Whistler Energy Consumption and Greenhouse Gas Performance Trends

2019 Annual Report

Prepared by: Maria Thorlakson, UBC Sustainability Scholar, 2020
Prepared for: Heather Beresford, Manager, Environmental Stewardship, Resort Municipality of Whistler
August 2020

Resort Municipality of Whistler
whistler.ca

WHISTLER

This report was produced as part of the UBC Sustainability Scholars Program, a partnership between the University of British Columbia and various local governments and organizations in support of providing graduate students with opportunities to do applied research on projects that advance sustainability across the region.

This project was conducted under the mentorship of the Resort Municipality of Whistler staff. The opinions and recommendations in this report and any errors are those of the author and do not necessarily reflect the views of the Resort Municipality of Whistler or the University of British Columbia.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Community Performance

Community GHG emissions for 2019 are estimated to total 131,166 tCO_2e, which is a 4% increase compared to 2018 and 1% lower than 2007 (133,019 tCO_2e). Passenger vehicle emissions account for 54% of Whistler's community wide GHG emissions, followed by natural gas (35%) primarily used for space and water heating.

The community of Whistler has committed to community level GHG reductions of 33% by 2020, 80% by 2050, and 90% by 2060 relative to a base year of 2007. 2019 emissions are currently only 1% below 2007 levels indicating that the community's 2020 GHG emissions reduction target will not be met. In 2020, Whistler developed a Climate Action Big Moves Strategy which sets a new target for the near term of 50% reduction below 2007 levels by 2030 to motivate action and increase accountability.

Community energy consumption for 2019 totaled 3.5 M GJ, which was a 3% increase compared to 2018 Electricity is the most prevalent type of energy consumed in Whistler at 39% of the total consumption, followed by vehicle fuels (31%), and natural gas (27%).

Community energy expenses for 2019 totaled $94 M, which was a 1% increase from 2018. Electricity expenses make up 43% of all expenses and increased by 5% from 2018. Passenger vehicle expenses account for 45% of total expenses but decreased by 5% from 2018.

Corporate Performance

Total corporate GHG emissions in 2019 were 2,360 tCO_2e. Direct corporate GHG emissions were 1,609 tCO_2e, declining 5% from 2018 and contracted emissions were 751 tCO_2e, up 55% from 2018. On a division-by-division basis, the relative emissions footprint of corporate operations is as follows: (42%) Infrastructure Services, (28%) Corporate and Community Services, and (29%) Resort Experience. GHG emissions across corporate operations are produced primarily from combustion of natural gas at 47%, followed by use of mobile fuels (gasoline and diesels) at 43%, and electricity at 9%. The slight decline in 2019 corporate emissions was primarily driven by 29% decline of natural gas use at the sewer utilities, which can be attributed to the proper allocation of the District Energy System consumption as well as the efficiencies in the waste water treatment plant consumption. The increase in contracted corporate emissions resulted from a change in boundary setting for waste transport emissions calculation.

Direct corporate energy consumption increased in 2019 by 4% to 78,091 GJ/year due to an 11% increase in electricity consumption. Electricity consumption makes up the greatest portion of total energy consumed across municipal operations at 65% of the total consumption, followed by natural gas (19%), and mobile fuels (16%). Resort Experience's energy consumption increased by 21% compared to 2018, Corporate and Community Services increased by 7% and Infrastructure Services did not see a significant change compared to 2018.

Overall, 2019 energy expenditures across municipal operations increased by 5% to ~$2.14 M. This was primarily due to an 11% increase in total electricity use, which makes up the largest portion of corporate energy expenditures (~$1.67M). By division total energy expenses increased for all major departments. Infrastructure Services increased by 3%, Resort Experience increased by 8% and Corporate and Community Services increased by 9%

Community Energy & Climate Action Plan Update

Section 5 of this Annual Report includes a detailed update on key RMOW- initiatives recommended within the CECAP for the first and second quarter of 2020. The update provides separate detail on mitigation (or energy

and emission reduction) initiatives as well a sub-section on key initiatives related to climate adaptation initiatives. Details include 2021 priorities where possible, and reflect the progress as of Q2, 2020.

The updates demonstrate that a wide range of activities has been undertaken, but it is also clear that the strategic emphasis for mitigation initiatives continues to be transportation-sector initiatives, and for adaptation initiatives, wildfire protection. As of Q2 2020, 9 initiatives are completed, 31 are ongoing, 67 are in progress and 27 are not initiated. At the end of Q4 2019, 8 initiatives were completed, 30 ongoing, 68 in progress and 27 not yet initiated. The need to accelerate Whistler's climate action is clear, and the Climate Action Big Moves Strategy introduced in June 2020 prioritizes what needs to be done in our community. The Strategy provides the guiding framework to prioritize CECAP actions, incorporate new opportunities, and align the community-wide efforts needed to achieve significant emissions reductions.

1.0 INTRODUCTION

Whistler's vision is to be a place where our community thrives, nature is protected, and guests are inspired[1]. Our community has a special dependence on weather patterns that deliver sufficient snowfall throughout the winter season. This intrinsic relationship to the weather has heightened awareness about Whistler's shared responsibility to manage our GHG emissions—and the potential impacts if we do not. Throughout our community, both private and public organizations understand that the integrity of functional natural systems is fundamental to the wellbeing of our community, and the viability of our economic engines.

The primary purpose of this Annual Report is to provide a summary of Whistler's community-wide energy use and greenhouse gas emissions performance over the past year (Section 3). The report includes detailed performance data, highlights key trends and insights, and benchmarks our performance against our adopted Official Community Plan (OCP) targets. It is the intent of this report therefore, to support and inform the strategic management of energy and climate-changing emissions across our community.

The second part of this report (Section 4) includes a summary of the energy and emissions performance of the RMOW's internal corporate operations. Although corporate emissions represent only 1.2% of the total community GHG emissions, RMOW staff have the greatest level of direct control over these corporate emissions, and as such have the opportunity and responsibility to both lead by example and demonstrate success.

Finally, this report includes a brief update on CECAP implementation initiatives that are led by the organization (Section 5).

[1] The Resort Municipality of Whistler. (2020). *Official Community Plan Bylaw No. 2199, 2018*. Retrieved from https://www.whistler.ca/ocp

2.0 BACKGROUND

Whistler is one of the few communities in B.C. that has a long history of both setting emissions reductions targets and annually monitoring its corporate and community wide GHG emissions. This commitment is evident in our dedication to long term planning, measurement, and reporting of energy consumption and GHG emissions performance, the integration of energy and emission reduction goals into broader municipal policies and practices, as well as continued participation on provincial and national advisory committees.

2.1 Whistler's Community Energy Planning

Enacted in 2008, Bill 27, the *Green Communities Act*, required local governments to include greenhouse gas emission targets, policies and actions in their Official Community Plans and Regional Growth Strategies. In response to the *Green Communities Act*, the RMOW integrated specific targets, policies, and actions within its Official Community Plan (OCP) and developed a Carbon Neutral Operations Plan. In 2018 the RMOW began the process of updating the OCP and on June 23, 2020 the *Official Community Plan Bylaw No. 2199, 2018* was adopted by Council.

2.1.1 Whistler Community Greenhouse Gas Reduction Targets

As per the Whistler OCP, the community of Whistler has targeted community-level greenhouse gas reductions of 33% by 2020, 80% by 2050; and 90% by 2060, all compared to 2007 GHG emission levels. Figure 2.1 highlights these targets along with Whistler's reported community emissions since 2000. Unfortunately, since 2014, Whistler has not been on trend towards these targets and the level of GHG reduction required to meet the 2020 GHG emission reduction target will not be achieved.

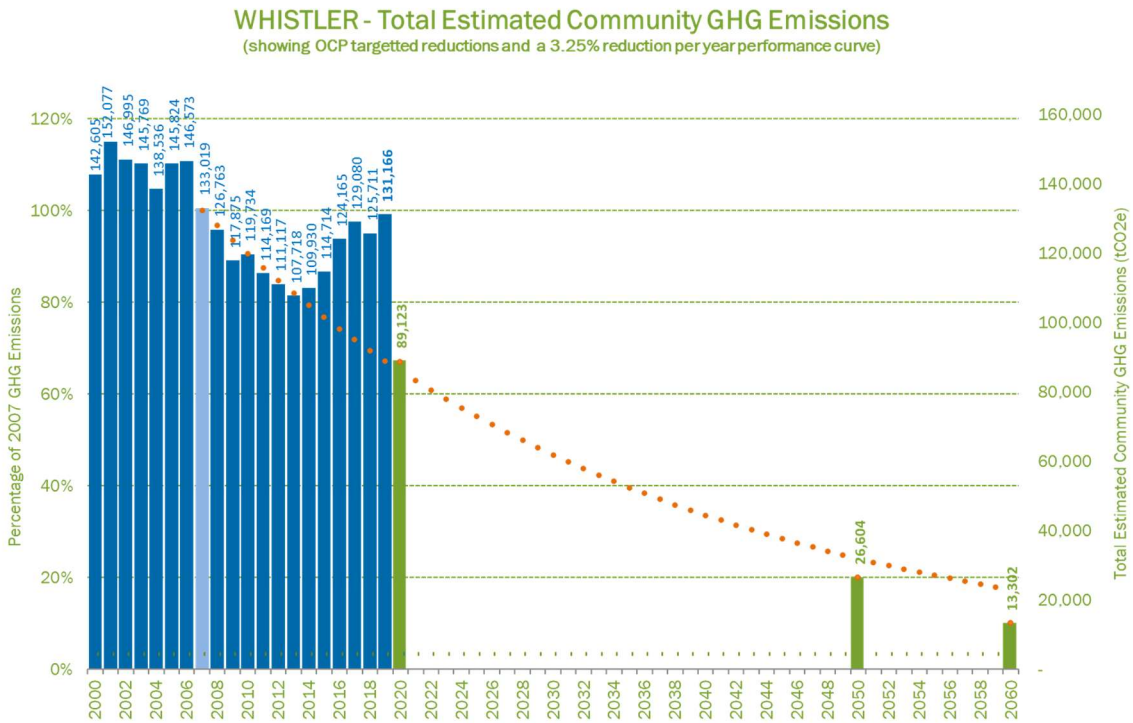

Figure 2.1 Whistler's total estimated community energy consumption

2.1.2 Whistler Community Energy Reduction Target

The OCP Amendment Bylaw No. 1938, adopted in 2010, includes a community-scale energy reduction target: "*The municipality will lead a community-wide effort to reduce total energy consumption to a level 10% lower than 2007 by 2020".* If the energy reduction target was to be achieved at a consistent pace over that decade, the target translated into a 0.75% annual energy consumption reduction over the target period (2011 – 2020). A visual presentation of this rate of reduction along with Whistler's actual energy consumption is included in Figure 2.2 for clarity. As is shown, Whistler and the RMOW fell substantially short of the target.

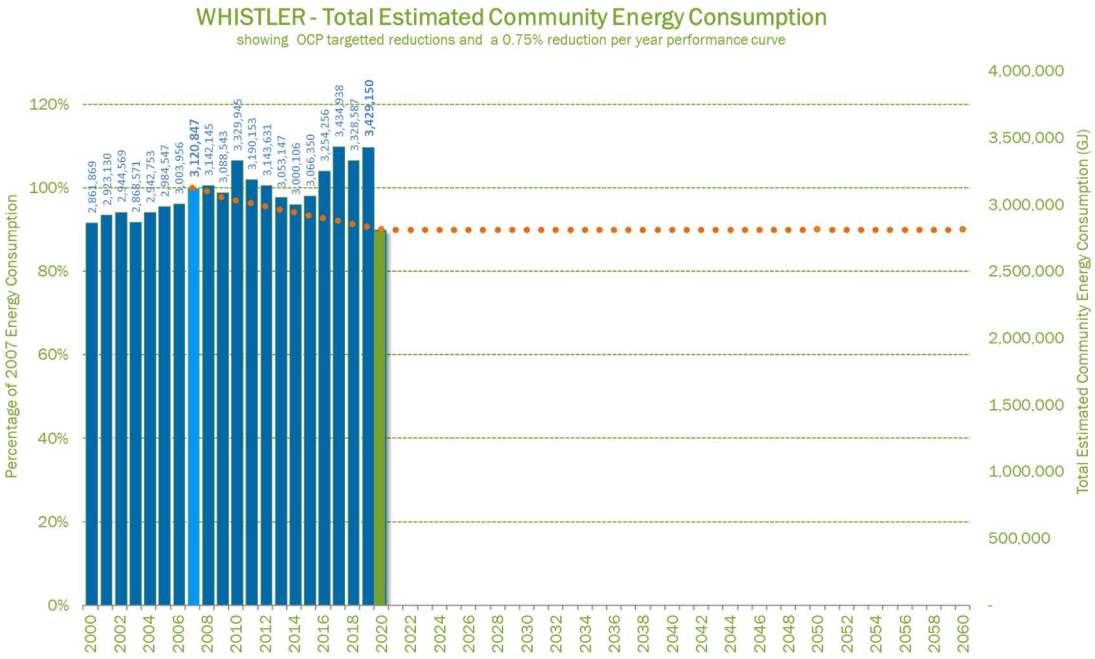

Figure 2.2 Whistler's total estimated community energy consumption

2.1.3 Climate Action Big Moves Strategy

In 2020, Whistler developed a Climate Action Big Moves Strategy which builds on the work of the 2016 CECAP and supports the OCP. The strategy provides the guiding framework to prioritize CECAP actions, incorporate new opportunities, and align the community-wide efforts needed to achieve significant emissions reductions. It should be noted that the Province of B.C. recently cancelled its 2020 targets (same 33% reduction as Whistler) as it was not on track to achieve this, and has instead committed to a new 2030 target of a 40% reduction below 2007 levels. As Whistler is not on track to meet existing climate targets, the Climate Action Big Moves Strategy sets a new target for the near term of 50% reduction below 2007 levels by 2030 to motivate action and increase accountability.

2.2 Corporate Carbon Neutrality

By signing on to the B.C. Climate Action Charter, the RMOW committed to take action and develop strategies to achieve the following three goals:

- Work toward becoming carbon neutral in their local government corporate operations
- Measure and report on their community GHG emissions profile
- Create complete, compact, energy-efficient rural and urban communities

The RMOW purchased and retired Verified Emission Reduction credits from third party sources starting in 2010 and the Cheakamus Community Forest since 2013 equal to its entire corporate carbon footprint for every year between 2010 and 2019 inclusive. More details can be found in Appendix A.

2.3 Inventory Methodology and Boundaries

The RMOW has two types of local-level GHG inventories: the corporate and the community wide inventory (Appendix B and C). The RMOW quantifies its emissions on an annual basis and compares them to the baseline year of 2007. Annual reports dating back to 2010 can be found on the RMOW tracking performance webpage[2]. The annual quantification of Whistler's community wide GHG emissions follows national and international inventory guidelines[3][4].The quantification methodology and emissions factors selected for the purposes of quantifying the RMOW's corporate and community emissions are those specified in the *2018 B.C. Methodological Guidance for Quantifying Greenhouse Gas Emissions,* included in Appendix D[5].

Corporate emissions are GHG emissions from RMOW's direct operations. The scope boundaries for RMOW's corporate GHG inventory include emissions related to the operation and maintenance of traditional services (as defined by the *Becoming Carbon Neutral Guidebook* in the BC Climate Action Toolkit)[6]. These services include those directly delivered by the RMOW and those contracted out. The corporate inventory includes stationary energy and transportation emissions. Stationary energy consists of natural gas and electricity for RMOW owned and operated buildings and facilities. Data for stationary energy consumption was obtained from utility records. Transportation includes mobile fuel purchases for all RMOW owned and operated fleet vehicles as well as staff mobile fuel purchases. Transportation data was compiled from internal fleet and staff fuel consumption accounts. The corporate inventory is contained within the sphere of the community inventory.

[2] The Resort Municipality of Whistler. (2020). *Tracking performance: energy use and GHG emissions.* Retrieved from https://www.whistler.ca/services/climate-action-and-energy/tracking-performace-energy-use-and-ghg-emissions

[3]International Organization for Standardization. (2018). *ISO 14064-1:2018 Greenhouse gases — Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals.* Retrieved from https://www.iso.org/standard/66453.html

[4] World Resources Institute. (2014). *Global Protocol for Community-Scale Greenhouse Gas Emission Inventories.* Retrieved from https://ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities

[5] Ministry of Environment and Climate Change Strategy. (2018). *2018 B.C. Methodological Guidance for Quantifying Greenhouse Gas Emissions.* Retrieved from https://www2.gov.bc.ca/assets/gov/environment/climate-change/cng/methodology/2018-pso-methodology.pdf

[6] Province of British Columbia. (2014). *Becoming Carbon Neutral: A Guidebook for Local Governments in British Columbia*. Retrieved from http://www.toolkit.bc.ca/sites/default/files/BecomingCarbonNeutralGuideV3.pdf

Community emissions are GHG emissions attributed to activities within the community of Whistler. The scope boundaries for RMOW's community wide GHG inventory include all emissions from stationary energy, mobile fuel use and landfill emissions related to residents, visitors, businesses, public sector and non-for-profit organizations, and other industries within the jurisdictional boundaries of the RMOW. Stationary energy comprises residential, commercial, and industrial natural gas and electricity consumption. Utility records were used to quantify stationary energy consumption for the community. Transportation includes mobile fuel consumption for fleet vehicles (Whistler Blackcomb, RCMP and School District #48), BC Transit, and passenger vehicle emissions. Fleet vehicle and BC Transit fuel consumption data was compiled from internal fuel consumption accounts or obtained from the relevant entity.

To quantify the community passenger vehicle emissions, RMOW uses the Vehicle Kilometers Travelled (VKT) approach. This approach was chosen as it captures GHG emissions from all intra-community travel, including visitors as opposed to GHG emissions from travel by Whistler registered vehicles only. This is important because visitor traffic accounts for more than 50% of all traffic in Whistler. However, this methodology only includes travel within the municipal boundaries of Whistler and does not account for inter-community travel. Traffic counter data are used to calculate total VKT, which is then converted to liters of fuel using vehicle type and fuel efficiency data. Liters of fuel are then converted to energy and GHG emissions using applicable emissions factors.

In addition, the RMOW has chosen to include all GHG emissions related to Whistler's solid waste at Rabanco Landfill in Washington. These include emissions from the closed Whistler Landfill, shipping emissions to Rabanco and RMOW's solid waste emissions from Rabanco.

3.0 COMMUNITY PERFORMANCE

This section highlights key trends in Whistler's community GHG emissions, energy consumption and energy expenditure for the 2019 reporting year. It also compares these trends to the Council-adopted OCP targets.

3.1 Community Greenhouse Gas Emissions

Total community emissions in 2019 were estimated to be 131,166 tCO_2e. This is approximately 4% above 2018 emissions, 1.4% below 2007 emissions, and 8% below 2000, but well above (+37%) our current community target levels. Figure 3.1 shows a breakdown of the Whistler community-level GHG emissions since 1990.

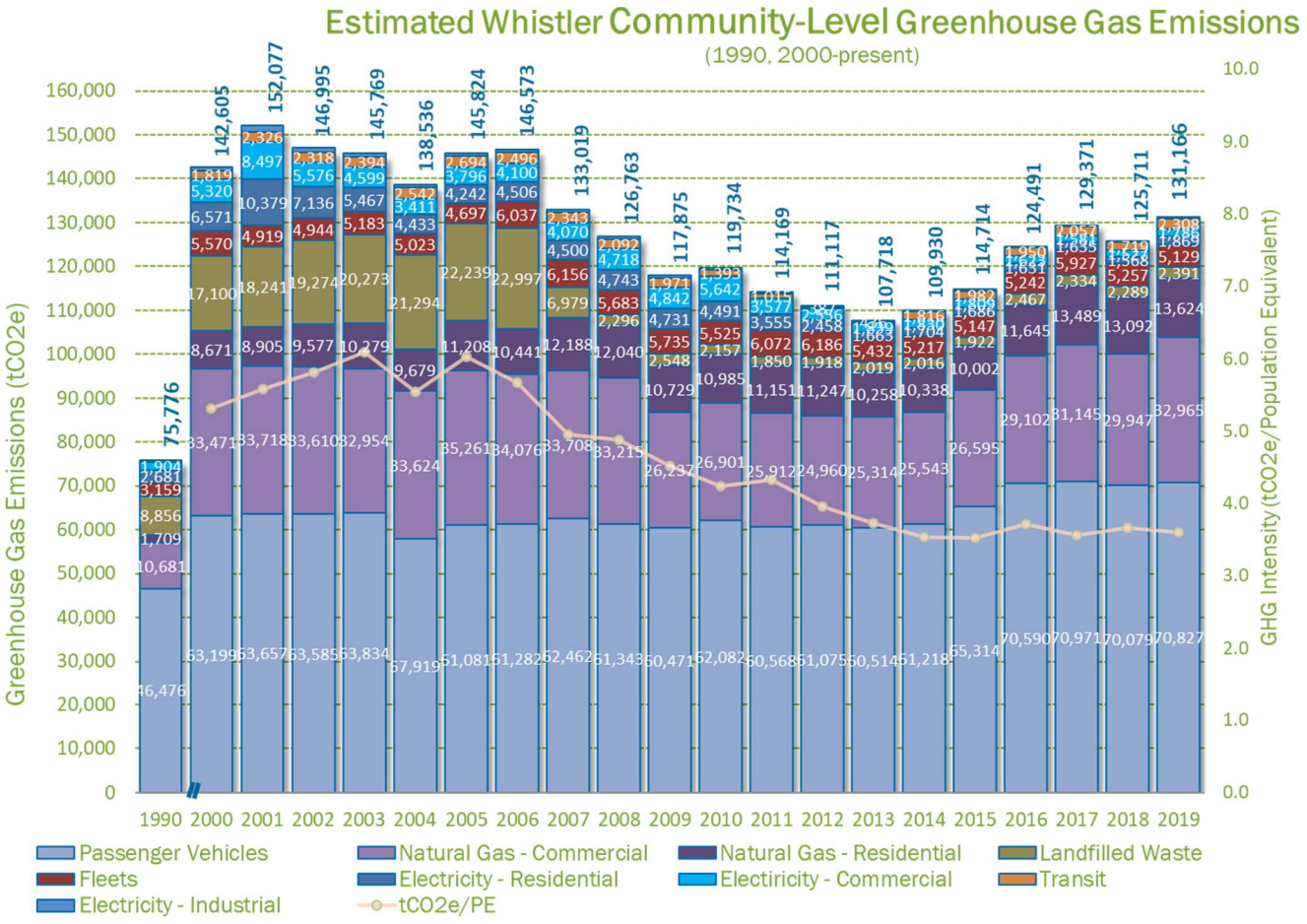

Figure 3.1. Estimated Whistler community-level GHG emissions.

From an emissions intensity perspective, 2019 GHG emissions per population equivalent (PE)[7] decreased by 1.6% to 3.60 tCO2e/PE. Despite a 4% increase in emissions, the emissions intensity decreased as the number

[7] The nature of Whistler being a tourism community means the number of people in Whistler on any given day is generally far greater than the population counts provided Canada Census or BC Statistics estimates. The total Population Equivalent is an estimate of the total number of people in Whistler on an average annualized basis. The indicator is often used in 'per capita' measures to normalize the data and make it comparable to other communities.

of people in the resort increased by 6%. This intensity improvement may suggest an increase in overall efficiency from a GHG perspective when the resort community is at higher levels of occupancy.

The vast majority of Whistler's emissions are from passenger vehicle transport and the built environment. With 54% of emissions originating from passenger vehicles and 39% from buildings, the 2019 reporting year was no exception. Mobile fuel and landfill emissions make up the remainder of emissions. Figure 3.2. shows the breakdown of community emissions (including corporate emissions) for the 2019 reporting year.

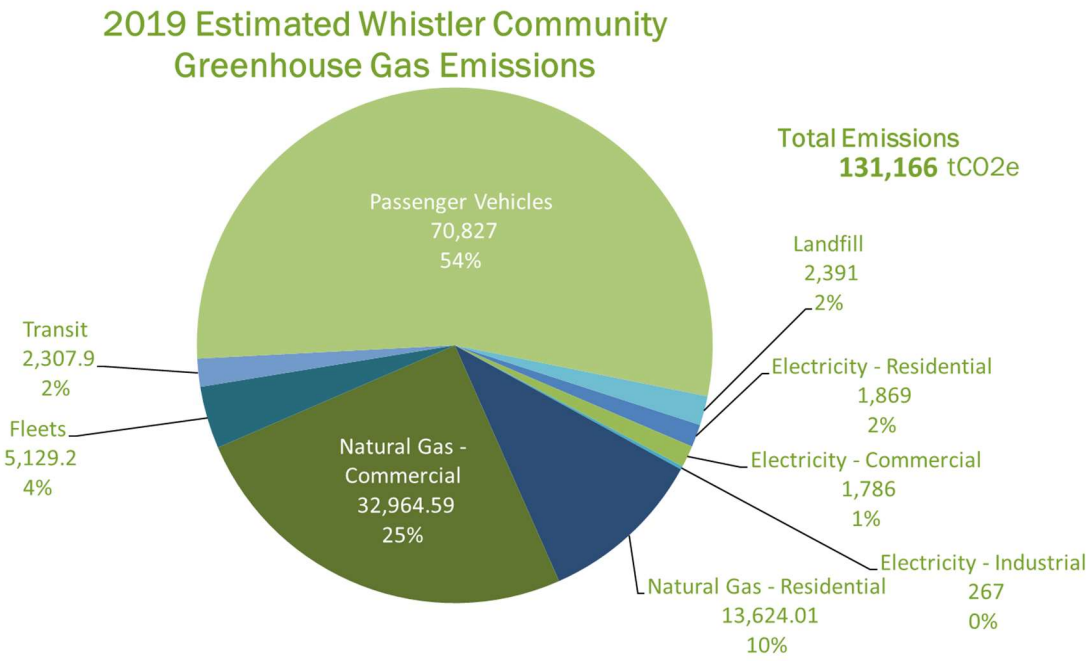

Figure 3.2. Estimated 2019 Whistler Community GHG emissions

3.1.1 Passenger Vehicles

Passenger vehicle transportation within RMOW boundaries continues to represent the single largest share of the overall emission footprint at 54%. Importantly, it is also the only major sector in which emissions have been increasing, with emissions growing by 12% since 2007. Passenger vehicle GHG emissions for the 2019 reporting year totaled 70,827 tCO_2e, which was a 1% increase since 2018. This trend stems from the increased sales of heavy-duty vehicles over light duty vehicles as well as increasing traffic counter numbers.

3.1.2 Buildings

Natural gas and electricity consumption contribute to Whistler's building GHG emissions. Although natural gas has historically been a less expensive energy to heat buildings with, its GHG intensity is significantly higher than electricity in BC.

There are several normalizers that influence building energy consumption and emissions. These include heating degree days (the number of degrees that a day's average temperature is below 18˚ Celsius[8]), population

[8] Weather Statistics Canada. (2020). *Heating Degree Days (18˚C) – Quarterly data for Whistler*. Retrieved from https://whistler.weatherstats.ca/charts/hdd-quarterly.html

equivalent (estimate of the total number of people in Whistler on an average annualized basis) and total estimated gross floor area (total property square meterage in Whistler).

Residential Buildings

The total estimated 2019 GHG emissions (electricity and gas) of Whistler's residential sector were 15,493 tCO_2e, which is a 6% increase compared to 2018. This increase is likely related to potentially greater usage rates of the existing residential housing inventory, greater load share of natural gas (i.e. in 2003 natural gas represented approximately 23% of all residential energy use, in 2019 it had risen to 30%) and increased GHG intensity of electricity. Currently 88% of residential GHG emissions in Whistler originate from natural gas. BC Hydro's GHG intensity increased to 10.67 gCO_2e/kWh in 2016 (as defined by the *2018 B.C. Methodological guidance for Quantifying GHGs*[9]) and was updated in Whistler's inventory for the 2019 reporting year, resulting in increases in electricity emissions, where consumption did not significantly increase relative to 2018.

Natural gas based GHG emissions across the residential sector were 13,624 tCO_2e, which is a 4% increase compared to 2018. Electricity-based emissions totaled 1,869 tCO_2e, which is a 19% increase compared to 2018. Natural gas emissions per residential account did not change significantly compared to 2018, although the number of residential accounts increased by 4%. Electricity emissions per residential account increased by 18% and the number of residential accounts increased by 1%. Figure 3.3 illustrates the breakdown of residential building GHG emissions in Whistler.

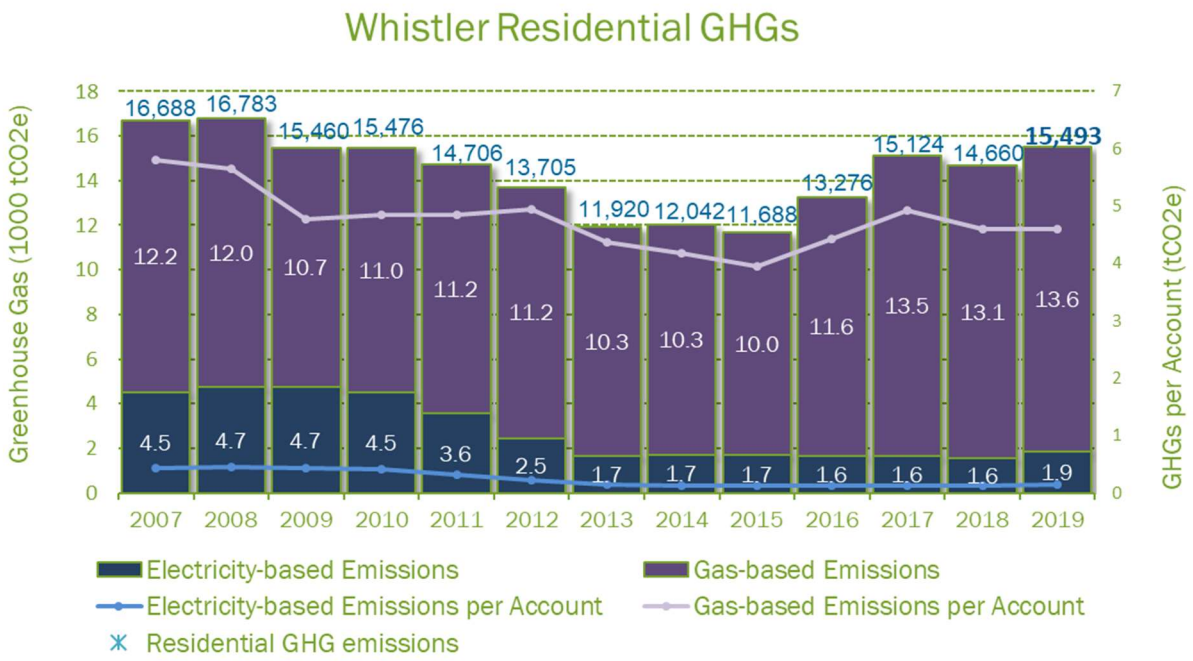

Figure 3.3 Whistler residential building GHG emissions from 2007 to present

Commercial Buildings

Total commercial building emissions (electricity and natural gas) were 34,751 tCO_2e, which was a 10% increase compared to 2018 and a 9% increase per account. Currently 95% of commercial GHG emissions originate from natural gas. Moving forward, increased emissions from higher electricity usage may indicate displacement of much more carbon intensive natural gas in the commercial sector.

[9] Ministry of Environment and Climate Change Strategy. (2018). *2018 B.C. Methodological Guidance for Quantifying Greenhouse Gas Emissions*. Retrieved from https://www2.gov.bc.ca/assets/gov/environment/climate-change/cng/methodology/2018-pso-methodology.pdf

In 2019 commercial sector natural gas GHG emissions totaled to 32,965 tCO_2e, which represents a 10% increase in GHG emissions compared to 2018. Emissions per account increased by 8% with the number of commercial natural gas accounts increasing by 2%. Commercial electricity-based emissions totaled to 1,786 tCO_2e, which represents an increase of 17% compared to 2018. Emissions per account decreased by 16% as there was no increase in the number of commercial electricity accounts. Figure 3.4 illustrates the breakdown of commercial building GHG emissions in Whistler.

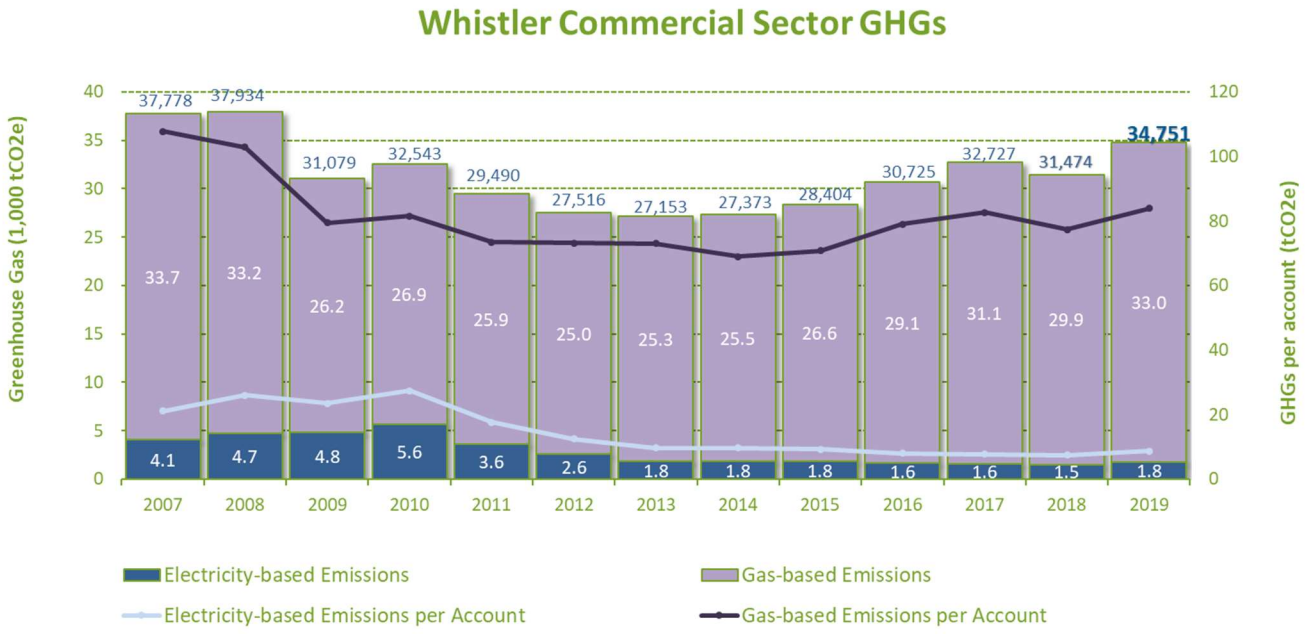

Figure 3.4 Whistler commercial building GHG emissions from 2007 to present

3.1.3 Landfill

Although landfill related emissions only account for 2% of Whistler's community emissions, it is worth drawing attention to the source of the emissions. As Whistler currently exports its solid waste to the Rabanco Landfill in Washington, Whistler incurs the costs and emissions associated with shipping this waste. In 2019 these emissions totaled 571 tCO_2e and emissions from the old Whistler Landfill and Rabanco Landfill totaled 1,821 tCO_2e.

3.1.4 Key Community GHG Performance Insights

Total GHG Emissions

- Total community GHG emissions increased by 4% compared to 2018 to a total of 131,166 tCO_2e
- 2019 community GHG emissions were 1.4% below 2007 levels but 37% above our current community target levels
- Whistler will not meet its 2020 OCP community emissions target and is not on track to meet the 2050 nor the 2060 targets

Transportation GHG Emissions

- Passenger vehicle emissions account for 54% of total Whistler community GHG emissions
- Passenger vehicle emissions increased by 1% from 2018 to a total of 70,827 tCO_2e
- The net difference between target reductions and actual performance for passenger vehicle transport is 28,790 tCO2e, which accounts for 69% of the amount by which Whistler missed its total reduction target

- This continues to be the biggest challenge area in terms of meeting OCP emissions reduction targets.

Building GHG Emissions

- Residential building emissions increased by 6% compared to 2018
- Natural gas accounts for 88% of all residential building emissions and increased by 4% compared to 2018 due to increased consumption
- Residential electricity emissions increased by 19% compared to 2018 despite no change in consumption, due to an increased emissions factor
- Commercial building emissions increased by 10% compared to 2018
- Natural gas accounts for 52% of all commercial building emissions and increased by 10% compared to 2018 due to increased consumption
- Commercial electricity emissions increased by 17%, despite a decrease in consumption due to an increased emissions factor

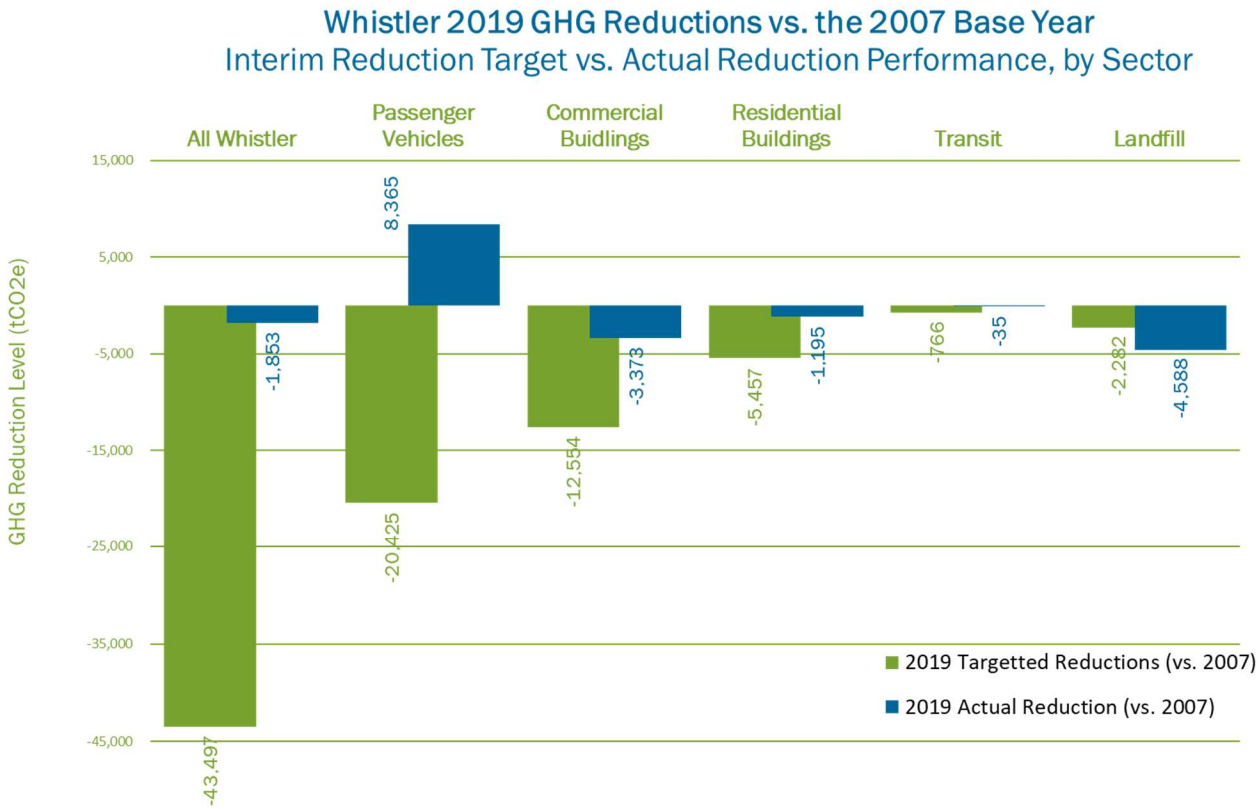

Figure 3.5 Whistler 2019 GHG reductions vs. the 2007 base year

3.2 Community Energy Consumption

Total community energy consumption in Whistler in 2019 was 3.4 M GJ. This was a 3% increase compared to 2018. Energy consumption per population equivalent (94.1 GJ/PE) decreased in 2019 and is the lowest energy intensity since detailed reported began in 2000 (-3% since 2018 and 24% below peak levels in 2005). Figure 3.6 illustrates Whistler's community wide energy consumption. Unfortunately, per population equivalent improvements have been less than increases in population, and 2019 total energy consumption was the second

highest year on record. Given the material gap to Whistler's 2020 energy consumption targets and the short time to achieve them, the community will not meet its proposed 2020 targets.

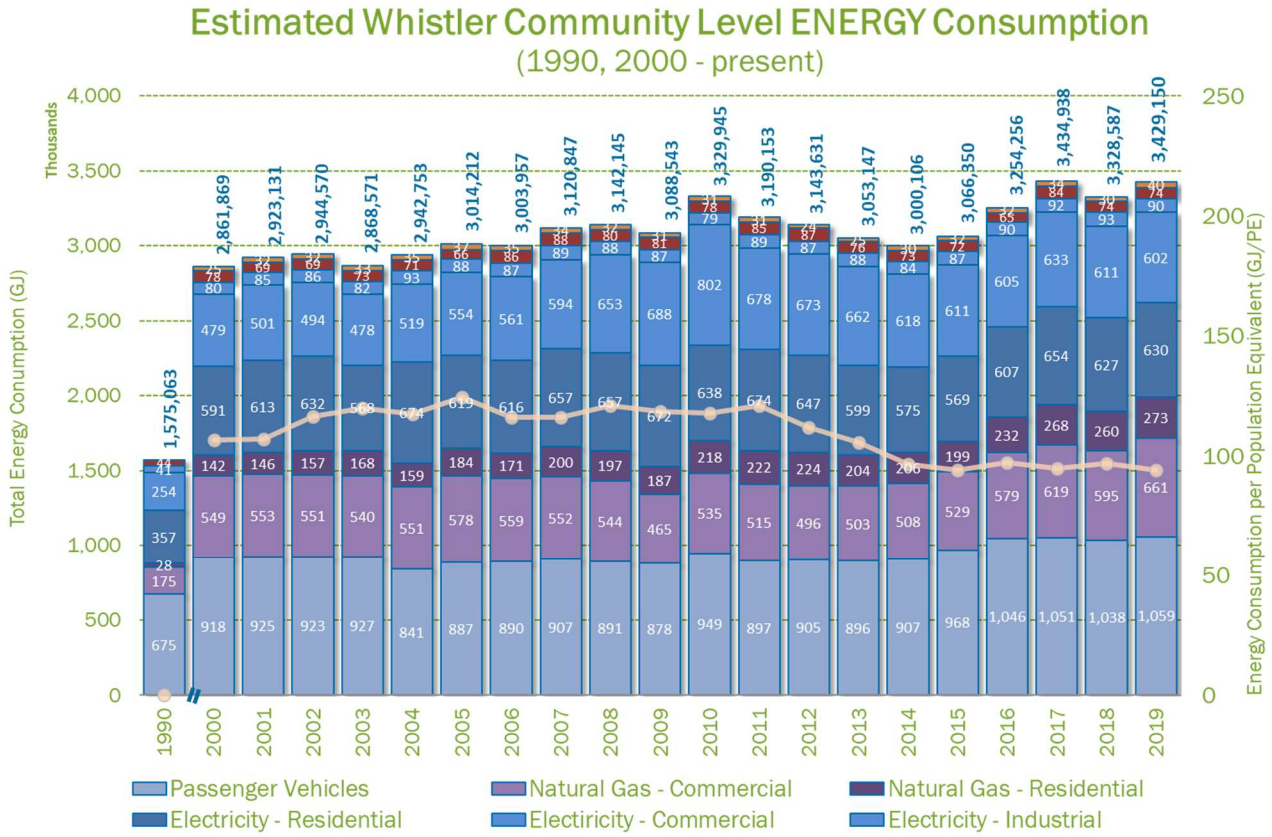

Figure 3.6 Whistler's community wide energy consumption from 2000 to present

Electricity is the most prevalent type of energy consumed in Whistler at 39% of the total consumption followed by vehicle fuels (~31%), and natural gas at 27% of total consumption. It is worth noting that different energy sources have differing carbon content, therefore GHG emissions are much more heavily associated with consumption of fossil fuels (i.e. gasoline, diesels, and natural gas, see Appendix D for emissions factors). Figure 3.7 shows the breakdown of community energy consumption for the 2019 reporting year.

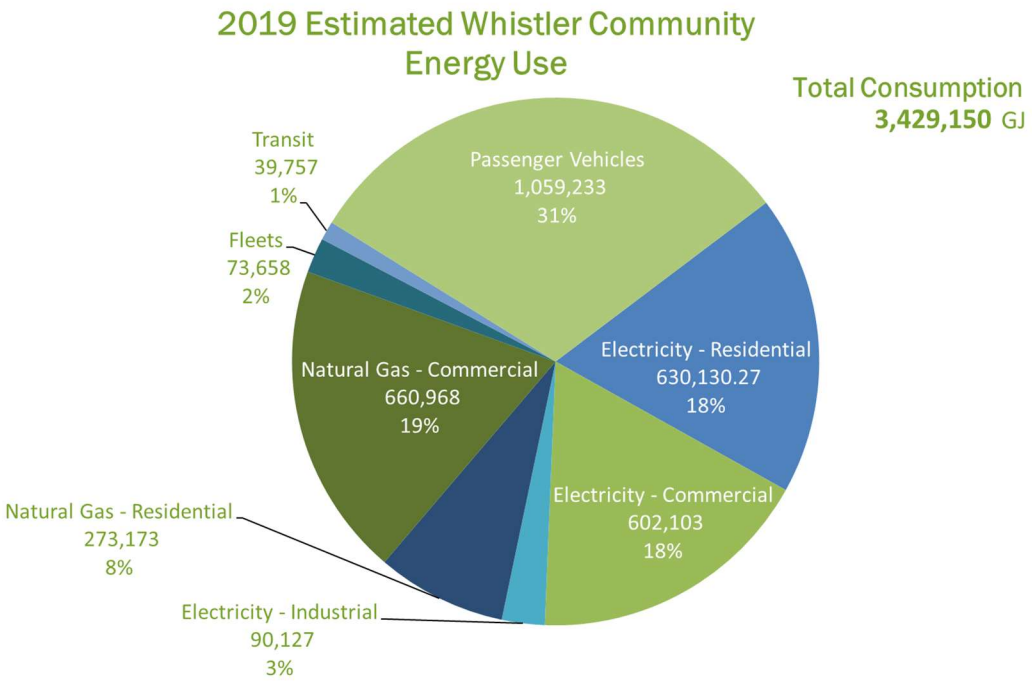

Figure 3.7 Whistler's estimated community energy consumption for the 2019 reporting year

Over the last few years there has been a substantive increase in the consumption of natural gas (natural gas consumption is up 181,893 GJ versus 2007, an increase of 24%). Fleet consumption decreased by 1%, electricity consumption decreased by 1%, and passenger vehicle energy consumption increased by 2% since 2018.

3.2.1 Passenger Vehicles

Total estimated fuel consumption for passenger vehicles in Whistler for 2019 was approximately 28 M liters, which is a 5% decrease compared to 2018. However, GHG energy consumption for passenger vehicles increased by 2%, which stems from a shift away from light passenger vehicles towards heavy duty trucks. This increase can also be explained by a change in some of the variables used in the vehicle kilometers travelled methodology.

3.2.2 Buildings

Residential Buildings

Total 2019 residential energy consumption was the second highest ever at 903,303 GJ (up 2 % compared to 2018 and 5% compared to 2007). The total estimated residential sector energy use intensity[10] (EUI) for 2019 was 146 GJ/m^2, which is 1% higher than the average over the last 10 years. 2019 was colder (4% greater HDD) and more populated (PE is +6%) compared to 2018.

Residential electricity consumption remained relatively stable in 2019 at 630,130 GJ (0% increase compared to 2018). Consumption per account also remained stable at 50 GJ (0% increase vs 2018). Natural gas consumption in 2019 was 273,173 GJ, which is up 5% compared to 2018. Per account gas consumption is up 1% at 92 GJ. Figure 3.8 highlights Whistler's 2019 residential energy use.

[10] EUI measures the estimated energy use per area of developed indoor space (i.e. GJ/m2)

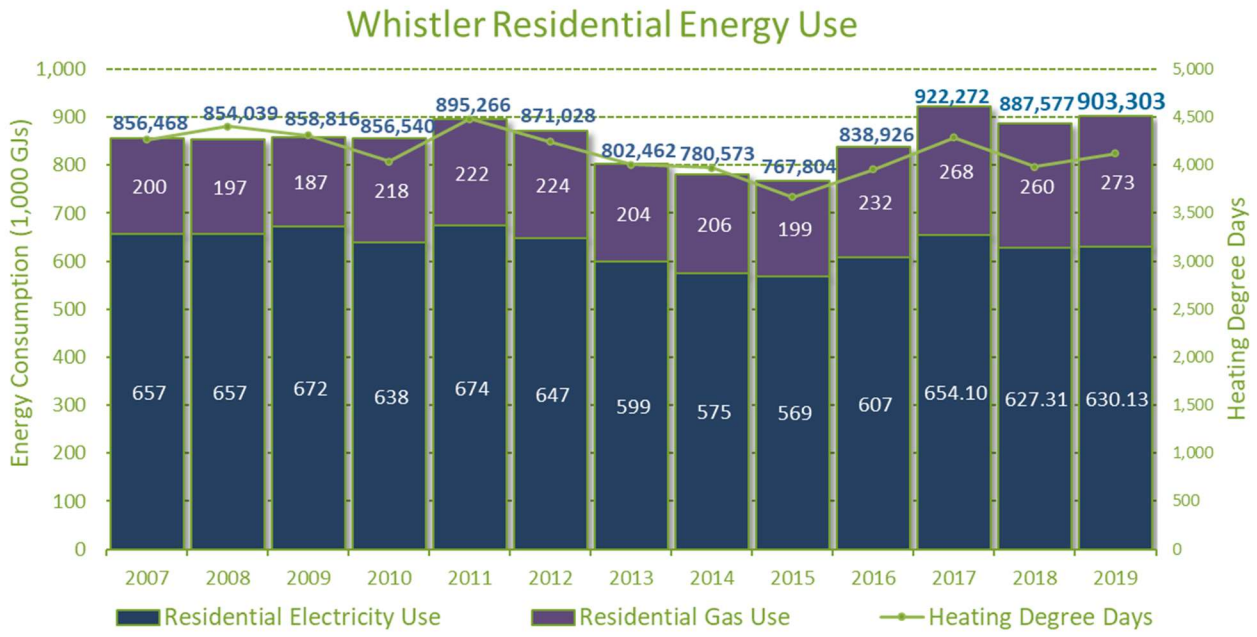

Figure 3.8 Whistler's residential energy use from 2007 to present

Commercial Buildings

Total commercial energy consumption was the second highest ever since 2007 at 1,263 GJ (5% increase compared to 2018 and 18% increase compared to 2007). Commercial electricity consumption was 602,102 GJ, which was a 1% decrease compared to 2018. Consumption per account decreased by 2% compared to 2018 to 2,923 GJ with the number of commercial accounts remaining constant. Commercial natural gas consumption was 660,968 GJ, which was an 11% increase compared to 2018. Consumption per account increased by 9% to 1,682 GJ and the number of commercial accounts increased by 2%. Figure 3.9 depicts Whistler's commercial building energy use from 2007 to present.

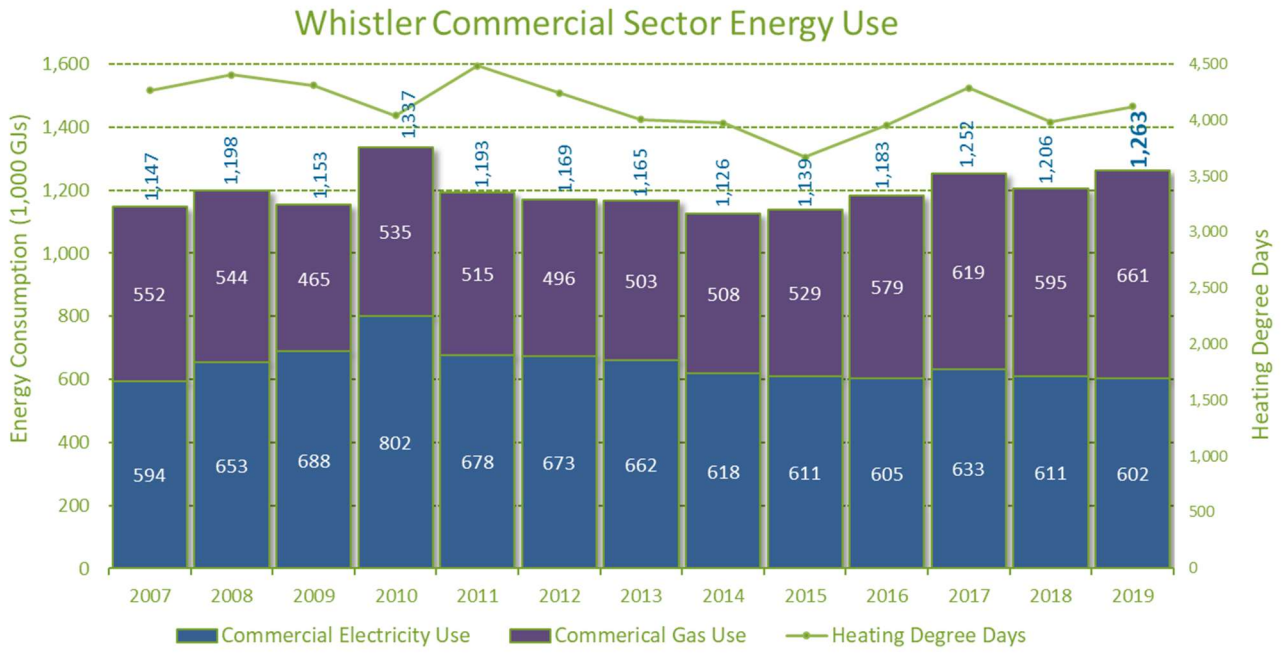

Figure 3.9 Whistler's commercial building energy use from 2007 to present

The 2019 electricity share of commercial energy consumption was 48%, consistent with a shift back toward natural gas for space and water heating. This shift back toward natural gas is generally well correlated with the reductions in Whistler natural gas rates that have been phased in through the broader standardization of the gas rates across the FortisBC service area. Response to these changing price signals appears to be moderating commercial sector total energy costs but increasing commercial sector GHG emissions. Commercial electricity consumption per population equivalent is at its lowest level since detailed recording began. However, natural gas consumption per population equivalent increased by 5% since 2018. This supports the conclusion that commercial energy consumption is shifting away from electricity to natural gas.

3.2.3 Key Community Energy Consumption Performance Insights

Total Energy Consumption

- Total community energy consumption increased by 3% compared to 2018 to a total of 3.4 M GJ
- Electricity represents 39% of energy consumed in Whistler but only 3% of the emissions
- Whistler will not meet its 2020 OCP community energy consumption target

Transportation GHG Emissions

- Passenger vehicle energy consumption increased by 2% from 2018 despite a 5% decrease in fuel consumption

Building GHG Emissions

- Energy consumption in residential buildings increased by 2% compared to 2018 due to a 5% increase in natural gas consumption and no increase in electricity consumption
- Commercial building energy consumption increased by 5% compared to 2018 due to an 11% increase in natural gas consumption and a 1% decrease in electricity consumption
- These trends indicate that both residential and commercial building sectors are switching back to natural gas from electricity due to lower rates. This is problematic due to the greater GHG intensity of natural gas, increasing Whistler's emissions.

3.3 Community Energy Expenditure

Total community energy expenditure for 2019 was approximately $94 M, which is a 1% increase from 2018. Most of this increase comes from residential and commercial building energy consumption in Whistler, with electricity expenses increasing by 5% and natural gas expenses increasing by 14%. Commercial fleet expenses remained relatively constant and passenger vehicle expenses decreased by 5% due to a drop in liters of fuel consumed. Figure 3.10 highlights these trends.

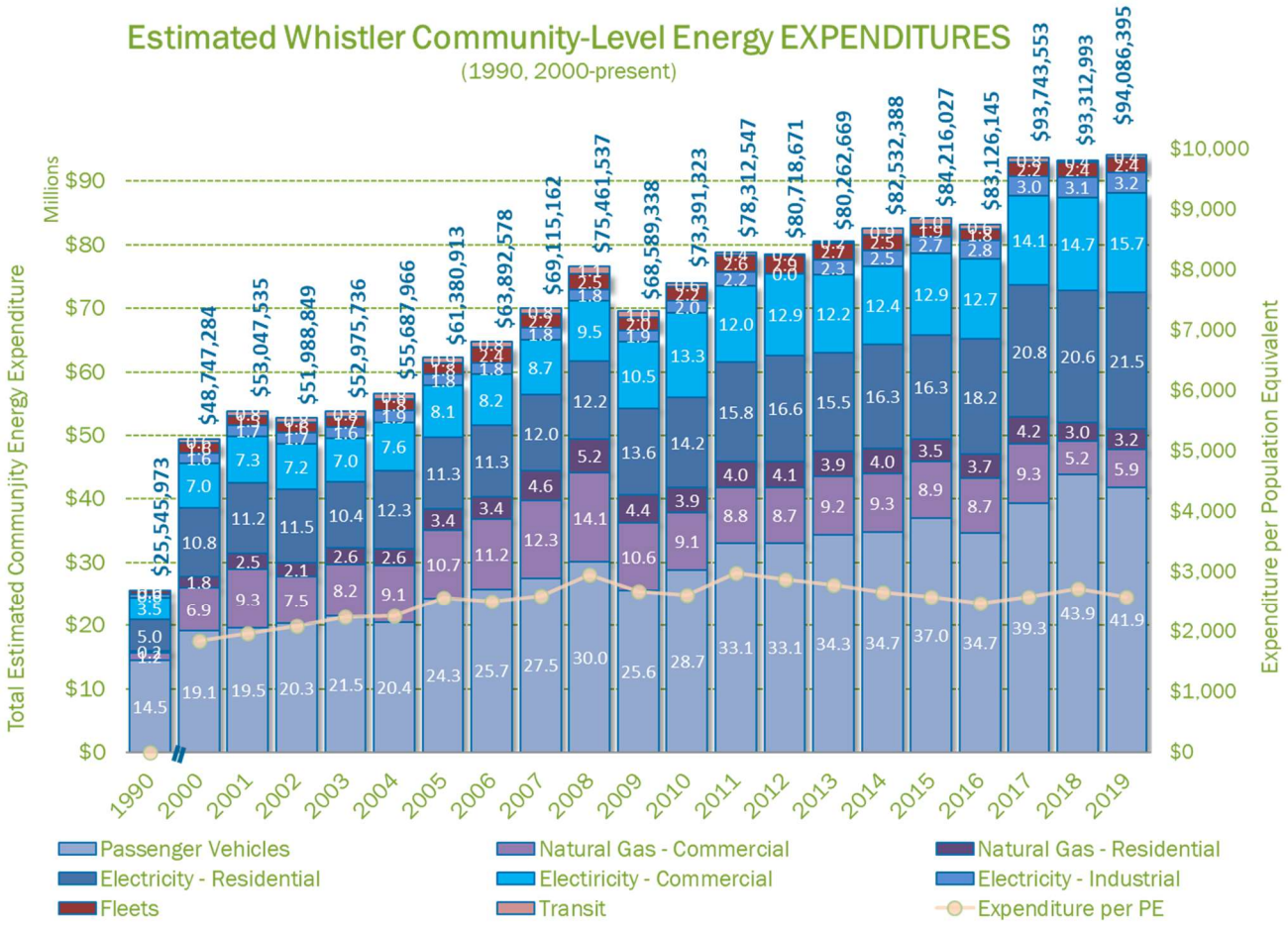

Figure 3.10 Estimated Whistler community energy expenditures from 1990 and 2000 to present

Most of Whistler's energy expenses come from passenger vehicles and electricity, which together make up 88% of Whistler's energy expenditures. Figure 3.11 provides a further breakdown of Whistler's energy expenses for the 2019 reporting year.

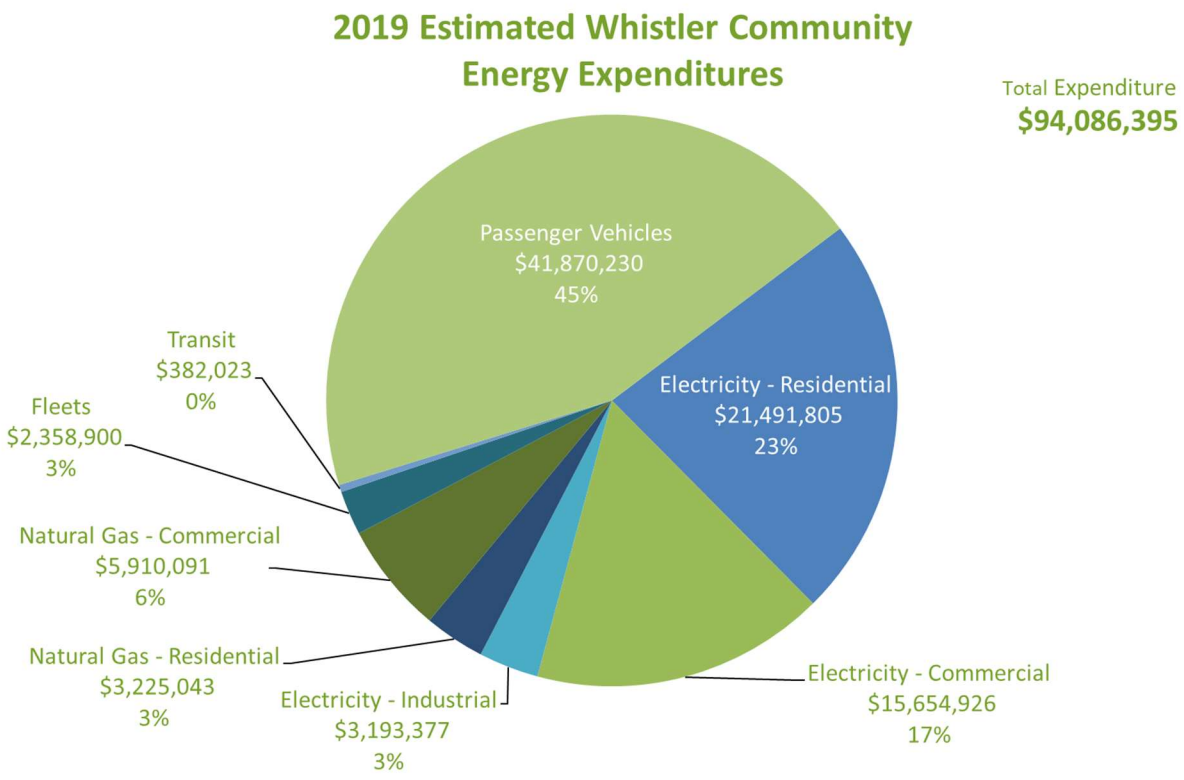

Figure 3.11 Whistler's community energy expenditures for the 2019 reporting year

In addition, 2019 saw an increase in the provincial carbon tax (rising to a rate of $40/tCO2e), which increases the costs of fossil fuel use. The increasing carbon costs could materially increase Whistler's energy expenditures in years to come but can effectively be mitigated against by adopting more low carbon energy into Whistler's energy supply.

3.3.1 Buildings

Building expenditures for Whistler totaled $49.5 M, which was a 6% increase from 2018. Whistler's community electricity expenses were $40.3 M and natural gas expenses were $9.1 M.

Residential Buildings

Total residential expenditures were $24.7 M, which is a 5% increase from 2018 and 16% higher than the 10-year average. Residential electricity expenditures totaled $21.5 M, which was a 4% increase from 2018, despite no increase in consumption. This reflects increasing electricity rates. Residential natural gas expenditures totaled $3.2 M, which was a 7% increase from 2018. This is greater than the 5% increase in consumption, indicating increases in natural gas prices as well. Figure 3.12 shows Whistler's residential energy expenditures since 2007.

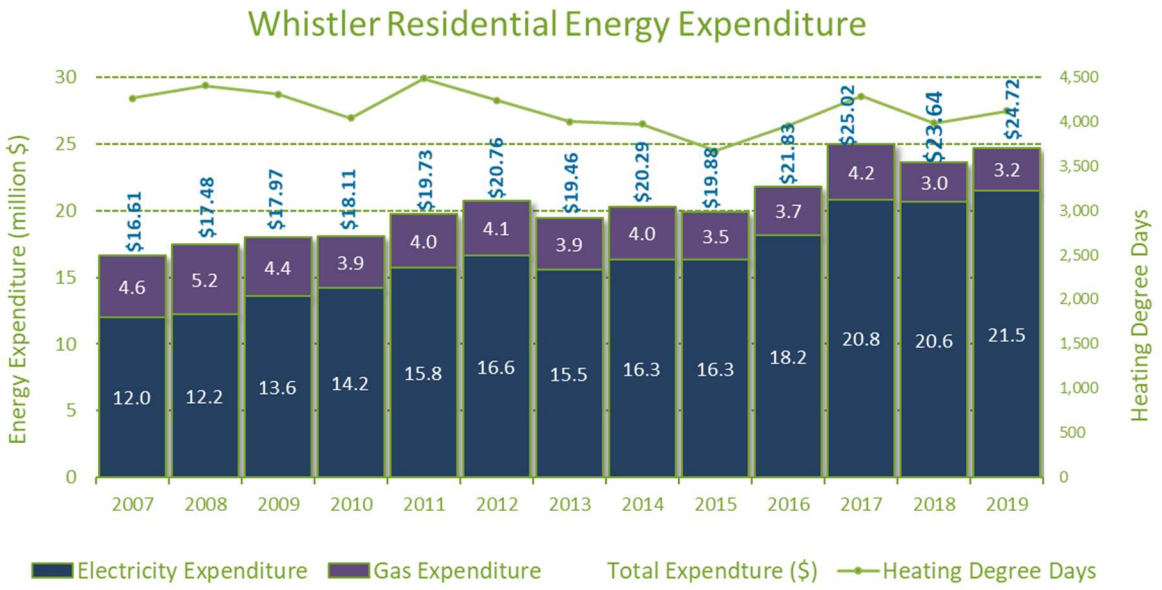

Figure 3.12 Whistler's residential energy expenditure from 2007 to present

Commercial Buildings

Total commercial expenditures were $21.6 M, which was an 8% increase from 2018 and equivalent to the 10-year average. Commercial electricity expenditures totaled $15.7 M, which was a 6% increase since 2018. This reflects an increase in electricity rates since consumption declined by 1% from 2018. Commercial natural gas expenditures totaled $5.9 M, which was a 14% increase from 2018. Consumption increased by 11% indicating that natural gas rates also increased. Figure 3.13 shows Whistler's commercial energy expenditures since 2007.

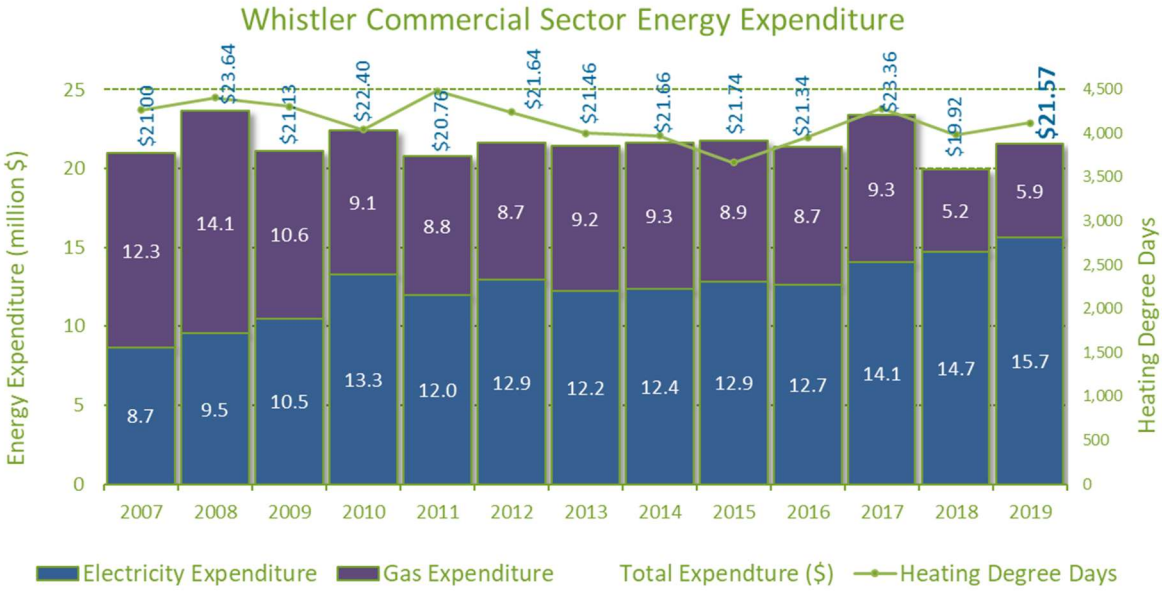

Figure 3.13 Whistler's commercial energy expenditure from 2007 to present

3.3.2 Key Community Energy Expenditure Performance Insights

Total Energy Expenditure

- Whistler's total community energy expenditure increased by 1% from 2018 to a total of $94 M due to increases in residential and commercial building energy consumption
- Natural gas expenses increased by 14% and electricity expenses increased by 5% compared to 2018
- Passenger vehicle fuel consumption and electricity consumption make up 88% of Whistler's total energy expenses

4.0 CORPORATE PERFORMANCE

This section highlights key trends in the RMOW's corporate GHG emissions, energy consumption and energy expenditure for the 2019 reporting year.

4.1 Corporate Greenhouse Gas Emissions

Total corporate GHG emissions in 2019 were 2,360 tCO_2e. Direct corporate GHG emissions were 1,609 tCO_2e, declining 5% from 2018 and contracted emissions were 751 tCO_2e, up 55% from 2018. The decline in direct emissions can be attributed to significant emission decreases at the sewer facility due to a change in billing structure. However, it should also be noted that there was an increase in emissions at MPSC. The increase in contracted corporate emissions resulted from a change in boundary setting for waste transport emissions calculation.

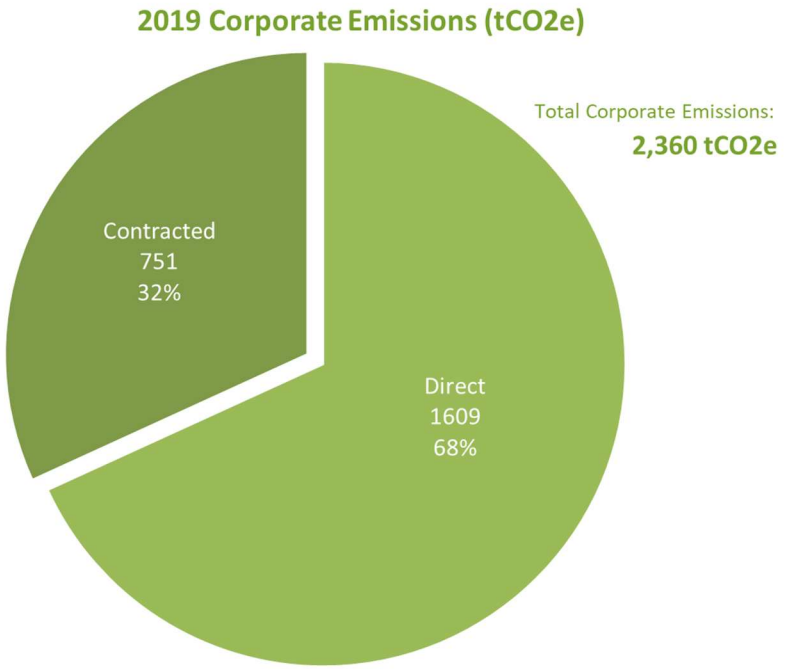

Figure 4.1. Breakdown of corporate GHG emissions for the 2019 reporting year

4.1.1 Divisional Trends

On a division-by-division basis, the relative emissions footprint of direct corporate operations is primarily associated with the following three divisions: (42%) Infrastructure Services (which includes roads crews, solid waste systems, the water utility as well as the sewer utility); (29%) Resort Experience (which includes village maintenance operations, horticulture, turf, and irrigation crews, parks and trails, and facility construction and maintenance operations); and (28%) Corporate and Community Services (including bylaw, fire, Meadow Park Sports Centre, and other recreation programs). Figure 4.2 highlights the relative contributions from each division and Figure 4.3 highlights the trends in RMOW Corporate GHG emissions since 2007.

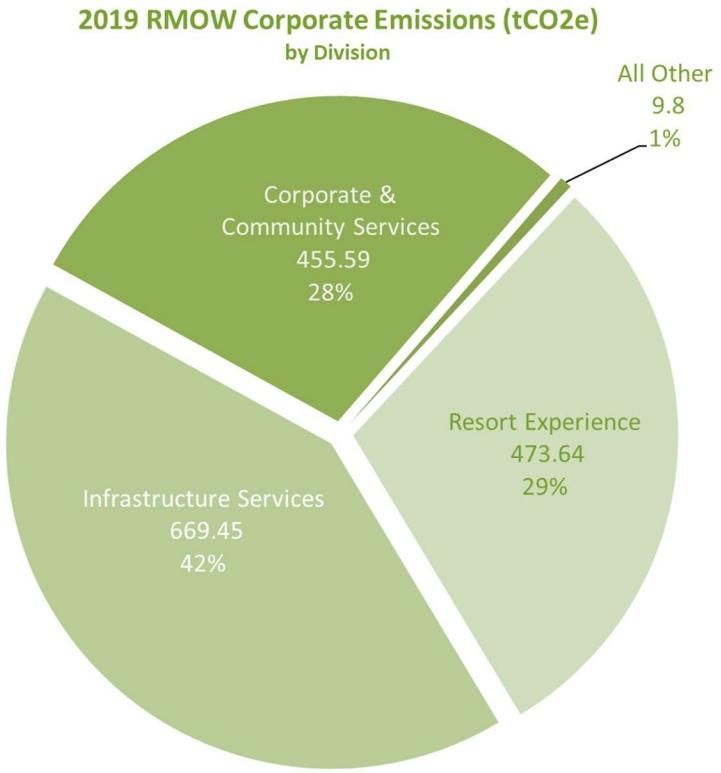

Figure 4.2 RMOW corporate emissions by division for the 2019 reporting year

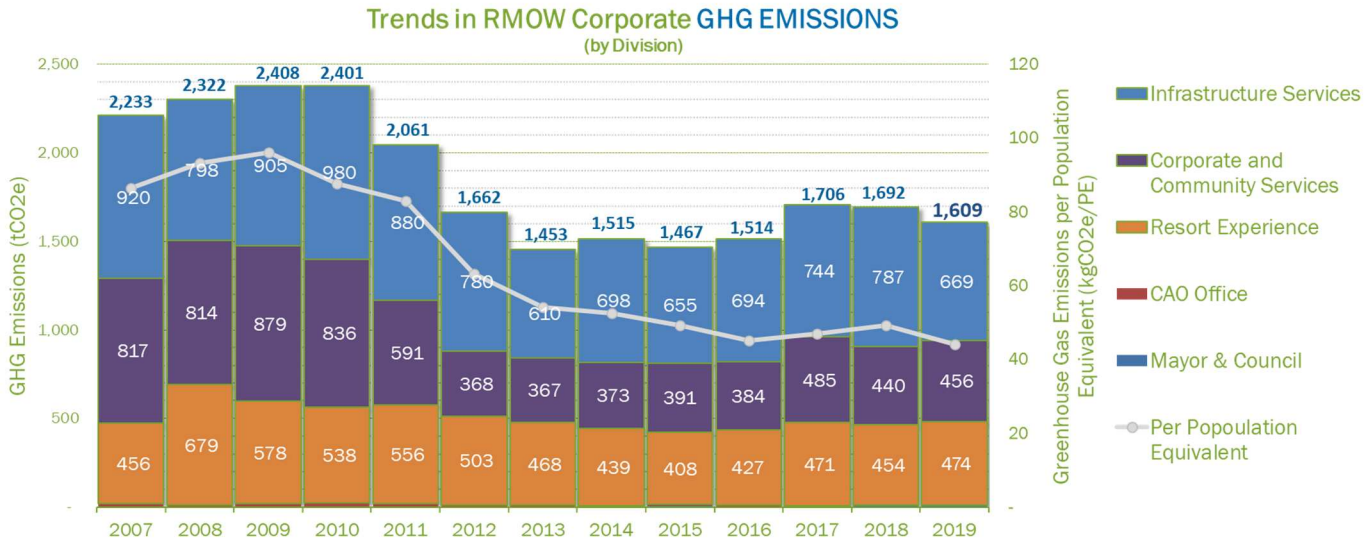

Figure 4.3. Trends in RMOW corporate GHG emissions from 2007 to present

Infrastructure Services

Infrastructure Services' GHG emissions declined by 15% from 2018, to a total of 669 tCO_2e. Emissions decreased across sewer utility, transportation, and environmental operations, which largely comes from a 27% decrease in natural gas consumption and a 17% increase in electricity consumption. No major equipment or operational changes at the plant were performed that would have resulted in such a noticeable decrease in natural gas consumption and increase in electricity consumption. However, there was a change to the natural gas billing structure in 2019, resulting in the allocation of the District Energy System natural gas to a separate account, lowering the overall consumption of the wastewater treatment plant (WWTP) account. Efficiencies in WWTP consumption could also be contributing to this decrease in emissions. The transportation department's mobile fuel use also declined 16% from 2018. Table 4.1 shows the year over year changes and changes vs. 2008 within Infrastructure Services.

Table 4.1 Infrastructure Services GHG emissions trends for the 2019 reporting year

2019	Sewer	Transportation	Environmental Operations	Water	TOTAL
YOY	-23%	-14%	-2%	3%	-15%
vs. 2008	-25%	-7%	31%	-55%	-16%

Corporate and Community Services

Corporate and Community Service's GHG emissions increased by 4% from 2018 to a total of 456 tCO_2e. They had material increases in natural gas, electricity, and mobile fuel consumption. However, the primary driver of increased emissions within the division was MPSC natural gas consumption which increased by 5% since 2018 Table 4.2 shows the year over year changes and changes vs. 2008 within Corporate and Community Services.

Table 4.2 Corporate and Community Services GHG emissions trends area for the 2019 reporting year

2019	MPSC	Fire	Recreation	Bylaw	TOTAL
YOY	4%	9%	-16%	-2%	3%
vs. 2008	-52%	38%	-11%	-18%	-44%

Resort Experience

Emissions from the Resort Experience division are overwhelmingly associated with the Parks/Village Operations functional area and within that, the Facilities, Construction and Maintenance (FC & M) department makes up over half of the emissions. Resort Experience saw an emissions increase of 4% from 2018 to a total of 474 tCO_2e and the majority of this was due to an 8% (22 tCO_2e) increase in emissions within the FC & M. This increase is associated with an increase in stationary natural gas use (7%) for building heating systems. Landscape Services emissions increased 10% since 2018 (5 tCO_2e). This is primarily caused by an increase in mobile fuel consumption. Table 4.3 shows the year over year changes and changes vs. 2008 within Park/Village Operation department of the Resort Experience division and total changes for the Resort Experience Division.

Table 4.3 Resort Experience and Park/Village Operations GHG emissions trends for the 2019 reporting year

2019	Parks/Village Operations	Village Maintenance	Land Services	Parks & Trails	Facility Construction & Maintenance	TOTAL
YOY	4%	-1%	10%	-12%	8%	4%
vs. 2008	-27%	12%	49%	13%	-26%	-30%

4.1.2 Energy Type Trends

RMOW corporate emissions come from two sources primarily: 47% from natural gas combustion, followed by 42% from mobile sources (gasoline and diesels). Figure 4.4 depicts RMOW corporate GHG emissions by fuel type.

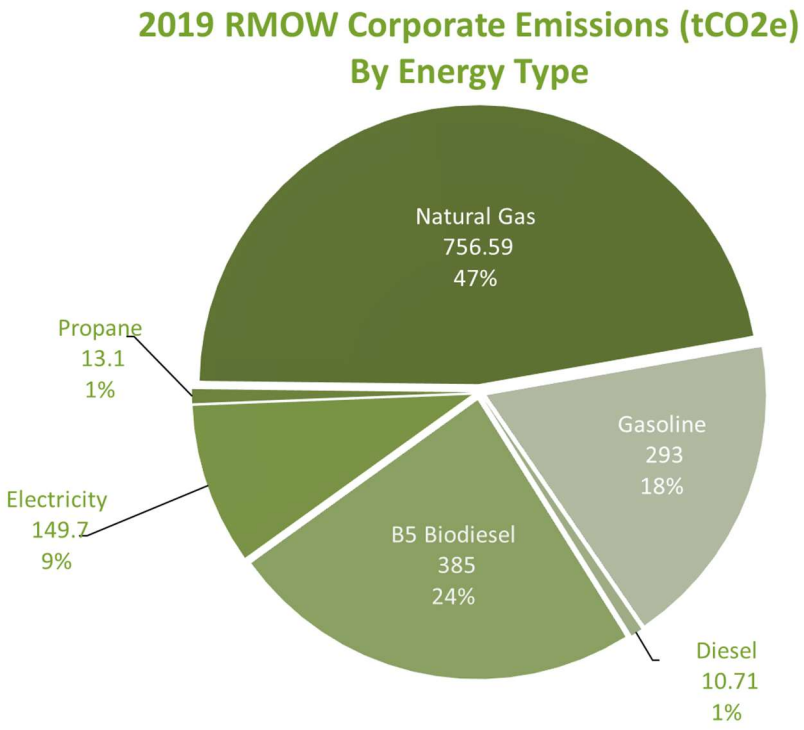

Figure 4.4 RMOW Corporate emissions by energy type for the 2019 reporting year

4.1.3 Key Corporate GHG Performance Insights

Overall

- RMOW direct corporate emissions declined 5% compared to 2018 to a total of 1,609 tCO_2e. This decline in emissions can be attributed to material emission decreases at the WWTP but it should be noted that there was an increase in emissions at MPSC.
- RMOW contracted emissions increased by 55% relative to 2018 to a total of 751 tCO_2e. resulting from a change in boundary setting for waste transport emissions calculation.

Divisional

- Infrastructure Services' emissions decreased by 15% from 2018 to a total of 669 tCO_2e, mainly because of decreased natural gas consumption (29%) at the WWTP. The transportation department's mobile fuel use also declined (-16%).
- Corporate and Community Services emissions increased by 4% from 2018 to a total of 455 tCO_2e due to increased natural gas usage at MPSC. Emissions at MPSC remain 53 tCO_2e above the 2016 levels, suggesting that there is further room for improvements.
- Resort Experience saw an emissions increase of 4% relative to 2018 levels to a total of 473 tCO_2e The majority of this increase was due to an increase in stationary natural gas use (7%) in Facilities, Construction & Maintenance (building heating systems).

4.2 Corporate Energy Consumption

Total direct corporate energy consumption in 2019 increased by 7% since 2018 to 78,091 GJ.

4.2.1 Divisional Trends

Infrastructure Services, Corporate and Community Services, and Resort Experience consumption make up most of all consumption, with Infrastructure Services accounting for over 50% of all RMOW corporate energy consumption. These three divisions all had increases in electricity consumption while natural gas consumption decreased significantly in Infrastructure Services due to a change in billing structure at the WWTP. Figure 4.5 shows corporate energy consumption by department.

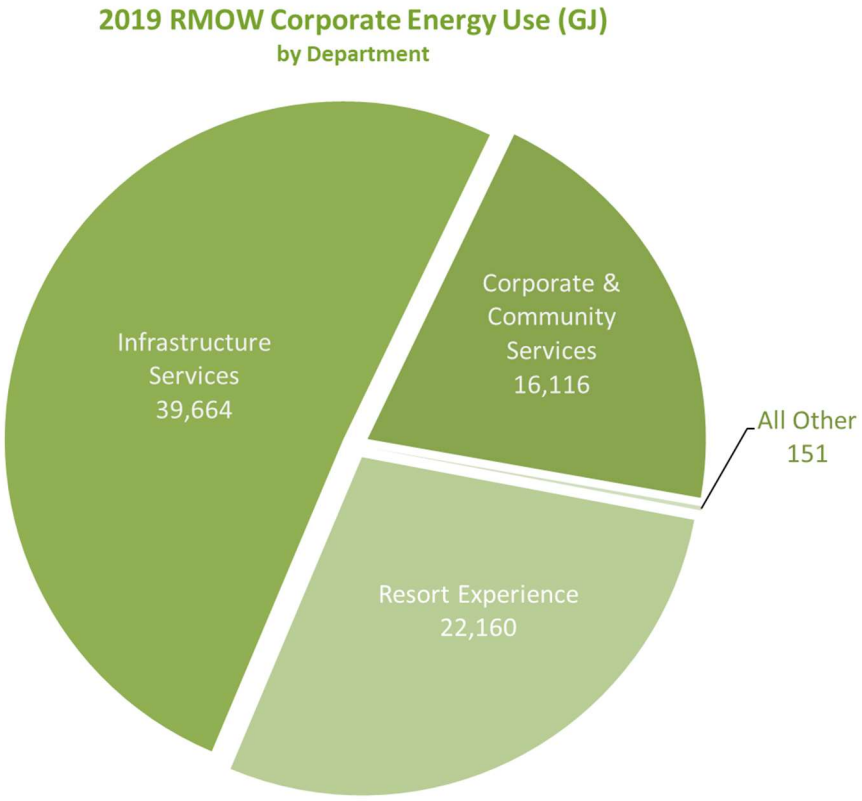

Figure 4.5 RMOW corporate energy use by department for the 2019 reporting year

2019 corporate energy consumption per population equivalent continued to be very near historic lows, similar to 2017 and 2018 levels, and 34% below the recent high in 2011. Corporate and Community Services saw a 6% increase in energy consumption from 2018, Infrastructure Services remained relatively constant overall compared to 2018 and Resort Experience increased by 21% relative to 2018 levels. These trends are highlighted in Figure 4.6.

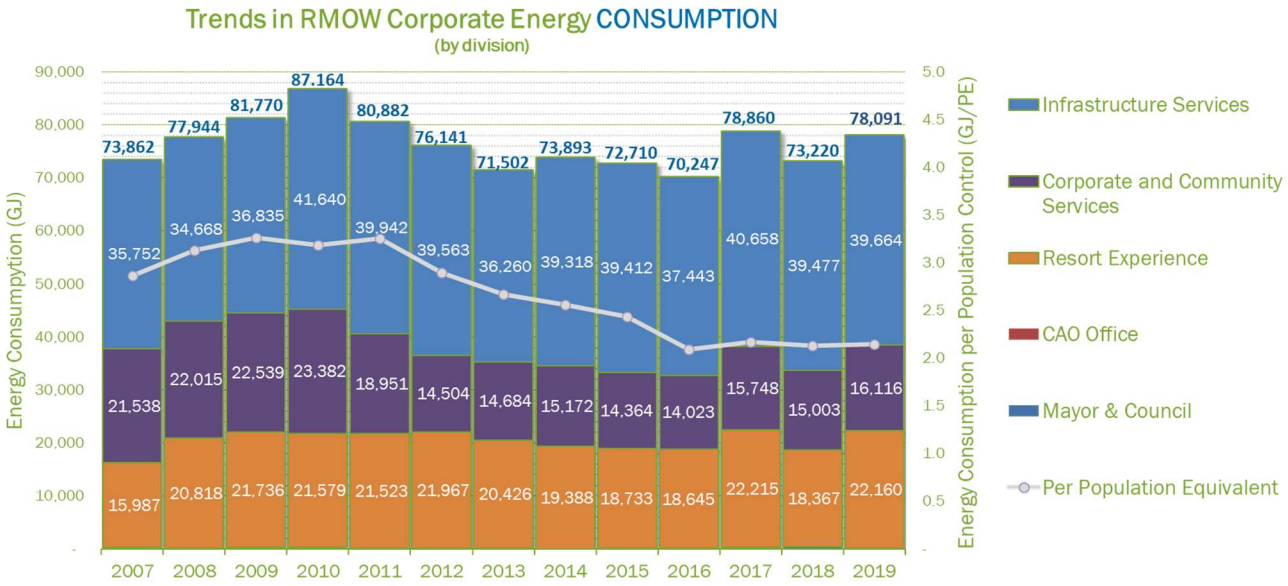

Figure 4.6 Divisional trends in corporate energy consumption from 2007 to present

4.2.2 Energy Type Trends

Electricity makes up the greatest portion of total energy consumed across municipal operations at 65% of total consumption, followed by natural gas (19%) and mobile fuels (16%). This breakdown is further highlighted in Figure 4.7.

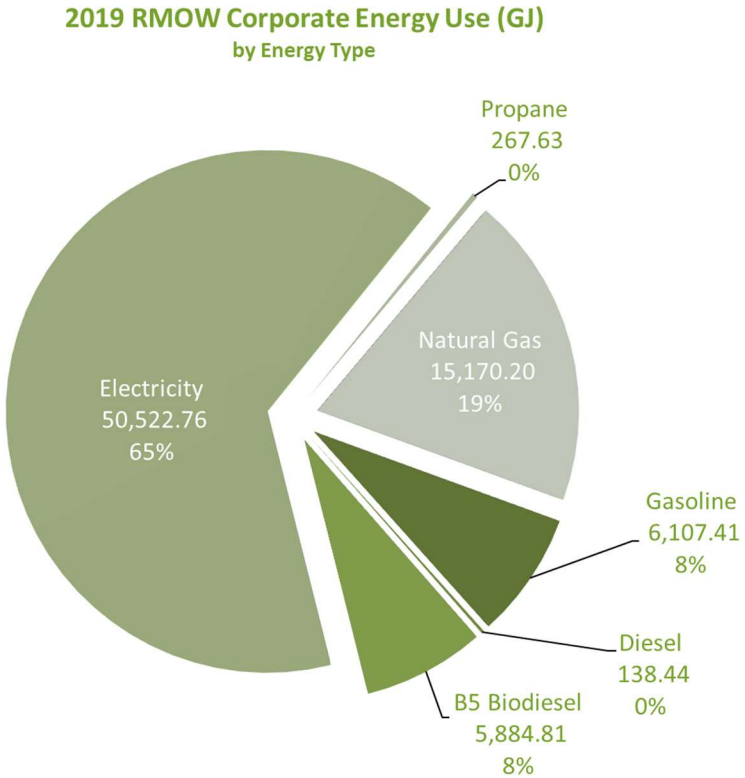

Figure 4.7 RMOW corporate energy consumption by energy type for the 2019 reporting year

4.2.3 Key Corporate Energy Consumption Performance Insights

Overall

- Corporate energy consumption increased by 7% from 2018 to 78,091 GJ. Infrastructure Services, Corporate and Community Services, and Resort Experience all had increases in electricity while natural gas consumption decreased significantly in infrastructure services.

Divisional

- Corporate and Community Services saw a year over year increase in energy consumption of 6%, Infrastructure Services remained relatively constant overall compared to 2018 and Resort Experience increased by 21% relative to 2018 levels.

4.3 Corporate Energy Expenditure

2019 corporate energy expenditure increased by 5% from 2018 to a total of $2.14 million. This reflects the 7% increase in total corporate energy consumption for 2019.

4.3.1 Divisional Trends

Corporate and Community Services energy expenditures increased by 9%, Resort Experience increased by 8% and Infrastructure Services saw an increase of 3% from 2018. Infrastructure services saw a decrease in natural gas expenses. However, this was offset by an increase in electricity expenses. Corporate and Community Services' energy expenses increased due to increases in expenses at MPSC (4%), fire (11%) and recreation (5%). These trends are highlighted in Figure 4.8.

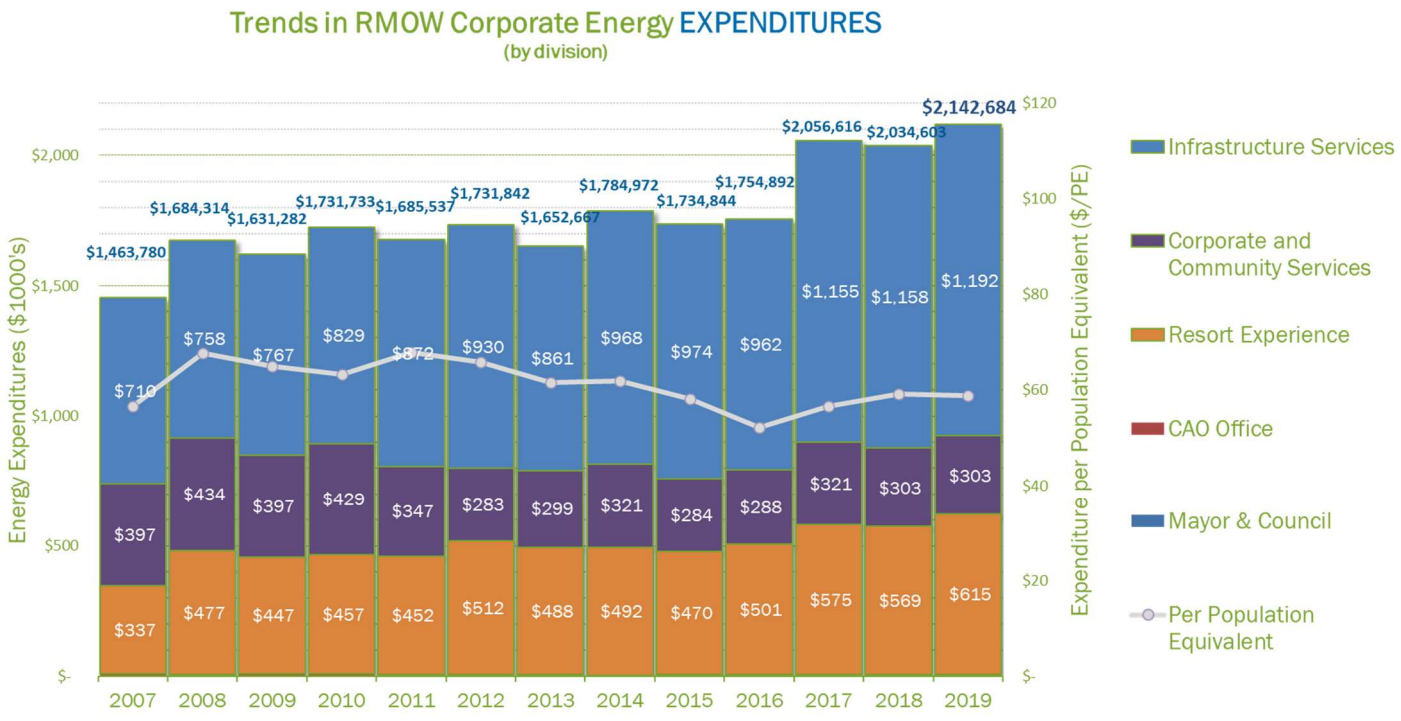

Figure 4.8 Divisional trends in RMOW corporate energy expenditures from 2007 to present

4.3.2 Energy Type Trends

Overall, 2019 corporate energy expenditures increased due to higher electricity energy consumption. Current expenditures have increased by approximately $460,000 (27%) from benchmark 2008 levels. Electricity represents approximately $1.7M/year (78%) of the total corporate energy expenditure. Figure 4.9 shows the 2019 RMOW corporate expenditures by fuel type.

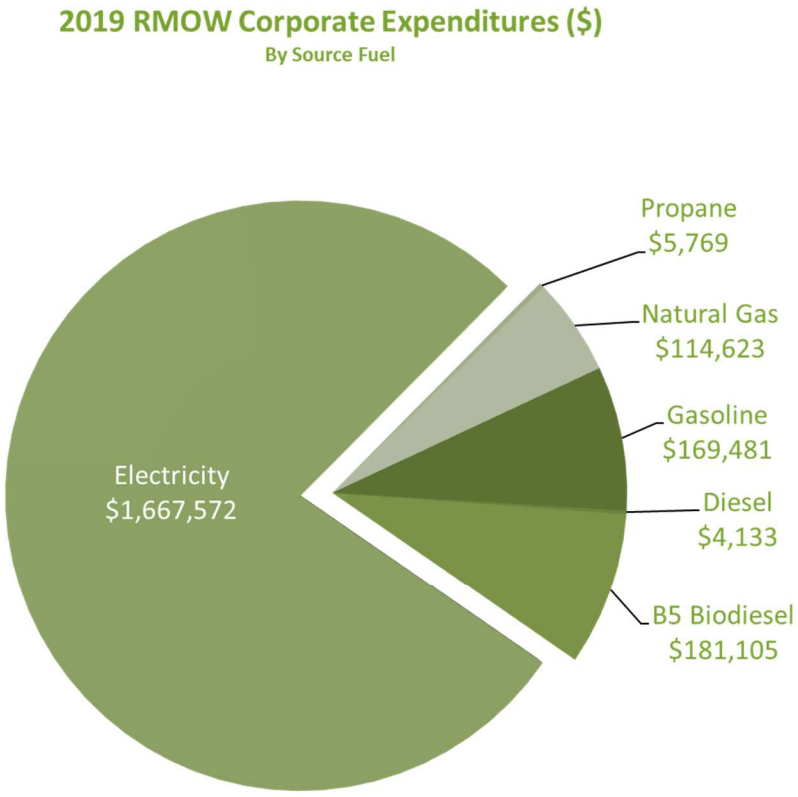

Figure 4.9 RMOW corporate expenditures by energy type for the 2019 reporting year

4.3.3 Key Corporate Energy Expenditure Performance Insights

Overall

- 2019 energy expenditures increased by 5% since 2018 to $2.14 M due to higher electricity energy consumption.

Divisional

- Corporate and Community Services expenditures increased by 9%, Resort Experience increased by 8% and Infrastructure Services saw an increase of 3%.
- Infrastructure services saw a decrease in natural gas expenses. However, this was offset by an increase in electricity expenses.

4.4 Contracted Corporate Greenhouse Gas Emissions

The scope boundaries for RMOW's corporate GHG inventory include emissions related to the operation and maintenance of traditional services (as defined by the *Becoming Carbon Neutral Guidebook* in the BC Climate Action Toolkit)[11]. Some of these traditional services are carried out by contractors hired by the RMOW. Therefore, GHG emissions originating from these contracted services are included in the corporate inventory.

Contracted GHG emissions for 2019 were 751 tCO_2e. This is 32% of total corporate emissions (2,360 tCO2e). Solid waste and compost pick-up and disposal as well as the operation of the Whistler Transfer Station make up 31% of the contracted emissions. The remainder are largely associated with maintenance and upgrades to municipal infrastructure including sewer, valley trail, wastewater treatment plant, etc. Table 4.4 highlights the three largest contributors to the RMOW's contracted emissions. Whistler also incurs additional expenses and GHG emissions to ship solid waste to the Rabanco Landfill in Washington. However, the associated shipping emissions are included in the community inventory only.

Contractor	Emissions	Percentage of total contracted emissions
GFL Environmental Inc.	234 tCO_2e	31%
Jacob Bros Construction (Lot A Waterproofing Project)	69 tCO_2e	9%
Alpine Paving (1978) Ltd.	42 tCO^2e	6%

Table 4.4 Three largest contracted GHG emitters for the 2019 reporting year

[11] Province of British Columbia. (2014). *Becoming Carbon Neutral: A Guidebook for Local Governments in British Columbia*. Retrieved from http://www.toolkit.bc.ca/sites/default/files/BecomingCarbonNeutralGuideV3.pdf

5.0 CECAP IMPLEMENTATION UPDATES

The following section will provide information on key initiatives advanced over the first and second quarter of 2020 (January through June), including the status of CECAP's 94 recommendations for mitigating climate change and for 40 recommendations to adapt to climate change. As of the second quarter of 2020, 9 initiatives are completed, 31 are ongoing, 67 are in progress and 27 are not initiated. At the end of the fourth quarter of 2019, 8 initiatives were completed, 30 ongoing, 68 in progress and 27 not yet initiated. Although significant actions have been taken, the need to accelerate Whistler's climate action is clear, and the Climate Action Big Moves Strategy prioritizes what needs to be done, at a minimum, in our community. The Strategy focuses on transportation, buildings, and waste, and articulates the key strategies and actions Whistler will need to further reduce greenhouse gas emissions to meet its targets. Background on the RMOW CECAP and Climate Action Big Moves Strategy can be found on the Whistler website.[12][13]

5.1 Reduction/Mitigation Initiatives

The below table summarizes key changes in the CECAP implementation for the first and second quarter of 2020. Consistent with the fact that the majority of Whistler's GHG emissions come from the passenger vehicle sector, significant internal effort has been applied to transportation sector reductions. Highlights of the 94 CECAP recommended 'reduction' initiatives are included in the tables below. By the end of the second quarter of 2020, 72 of these initiatives were in progress/ongoing and 6 were complete. In comparison 72 were in progress/ongoing and 5 were complete by the fourth quarter of 2019. Initiative 6.2.2.6 (Designate Whistler Village as a District Energy Investigation Area) moved from in progress to complete since Q4 2019.

Note that the numbering references below relate directly to the 2016 CECAP structure.

6.1 Mobile Energy Use – Transportation-based GHG Emissions

6.1.1 Design Land Use for Location Efficient Living, Working and Playing

		Recommended Action	Updates
short	6.1.1.1	Continued commitment to ensuring that Whistler is made up of increasingly complete and compact neighborhoods	• Commitment to complete and compact neighborhoods is still in place. • Significant progress on WHA housing in Cheakamus, delivering compact community development in energy efficient housing, linked to transit. • 1020 Legacy Way - WHA Passive House Building with 24 units completed. Adjacent to transit. • 1330 Cloudburst Drive: 45 units BC Step Code 3. Construction started in 2019, to be completed in 2021, connected to transit. • 3850 Bear Paw Trail, Rainbow: 20 Seniors units located adjacent to transit. • OCP was adopted on June 23rd, 2020
short	6.1.1.2	Investigate raising the target for the number of employees, especially full-time employees, living locally (i.e. > than the current 75%)	• No specific initiative led by RMOW staff at this time

[12] Resort Municipality of Whistler. (2016). *Community Energy and Climate Action Plan.* Retrieved from https://www.whistler.ca/sites/default/files/2020/Jun/related/26399/cecap_draft_7_0_final.pdf

[13] Resort Municipality of Whistler. (2020). *Climate Action Big Moves: Strategy Development.* Retrieved from https://www.whistler.ca/municipal-gov/strategies-and-plans/climate-action-big-moves-strategy-development#:~:text=The%20Climate%20Action%20Big%20Moves,emissions%20to%20meet%20its%20targets.

short	6.1.1.3	Adhere to the Whistler Urban Development Containment Area (WUDCA) as a means of reducing automobile trip distances.	• OCP was adopted on June 23rd, 2020
short	6.1.1.4	Ensure that whenever possible, new development or significant redevelopment is concentrated in existing neighborhoods or settled areas that are well-served by transit, pedestrian and cycling routes, amenities, and services; and are characterized by increased residential density.	• 1330 Cloudburst Drive WHA housing Construction started in Fall 2019. 45 units, BC Step Code 3, connected to transit. To be completed in 2021. • OCP was adopted on June 23rd, 2020
short	6.1.1.5	Explore opportunities to expand live-work use designations within existing zones where this inclusion would not have adverse impacts on the neighborhoods' character.	• OCP was adopted on June 23rd, 2020
short	6.1.1.6	Proposals for significant new development or redevelopment should be required to quantify future GHG emissions and energy consumption impacts (including transportation-based) and incorporate measures to minimize and/or mitigate projected increases.	• OCP was adopted on June 23rd, 2020 • A new Climate Strategy (Big Moves Climate Strategy) is in development to prioritize and accelerate this CECAP action • The Big Moves Climate Strategy focuses on reducing the carbon emissions from new buildings in BIG Move 4

6.1.2 Advance Local and Regional Mass Transportation Service

	Recommended Action		Updates
short	6.1.2.1	Work with regional passenger carriers and provincial regulatory bodies to encourage greater frequency and more affordable choices for regional bus travel	• RMOW staff have responded to referrals on this issue and made specific requests for encouraging better flexibility for motor carriers that would allow them to respond to passenger's needs. Work continues. • RMOW staff participated in the February 13, 2020 meeting in 2020 Q1 organized by the Chamber of Commerce with Private Carriers. • A new Climate Strategy (Big Moves Climate Strategy) is in development that prioritizes and accelerates regional transit
short	6.1.2.2	Support the expansion, promotion, and increased convenience of mass transportation services between Vancouver and Whistler	• Staff are doing some further cost analysis, but no additional Provincial funding is available in the foreseeable future. • RMOW staff participated in the February 13, 2020 meeting organized by the Chamber of Commerce with Private Carriers. RMOW invited to attend a UBCM sponsored forum on Regional Transit in Q2.
short t	6.1.2.3	Develop a public realm with improved multi-modal integration and comfortable, convenient transition areas – Bus Loop/taxi loop	• Gateway Loop is in operation.
short	6.1.2.4	Advance a community-based social marketing research project to determine the key perceived barriers and benefits of increased use of mass transit transportation. Based on the associated results, develop, and execute targeted community-based social marketing campaign and other relevant, practical solutions to increase use of mass transit	• Maytober Challenge encouraged residents to get out of their cars and onto more sustainable transport options including transit. It was a success with Bike valet up to 2,610 uses (up from 1,555 previous year), Increase in bus ridership with bikes up 17%, 23,500 more trips on buses (paid by monthly passes), and more frequent use on the Valley Trail for active transport. • Developed and launched a Winter Social media and traditional media campaign promoting family travel on the Whistler Transit System to get to the ski hill. • Planning spring/summer social media campaign with a COVID19 lens informing of tips to reduce GHG emissions, including using transit and biking.

short	6.1.2.5	Advance all potential opportunities to avoid increases in local transit fares.	• Monthly pass rates remain at the reduced price. • Pilot project to extend free transit to high school students announced in Q4 2019. Program set to commence in 2020. • High school transit Pass was given to students in Q1 and is valid through September 30, 2020. Due to COVID19, transit was free in Whistler and across the province for April and May. Transit fares were resumed June 1, 2020. Intending to keep Spirit Transit Pass discount and high school Transit Pass for 2020/2021.
med	6.1.2.6	Continue to pass the infrastructure, maintenance, congestion, environmental and land costs of road and parking infrastructure onto users.	• User pay parking in high-demand areas in Whistler Village continues. • Price change December 1, 2019 for monthly parking in Day Lots 1-3 with net revenue to offset costs for High school Transit Pass Pilot Project • Recommended parking price changes for June 15, 2020 were suspended due to COVID19.
med	6.1.2.7	Optimize the road network and highway to prioritize the flow of high occupancy vehicles (HOVs).	• RMOW comments on the draft Highway Capacity Study have been sent to MOTI. • RMOW staff met with MOTI staff to discuss RMOW comments and RMOW preface. Goal is to publish study in Q3 and present to Council.
med	6.1.2.8	Strategically expand transit system service levels and frequency where possible and affordable	• Further Transit hours are being planned for April 2021 (next Transit year) • Transit base service was expanded as of April 1, 2020 as it was planned pre-COVID19. However, summer transit was delayed, and weekend extra buses were suspended for 2020 due to COVID19. • Preparing request for expansion hours and vehicles effective April 1, 2021.
med	6.1.2.9	Explore and consider opportunities to link Whistler Blackcomb and other local business products with (discounted) local and regional mass transit passes.	• No specific initiative led by RMOW staff at this time
long	6.1.2.10	Continue to encourage the provincial government and private sector to pursue the return of higher-volume, affordable and more frequent passenger rail service to Whistler.	• Current focus on regional bus/coach transit
long	6.1.2.11	Ensure that any potential investigation into new regional air service or a new airport facility includes a full assessment of the GHG emissions balance of the proposed project.	• No new regional air services are proposed at this time.

6.1.3 Activate Walking, Biking, and other Forms of Healthy Transportation

		Recommended Action	Updates
short	6.1.3.1	Prioritize the recommendations of and regularly update the Whistler Transportation Cycling Plan and the Whistler Recreational Cycling Plan in planning for the pedestrian and bicycle network.	• Millar Creek to Function Junction expansion in progress • Prism property Valley Trail: project remains in planning stage. • New 1.5 km Valley Trail from Rainbow Park to Scotia Creek was tendered • Trail lighting additions on Valley Trail between Village Gate Blvd and Lorimer Rd. complete.
short	6.1.3.2	Consider opportunities to permit the repurposing of existing village parking to other purposes to support preferred modes of transportation (i.e. bike parking, end of trip facilities).	• Maytober Challenge helped drive increase • Expanding Whistler's bike valet program in 2020

s short	6.1.3.3	Advance a community-based social marketing research project to determine the key perceived barriers and benefits of increased use of active transportation. Built upon the findings of the research, develop, and execute targeted community-based social marketing campaign and other practical relevant solutions to increase use of active transportation	• Maytober Challenge encouraged residents to get out of their cars and onto more sustainable transport options including active transport. It was a success with Bike valet up to 2,610 uses (up from 1,555 previous year), Increase in bus ridership with bikes up 17%, 23,500 more trips on buses (paid by monthly passes), and more frequent use on the Valley Trail for active transport. • Free bike valet service available
med	6.1.3.4	Where opportunities exist, prioritize the optimization and enhancement of pedestrian infrastructure and safety throughout the community.	• Function Junction sidewalk work completed for 2019. Project to re-commence in 2020 to complete pathway down to Lynham Rd.

6.1.4 Support Electrification, and the Adoption of other Low Carbon Transport Options

	Recommended Action		Updates
short	6.1.4.1	Support the development of, and increased access to, reduced-carbon mobile fuel options such as natural gas, appropriate biofuels, and electrical charging stations across the community.	• 14 dual-port EV charging stations approved (28 stations total) with NRCan funding for 50%. This will increase charging ports in the Day Lots from 4 to 24 (6-fold increase), as well as add charging stations to other key parking lots. • 14 dual-port EV charging stations being installed (28 stations total) with NRCan funding for 50%, construction is scheduled to begin in July 2020
short	6.1.4.2	RMOW to aggressively advance the average fleet GHG and energy efficiency of the municipal vehicle fleet.	• Fleet purchases continue to consider electric vehicles wherever possible. • Fleet manager tested several pieces of electric turf equipment. However, the e market at this point is still less than desirable for turf equipment since battery longevity (on a daily use scenario) is not there yet, especially when it comes to tending to wet grass. • Two new Toyota Rav4 Hybrid vehicles were purchased increasing RMOW hybrid fleet • RMOW fleet manager participated at the BC West Coast Electric Fleet Symposium • RMOW has purchased 3 New Western Star plow trucks (dump trucks) and a Vactor Hydro Excavation truck all tier 4 final emission systems that will improve GHG emissions from the last generation that are 10+years old.
short	6.1.4.3	Champion and support inter-community travel providers (including airlines) that are progressive leaders in energy and GHG innovation through preferred marketing relationships and other in-kind partnership opportunities	• No specific initiative led by RMOW staff at this time
med	6.1.4.4	Integrate electric and/or lower carbon fuel vehicles into existing private and public fleets (transit/delivery/taxis/shuttles).	• BC Transit has introduced its Low Carbon Fleet Program, which will focus on purchasing electric heavy-duty buses as primary option starting in 2023. In addition, BC Transit has committed to increase the use of Renewable Natural Gas (RNG) in fleets that have CNG buses. • RMOW staff has engaged with BC Transit staff on their Low Carbon Fleet Program, and will continue to advocate that Whistler receive both higher shares of RNG as fuel source for current buses, as well as electric ones for bus replacement/expansion programs
med	6.1.4.5	Support the use of 'appropriate' electric assist bicycles on Whistler's roads, and Valley Trail network, and support appropriate opportunities to increase secure storage and charging infrastructure in the Village.	• E-bike policy currently in Phase 4: Implementation, monitoring and public communications. • Whistler Bike Valet service for 2020 will target e-bikes

med	6.1.4.6	Explore opportunities to structure local incentives to support electric vehicle use within and to/from Whistler. (i.e. preferred or reduced parking fees for electric vehicles)	• DLOC has agreed to fund electricity provisions and maintenance for EV chargers in the Day Lots (24 chargers), funded from parking revenue. This will ensure financial sustainability for the chargers over the long-term. • Electricity will be continued to be offered free of charge for existing and new EV chargers, including for the 14 new dual-port chargers to be advanced by the NRCan grant (see 6.1.4.1). In addition, EV reserved parking will expand from 4 spots to 24 spots in the Day Lots • CleanBC Go Electric EV Charger Rebate Program in place for single family homes, MURBs, and businesses
med	6.1.4.7	Profile ultra-low emission private vehicle fleets (hotels, commercial recreation, as appropriate).	• Internal staff planning underway to organize trip for Whistler fleet operators to visit a leading operator of an electric bus fleet. Electric bus delivery delay has delayed the original timeline. RMOW staff waiting for appropriate time. • RMOW staff waiting for appropriate time to visit electric bus fleet and advance this action • Efforts on hold due to Covid 19 pandemic
med	6.1.4.8	Increase the enforcement of the Whistler anti-idling bylaw.	• Bylaw department is now fully staffed, making it more possible to enforce this bylaw. • Covid-19 priorities challenging ability to expand enforcement of this bylaw at this time
med	6.1.4.9	Invest in electric vehicle integration across municipal fleet	• Funding for EV charging infrastructure received from NRCan. This includes a new dual-port charger for the municipal hall parking, which can support charging of RMOW vehicles, doubling charging capacity at Municipal hall. • Construction of the updated dual port charger at Municipal Hall is scheduled to be completed in August 2020. • 24 additional vehicle charging stations are under construction in public parking lots.
med	6.1.4.10	Encourage local commercial recreation and leisure operators to minimize the GHG emissions associated with their activities	• Supported through ongoing commercial recreation Crown land referral processes.
long	6.1.4.11	Develop a social marketing initiative to drive the use and purchase of more efficient vehicles.	• Internal RMOW staff work underway for a social media campaign on educating on benefits and incentive programs of more efficient and low carbon technologies, including EVs.
long	6.1.4.12	Explore opportunities to effectively support and encourage the development of a new car coop/sharing program in Whistler, in addition to promoting ride-share and carpool programs.	• Carpool parking pass still available as a more cost-effective option, encouraging car pooling

6.2 Stationary Energy Use – Buildings & Infrastructure GHG Emissions

6.2.1 Improve the Energy Efficiency and Comfort of Existing Buildings and Infrastructure

		Recommended Action	Updates
Existing RESIDENTIAL Buildings			
short	6.2.1.1	Continue to support and enhance the social marketing campaign to increase uptake of enhanced incentive programs and associated energy efficiency performance improvements.	• RMOW increased its contributions to EfficiencyBC programs. Residents can now qualify for rebates for up to $6,000 for electric heat pump (from $4,000 initially). In addition, the program was expanded for domestic hot water heat pump systems, with a rebate of $2,000. The hot water tank increases the program to more people, including both eclectic and natural gas customers. • Increased benefits are shared on website, e-mails, and part of an upcoming social media outreach campaign (as mentioned in 6.1.4.11)

short	6.2.1.2	Support and encourage EnerGuide energy performance labeling on homes for sale.	• Regular promotion of EfficiencyBC incentives through social media, newsletter, website, and poster/ word of mouth at the Building Department • Poster for EfficiencyBC updated to reflect increased rebate offer. • Power Down to Save up continues to offer rebates for home energy assessment
short	6.2.1.3	Expand the integration of climate change, energy efficiency and water conservation literacy into school programs and curriculum.	• SD48 lead. • RMOW staff have provided Fire Smart sessions in local classrooms continues and support AWARE in delivering climate workshops in schools.
short	6.2.1.4	Profile a deep energy retrofit as an example of what can be done to promote energy efficient retrofits in existing homes.	• Internal discussions underway on engaging builders on energy efficiency projects in homes. One focus will be on profiling a successful installation of a heat pump, as training on heat pump installation currently appears to be a barrier for broad adoption • A new Climate Strategy (Big Moves Climate Strategy) is in development to prioritize and accelerate this CECAP action
short	6.2.1.5	Continue to optimize performance outcomes of the Cheakamus Crossing District Energy System and apply learning to future projects.	• DES modelling work underway. • To-date there have been 34 units remove themselves from DES in Cheakamus Crossing.
long	6.2.1.6	Advance opportunities to reduce the direct heating of outdoor areas (i.e. heated driveways, heated stairs, patio heaters, outdoor gas fireplaces).	• RMOW tools are being investigated, and how to engage key stakeholders • OCP was adopted on June 23rd, 2020 • Reducing the emissions from outdoor heating has been implemented as priority action in the new Big Moves Climate Strategy
long	6.2.1.7	Encourage existing multi-tenant or multi-owner residential buildings to maintain or add individually metered energy consumption for individual properties (i.e. encourage user-pays principle).	• Climate Change Coordinator has engaged with electric vehicle advocacy groups to advance "Right to Charge" rules to enable MURBs to enable EV charging. This may require sub-metering for parking spaces. • A new Climate Strategy (Big Moves Climate Strategy) is in development to prioritize and accelerate this CECAP action
Existing COMMERCIAL/INSTITUTIONAL Buildings and Infrastructure			
short	6.2.1.8	Actively investigate the development of new district energy system for Whistler Village that increases energy efficiency, increases the share of energy production from renewable sources, reduces operating costs and decreases GHG emissions.	• No specific initiative led by RMOW staff at this time
short	6.2.1.9	Develop and implement a social marketing campaign with incentives to increase audits, uptake of incentive programs and associated energy efficiency performance improvements.	• No specific initiative led by RMOW staff at this time
short	6.2.1.10	Support and improve staff training on energy efficiency practices across hotel operations (start-up practices, etc.).	• RMOW staff have reached out to hotel energy managers to engage on energy efficiency initiatives and adopting more low carbon fuel. • Planning for workshop of key energy stakeholders put on hold due to Covid 19
short	6.2.1.11	Advance a system of voluntary and mandatory energy benchmark reporting across Whistler's large energy consumers (leverage NRCAN Portfolio Manager updates into Canada).	• No specific initiative led by RMOW staff at this time
short	6.2.1.12	Promote increased awareness of Energy Performance Contracting and other energy efficiency opportunities for commercial sector properties.	• A new Climate Strategy (Big Moves Climate Strategy) is in development that includes increased energy efficiency of the commercial sector as priority action

short	6.2.1.13	Support the reestablishment of the former Whistler Facility Managers Association (WFMA).	• Planning for workshop of key energy stakeholders underway, including with energy managers from hotels (see 6.2.10). • Engagement of the hotel sector has been put on hold due to Covid 19
med	6.2.1.14	Encourage approaches that reduce the direct heating of outdoor areas such as through open shop doors, patio heaters and heated driveways (i.e. explore the potential to create and enforce a closed door - energy waste bylaw in commercial and retail zones).	• OCP was adopted on June 23rd, 2020 • Reducing the emissions from outdoor heating has been implemented as priority action in the new Big Moves Climate Strategy
med	6.2.1.15	Encourage existing multi-tenant or multi-owner commercial buildings to maintain or add individually metered energy use (i.e. encourage user-pays principle).	• No specific initiative led by RMOW staff at this time
med	6.2.1.16	Catalogue and develop strategies for maximizing the re-use of waste heat resources across the resort community.	• No specific initiative led by RMOW staff at this time

6.2.2 Ensure the Most Energy Efficient and Comfortable New Buildings and Infrastructure as Possible

		Recommended Action	Updates
New RESIDENTIAL Buildings			
short	6.2.2.1	Support the trades, sub-trades, developers and building community with programs and initiatives designed to increase the uptake of energy efficient residential building designs, programs, and technologies in Whistler.	• The Building Department was considering holding two open house events in 2020 regarding Certified Energy Modelling of existing and new Part 9 buildings. • An open house is being planned for implementation of Part 3 Energy Step Code.
short	6.2.2.2	Streamline the development of passive house-certified, and net-zero residential buildings using tools such as accelerated permit processing.	• Building Department focused on the successful roll out of Energy Step Code (Part 9)
med t	6.2.2.3	Explore the feasibility for requiring energy modeling for new residential buildings and significant renovations at building permit phase.	• Energy Step code in place, which requires energy modelling for new residential construction (Part 9). • So far, 8 building permits have been issued under new ESC, with 4 permits requiring step 3, and 4 permits requiring step 4 • Energy Modelling is now required for all new single family and duplex buildings, through the Energy Step Code.
long	6.2.2.4	Maintain and update the RMOW Green Building Policy to require higher energy performance standards during rezoning for new residential buildings.	• As of September 30th, 50% of issued building permits for new Part 9 residential buildings require meeting Energy Step Code Level 4. • The RMOW Green Building Policy has not been updated since 2008. It will be reviewed by the RMOW Green Building Task Force when that group is formed. The requirements for the energy step code were added to the RMOW Building and Plumbing Regulation Bylaw No. 1617
long	6.2.2.5	Encourage new multi-tenant or multi-owner residential buildings to have individually metered energy use (i.e. encourage user-pays principle).	• No specific initiative led by RMOW staff at this time
Existing COMMERCIAL/INSTITUTIONAL Buildings and Infrastructure			

short	6.2.2.6	Designate Whistler Village as a District Energy Investigation Area to encourage flexible building systems for future potential District Energy System connectivity.	• OCP was adopted on June 23rd, 2020
short	6.2.2.7	Streamline the development of certified high-performance commercial buildings and/or significant renovations using tools such as accelerated permit processing.	• Internal planning under way to advance & implement Energy Step Code for Part 3 buildings in 2020. • Internal planning under way to introduce Step 2 for Part 3 Buildings. This will need to be brought forward by the Climate Action Coordinator.
med	6.2.2.8	Explore the feasibility of requiring energy modeling for new commercial buildings and significant renovations at building permit phase.	• Integration of Energy Step Code requirements for Part 3 Buildings (complex buildings) will be considered by staff in 2019 • All levels of the Energy Step Code require energy modelling. • Internal planning under way to introduce Step 2 for Part 3 Buildings. This will need to be brought forward by the Climate Action Coordinator.
med	6.2.2.9	Support the trades, sub-trades, developers and building community with programs and initiatives designed to increase the uptake of energy efficient commercial building designs, programs, and technologies in Whistler.	• Internal planning underway to hold open house with HVAC experts on identifying latest technology trends, most appropriate technology choices for Whistler's climate & techniques for most effective installations
long	6.2.2.10	Update the RMOW Green Building Policy to modernize the framework and ensure that opportunities to increase energy performance outcomes are identified and leveraged during permit approval and rezoning processes (commercial, institutional, and residential).	• Integration of Energy Step Code for Part 3 buildings will be coordinated with forthcoming updates to the RMOW Green Building Policy • Internal planning underway to update the Green Building Policy once the RMOW Green Building Task Force is formed. .
long	6.2.2.11	Encourage new multi-tenant or multi-owner commercial buildings to have individually metered energy use (i.e. encourage user-pays principle).	• No specific initiative led by RMOW staff at this time

6.3 Renewable Energy and Energy Supply Alternatives

6.3.1 Encourage the Use of Renewable Energy across the Community

		Recommended Action	Updates
short	6.3.1.1	Encourage the use and fair commodity pricing of 'renewable' natural gas.	• Internal discussions on use of RNG in RMOW corporate facilities. • Engagement with BC Transit to use more RNG in Whistler's CNG transit bus fleet
short	6.3.1.2	Investigate and advance opportunities to incent electric heat pump systems to replace existing gas/propane/basic electric heating systems.	• Heat pump conversion incentive increased from $4,000 to up to $6,000, in collaboration with Province of BC as part of EfficiencyBC • Incentive broadened to include $2,000 incentive rebate for electric heat pump hot water tanks.
short	6.3.1.3	Evaluate the potential for including support for local renewable energy installations within future energy and/or climate related community-based social marketing campaigns.	• Commenced solar PV feasibility study for MPSC with an electrical engineering consulting firm • Climate Action Coordinator explored external funding opportunities for strategic RMOW corporate initiatives, with several projects identified, including a bio energy project to heat MPSC.
short	6.3.1.4	Support provincial building code extensions and other tools that maximize the extent that local building regulation can require or support increased energy efficiency or renewable energy systems in local development and construction.	• Whistler's leadership on Energy Step Code is helping broader adoption across BC through setting an important and visible example. • The RMOW is a continued leader in the implementation of the Energy Step Code

med	6.3.1.5	Develop a Renewable Energy Strategy to move Whistler toward the new 100% renewable energy target	• No specific initiative led by RMOW staff at this time
med	6.3.1.6	Undertake a research study to evaluate the best opportunities for developing and expanding renewable energy production in Whistler.	• Engagement with utility on bringing more RNG to Whistler, as well as sourcing more RNG from Whistler's operations. • Internal staff discussions on best use of biomass from Fire smart fuel reduction, including as heating source for RMOW corporate facilities
med	6.3.1.7	Develop and/or expand renewable energy pilot installations on appropriate municipal buildings and facilities	• Commenced solar PV feasibility study for MPSC with an electrical engineering consulting firm • Identified biomass heating for MPSC as a potential candidate for pilot project financing with a federal agency.

6.3.2 Encourage the Addition of Responsible, Regional Renewables

	Recommended Action		Updates
short	6.3.2.1	Support local and regional renewable electricity production opportunities that include a careful assessment of potential negative impacts on ecosystem function, wildlife values, air quality, community character and visual aesthetics.	• No specific initiative led by RMOW staff at this time
med	6.3.2.2	Partner with utilities to provide feedback on the Integrated Resource Plans, and advocate for the inclusion of renewable energy provisions.	• No current IRP engagement at present (on mailing list)

6.4 Solid Waste System-based GHG Emissions

6.4.1 Materials Minimization and Diversion

	Recommended Action		Updates
short	6.4.1.1	Support the implementation of a strong SLRD Solid Waste Management Plan - with strong targets and actions, regional collaboration, and continued avoidance of waste/garbage incineration as part of the Plan.	• New 5-year contract for composter operation has been executed • Created and hired for Solid Waste Technician position.
short	6.4.1.2	Support the expansion of local compost diversion programs (marketing, education, pricing, infrastructure, etc.)	• New Solid Waste Technician hired • SW Technician is working on outreach program
short	6.4.1.3	Evaluate opportunities to require new development or significant redevelopment to incorporate meaningful measures to minimize solid waste during design and construction, deconstruct rather than demolish, and encourage alternative and evolving methods of waste diversion during building operation.	• New Solid Waste Technician hired • Expansion of improved and streamlined recycling infrastructure in municipal facilities

med	6.4.1.4	Continue moving towards the Zero Waste goal endorsed in 2005 and update the municipal solid waste strategy to advance zero-waste goals, planning and actions.	• Waste management update presented to Council and resolution passed in support for Single-use reduction program • Second meeting of Zero Waste Committee in June 2020
med	6.4.1.5	Support and promote the increased use of the Sustainable Events Guide and monitor performance outcomes for all key events.	• No specific initiative led by RMOW staff at this time
med	6.4.1.6	Evaluate and support implementation of efficient and convenient methods of collecting solid waste, recyclables and compost for people utilizing preferred methods of transportation.	• Transport of waste and/or recyclables on local transit now permitted as a pilot project (with some limitations).
med	6.4.1.7	Encourage the private sector to develop and/or participate in innovative, cost-effective, and environmentally sustainable solid waste and recycling programs in support of achieving our Zero Waste goal.	• Solid Waste Technician is organizing an outreach program to better inform businesses about their options and responsibilities regarding waste management
med	6.4.1.8	Implement standardized SLRD signage across Whistler to improve recycling and composting rates.	• New compost bins installed in Village area

6.4.2 Reduce Upstream Emissions from Goods and Services

	Recommended Action		Updates
short	6.4.2.1	Support the creation of a 'sharing economy' working group to explore the best opportunities for sharing locally available skills and equipment as a means of increasing affordability, reducing new consumption, and decreasing local waste production.	• Will be integrated with Zero Waste Committee • Second meeting of Zero Waste Committee in June 2020
short	6.4.2.2	Encourage the use of the Re-Build-It Centre and Re-Use it Centre for the reuse of building materials, products and to support community services.	• Both facilities closed during covid-19 response.
short	6.4.2.3	Promote opportunities for education and learning related to food production and associated GHG and environmental impacts.	• RMOW staff attends Squamish Lillooet Food Project meetings.
short	6.4.2.4	Promote and facilitate opportunities to shorten food supply chains and that support less GHG intensive food growing and menu choices.	• OCP was adopted on June 23rd, 2020

6.5 Enabling Energy Reduction and Climate Change Mitigation

6.5.1 Ensure Adequate Governance and Funding for ongoing Climate Action progress

Recommended Action	Updates

short	6.5.1.1	Create a 'Climate Leadership Committee' as a select committee of Council.	• Internal planning initiated to develop a strategy for priority actions, including stakeholder engagement and setting of new 2030 targets.
short	6.5.1.2	Investigate and advance opportunities to fund expanded local energy efficiency incentive programs with the annual RMOW corporate carbon tax rebate (CARIP).	• Heat pump incentive increased to up to $6,000. Program broadened to include switching to heat-pump hot water heaters. • Matching funding to NRCan EV infrastructure grant partially paid for by CARIP reserve funds • Climate Action Coordinator is currently investigating funding opportunities for a feasibility study of an energy efficiency program
short	6.5.1.3	Create a Climate Action Coordinator position on municipal staff to lead the coordination and implementation of this CECAP and related energy and climate management responsibilities at the RMOW.	• Climate Action Coordinator is advancing CECAP measures in coordination with other staff and stakeholders • New Climate Action Coordinator, Luisa Burhenne, started on June 1, 2020 • Climate Action Coordinator to recommend that the Carbon Neutral Operations Plan be updated
short	6.5.1.4	Review and consider the implementation of a FortisBC franchise fee and dedicate the incremental funds to energy efficiency programs.	• No specific initiative led by RMOW staff at this time
short	6.5.1.5	Consider use of cash-in-lieu parking fees for improvement of pedestrian, cycling, and transit infrastructure.	• A consultant will need to be engaged to develop a design that will meet MOTI requirements.

6.5.2 Actively Work with Other Levels of Government to Advance Shared Climate Goals

		Recommended Action	Updates
short	6.5.2.1	Lobby the Provincial government for further systematic increases in the BC Carbon Tax, and for a shift toward VKT-based car insurance structures (vehicle-kilometers-travelled-based).	• Support for carbon pricing planned for upcoming community engagement campaign.
short	6.5.2.2	Lobby the Provincial government for further systematic improvements to the BC Building Code that focus on energy efficiency.	• Whistler's leadership on Energy Step Code noted by other communities and observed with interest. Whistler's leadership is helping breakdown concerns on implementing higher levels of ESC, serving as a real-life proof.
short	6.5.2.3	Lobby senior governments to encourage increased energy and GHG innovation in the automotive and aviation sectors.	• No specific initiative led by RMOW staff at this time
short	6.5.2.4	Increase collaboration with neighbouring Sea to Sky communities and the SLRD on climate-related issues.	• The RMOW's Climate Action Coordinator connected with Squamish's new Climate Change Manager to advance regional climate and clean energy initiatives • Regular meetings with RMOW and DOS Climate action staff in progress to advance regional climate, transportation, and clean energy initiatives.
med	6.5.2.5	Work with other groups and jurisdictions (i.e. BC Mayors Climate Leadership Council, City of Vancouver, and other leading communities) toward advancing Whistler's 100% renewable energy goals.	• Climate Action Coordinator researching all feasible low carbon energy options, including clean electricity, renewable natural gas, district energy and more. Engaging with thought leaders in business, academia, and utilities. • Ongoing collaboration with City of Vancouver staff on identifying priority climate action, to build on their leadership. • Collaboration of new Climate Action Coordinator with FCM Community of Practices group to leverage learning and amplify voice to advance strong action for municipalities across Canada

6.5.3 Support High Quality, Third-Party Verified Local Offset Products

		Recommended Action	Updates
short	6.5.3.1	Encourage local organizations to support local carbon reduction projects like the Cheakamus Community Forest offset project.	• RMOW completed CARIP report and identified 2019 emissions. Carbon offsets to be purchased from CCF • No further community promotion on purchasing carbon offsets from the CCF at this time. Will consider as part of broader climate communications messaging
short	6.5.3.2	Encourage local accommodation providers and booking companies to provide options for purchasing local offset products.	• Internal staff discussions on engaging associations to offer and promote local carbon offset projects
short	6.5.3.3	Continue to meet municipal carbon neutral commitments through the purchase of locally and regionally sourced high quality, externally verified offset products (i.e. Cheakamus Community Forest).	• The RMOW has maintained its carbon neutral status every year since 2010. Annual offset purchases are 100% sourced from the Cheakamus Community Forest. • RMOW will purchase offset credits for 2019 year in early fall.

5.2 Adaptation Initiatives

Consistent with both the 2017 and 2018 Council Priorities and the key findings of the CECAP vulnerability and risk assessments, the primary (though not exclusive) focus of the adaptation activities over the last two years was wildfire protection initiatives. Highlights of CECAP recommended initiatives as well as recent updates are included below for reference. By the end of the second quarter of 2020, 26 of these initiatives were in progress/ongoing and 3 were complete, which is the same as at the end of the fourth quarter of 2019.

Note that the numbering references below relate directly to the 40 recommended 'climate adaptation' actions included within the 2016 CECAP structure.

8.5 Recommended Adaptation Initiatives

8.5.1 Minimize Wildfire Threats

		Recommended Action	Updates
short	8.5.1.1	Continue to implement the Community Wildfire Protection Plan, including emphasis on public education and engagement.	• Alpine Axeceleration resumed work in April on the Spruce Grove/Lost Lake unit to complete the final 13 hectares. • FireSmart crew continued work on municipal lands, chipper services and with stratas. • FS program and outreach continued through Q2 with mixed term and redeployed staff from the Recreation team.
short	8.5.1.2	Prioritize the implementation of the landscape-level wildfire management plan for the Cheakamus Community Forest area.	• Cheakamus Community Forest continued project on Cheakamus Lake Road through Q1 and Q2.

short	8.5.1.3	Increase municipal and collaborative efforts around wildfire prevention with key corridor partners (i.e. MFLNRO, Sea to Sky fire rescue services, SLRD, Vancouver Coastal Health).	• Coordination and communications continue between corridor partners particularly through the Emergency Management planning work.
short	8.5.1.4	Continue to review and update pre-incident and emergency response plans and communication protocols for wildfire situations.	• Response plans, contact information, etc. has been updated and regular reviews are scheduled. Confirming communication protocols with Blackcomb Helicopters for wildfire and other emergencies. Communications exercise scheduled for October 24, 2019.
short	8.5.1.5	Develop private property wildfire risk reduction guidelines and implement through municipal policy and/or procedures.	• Wildfire DPA brochure developed and in final review stages before providing to the public • Wildfire DPA brochure finalized and printed. Once it is made available to the public, feedback on the brochure will be monitored to determine if future edits are needed to improve the clarity of the information
short	8.5.1.6	Review existing and consider more restrictive campfire and backyard fire bans and increase the enforcement of fire bans and ticketing/fines for offenses during high fire risk periods.	• The proposed Fire and Life Safety Bylaw 2201, 2018 remains in draft at least until September. The existing Fire Protection and Fireworks Bylaw 2046, 2014 remains in effect. 6.5 request for "Campfire Permit" remains in effect until further notice. 6.11 Garden Debris Fires are no longer allowed in the RMOW and will be repealed in the new Fire and Life Safety Bylaw. Further, WFRS are part of the Wildfire Working Group together with Protective Services, Emergency Management and Environmental Stewardship preparing a coordinated effort at education, response and enforcement with wildfire, illegal campfires, etc.
short	8.5.1.7	Consider creating Development Permit Areas for wildfire protection.	• OCP was adopted on June 23rd, 2020 which includes a Wildfire Development Permit.
med	8.5.1.8	Lobby Provincial and Federal governments to increase funding for community and landscape level wildfire fuel reduction and response.	• RMOW staff discussed multi-year funding with various provincial staff and ministers at UBCM
med	8.5.1.9	Encourage private operators to implement wildfire prevention best practices for outdoor tourism and recreation facilities, particularly in and around high-risk interface areas.	• Nothing specific to private operators has been initiated but significant information is being shared with the general public
long	8.5.1.10	Enhance collaborative efforts with regional partners to prevent and respond to wildfires (i.e. MFLNRO, Sea to Sky fire rescue services, SLRD, Vancouver Coastal Health).	• Sea to Sky Multimodal Evacuation Plan Guidance Document complete and approved by Council. • Fire Danger Rating Plan complete. • Air Quality Advisory Response Plan complete and reviewed by Vancouver Coastal Health Medical Health Officer. • Repeater for Combined Events radio frequency installed; RMOW and WFRS radios updated.
long	8.5.1.11	Lobby the Province to incorporate FireSmart principles into the BC Building Code.	• No specific initiative led by RMOW staff at this time

8.5.2 Minimize Congestion on Highway 99

Recommended Action	Updates

short	8.5.2.1	Facilitate, develop, and promote alternative and mass transportation options to and from Whistler.	• Regional transit funding model rejected by Province in 2019. Options being considered

8.5.3 Minimize Damage from Heavy Rain Events

		Recommended Action	Updates
short	8.5.3.1	Continue to conduct annual assessments of significant waterways to identify and mitigate high risk flood locations while respecting in-stream and riparian habitat regulations.	• Funding was received and hazard assessment in progress.
med	8.5.3.2	Complete and implement a comprehensive update of the Whistler Integrated Stormwater Management Plan (ISMP) that accounts for future climate change and related hydrologic changes within the lifespan of all existing and new infrastructure, buildings, and developments. The ISMP should include key components of leading best practices in stormwater management planning and risk assessment.	• Funding was received and hazard assessment in progress.
med	8.5.3.3	Complete and/or update floodplain mapping for all significant Whistler watersheds. Amend zoning and/or policies as needed to reflect adequate flood protection measures.	• Funding was received and hazard assessment in progress.
med	8.5.3.4	Follow changes in risk-based insurance premiums and overland flood insurance and adapt as needed to changing context and regulations.	• No changes required yet.
med	8.5.3.5	Review and adapt as appropriate emergency planning protocols for extreme weather occurrences and related impacts, in consideration of projected climate changes.	• Emergency planning protocols are constantly being updated, improved, and expanded. • Fitzsimmons Creek Debris Flood Emergency Response Plan complete and approved by Emergency Planning Committee. Mock exercise tested this plan with external agencies on October 24, 2019.
med	8.5.3.6	Improve the design and maintenance of current and future outdoor recreation assets to better absorb heavy rain events (i.e. trails, roads and other activity infrastructure).	• Trail improvements currently in progress
med	8.5.3.7	Consider improvements to signs and lighting for Highway 99 and municipal bridges with respect to weather and flooding alerts. Explore new or additional tools for monitoring at-risk areas.	• No specific initiative led by RMOW staff at this time
long	8.5.3.8	Update relevant policies and plans aimed at protecting Whistler's potable water supply from contamination (i.e. 21 Mile Watershed Protection Plan and Groundwater Protection Plan) to consider additional potential impacts related to projected local climate changes.	• No new updates since 21 Mile Creek surface water protection plan endorsed by Council in June 2019.
long	8.5.3.9	Explore opportunities to improve sediment and erosion control requirements during development and construction.	• Enhanced policies included in the 2018 Updated OCP – both the Natural Areas chapter and associated Development Permit Areas. • OCP was adopted on June 23rd, 2020

long	8.5.3.10	Join the UN campaign "My City's Getting Ready!"	• No specific initiative led by RMOW staff at this time

8.5.4 Ensure Adequate Water Supply

	Recommended Action		Updates
short	8.5.4.1	Continue to update and prioritize implementation of the Comprehensive Water Conservation and Supply Plan focused on municipal conservation and infrastructure improvements, in addition to relevant policies, community-wide regulations and enforcement. The plan should be updated as needed to include or consider best practices in water conservation and supply management.	• Work has started on evaluating metered water rates for industrial, commercial, and institutional properties in Whistler
short	8.5.4.2	Enhance public engagement, communications, and social marketing initiatives to optimize water conservation efforts and emergency preparedness related to water shortages.	• Stakeholder outreach will continue.
short	8.5.4.3	Explore opportunities to improve municipal irrigation systems to maximize efficiency and reduce irrigation needs.	• Through parks master planning process to address potential improvements across municipal parks
long	8.5.4.4	Consider opportunities to increase and promote rainwater and grey water capture and use in public and private infrastructure.	• No specific initiative led by RMOW staff at this time

8.5.5 Enhance Weather Independent Tourism Opportunities

	Recommended Action		Updates
short	8.5.5.1	Consider the development of a comprehensive resort-wide product enhancement, communications, and marketing strategy to improve and promote the range of weather-independent and all-season tourism and recreation opportunities.	• Advancement of Arts, Culture and Heritage programing and itineraries under development
short	8.5.5.2	Explore possibilities to secure additional appropriate waterfront areas for parks and recreation as needed (according to carrying capacity research) to support long-term growth in summer visitation, while preserving the environmental values of new site(s).	• Land acquisition opportunity being advanced
short	8.5.5.3	Continue to advance both cultural tourism development and the expansion of complementary learning and education initiatives.	• New Manager, Cultural Planning & Development role created at RMOW. • Dedicated work plan developed and rolled out in 2017, advancement of new and ongoing initiatives underway
med	8.5.5.4	Explore opportunities to develop easily accessible and affordable non-skiing, snow-based winter activities above the valley.	• No specific initiative led by RMOW staff at this time

med	8.5.5.5	Explore opportunities to accelerate Whistler Blackcomb Bike Park and other multi-use trail expansion in both physical footprint and length of season.	• Alpine Trail program continues to be progressed
med	8.5.5.6	Place emphasis in relevant municipal policies on re-purposing existing under-used space to diversify tourism economy and provide non-snow-dependent recreation opportunities; remove barriers and encourage innovation.	• No new initiatives since Parks Master Plan underway, update provided at March 12, 2019 Council meeting.

8.5.6 Improve Ski Infrastructure for Weather Variability

		Recommended Action	Updates
short	8.5.6.1	Anticipate snowline changes and consider building, improving, and/or moving lifts, trails, and other infrastructure accordingly to maintain and enhance terrain quality and user experience.	• Unchanged, RMOW not lead
short	8.5.6.2	Continue to improve summer/fall grooming, trail surfacing and snowmaking operations at lower elevations to facilitate more effective snow management in low-snow conditions for alpine and cross-country ski trails.	• Unchanged, RMOW not lead
short	8.5.6.3	Consider the potential to offer a Whistler Blackcomb combination ski/bike park pass and promote the overlap of recreation offerings earlier and later in the respective seasons.	• Unchanged, RMOW not lead
med	8.5.6.4	Investigate potential land exchanges to optimize potential ski terrain.	• Unchanged, RMOW not lead
med	8.5.6.5	Investigate opportunities to develop and/or improve policies related to alpine land use and development, with emphasis on enhancing recreation offerings and protecting the environment.	• Unchanged, RMOW not lead

8.5.7 Minimize Threats to Ecosystems, Biodiversity and the CCF

		Recommended Action	Updates
short	8.5.7.1	Improve invasive species management efforts related to increasing pressures associated with a changing climate.	• Sea to Sky Invasive Species Council engaged again in 2020.
med	8.5.7.2	Develop and implement a Biodiversity Conservation Strategy that considers climate change and includes recommendations to monitor and protect ecosystem health and biodiversity from pressures including climate change.	• Consultant and Environmental Stewardship staff continue to develop priority habitat protection framework.

med	8.5.7.3	Conduct research and modify Cheakamus Community Forest management plans and practices to minimize risks related to climate change.	• The CCF is aware of this issue and implemented changes to adapt.

6.0 CLOSING COMMENTS

The impact of changing climatic conditions – especially reliable snow patterns – has the potential to substantially impact Whistler's primary economic engine – tourism. Informed, strategic planning that considers and evaluates the impacts of the issues related to climate change and rising fuel costs can help to ensure that Whistler is best positioned to maintain its success into the future.

Accurate, detailed data is fundamental to these discussions; information like that which is included within this report will continue to provide a strong basis for informed decision-making as our community measures its success, matures, evolves, and thrives in the coming decades.

APPENDICES

A	Summary of Corporate Carbon Neutral Commitment Verified Emission Reductions (VERs)
B	Whistler 2019 Community Energy & Emissions Inventory
C	RMOW 2019 Corporate Energy & Emissions Inventory
D	Summary of Emission Factors

APPENDIX A: SUMMARY OF 2019 CORPORATE CARBON NEUTRAL COMMITMENT

Verified Emission Reduction (VERs): The RMOW has purchased and retired Verified Emission Reduction credits equal to its entire corporate carbon footprint for every year between 2010 and 2019 inclusive, a summary is provided below:

Year	VERs	Project	Certification Standard	Registry	Vendor
2010	1,145 tonnes	Mare Monastir Wind Farm, Turkey	Gold Standard – project reference: GS368	GS APX Registry	Offsetters Clean Technology Inc.
	1,145 tonnes	Sun Select Aldegrove Biomass Boiler, British Columbia	ISO 14064-3 and CDM additionality tool	Markit Registry	Offsetters Clean Technology Inc.
2011	1,063 tonnes	Mare Monastir Wind Farm, Turkey	Gold Standard – project reference: GS368	Markit Registry	Offsetters Clean Technology Inc.
	1,063 tonnes	Sun Select Aldegrove Biomass Boiler, British Columbia	ISO 14064-3 and CDM additionality tool	Markit Registry	Offsetters Clean Technology Inc.
2012	973 tonnes	Mare Monastir Wind Farm, Turkey	Gold Standard – project reference: GS368	Markit Registry	Offsetters Clean Technology Inc.
	974 tonnes	Sun Select Aldegrove Biomass Boiler, British Columbia	ISO 14064-3 and CDM additionality tool	Markit Registry	Offsetters Clean Technology Inc.
2013	1,617 tonnes	Cheakamus Community Forest, British Columbia	BC Emission Offsets Regulation using the BC Forest Carbon Offset Protocol	Markit Registry	Cheakamus Community Forest
2014	1,805 tonnes	Cheakamus Community Forest, British Columbia	BC Emission Offsets Regulation using the BC Forest Carbon Offset Protocol	Markit Registry	Cheakamus Community Forest
2015	1,751 tonnes	Cheakamus Community Forest, British Columbia	BC Emission Offsets Regulation using the BC Forest Carbon Offset Protocol	Markit Registry	Cheakamus Community Forest
2016	1,810 tonnes	Cheakamus Community Forest, British Columbia	BC Emission Offsets Regulation using the BC Forest Carbon Offset Protocol	Markit Registry	Cheakamus Community Forest
2017	2,385 tonnes	Cheakamus Community Forest, British Columbia	BC Emission Offsets Regulation using the BC Forest Carbon Offset Protocol	Markit Registry	Cheakamus Community Forest
2018	2,177 tonnes	Cheakamus Community Forest, British Columbia	BC Emission Offsets Regulation using the BC Forest Carbon Offset Protocol	Markit Registry	Cheakamus Community Forest
2019	2,360 tonnes	Cheakamus Community Forest, British Columbia	BC Emission Offsets Regulation using the BC Forest Carbon Offset Protocol	Markit Registry	Cheakamus Community Forest

Since 2013 the RMOW has purchased VERs from the Cheakamus Community Forest (CCF) to offset 2013 - 2019 corporate emissions. More information about the project can be found on the Cheakamus Community Forest (CCF) website (https://www.cheakamuscommunityforest.com/)

RMOW staff are confident in the benefits of supporting a local offset project, the co-benefits associated with the project approaches, and the independent, third party rigor that is being applied to the CCF project. Consistent with our commitments in both the UBCM Climate Action Charter, and the RMOW Carbon Neutral Plan, the RMOW remains committed to achieving carbon neutrality with respect to all corporate operations. All RMOW departments have been charged internally for the costs associated with the RMOW carbon neutrality commitments. All departments continue to use the price signals that these costs imply ($25/t$CO_2$e) to improve financial decision making and preference cost-effective projects and initiatives that are capable of continuously reducing carbon emissions and decreasing carbon costs across corporate operations. Note that consistent with Provincial policy, the carbon neutral commitment of the RMOW includes an estimate of the contracted emissions associated with 'traditional services of local government' (e.g. any contracted snow clearing in the Village, solid waste collection contracts etc.)

APPENDIX B: SUMMARY OF WHISTLER 2019 COMMUNITY ENERGY AND EMISSIONS INVENTORY

Whistler

Community Energy & Greenhouse Gas Inventory 2000-present

			Stationary Energy Use (Buildings)								Mobile Energy Use										Waste	Grand Totals		Intensity Performance			
			Electricity				Propane/Natural Gas			All Buildings	Commercial Fleet Usage						Transit			Passenger Vehicles						
			residential	commercial	industrial (sm com)	subtotal	residential	commercial	subtotal	Building Total	E5 gasoline	E10 gasoline	B5 biodiesel	diesel	diesel(s) subtotal	subtotal	B4 biodiesel	CNG	subtotal	gasoline	Landfill			GHG Intensity (tCO2e/PE)	Energy Intensity (GJ/PE)	YOY	Expenditure Intensity (GJ/PE)
2019	Consumption	litres					10,790,333.5	26,108,236.0	**36,898,569.5**	**36,898,569.5**	221,938.8	166,122.2	176,594.4	1,391,980.3	1,568,574.7	**1,956,635.7**	58,513.5		**58,513.5**	**28,100,825.3**							
		kWH	175,176,214	167,384,584	25,055,418	**367,616,216**				**367,616,216.0**					-	-			-				Consumption	2019	3.60	94.1	-2.9%	$ 2,583
	Energy	GJ	630,130.27	602,103	90,127	**1,322,360**	273,173	660,968	**934,141.0**	**2,256,501.5**	7,768.0	5,814.4	6,763.5	53,312.2	60,075.7	**73,658**	2,241.0	37,516.2	**39,757**	**1,059,233**		**3,429,150**	Energy				
	(10) GHG	tCO2e	1,869	1,786	267	**3,922**	13,624.01	32,964.59	**46,588.6**	**50,511**	502.1	356.7	459.6	3,810.9	4,270.4	**5,129.2**	153.9	2,154.1	**2,307.9**	**70,827**	**2,391**	**131,166**	GHG				
	Expenditure	approx. $	$ 21,491,805	$ 15,654,926	$ 3,193,377	**$ 40,340,108**	$ 3,225,043	$ 5,910,091	**$ 9,135,134**	**$ 49,475,242**	$ 331,095	$ 212,467	$ 207,751	$ 1,607,587	$ 1,815,338	**$ 2,358,900**	$ 69,631	$ 312,392	**$ 382,023**	**$ 41,870,230**		**$ 94,086,395**	Expenditure				

APPENDIX C: SUMMARY OF RMOW 2019 CORPORATE ENERGY AND EMISSIONS INVENTORY

RMOW Energy and GHG Emissions Assessment - 2019

By Division, Department, and Worksgroup - showing potential carbon carbon costs related to 'neutrality' commitment

Division	Dept.	Workgroup	Organizational Unit	Totals						
				cost ($)	mobile fuels (Litres)	mobile fuels (GJ)	stationary gas (GJ)	Electricity (GJ)	Total Energy Use (GJ)	GHGs (tCO2e)
1100			Mayor & Council	$ 3,592	2,408.0	83.5	-	-	83	5.42
	1101		Mayor & Council	$ 3,592	2,408.0	83.5	-	-	83	5.42
				$ -	-	-	-	-	-	-
1200			CAO Office	$ 2,673	1,960.0	67.9	-	-	68	4.42
	1201		Administrator	$ 2,491	1,838.2	63.7	-	-	64	4.14
	3100		Human Resources	$ 182	121.7	4.2	-	-	4	0.27
				$ -	-	-	-	-	-	-
5000			Resort Experience	$ 614,846	84,011.1	4,691.9	4,678	12,790	22,160	473.64
	5100		General Manager	$ 985	740.1	25.7	-	-	26	1.67
	1401		Partnership & Economic Services	$ 108	72.6	2.5	-	-	3	0.16
	5200		Resort Parks Planning	$ 733	577.8	20.0	-	-	20	1.30
	1402		Village Animation	$ 1,322	1,034.4	35.9	-	-	36	2.33
	5400		Resort Planning	$ 526	352.3	12.2	-	-	12	0.78
	5300		Park/Village Operations	$ 607,907	78,685.7	2,873.9	4,678	12,790	20,342	461.65
	7200		Building Dept.	$ 2,470	1,935.9	67.1	-	-	67	4.36
	8300		Environment Stewardship	$ 794	612.2	1,654.6	-	-	1,655	1.38
				$ -	-	-	-	-	-	-
6000			Infrastructure Services	$ 1,192,029	145,085.8	5,326.8	4,426	29,911	39,664	669.45
	6100		General Manager	$ 727	561.1	19.4	-	-	19	1.26
	6200		Development Services	$ 92	61.7	2.1	-	-	2	0.14
	6400		Transportation	$ 162,028	80,381.1	3,068.8	-	1,353	4,422	209.68
	6500		Central Services	$ 4,108	2,858.6	13.5	52	-	65	9.60
	6600		Environmental Operations	$ 71,645	57,883.8	2,099.6	-	-	2,100	138.53
	8200		Water Utility	$ 429,327	145.1	5.0	-	11,777	11,782	35.23
	8300		Sewer Utility	$ 428,746	3,339.5	123.2	4,322	15,011	19,457	269.77
	6600		Solid Waste	$ 95,572	-	-	52	1,770	1,822	5.24
	6800		Transit	$ -	-	-	-	-	-	-
	6800		Emergency Planning	$ -	-	-	-	-	-	-
				$ -	-	-	-	-	-	-
7000			Corporate & Community Services	$ 329,544	53,813.5	1,960.6	6,333	7,822	16,116	455.59
	7100		CCS General	$ 103	69.3	2.4	-	-	2	0.16
	2200		Lesgislative Services	$ 173	115.8	4.0	-	-	4	0.24
	2300		Financial Services	$ 278	210.3	7.3	-	-	7	0.47
	2400		Fiscal Planning	$ -	-	-	-	-	-	-
	2500		Information Technology	$ 1,325	923.7	32.0	-	-	32	2.08
	4100		Bylaw	$ 18,293	7,067.1	244.9	-	258	503	16.69
	4300		Fire	$ 33,446	27,045.3	1,001.1	52	-	1,053	69.65
	5800		Meadow Park Sports Centre	$ 254,048	1,173.2	40.7	6,281	7,564	13,886	338.32
	4200		RCMP	$ 7,527	6,153.3	229.7	-	-	230	1.08
	5500		Whistler Public Library	$ 812	544.0	18.9	-	-	19	1.23
	5700		Recreation	$ 13,539	10,511.7	379.7	-	-	380	25.68
				$ -	-	-	-	-	-	-
				$ 2,142,684	287,278.4	12,130.7	15,438	50,523	78,091	1,608.52

APPENDIX D: SUMMARY OF EMISSIONS FACTORS

Summary of Emission Factors

based on 2018 BC Best Practices Methodology for Quantifying GHG Emissions, BC Ministry of Environment (Jan, 2019)

https://www2.gov.bc.ca/assets/gov/environment/climate-change/cng/methodology/2018-pso-methodology.pdf

Stationary Emissions

Source Fuel	TOTAL (Petro) t CO2e/GJ	TOTAL (Petro) tCO2e/litre
Natural Gas	0.0499	n/a
Propane	0.0612	0.001548
Diesel (B0)	0.0706	0.002705

	t CO2e/GWh	tCO2e/GJ
BCH 2018 Electricit	10.7	0.00296

Key Conversion	
0.025310	GJ/litre
0.038300	GJ/litre

Mobile Emissions

Light Duty Vehicles

Source Fuel	TOTAL (Petro) t CO2e/GJ	TOTAL (Petro) tCO2e/litre	TOTAL (Bio) t CO2e/GJ	TOTAL (Bio) tCO2e/litre	TOTAL (All) t CO2e/GJ	TOTAL (All) tCO2e/litre	Key Conversion	
Gasoline (E0)	0.0703	0.00246	0.00000	0.0000	0.0703	0.002462	0.03500	GJ/litre
E5 Gasoline	0.0669	0.00234	0.00322	0.0001	0.0702	0.002417	0.03500	GJ/litre
E10 Gasoline	0.0635	0.00222	0.00644	0.0002	0.0700	0.002372	0.03500	GJ/litre
Diesel (B0)	0.0720	0.00276	0.00000	0.0000	0.0720	0.002757	0.03830	GJ/litre
B4 Diesel (RLCFR)	0.0691	0.00265	0.00277	0.0001	0.0719	0.002747	0.03830	GJ/litre
B5 Diesel	0.0684	0.00262	0.00347	0.0001	0.0719	0.002744	0.03830	GJ/litre
B10 Diesel	0.0649	0.00248	0.00694	0.0002	0.0718	0.002731	0.03830	GJ/litre
B20 Diesel	0.0577	0.00221	0.01387	0.0003	0.0716	0.002706	0.03830	GJ/litre
Propane	0.0608	0.00154	0.00000	0.0000	0.0608	0.001539	0.02531	GJ/litre
Natural Gas	0.0574		0.000000	0.0000	0.0574		0.05379	GJ/kg

Light Duty Trucks (incl. SUVs & Minivans)

Source Fuel	TOTAL (Petro) t CO2e/GJ	TOTAL (Petro) tCO2e/litre	TOTAL (Bio) t CO2e/GJ	TOTAL (Bio) tCO2e/litre	TOTAL (All) t CO2e/GJ	TOTAL (All) tCO2e/litre	Key Conversion	
Gasoline (E0)	0.0713	0.00249	0.00000	0.0000	0.0713	0.002495	0.03500	GJ/litre
E5 Gasoline	0.0678	0.00237	0.00322	0.0001	0.0710	0.002448	0.03500	GJ/litre
E10 Gasoline	0.0644	0.00225	0.00644	0.0002	0.0708	0.002401	0.03500	GJ/litre
Diesel (B0)	0.0720	0.00276	0.00000	0.0000	0.0720	0.002757	0.03830	GJ/litre
B4 Diesel (RLCFR)	0.0691	0.00265	0.00277	0.0001	0.0719	0.002747	0.03830	GJ/litre
B5 Diesel	0.0684	0.00262	0.00347	0.0001	0.0719	0.002744	0.03830	GJ/litre
B10 Diesel	0.0649	0.00248	0.00694	0.0002	0.0718	0.002732	0.03830	GJ/litre
B20 Diesel	0.0577	0.00221	0.01387	0.0003	0.0716	0.002706	0.03830	GJ/litre
Propane	0.0608	0.00154	0.00000	0.0000	0.0608	0.001539	0.02531	GJ/litre
Natural Gas	0.0574		0.000000	0.0000	0.0574		0.05379	GJ/kg

Heavy Duty Vehicles

Source Fuel	TOTAL (Petro) t CO2e/GJ	TOTAL (Petro) tCO2e/litre	TOTAL (Bio) t CO2e/GJ	TOTAL (Bio) tCO2e/litre	TOTAL (All) t CO2e/GJ	TOTAL (All) tCO2e/litre	Key Conversion	
Gasoline (E0)	0.0679	0.00238	0.00000	0.0000	0.0679	0.002377	0.03500	GJ/litre
E5 Gasoline	0.0646	0.00226	0.00322	0.0001	0.0679	0.002258	0.03500	GJ/litre
E10 Gasoline	0.0613	0.00215	0.00644	0.0002	0.0678	0.002140	0.03500	GJ/litre
Diesel (B0)	0.0715	0.00274	0.00000	0.0000	0.0715	0.002738	0.03830	GJ/litre
B4 Diesel (RLCFR)	0.0687	0.00263	0.00277	0.0001	0.0714	0.002747	0.03830	GJ/litre
B5 Diesel	0.0679	0.00260	0.00347	0.0001	0.0714	0.002744	0.03830	GJ/litre
B10 Diesel	0.0644	0.00247	0.00694	0.0002	0.0713	0.002732	0.03830	GJ/litre
B20 Diesel	0.0573	0.00220	0.01387	0.0003	0.0712	0.002706	0.03830	GJ/litre

Off Road Vehicles

Source Fuel	TOTAL (Petro) t CO2e/GJ	TOTAL (Petro) tCO2e/litre	TOTAL (Bio) t CO2e/GJ	TOTAL (Bio) tCO2e/litre	TOTAL (All) t CO2e/GJ	TOTAL (All) tCO2e/litre	Key Conversion	
Gasoline (E0)	0.0686	0.00240	0.00000	0.0000	0.0686	0.002402	0.03500	GJ/litre
E5 Gasoline	0.0653	0.00229	0.00322	0.0001	0.0685	0.002282	0.03500	GJ/litre
E10 Gasoline	0.0620	0.00217	0.00644	0.0002	0.0684	0.002162	0.03500	GJ/litre
Diesel (B0)	0.0781	0.00299	0.00000	0.0000	0.0781	0.002992	0.03830	GJ/litre
B4 Diesel (RLCFR)	0.0750	0.00287	0.00277	0.0001	0.0778	0.002747	0.03830	GJ/litre
B5 Diesel	0.0742	0.00284	0.00347	0.0001	0.0777	0.002744	0.03830	GJ/litre
B10 Diesel	0.0704	0.00270	0.00694	0.0002	0.0773	0.002732	0.03830	GJ/litre
B20 Diesel	0.0626	0.00240	0.01387	0.0003	0.0765	0.002706	0.03830	GJ/litre

Various

Source Fuel	TOTAL (Petro) t CO2e/GJ	TOTAL (Petro) tCO2e/litre	TOTAL (Bio) t CO2e/GJ	TOTAL (Bio) tCO2e/litre	TOTAL (All) t CO2e/GJ	TOTAL (All) tCO2e/litre	Key Conversion	
Biodiesel (B100)	0.0008	0.000027	0.06936	0.0016	0.07013	0.002501	0.03567	GJ/litre
Ethanol (E100)	0.0022	0.000051	0.06443	0.0015	0.06660	0.001560	0.02342	GJ/litre