2029 Energy Plan update.

4. Analysis

Energy Plan highlights corporate emission reduction initiatives toward achieving York Region's net-zero carbon emissions by 2050

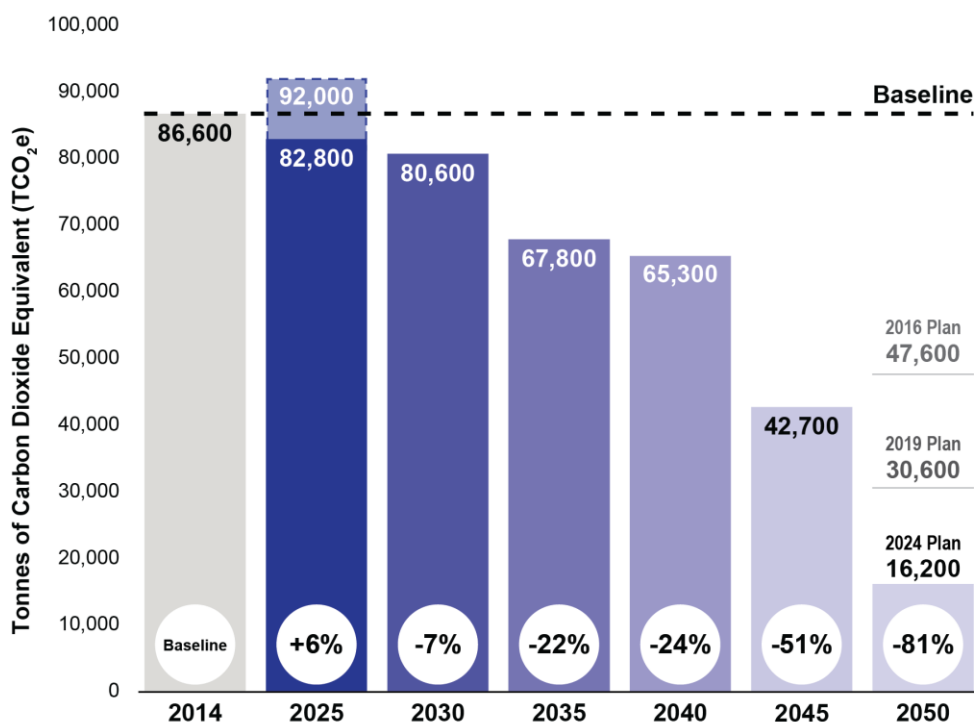
York Region's Climate Change Action Plan aims to reduce greenhouse gas emissions with a long-term goal of becoming net-zero by 2050. The 2024 Energy Plan advances efforts to deliver corporate elements of the Climate Change Action Plan.

An 81% reduction in corporate greenhouse gas emissions by 2050 is achievable with existing technologies

Based on principles of “*conservation first*”, electrification and a zero-emissions electricity grid, technological advances since the previous Energy Plan provide an opportunity to achieve an 81% reduction in direct corporate emissions by 2050. Interim emission targets based on proposed initiatives are illustrated in Figure 2:

Figure 2

Forecasted Direct Corporate Greenhouse Gas Emissions Targets



NOTE: Targets assume Provincial investments in green electricity generation and a zero-carbon electricity grid by 2050

Supply chain challenges may delay implementation of initiatives in the near-term

Supply chains are still recovering from the global pandemic, which continue to impact timing of fleet electrification initiatives (transit buses, corporate vehicles and ambulances) identified in the Energy Plan. The additional 10,000 tonnes (Figure 2 - light blue in 2025 target) illustrates risk to the Region’s mitigation strategy associated with potential delays in receiving electric transit buses and utility transformers. It is not anticipated these challenges will extend beyond near-term targets. The Region is working closely with stakeholders to manage supply chain challenges and mitigate risks associated with electric bus funding deadlines.

An alternate path was investigated to determine feasibility of achieving net-zero carbon emissions five years ahead of the 2050 target

The emission path illustrated in Figure 2 and financially summarized in Table 2 is based on prudent financial management balancing emission reductions with corresponding investments. A more aggressive path to net-zero emissions by 2045 was analyzed as part of the Energy Plan update and proved to be possible but capital intensive. Net-zero by 2045 relies on technologies not currently mainstream or still in development. At this time acceleration of the Region's approach to reduce emissions is not recommended. In addition to significant costs and untested technologies, this path requires purchasing carbon credits for the balance of the Region's remaining corporate emissions to meet the net-zero carbon target and currently forecasted at an annual cost of \$2.8 million.

Provincial plans to use natural gas to generate electricity will reduce the impact of short and medium-term emission reductions until a zero-emissions electricity grid is achieved

In 2022, almost 90% of Ontario's electricity was generated by non-emitting sources like nuclear, hydro, solar, wind and biomass. The balance was supplied by natural gas generation. Natural gas generation will provide a larger proportion of Ontario's electricity while its nuclear generating plants are refurbished. As a result, provincial electricity emissions could increase by up to 400% during the refurbishment period projected into the coming decade.

Energy Plan targets reflect increased short-term natural gas generation, with York Region reliant on a long-term emissions free grid requiring continuous advocacy on Provincial energy policy and investments to ensure the Region's efforts to minimize use of fossil fuels yield anticipated results. If electricity emissions remain at an elevated level beyond 2040 as modeled, the Region will not be able to meet its 2045 and 2050 emissions targets. Despite near-term and the potential for extended impacts of natural gas generation on York Region emissions, electrification remains the dominant strategy to reduce emissions. A copy of the Energy Plan will be forwarded to the Province to ensure that necessary clean energy is considered in future electricity plans.

Should the Provincial government make significant energy policy changes that result in longer than anticipated use of natural gas to supply electricity, point-source methods to abate emissions at generating stations will need to be examined. The Region can mitigate prolonged emissions risks through evaluating emerging technologies in future iterative updates to the Energy Plan.

Despite the obstacle presented above, population growth in York Region is projected to outpace near-term electricity emissions growth and result in lower per capita emissions. Decreasing per capita emissions is consistent with targets in the Region's [2023 to 2027 Strategic Plan: From Vision to Results](#).

2024 Energy Plan provides flexibility to account for the fast pace of evolving technologies

Technology continues to advance in many sectors and reduce greenhouse gas emissions. One of the most relevant examples is advancement of battery electric transit bus technology. In the 2016 Energy Plan diesel-electric hybrid transit buses were proposed beyond 2030 because electric transit technology was still in its infancy. By December 2020, electric vehicle technology had advanced such that Council approved the [Transit and Corporate Fleet Electrification Plans](#). With support from external funding, the Region is able to purchase almost 200 battery electric buses by 2026, pilot an electric ambulance and install a public and dedicated fleet vehicle charging network (Table 2).

York Region has started planning for decarbonization of existing buildings and reducing embedded carbon in water and wastewater capital projects

After transit and fleet vehicle emissions, buildings are the next largest source of corporate emissions. Buildings are a unique challenge since existing ones were built to lower energy efficiency standards and our current portfolio includes buildings with service lives beyond 2050. New buildings built to high efficiency standards will be better performing and operate with lower energy costs and emissions over the buildings' life. Progress continues on testing criteria for a Sustainable Buildings Policy to make high-performance buildings the standard for Regional building design and construction. First-cost versus full life-cycle costs and impacts this may have on the Region's capital infrastructure plans for administrative and operations facilities are the basis for continued analysis and recommendations. Staff will report back to Council with associated business case and environmental benefits for adopting as a formal policy.

Existing Building Climate Change Action Plans are being developed and will identify strategies and budget requirements to decarbonize York Region's 25 largest greenhouse gas emitting buildings. Two action plans have been completed with asset rehabilitation financial requirements summarized in Table 2. As studies are completed, budget requirements for incremental costs will be updated as required to reduce emissions from the Region's existing building stock.

York Region has developed a Greenhouse Gas Emissions Management Framework for water and wastewater capital infrastructure projects integrating climate change mitigation considerations into environmental assessments, detailed design and construction project delivery phases of water and wastewater asset construction. By analyzing lifecycle emissions, including operation and end-of-life emissions, the Region can identify the least carbon intensive project option.

The Region accomplished many notable initiatives since the last Energy Plan update that deliver cost savings and emissions reductions

Table 1 below highlights a few of the many accomplishments since the last Energy Plan update.

Table 1
Notable Energy Plan Accomplishments Since 2019

Lighting upgrades	<ul style="list-style-type: none"> Completed lighting retrofits at six Region buildings Saves \$260,000 per year in operating costs
Battery electric transit bus pilot	<ul style="list-style-type: none"> Fuel and maintenance costs savings of 40% and 49% respectively Greenhouse gas emissions reduction of 97%
Fleet electrification	<ul style="list-style-type: none"> Acquired five electric cargo vans, 10 electric light-duty pickup trucks and 48 hybrid-electric police pursuit vehicles Installed a publicly accessible electric vehicle charger network at eleven facilities across the Region
Ambulance technologies	<ul style="list-style-type: none"> Installed hybrid-electric drive trains on 16 ambulances and installed anti-idle technology on ambulance fleet Annually saves \$84,000 in fuel costs and 200 tonnes of emissions
Social housing energy audits and retrofits	<ul style="list-style-type: none"> Completed energy audits on over 1,300 social housing units across 18 buildings Electricity and natural gas savings of \$30,000 per year
Next Generation Energy Management System	<ul style="list-style-type: none"> Purchased an energy management system to reduce electricity, natural gas and water consumption and associated emissions
Wastewater energy exchange project	<ul style="list-style-type: none"> Advanced initiative with Markham District Energy to replace natural gas consumption with electricity through wastewater energy exchange Once fully implemented, project will use low-grade energy in sewage to reduce community emissions by 30,000 tonnes per year
Inflow & infiltration reduction strategy	<ul style="list-style-type: none"> Total reduction of 26 megalitres per day Exceeded reduction target 2 years ahead of schedule

5. Financial Considerations

Capital investments by each department will be required to achieve targets

The Energy Plan minimizes financial impacts on existing capital budgets by leveraging existing plans, planned asset replacement cycles, external funding and internal reserves to advance Regional sustainability initiatives. Table 2 lists projects proposed in the Energy Plan with forecasted capital investments, total emission reductions and cost per tonne.

Table 2
Summary of Energy Plan Incremental Capital Requirements

Initiative	5-Year Estimated Capital Cost*	Estimated Lifetime Capital Cost*	Estimated Lifetime Emissions Avoidance (in Tonnes)	\$/Tonne
Transit bus electrification	\$120.0 M	\$520 M	524,000	\$992
Buildings decarbonization**	\$5.6 M	\$46 M	15,800	\$2,911
Battery electric ambulances	\$4.0 M	\$32 M	48,500	\$660
Commissioning and optimization of operations	\$2.4 M	\$31 M	12,300	\$2,520
Light-duty fleet electrification	\$1.5 M	\$20 M	61,400	\$326
Gas powered equipment	\$0.03 M	\$0.1 M	400	\$250
Total	\$133.5 M	\$649.1 M	662,400	
Weighted Average (lifetime cost/ emissions avoidance)				\$980

* Exclusive of external funding

** Findings from 2 of 25 scheduled Existing Building Climate Change Action Plans

Capital costs listed in Table 2 are incremental to budgets established based on like for like replacements. Transit and ambulance capital budgets have been adjusted to reflect the additional capital requirements net of secured external funding.

Triple Bottom Line approach used to balance financial, environmental and social attributes in ranking proposed projects in the Energy Plan

All projects are subject to business cases built on a Triple Bottom Line framework incorporating United Nations Sustainable Development Goals and Planetary Boundaries that account for greenhouse gas emissions reduction (environmental), social impact, cost and savings (financial) to ensure projects deliver a comprehensive group of benefits and good value to the Region. Financial and environmental attributes account for over 80% of the total weighting based on the Triple Bottom Line methodology developed by York Region's cross functional Energy Conservation Demand Management Steering Committee.

Departments are required to develop business cases based on lifecycle cost-benefit analyses to support project investments. For example, Transit's electric bus pilot resulted in a 49% savings in maintenance costs, a 40% savings in energy costs and a 97% reduction in greenhouse gas emissions. With third-party funding and Council's support, a transition to an electric transit system was approved to accelerate the purchase of up to 200 electric buses by 2026. As costs of advancing technologies decline and available third-party funding expands, investments in energy efficient projects will become more affordable. Historically, projects with payback periods less than ten years were prioritized. However, some of the high-impact projects in the 2024 Energy Plan will require third-party funding to achieve acceptable returns on capital investments.

Successful implementation of Energy Plan initiatives will save the Region an annual \$14 million in carbon taxes by 2030

In 2018, the Federal Carbon Pricing Program was applied to purchases of fossil fuels (natural gas, gasoline and diesel fuel) to provide a financial incentive for reducing carbon-based fuel consumption. A portion of carbon pricing revenues are returned annually to Canadians in the form of a Climate Action Incentive Payment to offset impacts of carbon pricing on cost of living. The balance is transferred to Provincial governments. At \$50 per tonne, York Region's 2022 cost of carbon was \$3.25 million in addition to underlying fuels cost. Each year, on April 1, the Federal government increases the carbon tax by \$15 per tonne. In 2023, it's estimated the Region's fuel costs increased by \$610,000 in carbon tax to provide the same services delivered the previous year (not accounting for inflation and assuming no change in fuel consumption).

Successful implementation of initiatives in the 2024 Energy Plan to conserve and electrify corporate service delivery could avoid \$14 million per year in carbon taxes by 2030. Total cumulative carbon tax savings could equate to over \$225 million from 2030 to 2050 if the targets described in the Energy Plan are achieved. Investment in transit bus and fleet vehicle electrification will yield the greatest emissions reduction as these are York Region's largest category of corporate emissions followed by buildings and wastewater emissions.

6. Local Impact

The Energy Plan proposes financial, environmental, and social benefits to inspire and lead York Region municipalities, businesses and residents. Reduced fuel consumption will shield the Region and local municipalities against the rising cost of energy and translate into reduced greenhouse gas emissions.

The Region will continue to look for opportunities to share knowledge gained through recently completed and future initiatives to the benefit of our local municipal partners and the Region.

7. Conclusion

It is recommended Council approve the 2024 update to York Region's Energy Conservation and Demand Management Plan which includes opportunities to make prudent investments in the future of York Region and its residents. The 2024 Energy Plan charts a course toward net-zero carbon emissions by 2050, and positions York Region as an environmental leader. Through a commitment to conservation and increased efficiency, along with five-year Energy Plan updates, the Region is well positioned to identify and implement emergent technologies and approaches needed to meet its Vision goals.

For more information on this report, please contact David Szeptycki, Director, Sustainability, Communications and Innovation, Public Works Department at 1-877-464-9675 ext. 75723. Accessible formats or communication supports are available upon request.

Recommended by:



Laura McDowell, P.Eng.
Commissioner of Public Works



Approved for Submission: **Erin Mahoney**
Chief Administrative Officer

April 22, 2024
#15793743

Appendix A - 2024 Energy Plan Initiatives Summary
Appendix B – 2024 Energy Plan Emissions Boundary by Scope
Attachment 1 - 2024 Corporate Energy Conservation and Demand Management Plan
(#16024621)

2024 Energy Plan Initiatives Summary

BUILDINGS

- ▶ Sustainable Buildings Policy
- ▶ Temperature and Humidity Standards
- ▶ Buildings/Space/Office Consolidations
- ▶ Climate Change Action Plans for 25 largest buildings

TRANSIT

- ▶ Transit bus electrification
- ▶ Mobility on Request electrification



NON-TRANSIT FLEETS

- ▶ Convert 50% of sedans/SUVs/Passenger Vans to battery/plug-in/hybrid electric
- ▶ Fleet rationalization and optimization
- ▶ Battery electric ambulance pilot
- ▶ Safe and efficient driver training programs

WATER AND WASTEWATER

- ▶ Pump optimization
- ▶ Low-carbon energy sources
- ▶ Net-zero carbon wastewater strategy
- ▶ Measurement of fugitive emissions

STREET AND TRAFFIC LIGHTS, BEACONS AND SHELTERS

- ▶ Intersection streetlight conversion to LED
- ▶ Adaptive streetlight technologies
- ▶ Solar panels for transit shelters

2024 Energy Plan Emissions Boundary by Scope

Scope 1 – Direct emissions:

- Natural gas for wastewater process heat as well as heating needs at Region owned buildings
- Fleet vehicle and employee mileage gasoline
- Transit and fleet diesel fuel
- Wastewater emissions from Region wastewater infrastructure and treatment facilities
- Carbon absorbed by York Region owned forests and street trees

Scope 2 - Electricity emissions to:

- Condition Region owned building spaces
- Operate Region owned water and wastewater facilities
- Power electric buses and vehicles, lights and computers

