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The Regional Municipality of Durham Report

To:	Committee of the Whole
From:	Chief Administrative Officer
Report:	#2022-COW-3
Date:	February 9, 2022

Subject:

2022 Annual Corporate Climate Change Action Plan Update

Recommendation:

That the Committee of the Whole recommends to Regional Council:

A) That Regional Council receive the 2022 Annual Corporate Climate Change Action Plan Update for information.

Report:

1. Purpose

1.1 This report provides the first annual update on the implementation of the Durham Region Corporate Climate Change Action Plan (CCAP) since endorsement by Council in March 2021. Specifically, this report will provide:

a. a 2020 corporate greenhouse gas (GHG) inventory update;
b. a forecast of corporate GHG emissions to 2025 relative to Council approved interim targets based on anticipated projects, as well as additional opportunities identified through feasibility studies, energy audits and investigative efforts by Regional staff;
c. a summary of 2021 accomplishments and identified priority initiatives for 2022-2025; and
d. recommended next steps to scale-up corporate climate action and close the gap between forecasted emissions and approved targets.

2. Background

2.1 Intergovernmental Panel of Climate Change's (IPCC) Sixth Assessment Report, released in August 2021, states, "It is unequivocal that human influence has warmed the atmosphere, ocean, and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred." These changes are already contributing to many weather and climate extremes in every region across the globe, including the Great Lakes Region. The impacts of climate change are creating immeasurable harm to people and ecosystems, with a greater burden for vulnerable residents such as elderly and low-income individuals.

2.2 Climate science indicates that there is a narrow window to limit further warming to below 1.5°C above pre-industrial levels, a threshold that if exceeded would bring catastrophic and irreversible climate change. Maintaining temperatures below this threshold will require dramatic reduction in GHG emissions across all sectors of society and coordinated action across all levels of government. In recognition of this fact, in 2021 the federal government committed Canada to cutting emissions by 40-45 per cent below 2005 levels by 2030 and joined over 120 countries in committing to net-zero emissions by 2050.

2.3 Local and Regional municipalities have a key role to play in addressing climate change. Globally more than 1,000 municipalities, including Ajax and Whitby, have joined the global Race to Zero campaign, which includes commitments to reduce emissions in half by 2030 and reach net zero emissions by 2050. Municipalities play a direct role by decarbonizing their own corporate assets and operations which are estimated to account for approximately 5 per cent of community-wide emissions, and an indirect role through policies (e.g. land use), programs, and services (e.g. transit) to enable broader community-wide GHG emissions reductions.

2.4 Regional staff have considered climate change mitigation measures and energy efficiency in projects for many years, but formalized plans and targets had not been established.

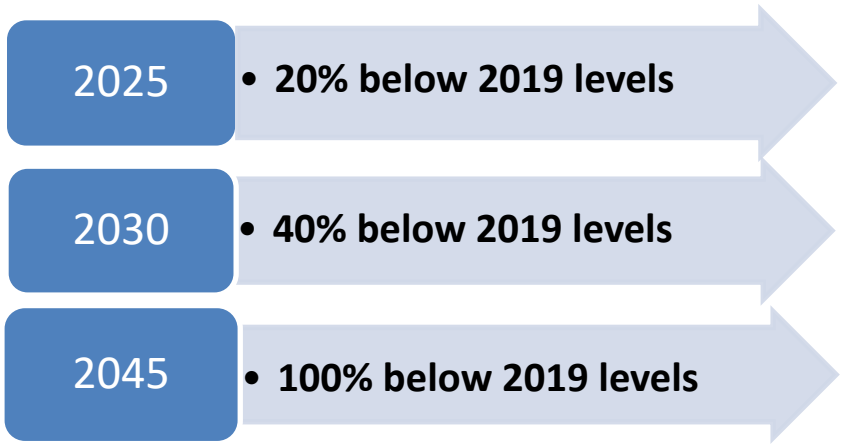
3. Previous Reports and Decisions

3.1 In January 2020, Council declared a climate emergency and directed staff to develop a Corporate Climate Change Master Plan with GHG reduction targets that position the Region as a leader in the community-wide effort to reduce GHG emissions.

3.2 In June 2020, Council adopted Report #2020-A-13, which approved an investment plan for the $5 million Climate Mitigation and Environmental Initiatives Reserve Fund as leverage for external funding and to initiate key strategic GHG reduction projects. An additional $250,000 was added to the reserve fund through the 2021 budget. See Attachment #1 for an update on approved allocations to date.

3.3 In March 2021, Council adopted Report #2021-A-3, which included the approval of a Corporate Climate Action Plan (CCAP) which set short, medium and long-term GHG targets as shown in Figure 1 below. The CCAP identified short-term priority actions to 2025 and provided direction to integrate climate change into the annual business planning and budgets process. Council also directed staff to report annually on the progress of implementation.

Figure 1: Corporate CCAP Targets



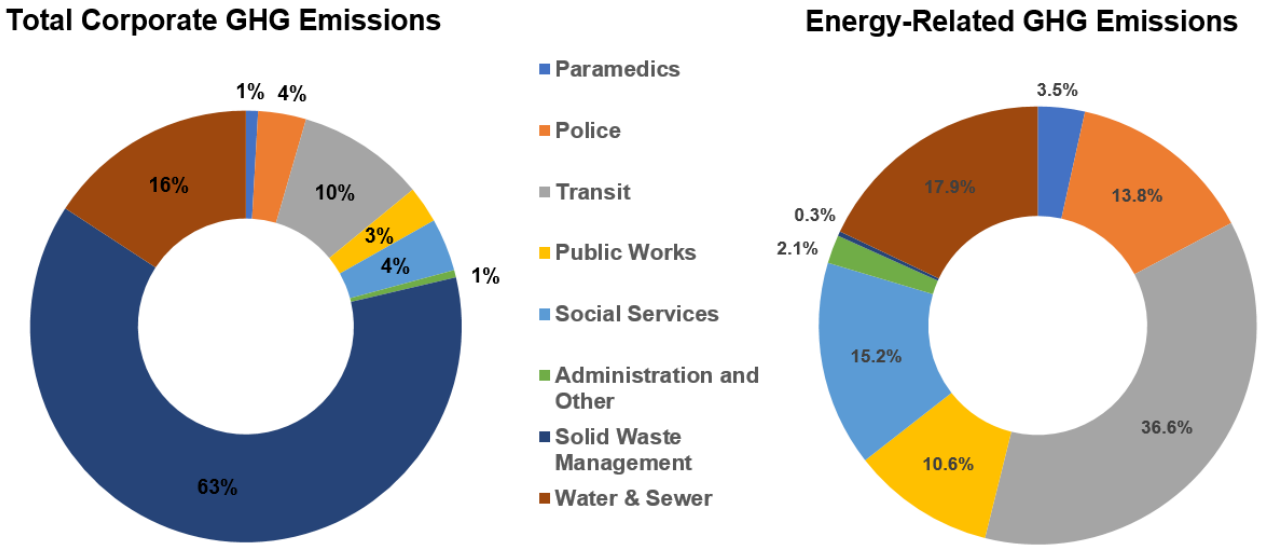
3.4 In November 2021, Council adopted Report #2021-F-31 which included the approval to direct a portion of the 2020 operating surplus dollars to advance Regional facilities-related GHG reduction initiatives.

4. Durham Region Corporate GHG Footprint

4.1 Durham Region's corporate emissions are calculated based on energy used in all Regionally owned and operated (including leased facilities where the Region is responsible to pay for its direct utility costs) buildings (e.g. offices, long-term care homes, social housing, etc.), corporate fleet vehicles, water supply and sanitary sewerage treatment and distribution facilities, and traffic signals, among other operations. The inventory also includes non-energy GHG emissions associated with the Region's solid waste and wastewater management operations.

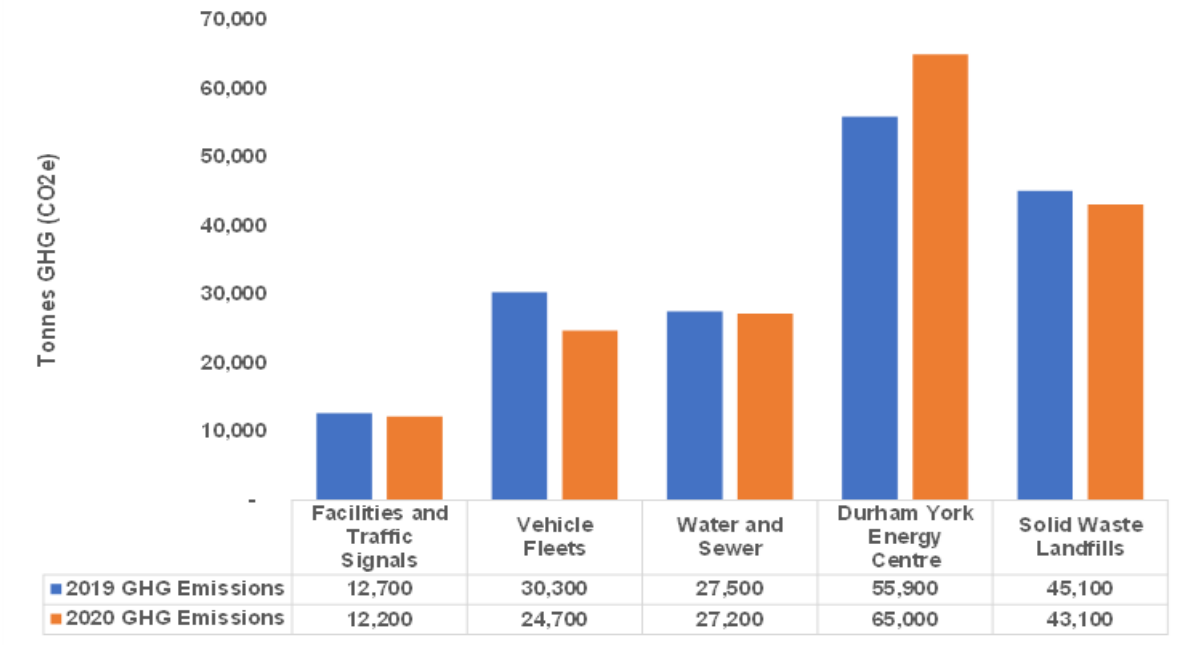
4.2 In 2020, corporate emissions were approximately 172,200 tonnes carbon dioxide equivalent (tCO_2e), which is approximately 3 per cent of Durham's 2020 Region-wide community-based emissions. Figure 2 below provides a breakdown of emissions by corporate operating area, both for total corporate GHG emissions and energy related GHG emissions.

Figure 2: 2020 Corporate GHG Footprint by Operating Area



4.3 As shown in Figure 3 below, the Region's corporate emissions increased marginally from 2019 to 2020 but remained a relatively stable share of Region-wide emissions. 2020 emissions trends may also be best understood in the context of Region's COVID-19 response. For example, as noted in Report #2021-INFO-133, DYEC experienced a significant increase in residential wastes due to stay-at-home orders and school and workplace closures. Managing this increase in waste volume contributed to increased GHG emissions at DYEC. COVID-19 related operational changes and resultant GHG emission impacts were also seen in other areas, namely in DRT service reductions which reduced fleet fuel consumption.

Figure 3: 2019 Baseline Inventory vs 2020 Actual GHG Emissions by Sector



	Facilities and Traffic Signals	Vehicle Fleets	Water and Sewer	Durham York Energy Centre	Solid Waste Landfills
2019 GHG Emissions	12,700	30,300	27,500	55,900	45,100
2020 GHG Emissions	12,200	24,700	27,200	65,000	43,100

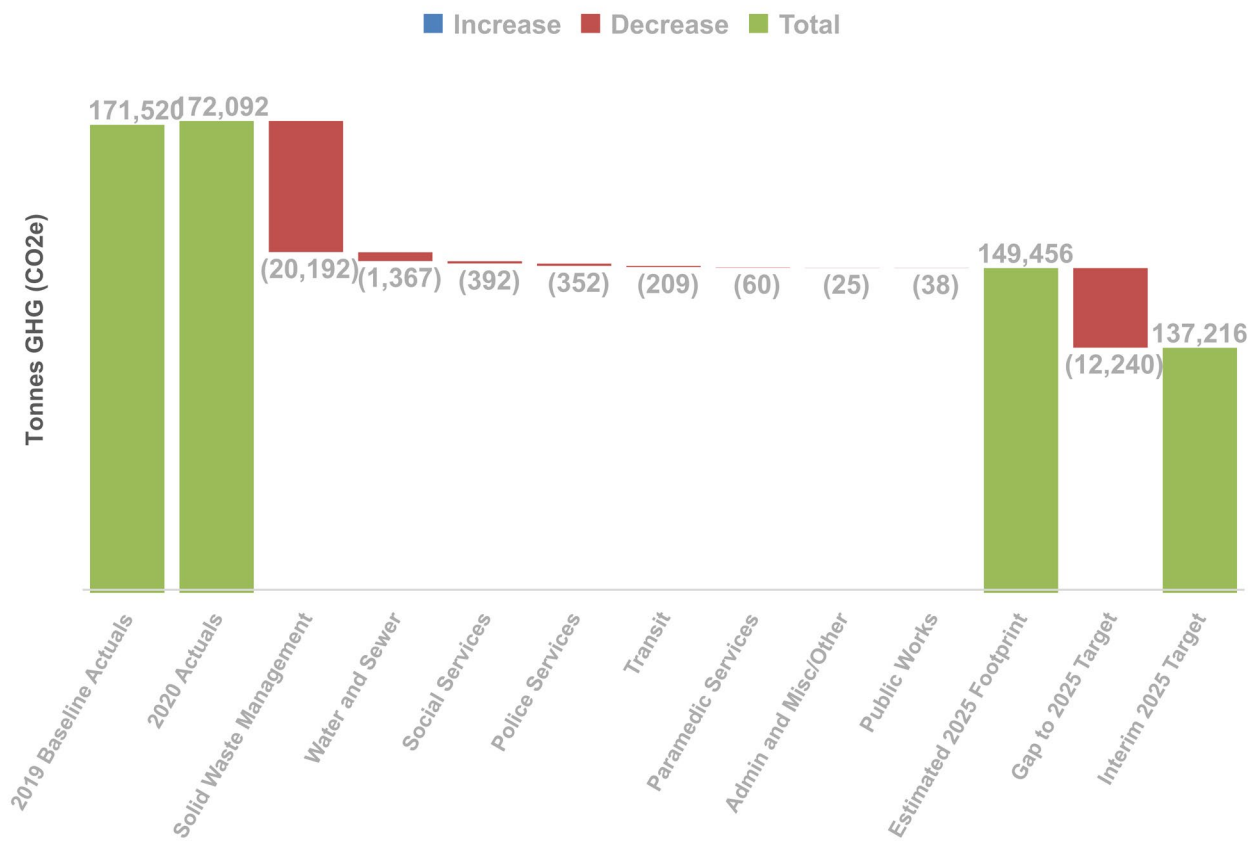
5. Corporate Carbon Footprint Forecast: 2022 - 2025

5.1 The CCAP included the introduction of a carbon budget management framework into the Region's annual business planning and budgets process, including monitoring and reporting against emissions reduction targets. Regional staff from Finance and the CAO's Office collected and analyzed data from departmental submissions as part of the Region's five-year operating and 10-year capital forecast planning process to enable the development of a corporate carbon forecast to 2025 relative to Council endorsed targets.

5.2 Based on a review of planned and potential major initiatives that have emissions data available and quantified within their project details, the 2025 corporate GHG inventory is forecasted to be 13 per cent below the 2019 baseline which is short of the Council approved target of 20 per cent below 2019 baseline. This forecast includes GHG reduction initiatives, as well as increases associated with the construction of new corporate facilities that are included in the capital forecast (e.g. Mixed Waste Pre-sort and Anaerobic Digestion Facility, Clarington Police Complex Phase 2, and the Seaton Paramedic Station).

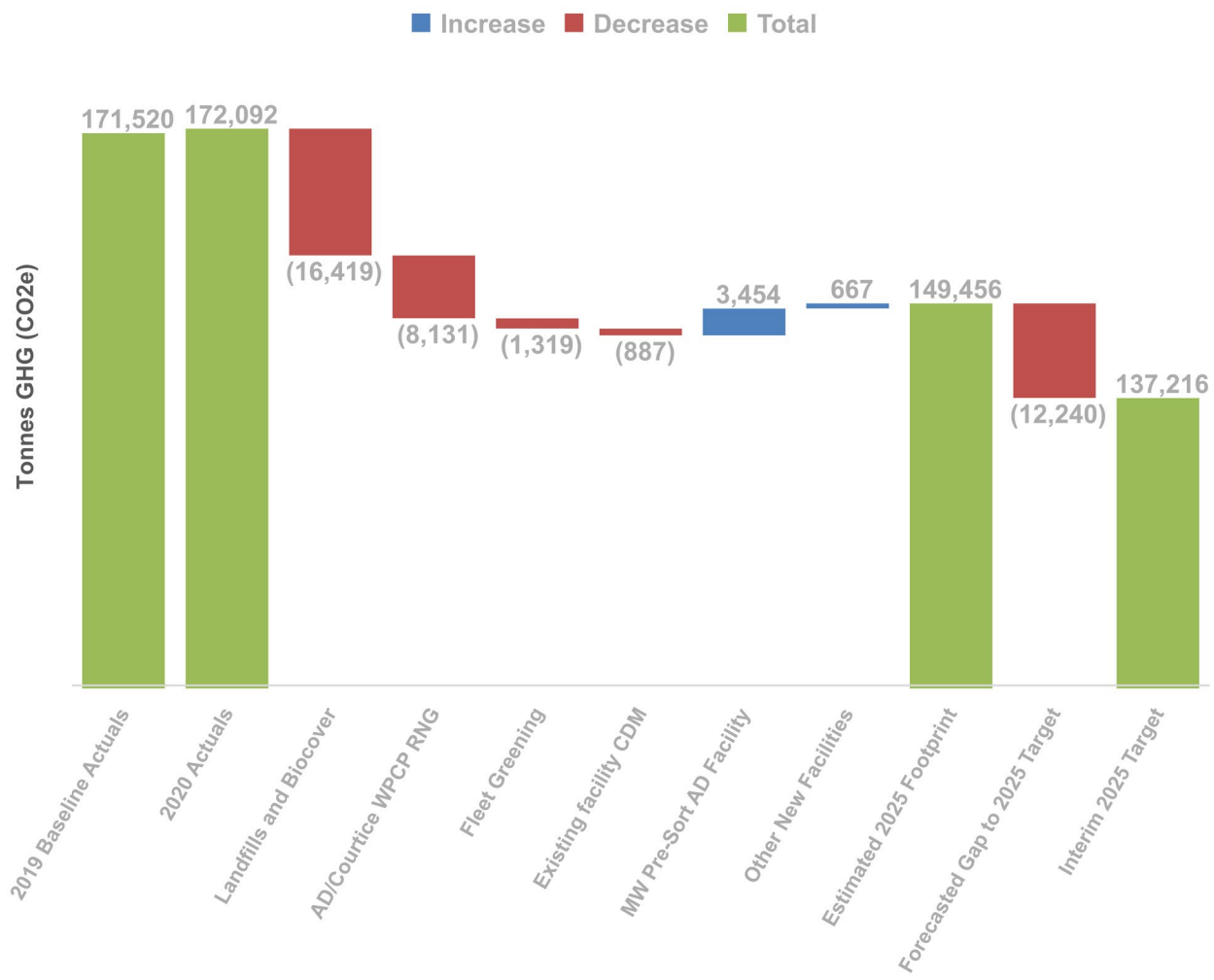
5.3 Figures 4 and 5 provide a snapshot of the carbon reduction forecast by operating area, and by major planned and/or potential initiative, respectively. Note that initiatives in the capital forecast will require Council approval through annual budget processes to 2025. Sections 6 through 14 of this report provide further details by corporate operating area on progress to date and forward looking priorities.

Figure 4: 2021 - 2025 GHG Reduction Forecast by Operating Area1



[1] Projections assume all RNG production from proposed Mixed-Waste Pre-Sort and Anaerobic Digestion facility (assumed operations in 2025) is directed towards use in Regional facilities under the Region's natural gas purchasing program. Final strategy regarding self-consumption and/or market sales approach to be developed as project parameters are further known (including potential RNG yields).

Figure 5: 2021 – 2025 GHG Reduction Forecast by Major Initiative2



6. Operating Area Overview

6.1 Following Council's adoption of the CCAP, the carbon budget management framework has been integrated into the 2022 annual business planning and budgets cycle. As part of departmental forecast and budget submissions, staff were requested to provide data on GHG impacts of proposed capital projects, where available and applicable. This data is summarized into a project level inventory by year for tracking against the 2025 corporate GHG target. The following overview by operating area, starting in Section 7 below, provides a summary of these findings.

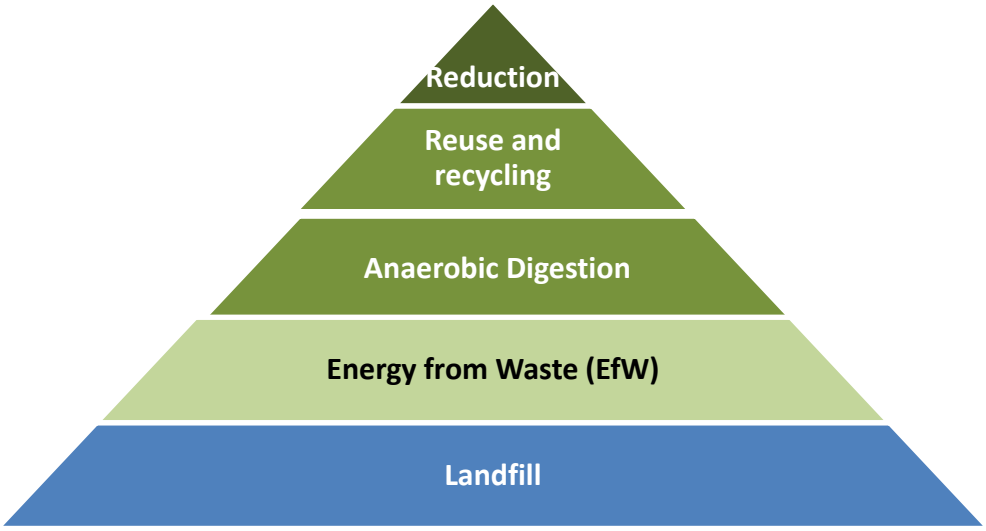
[2] Projections assume all RNG production from proposed Mixed-Waste Pre-Sort and Anaerobic Digestion facility (assumed operations in 2025) is directed towards use in Regional facilities under the Region's natural gas purchasing program. Final strategy regarding self-consumption and/or market sales approach to be developed as project parameters are further known (including potential RNG yields).

6.2 There are projects in the capital forecast for which emissions quantification was not available. To address this challenge, Regional staff are developing a flexible project-level corporate GHG accounting tool that staff can used to conduct ex ante measurements that can be included as part of departmental business planning and budget submissions. It is anticipated that this tool and associated staff training will be available in mid-2022 to support the 2023 annual business planning and budget cycle.

7. Solid Waste Management (Works Department)

7.1 This source of emissions is related to the management of residential solid waste on behalf of a growing region of more than 200,000 households. Whereas historically residential solid waste was primarily disposed of in landfills located within Durham Region, in 1999 Council directed that "no new landfill site(s) be established in the Region of Durham". Given that the Region's landfill sites are all at capacity and closed to new waste volumes, that decision led to solid waste generated in Durham being shipped to other jurisdictions in the Greater Toronto Area and beyond until the Durham York Energy Centre (DYEC) began energy-from-waste (EfW) operations in 2016. As illustrated in Figure 6 below, this decision reflects a positive move towards sustainable solid waste management in the Region.

Figure 6: The Hierarchy of Sustainable Solid Waste Management3



7.2 The IPCC's Fifth Assessment Report identifies waste management through EfW as an opportunity for significant emissions avoidances when compared to alternatives like landfill disposal. In the case of DYEC, it is estimated that EfW results in approximately 3,000 fewer long-haul truck trips annually to landfills in southwestern Ontario or New York State. Energy recovery through processing of waste at DYEC

[3] Figure 6 was adapted from Climate Change and Cities: Second Assessment Report of the Urban Climate Change Research Network. Cambridge University Press. New York. 553–582.

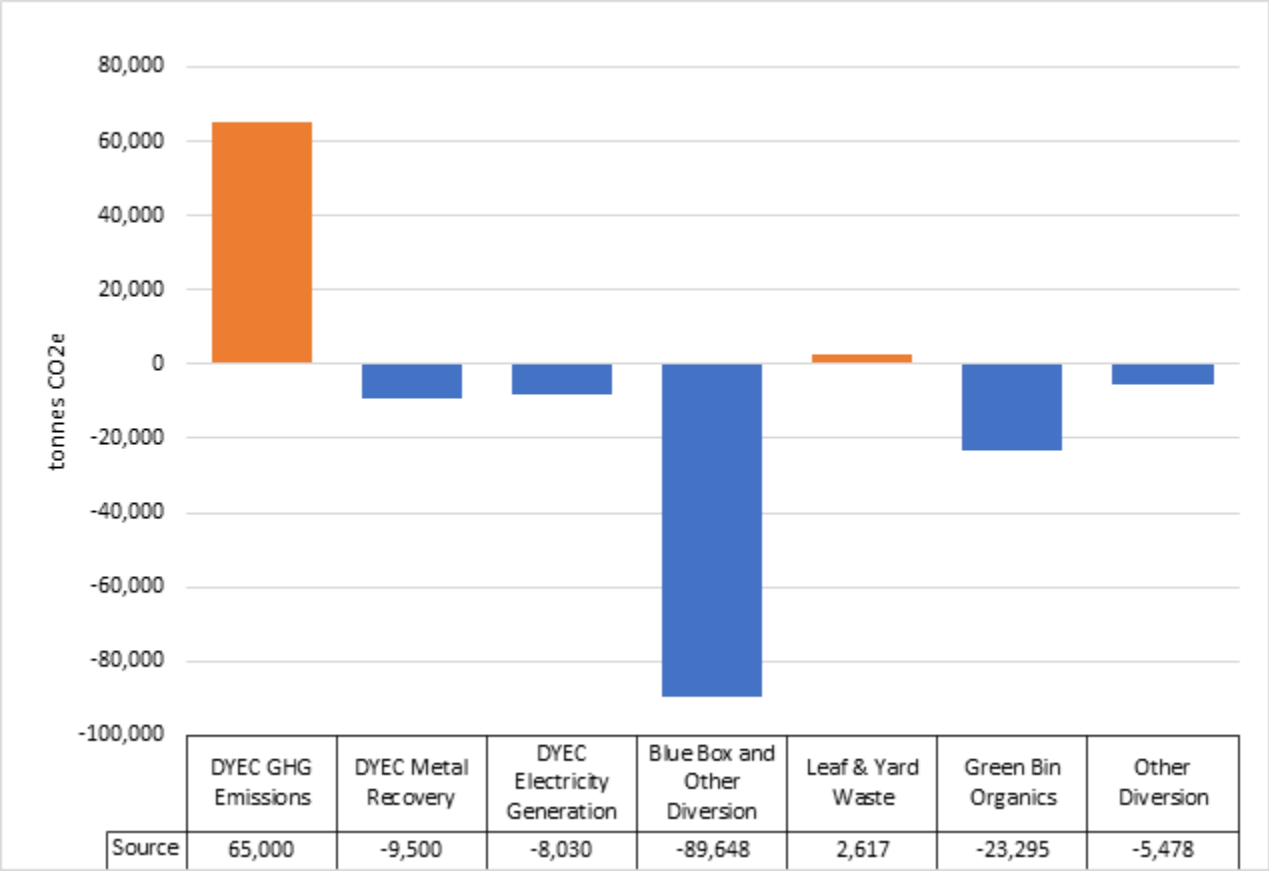
also avoids the prolonged generation of methane from waste decomposition in landfills, which Canada pledged to reduce as part of November 2021 global climate negotiations in Glasgow Scotland (COP26). DYEC operations also facilitate the recovery and recycling of metals which would otherwise end up in a landfill. Finally, the more than 600 million kWh of electricity generated from DYEC since 2016 reduces fossil fuel generation on the Ontario electricity grid.4 Use of the DYEC for waste management through EfW provides a net climate benefit compared to the status quo alternative of landfill disposal.

7.3 In 2020, DYEC processed 113,095 tonnes of waste originating in Durham Region. Using emissions avoidance calculations presented in Report #2021-A-3 – Attachment 4, EfW operations are estimated to have avoided more than 17,000 tonnes of GHG emissions that would have otherwise been emitted through landfill disposal.

7.4 Additional emissions avoidances are achieved through the Region's waste diversion programs, including blue box recycling (e.g. paper, plastic and metal products and packaging), green bin organics composting (e.g. food waste), and mixed electronics disposal. The Region's waste management programs avoid GHG emissions that would result from disposal of these materials in landfill and from the production of raw materials for new consumer goods and packaging. As shown in Figure 7 below it is estimated that the Region's solid waste management operations helped to avoid more than 130,000 tonnes of GHG emissions in 2020, which is greater than total solid waste emissions from DYEC and landfill operations.

[4] Under the Region's power purchase agreement with the Ontario Independent Electricity System Operator (IESO), any environmental attributes (e.g. credits or offsets) associated with power generated at DYEC and fed into the provincial electricity grid are transferred to the IESO.

Figure 7: Estimated 2020 GHG emissions avoidance from Regional Waste Management Operations



7.5 These avoided emissions related to solid waste management operations are not directly reflected in the corporate inventory, as they result in GHG emissions reductions at the community scale. This is similar to other aspects of Regional corporate operations. For example, regional investment in public transit can increase corporate GHG emissions while significantly reducing community-based emissions.

2020 Update and 2021 Accomplishments

7.6 In 2020, the management of solid waste produced 108,200 tCO_2e or 63 per cent of total corporate emissions. However, when looking at corporate energy-related GHG emissions only solid waste represents less than one per cent of the total. Solid waste emissions are split roughly 60 per cent/40 per cent between (1) DYEC operations which emit through the waste incineration process and natural gas combustion and (2) closed landfills which emit methane through the waste decomposition process. Emissions from the Region's closed landfill sites continue to decline annually due to natural decomposition processes.

7.7 The Region continues to be a leader on waste diversion among urban regional municipalities. The Region's 2019 waste diversion rate of 64 percent ranks first among urban regional municipalities in Ontario.

7.8 As noted in The Atmospheric Fund's 2019-2020 Carbon Emissions Inventory for the Greater Toronto and Hamilton Area, Durham Region's waste sector emissions are amongst the lowest as a portion of total community-wide emissions compared to municipal peers. The Region's solid waste management represents an example of strong corporate climate leadership.

7.9 In 2021, a draft Long-term Waste Management Plan and Five-Year Action Plan (2022-2026) were developed that seeks to continue the Region's leadership, including a specific objective to support the achievement of corporate GHG reduction targets.

Next Steps 2022-2025

7.10 As the Region continues to pursue the development of the Mixed-Waste Pre-Sort and Anaerobic Digestion facility to manage organic waste streams, there may be an opportunity to utilize renewable natural gas (RNG) to displace corporate natural gas consumption. Regional staff continue to explore this opportunity in the context of business plan development for the new facility and other Regional biogas-producing facilities (e.g. wastewater treatment facilities) which may be capable of producing RNG.

7.11 Staff are initiating an initial feasibility study for an Oshawa Landfill Biocover Pilot in 2022. The project will assess the potential for an alternative landfill cover system that will biologically convert up to 50 per cent of the methane to carbon dioxide. If the study shows the project as potentially viable, staff will develop a business case and proposed budget, including potential opportunities to leverage external funding, for implementation. If successful, this approach could be applied to other closed landfill sites under Regional control, as appropriate. This project has the potential to significantly reduce methane emissions from closed landfill sites.

7.12 Staff will examine the possible inclusion of supply chain emissions within the corporate GHG inventory and annual reporting. This could provide a broader picture of the Region's influence on activities and related emissions from assets and operations which are necessary for corporate operations, but outside of the Region's control or ownership. These emissions categories may include, but are not limited to, contracted services including waste trucking/haulage and other areas of operations which the Region indirectly influences in its supply chain. Staff are also working to optimize waste management facility operations and haulage to minimize vehicle kilometers travelled to transport waste to disposal locations.

7.13 Staff will examine the potential for carbon offsets and/or renewable energy credits to serve as an offset against corporate GHG emissions. Opportunities may include carbon offsets from the avoided methane emissions in landfills, carbon capture and sequestration or renewable energy credits from the production of RNG. Additional

opportunities to generate emissions reductions from waste operations could include utilization of waste heat generated at DYEC within other Regional or surrounding facilities through district energy systems.

7.14 A summary of the GHG forecast for solid waste management is presented in Figure 8.

Figure 8: Solid Waste Management Short-term GHG Reduction Forecast[5]

Major Planned/Potential Initiatives	Baseline Actual	Actual	Forecast				
	2019	2020	2021	2022	2023	2024	2025
Oshawa Landfill Bio-Cover Pilot			-	-	-	(8,350)	(7,994)
AD-Derived Biogas - RNG Upgrading/Utilization			-	-	-	-	(7,227)
Mixed-Waste Pre-Sort and AD Facility			-	-	-	-	3,454
Total Planned/Potential Initiatives	**101,094**	**108,203**	**-**	**-**	**-**	**(8,350)**	**(11,767)**
Less: Natural Landfill Methane Reduction			(1,835)	(3,591)	(5,273)	(6,883)	(8,425)
Total Planned/Potential Initiatives			**(1,835)**	**(3,591)**	**(5,273)**	**(15,233)**	**(20,192)**
Annual GHG Emissions (t CO_2e)			**106,368**	**104,612**	**102,930**	**92,970**	**88,011**
% Change from 2019 Annual Baseline	**n/a**	**7%**	**5%**	**3%**	**2%**	**-8%**	**-13%**

Note: Totals may not add up due to rounding of numbers.

8. Water and Wastewater (Works Department)

2020 Update and 2021 Accomplishments

8.1 This source of emissions is related to the treatment, storage, and pumping of drinking water and wastewater for the benefit of residents, businesses, and institutions across the Region. Combined, water and wastewater are the largest sources of corporate energy consumption and, in 2020, produced approximately 27,200 tCO2e or 16 per cent of total corporate emissions. These emissions are largely related to wastewater treatment, which includes non-energy GHG emissions, with a small share (>10 per cent) related to drinking water treatment. Energy management programs and equipment replacements which are more energy efficient have limited the growth of emissions.

8.2 In 2021, an Integrated Resource Recovery (IRR) study for the Duffin Creek Water Pollution Control Plant (WPCP) was finalized on behalf of Durham and York

[5] Projections assume all RNG production from proposed Mixed-Waste Pre-Sort and Anaerobic Digestion facility (assumed operations in 2025) is directed towards use in Regional facilities under the Region's natural gas purchasing program. Final strategy regarding self-consumption and/or market sales approach to be developed as project parameters are further known (including potential RNG yields).

Regions. This study outlines several projects with significant GHG reduction potential. Regional Staff will evaluate these projects in collaboration with York Region for inclusion in future annual budgets and the 10-year capital plan.

Next Steps 2022- 2025

8.3 Regional staff in the Works Environmental Services Branch are initiating the development of a Water & Wastewater GHG Emission Management Strategy in 2022. Once complete, recommended actions will be brought forward to Regional Council as part of the annual budget process and 10-year capital plan to help close the gap between forecasted emissions reductions and corporate GHG targets.

8.4 Planned GHG reduction initiatives include significant water supply and sanitary sewerage process and facility upgrades scheduled for 2022 and 2023, together with a potential biogas utilization project for the Courtice WPCP that would transport biogas produced at the plant to the AD facility for comingling and upgrading to RNG for injection into the natural gas distribution system.

8.5 Figure 9 below summarizes forecasted GHG reduction initiatives for water and wastewater services.

Figure 9: Water & Wastewater Short-term GHG Reduction Forecast[6]

Major Planned/Potential Initiatives	Baseline Actual	Actual	Forecast				
	2019	2020	2021	2022	2023	2024	2025
Harmony Creek WPCP Blower Upgrade	27,540	27,164	(17)	(17)	(17)	(17)	(17)
Courtice WPCP Turbo Blower Upgrade			-	(6)	(12)	(12)	(12)
Other CDM-Related Measures at Water and Sewer Facilities			(6)	(43)	(435)	(435)	(435)
Courtice WPCP Biogas Pipeline (RNG/Flaring Avoidance)			-	-	-	-	(904)
Total Planned/Potential Initiatives			**(23)**	**(66)**	**(463)**	**(463)**	**(1,367)**
Annual GHG Emissions (t CO_2e)			**27,141**	**27,098**	**26,701**	**26,701**	**25,797**
% Change from 2019 Annual Baseline	**n/a**	**-1%**	**-1%**	**-2%**	**-3%**	**-3%**	**-6%**

Note: Totals may not add up due to rounding of numbers.

[6] Projections assume all RNG production from proposed Mixed-Waste Pre-Sort and Anaerobic Digestion facility (assumed operations in 2025) is directed towards use in Regional facilities under the Region's natural gas purchasing program. Current incremental Courtice WPCP contemplates only projected flared volumes. Final strategy regarding self-consumption and/or market sales approach to be developed as project parameters are further known (including potential RNG yields).

9. Durham Region Transit (DRT)

2020 Update and 2021 Accomplishments

9.1 The decrease in 2020 DRT emissions compared to 2019 is a result of service reductions in response to a 70 per cent decline in ridership during the COVID-19 pandemic. DRT continued to play a critical role in helping front-line workers and residents to access essential services, and more broadly DRT enabled community - wide GHG emissions reductions by encouraging people to choose alternatives to single occupant vehicle trips. In 2020, Transit produced approximately 16,500 tCO2e or 10 per cent of total corporate emissions.

9.2 In 2021, DRT purchased 4 plug-in hybrid SUVs as well as finalized the specifications for its first 11 hybrid electric buses, funded by the Investing in Canada Infrastructure Plan (ICIP). These hybrid electric buses are expected to be delivered in Q2 2022. DRT also received Council authorization to enter into a negotiated agreements with Oshawa Power and Utilities Corporation (OPUC) and eCamion for the charging equipment and infrastructure at DRT's Oshawa Depots (both Farewell & Raleigh), required to support the battery electric bus pilot scheduled to begin in 2023.

9.3 DRT initiated a feasibility and planning study in 2021 that will inform the fleet transition plan to a zero emission transit fleet. This study will also support the mandatory planning requirements of the federal Zero Emission Transit Fund that will enable DRT to secure capital funding for zero emission buses and the associated infrastructure. The transition plan will be completed in 2022 and presented to Regional Council for approval.

Next Steps 2022-2025

9.4 As outlined in Report #2021-DRT-21 DRT's E-Mission Zero Program includes multiple initiatives to set the foundation for the transition to zero emissions over the next 20 years. Key short-term initiatives to reduce corporate emissions include:

a. Integrated battery electric bus and charging infrastructure demonstration pilot project – DRT will release an RFP to acquire its first eight battery electric buses as part of the battery electric bus pilot. Timing of delivery is uncertain, due to industry supply chain issues. As part of the pilot, DRT is partnering with OPUC, using grant funding from The Atmospheric Fund (TAF), to assess charging infrastructure design and financing options for DRT's Oshawa depot.
b. Zero Emission Bus (ZEB) fleet and facility feasibility study – The study is expected to be completed in the first half of 2022 and will identify a multi-year ZEB fleet, infrastructure, and investment plan to help close the gap between forecasted emissions reductions and corporate GHG reduction targets.
c. Begin construction of a new flagship net zero transit operations and maintenance facility at 2400 Thornton Road in Oshawa, capable of hosting a fleet of zero emission vehicles. Construction is expected to begin in 2024 with completion in 2027.

9.5 Figure 10 summarizes forecasted GHG reduction initiatives for DRT.

Figure 10: DRT Short-term GHG Reduction Forecast

Major Planned/Potential Initiatives	Baseline Actual	Actual	Forecast				
	2019	2020	2021	2022	2023	2024	2025
Fleet Initiatives	21,925	16,457	(1)	(106)	(209)	(209)	(209)
Facility-Based Initiatives			(0)	(1)	(1)	(1)	(1)
Total Planned/Potential Initiatives			**(1)**	**(107)**	**(209)**	**(209)**	**(209)**
Annual GHG Emissions (t CO_2e)			**16,456**	**16,350**	**16,247**	**16,247**	**16,247**
% Change from 2019 Annual Baseline	**n/a**	**-25%**	**-25%**	**-25%**	**-26%**	**-26%**	**-26%**

Note: Totals may not add up due to rounding of numbers.

10. Police Services (DRPS)

2020 Update and 2021 Accomplishments

10.1 In 2020, Police Services produced approximately 6,200 tCO2e or 4 per cent of total corporate emissions. These emissions consist of 72 per cent fleet-related emission and 28 per cent from facilities-related emissions.

10.2 DRPS's 2021 vehicle replacement plan has 10 vehicles (~23 per cent of total) being low carbon vehicles, as noted in Report #2021-F-3. As of September 2021, the DRPS fleet had 46 hybrid electric vehicles in its total fleet of approximately 400 vehicles, representing slightly more than 10 per cent. Existing hybrid pursuit vehicles in the DRPS fleet have shown a 33 per cent fuel efficiency over internal combustion engines.

Next Steps 2022-2025

10.3 DRPS's 2022 vehicle replacement plan has 35 vehicles (64 per cent of total) being low carbon or zero emission vehicles, as noted in Report #2021-F-38. Assuming the total fleet size remains at ~400 vehicles, the share of low carbon vehicles will increase from 10 percent in 2021 to 20 percent in 2022.

10.4 With the approved funding allocated from the climate mitigation and environmental initiatives reserve fund (see Attachment #1) and based on the analysis of measures undertaken by the Works Department's Facilities Design, Construction and Asset Management Division (DCAM), the Clarington Police Complex (CPC) Phase 2 project will incorporate low carbon measures that are anticipated to reduce energy consumption and GHG emissions by approximately 70 per cent over baseline corporate building standards (LEED Silver equivalency). The tender for the construction of the CPC Phase 2 closed on January 20, 2022, with the opening of

the facility forecasted in 2024. The Police Services short-term GHG reduction forecast is presented below in Figure 11.

10.5 Building on DRPS's leadership in adopting low carbon vehicles, a multi-year fleet low carbon transition plan is required to support alignment with corporate GHG targets and the Region's 10-year capital plan including consideration of charging infrastructure needs to support the move to plug-in hybrid and battery electric vehicles, where operationally feasible.

Figure 11: Police Services Short-term GHG Reduction Forecast

Major Planned/Potential Initiatives	Baseline Actual	Actual	Forecast				
	2019	2020	2021	2022	2023	2024	2025
Fleet Initiatives	5,958	6,198	(71)	(251)	(489)	(750)	(1,011)
Facility-Based Initiatives			(4)	(5)	(5)	(5)	(5)
New DRPS Clarington Police Complex Phase 2			-	-	-	-	663
Total Planned/Potential Initiatives			**(75)**	**(256)**	**(494)**	**(755)**	**(352)**
Annual GHG Emissions (t CO_2e)			**6,122**	**5,941**	**5,704**	**5,443**	**5,845**
% Change from 2019 Annual Baseline	**n/a**	**4%**	**3%**	**0%**	**-4%**	**-9%**	**-2%**

Note: Totals may not add up due to rounding of numbers.

11. Social Services

2020 Update and 2021 Accomplishments

11.1 Corporate emissions are generated through the operation of long-term care (LTC) homes, Durham Region Local Housing Corporation (DRLHC) multi-unit residential properties, and Regionally-operated childcare facilities. In 2020, Social Services produced approximately 6,800 tCO2e or 4 per cent of total corporate emissions with roughly 2/3 related to long-term care homes, and 1/3 related to DRLHC operations (Regional childcare facilities represent approximately 1 per cent of the total).

Next Steps 2022-2025

11.2 Major 2022 initiatives include the implementation of a deep energy retrofit at DRLHC's King Charles Court property located at 155 King St. E, Oshawa, and energy envelope upgrade projects at Harwood Manor at 655 Harwood Avenue in Ajax and Windsor Place at 315 Colborne Street in Whitby.

11.3 In addition to the retrofit work, both the Beaverton Supportive Housing facility and the Oshawa micro-homes pilot units have been designed to operate using only electricity as an energy source (i.e. no on-site natural gas consumption).

Furthermore, the proposed rooftop solar PV array for the Beaverton facility is being designed with capacity to generate up to 50 per cent of the building's electrical requirements. The only GHG emissions that will be associated with the operation of these supportive housing units will be electricity grid related emissions.

11.4 Looking forward to 2025, Regional staff are advancing plans for deep retrofits at four of DRLHC's multi-unit residential seniors buildings as outlined in Report #2021-COW-35, as well as a potential rooftop solar PV installation at Fairview Lodge LTC facility. The Social Services short-term GHG reduction forecast is presented below in Figure 12.

11.5 Given the relatively large share of Regional facility energy costs and GHG emissions that are currently associated with the LTC portfolio, combined with anticipated future increases in service demands associated with an aging population, Regional staff will explore the development of a portfolio-wide energy and emissions plan for the Region's LTC facilities to better align this operating area with Council-approved GHG reduction targets.

11.6 In addition to the review of existing long term care (LTC) stock, DCAM has included options in the updated construction cost estimate for the proposed 200 bed Seaton LTC to provide for a 91 per cent reduction in the facility's estimated operational carbon emissions when compared to a traditional base building design standard. The measures also prepare this facility for the addition of future carbon emission reduction options to move this facility to zero carbon emissions in the future.

Figure 12: Social Services Short-term GHG Reduction Forecast

Major Planned/Potential Initiatives	Baseline Actual	Actual	Forecast				
	2019	2020	2021	2022	2023	2024	2025
FCM Sustainable Affordable Housing (SAH) Fund Initiative	6,968	6,816	-	-	-	-	(325)
Social Housing Apartment Improvement Program (non-SAH)			-	(54)	(54)	(54)	(54)
Other Facility-Based Initiatives			-	-	(14)	(14)	(14)
Total Planned/Potential Initiatives			**-**	**(54)**	**(67)**	**(67)**	**(392)**
Annual GHG Emissions (t CO_2e)			**6,816**	**6,763**	**6,749**	**6,749**	**6,424**
% Change from 2019 Annual Baseline	**n/a**	**-2%**	**-2%**	**-3%**	**-3%**	**-3%**	**-8%**

Note: Totals may not add up due to rounding of numbers.

12. Public Works and Corporate Fleet Operations (excluding Transit, Police, and Paramedic Services)

2020 Update and 2021 Accomplishments

12.1 This category comprises emissions associated with Works Department fleet vehicles and depots used to support the operation and maintenance of the Regional Road network and other Regional infrastructure and facilities. In 2020, Works Fleet & Depots produced approximately 4,800 tCO2e or 3 per cent of total corporate emissions, largely related to vehicle fuel consumption.

12.2 In 2021, Works fleet purchased 9 plug-in hybrid SUVs, replacing 7 internal combustion engines, and adding 2 additional plug-in hybrid SUVs to the finance and Ajax Water Supply Plant fleets. Works Fleet Operations also launched a new fleet data management platform, Maximo, that will assist in data management for fleet operations, maintenance, and fuel consumption.

Next Steps 2022-2025

12.3 Works is planning to pilot a battery EV and a dual fuel-propane pickup truck in 2023, as future fleet options. Forecasted Works Fleet GHG reductions to 2025 are presented in Figure 13.

12.4 Installation of EV chargers at various facilities to support the transition to electric vehicles is underway. A total of eight (8) Level 2 charging stations for light duty fleet vehicles were installed in 2021, and an additional 45 Level 2 stations are proposed in the 2022 budget to support corporate fleet electrification.

Figure 13: Public Works Short-term GHG Reduction Forecast

Major Planned/Potential Initiatives	Baseline Actual	Actual	Forecast				
	2019	2020	2021	2022	2023	2024	2025
Fleet Initiatives	5,103	4,753	(1)	(1)	(1)	(1)	(1)
Facility-Based			(0)	(4)	(15)	(26)	(37)
Total Planned/Potential Initiatives			**(2)**	**(5)**	**(16)**	**(27)**	**(38)**
Annual GHG Emissions (t CO_2e)			**4,752**	**4,748**	**4,737**	**4,726**	**4,715**
% Change from 2019 Annual Baseline	**n/a**	**-7%**	**-7%**	**-7%**	**-7%**	**-7%**	**-8%**

Note: Totals may not add up due to rounding of numbers.

13. Paramedic Services (RDPS)

2020 Update and 2021 Accomplishments

13.1 RDPS produces GHGs through energy consumption in fleet (e.g. ambulances and support vehicles) and buildings. In 2020, Paramedic Services produced approximately 1,600 tCO_2e or 1 per cent of total corporate emissions. These emissions consist of 78 per cent fleet and 22 per cent facilities.

13.2 Key 2021 initiatives to reduce RDPS's GHG emissions include the acquisition of the fleet's first set of 5 hybrid-electric ambulances. RDPS is joining other Ontario ambulance services in adopting hybrid vehicles, including the Toronto Paramedic Services who announced a conversion of more than 100 of their ambulances to hybrid in 2021 following a successful pilot launched in 2018, as well as smaller Ontario jurisdictions such as Oxford County and Essex-Windsor EMS services. Industry pilots show a 25 per cent fuel efficiency when converting to hybrid ambulances.

Next Steps 2022-2025

13.3 Looking forward to 2025 key initiatives include the planned acquisition of an additional 5 hybrid-electric ambulances (2022) as replacement vehicles, as well as the planned construction of the new RDPS Station and Training Facility in Seaton to a high-performance low carbon standard. With approved funding from the climate mitigation and environmental initiatives reserve fund (see Attachment #1) and based on the analysis of measures undertaken by Works DCAM staff, the Seaton RDPS Station has been designed to achieve 70 percent GHG emissions reductions as compared to a baseline building built to Ontario Building Code. The RDPS short-term GHG reduction forecast is presented below in Figure 14.

Figure 14: Paramedic Services Short-term GHG Reduction Forecast

Major Planned/Potential Initiatives	Baseline Actual	Actual	Forecast				
	2019	2020	2021	2022	2023	2024	2025
Fleet Initiatives	1,854	1,558	(2)	(31)	(63)	(63)	(63)
New Seaton RDPS Station			-	-	3	3	3
Total Planned/Potential Initiatives			**(2)**	**(31)**	**(60)**	**(60)**	**(60)**
Annual GHG Emissions (t CO_2e)			**1,556**	**1,527**	**1,498**	**1,498**	**1,498**
% Change from 2019 Annual Baseline	**n/a**	**-16%**	**-16%**	**-18%**	**-19%**	**-19%**	**-19%**

Note: Totals may not add up due to rounding of numbers.

14. Administration & Miscellaneous/Other

2020 Update and 2021 Accomplishments

14.1 This source of emissions is primarily related to energy consumption at Regional Headquarters (RHQ). While comprising a small portion of total corporate GHG emissions (~1 per cent in 2020), action in this area is important because office buildings represent a larger share of community-wide emissions. With RHQ as a flagship public-facing facility, action to reduce emissions shows leadership by providing example of what can be done, demonstrating success, and sharing lessons learned with other public and private sector office building owners and operators across the Region.

14.2 Key 2021 initiatives to reduce GHG emissions in this area include the Workplace Modernization Project at RHQ, and the adoption of a hybrid workplace model. Through WMP, the Region avoids the need to expand Regional Headquarters and eliminates the associated GHG emissions from facility construction and operations. Reduced employee commuting will also result in emissions reductions that will be reflected in the community-wide GHG inventory.

14.3 Lighting retrofit work has progressed within RHQ, converting the previous fluorescent lighting with LED. Energy efficiency is also a key consideration in all maintenance work undertaken to reduce the building's emissions footprint.

Next Steps 2022-2025

14.4 Looking forward to 2025, GHG reduction initiatives in the capital forecast include a rooftop solar PV installation at RHQ (a detailed engineering study is currently underway) and building automation systems (BAS) upgrades. Anticipated GHG reductions from planned initiatives in Administration are presented in Figure 15.

14.5 Deep building retrofit work will also be undertaken as part of the Workplace Modernization work being undertaken at the 101 Consumers Dr., Whitby location. The incorporation of deep energy retrofit measures into the optimization and modernization of this building will reduce the GHG emissions by approximately 58 per cent while providing the stage for future reduction measures including a solar PV array installation.

Figure 15: Administration & Miscellaneous Short-term GHG Forecast

Major Planned/Potential Initiatives	Baseline Actual	Actual	Forecast				
	2019	2020	2021	2022	2023	2024	2025
Facility-Based Initiatives	1,077	942	(22)	(22)	(25)	(25)	(25)
Total Planned/Potential Initiatives			**(22)**	**(22)**	**(25)**	**(25)**	**(25)**
Annual GHG Emissions (t CO_2e)			**920**	**920**	**918**	**918**	**918**
% Change from 2019 Annual Baseline	**n/a**	**-13%**	**-15%**	**-15%**	**-15%**	**-15%**	**-15%**

Note: Totals may not add up due to rounding of numbers.

15. Summary 2021 – 2025 Short-term Corporate GHG Reduction Forecast and Corporate Priorities

15.1 The CCAP provided a preliminary list of GHG reduction priorities as presented in Figure 16. This list has been updated to reflect the current status of budgeted, planned and/or potential projects that have been summarized in the report above.

Figure 16: Short-term Corporate GHG Reduction Priorities

Operating Area	GHG Reduction Initiative(s)	CCAP identified short-term GHG reduction impacts by 2025	Updated short-term GHG reduction projects by 2025
Solid Waste	Renewable Natural Gas ((RNG) production	0 - 7,500 tCO_2e	4,677 tCO_2e
Solid Waste	Landfills	12,000 tCO_2e	16,419 tCO_2e
Corporate Facilities	Energy efficiency, and deep energy retrofits	1,000 - 2,000 tCO_2e	220 tCO_2e
Corporate Fleet	Transition to low carbon & zero-emission vehicles	2,000 - 4,000 tCO_2e	1,319 tCO_2e
Total		15,000 – 25,500 tCO_2e	22,635 tCO_2e
GHG emissions reduction target		33,900 tCO_2e	34,300 tCO_2e
% of target		44% to 75%	66%

Note: While Courtice WPCP-derived biogas upgraded to RNG is included within Figure 9 totals for Water and Wastewater Short-Term GHG Reduction Forecast, it is included above in the Renewable Natural Gas broad category totals.

15.2 As Figure 16 demonstrates, there is potential for significant emissions reductions in solid waste management forecast due to signature projects like the Mixed-Waste Pre-Sort and Anaerobic Digestion facility and its related RNG potential, as well as the proposed landfill biocover project. These potential actions, if implemented, would account for more than 90 per cent of the potential estimate emissions reductions in 2025.

15.3 Additional planning is being undertaken to identify opportunities in corporate facilities and fleets across all operational areas to build measures into the annual budget cycle and 10-year capital forecast and close the gap between projected emissions, and the Council-approved 2025 Corporate GHG emission reduction target.

Cross-corporate climate action priorities

15.4 Given the relatively short timeline for turnover of Regional fleets (e.g. 5 to 7 years), in 2022 Regional staff will focus on integrating a low and zero carbon lens into the current fleet management program. Staff will develop data-driven fleet transition plans for relevant operating areas, including planning for necessary charging infrastructure at the facility-level to support zero emissions vehicle adoption. Note that the Region has been successful in securing federal government funding for electric vehicle charging stations in collaboration with local area municipalities and other entities through the Zero Emission Vehicle Infrastructure Program (ZEVIP). With successful ZEVIP funding submissions through Round 1 and 2 to support public charging and light duty fleets, respectively (and potential funding support under Round 3), the Region and local partners are planning for the installation of more than 100 Level 2 and 3 EV charging stations across the Region for public and fleet use over the coming years.

15.5 Works DCAM staff are leading the development of a Durham Standard to provide direction for low carbon new development and retrofits of Regional facilities. This standard will provide a framework for decision-making in terms of sustainability and resilience, space optimization, accessibility/inclusivity for facility-based capital projects with quantifiable and measurable outcomes. The Durham Standard is currently being finalized and anticipated to be presented to Council as early as Q2 2022. This document will assist in reducing GHG emissions of existing buildings and minimizing the footprint of new facilities.

15.6 As approved in Finance and Administration Committee Report #2021-F-31, comprehensive building condition assessments and ASHRAE Level 3 energy audits are commencing. This analysis will determine the measures recommended for each facility portfolio and provide the basis for the development of the GHG reduction plan and pathway for Regional buildings. The actions coming from this plan will be included in future capital budgets, prioritized by both reductions achieved and state of good repair needs.

15.7 Staff are evaluating options for corporate-wide data tracking platforms for both facilities and fleet. Operating areas have variable data tracking methods, and currently reporting is produced manually by staff which is labour intensive and lacks robust reporting capabilities. It is anticipated that enterprise-wide energy data tracking and reporting platforms will be implemented in 2022.

16. Conclusion

16.1 This report provides an update on progress with implementation of the Corporate Climate Action Plan (CCAP), including a GHG emissions forecast to 2025 by operating area. The report also identifies recommended next steps to better align the corporate emissions forecast with Council approved interim 2025 GHG reduction target of 20 per cent below 2019 levels.

16.2 Based on projects that are budgeted or included in the 10-year capital plan, Regional staff are forecasting a 13 per cent reduction by 2025 (as measured from 2019 baseline). Recognizing that 2021 was the first year that climate considerations were directly incorporated into the annual budget process, departmental alignment with Council endorsed corporate GHG targets remains a work in progress.

16.3 In several cases, departments are in the process of developing portfolio-wide decarbonization plans for assets within their portfolio of responsibility (e.g. DRT zero emission transition plan, water and wastewater GHG emission management strategy, corporate facility master carbon reduction pathway and plan, and long-term waste management plan). The results of these initiatives will be reflected in future updates to the corporate carbon forecast included as part of annual progress updates to Council.

16.4 This report has been reviewed by staff in Works, Finance, Social Services, Transit, DRPS, and RDPS.

16.5 For additional information, contact: Ian McVey, Manager, Sustainability, at 905-668-7711, extension 3803.

16.6 Approved by Sandra Austin, Director Strategic Initiatives, 905-668-7711, extension 2449.

17. Relationship to Strategic Plan

17.1 This report aligns with the following strategic goals and priorities in the Durham Region Strategic Plan:

a. Goal #1 – Environmental Sustainability

- Accelerate the adoption of green technologies and clean energy solutions through strategic partnerships and investment
- Demonstrate leadership in sustainability and addressing climate change

18. Attachments

Attachment #1: Status of Climate Mitigation and Environmental Initiatives Reserve Fund

Respectfully submitted,

Original signed by

Elaine C. Baxter-Trahair
Chief Administrative Officer

Attachment #1: Status of Climate Mitigation and Environmental Initiatives Reserve Fund

Project	Details	Proposed Investment
Total Reserve Funding		**$5,250,000**
Corporate high-performance new buildings	**Incremental additional investment to meet net zero energy performance in new corporate facilities**	
Seaton RDPS Station	Installation of a geothermal system with an estimated incremental cost of $745,000 and installation of solar panels at a cost of $162,000 over the base design.	$907,000
Durham Region Police Service Clarington Complex Phase 2 Project	Enhanced envelope and HVAC measures	$1,342,700
Corporate deep energy retrofits of existing corporate facilities	**Rooftop solar, energy audits, social housing retrofits**	
Housing portfolio retrofits	Focus on DRLHC multi-unit seniors' buildings with opportunity to leverage FCM Social Affordable Housing program funding.	$1,000,000
Landfill Biocover Pilot Project	Development of landfill biocover project at Oshawa landfill.	$500,000
Durham Community Energy Plan (DCEP) Implementation	**Funding to support launch of priority programs identified as part of DCEP's Low Carbon Pathway**	
Durham Greener Homes Program (home energy retrofits)	Leverage funding to secure funding from the Federation of Canadian Municipalities' Community Efficiency Financing Program	$350,000
Region-wide nature-based climate solutions program	**Enhance tree planting and stewardship programs in partnership with Conservation Authorities and non-profit partners**	
Tree Planting Programs	Partnership with five Conservation Authorities to expand private land tree planting with a goal of 740,000 trees planted by 2025.	$439,000
Adaptation studies	**Urban flood risk vulnerability assessment and public health climate vulnerability assessment**	
Adaptation and Risk Assessment	Match funding Ajax/Pickering shoreline hazard assessment	$100,000
Total project commitments to date		**$4,638,700**
Total uncommitted funds		**$611,300**