



City of Kingston Corporate GHG Inventory Report – 2021

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Prepared For:

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Executive Summary

This report provides updated greenhouse gas (GHG) emissions inventory for the Corporation of the City of Kingston for the years 2020 and 2021. The scope of the report includes municipal operations from the Corporation of the City of Kingston (and Utilities Kingston for conducting water and wastewater operations on the City's behalf). Data sources for the report were provided by the City of Kingston and Utilities Kingston. Energy and emissions are measured in the report as total energy consumption (GJ), total GHG emissions (tCO₂e), and energy expenditures (\$). A complete description of methods, data, and emission factors used for these results are available in the Supplemental Information Report.

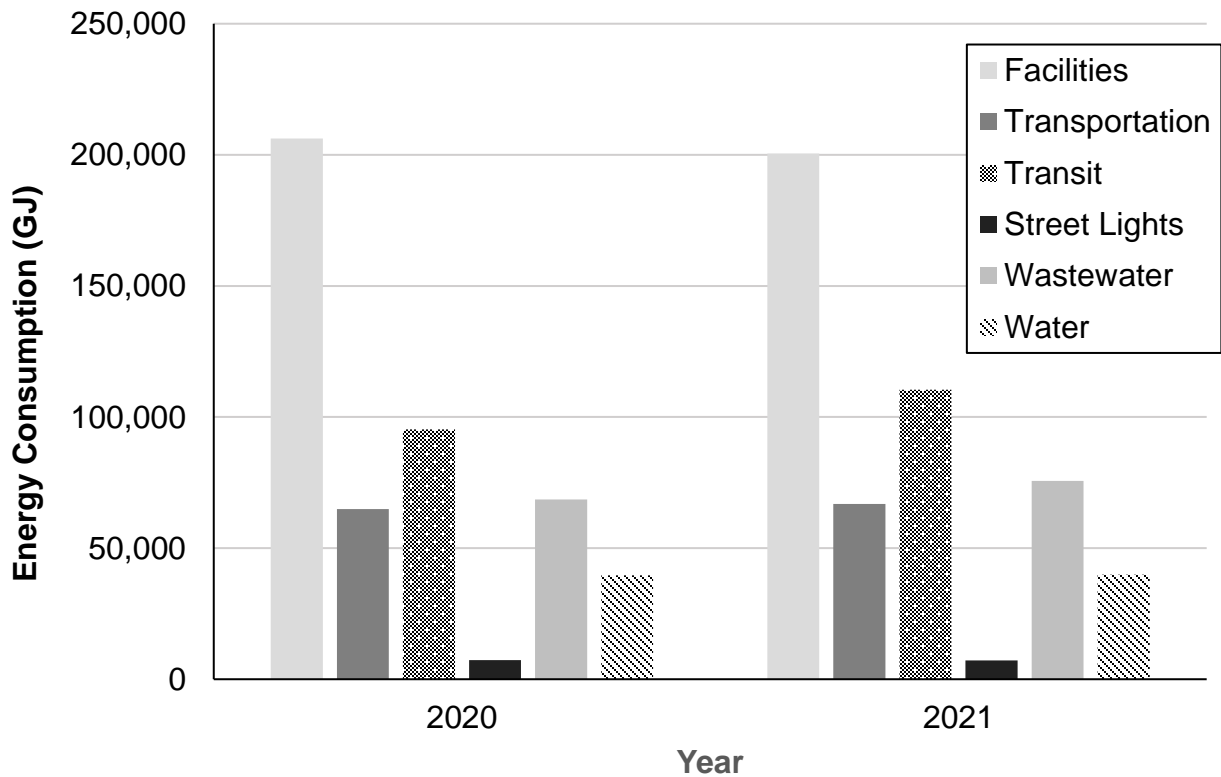
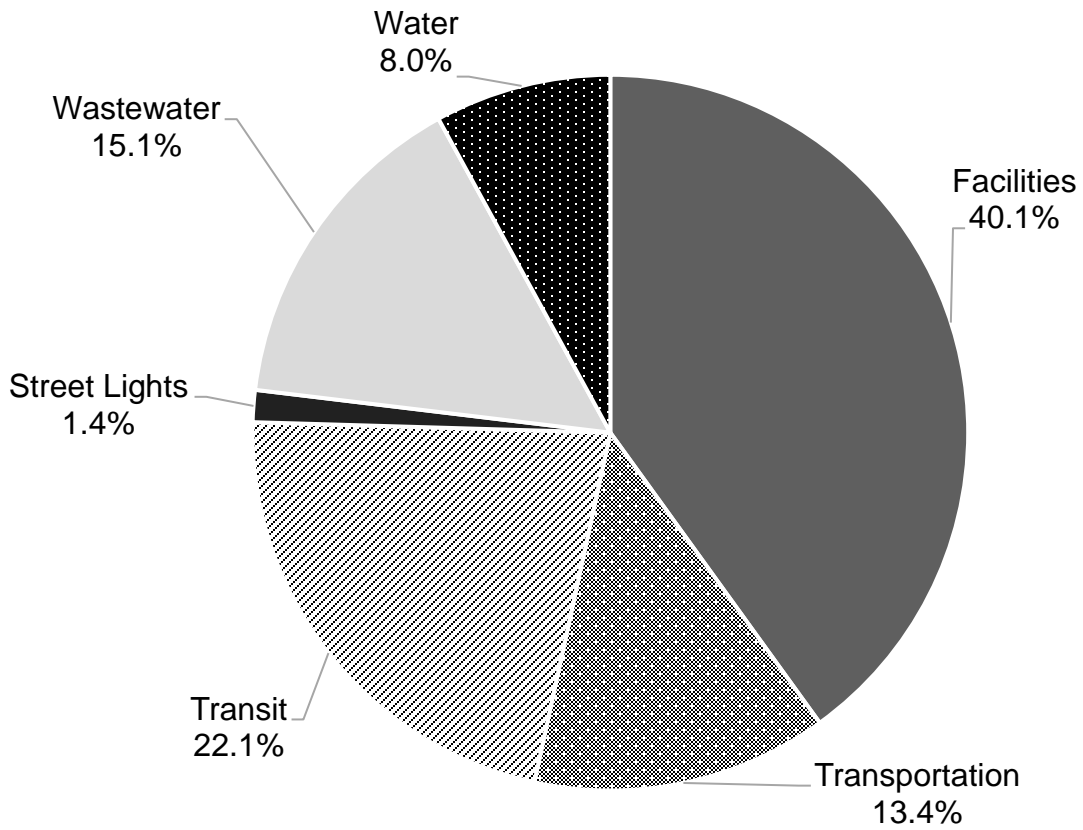
Some updated facilities data was added to the original 2020 inventory but these were minor adjustments that changed 2020 results by less than 0.8%. Working directly with sectors to improve and standardize reporting scopes and boundaries has helped minimize uncertainty between inventory years. As part of the City's ongoing approach to improve inventory results, expansion of Waste and Transportation sector scopes over the next few years will look to continue that trend of ensuring that as facilities, energy use, and services evolve, the corporate inventory remains comprehensive.

The 2020 inventory year saw a significant decrease in overall GHG emissions (~18%) due to the effects of shutdowns related to covid-19. It is unlikely that the 2021 inventory results in this report reflect true 'business-as-usual' emission patterns yet, however they are likely more normal than the 2020 emissions and provide a good estimation for 2022 inventory results. A summary of the 2021 results is provided below:

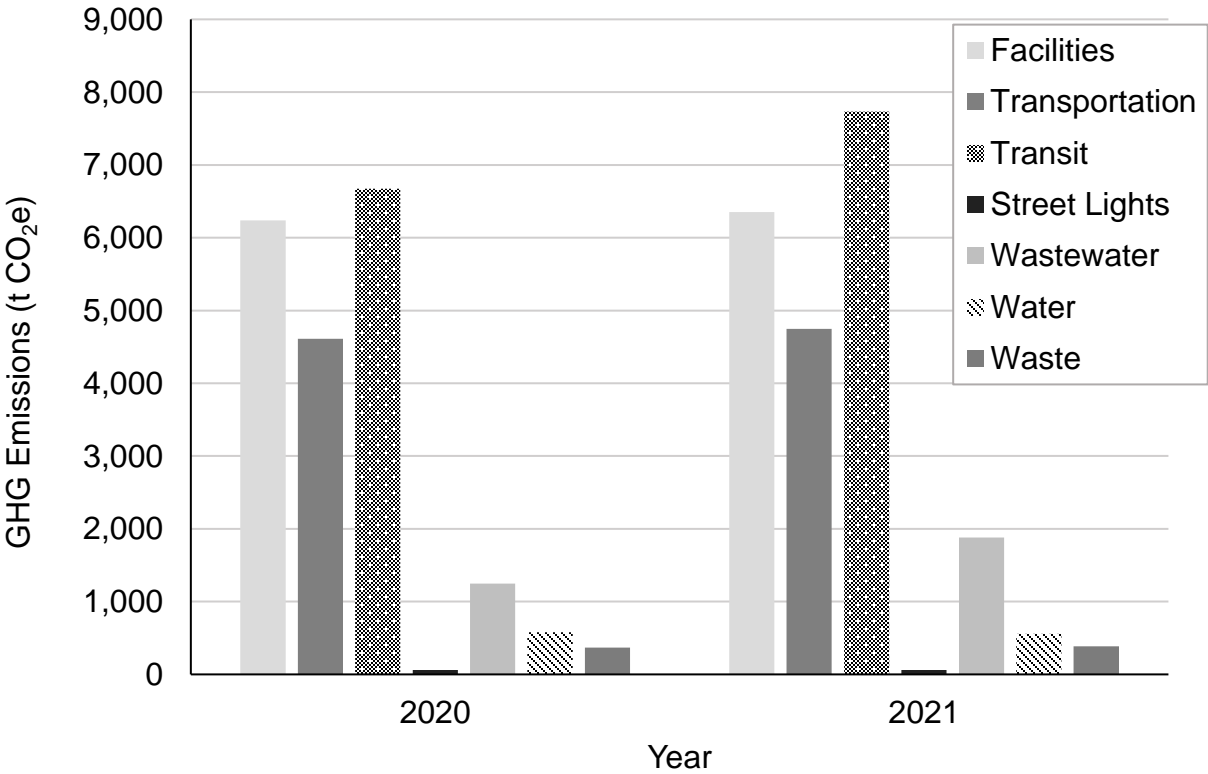
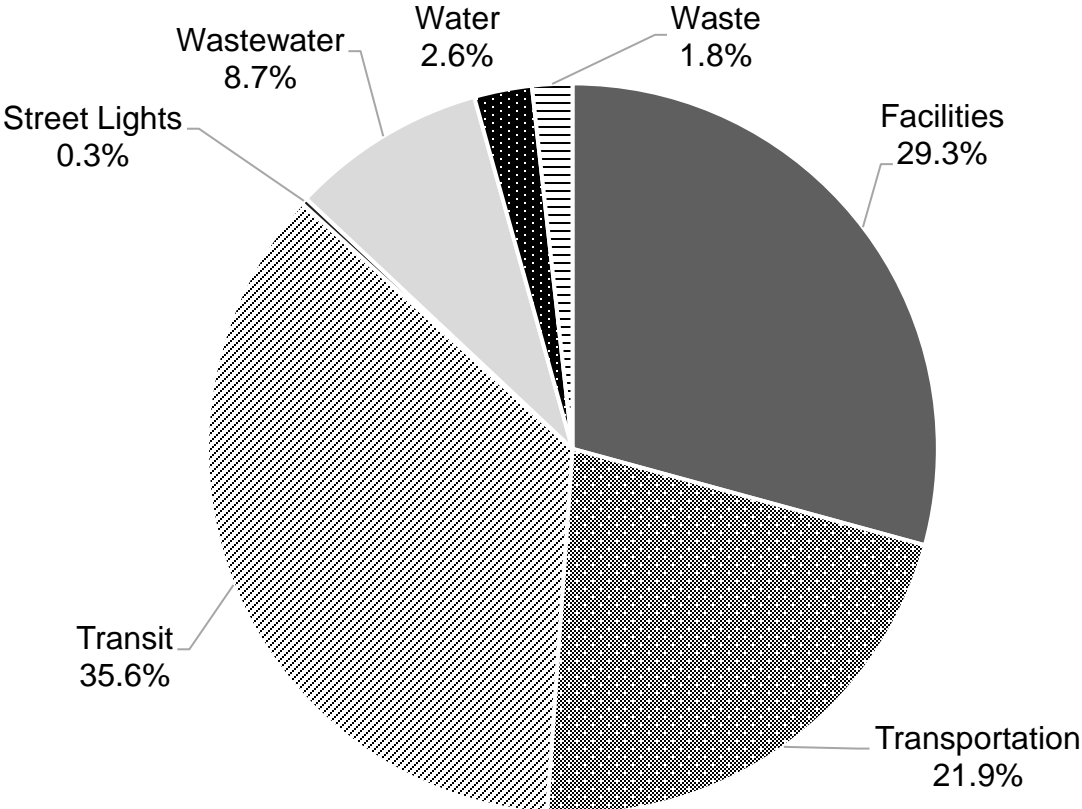
Summary of Results

1. Overall, corporate annual GHG emissions remained 9.3% lower than 2019 results. There were 2,224 less tonnes of CO₂e emitted in 2021 than in 2019.
2. There were 1,940 more tonnes of CO₂e emitted in 2021 than in 2020, a 9.8% increase from the first year of the pandemic.
3. More than half (54.7%) of the increase in emissions from 2020 came from increased diesel consumption in the Transit sector, which added 1,940 tonnes.
4. The second largest increase from 2020 results (32.7%) came in the wastewater sector which added an additional 634 tonnes in 2021.

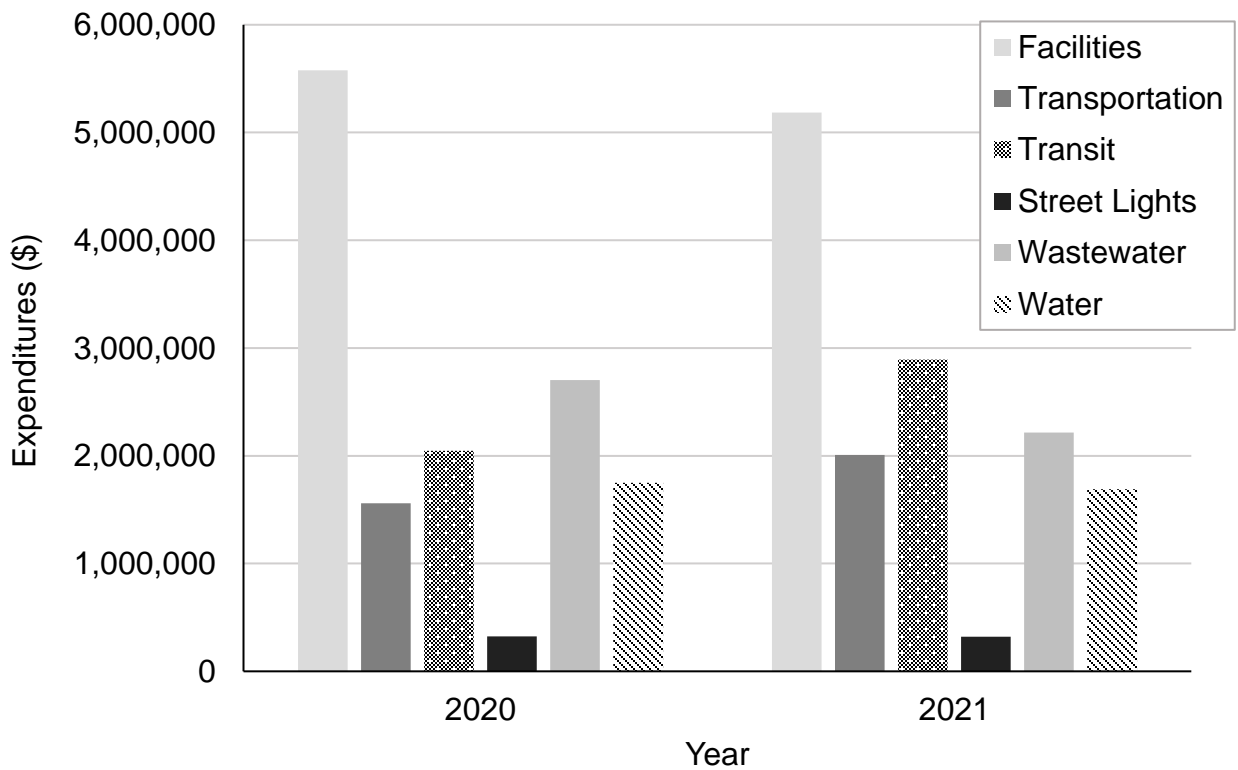
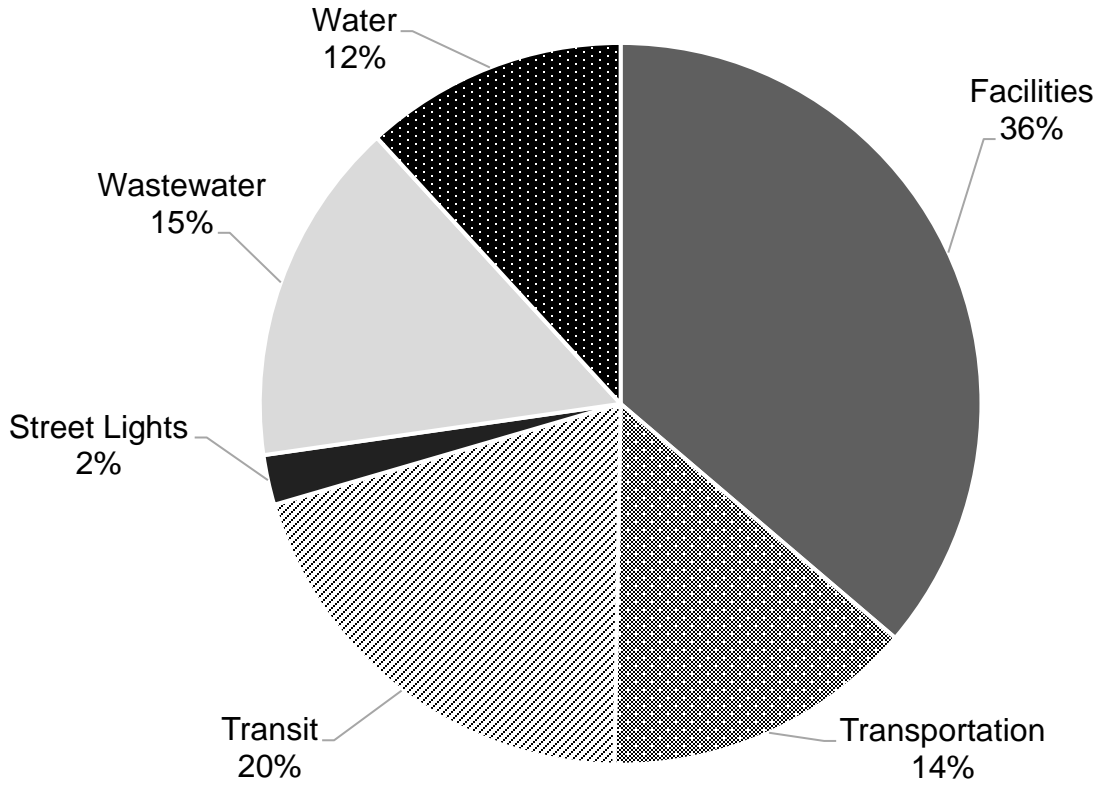
2021 Energy Consumption by sector (total: 500,554 GJ) and historical trend



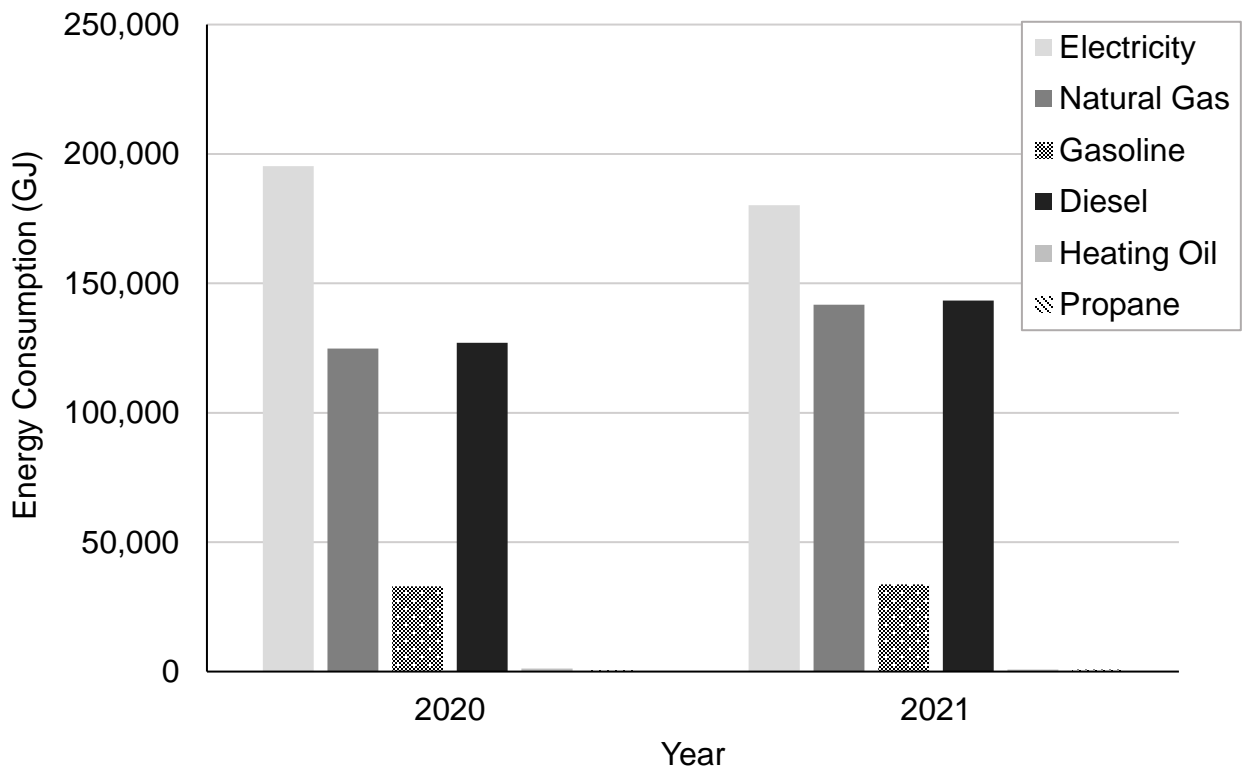
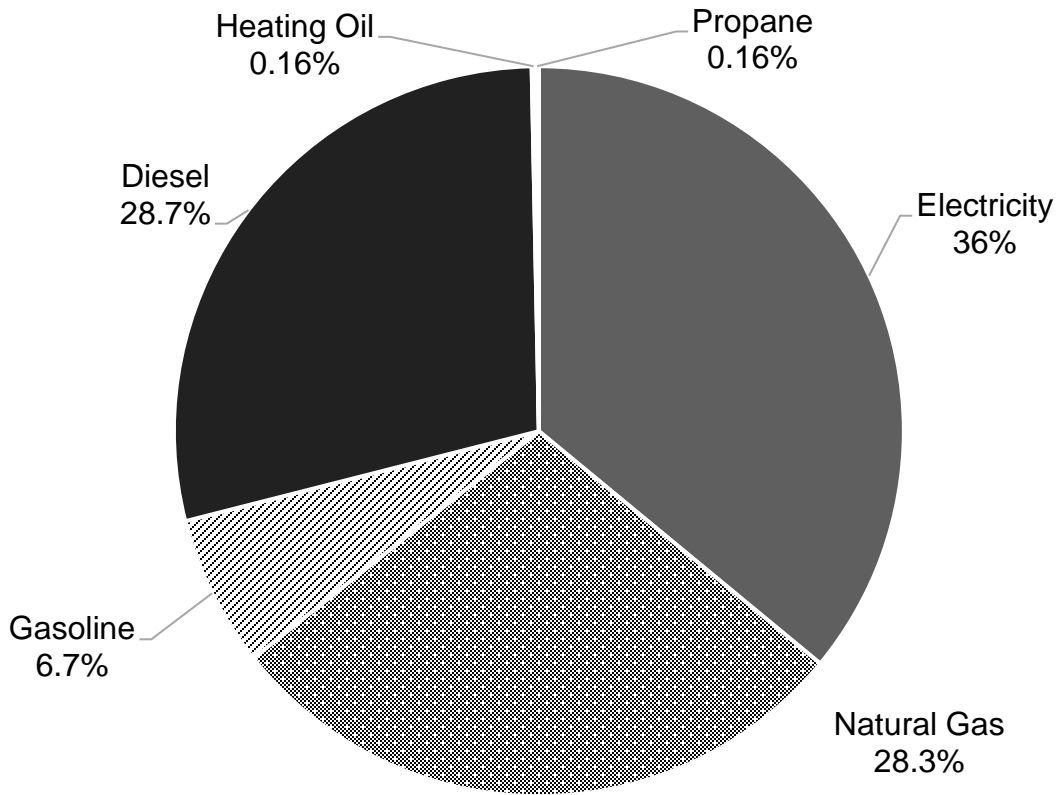
2021 GHG Emissions by sector (total: 21,717 tonnes CO₂e) and historical trend



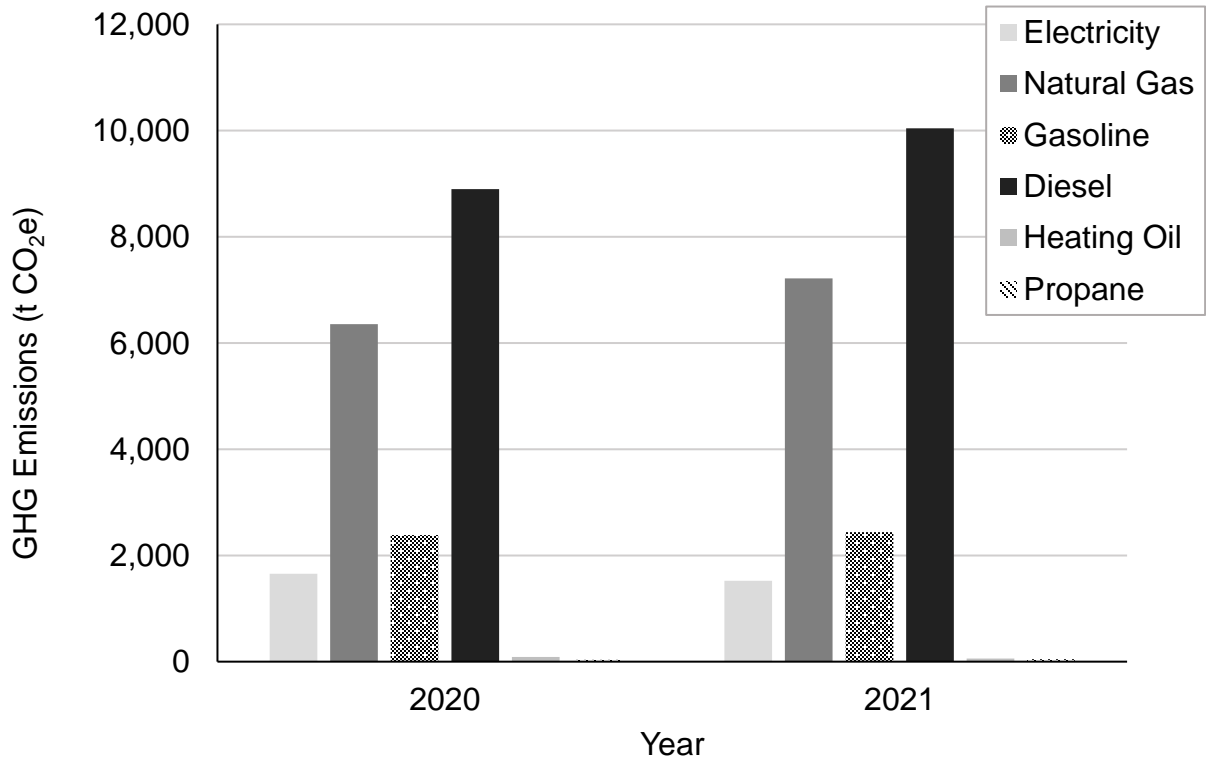
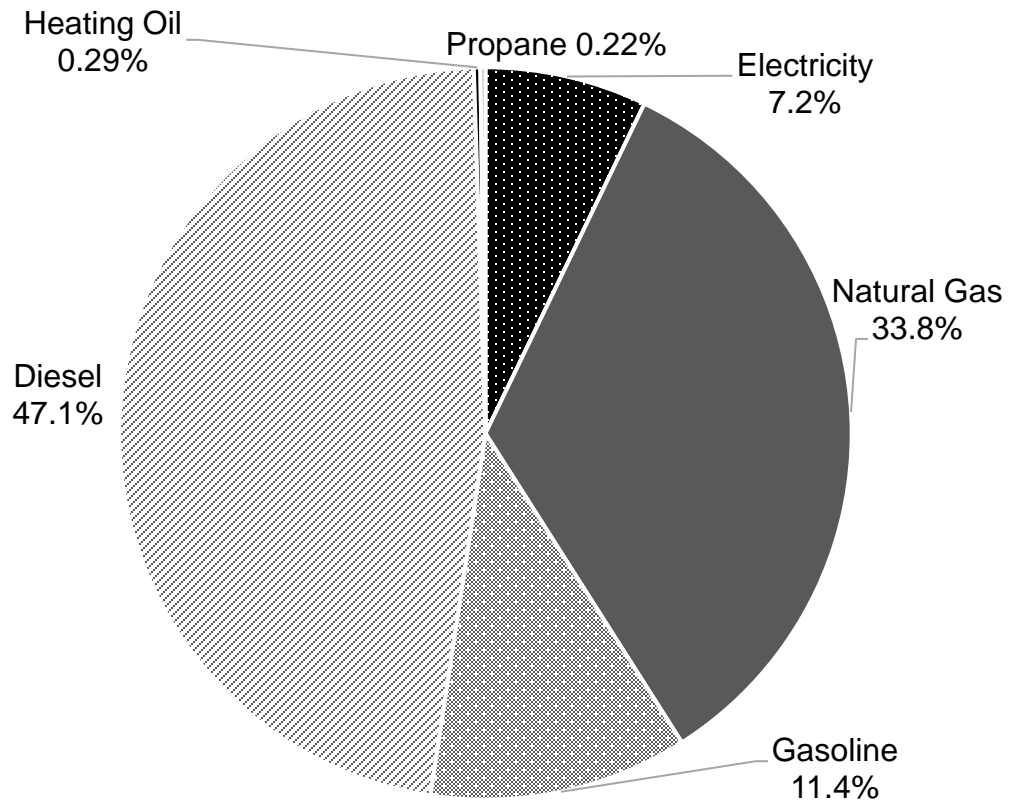
2021 Expenditures by sector (total: \$14,313,408) and historical trend



2021 Energy Consumption by source (total: 500,554 GJ) and historical trend



2021 GHG Emissions by source (total: 21,331 tonnes CO₂e) and historical trend



2021 Expenditures by source (total: \$14,313,408) and historical trend

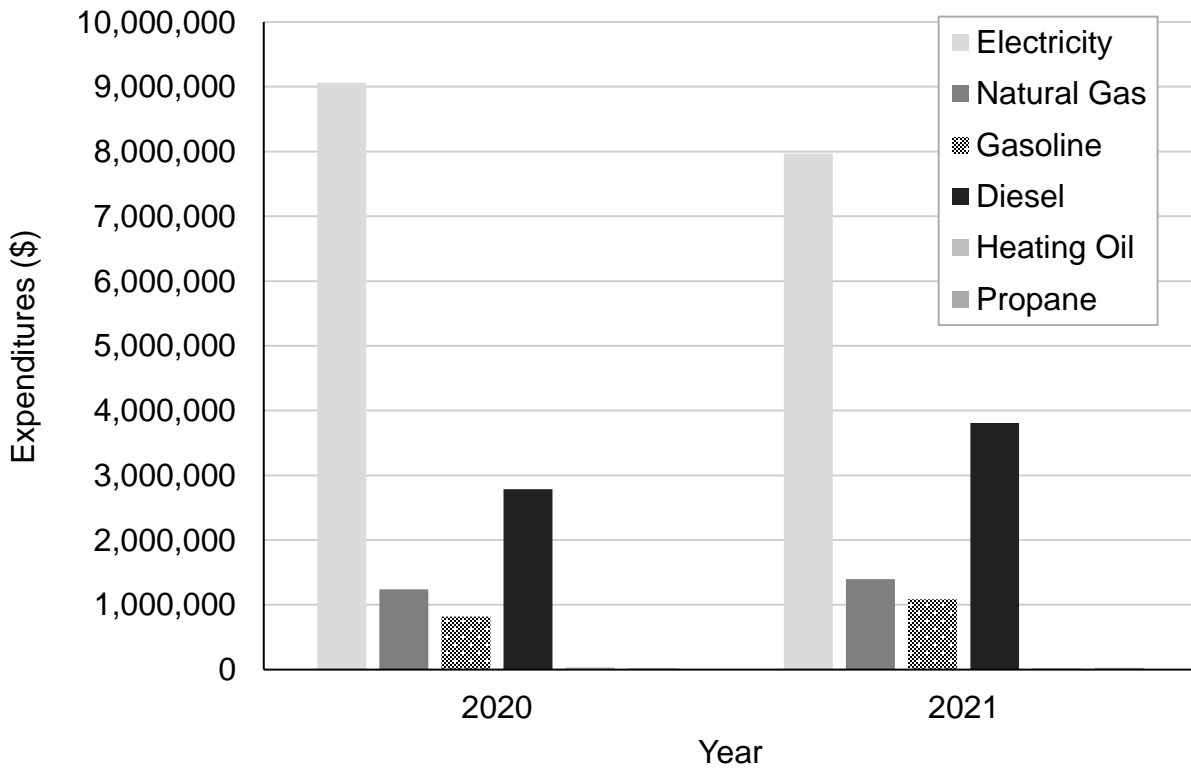
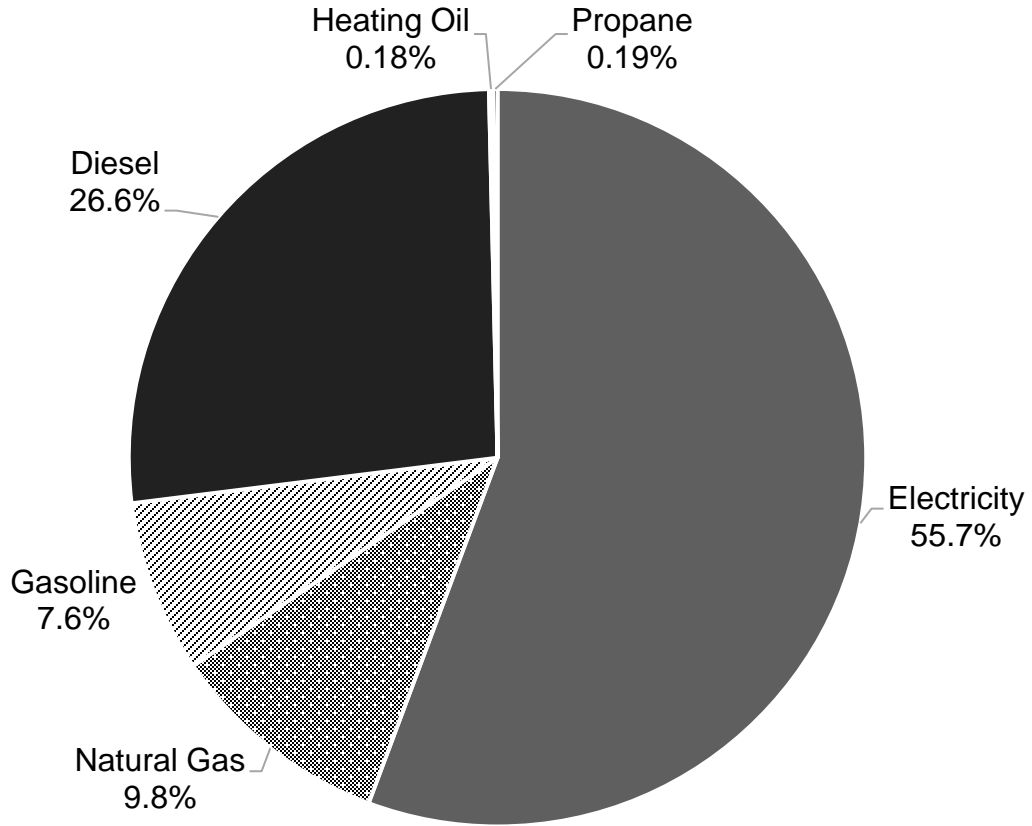


Table 1. Summary of energy consumption (GJ), GHG emissions (t CO₂e), and expenditures (\$) for 2020 - 2021 across all sectors.

Sector	2020			2021			Energy Consumption Change (GJ)	GHG Emissions Change (tCO ₂ e)	Expenditure Change (\$)
	Energy Consumption (GJ)	GHG Emissions (t CO ₂ e)	Expenditure (\$)	Energy Consumption (GJ)	GHG Emissions (t CO ₂ e)	Expenditure (\$ million)			
Facilities	206,171	6,240	5,576,650	200,475	6,352	5,186,623	-5,696	113	-390,027.80
Transportation	64,837	4,611	1,560,441	66,860	4,748	2,009,321	2,023	137	448,880.45
Transit	95,253	6,672	2,047,919	110,421	7,733	2,893,048	15,167	1,062	845,129.16
Street Lights	7,308	62	324,551	7,221	61	320,721	-86	-1	-3,830.66
Wastewater	68,578	1,246	2,703,434	75,661	1,880	2,214,532	7,083	634	-488,902.43
Water	39,587	578	1,748,515	39,915	556	1,689,163	328	-22	-59,352.01
Waste	0	369	0	0	386	0	0	16	0.00
TOTAL	481,734	19,777	13,961,511	500,554	21,717	14,313,408	18,820	1,940	351,897

Table 2. Summary of energy consumption (GJ), GHG emissions (t CO₂e), and expenditures (\$) for 2020 - 2021 for energy sources.

Energy Source	2020			2021			Energy Consumption Change (GJ)	GHG Emissions Change (tCO ₂ e)	Expenditure Change (\$)
	Energy Consumption (GJ)	GHG Emissions (t CO ₂ e)	Expenditure (\$)	Energy Consumption (GJ)	GHG Emissions (t CO ₂ e)	Expenditure (\$)			
Electricity	195,277	1,653	9,062,231.08	180,140	1,525	7,970,198.62	-15,138	-128	-1,092,032.46
Natural Gas	124,764	6,353	1,240,036.37	141,757	7,218	1,397,732.74	16,994	865	157,696.36
Gasoline	32,938	2,384	817,863.95	33,658	2,436	1,084,660.16	719	52	266,796.21
Diesel	127,044	8,897	2,785,691.36	143,406	10,043	3,808,059.16	16,362	1,146	1,022,367.80
Heating Oil	1,137	86	35,596.59	809	61	25,330.19	-328	-25	-10,266.40
Propane	574	35	20,092.01	784	47	27,427.20	210	13	7,335.19
TOTAL	481,734	19,408	13,961,511	500,554	21,331	14,313,408	18,820	1,923	351,897

Report Takeaways

- Annual corporate GHGs have been reduced by 9.3% since 2019, a total of 2,224 tonnes.
- In order to achieve a 15% reduction in GHGs by 2022 at the corporate scope, a target of 21,334 tonnes CO_{2e} for 2021 was budgeted. The actual 2021 emissions of 21,717 tonnes CO_{2e} exceeded the budget by 383 tonnes.
- Despite many City-owned building having higher occupancy and use rates in 2021, the Facilities sector remained more than 13% below 2018 emissions. Heating degree days (HDD) were similar to 2020 and only decreased by around 3%, and a modest reduction (10%) in cooling degree days (CDD) occurred. This suggests that recent energy retrofit initiatives are beginning to have a significant effect in the facilities sector and will be important to continue to reach 2022 reduction targets.
- The large increase in Transit emissions highlights the challenge in reducing GHGs at the community and corporate scale simultaneously. While increasing Transit use across the City reduces GHG emissions at the community scale, use of diesel-powered buses increases GHG emissions at the corporate scale. Increasing the rate of bus changeover from diesel to electric will become increasingly important in the next few years in order to help reduce GHG emissions associated with Transit, as ridership is likely to increase.
- Increases in GHG emissions from wastewater from 2020 are likely associated with increases in wastewater production from business and other facilities as they continued re-opening across the City in 2021. From a historical perspective, GHG emissions from wastewater are about the same as those from 2018, and less than the emissions from wastewater in 2019, suggesting that on a per capita basis wastewater GHG emissions are consistent with past emissions in that sector.

References

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Cover photo: By Andrew MacKinnon - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=206641>

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