# WHISTLER ENERGY CONSUMPTION AND GREENHOUSE GAS PERFORMANCE TRENDS 2017 ANNUAL REPORT

Corporate, Economic & Environmental Services Department The Resort Municipality of Whistler | August 2018





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# 1 EXECUTIVE SUMMARY

As a tourism-focused mountain town, Whistler has long been concerned with the issue of climate change. The resort community has a special dependence on stable snow and weather patterns, making us very aware of our shared responsibility to manage greenhouse gas emissions, and even more sensitive to the reality of the potential impacts if we do not.

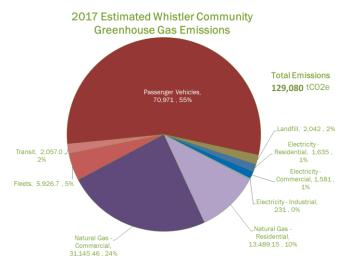
Since 2010, the primary purpose of this Annual Report has been to provide a summary of Whistler's energy and greenhouse gas (GHG) emissions performance for the previous year. The secondary purpose of this report includes a summary of the energy and emissions performance for the RMOW's internal corporate operations. This ongoing performance data forms the foundation for informed energy cost management and ongoing climate change mitigation efforts. Finally, this report also includes a progress update on key Community Energy & Climate Action Plan (CECAP) implementation progress.

#### COMMUNITY-WIDE PERFORMANCE

2017 COMMUNITY GHG EMISSIONS: Greenhouse gas emissions in Whistler are made up of emissions from stationary sources (buildings and infrastructure systems), mobile sources (passenger vehicles, fleets, and transit), and emissions from landfilled wastes. Passenger vehicle transportation within Resort Municipality of Whistler (RMOW) boundaries continues to represent the largest share of the overall emission footprint at 57%, followed by natural gas consumption at 33% (primarily used for space and water heating).

The community of Whistler has committed to community-level greenhouse gas reductions of:

- 33% by 2020;
- 80% by 2050; and
- 90% by 2060 (each versus 2007 levels).



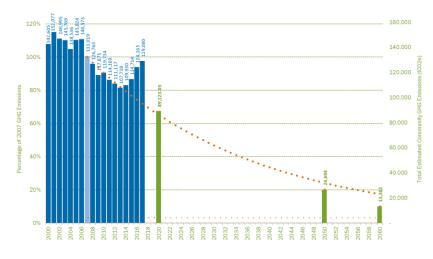
From 2008 until 2012, the community managed to remain on pace towards these targets, averaging annual reductions of approximately 3.8% per year - however the 2014 through 2017 community results indicate that Whistler is no longer on pace to meet the community's 2020 target GHG reduction level. These four most recent years have averaged a 4.7% increase in total emissions per year and have eroded total GHG reductions from -19% in 2013 to now only -3% vs 2007 levels (i.e. giving up much of the early years' improvements).

Total community GHG emissions in 2017 are estimated to be 129,080 tC02e1 (3% lower than 2007 levels, 9.5% lower than 2000 levels, but 4% above 2016 levels).

From a GHG emissions intensity perspective, estimated 2017 GHG emissions per population equivalent<sup>2</sup> levels have decreased year over year by 4% to 3.56 tC02e/PE. This intensity level is 28% lower than 2007 levels, and is the third lowest annual per capita measure since detailed record keeping began in 2000.

<sup>&</sup>lt;sup>1</sup> Carbon dioxide equivalent (or CO<sub>2</sub>e) is the most common unit of measure for quantifying the amount of 'climate change impact' a given type and amount of greenhouse gas may cause, using the functionally equivalent amount or concentration of carbon dioxide (CO<sub>2</sub>) as the reference. <sup>2</sup> 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. More detail on the composition of the Population Equivalent can be found at:





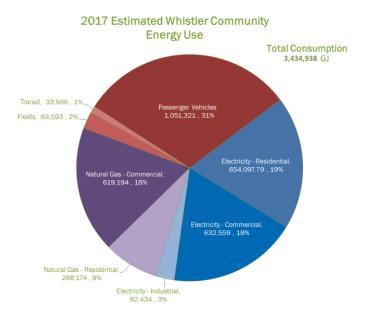
Looking ahead, the key challenge for the community continues to be slowing the recent growth in emissions, and regaining the rate of reduction when further 'one-time changes' (such as the piped propane to natural gas conversion and the landfill cap and capture projects) are, for the most part, no longer readily available. Given the distribution of emissions within the community, a significant reduction in emissions from passenger vehicle and natural gas use will be critical to achieving the required reductions needed to regain the targeted reduction curve.

To achieve the Official Community Plan's 2020 GHG target, annual reductions of ~13,000 tonnes of CO2e would be required for each of the next three years (approx. a 10% reduction each year). This level of reduction is highly improbable and **the community's 2020 GHG emission reduction target will not be achieved.** 

**2016 COMMUNITY ENERGY CONSUMPTION & EXPENDITURES:** Electricity is the most prevalent type of energy consumed in Whistler, at 40% of the total consumption, followed by vehicle fuels (~35%), and natural gas at 25% of total consumption.

Total community energy consumption in 2017 is estimated to be 3.43 million GJ (up approximately 10% from 2007 levels, and up 5.6% year over year). These increases are at least partly driven by a colder 2017 winter (8.3% colder than 2016), as well as significant increases in local population equivalent (also up 8.3% vs. 2016 levels).

Community energy consumption since the base commitment year of 2007 has followed a generally similar pattern as community GHG emissions. While 2011 through to 2014 showed small but consistent reductions in total energy consumption, 2017 levels are estimated to be the highest ever recorded in the community. At the same time, similar to the recent emissions trends, total energy consumption per population equivalent has decreased for six of the last seven years, and 2017 levels are the second lowest levels ever recorded.



The estimated annual **collective energy expenditure within Whistler has increased by more than \$45 million since 2000 (\$94 million vs. \$49 million/yr).** Energy expenditures for residential buildings now total approximately \$25 million/year, with commercial building expenditures totaling approximately \$23 million on an annual basis (passenger vehicles and fleets make up the remainder). As such, 2017 marks the first year that residential energy expenditures exceeded commercial expenditures. Total passenger vehicle estimated expenditures held steady at an estimated \$35M/year due to the continuation of suppressed fuel prices versus 2015 rates. However, total estimated passenger vehicles fuel expenditures still represent an increase of approximately \$20 million/yr as compared to 2000 levels.

2016 energy expenditures per population equivalent increased by approx. 4% vs. 2016 levels, primarily driven by the increased price of mobile fuels.

Finally, despite recent rate declines in natural gas and mobile fuels, over the long term it is expected that energy rates will continue to outpace inflation. As such, it is expected that the combined community expenditure will continue to rise faster than our collective ability to pay for it. A fact that underscores the importance of increasing community-wide energy conservation and energy efficiency.

## 2017 CORPORATE OPERATIONS PERFORMANCE

**2017 CORPORATE GHG EMISSIONS:** The RMOW's Carbon Neutral Operations Plan sets the targets for total corporate GHG reductions as follows: 10% by 2010; 20% by 2013; and 30% by 2015 – all relative to 2008 levels.

Total corporate GHG emissions in 2016 were 1,705 tC02e. This level of emissions is 13% above 2016 levels, but it is approximately 27% below the 2008 benchmark (the reference year for RMOW target setting).

As demonstrated in the chart to the right, 2017 corporate emissions are still no longer below the 2015 annual GHG emission level targeted in the 2009 Carbon Neutral Operations Plan. Currently the RMOW does not have corporate targets beyond 2015, but 2017 levels are neither below the last 2015 target nor the extrapolated reduction curve inferred by the Carbon WHISTLER - Total Estimated RMOW Corporate GHG Emissions (showing targetted reductions and a 4.75% reduction per year targetted performance curve)



Neutral Ops Plan targets (i.e an extended sequence of 4.75% annual reductions).

On a division-by-division basis, the relative emissions footprint of corporate operations is as follows: (44%) Infrastructure Services — which includes roads crews, solid waste systems, the water utility, and the sewer utility; (28%) Corporate and Community Services — including bylaw, fire, Meadow Park Sports Centre, and other recreation programs; and (28%) Resort Experience (REX) — which includes village maintenance operations, horticulture, turf, and irrigation crews, parks and trails, as well as facility construction and maintenance operations.

GHG emissions across corporate operations are produced primarily from the combustion of mobile fuels (gasoline and diesels) at 44%, followed by natural gas at 48%, and electricity at 8%.

Increases in 2017 corporate emissions were primarily driven by increases in natural gas consumption across municipal office buildings, the WWTP and MPSC.

**2017 CORPORATE ENERGY CONSUMPTION & EXPENDITURES:** Total corporate energy consumption increased in 2017 by 12% year over year to 78,860 GJ/year. Electricity consumption makes up the greatest portion of total energy consumed across municipal operations at 62% of the total consumption, followed by natural gas (21%), and mobile fuels (17%).

Corporate and Community Services experienced the biggest increase in energy consumption year-overyear at 12%. Similarly Resort Experience and Infrastructure Services both increased in consumption by 9%. However, Resort Experience's consumption levels are 2% below 2008 benchmark levels while Infrastructure Services' current consumption level is 17% above the benchmark level. Corporate and Community Services continues to demonstrate the largest consumption decrease in relation to the 2008 benchmark year, consuming 29% less than 2008.

Overall, 2017 energy expenditures across municipal operations increased by 14% to ~\$2.05M. This was primarily due to a ~13% increase in the total electricity expenditures, which makes up the largest portion of corporate energy expenditures (~\$1.54M/year). By division total energy expenses increased for Infrastructure Services, Corporate and Community Services and Resort Experience by 17%, 10% and 13% respectively.

## COMMUNITY ENERGY & CLIMATE ACTION PLAN (CECAP) UPDATE

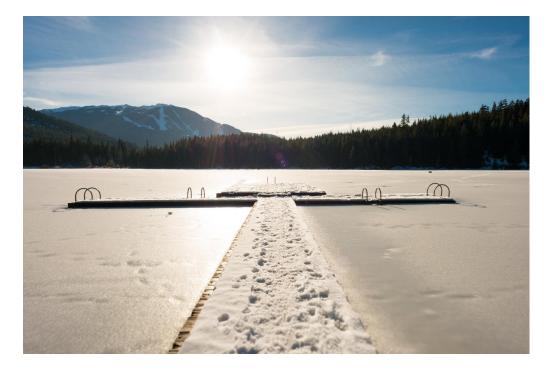
Section 5 of this Annual Report includes a detailed update on key RMOW- initiatives recommended within the CECAP. The update provides separate detail on mitigation (or energy and emission reduction) initiatives as well a sub-section on key initiatives related climate adaptation initiatives. Details include 2019 priorities where possible, and reflect the high level progress as of Q2, 2018.

The updates demonstrate that a wide range of activities have been undertaken, but it is also clear that the strategic emphasis for recent years mitigation initiatives continues to be transportation-sector initiatives; and for adaptation initiatives, wildfire protection.

## SUMMARY COMMENTS

The impact of changing climatic conditions (see CECAP for more detail) has the potential to substantially impact the Whistler community. Informed, strategic planning that considers and evaluates the impacts of the issues related to climate change and rising long term 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 such as that which is included in 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.



# 2 INTRODUCTION

Whistler's Vision is to be the *Premier Mountain Resort as we move toward sustainability*. Implied in this vision is a journey – an understanding that it will take continued commitment to get to our intended destination. The Whistler community also understands that on this journey we will have to find a way to do things more efficiently.

As a mountain town, Whistler has long been concerned with the issue of climate change. Our resort community has a special dependence on stable snow and weather patterns, making us very aware of our shared responsibility to manage greenhouse gas emissions, and even more sensitive to the reality of 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.

Moreover, we now live in an era of climate responsibility and by extension this requires climate action; climate change is a certainty, as is human responsibility for it<sup>3</sup>. The IPCC concluded in 2016 that "**Human influence on the climate system is clear; and that limiting climate change will require substantial and sustained reductions of GHG emissions**." Reducing Whistler's greenhouse gas emissions is one of the most significant actions we can take as a community to take responsibility for our part in solving the climate crisis.

Recent reporting from California notes that, "...the state reached their 2020 carbon pollution reduction goal four years ahead of schedule – a reduction of 13 per cent from the 2004 peak, while the economy grew by 26 per cent in the same period". This is the type of shift that Whistler aspires to – a demonstration that GHGs can decrease while the economy remains strong; that a healthy, prosperous economic sector is not mutually exclusive with declining emission levels

The primary purpose of this Annual Report is to provide a summary of Whistler's community-wide energy 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 Council-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 less than 1.5% 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.

Similar to the 2016 Annual Performance Report, this report includes a brief update on CECAP implementation initiatives that are led by the organization. This update and associated details is included as Section 5 of this Report.

Finally, this is the 7<sup>th</sup> Performance Report that has been produced at this level of detail (2010, 2011, 2013, and 2014, and 2015 (included within the CECAP) as well as the 2016 report are available at <u>www.whistler.ca/climateaction</u>).

<sup>&</sup>lt;sup>3</sup> Climate Change 2013, The Physical Science Basis – Working Group 1 Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, IPCC, 2013. <u>http://www.ipcc.ch/report/ar5/wg1/</u>

## 2.1 BACKGROUND

Whistler is one of the few communities in BC that has a relatively long history of both setting emissions reductions targets and annually monitoring its GHG emissions footprint. 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.

## 2.1.1 Whistler2020

The Whistler community understands that sustainability is not just about the environment; that three integrated (not just balanced) concepts – ecological integrity, fiscal viability, and social justice – point to a larger strategy, and that these three concepts are not as strong in isolation as they are when considered together.

In 2005 the RMOW adopted Whistler2020, the community's comprehensive, long-term sustainability plan, as direction setting policy.

Whistler2020 was the product of thousands of voices across the resort community coming together to articulate the vision of the resort community we aspire to be.

The community vision articulated within Whistler2020 is organized around the following five priorities:

- 1. Enriching Community Life
- 2. Enhancing the Resort Experience
- 3. Ensuring Economic Viability
- 4. Protecting the Environment
- 5. Partnering for Success

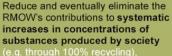
Moreover, Whistler2020 imbedded and integrated four science-based Sustainability Objectives premised on the Natural Step principles (see box on the right) into the vision and the framework for making decisions. In this sense, these Sustainability Objectives were designed to act as a compass to help frame and guide decisionmaking and ongoing planning.

Working within the Whistler2020 framework, the community has aimed to steadily integrate the Sustainability Objectives into all aspects of community planning and development strategies – from Energy and Transportation strategies, to Economic and Visitor Experience strategies. Through the application of this approach, our community is striving to integrate climate change mitigation (and increasinglyt adapation) into a broad spectrum of community policies and operational practices.

#### Whistler's Sustainability Objectives are to:



Reduce and eventually eliminate the RMOW's contributions to systematic increases in concentrations of substances from the Earth's crust (e.g. by increasing energy efficiency),





Reduce and eventually eliminate the RMOW's contributions to systematic physical degradation of nature (e.g. by purchasing certified wood), and

and in that society people are not subject to conditions that systematically...



Reduce and eventually eliminate our contribution to systematically undermining the ability of others to meet their basic human needs. (e.g. by purchasing FairTrade).

Though climate change is viewed mainly as an environmental problem, it is much more than that.

## 2.1.2 Whistler's Community Energy Planning – A Brief History

Whistler committed to its first greenhouse gas emission reduction targets in 1997. In that year, Whistler Council endorsed the Kyoto Protocol target of having the community's emissions at 6% below 1990 levels by the year 2012. For municipal (corporate) emissions, Council also committed to being a part of the "20% Club", committing to reducing corporate emissions 20% below 1990 levels by 2012 – two aspirations that the community of Whistler did not achieve.

Following up on these commitments, the RMOW participated in the Federation of Canadian Municipalities' (FCM) Partners for Climate Protection (PCP) program. The PCP program was launched by FCM as an extension of ICLEI's (Local Governments for Sustainability) Cities for Climate Protection program in the United States. Partner cities become members in a network of municipalities that began working toward the achievement of the five management-based milestones of the program. The milestones were designed to create tools and processes that were easy to understand and implement, and also provide effective guidance for municipalities to take serious steps toward climate action.

To meet the commitments of the Partners for Climate Protection program process, the RMOW developed the first Integrated Energy, Air Quality, and Greenhouse Gas Management Plan in Canada in 2004.

## FCM/ICELI Partners for Climate Protection

The five milestones of the Partners for Climate Protection program are:

- 1. Create a greenhouse gas emissions inventory and forecast;
- 2. Set an emissions reductions target;
- 3. Develop a local action plan;
- 4. Implement the local action plan or a set of activities; and
- 5. Monitor progress and report the results.

In 2007, the Resort Municipality of Whistler became the first community in Canada to complete all five milestones for both community and corporate emissions.

The recommended implementation scenario in the Integrated Energy Plan acknowledged that achieving our community target of 6% below 1990 levels would be very difficult to achieve by 2012. As such, the plan recommended a reductions scenario that would see Whistler's emissions at 9% below 2000 levels (but 22% above 1990 levels) by 2020. This was recommended in contrast to the forecasted *business as usual* (i.e. take no action) scenario that predicted Whistler community GHG emissions would rise to 92% above 1990 levels (47% above 2000) by the year 2020.

In September of 2007, at the Union of BC Municipalities (UBCM) conference in Vancouver, Whistler was one of original sixty-two<sup>4</sup> local governments in BC that signed on to the Province's voluntary BC Climate Action Charter. The Charter opens with the following statement, agreed to by all signatories, **"Scientific consensus has developed that increasing emissions of human caused greenhouse gases (GHG), including carbon dioxide, methane and other GHG emissions, that are released into the atmosphere are affecting the Earth's climate.<sup>75</sup>** 

Currently approximately 180 BC communities are signatories to the Charter. By signing the Charter, local governments agreed that:

- 5. In order to contribute to reducing GHG emissions:
  - (a) Signatory Local Governments agree to develop strategies and take actions to achieve the following goals:

(i) Being carbon neutral in respect of their operations by 2012, recognizing that solid waste facilities regulated under the Environmental Management Act are not included in operations for the purposes of this Charter.

(ii) Measuring and reporting on their community's GHG emissions profile; and

(iii) creating complete, compact, more energy efficient rural and urban communities(e.g. foster a built environment that supports a reduction in car dependency and energy use, establish policies and processes that support fast tracking of green development projects, adopt zoning practices that encourage land use patterns that increase density and reduce sprawl.)<sup>6</sup>

<sup>&</sup>lt;sup>4</sup> The BC Climate Action Charter was eventually signed by more than 170 local governments across British Columbia.

<sup>&</sup>lt;sup>5</sup> The British Columbia Climate Action Charter, Section 1

<sup>&</sup>lt;sup>6</sup> The British Columbia Climate Action Charter. Section 5.

The Charter is a voluntary agreement designed to bring local government support for the Province's broader overall climate action strategy of reducing emissions 33% (from 2007 levels) by 2020.

Enacted in 2008, Bill 27, *the Green Communities Act*, required local governments to include (among other things) 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 (discussed later in this report), policies, and actions within its Official Community Plan, and developed a Carbon Neutral Operations Plan.

In 2015 and 2016 staff undertook the process of updating the Whistler Integrated Energy Plan. Developed by a committee of more than 30 leaders from across the community, the new **Community Energy and Climate Action Plan (CECAP)** project updated the existing RMOW Integrated Energy, Air Quality and Greenhouse Gas Management Plan and set out new strategic directions for mitigating Whistler's contribution to climate change, included detailed 50 year climate projections for the Whistler area, and also recommended a series of adaptation strategies to prevent and minimize the likely impacts of 'locked-in' changes to future local climate regimes. The CECAP was endorsed by municipal Council on July 26, 2016 and is available online at: <a href="https://www.whistler.ca/climateaction">www.whistler.ca/climateaction</a>.

In 2017 and 2018, a further update to the Whistler Official Community Plan was initiated and continues to be in progress. The updated OCP significantly expands on previous climate and energy related content and now includes integrated content both within a new Climate Acton and Energy chapter as well as significant related content in the Transportation and Infrastructure chapters <u>www.whistler.ca/ocp</u>.



Building on the background and contextual elements presented in Section 2, Section 3 details how the community of Whistler is progressing toward its energy and emission reduction goals, Section 4 presents similar performance data for RMOW corporate operations, and Section 5 provides a brief 2017/18 update on the RMOW-led, CECAP-recommended initiatives.

# **3 COMMUNITY PERFORMANCE**

Since the year 2000, RMOW staff have tracked and compiled community energy consumption, energy expenditure and GHG emission data. At the community level, primary sources of data to support this inventory are accessed from local utilities (BC Hydro and FortisBC), from local traffic counter data (both provincial and municipal), from BC Transit, as well as from annual RMOW waste and recycling performance tracking. Sections 3.1 and 3.2 of this report summarize the most current performance trends for 2017.

## 3.1 COMMUNITY GREENHOUSE GAS EMISSIONS

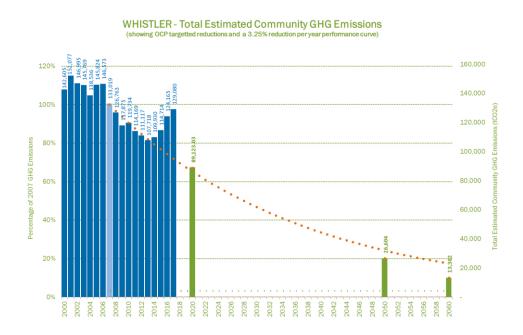
Section 3.1 deals specifically with GHG emissions at the community level. This section includes information on related Council-adopted targets, an overview of 2017 performance, as well as a short section on key associated insights and trends.

## 3.1.1 Community GHG Reduction Target

As previously noted, the *Provincial Green Communities Act* (Bill 27, 2008) requires all municipalities to adopt **targets**, policies and actions for the reduction of community-wide GHGs. As per the Whistler Official Community Plan, when compared to 2007 GHG emission levels, the community of Whistler has targeted community-level greenhouse gas reductions of: **33% by 2020, 80% by 20507; and 90% by 2060**.

33% by 2020 80% by 2050 90% by 2060

If it was anticipated that the attainment of these targets would be achieved at a relatively consistent rate (or pace) over the coming decades, these targets translate into an **annual GHG reduction of approximately 3.25% per year (or approx. 3,500 tCO2e per year).** The following chart illustrates the potential achievement of this 'targets' and an inferred 'pace' over time. The chart presents the adopted community targets (green bars), the historic community emissions levels (blue bars) as well as an indication of the approximate annual reductions that would be required to achieve the prescribed targets using a constant rate of improvement model (orange dots).



7 33% by 2020 and 50% by 2050 are identical to the Provincial targets set by the Government of BC.

As demonstrated on the previous chart, the community of Whistler remained generally on pace towards its targets for the first six years of the commitment period. GHG emission reductions achieved during these first six years (2008-2011) were impressive – averaging more than 4,000 tonnes of reductions annually over the six year period.

It is worth noting, that the primary sources of the reductions over the first four years were generally **onetime** only events. These included:

- the changes to Whistler's waste management processes;
   (i.e. landfill closure, landfill gas management, organics recycling and the switch to the advanced landfill management systems at Rabanco);
- 2) the switch from piped propane to piped natural gas across the community;
- the changes brought about through the provincial low-carbon fuel standards for gasoline and diesel;
- 4) the decrease in GHG intensity (GHGs/kWh) of BC Hydro supplied electricity; and
- the reduction in diesel consumption associated with the hydrogen transit bus pilot project (Note that pilot project has since ended, resulting in an increase in transit diesel consumption in 2014 through 2016)



It is also important to note that the 7<sup>th</sup> year of the commitment period (2014) did not remain below the intended curve toward the 2020 adopted target (33% reduction vs. 2007). **The 2014 year-over-year emission levels not only did not decrease by the target 3,000-4,000 tonnes, but actually increased by 2,200 tCO2e (2.1%) and for the first time in the commitment period produced a level above the target curve.** Unfortunately this trend has continued each year since (2015-2017). Whistler's annual emissions are now estimated at 129,080 tCO2e, which represents an average increase of over the last four years of approximately 5,300 tCO2e per year, and an increase of 21,000 tonnes in total.

2017 community GHG levels are now estimated at 3% below the 2007 base year (rather than the targeted 28.1%), or 129,000 tCO2e rather than the targeted 95,600 tCO2e. At this point, to achieve the OCP targeted 2020 GHG emission level, would require annual reductions of more than 10,000 tonnes per year for the next three years.

Unfortunately, this level of reduction is highly improbable and, the community's 2020 GHG emission reduction target will not be achieved.

Looking ahead, the key challenge for our community will be firstly to slow the rate of increase that has occurred over the last 4 years, and secondly regaining the rate of reductions achieved over the 2008-2013 period. This will be challenging due to the fact that further 'one-time changes' are, for the most part, no longer readily available. To regain a performance level consistent with the target curve presented above, additional reductions of approximately 6,000 tonnes of CO2e would be required annually for the next 10-12 years.

Future GHG reductions will need to be primarily premised on actual energy conservation and increased efficiency rather than one-time technological or infrastructure changes in community systems. The required conservation or efficiency improvements will be particularly challenging for the community as historic performance assessments demonstrate that even while GHG reductions were being achieved, community-scale energy conservation gains have proven to be more elusive.

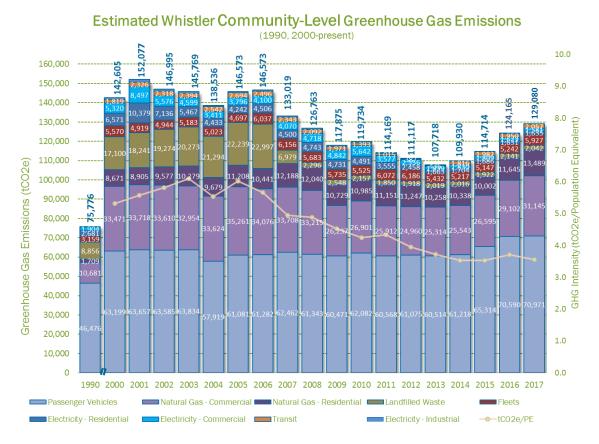
Current trends suggest that the opportunity for near term gains in GHG performance will need to come primarily from the



transportation sector, and secondarily from improvements in fossil fuel-based space heating demands across both the commercial and residential sectors.

## 3.1.2 Community GHG Emission Performance

Total community emissions in 2017 were estimated to be **129,080 tCO2e**. This level is approximately 3% lower than 2007 levels, 9.5% lower than 2000, but **4% above 2016 levels** and well above (+35%) our current community target levels.



It is however worth noting that from a GHG emissions intensity perspective, 2017 GHG emissions per population equivalent<sup>8</sup> decreased to 3.56 tCO2e/PE. This level is 4% below 2016 levels, 28% below 2007 levels, and the third lowest annual per capita measure since detailed record keeping began in 2000. Stated another way, while total community emissions went up, the number of people in the resort (both residents and visitors alike) increased more significantly, hence the ratio, or the emissions/person declined. This intensity improvement may suggest an increase in overall efficiency from a GHG perspective when the resort community is at higher levels of occupancy.

As noted above, the primary drivers of reductions in previous years have been the changes to the local waste management system (especially landfill gas capture); the switch from piped propane to piped natural gas, the BC Transit Hydrogen Transit Fleet pilot project (which has since ended), and more recently, the provincial low carbon fuel standards and the decreasing GHG intensity of BC Hydro electricity supply.

<sup>&</sup>lt;sup>8</sup> 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. More detail on the composition of the Population Equivalent can be found at: <a href="http://www.whistler2020.ca/whistler/site/genericPage.acds?instanceid=2985334&context=2985223">http://www.whistler2020.ca/whistler/site/genericPage.acds?instanceid=2985334&context=2985223</a>

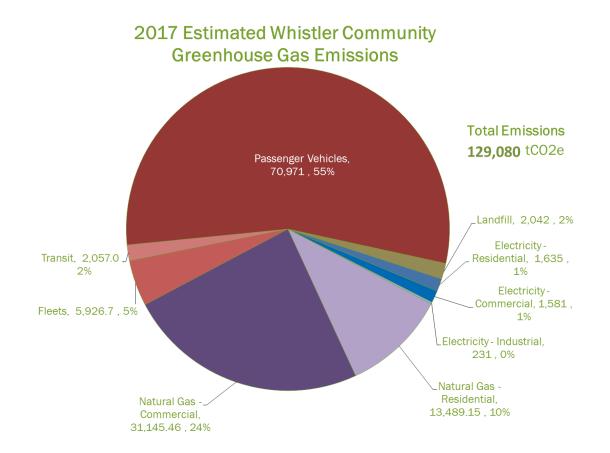
As further one-time, system-level changes such as those noted above become less available to our community, Whistler will no longer achieve significant reductions without substantive 'energy conservation' or potential switches to lower carbon energy sources (e.g. electrification of transportation and/or space heating) becoming core drivers of further emission reductions.

## **Distribution of Emissions**

Greenhouse gas emissions in Whistler are made up of emissions from stationary sources (buildings and infrastructure systems), mobile sources (passenger vehicles, fleets, and transit), as well as emissions from landfilled wastes. The approximate share of each of these sources is presented in the following chart.

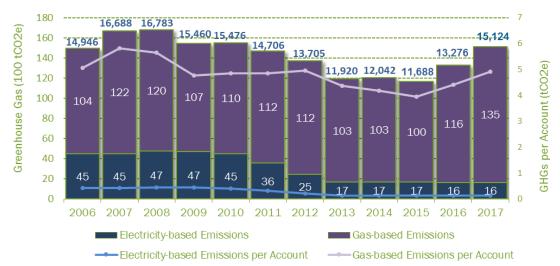
## **Passenger Vehicles**

Passenger vehicle transportation within RMOW boundaries continues to represent the single largest share of the overall emission footprint at 57%, followed by natural gas consumption at 33% (primarily used for space and water heating).



## Whistler Buildings - GHGs

The following two charts show the changes in greenhouse gas emissions from key segments of the community building inventory.



## Whistler Residential GHGs

## **Residential Natural Gas Emissions**

Total natural gas based GHG emissions across the residential sector have increased 16% year over year. This increase is at least partially driven by a colder winter in 2017 (2017 was 8.3% colder than 2016, and 4% colder than the 10 yr average).

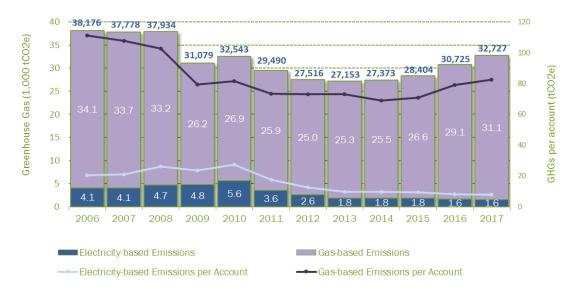
Given that emissions per residential account increased by 11.6% - this is an increase that cannot easily be explained by simply a colder winter rationale alone.

It is not clear what is driving this incremental increase in per account consumption, but possible rationales could include: pricing signals (i.e. the new lower costs of natural gas) may be influencing resident behavior; it could also be attributable to more frequent use of second-home or vacation properties than in previous years; or possibly increases in heated floor area per account. Regardless, current data does not support an 'increasing average space heating efficiency' hypothesis for the residential sector as a whole at this time.

#### **Residential Electricity Emissions**

2017 electricity-based emissions held relatively constant in the residential sector on both a total basis (+0.2%), as well as an emissions per account basis (+1.5%). While total residential electrical consumption increased in 2017 (+7.7%), the primary driver of decreasing electricity-based emissions over the past few years has been the reduction in system-wide BC Hydro GHG emissions intensities (i.e. the system-wide provision of lower carbon electricity to the community).

Finally, the total estimated 2017 GHG intensity (electricity + gas) of Whistler's residential sector appeared to increase by approximately 8% on a per m<sup>2</sup> basis (vs. 2016). As above, this is an increase that cannot solely be attributed to a colder winter, and seems to be related to potentially greater usage rates (i.e. more use of the existing residential housing inventory), **and a greater load share of natural gas** (i.e. in 2003 natural gas represented approximately 23% of all residential energy use, in 2017 it had risen to 29%).



## Whistler Commercial Sector GHGs

## **Commercial Sector Natural Gas Emissions**

Commercial sector GHG emissions decreased substantially after the conversion from propane to natural gas was finalized in 2009 (2009 commercial heating gas emissions declined by 25% versus 2005 levels). Commercial natural gas emissions remained relatively steady during 2011-2015 at approximately 27% lower than pre conversion 2007 levels. More recently however, 2016 and 2017 levels have demonstrated a substantial increase, 2016 rising 14% above the '11-14 average, and 9.3% year over year, and 2017 increasing YOY by a further 6.5%. This recent increases cannot be fully explained by a colder winter/increased heating load rationale as the '11-'14 winters were, on average, colder than the average of '16-'17.. Rationale may be rooted in price signals leading to fuel switching (i.e. driven by the recently reduced delivered price of natural gas), by increased occupancy levels in the resort, by a small increase in heated commercial floor space, or by a combination of all three.

Commercial natural gas emissions per account increased 4.4% in 2017 to the highest level since 2008, however, still considerably lower (more than 20% lower) than pre-conversion levels.

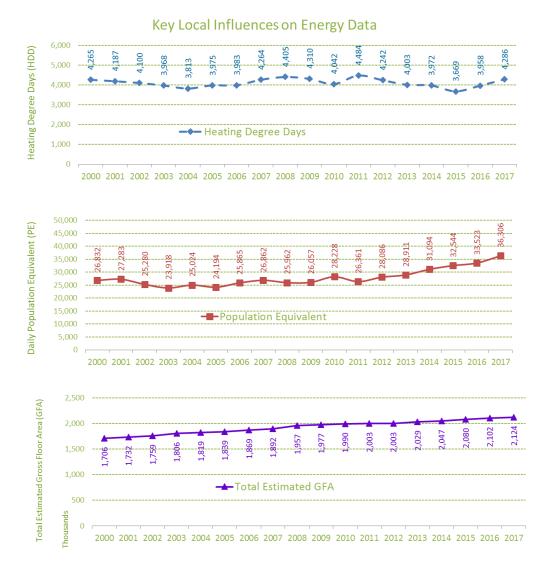
#### Commercial Sector Electricity Emissions

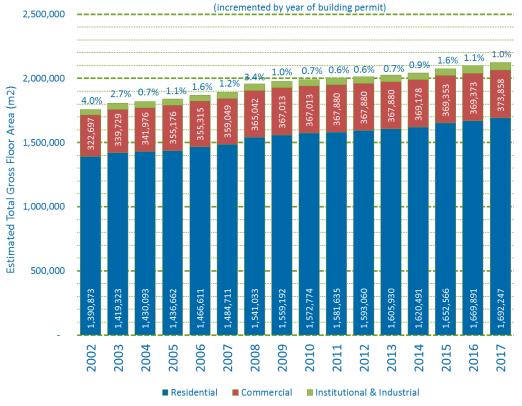
Commercial sector GHG emissions from electricity consumption peaked in 2010 (Olympic Games year). Since the Games year, total sector electricity-based emission levels have decreased substantively. These reductions are partially driven by a drop in electrical consumption post Games (2016 commercial electrical consumption is 21% lower than 2010), **but are primarily driven by decreasing GHG intensity levels across the BC Hydro system** (i.e. reductions driven by forces outside of the community). In 2017, commercial electricity based emissions have decreased by almost 3% year over year. This is driven by continuing reductions in the GHG intensity levels across the BC Hydro system (annually calculated as a three-rolling average).

Emissions per account have followed patterns similar to that described above and commercial electricitybased GHG emissions per account are now at the lowest level since detailed reporting began almost 15 years ago (i.e. 2017 per account emission levels are now less than half of 2003 levels).

The following five charts provide additional detail regarding the primary influences on energy consumption and emissions trends over time. These trends are useful for the exploration of possible explanations for observed change over time. It is however important to note that Whistler's **GHG emission reduction targets are set at total emission levels** – i.e. targets are not at set at per-capita, or per-m<sup>2</sup> intensity levels, as only

**total emissions** levels have an influence overall climate impacts. Intensity measures do help provide insights as to the factors are driving changes in performance, but it is only the <u>total</u> parts-per-million (ppm) of carbon in the atmosphere that defines and shapes the impacts of climate change. It is for this reason that Whistler chose to set total emission targets rather than emission intensity targets.





## Estimated Growth in Total Whistler Gross Floor Area

BC Hydro Emission Factor Comparison					(tCo2e/GV	Vh)										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
3 year rolling average	40.7	34.7	23.7	24.7	26.3	24.7	26.0	25.3	25.3	19.0	13.7	10.0	10.7	10.7	9.7	9.0

\*estimated, final 2016 value yet to be confirmed e confirmed

## 3.1.3 Key Community GHG Performance Insights

## **Total GHG Emissions**

57% of all estimated community-level emissions (~70,000 tonnes annually) are produced by
passenger vehicle transportation within municipal boundaries. The passenger vehicle sector provides
a critically important opportunity for future community emission reductions.



- For the fourth year in a row, emission levels have risen year over year (+4%, +3,211 tC02e), confirming the fact that **the community will not achieve its 2020 OCP emission reduction goals.**
- On the other hand, emissions per population equivalent achieved the third lowest level on record in 2017 (3.56 tCO2e/pe).
- The lack of additional, significant one-time changes (i.e. low hanging fruit similar to the propane to natural gas conversion project or the landfill cap-and-capture project) will make future progress toward our GHG reduction goals much more difficult.

## **Commercial Buildings GHG Emissions**



- Total commercial emissions, and emissions per commercial account both increased—6.5% and 3.8% respectively.
- Collectively, commercial building emissions have decreased by 13% from the 2007 year. Unfortunately, the sector has given back significant ground in this respect as it was more than 27% below 2007 in 2014. The sector is now no longer on target to meet its share of the 2020 target (-33%). See page 17 for more detail on sector by sector progress).

## Residential Buildings GHG Emissions

- Total residential GHGs have dropped from 2007 levels by 9.4% (primarily due to the shift to natural gas from propane, and the decrease in BC Hydro GHG intensity collectively the use of cleaner fuels). Unfortunately, the sector has collectively also given back significant ground in this respect as it was more than 30% below 2007 as recently as 2015.
  - Unfortunately, 2017 emission levels have also slipped below target reduction pace for the sector and the sector is no longer on pace to meet its share of the 2020 reduction target. See page 17 for more detail.
  - The primary source of emissions across the residential inventory remains natural gas consumption (~89%) for space and water heating.
- The shift to natural gas (from propane), and the decreasing GHG-intensity of BC Hydro electricity are the primary reasons for the GHG reductions in this sector. It should be noted that 2017 total energy consumption across the residential sector has now increased by 7.7% since 2007 (highlighting the role that cleaner fuels have contributed to the 9.4% GHG reduction noted above).

## Transportation GHG Emissions

<u>Low carbon fuel standards</u> have helped to mitigate the emissions from both gasoline and diesel consumption (5% ethanol blend in gasoline, and 4% biodiesel blend in diesel).



Estimated total vehicle kilometers travelled (VKT) in Whistler (locals and visitors combined) increased significantly over the previous 3 years (2014 – 2016), but has moderated to hold essentially stable for 2017 (and early indications suggest a potential drop in passenger vehicle emissions for 2018).

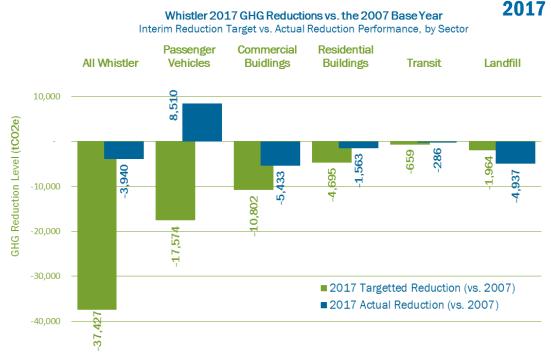


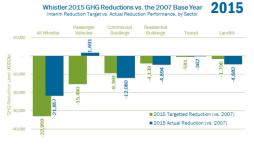
The average fuel efficiency of BC registered vehicles has only improved by ~3-5% over the last 10 years. This change has slowly reduced emission levels per kilometer driven from 2000 levels, but not by enough to cause sector-wide reductions in total estimated emissions. Moreover, recent trends indicate that lower gasoline prices may be contributing to an increase in the purchase of light duty trucks and SUVs, and a concurrent decrease in smaller passenger vehicle – a trend that works counter to the increased efficiencies noted above.

- The low carbon fuel standards and the increases in vehicle efficiency are still far too small to move passenger vehicle emissions to the targeted reduction levels discussed in Section 3.1.1. Significantly more efficient vehicles, fuel switching to lower carbon fuel sources, and/or a significant decrease in VKT per person will be required to catalyze required emission reductions in this sector.
- Estimated passenger vehicle emissions have increased by 13.6% since 2007 base year (+8,510 tC02e), This difference between targeted emissions reductions from the transportation sector (-28.1%) and the actual passenger vehicle performance levels (+13.6%) is the single largest reason why the community is failing to maintain interim GHG target reduction levels (net difference between target reductions and actual performance is ~26,000 tC02e).

#### Looking Ahead

- As previously noted, the key challenge for the community moving forward, will be regaining the rate of reduction achieved over the first five years of the commitment period. This is due to the fact that further 'one-time changes' are, for the most part, no longer readily available.
  - Future reductions will need to be primarily premised on actual energy conservation and efficiency rather than one-time technological changes in community systems (i.e. primarily by driving less, and secondarily by reducing fossil fuels consumed by buildings)
  - As seen in the chart 2017 below, the greatest need (and opportunity) for ongoing emission reductions is in the **passenger vehicle sector**
  - Note that the 2016 and 2015 charts are also included below for reference and comparison.







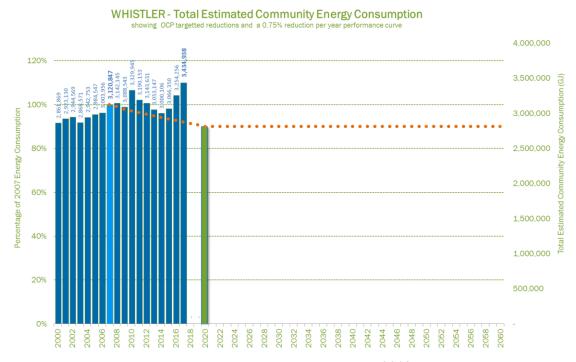
## 3.2 COMMUNITY ENERGY CONSUMPTION & ENERGY EXPENDITURES

Section 3.2 deals with energy consumption and energy expenditures at the community level. This section includes information on related targets, an overview of 2017 performance, as well as a short section on key associated insights and trends.

## 3.2.1 Community Energy Reduction Target

OCP Amendment Bylaw 1983, 2011 includes the Objective: 'Make Energy Conservation the Core Strategy and Highest Priority for Achieving Our Greenhouse Gas Emission Reduction Goals'. To this end, the OCP Amendment Bylaw also 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".

This proposed policy introduces Whistler's first comprehensive **energy** reduction target – and one of the first by a local government in BC. Similar to the chart in Section 3.1.1 above, if it is assumed that this energy reduction target will achieved at a consistent pace over the next decade, this target translates into a 0.75% annual energy consumption reduction over the target period (2011 - 2020). A visual presentation of this rate of reduction is included below for clarity.



As evidenced in the chart above, and while there are similarities since 2010, the longer term historic energy consumption has not followed exactly the same trajectory as community GHG emissions. Fuel shifting (propane to natural gas, and changes associated with landfill management) primarily impact GHG levels but do not influence the total energy consumption.

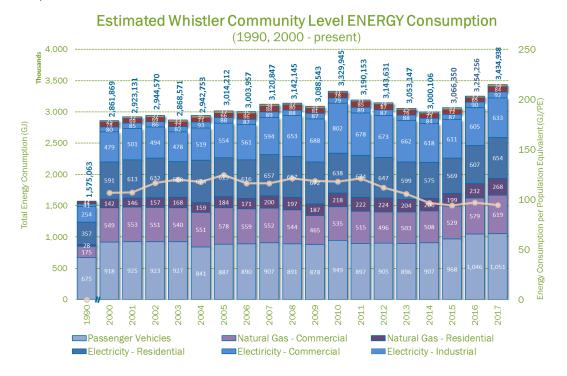
**2017** energy consumption levels are now the highest levels ever recorded in Whistler. Community-wide energy consumption did decrease at an average rate of -2.5% between 2011 and 2014 and the community was quite close to being on-track to meet OCP targeted levels. However, reductions reversed in 2015 and has continued to increase through 2016, and 2017 thereby moving the community significantly off pace for the proposed 2020 target.

Currently, Whistler's total energy consumption is approximately 500,000 GJ higher than projected target levels for 2017 (i.e. 10% higher than 2007 levels, rather than 8% below).

## 3.2.2 Community Energy Consumption Performance

Energy consumption in Whistler includes consumption from stationary sources (buildings and infrastructure), as well as mobile sources (passenger vehicles, fleets, and transit). Total community energy consumption in 2017 was estimated to be **3.4 million GJ** (8% above 2016 levels).

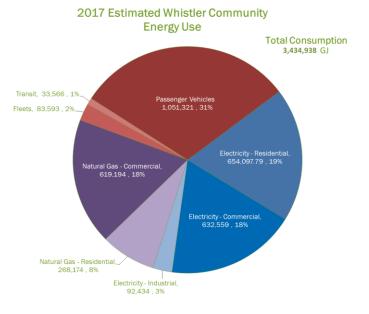
Energy consumption per population equivalent (94.6 GJ/pe) decreased in 2017 to near the **lowest** performance level since detailed reported began in 2000 (-2.6% YOY and 24% below peak levels in 2005).



The 2017 total energy consumption was the highest year on record and approx. 8.3% higher than the 10 year average. Unfortunately, despite generally lower per population equivalent consumption, recent total

consumption trends (past three years) suggest that it is highly unlikely for the community to meet its proposed 2020 energy consumption target (see Section 3.2.1).

Electricity is the most prevalent type of energy consumed in Whistler at 40% of the total consumption (slightly down from previous two years), followed by vehicle fuels (~35%), and natural gas at approximately one quarter of total consumption. It is worth noting that due to the fact that different energy sources have differing carbon content, GHG emissions are much more heavily associated with consumption of fossil fuels (i.e. gasoline, diesels, and natural gas). This fact accounts for the differences in relative proportions depicted in this chart as compared to the similar chart presented in Section 3.1.2.

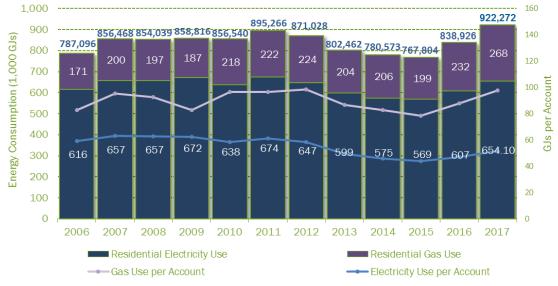


Over the last few years there has been a substantive increase in the consumption of natural gas (natural gas consumption is up 180,000 GJ versus 2013, an increase of more than 25%). Fleet consumption had been improving over last 4-5 years, but in 2017 returned to near 2011/12 levels. Electricity consumption is up 6% YOY, and has given back some of the gains achieved since 2013 (likely at least partially driven by the colder 20176 winter), and finally passenger vehicle consumption remained generally steady YOY suggesting some positive impacts associated with the work of the TAG recommendations.

## Whistler Buildings – Energy Consumption

Total energy consumption across Whistler's buildings is presented in the following two charts.

#### Residential Buildings - Energy Consumption



## Whistler Residential Energy Use

Residential electricity consumption increased in 2017 in both total terms (+10%), and on a per account basis (+10%) vs 2016. Total 2017 residential energy consumption was the highest ever at 922,272 GJ (up 13.5% versus the average of the previous 5 years). This change reflects increases in both electricity (+8%) and gas consumption (+16%) across the residential sector and cannot be explained by weather-induced heating demands alone. 2017 was colder than the average of the previous five seasons, but only by approximately 8% (and only about 40% of residential consumption is sensitive to HDD fluctuations). This increase is more likely a function of the increasing amount of heated floor space within the residential sector (~1.3% increase in floor area per annum over the last 10 years) or an increased use of vacation properties and second homes in the residential sector vs. previous levels.

## **Residential Natural Gas**

Total 2017 natural gas consumption is 28% above the average of the previous 10 years; and per account consumption of gas is average consumption is up 11.% YOY and +8.6% versus the 10 year average.

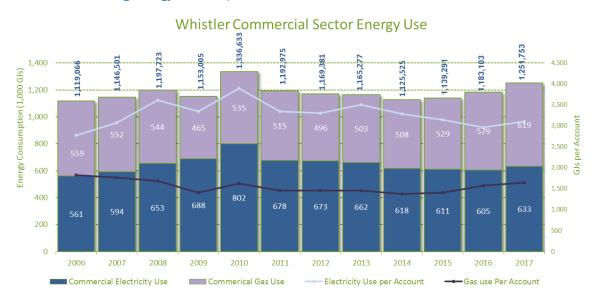
#### **Residential Electricity**

Residential electricity consumption increased by 8% in total, and by 10.2% on a per-account basis. 2017 per-account electricity levels were 6.7% lower than the average of the last 10 years.

The total estimated residential sector total energy use intensity<sup>9</sup> (EUI) for 2017 was approximately equivalent to the average of the last 10 years despite the fact that 2017 was 8% higher 2016. This fact is

<sup>&</sup>lt;sup>9</sup> EUI measures the estimated energy use per area of developed indoor space (i.e. GJ/m2)

potentially suggestive that the sector is slowly improving in collective (avg) energy efficiency levels but that progress slowed in 2017 due to colder temperatures and higher usage rates.



## **Commercial Building Energy Consumption**

2017 results indicated that there has been a 5.8% increase year over year in total building energy consumption by the commercial sector, dirven by increases in both electricity and natural gas consumption.

#### **Commercial Natural Gas & Electricity**

The period from 2003 through to 2009 saw a significant shift in commercial energy consumption trends. This period saw decreases in propane use at the same time as roughly equal increases in electricity use across the sector. In sum, energy consumption was little changed, but the 'fuel-shift' did lead to lower overall GHG emissions meaningfully. The primary reason for this shift was likely attributable be the increased use of hybrid electric/gas boilers for space and water heating loads in the large hotel sector (i.e. a fuel shift from natural gas/propane to electricity for space and water heating loads in the commercial sector).

By 2010 60% of all energy consumed in the commercial sector was electricity (up from 47% in 2003). As previously noted, this shift had favourable impacts from a GHG perspective (and to a lesser extent, financial), even as total energy consumption remained relatively constant. Since 2010, the electricity share of the commercial energy consumption has decreased steadily. The 2017 electricity share has remains at 51% (identical to 2016) suggesting a shift back toward natural gas for space and water heating may be occurring in these same facilities. 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 appear to be moderating commercial sector total energy costs, but increasing commercial sector GHG emissions.

Electricity consumption per account in the commercial sector had decreased in 2016 by 5.7% but increased again in 2017 by 4.5%. The 2017 consumption per account remains approximately 7.3% below the 10 year average.

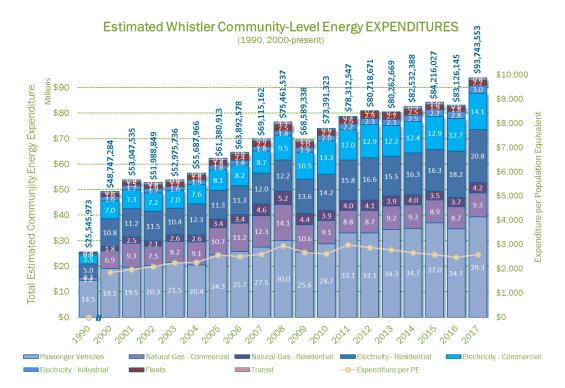
Natural gas consumption per account increased by a similar amount (+4.4%) in 2017, and is now approximately 8% higher than the average of the previous 10 year period.

It is however worth noting that both commercial gas consumption and commercial electricity consumption per population equivalent are now at the lowest levels since detailed recording began (approximately 30-40% below the respective high water mark for each of these metrics).

## 3.2.3 Community Energy Expenditure Performance

The estimated annual collective energy expenditure within Whistler<sup>10</sup> has increased by more than \$45 million (+94%) between 2000 and 2017 (\$94 million vs. \$49 million). Increases in energy rates have levelled for the last couple of years (with the exception of BC Hydro), somewhat bucking the historic trend toward increases in excess of the rate of inflation. This levelling—and even rate reductions for natural gas—in both mobile fuels and natural gas had significantly moderated the rise in total community energy expenditures, however mobile fuels are regaining more historic escalation rates which is the primary reason for the increase in 2017 expenditures seen below.

When and if energy rates regain more historical increases (mobile fuel rates have already begun to rise steadily – up >10% vs 2017 average rates), total expenditures are expected to climb relatively quickly. This fact underscores the importance of increasing both energy conservation and energy efficiency across the community. It is quite likely that a total expenditure of \$100 million could be reached by the year 2020.

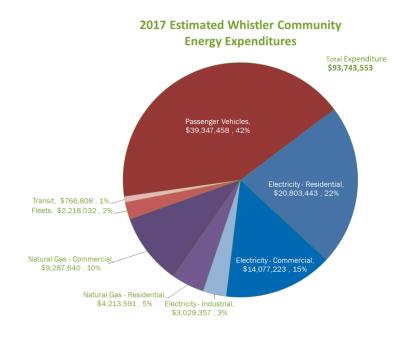


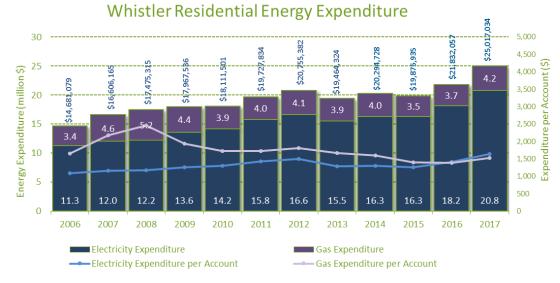
Energy expenditures for buildings (both commercial and residential) had remained relatively constant since 2008 at approximately \$42-44 million/year with electricity expenditures increasing by a margin nearly equal to the drop in natural gas expenditures. More recently, 2016 and 2017 expenditure levels have increased to total now more than \$48 million per year.

<sup>&</sup>lt;sup>10</sup> Note that this number includes an estimate of the consumption of gasoline for all vehicle kilometres travelled within Whistler's municipal boundaries. As such it includes a portion (i.e the portion within municipal boundaries) of the incurred costs of energy consumption associated with both visitors arriving by automobile, as well as commuting employees from neighbouring communities.

The final two charts in this section present the ten-year trend in cumulative energy expenditures across Whistler's key building inventory. Despite the decrease in the price of natural gas, total expenditures in the residential sector continued to demonstrate a generally upward trend. As of 2017, residential expenditures total almost \$25 million/year, and commercial expenditures were slightly above \$23 million.

Historic rate escalation for electricity averages approximately 3-5% per annum. However, given the relatively recent British Columbia Utilities Commission (BCUC) amalgamation ruling, the delivered rate of natural gas decreased 30-40% between 2014 and 2016.

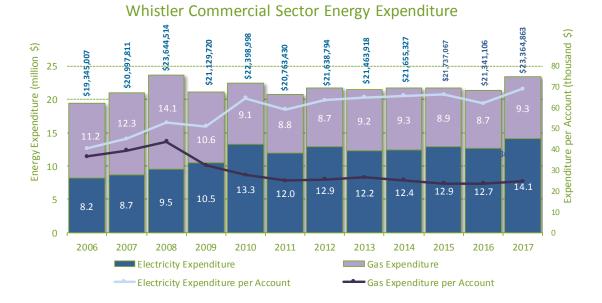




## **Residential Building Energy Expenditures**

Residential building expenditures decreased in 2013 for the first time in a decade due to a reduction in total energy consumption across this sector. Residential expenditures have since regained a generally rising trend (2014-2017) despite declining consumption in '14 and '15. This is due to the fact that rates have increased (primarily electricity) by a margin in excess of the percent reduction in associated consumption levels. Increases in 2016 and 2017 are largely driven by increasing consumption, though electricity rates did also rise during this period.

In 2017, expenditures increased significantly seemingly due to a combination of increased electricity rates, increased consumption, increased heated floor space in the community, and increased occupancy levels across the resort.



## Commercial Building Energy Expenditures

Total commercial energy expenditures remained relatively constant between 2012 and 2016. This seems to be due to a combination of slightly decreased energy consumption of the sector, and a shift away from electricity to natural gas in the large accommodation sector energy users. However, despite the apparent shift back toward natural gas over recent years, 2017 expenditures neared all-time highs.

## Power Down - Residential Energy Assessment Rebate Program

The Residential Energy Assessment Rebate Program offers Whistler homeowners \$250 towards an Energuide for Homes home energy evaluation - a service which normally cost between \$300 and \$450. Since the program began in August, 2014, approximately 250 new and existing homes have been assessed through this program.

Although the current sample size is relatively small, staff have been evaluating the results of these assessments and using the insights to inform ongoing policy development (eg. Energy Step Code) and to track both uptake levels and changes in home energy performance over time.

# Your home probably has a hole **this big** in it.



# 3.2.4 Key Community Energy Consumption & Energy Expenditure Performance Insights

## **Total Energy Consumption**



- Total community energy consumption increased in each of the last three years. 2017 levels were 5.5% above 2016 levels and 2017 is now at the highest annual level on record.
- Community energy consumption trends were on track to meet 'proposed' OCP targeted levels between 2011 and 2014, however 2016 and 2017 are now far above the required pace to meet 2020 goals.
  - Current community energy consumption levels (3.43 million GJ/yr) are more than 600,000 GJ higher than the proposed OCP 2020 target.
- Energy consumption per population equivalent is very near the lowest level since detailed reporting began (94.6 GJ/pe vs. the 130 GJ/pe in 2005). This represents a 27% reduction in energy consumption per person over a 12 year time frame.

## **Residential Energy Consumption**

- 2017 residential energy consumption increased YOY in both total terms, as well as on a per account basis.
- The estimated residential sector energy use intensity (EUI) for 2017 was equivalent to the average EUI of the last 10 years. Unfortunately, this fact does not currently support an 'increasing efficiency' observation for the residential sector.

## **Commercial Consumption**

- 2017 commercial consumption levels have increased by 5.8% year over year and are approximately 6% higher than the 10 year average for the sector.
- There appears to be a continuing shift from electricity consumption to natural gas in the commercial sector. This has helped to moderate total commercial sector energy expenditures, but has increased the GHG emissions from the sector.

## **Passenger Vehicles**

• Despite small increases in average vehicle fuel efficiencies, estimated energy consumption associated with passenger vehicles has steadily increased since 2013. However in 2017, estimated energy consumption within the sector remained stable. Ongoing monitoring will be required to evaluate if this stabilization will endure, but early 2018 data is supportive of a moderation in the ongoing growth of passenger vehicle emissions.

## **Total Energy Expenditures**



- Driven by both increased consumption, and increased fuel and utility rates, total estimated energy expenditures have risen by approximately \$10M YOY to a total of more than \$93M/yr.
- Passenger vehicle expenditures held steady year over year at approximately \$34.7M/yr
- Stabilized natural gas rates combined with increased consumption contributed to higher total natural gas expenditures in 2017 (\$13.5M/yr, +9.4%).

## **Residential Building Sector Expenditures**



- 2017 residential electricity expenditures increased year over year, making 2017 the highest annual residential electricity expenditure on record (\$20.8M/yr, and increasing to approx. \$1,600 per account)
- Total residential gas expenditures increased for the second year in a row to \$4.2M/year in 2017, and increased to an estimated annual cost of more than \$1,500 per account.

#### **Commercial Building Sector Expenditures**

- Total 2017 commercial energy expenditures increased to an estimated \$23.6M.
- Both total, and per-account, commercial electricity expenditures increased year over year.
- Both total, and per-account, commercial natural gas expenditures increased year over year.

## Looking Ahead

- The commercial sector has made progress toward decreased energy expenditures across its collective inventory. However, this reduction may have the net effect of increasing GHGs as it seems to be based primarily on an increasing shift to natural gas use away from electricity.
- The data had suggested that there was improved energy efficiency (per m2) in both the residential and commercial sectors between approximately 2012 and 2015 but this trend did not continue into 2016 and reversed somewhat in 2017. This cannot be rationalized solely by a colder winter rationale (though that is part of the story for 2017), and is likely attributable to higher occupancy/use rates across the resort over the last few years.



# 4 CORPORATE PERFORMANCE

Initiated as part of the 2004 RMOW Integrated Energy, Air Quality, and GHG Management Plan, detailed energy and emission inventories are now compiled, assessed, and shared with key operations staff across the organization on a regular basis. Energy consumption, emissions, and expenditures are tracked independently by fuel type (gasoline, diesels, electricity and natural gas) for each division, department, and workgroup across all functional areas of the organization.

The primary purpose of these inventories is to provide a foundation for identifying energy conservation opportunites, assessing energy performance across key municipal building assets, and structuring business case assessements for potential upgrades and efficiency retrfofits. Additionally, these inventories are designed to satisfy Council-adopted commitments to external programs such as the Partners for Climate Protection program and the BC Climate Action Charter, as well as the internal commitments in the RMOW Integrated Energy Plan, the CECAP, the RMOW Carbon Neutral Operations Plan, and the Whistler Offical Community Plan (OCP).

As a means of comparison to community-wide emissions, RMOW corporate emissions represent approximately 1.3% of the total community estimated emissions. Despite this relatively small share of overall emissions, the RMOW has recognized and accepted the need for leadership in carbon and energy management across the organization

Further, the historic upward pressure on energy rates (over the long term energy rates rise faster than the rate of inflation) makes it clear for all organizations that energy consumption should be tracked, managed and ultimately reduced as a fiscal strategy, not just an environmental one.



## 4.1 KEY CORPORATE INSIGHTS and SUMMARY



## 4.2 CORPORATE GREENHOUSE GAS EMISSIONS

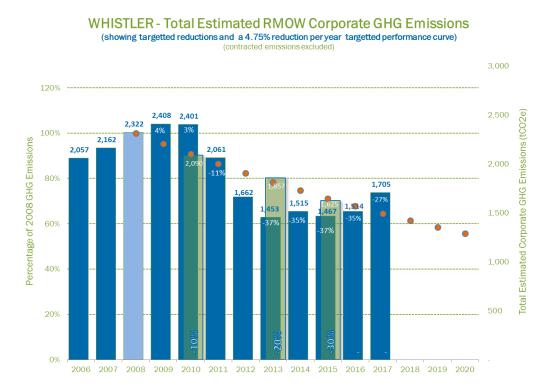
Section 4.2 deals specifically with greenhouse gas emissions associated with RMOW corporate operations. This section includes information on related targets, an overview of 2017 performance results, as well as a short section on key associated insights and trends.

## 4.2.1 Corporate GHG Reduction Targets

The RMOW's 2009 Carbon Neutral Operations Plan sets the targets for total corporate GHG reductions as follows:

<b>10%</b> by 2010 <b>20%</b> by 2013 <b>30%</b> by 2015	(all relative to <b>2008</b> levels)
--	--------------------------------------

The following chart presents these targets graphically (light green bars), the historic corporate emissions levels (blue bars) as well as an indication of the annual reductions that would be required to achieve the prescribed targets using a constant rate of improvement model at approximately -5%/yr (orange dots).

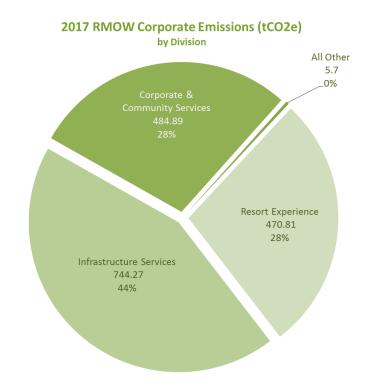


As demonstrated in the chart above, RMOW corporate emissions reduced substantively between 2010 and 2013, stabilized between 2013 and 2015, but have increased steadily over the last two years. 2017 emission levels increased 13% YOY; are still 27% below 2008 levels; but are currently at a level 14% (207 tC02e) above the target reduction rate curve.

## 4.2.2 Corporate GHG Performance

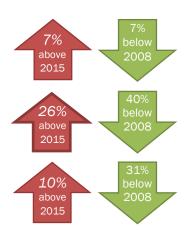
Total direct corporate GHG emissions in 2017 were 1,705 tCO2e.

On a division-by-division basis, the relative emissions footprint of corporate operations is primarily associated with the following three divisions: (44%) **Infrastructure Services** (which includes roads crews, solid waste systems, the water utility as well as the sewer utility); (28%) **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). The relative contributions from each division are shown in the graphic below.

Key 2017 Corporate GHG emissions trend by organizational Division are presented below.

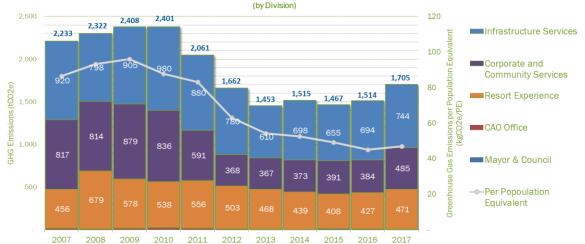


• Infrastructure Services

emission levels **increased** by 7% year over year (YOY), which puts 2017 levels at 7% lower than 2008 benchmark levels.

- Corporate and Community Services emission levels increased by 26% YOY, which means that current levels are 40% below their corresponding 2008 benchmark level.
- **Resort Experience** (REX)

emission levels **increased** by 10%, making current levels now approximately 31% lower than 2008 levels.



## Trends in RMOW Corporate GHG EMISSIONS

As seen in the chart above, Corporate and Community Services (purple segments) is largest source of increased emissions YOY, which is primarily due to the fact core HVAC system failures caused the back-up gas boiler system to increase load share. Other significant increases are associated with increased general heating load demand (colder year) for most building assets (REX), and for Infrastructure Services, increased natural gas consumption at the WWTP likely attributable to increased processing volumes, and increased roads/transportation crew mobile fuel consumption likely related to increased snow clearing demands in 2017.

Overall, the largest source of GHG reductions over the last decade has clearly been the energy retrofits at MPSC (Corporate and Community Services) – especially the installation of the geo-exchange and solar hot water systems.

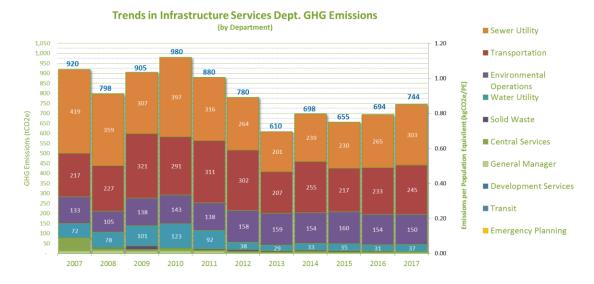
#### 2017 RMOW Corporate Emissions (tCO2e) **Distribution by Fuel Type By Energy Type RMOW** corporate emissions come primarily from two sources - 43% from mobile sources (gasoline and diesels), and 48% from natural gas combustion. Natural Gas 823.22 The relative shares of each of 48% these energy types are presented to the right. Propane, 5.8, 1% Gasoline Electricity 277 140.2 16% 8% **B5** Biodiesel 459 27%

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## 4.2.3 Divisional Trends

## Infrastructure Services

Changes in Infrastructure Services emission levels over the last ten years are presented below:



#### Infrastructure Services' GHG emission trends by key functional area:

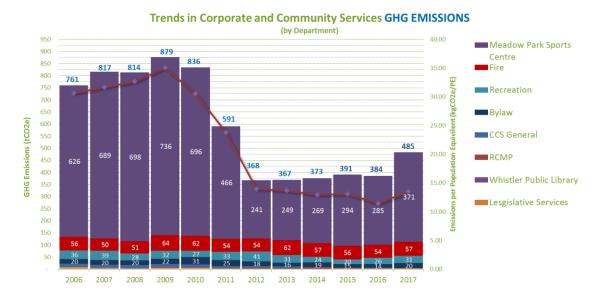
2017	Sewer	Transport.	Env. Ops	Water	TOTAL
YOY	14%	5%	-2%	20%	7%
vs. 2008	-15%	8%	43%	-52%	-7%

#### Key Insights

- WWTP emissions (Sewer Utility) increased significantly on a year over year basis, but is currently 35 tCO2e (15%) lower than the 2008 benchmark level. In 2013, emissions associated with the WWTP reached an all-time low of 201 tCO2e, however 2017 emissions have returned nearly to 2011 levels (albeit at much higher levels of processing volume). This 2017 increase is primarily attributed to a 20% YOY increase in natural gas consumption at the WWTP.
- Mobile emissions from the transportation (roads) department saw a year over year increase of 12tCO2e (5%). This increase is at least partially the result of a higher than average snow clearing year. The current emission levels for the transportation department are now 8% higher than 2008 benchmark levels.
- Environmental Operations emissions decreased slightly year over year, but is still 45 tCO2e (43%) above the 2008 benchmark levels. This year over year decrease in specifically due to reduced B5 diesel year over year (-16%). The overall increase since 2008 is primarily driven by an increased amount of mobile fuel use in the utilities workgroup.

## **Corporate and Community Services**

Changes in Corporate and Community Services emission levels over the last ten years are presented below:



Corporate and Community Services GHG emission trends by key functional area are summarized below:

2017	MPSC	Fire	Rec	Bylaw	TOTAL
YOY	30%	6%	19%	41%	26%
vs. 2008	-47%	13%	10%	0%	-40%

#### Key Insights

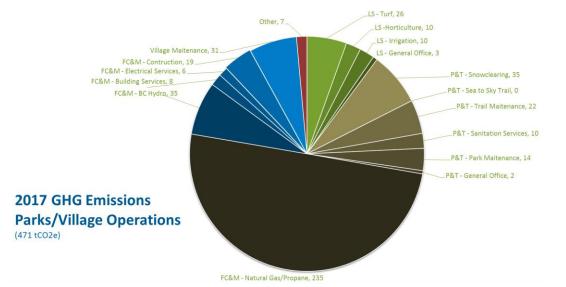
- For 2017, the primary driver of increased emissions within the division was MPSC natural gas consumption. However, even with an increase of 86 tC02e year over year, the 2017 MPSC annual emissions are still 327 tC02e lower than 2008 benchmark levels. This year over year increase is attributable to a fuel shift to natural gas used for the heating of the pools (+20%) that was associated with the a leak in the geo-exchange ground loops, and the failure of the roof-top pool dehumidifier system (Dectron) for an extended period of time.
- Bylaw emissions increased by ~6 tCO2e year. This increase is attributed to a 44% increase year over year of gasoline mobile fuel usage from both patrolling Day lots and Animal Control.
- The Fire department's emissions have increased YOY and as compared to 2008 benchmark levels, however the scale of this change is relatively small in total terms (+7 tC02e vs. 2008 levels).
- Recreation emissions increased by 5 tCO2e year over year, which was primarily due an increase in mobile fuel consumption – especially with X-Country snow grooming.



### **Resort Experience (REX)**

Changes in REX emission levels over the last ten years are presented below.

As the emissions from the REX division are overwhelmingly associated with the Parks/Village Operations functional area, a more detailed breakdown is included in the graphic below.



Park/Village Operation dept. GHG emission trends by key functional area are demonstrated below along

with the total Park/Village Operations trends:

2017	P/Vops	V.Maint.	Land S	Parks &T	FC & M	TOTAL
YOY	12%	-4%	-9%	23%	15%	10%
vs. 2008	- <b>27</b> %	16%	30%	29%	-26%	-31%

### Key Insights

- Facility Construction & Maintenance (FC&M) emissions represent by far the largest emission share for this division (within the Parks/Village Operations above). The FC&M increase (40 tCO2e) came primarily from increased natural gas use at buildings such as the Public Works Yard and the Public Safety Building, among others.
- Parks and Village Operations increased in 2017 by ~48 tCO2e year over year. This increase in tCO2e is primarily due to increases in the use of diesel for parks and trail snow clearing & associated maintenance, as well as natural gas for building heating systems.

### 4.2.4 Key Corporate GHG Emission Performance Insights

### Overall



- RMOW corporate emissions are up 13% YOY, are still 27% lower than the 2008 benchmark year but are now 14% higher than the emissions target for this year.
- Large reductions in GHG emissions in previous years were largely due to upgrades at Meadow Park Sports Centre, a decrease in BC Hydro's emission factor for electricity, and also a reduction in consumption across divisions, specifically in Infrastructure Services. However, since many of the larger retrofit projects were completed in previous years, much of the current change in emissions results from changes in fuel use for operational demands. In 2017, fuel use for operational demand increased, and without significant retrofit projects to offset these increases, there was a subsequent net increase in overall RMOW emissions.

### **Divisional Insights**



- Infrastructure Services' emissions increased by 7% year over year, mainly as a result of increased natural gas consumption (20%) at the WWTP, and an increase in the Transportation department's mobile fuel use, which is largely due to a 17% increase in road maintenance diesel use. Despite these increases, 2017 emission levels in this division are currently 7% lower than 2008 benchmark levels.
- Corporate and Community Services emissions increased by 26% year over year. This increase in
  emissions is due to higher amount of natural gas usage at MPSC. Although this is a larger year
  over year increase than in previous years, Corporate and Community Services is still 40% below
  2008, and it's expected that the two HVAC system failures experienced in 2017 will be fully
  rectified in 2018.
- The REX division saw an emissions increase in 2017 (10%) and the majority of this was due to an increase in stationary natural gas use (18%) in Facilities, Construction & Maintenance (building heating systems).

• Municipal buildings with the lowest intensity of GHG emissions include the following: (all expressed as kgC02e/ft2/year)

- Lost Lake Passivhaus: 0.07
- Spruce Grove Field House 0.16
- Whistler Public Library 0.29<sup>11</sup>

<sup>&</sup>lt;sup>11</sup> For reference, Maurice Young Arts Centre emits 2.1 kgCO2e/ft2/year

### 4.3 CORPORATE ENERGY CONSUMPTION

This section deals specifically with the energy consumption associated with RMOW corporate operations. This section includes information an overview of 2017 performance levels, and a short section on key associated insights and trends.

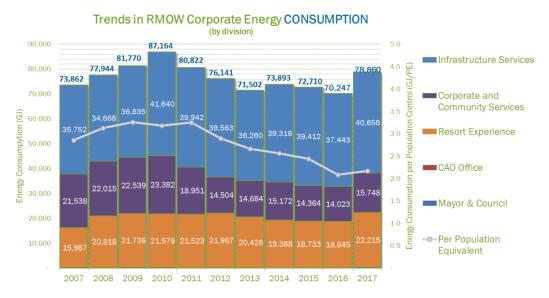
### 4.3.1 Corporate Energy Consumption Reduction Targets

The RMOW does not currently have any formally adopted targets for corporate energy consumption. The 2004 RMOW Integrated Energy, Air Quality and GHG Management Plan did, however, include recommended corporate energy consumption targets for 'consideration'. These recommended energy consumption targets for municipal operations were: year 2010 (64,000 GJs), and year 2020 (55,000 GJs).

The RMOW Carbon Neutral Operations plan does not include formal targets but rather recommends ongoing commitment to energy conservation as both (a) the primary strategy for reducing corporate GHG emissions, and (b) an important means of controlling ongoing utility and fuel costs across corporate operations.

### 4.3.2 Corporate Energy Consumption Performance

Total corporate energy consumption increased in 2017 by 9.7% to 78,860 **GJ/year**. This is still above the 2010 target recommended within the 2004 RMOW Integrated Energy Plan (64,000 GJ/year), and considerably higher than the upcoming 2020 target (55,000 GJ). At the same time, 2017 corporate energy consumption per population equivalent continued to be very near historic lows, similar to 2016 levels.



The ten-year trends in corporate energy consumption are presented below:

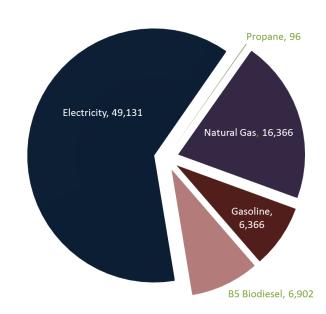
If the corporate energy consumption is subdivided by fuel type rather than by organizational division, the ten-year trends appear as follows:



Trends in RMOW Corporate Energy CONSUMPTION (by Fuel Type)

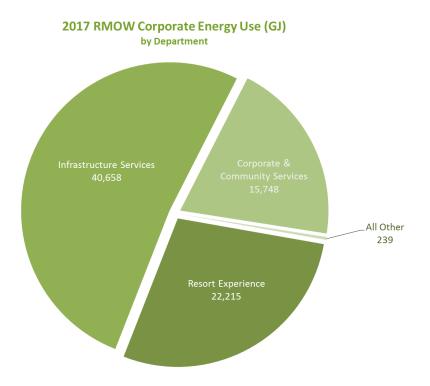
Electricity consumption makes up the greatest portion of total energy consumed across municipal operations at 63% of the total consumption, followed by natural gas (21%), and mobile fuels (15%).

A more detailed breakdown of 2017 corporate energy consumption, presented by energy type, is included Below for reference:



2017 RMOW Corporate Energy Use (GJ) by Energy Type

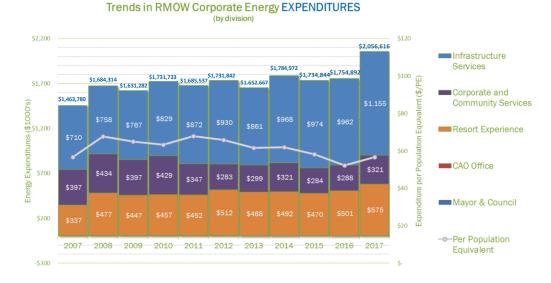
Finally, 2017 energy consumption by division is included for reference below:



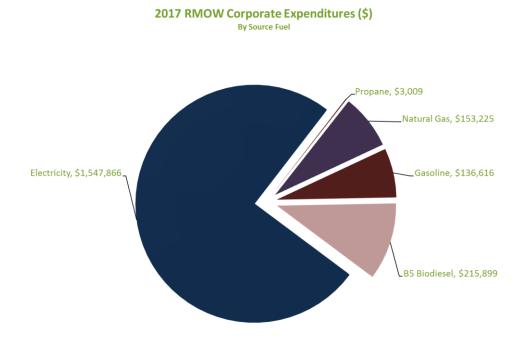
### **Corporate Energy Expenditures**

Total 2017 corporate energy expenditure increased by approximately 17% to a total of ~\$2.06 million.

Further conservation will be the key to managing expenditures at a level consistent with current levels given that long term trends in energy rate inflation generally exceeds the Consumer Price Index (CPI). To this end it is worth noting that corporate expenditures would already be much higher if there had not been a moderation in mobile fuel rates (2014-2016), and the consolidation of Fortis Whistler into the broader FortisBC rate structure (~30% decline in prices between 2014 and 2016). Both of these rates (mobile fuels, and natural gas) are expected to regain more historical averages in years to come.



The ten-year trends in total corporate energy expenditure are presented below:



### 2017 corporate energy expenditures by fuel type are presented in the following chart:

### 4.3.3 Performance of Key Corporate Buildings

Across its operations, the RMOW has made investments into energy efficiency and green building technologies for more than a decade. The benefits of these initiatives vary according to the project, but include reduced GHG emissions, reduced energy consumption, decreased energy expenditures, healthier buildings and decreased materials and resources within the construction process. For the purposes of this report, an update on energy consumption, expenditure and emissions is provided for key buildings across RMOW operations.

### Whistler Public Library



Whistler Public Library (WPL) opened in 2008 as Whistler's first LEED Gold certified building. The building has won numerous awards, including BC Wood Works award for innovative hemlock construction methods, as well as the Lieutenant-Governor Award in Architecture.

Energy performance at the WPL indicates that the building is still operating at approximately 60% better than the 2007 Model National Energy Code for Buildings (MNECB). At this level of performance (~800 GJ/yr.), annual utility costs are approximately \$20,000 less than had the building been built to typical building code standards (MNECB) at the time.

### Spruce Grove Field House



In 2001, the RMOW chose to install a geo-exchange heat pump instead of a gas furnace at SGFH. The incremental cost of the GHX equipment was \$126,350, however the system was forecast to reduce operating costs by \$21,800/year thereby producing an expected simple pay back (SPB) period of 5.8 years and an internal rate of return (IRR) on invested capital of 16.5%.

Actual annual reductions in energy costs have averaged \$20,700 since the installation of the GHX equipment, producing a SPB of 6.1 years (IRR of 15.5%). As of 2008, the incremental cost of the GHX system had been fully recovered and annual utility savings continue to run at approx. \$18,000/year versus the forecasted gas-powered furnace baseline.

### Meadow Park Sports Centre



In 2010, a \$930,000 energy system upgrade was installed at MPSC. The new system incorporated both evacuated tube solar technology and a vertical loop geo-exchange bore field. The system design employs the solar panels to pre-heat the domestic hot water loads directly, while the heat pumps draw heat from the ground (70 boreholes at 155' depth) to

serve the various pool loads within the building (lap pool, leisure pool & hot tub). Utility cost reductions that were anticipated as a result of these upgrades were estimated at \$115,000 - \$130,000/ year (SPB: 6.5 - 7.8 years; IRR: 10% - 13%), with annual GHG reductions forecasted at 300-350 tCO2e/year.

While the finalization of the project construction and commissioning phases was delayed until mid-2011, the system is now fully functional and generally working very well (with the exception of the ground loop leak in 2017 discussed above). In 2017, annual energy expenditures at MPSC were \$255,820, which is 5% higher than 2016 expenditures. However, 2017 expenditures were still 32% (\$123,000) lower than 2008 base year expenditures (before the renovation). The year over year increase is largely due to the increased cost of electricity and increased natural gas usage associated with the temporary HVAC system issues discussed in section 4.2.3 above.

### Lost Lake PassivHaus



The \$1.5 million project was the result of partnership between the RMOW, the Austria Passive House Group (APG) and Sea-to-Sky Consulting. A grant from the Whistler Blackcomb foundation was also instrumental to the realization of this project. The Passive House (PH) approach to construction uses radically improved building envelope design

and components to achieve dramatic reductions in building energy consumption of approx. 90% compared with standard Building Code construction. This energy usage translates into has less than half of the energy consumption of a Platinum LEED house – Canada's current high standard for "green" building. The small amount of heating energy which is still needed in a Passive House can then be supplied via the ventilation system air flows. Passive houses are well established in Europe with well over 17,000 existing passive units; approximately 4,000 of these are in Austria.

In partnership with BC Hydro, the RMOW tracked the LLPH from Jan of 2011 to Dec '12 using a real time Energy Management Information System (EMIS energy consumption at). At the end of the pilot project, the results showed that all building heating loads (including hot water) consumed 2,922 kWh (11.7 kWh/m2/yr), and all other loads in the building combined for a total of 15,156 kWh (60 kWh/m2/yr) – both values well inside the limits allowable within the rigorous passive house certification protocol.

### 4.3.4 Key Corporate Energy Consumption Performance Insights

### **Energy Consumption**

### Overall

 Corporate energy consumption increased by 9.7% in 2017. Operations experienced increases in electricity (5.4%), natural gas (25.2%) and mobile fuels (24.5%).

### **Divisional Insights**

- Corporate and Community Services saw a year over year increase in energy consumption of 12%, Infrastructure Services increased by 9%, and REX by 19% each relative to 2016 levels.
- In a historical context, Corporate and Community Services' 2017 consumption is substantially less than 2008 benchmark levels (-28%).

### **Energy Expenditures**

### Overall



- Overall 2017 energy expenditures across municipal operations increased by 17% year over year to ~\$2.06M. Current expenditures have increased by approximately \$350,000 (22%) from benchmark 2008 levels.
- Electricity represents approximately \$1.5M/year of the total corporate energy expenditure.

### **Divisional Insights**



- Corporate and Community Services, Resort Experience and Infrastructure Services all saw increases in expenditure during the 2017 year by 11%, 14% and 20%, respectfully.
- Although Corporate and Community Services' energy expenses increased year over year, the CCS's expenditures are still nearly \$112,000 lower than benchmark 2008 levels, primarily related to savings achieved at MPSC.
- Upgrades in energy efficiency across the operation have yielded solid, expected returns on investment. However, without further investments in additional energy efficiency and conservation across the operation, continued increases in energy expenses are likely.

## **5 CECAP IMPLEMENTATION UPDATES**

The CECAP was developed to update the 2004 Integrated Energy, Air Quality and GHG Emissions Plan, and to respond to the critical fact that Whistler was not on target to meet its GHG reduction targets as articulated in the Official Community Plan (Bylaw No 1021, 1993). The CECAP was designed to include a formal adaptation plan to ensure increased community resilience to projected local climate changes over time. Detailed CECAP modelling and associated analyses projected the following key climate changes for Whistler over the next 25 to 55 years:

- 1. Increase in the frequency and intensity of heavy rain events.
- 2. Longer, hotter and drier summers.
- 3. Milder winters, with increased precipitation falling as rain near valley bottom, while snow pack at higher elevation sees limited change.

The CECAP attempts to articulate a vision of a resilient, lower carbon Whistler and confirms community targets for the reduction of GHG emissions, and the stabilization of community energy consumption as well as builds a foundation for significant increases in the use of renewable energy over time.

The Plan was collaboratively developed with a Community Advisory Group (CAG), an internal staff content expert team, and led by a cross-departmental project management team. There were also several opportunities for public and stakeholder input to be integrated into the plan. The CECAP establishes a series of emission reduction and climate adaptation objectives, and includes priority recommended actions designed to reduce GHG emissions and to increase Whistler's resilience in the face of climate change.

The effective implementation of these recommended initiatives is designed to better position Whistler to meet the challenges of a changing climate, reduce community dependence on fossil fuels, and decrease collective energy-related expenditures. Key recommended **energy and GHG reduction initiatives** range from support for expanding access to mass transportation services and growing electrification of transportation, to reducing emissions related to solid waste management and to homeowner and commercial sector incentives for improving the energy efficiency of Whistler's built environment. Key recommended **adaptation initiatives** included range from renewing our integrated storm water management, expanded water conservation and wildfire protection plans, to increasing access to weather independent attractions in the valley and increasing communication and engagement around climate and energy related issues.

The 2016 CECAP outlines the targeted implementation timelines, lead organization and general resource implications for each of the recommended actions. For each of the recommended 'Reduction Actions', the CECAP also includes an estimated energy and emissions reduction potential for each identified action.

The following section provides information related to the RMOW's 2017/18 implementation progress associated with the CECAP. The update below includes brief highlights on all 94 recommended 'reduction' actions (across all 15 objectives); as well all 40 recommended 'adaptation' initiatives (across 7 objectives).

## 5.1 REDUCTION/MITIGATION INITIATIVES

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.

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

	Reco	ommended Action	Updates		
short	6.1.1.1	Continued commitment to ensuring that Whistler is made up of increasingly complete and compact neighbourhoods	<ul> <li>Commitment supported through 2018 updated Official Community Plan (consideration of OCP adoption is planned for fall, 2018)</li> <li>Work on resident housing infill initiative began in March, 2018 (Infill Housing Proposed Project Approach (Administrative Report to Council, 18-026)</li> </ul>		
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%)	<ul> <li>Significant new work on resident and employee housing was undertaken in 2017 with the creation of the Mayor's Task Force on Resident Housing. Implementation of key recommended initiatives (8) has continued throughout 2018, and updates are regularly provided to Council and the community.</li> <li>The implementation of recommendations contained within the final report of the Mayor's Task Force on Housing is a top priority for the organization. Initiative underway include advancement of Cheakamus Crossing Phase 2 development planning, Private Resident Restricted applications, Infill Housing initiative and, updated WHA eligibility and affordability policies.</li> </ul>		
short	6.1.1.3	Adhere to the Whistler Urban Development Containment Area (WUDCA) as a means of reducing automobile trip distances.	• Commitment supported through 2018 updated Official Community Plan (consideration of OCP adoption is planned for fall, 2018)		
short	6.1.1.4	Ensure that whenever possible, new development or significant redevelopment is concentrated in existing neighbourhoods or settled areas that are well-served by transit, pedestrian and cycling routes, amenities and services; and are characterized by increased residential density.	<ul> <li>Commitment supported through 2018 updated Official Community Plan (consideration of OCP adoption is planned for fall, 2018)</li> <li>Supported through the Council-adopted Guidelines for private resident restricted developments</li> </ul>		
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.	• Commitment supported through 2018 updated Official Community Plan (consideration of OCP adoption is planned for fall, 2018)		
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.	<ul> <li>Commitment supported through 2018 updated Official Community Plan (consideration of OCP adoption is planned for fall, 2018)</li> <li>Supported conceptually through Council-adopted Guidelines for private resident restricted developments, and the ongoing related evaluation and consideration processes.</li> </ul>		

# 6.1.2 Advance Local and Regional Mass Transportation Service

	Dees		•
	Reco	ommended 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.
short	6.1.2.2	Support the expansion, promotion and increased convenience of mass transportation services between Vancouver and Whistler	• RMOW currently working with neighbouring municipalities, BC Transit and Ministry of Transportation staff on funding framework for a Regional Transit system. A meeting with the Minister of Transportation is planned for September 2018, and it is anticipated that work on this issue will continue into 2019.
short	6.1.2.3	Develop a public realm with improved multi-modal integration and comfortable, convenient transition areas – Bus Loop/taxi loop	• Gateway Loop Upgrade Project is substantially complete with only a few deficiencies still to be finished by the contractor. The improved site is already providing a significant improvement to the arrival experience and inter-community transportation sector in Whistler.
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	<ul> <li>A first portion of the social marketing research has been completed and target groups identified. This work will continue with the new transit initiatives being implemented in summer, fall, and winter 2018.</li> <li>More work is expected to continue in spring 2019.</li> </ul>
short	6.1.2.5	Advance all potential opportunities to avoid increases in local transit fares.	<ul> <li>The cost of monthly transit passes has been substantially reduced through the use of revenue from the pay parking in Day Lots 1 – 5.</li> </ul>
med	6.1.2.6	Continue to pass the infrastructure, maintenance, congestion, environmental and land costs of road and parking infrastructure onto users.	<ul> <li>User pay parking has been implemented for high-demand periods at all municipal parking areas.</li> </ul>
med	6.1.2.7	Optimize the road network and highway to prioritize the flow of high occupancy vehicles (HOVs).	• Transit queue-jumper lanes are being considered as part of the Highway Capacity Study currently underway with MOTI.
med	6.1.2.8	Strategically expand transit system service levels and frequency where possible and affordable	<ul> <li>1,000 additional Transit service hours were added in 2017, and 6,500 more are being built into the 2018 transit schedule. Funding for a portion of these hours is being linked to the Community Transportation Initiatives fund established by the Day Lot Parking Committee.</li> <li>Ongoing transit hour increases are planned through 2022.</li> </ul>
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.	No opportunities for this initiative have been realized yet.

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					
	Rect		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.	• REX's priority for 2017 and 2018 has been continuing progress on legitimizing bicycle use on portions of the valley trail that are within municipal road right-of-ways (legally described as sidewalks).			
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).	• Parking stalls under the Library have been repurposed (on a pilot project basis) to a secure bike parking area for the summer of 2018.			
short	6.1.3.4	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	<ul> <li>A first portion of the social marketing research has been completed and target groups identified. This work will continue with the new transit initiatives being implemented in summer, fall, and winter 2018.</li> <li>More work is expected to continue in spring 2019.</li> </ul>			
med	6.1.3.5	Where opportunities exist, prioritize the optimization and enhancement of pedestrian infrastructure and safety throughout the community.	<ul> <li>Additional flashing lights for pedestrian crossings are planned for several village locations.</li> <li>Commitment supported through 2018 updated Official Community Plan (consideration of OCP adoption is planned for fall, 2018)</li> </ul>			

# 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.	<ul> <li>Led the finalization of the Level III DC Fast Charger installation at the Conference Centre Underground (w BC Hydro and Plug In BC),</li> <li>Continue to monitor and upgrade the 10 existing level II public EV chargers across the community, as well as liaise with private EVSE providers.</li> </ul>	
short	6.1.4.2	RMOW to aggressively advance the average fleet GHG and energy efficiency of the municipal vehicle fleet.	<ul> <li>Each new vehicle purchase is viewed through the lens of providing the most efficient vehicle that can reliably perform the required tasks.</li> <li>Several hybrid and EV vehicles have been added to the fleet in the past two years.</li> </ul>	
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).	• This recommended action is not an RMOW lead. An update on the integration of lower carbon and electric vehicles into municipal fleets is provided in 6.1.4.2.	

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 is currently being developed.
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)	<ul> <li>Most local EV charging stations provide free electricity (financial incentive), however parking fees are still collected.</li> <li>Ongoing consideration of this action through the lens of our overall parking strategy and the work of the TAG.</li> </ul>
med	6.1.4.7	Profile ultra-low emission private vehicle fleets (hotels, commercial recreation, as appropriate).	No specific initiative led by RMOW staff at this time
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.
med	6.1.4.9	Invest in electric vehicle integration across municipal fleet	<ul> <li>Each new vehicle purchase is viewed through the lens of providing the most efficient vehicle that can reliably perform the required tasks.</li> <li>Several hybrid and EV vehicles have been added to the fleet in the past two years.</li> </ul>
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.	No specific initiative led by RMOW staff at this time
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.	<ul> <li>Carpool options were implemented for Lots 4 &amp; 5, and WB may test a carpool incentive program in winter 2018/19.</li> </ul>

# 6.2 Stationary Energy Use – Buildings & Infrastructure GHG Emissions

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

0.2	0.2.1 Improve the chergy chiclency and connort of existing buildings and infrastructure				
		ommended Action	Updates		
Exist	ing RE	SIDENTIAL 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.	<ul> <li>Power Down program continued through 2018 including ongoing communication and advertising support.</li> <li>New provincial programs expected in later 2018, RMOW cross-marketing and financial support is planned to begin Jan, 2019</li> </ul>		
short	6.2.1.2	Support and encourage EnerGuide energy performance labeling on homes for sale.	• Staff are working on the potential integration of labelling (administrative requirements) as association with the Energy Step Code that will take effect for Part 9 buildings in 2019.		
short	6.2.1.3	Expand the integration of climate change, energy efficiency and water conservation literacy into school programs and curriculum.	<ul> <li>SD48 lead.</li> <li>RMOW staff have provided Fire Smart sessions in local classrooms (2018)</li> </ul>		
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.	<ul> <li>No formal 'profile' has been initiated by RMOW staff</li> <li>Financial incentives still provided to support energy upgrades for existing homes (<u>www.whistler.ca/powerdown</u>)</li> <li>New incentives planned for Jan, 2019 (heat pump conversion incentives integrated with new EfficiencyBC programs)</li> </ul>		
short	6.2.1.5	Continue to optimize performance outcomes of the Cheakamus Crossing District Energy System and apply learning to future projects.	<ul> <li>Work on improving the performance of home heating systems in Cheakamus Crossing is on-going.</li> <li>Optimizing the performance of the DES heating loop is also in progress with fine-tuning the operation of new condensing natural gas boilers at the WWTP.</li> </ul>		
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).	• Commitment supported through 2018 updated Official Community Plan (consideration of OCP adoption is planned for fall, 2018)		
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).	No specific initiative led by RMOW staff at this time		
Existi	ng CO	MMERCIAL/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.	<ul> <li>No specific initiative led by RMOW staff at this time</li> <li>Two previously feasibility studies were completed in in 2005 and 2013</li> </ul>		
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.	<ul> <li>No specific 'commercial' initiatives led by RMOW staff at this time.</li> <li>See 6.2.1.1 for residential sector initiatives</li> </ul>		

short	6.2.1.10	Support and improve staff training on energy efficiency practices across hotel operations (start-up practices, etc).	• No s	pecific initiative led by RMOW staff at this time
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 s	pecific 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.	• No s	pecific initiative led by RMOW staff at this time
short	6.2.1.13	Support the reestablishment of the former Whistler Facility Managers Association (WFMA).		sideration for 2019 (pending FCM Climate Staff grant application ome)
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).		mitment supported through 2018 updated Official Community Plan sideration of OCP adoption is planned for fall, 2018)
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 s	pecific 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 s	pecific initiative led by RMOW staff at this time

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

	Reco	ommended Action	Updates		
New	RESID	DENTIAL 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.	<ul> <li>Continued to offer and promote the Power Down incentive program to provide \$250 incentives off of the price of third party energy assessments of both new building plans, as well as existing homes. Continuing through 2018 and 2019.</li> <li>Adopted Building and Plumbing Bylaw Amendment (Energy Step Code) No. 2197 2018. Regulations to take effect Jan, 2019 and planning work continues on the delivery of on-site training sessions with the local CHBA through Q3 and Q4, 2018.</li> </ul>		
short	6.2.2.2	Streamline the development of passive house- certified, and net-zero residential buildings using tools such as accelerated permit processing.	<ul> <li>Adopted Building and Plumbing Bylaw Amendment (Energy Step Code) No. 2197 2018. Regulations to take effect Jan, 2019</li> <li>Anticipated future Energy Step Code regulations will increase incrementally toward net-zero ready homes over the next 10 years</li> <li>WHA currently building one of the first Passivhaus certified affordable housing apartment buildings in the country. Work ongoing.</li> </ul>		

med	6.2.2.3	Explore the feasibility for requiring energy modeling for new residential buildings and significant renovations at building permit phase.	<ul> <li>Adopted Building and Plumbing Bylaw Amendment (Energy Step Code) No. 2197 2018. Regulations to take effect Jan, 2019 and planning work continues on the delivery of on-site training sessions with the local CHBA through Q3 and Q4, 2018.</li> <li>All levels of the Energy Step Code require energy modelling.</li> </ul>
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.	<ul> <li>Adopted Building and Plumbing Bylaw Amendment (Energy Step Code) No. 2197 2018. Regulations to take effect Jan, 2019</li> <li>Approval of owner-initiated rezoning processes trigger the requirement of ESC Step 4 for any associated Part 9 residential buildings located on site.</li> </ul>
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
Existi	ng CO	MMERCIAL/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.	• Similar commitment supported through 2018 updated Official Community Plan (consideration of OCP adoption is planned for fall, 2018)
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.	<ul> <li>No specific initiative led by RMOW staff at this time</li> <li>Integration of Energy Step Code requirements for Part 3 Buildings (complex buildings) will be considered by staff in 2019</li> </ul>
med	6.2.2.8	Explore the feasibility of requiring energy modeling for new commercial buildings and significant renovations at building permit phase.	<ul> <li>Integration of Energy Step Code requirements for Part 3 Buildings (complex buildings) will be considered by staff in 2019</li> <li>All levels of the Energy Step Code require energy modelling.</li> </ul>
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.	No specific initiative led by RMOW staff at this time
ng Buol	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 requirements for Part 3 Buildings (complex buildings) will be considered by staff in 2019
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

		ommended Action	Updates		
short	6.3.1.1	Encourage the use and fair commodity pricing of 'renewable' natural gas.	No specific initiative led by RMOW staff at this time		
short	6.3.1.2	Investigate and advance opportunities to incent electric heat pump systems to replace existing gas/propane/basic electric heating systems.	• New incentives will begin Jan, 2019 (heat pump conversion incentives integrated with new Provincial EfficiencyBC programs)		
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.	No specific initiative led by RMOW staff at this time		
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.	<ul> <li>Adopted Building and Plumbing Bylaw Amendment (Energy Step Code) No. 2197 2018. Regulations to take effect Jan, 2019</li> </ul>		
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.	No specific initiative led by RMOW staff at this time		
med	6.3.1.7	Develop and/or expand renewable energy pilot installations on appropriate municipal buildings and facilities	No specific initiative led by RMOW staff at this time		

# 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

	Reco	mmended 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.	<ul> <li>New Waste Diversion Bylaw that compels all Whistler businesses to divert recyclables and organics from the landfill waste stream comes in effect in August 2018.</li> </ul>
short	6.4.1.2	Support the expansion of local compost diversion programs (marketing, education, pricing, infrastructure, etc.)	• Multiple stakeholder meetings for implementation of the New Waste Diversion bylaw have been held in 2017 and 2018.
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.	No specific initiative led by RMOW staff at this time
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.	• Will be initiated in fall 2018 through a Zero Waste Working group.
med	6.4.1.5	Support and promote the increased use of the Sustainable Events Guide and monitor performance outcomes for all key events.	• RMOW staff focused on the solid waste outcomes of event production - staff distribute and reference the RMOW 'Special Event Solid Waste Management Plan reporting requirements (associated with Solid Waste Bylaw No. 2139, 2017), as well as an Event Waste Diversion Tips and Tools resource.
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.	<ul> <li>Transport of waste and/or recyclables on local transit now permitted as pilot project (with some limitations).</li> </ul>
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.	• See 6.4.1.1
med	6.4.1.8	Implement standardized SLRD signage across Whistler to improve recycling and composting rates.	<ul> <li>Pilot project in 2017 and 2018 is testing signage (and a separate compost bin) in the streetscape realm at Celebration Plaza and Skiers Plaza.</li> <li>RMOW public facing waste bins (library and Meadow Park) and internal waste bins at other municipal facilities now have standardized signage.</li> </ul>

# 6.4.2 Reduce Upstream Emissions from Goods and Services

	Reco	ommended 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.	CECAP implementation recommended for AWARE and other community groups.
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.	• Supported the relocation, expansion and improvement of both facilities.
short	6.4.2.3	Promote opportunities for education and learning related to food production and associated GHG and environmental impacts.	<ul> <li>CECAP implementation recommended for AWARE and other community groups.</li> <li>Updated Food Chapter and associated policies are included within the draft 2018 OCP Update.</li> </ul>
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.	<ul> <li>CECAP implementation recommended for AWARE and other community groups.</li> <li>Updated Food Chapter and associated policies are included within the draft 2018 OCP Update.</li> </ul>

# 6.5 Enabling Energy Reduction and Climate Change Mitigation

# 6.5.1 Ensure Adequate Governance and Funding for ongoing Climate Action progress

	Reco	ommended Action	Updates	
short	6.51.1	Create a 'Climate Leadership Committee' as a select committee of Council.	• Not initiated. Committee and task force priorities and resources dedicated to Transportation and Housing initiatives in 2017 and 2018	
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).	<ul> <li>New incentives will begin Jan, 2019 (heat pump conversion incentives integrated with new Provincial EfficiencyBC programs)</li> <li>New incentives are funded through municipal CARIP revenues</li> </ul>	
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.	<ul> <li>Submitted a detailed application to the FCM Climate Staff grant program in Q2, 2018. Applications are currently under review, a decision expected in Q4, 2018.</li> <li>If successful, the grant funds approximately 80% of two years' payroll costs for the position.</li> </ul>	
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.	No specific initiative led by RMOW staff at this time	

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

	Reco	ommended 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).	<ul> <li>Letters sent in 2016.</li> <li>Further BC carbon tax increases began in April, 2018 (now \$35/tCo2e)</li> </ul>
short	6.5.2.2	Lobby the Provincial government for further systematic improvements to the BC Building Code that focus on energy efficiency.	<ul> <li>Adopted Building and Plumbing Bylaw Amendment (Energy Step Code) No. 2197 2018. Regulations to take effect Jan, 2019</li> <li>It is expected that BCBC will increase the base code to Step 3 by 2022/23</li> </ul>
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 current focus of regional GHG reduction efforts is the design, funding governance and implementation of a new regional transit system.
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.	<ul> <li>No specific initiative led by RMOW staff at this time</li> <li>Part of the anticipated responsibilities associated with 6.5.1.3</li> </ul>

# 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.	<ul> <li>CECAP implementation recommended for CCF and Whistler Chamber.</li> <li>RMOW continues to purchase offset products from CCF for annual carbon neutral commitments.</li> </ul>
short	6.5.3.2	Encourage local accommodation providers and booking companies to provide options for purchasing local offset products.	No specific initiative led by RMOW staff at this time
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 now 100% sourced from the Cheakamus Community Forest.

## 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.

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.	<ul> <li>CWPP and RMOW Wildfire Protection Strategy are being implemented.</li> <li>FireSmart Coordinator providing public education and engagement such as FireSmart property assessments, community chipper days and attending strata and neighbourhood meetings.</li> </ul>
short	8.5.1.2	Prioritize the implementation of the landscape-level wildfire management plan for the Cheakamus Community Forest area.	• The RMOW and CCF signed a Memorandum of Understanding regarding fuel thinning projects within the CCF area. Callaghan FSR continued in 2017and Cheakamus Lake FSR scheduled for 2018/19.
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).	<ul> <li>RMOW, CCF and FLNRO coordinating on fuel thinning projects (Cheakamus Lake Road, Callaghan FSR, Alpine Meadows/CCF5).</li> <li>Coordinated with SLRD and Lil'wat Nation to FireSmart Wedge Crossing informal camping area.</li> </ul>
short	8.5.1.4	Continue to review and update pre-incident and emergency response plans and communication protocols for wildfire situations.	<ul> <li>Planning, monitoring and response protocols updated with WFRS, WB, BC Wildfire Service, Blackcomb Helicopters, etc.</li> <li>Inter-agency wildfire exercise completed in spring 2018.</li> <li>Corridor-wide evacuation plan being developed in 2018.</li> </ul>
short	8.5.1.5	Develop private property wildfire risk reduction guidelines and implement through municipal policy and/or procedures.	• FireSmart Property Assessment template developed based on FireSmart Canada guidelines and related municipal policies, and integrated with Planning Department referral process.
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.	<ul> <li>Will be part of an overall 2018 Fire Bylaw review.</li> <li>Enforcement handled by career staff doing campfire patrols during periods of extreme hazard and through partnership with Bylaw staff, RCMP and Provincial CO's, based on locations and land ownership.</li> </ul>
short	8.5.1.7	Consider creating Development Permit Areas for wildfire protection.	• Wildfire DPA drafted in 2018 as part of the OCP update process (consideration of OCP adoption is planned for fall, 2018).

med	8.5.1.8	Lobby Provincial and Federal governments to increase funding for community and landscape level wildfire fuel reduction and response.	• RMOW submitted a letter of recommendations to the provincial review of wildfire and flood response (Abbott report)
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.	No specific initiative led by RMOW staff at this time
bug	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).	WFRS and Emergency Management collaborating with provincial agencies on wildfire response and evacuation planning
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.	• RMOW currently working with BC Transit and Ministry of Transportation staff on funding framework for a Regional Transit system. Earliest implementation would be fall 2019. See additional updates in Section 6.1.2 above.

# 8.5.3 Minimize Damage from Heavy Rain Events

	Reco	ommended 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.	• A significant risk assessment of all RMOW waterways began in 2017 (with a contribution from federal emergency program funding).
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.	• This plan will follow completion of the risk assessment work associated with Action 8.5.3.1
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.	• This mapping will follow from completion of the risk assessment work associated with Action 8.5.3.1
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.	<ul> <li>Emergency planning protocols are constantly being updated, improved and expanded.</li> <li>Specific work is underway to improve evacuation protocols, internal communication systems, as well as critical infrastructure management in light of potential new emergencies – with a focus on wildfire threat.</li> </ul>
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).	<ul> <li>No specific system-wide initiative led by RMOW staff at this time.</li> <li>Ongoing incremental improvements ongoing</li> </ul>
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
guol	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.	• 21 Mile Creek surface water protection plan endorsed by Council in June 2018.
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.
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.	<ul> <li>Whistler's Outdoor Potable Water Use Bylaw was adopted by Council in spring 2018, with work on the Once-Through Cooling Bylaw now in progress.</li> </ul>
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 through 2018.
short	8.5.4.3	Explore opportunities to improve municipal irrigation systems to maximize efficiency and reduce irrigation needs.	• Significant upgrades done in 2016, and further refinements to systems and policies undertaken in 2017. RMOW system is now very efficient and responsive.

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

	Reco	ommended 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).	Parkhurst land acquisition completed.
short	8.5.5.3	Continue to advance both cultural tourism development and the expansion of complementary learning and education initiatives.	<ul> <li>New Manager, Cultural Planning &amp; Development role created at RMOW.</li> <li>Dedicated work plan developed and rolled out in 2017, advancement of new and ongoing initiatives underway.</li> </ul>
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.	Park Master Planning project initiated for 2018

# 8.5.6 Improve Ski Infrastructure for Weather Variability

	Reco	ommended 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.	•	CECAP implementation recommended for WB. \$66M investment in lift infrastructure in progress (Blackcomb Gondola, Emerald Express upgrades, Catskinner relocation etc)						
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.	•	CECAP implementation recommended for WB.						

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.	CECAP implementation recommended for WB.
med	8.5.6.4	Investigate potential land exchanges to optimize potential ski terrain.	CECAP implementation recommended for WB.
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.	<ul> <li>CECAP implementation recommended for WB.</li> <li>WB has ongoing environmental policy focus on 'Mountain Ecosystems' including Operation Green Up, integration into Standard Operating Procedures outlined on website</li> </ul>

# 8.5.7 Minimize Threats to Ecosystems, Biodiversity and the CCF

	Reco	ommended Action	Updates
short	8.5.7.1	Improve invasive species management efforts related to increasing pressures associated with a changing climate.	<ul> <li>RMOW engages Sea to Sky Invasive Species Council to identify, monitor and control priority invasive species on municipal lands, and to deliver public education.</li> </ul>
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.	• OCP policy added to develop a Priority Habitat Management Strategy that will address ecosystem health, biodiversity, connectivity, climate change etc.
med	8.5.7.3	Conduct research and modify Cheakamus Community Forest management plans and practices to minimize risks related to climate change.	CCF has changed silviculture strategy and modified tree stocking standards to take climate change into account

## 6 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.

Energy management as sound fiscal management is seen as a key priority by leading organizations both across our community, and beyond. As such, RMOW staff are committed to tracking corporate and community level energy consumption, expenditures, and associated greenhouse gas emissions on an annual basis. Moreover, the Whistler community is vocally concerned about both effective energy management and the ongoing mitigation of our local contributions to global climate change, and they continue to tell us so across a variety of community engagement channels.

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.

Finally, emissions from our corporate and community inventories are not the only emissions related to the activities of our community – as a community premised on destination tourism, there are significant emissions associated with the travel to, and from Whistler. While precise data on the scale of these emissions is difficult to quantify, the research undertaken during the creation of our existing Integrated Energy, Air Quality and GHG Emissions Management Plan did endeavor to estimate the approximate level of these emissions. By using visitor point-of-origin data from Tourism Whistler research and applying typical distance-based emission factors for various travel modes, a total estimate of 'inter-community' estimated GHG emissions was calculated for the year 2000. Assuming a relatively stable point-of-origin mix, and then applying total annual visitation numbers, inter-community travel emissions have been coarsely estimated for each year from 2001 through 2017. In approximate terms, inter-community travel emissions likely represent 5-10 times the total footprint included within Whistler's community inventory. Given its scale and relation to our community economic engines, this is an issue that should not be overlooked within Whistler's (or any similar community's) ongoing discussions of climate mitigation and adaptation approaches.

## **APPENDICES**

А	Whistler Updated 2017 Community Energy & Emissions Inventory
В	RMOW 2017 Corporate Energy & Emissions Inventory
С	Summary of Emission Factors
D	<ul> <li>Summary of Corporate Carbon Neutral Commitment</li> <li>RMOW Carbon Footprint</li> </ul>
	Verified Emission Reductions (VERs)

Whistl	er					Stationary Ene	ergy Use (Build	dings)			Mobile Energy Use											Waste				Inte	nsity Perform	nance	
Community	Fnergy &			Elec	ctricity		Pro	pane/Natura	l Gas	All Buildings				Fleet Usa	ige					Transit		Passenger Vehicles		(	Grand				Expondituro
	Gas Invento	ory	residential	commercial	industrial (sm com)	subtotal	residential	commercial	subtotal	Building Total	gasoline E5 gasolin	e E10 gasoline	B5 biodiesel	B10 biodiesel	B20 biodiesel	diesel	diesel(s) subtotal	subtotal	B4 biodiesel	diesel	subtotal	gasoline	Landfill		Totals		Intensity (tCO2e/PE)		Intensity (GJ/PE)
	Consumptio	ion litres	00 202 507	70 500 450	44 470 070	101 070 010	1,106,750.5	6,914,949.0	8,021,699.5	8,021,699.5	470,647.0					728,573.7	728,573.7	1,199,220.7				19,284,750.0			Consumption				
1990	Ener	kWH rgv Gi	99,292,687		11,478,073 41,321.1	181,278,919 652,604	28,019.0	175,062.0	203,081.0	181,278,919.2 855,685.1	16,473.5					27,904.0	27,904.0	44,377.5				675,000.0		1.575.063	Fnergy	1990	n/a	n/a	n/a
(estimated)		HG tCO2e	2,680.9		309.9	4,895	1,709.49	10,680.87	12,390.4	17,284.9	1,168.6					1,990.7	1,990.7	3,159.3				46,476	8,855.7	75,776	GHG	(estimated)			
	Expenditu	ure approx. \$	\$ 4,964,634	\$ 3,525,408 \$	\$ 573,904 <b>\$</b>	\$ 9,063,946	\$ 198,375 \$	1,239,439 \$	1,437,813	\$ 10,501,759	\$ 296,508				\$	284,144	\$ 284,144 \$	580,651		\$	-	\$ 14,463,563		\$ 25,545,973	Expenditure				
	Consumptio	ion					5,613,424.0	21,669,345.0	27,282,773.1	27,282,773.1	764,536.6					1,343,525.5	1,343,525.5	2,108,063.3		658,990.3	658,990.3	26,223,488.8			Consumption				
2000		kWH	164,269,458		22,133,057	319,398,916				319,398,916.0		_														2000	5.24	100 7	¢ ( 000
2000	Ener	rgy GJ HG tCO2e	591,370.0		79,679.0	1,149,838	142,112.0 8,670.52	548,591.0 33,470.58	690,707.1 42,141.1	1,840,544.6 54,917.1	26,760.1					51,456.4	3,670.9	78,217.7 5,570.5		25,239.0	25,239.0 1,818.8	917,868.0 63,199	17,100.3	2,861,869 142,605	Energy	2000	5.31	106.7	\$ 1,839
	Expenditu		\$ 10,808,930				\$ 1,776,400 \$	6,857,388 \$	8,633,839	\$ 28,023,089					\$	1,007,644	\$ 1,007,644 <b>\$</b>	1,581,048	\$	599,681 \$	599,681			\$ 49,346,965	Expenditure				
	Consumptio	ion					5,765,538.5	21,829,756.5	27,595,295.1	27,595,295.1	664,838.8					1,196,214.2	1,196,214.2	1,861,052.6		842,759.3	842,759.3	26,413,689.2			Consumption				
		kWH	170,144,631		23,505,964	332,950,504				332,950,504.5															-				
2001	(61) GHG	07	612,520.6		84,621.5	1,198,623.6	145,963.0 8,905.48	552,652.1 33,718.35	698,619.3 42,623.8	1,897,242.9 62,933.8	23,270.5					45,814.4	45,814.4	69,085.1 4,919.3		32,277.3	32,277.3 2,326.0	924,525.3 63,657	18,240.6	2,923,131 152,077	Energy	2001	5.57	107.1	\$ 1,972
	Expenditu		\$ 11,195,517				\$ 2,466,775 \$	9,339,820 \$		\$ 32,012,562					\$	956,971		1,488,843	s	766,911 \$	766,911		10,240.0	\$ 53,814,446	Expenditure				
	Consumptio	litros					6,200,157.0	21,759,689.5	27,959,846.8	27,959,846.8	662,834.3					1,206,987.2	1,206,987.2	1,869,821.2		839,903.2	839,903.2	26,383,793.4			Concumption				
	consumptio	kWH	175,477,178	137,118,356	23,972,522	336,568,058				336,568,057.8															consumption				
2002	Ener	07	631,717.8		86,301.1	1,211,646.7	156,966.0	550,878.2	707,849.0	1,919,495.7	23,200.4					46,227.0	46,227.0	69,427.6		32,167.9	32,167.9	923,478.9		2,944,570	Energy	2002	5.81	116.5	\$ 2,087
	(41) GH Expenditu	HG tCO2e ure approx. \$	7,136.1 \$ 11,546,398		974.9 1,730,816 \$	13,687 \$ 20,475,931	9,576.79 \$ 2.134.738 \$	33,610.13 7.491.944 \$	43,186.9	\$ 30,102,677	1,645.8 \$ 556,781					3,297.8	3,297.8 5 1.013.869 <b>\$</b>	4,943.9		2,318.1 764,312 \$	2,318.1	63,585 \$ 20,315,521	19,273.8	146,995 \$ 52,753,161	GHG				
	· ·	litros	Ş 11,540,550	<i>, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</i>	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	20,473,331	6,654,565.0	21,335,108.5	27,989,673.9	27,989,673.9	605,513.2				ŕ	1,346,646.2	1,346,646.2	1,952,158.9	ç	867,463.3	867,463.3			\$ 52,753,101	Experiorture				
	Consumptio	kWH	157,711,048	132,653,721	22,654,960	313,019,729				313,019,729.3															Consumption				
2003	Ener	rgy <sub>GJ</sub>	567,759.7		81,557.8	1,126,872.2	168,470.0	540,129.3	708,604.6	1,835,476.8						51,575.9	51,575.9	72,769.9		33,223.4	33,223.4	927,101.1		2,868,571	Energy	2003	6.09	119.9	\$ 2,2 <mark>48</mark>
		HG tCO2e	\$ 10,377,387		785.4	10,851	10,278.67	32,954.32 8,236,972 \$	43,233.0	\$ 29,783,617	1,503.5 \$ 538,907					3,679.4	3,679.4	5,182.9		2,394.2 789,392 \$	2,394.2		20,273.4	145,769	GHG		- I	i l	
	Expenditu	litros	\$ 10,577,587	\$ 6,964,520 ;	5 1,033,086 <b>3</b>	5 16,577,557	\$ 2,569,168 \$ 6,266,556.5	21,768,771.5	10,806,220 28,035,328.2	28,035,328.2	568,827.3				ç	1,198,515	\$ 1,198,515 <b>\$</b> 1,321,678.3	1,737,423	\$	921,024.2	789,392 921,024.2			\$ 53,765,128	Expenditure				
	Consumptio	kWH	187,300,944	144,140,916	25,780,616	357,222,478				357,222,478.0						,, ,,		,,				,,			Consumption				
2004	Ener	rgy <sub>GJ</sub>	674,283.3	518,907.3	92,810.2	1,286,003.2	158,647.0	551,108.1	709,759.9	1,995,763.1	19,910.0					50,619.6	50,619.6	70,529.5		35,274.8	35,274.8	841,186.1		2,942,753	Energy	2004	5.54	117.6	\$ 2,2 <mark>5</mark> 9
		HG tCO2e	4,432.8		610.1	8,454	9,679.35	33,624.15	43,303.5	51,757.8						3,611.2	3,611.2	5,023.5		2,542.0	2,542.0		21,294.0	138,536	GHG				
	Expenditu	ure approx. \$	\$ 12,324,402	\$ 7,567,398 \$	\$ 1,861,360 \$	\$ 21,753,164	\$ 2,617,676 \$ 7,256,505.5	9,093,284 \$ 22,828,318.5	11,711,038	\$ 33,464,201 30,084,824.7	\$ 540,386 510,643.0		43,107.6		\$ 60,026.9	1,255,594	\$ 1,255,594 <b>\$</b> 1,268,684.9	1,795,981	ş	838,132 \$ 976,181.8	838,132 976,181.8			\$ 56,526,098	Expenditure				
	Consumptio	ion kwH	171,981,194	153,887,410	24,577,249	350,445,855	7,230,303.3	22,020,910.5	50,004,024.7	350,445,855.1	510,043.0		43,107.0		00,020.5	1,105,550.4	1,100,004.5	1,773,32712		570,101.0	570,10110	25,544,65515			Consumption				
2005	Ener	rgy <sub>GJ</sub>	619,132.2	553,994.6	88,478.1	1,261,607.1	183,709.0	577,932.1	761,647.1	2,023,254.2	17,873.4		1,651.0		2,299.0	44,640.0	48,590.0	66,463.1		37,387.3	37,387.3	887,107.2		3,014,212	Energy	2005	6.03	124.6	\$ 2,574
		HG tCO2e	4,242.2		606.2	8,644	11,208.44	35,260.74	46,469.2	55,113.5	1,267.9		117.2		127.4	3,184.6	3,429.2	4,696.8		2,694.3	2,694.3		22,239.0	145,824	GHG				
	Expenditu	ure approx. \$	\$ 11,316,363	\$ 8,079,089 \$	\$ 1,774,477 <b>\$</b>	\$ 21,169,932	\$ 3,398,617 \$ 6,759,358.5	10,691,744 \$ 22,061,380.0	14,090,472 28,820,738.9	\$ 35,260,403 28,820,738.9	\$ 510,643 565,016.0	\$	47,418	\$	66,030 \$ 117,364.5	1,165,550	\$ 1,278,998 <b>\$</b> 1,721,901.3	1,789,642	\$	888,325 \$ 904,215.0	888,325 904,215.0	\$ 24,330,867 25,428,317.1		\$ 62,269,238	Expenditure				
	Consumptio	kWH	171,103,625	155,708,346	24,276,391	351,088,364	0,759,550.5	22,001,380.0	20,020,730.3	351,088,363.6	303,010.0		55,015.8		117,304.3	1,545,521.5	1,721,501.5	2,280,510.5		504,215.0	504,215.0	23,420,317.1			Consumption				
2006	Ener	rgy <sub>GJ</sub>	615,973	560,550.0	87,395.0	1,263,920	171,123	558,516.0	729,644.2	1,993,564.3	19,776.6		2,107.0		4,495.0	59,345.9	65,949.1	85,725.7		34,631.0	34,631.0	890,035.6		3,003,957	Energy	2006	5.67	116.1	\$ 2,502
		HG tCO2e	4,505.7		639.3	9,245	10,440.54	34,076.12	44,516.7	53,762.0	1,402.9		149.6		249.0	4,233.7	4,633.6	6,036.6		2,495.6	2,495.6		22,997.0	146,573	GHG				
	Expenditu	ure approx. \$	\$ 11,258,619	\$ 8,174,688 \$	\$ 1,752,755	\$ 21,186,065	\$ 3,422,460 \$ 7,890,836.0	11,170,319 \$ 21,823,078.5	14,592,884 29,713,915.5	\$ 35,778,949 29,713,915.5	\$ 598,917 556,073.0	\$	60,515	\$	71,855.0	1,642,493	\$ 1,832,110 <b>\$</b> 1,764,194.8	2,431,029 2,320,267.3	\$ 318,923.0	822,836 \$ 557,856.0	822,836 876,779.0			\$ 64,715,413	Expenditure				
	Consumptio	ion kwh	182,416,681	165,005,013	24,859,169	372,280,866	7,690,636.0	21,823,078.5	23,713,913.5	372,280,865.8	556,075.0		121,200.0		/1,635.0	1,571,079.0	1,764,194.8	2,320,207.3	518,925.0	337,630.0	8/6,//9.0	25,917,752.0			Consumption				
2007	Ener	rgy <sub>GJ</sub>	656,700	594,018.0	89,493.0	1,340,214	199,768	552,483.0	752,257.7	2,092,471.4	19,463.0		4,644.2		2,752.0	60,769.3	68,166.4	87,629.2	12,214.6	21,365.6	33,580.2	907,166.0		3,120,847	Energy	2007	4.95	116.2	\$ 2,604
	(25) GH	HG tCO2e	4,499.6	4,070.1	613.2	9,183	12,188.23	33,708.04	45,896.3	55,079.2	1,380.7		329.8		152.5	4,292.6	4,775.7	6,156.3	803.7	1,539.7	2,343.4	62,462	6,978.9	133,019	GHG				
	Expenditu	ure approx. \$	\$ 12,019,650	\$ 8,671,541 \$	\$ 1,796,579 <b>\$</b>	\$ 22,487,773	\$ 4,586,515 \$	12,326,270 \$	16,912,809	\$ 39,400,583	\$ 622,802	\$	122,473	\$	66,825 \$		\$ 1,618,980 \$	2,241,783	\$ 322,112 \$	507,649 \$	829,761	\$ 27,472,797		\$ 69,944,924	Expenditure				
	Consumptio	ion kwh	182,416,484	181,477,164	24,323,468	388,217,118	7,794,930.0	21,503,997.5	29,298,928.3	29,298,928.3 388,217,118.0	612,787.0		94,309.0		36,891.0	1,400,888.0	1,532,087.3	2,144,874.0	829,336.3		829,337.9	25,453,537.1			Consumption				
2008	Ener		656,699		87,564.5	1,397,584	197,340	544,405.0	741,751.4	2,139,335.9	21,448.0		3,612.0		1,412.9	53,653.3	58,677.5	80,125.7	31,763.2		31,764.8	890,918.3		3,142,145	Energy	2008	4.88	121.0	\$ 2,949
		HG tCO2e	4,742.8	4,718.4	632.4	10,094	12,040.09	33,215.18	45,255.3	55,348.9	1,521.6		256.5		78.3	3,827.6	4,161.7	5,683.4		-	2,091.5	61,343	2,296.0		GHG				
	Expenditu	ure approx. \$	\$ 12,230,106	\$ 9,536,689	\$ 1,799,666 \$	\$ 23,566,465				\$ 42,919,526		\$	126,374	\$	47,220 \$			2,506,837	\$ 1,111,311 \$	- \$				\$ 76,572,850	Expenditure				
	Consumptio	ion		401			7,370,028.5	18,366,710.0	25,736,739.1	25,736,739.1	540,164.3		80,926.9		-	1,528,107.0	1,609,032.8	2,149,196.4	808,540.0		808,540.0	25,091,769.4			Consumption				
2009	Ener	kWH	186,880,727 672,233		24,174,852 86,959.9	402,326,601	186,583	464,980.0	651,568.9	402,326,601.2 2,098,790.1	18,906.2		3,099.5			58,525.8	61,624.1	80,530.0	30,966.7		30,966.7	878,255.8		3 088 543	Energy	2009	4.52	118 5	\$ 2,670
2005		HG tCO2e	4,730.5		611.9	10,184	10,729.3	26,236.9	36,966.2	47,150.4	1,341.2		220.1		-	4,175.2	4,394.1	5,735.1			1,970.7	60,471	2,548.0	117,875	GHG	2005-	4.52	110.5	÷ 2,070
		ure approx. \$		\$ 10,503,548			\$ 4,367,033 \$					\$	77,690	\$	- \$	1,421,140				- \$				\$ 69,559,586	Expenditure				

Whist	tler				Stationary Energy Use (Buildings) Mobile Energy Use										Waste				Inte	ensity Perforn	mance										
Communi	ity Fne	ergy &			Elec	ctricity		Prop	pane/Natural	Gas	All Buildings					Fleet Usa	age					Transit		Passenger Vehicles			Grand				Expanditura
Greenhou 2000-pres	use Ga		у	residential	commercial	industrial (sm com)	subtotal	residential	commercial	subtotal	Building Total	gasoline	E5 gasoline	E10 gasoline	B5 biodiesel	B10 biodiesel	B20 biodiesel	diesel	diesel(s) subtotal	subtotal	B4 biodiesel	diesel	subtotal	gasoline	Landfill		Totals		Intensity (tCO2e/PE)		Intensity (GJ/PE)
	Co	onsumptic	n litres					8,626,247.0	21,124,955.5	29,751,202.5	29,751,202.5	538,507.6			73,399.3		-	1,459,664.0	1,533,063.3	2,071,570.9	552,933.0		552,933.0	27,115,863.2			Consumption	[		ļ I	
2010			kWH	177,406,854	222,907,154	22,054,198	422,368,206				422,368,206.0				2.811.2					-			-					2010	4.24	110.0	¢ 2.021
2010	(25	5) Energ	·	638,154 4,491	801,824.3	79,331.6	1,519,310	218,386	534,809.0 26,900.89	753,195.0 37,885.7	2,272,505.1 48,577	18,848.2			2,811.2		-	55,904.4	58,715.6	77,563.8	21,177.1		30,773.0	949,102.7 62,082	2,157	3,329,945	Energy	2010	4.24	118.0	\$ 2,621
		s) Gr Expenditu	-	\$ 14,195,359 \$	13,280,245		29,439,427	\$ 3,916,142 \$	9,118,753 \$	13,034,895	\$ 42.474.322	\$ 565,433		\$	84.147				1,608,753 \$	2,174,186			580.580	\$ 28,742,815	2,137	\$ 73.971.903	Expenditure				1
			litres	+ -,,, +		• •,••••,•••• •		8,756,597.0	20,348,741.0	29,105,338.0	29,105,338.0	557,119.7		*	60,328.0		-	1,655,955.0	1,716,283.0	2,273,402.7	393,617.0		393,617.0	25,633,167.1		<i> </i>	Experiarcare				
	Co	onsumptio	n kWH	187,255,325	188,433,060	24,702,582	400,390,967				400,390,967.0									-			-				Consumption				1
2011		Energ	y GJ	673,580	677,817	88,858	1,440,255	221,686	515,158	736,844.0	2,177,099.3	19,499.6			2,310.5		-	63,422.3	65,732.8	85,232	15,075.3		30,615	897,206		3,190,153	Energy	2011	4.33	121.0	\$ 2,986
	(19	9) GH	G tCO2e	3,555	3,577	469	7,601	11,150.81	25,912.45	37,063.3	44,665	1,383.3			164.1		-	4,524.5	4,688.6	6,071.9	1,014.7	-	1,014.7	60,568	1,850	114,169	GHG	/			1
	E	Expenditu	e approx. \$	\$ 15,752,532 \$	11,978,744	\$ 2,183,542 \$	29,914,818	\$ 3,975,302 \$	8,784,686 \$	12,759,988	\$ 42,674,806	\$ 646,259		\$	69,981		\$	1,854,715 \$	1,924,696 \$	2,570,955	\$ 413,298 \$	- 5	413,298	\$ 33,066,786		\$ 78,725,844	Expenditure	/			( <b></b>
	6	onsumptio	n					8,832,160.5	19,600,848.0	28,433,008.5	28,433,008.5	381,728.0	22,659.0	153,790.5	35,495.0	31,226.0	-	1,698,325.0	1,765,046.0	2,323,223.5		142,777.3	142,777.3	25,847,997.1			Consumption	/ /			
		Jillounptie	kWH	179,985,206	187,137,582	24,172,706	391,295,494				391,295,494.0								-	-			-				consumption	/ /			1
2012		Energ	y GJ	647,429	673,157	86,952	1,407,538	223,599	496,224	719,823.0	2,127,360.7	13,360.8	793.1	5,382.8	1,359.4	1,195.9	-	65,045.0	67,600.4	87,137		5,468.3	24,408	904,725		3,143,631	Energy	2012	<b>3.9</b> 6	111.9	\$ 2,880
	(14	.,	-	2,458	2,556	330	5,343	11,247.03	24,960.07	36,207.1	41,551	947.8	55.2	367.5	96.5	78.7	-	4,640.3	4,815.5	6,186.0		387.2	387.2	61,075	1,918	111,117	GHG	/ /			1
	E	Expenditu	e approx. \$	\$ 16,649,189 \$	12,948,995	\$ 2,333,465 \$	31,931,649	\$ 4,106,193 \$	8,689,799 \$	12,795,991	\$ 44,727,640	\$ 480,977 \$	22,660 \$	193,776 \$	44,369 \$	40,906	\$	-)	2,208,181 \$	2,905,594		171,333		\$ 33,085,436		\$ 80,890,003	Expenditure				
	Co	onsumptic	n litres					8,055,274.5	19,878,572.5	27,933,847.0	27,933,847.0	255,029.0	11,884.1	165,424.9	62,242.3		-	1,539,045.7	1,601,288.0	2,033,626.0	167,439.9		167,439.9	25,610,496.9			Consumption				1
2012			kWH	166,391,496	184,042,131	24,428,104	374,861,731				374,861,731.0								-	-			-				2012	2.72	105.0	A 3 704	
2013		Energ	/	598,531	662,022	87,871	1,348,423	203,931	503,255	707,186.0	2,055,609.5	8,926.2	416.0	5,790.0	2,383.9	-	-	58,944.7	61,328.6	76,461		•	24,665	896,412		3,053,147	Energy	2013	3.73	105.6	\$ 2,784
	(10	-, -	-	1,663	1,839	244	3,746	10,257.73	25,313.73	35,571.5	39,317	633.2	29.0	395.3	169.3	-		4,205.1	4,374.4	5,431.8		-	436.1	60,514	2,019	107,718	GHG				1
	E	Expenditu		\$ 15,538,193 \$	12,248,824	\$ 2,328,291 \$	30,115,308	\$ 3,926,131 \$	9,215,094 <b>\$</b> 20,058,692.5	13,141,225 28,177,325.0	\$ 43,256,533 28,177,325.0	\$ 341,739 \$	15,925 \$	167 680 2	82,160 58,878.6		\$	2,031,540 \$	2,113,700 \$	2,688,070			697,357.8	\$ 34,318,066 25,908,242.1		\$ 80,483,689	Expenditure				
	Co	onsumptic	n litres	159.860.437	171,723,384	23,268,258	354,852,079	8,118,632.5	20,058,692.5	28,177,325.0	354,852,079.0	251,219.7	11,491.0	167,689.2	58,878.6		-	1,465,481.8	1,524,360.4	1,954,760.2	697,357.8		697,357.8	25,908,242.1			Consumption	/ /			1
2014	-	Energ	KWH	575,038	617,710	83,699	1,276,446	205,535	507,815	713,350.0	1,989,796.3	8,792.9	402.2	5,869.2	2,255.0			56,127.2	58,382.3	73,447	26,708.5		- 30,029	906,834		2 000 106	Eporal	2014	3.54	96.5	\$ 2.654
2014	(10		-	1.704	1,830	248	3,782	10,338,41	25.543.09	35,881.5	39.664	623.8	78.0	400.7	160.1			4.004.1	4,164.2	5,216.6	-		1,816.5	61,218	2.016	109,930	CHC	2014	3.34	50.5	Ş 2,034
		Expenditu	-	\$ 16,339,324 \$	12,357,013		31,159,873	\$ 3,955,404 \$	9,298,314 \$	13,253,718	\$ 44,413,591	\$ 336.634 \$	15.398	217,870 \$	79,486		s	1,831,852 \$	1,911,338 \$	2,481,241		. (	920,512	\$ 34,717,044	2,010	\$ 82.532.388	Expenditure	/ /			1
		<u> </u>	litros	+,,+		• • • • • • •		7,854,733.0	20,884,558.5	28,739,291.5	28,739,291.5	253,829.9	16,822.6	163,836.7	58,779.8		-	1,436,449.3	1,495,229.0	1,929,718.3	760,820.6		760,820.6	27,641,781.3		¢ 02,562,566	Experiarcare				
	Co	onsumptio	nkwh	158,168,151	169,738,001	24,133,174	352,039,326				352,039,326.0												-				Consumption				1
2015		Ener	V GJ	568,950	610,568	86,810	1,266,329	198,854	528,723	727,577.0	1,993,905.5	8,884.2	588.8	5,734.4	2,251.2	-	-	55,015.3	57,266.5	72,474	29,139.1		32,460	967,511		3,066,350	Energy	2015	3.52	94.2	\$ 2,588
	(10	0) GH	G tCO2e	1,686	1,809	257	3,752	10,002.36	26,594.77	36,597.1	40,349	630.3	41.0	391.5	159.9		-	3,924.8	4,084.6	5,147.3	1,981.8	-	1,981.8	65,314	1,922	114,714	GHG				1
	E	Expenditu	e approx. \$	\$ 16,340,740 \$	12,850,267	\$ 2,656,990 \$	31,847,997	\$ 3,535,195 \$	8,886,800 \$	12,421,995	\$ 44,269,992	\$ 312,211 \$	20,692 \$	i 163,968 \$	78,765		s	1,326,130 \$	1,404,895 \$	1,901,765	\$ 1,004,283 \$	- \$	1,004,283	\$ 37,039,987		\$ 84,216,027	Expenditure	/ /			
	60	onsumptio	litres					9,144,645.0	22,853,357.0	31,998,002.0	31,998,002.0	258,906.5	-	160,861.7	205,119.2	-	-	1,338,459.8	1,543,579.0	1,963,347.2	748,564.3		748,564.3	29,874,693.9			Consumption	/ · · · ·			
		Jiisumptic	kWH	168,861,748	168,061,189	24,970,147	361,893,084				361,893,084.0								-	-			-				consumption				
2016		Energ		607,416	604,537	89,821	1,301,774	231,510	578,566	810,076.0	2,111,849.7		-	5,630.3	7,856.0		-	51,262.4	59,118.3	64,749		-	31,991	1,045,667		3,254,256	Energy	2016 3.	<b>3.7</b> 0	97.1	\$ 2,480
	(10	o) GH Expenditu	-	1,631 \$ 18,166,592 \$	1,623	241 \$ 2,841,204 <b>\$</b>	3,496	11,644.95 \$ 3,665,465 \$	29,101.87 8.680.252 \$	40,746.8 12.345.716	44,242 \$ 46.014.366	642.9 \$ 294.443 \$		384.3 159.655 \$	557.8 159.403 \$			3,657.0	4,214.9 1.370.840 \$	5,242.1		-	1,949.9 632,196	70,590 \$ 34,654,645	2,141	124,165 \$ 83.126.145	GHG				1
			litros	÷ 10,100,592 Ş	12,000,034 :	÷ 2,041,204 \$	33,088,050	10,592,873.0	24,458,163.0	35,051,036.0	35,051,036.0	÷ 234,443 Ş	262,582.0	168,712.6	211,018.5	-	-	1,211,437 \$	1,788,462.5	2,219,757.2	789,709.0		789,709.0	30,036,227.6		<del>3 83,120,</del> 145	Experiature				
	Co	onsumptio	n kWH	181,839,187	175,851,348	25,696,643	383,387,178				383,387,178.0								-	-			-				Consumption				1
2017		Energ	y GJ	654,097.79	632,559	92,434	1,379,091	268,174	619,194	887,368.0	2,266,458.6		9,190.6	5,905.1	8,081.9		-	60,415.3	68,497.3	83,593	30,245.5	-	33,566	1,051,321		3,434,938	3,434,938 Energy	2017	3.56	94.6	\$ 2,582
	(10	-,		1,635	1,581	231	3,448	13,489.15	31,145.46	44,634.6	48,082		639.7	403.1	573.9		-	4,310.0	4,883.9	5,926.7	-	-	2,057.0	70,971	2,042	129,080	GHG				1
	E	Expenditu	e approx. \$	\$ 20,803,443 \$	14,077,223	\$ 3,029,357 \$	37,910,023	\$ 4,213,591 \$	9,287,640 \$	13,501,232	\$ 51,411,255	\$	343,982 \$	210,344 \$	207,409 \$	-	\$	1,456,296 \$	1,663,706 \$	2,218,032	\$ 766,808 \$		766,808	\$ 39,347,458		\$ 93,743,553	Expenditure				

# APPENDIX B Summary of RMOW 2017 Corporate Energy & Emissions Inventory

RMOW Energy and GHG Emissions Assessment - 2017 By Division, Department

						T	otals			
Division	Dept. Workgroup	Organizational Unit		cost (\$)	mobile fuels (Litres)	mobile fuels (GJ)	stationary gas (GJ)	Electricity (GJ)	Total Energy Use (GJ)	GHG (tCO2c
100		Mayor & Council	\$	2,144	1,636.8	147.8	-	-	148	3.8
	1101	Mayor & Council	\$	2,144	1,636.8	147.8	-	-	148	3.8
200		CAO Office	\$	3,463	785.7	91.1	_	_	91	1.80
200	1201	Administrator	\$	3,430	760.3	90.2		-	90	1.8
	3100	Human Resources	\$	33	25.5	0.9	-	-	1	0.0
000		Resort Experience	\$	574,940	82,318.1	4,836.5	4,660	12,719	22,215	470.8
	5100	General Manager	\$	84	63.9	2.2	-	-	2	0.1
	1401	Partnership & Economic Services	\$	92	70.0	2.4	-	-	2	0.1
	5200	Resort Parks Planning	\$	788	727.1	25.2	-	-	25	1.6
	1402 5400	Village Animation	\$	528	491.9	17.0	-	-	17	1.1
	5300	Resort Planning	\$	382 570,298	291.6	10.1 2.860.0	- 4,660		20,238	0.6
	7200	Park/Village Operations Building Dept.	\$	2,135	78,130.6 1,955.3	2,000.0	4,660	12,719	20,238	461.
	8300	Environment Stewardship	\$	634	587.7	1,851.8			1.852	4.
	0000	Limitoniient Stewardship	•	0.04	301.1	1,031.0			1,002	
000		Infrastructure Services	\$	1,154,988	167,695.7	6,387.0	4,902	29,369	40,658	744.2
	6100	General Manager	\$	616	573.9	19.9	-	-	20	1.
	6200	Development Services	\$	133	101.7	3.5	-	-	4	0.
	6400	Transportation	\$	178,979	95,183.7	3,644.2	-	1,560	5,205	245.
	6500	Central Services	\$	3,134	2,074.5	1.2	21	-	22	6
	6600	Environmental Operations	\$	70,479	62,357.3	2,266.9	-	-	2,267	150.
	8200	Water Utility	\$	401,594	-	-	-	12,480	12,480	36.
	8300	Sever Utility	\$	406,169	7,051.4	439.1	4,881	13,490	18,810	303.
	6600	Solid Waste	\$	93,421	-	-	-	1,838	1,838	0.
	6800	Transit	\$	131	100.3	3.5	-	-	3	0.
	6800	Emergency Planning	\$	331	252.9	8.8	-	-	9	0.
000		Corporate & Community Services	\$	321,080	49,427.5	1,805.0	6,900	7,043	15,748	484.
	7100	CCS General	\$	30	22.6	0.8	-	-	1	0.
	2200	CEES/Leg Services	\$	191	146.1	5.1	-	-	5	0.
	2300	Financial Services	\$	191	146.1	5.1	-	-	5	0.
	2400	Fiscal Planning	\$	-	-	-	-	-	-	-
	2500	Information Technology	\$	1,539	1,224.5	42.4	-	-	42	2.
	4100	Bylaw	\$	19,509	8,591.7	297.8	-	302	600	20.
	4300	Fire	\$	26,930	22,941.6	860.0	-	-	860	57.
	5800	Meadow Park Sports Centre	\$	255,820	1,724.1	59.8	6,900	6,741	13,701	371.
	4200 5500	RCMP	\$	94 500	412.1	14.3	-	-	14	0.3
	5500	Whistler Public Library	\$		381.4	13.2 506.6	-	-	13	0.3
	3100	Recreation	*	16,274	13,837.3	506.6	-	-	507	31.
			*	2,056,616	301.863.7	13.267.5	16.462	49,131	78.860	1,705.7

# APPENDIX C Summary of Emission Factors

Summary	of Emiss	ION Fac	tors						
based on 2012 BC Be	st Practices Me	thodology for <b>C</b>	Quantifying GH	G Emissions, B	C Ministry of E	nvironment (Sept, 2	2012)		
Stationary Emi	ssions								
Source Fuel	TOTAL	(Petro)					Key Con	version	
Source Fuel	t CO2e/GJ	tCO2e/litre					Key Con	version	
Natural Gas	0.0503	n/a							
Propane	0.0610	0.001544					0.025310	GJ/litre	
Diesel (BO)	0.0728	0.002790					0.038300	GJ/litre	
Mobile Emissio	ons								
ight Duty Vehicles	;								
-	п	(Petro)	TOTA	L (Bio)	ΤΟΤΑ	L (All)	K		
Source Fuel	t CO2e/GJ	tCO2e/litre	t CO2e/GJ	tCO2e/litre	t CO2e/GJ	tCO2e/litre	Key Con	version	
Gasoline (EO)	0.0709	0.00248	0.00000	0.0000	0.0709	0.002483	0.03500	GJ/litre	
5 Gasoline	0.0675	0.00236	0.00319	0.0001	0.0707	0.002436	0.03500	GJ/litre	
10 Gasoline	0.0641	0.00224	0.00638	0.0001	0.0705	0.002389	0.03500	GJ/litro	
iesel (BO)	0.0713	0.00273	0.00000	0.0000	0.0713	0.002732	0.03830	GJ/litro	
4 Diesel (RLCFR)	0.0685	0.00262	0.00275	0.0001	0.0713	0.002722	0.03830	GJ/litre	
5 Diesel	0.0678	0.00260	0.00343	0.0001	0.0713	0.002720	0.03830	GJ/litro	
10 Diesel			0.00543			0.002720		GJ/litro	
	0.0643	0.00246		0.0002	0.0711		0.03830		
20 Diesel	0.0572	0.00219	0.01373	0.0003	0.0710	0.002681	0.03830	GJ/litr	
ropane	0.0605	0.00153	0.00000	0.0000	0.0605	0.001532	0.02531	GJ/litr	
latural Gas	0.0562		0.000000	0.0000	0.0562		0.05379	GJ/kg	
ight Duty Trucks (i	1	,		(8:)		. ( . !!)			
Source Fuel	-	(Petro)		L (Bio)		L (All)	Key Con	ersion	
	t CO2e/GJ	tCO2e/litre	t CO2e/GJ	tCO2e/litre	t CO2e/GJ	tCO2e/litre			
asoline (EO)	0.0720	0.00252	0.00000	0.0000	0.0720	0.002519	0.03500	GJ/litre	
5 Gasoline	0.0685	0.00240	0.00319	0.0001	0.0717	0.002471	0.03500	GJ/litr	
10 Gasoline	0.0650	0.00228	0.00638	0.0001	0.0714	0.002422	0.03500	GJ/litre	
iesel (BO)	0.0713	0.00273	0.00000	0.0000	0.0713	0.002733	0.03830	GJ/litro	
4 Diesel (RLCFR)	0.0685	0.00262	0.00275	0.0001	0.0713	0.002722	0.03830	GJ/litr	
5 Diesel	0.0678	0.00260	0.00343	0.0001	0.0713	0.002720	0.03830	GJ/litr	
10 Diesel	0.0643	0.00246	0.00687	0.0002	0.0712	0.002707	0.03830	GJ/litro	
20 Diesel	0.0572	0.00219	0.01373	0.0003	0.0710	0.002681	0.03830	GJ/litre	
ropane	0.0605	0.00153	0.00000	0.0000	0.0605	0.001532	0.02531	GJ/litre	
latural Gas	0.0562	0.00133	0.000000	0.0000	0.0562	0.001332	0.05379	GJ/kg	
leavy Duty Vehicle			0.000000	0.0000	0.0302	·	0.03373	OJ/Kg	
eavy Duty vehicle	1	(Detwe)	TOTA	(0:-)	7074	. (			
Source Fuel		(Petro)		L (Bio)		L (All)	Key Con	version	
	t CO2e/GJ	tCO2e/litre	t CO2e/GJ	tCO2e/litre	t CO2e/GJ	tCO2e/litre			
iasoline (EO)	0.0672	0.00235	0.00000	0.0000	0.0672	0.002352	0.03500	GJ/litre	
5 Gasoline	0.0640	0.00224	0.00319	0.0001	0.0672	0.002235	0.03500	GJ/litre	
10 Gasoline	0.0607	0.00212	0.00638	0.0001	0.0671	0.002117	0.03500	GJ/litre	
iesel (BO)	0.0708	0.00271	0.00000	0.0000	0.0708	0.002712	0.03830	GJ/litr	
4 Diesel (RLCFR)	0.0680	0.00260	0.00275	0.0001	0.0708	0.002722	0.03830	GJ/litr	
5 Diesel	0.0673	0.00258	0.00343	0.0001	0.0707	0.002720	0.03830	GJ/litre	
10 Diesel	0.0638	0.00244	0.00687	0.0002	0.0707	0.002707	0.03830	GJ/litr	
20 Diesel	0.0568	0.00218	0.01373	0.0003	0.0705	0.002681	0.03830	GJ/litre	
Off Road Vehicles									
	ΤΟΤΑΙ	(Petro)	τοτα	L (Bio)	τοτα	L (All)			
Source Fuel	t CO2e/GJ	tCO2e/litre	t CO2e/GJ	tCO2e/litre	t CO2e/GJ	tCO2e/litre	Key Con	version	
	0.0675						0.03500	GI/lite	
acolino (EQ)		0.00236	0.00000	0.0000	0.0675	0.002361	0.03500	GJ/litr	
	0.0642	0.00225	0.00319	0.0001	0.0674	0.002243	0.03500	GJ/litr	
5 Gasoline			0.00638	0.0001	0.0673	0.002125	0.03500	GJ/litr	
5 Gasoline 10 Gasoline	0.0609	0.00213			0.0785	0.003007	0.03830	GJ/litre	
5 Gasoline 10 Gasoline viesel (B0)	0.0609	0.00301	0.00000	0.0000					
5 Gasoline 10 Gasoline iiesel (B0) 4 Diesel (RLCFR)	0.0609 0.0785 0.0754	0.00301 0.00289	0.00275	0.0001	0.0782	0.002722	0.03830		
5 Gasoline 10 Gasoline Diesel (B0) 14 Diesel (RLCFR) 15 Diesel	0.0609	0.00301				0.002722 0.002720	0.03830	GJ/litr	
Gasoline (E0) 25 Gasoline 210 Gasoline Diesel (B0) 34 Diesel (RLCFR) 35 Diesel 310 Diesel	0.0609 0.0785 0.0754	0.00301 0.00289	0.00275	0.0001	0.0782			GJ/litre GJ/litre GJ/litre	

# APPENDIX D Summary of 2016 Corporate Carbon Neutral Commitment

DIVISIO	on, Departr	nent				WHISTLER
Division	Dept.	Workgroup	Organizational Unit	GHGs (tCO2e)	contra	carbon cost v cted emissions (\$ (not GST
100			Mayor & Council	3.87	\$	96.68
	1101		Mayor & Council	3.87	\$	96.68
1200	1201		CAO Office Administrator	1.86 1.80	<b>\$</b> \$	<b>46.41</b> 44.91
	3100		Human Resources	0.06	\$ \$	1.50
	5100		numan Resources	0.00	Ŷ	1.50
5000			Resort Experience	470.81	\$	13,810.37
	5100		General Manager	0.15	\$	3.78
	1401		Partnership & Economic Services	0.17	\$	4.13
	5200		Resort Parks Planning	1.64	\$	40.89
	1402		Village Animation	1.10	\$	27.60
	5400		Resort Planning	0.69	\$	17.22
	5300		Park/Village Operations	461.22	\$	13,570.44
	7200		Building Dept.	4.46	\$	111.60
	8300		Environment Stewardship	1.39	\$	34.72
000			Infrastructure Services	744.27	Ś	33,549.81
	6100		General Manager	1.29	\$	32.20
	6200		Development Services	0.25	\$	6.13
	6400		Transportation	245.30	\$	9,005.55
	6500		Central Services	6.01	\$	150.26
	6600		Environmental Operations	150.37	\$	4,779.22
	8200		Water Utility	36.98	\$	8,404.48
	8300		Sewer Utility	303.19	\$	8,599.82
	6600		Solid Waste	0.03	\$	2,550.86
	6800		Transit	0.24	\$	6.04
	6800		Emergency Planning	0.61	\$	15.24
000			Corporate & Community Services	484.89	\$	12,122.30
	7100		CCS General	0.05	\$	1.33
	2200		CEES/Leg Services	0.32	\$	8.03
	2300		Financial Services	0.35	\$	8.63
	2400		Fiscal Planning	-	\$	
	2500		Information Technology	2.86	\$	71.52
	4100		Bylaw	20.21	\$	505.30
	4300		Fire Mandaux Back Superty Control	57.12	\$	1,428.10
	5800 4200		Meadow Park Sports Centre RCMP	371.02	\$ ¢	<u>9,275.52</u> 23.32
	4200 5500		KCMP Whistler Public Library	0.93	\$ \$	23.32
	5500 5700		Recreation	31.12		778.02
				1,705.70	\$	59,625.58

 Total Estimated Contracted Emissions
 680

 Offset Cost of Contracted Emissions
 \$ 17,000

### Verified Emission Reduction (VERs)

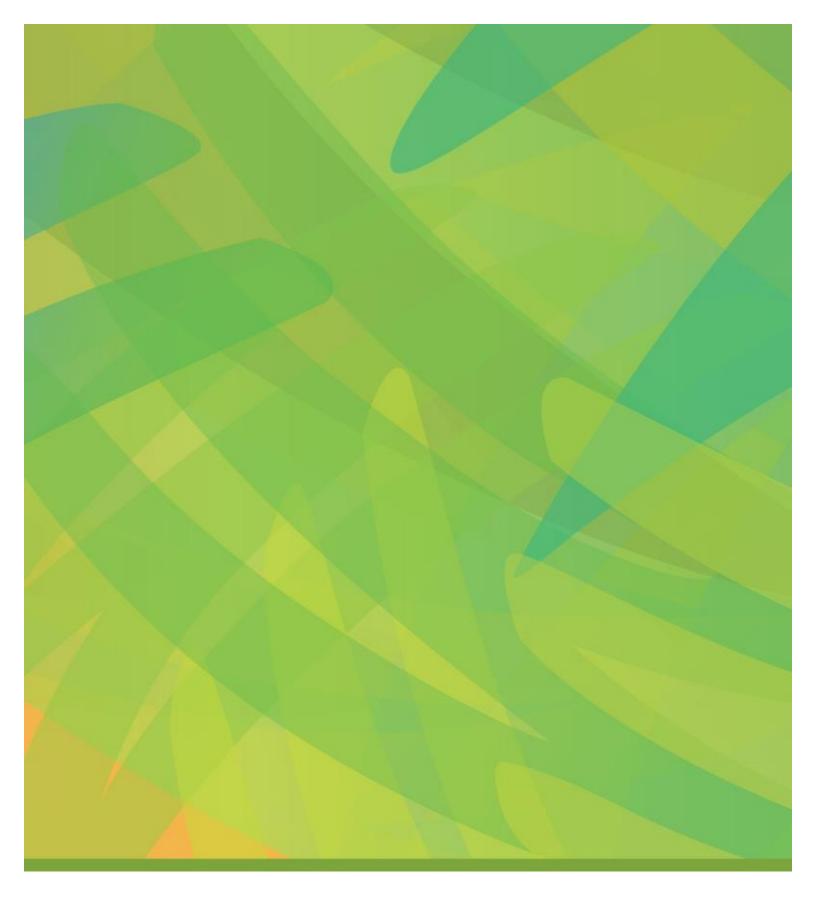
**2010 – 2017 Carbon Neutrality:** The RMOW has purchased and retired Verified Emission Reduction credits equal to its entire corporate carbon footprint for every year between 2010 and 2017 inclusive. A summary is provided below:

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.
2010	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.
2011	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.
2012	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

**2013 - 2017 Carbon Neutrality**: The RMOW has purchased VERs from the Cheakamus Community Forest (CCF) to offset 2013 - 2016 corporate emissions. More information about the project can be found on the Cheakamus Community Forest (CCF) website (<u>http://www.cheakamuscommunityforest.com/ccf-projects/</u>)

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 rigour 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/tCO2e) 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' (eg. any contracted snow clearing in the Village, solid waste collection contracts etc...)

See Appendix D above for more detail.



### THE RESORT MUNICIPALITY OF WHISTLER

Host Mountain Resort 2010 Olympic and Paralympic Winter Games

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