

Town of Canmore
2018 Corporate and Community
Greenhouse Gas Inventory
January 2020

As part of Canmore’s commitments as members of the Federation of Canadian Municipalities Partners for Climate Protection Program and the Global Covenant of Mayors for Climate and Energy, the Town of Canmore is required to update our greenhouse gas (GHG) inventories and progress towards our targets on an ongoing basis.

The Climate Change Action Plan, adopted in December 2018, establishes 2015 as the baseline GHG inventory. The 2030 and 2050 reduction targets and future inventories all compare to the 2015 baseline.

2018 is the first update to the inventory since setting the 2015 baseline. Due to the amount of work required, it is recommended to complete an inventory update every three years. The next one planned for 2021, which aligns with the next Canadian census.

Corporate GHG Inventory Summary

The Corporate Inventory (Figure 2) accounts for emissions generated from Town of Canmore operations; Town-owned facilities, water and wastewater treatment and the vehicle and equipment fleet.

Targets: Reduce GHG emissions by 50% by 2030 and 80% by 2050, compared to 2015.

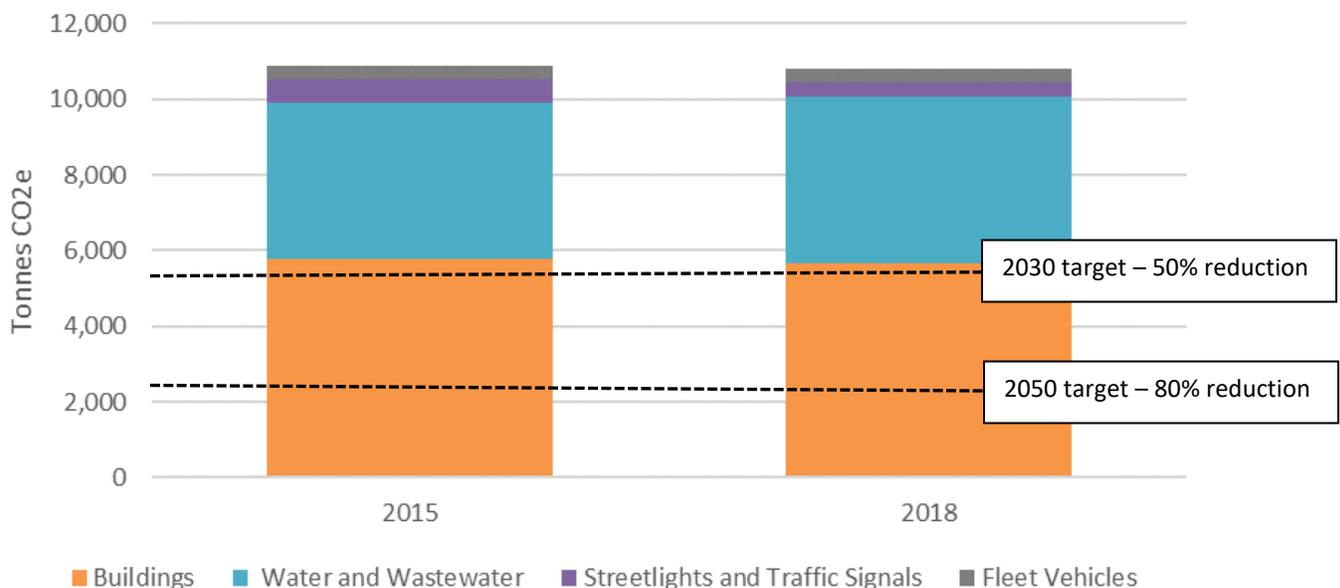


Figure 1: Town of Canmore 2018 Corporate GHG Inventory

Town of Canmore Corporate GHG emissions declined by 0.4% between 2015 and 2018. Most noteworthy was a reduction in street and traffic lighting, where GHGs declined by 37%. Much of this decline can be attributed to converting streetlights to LED.

The pie chart in Figure 2 further breaks out the sources of 2018 Town of Canmore Corporate GHG emissions. Together, three buildings - the Wastewater Treatment Plant, Elevation Place and the Canmore Recreation Centre - produce 69% of all Corporate emissions. While lighting and space heating

in these facilities accounts for some of the GHGs, most Town of Canmore emissions are associated with water; pumping and treating of wastewater, maintaining ice rink surfaces, and warming and filtering water for the swimming pool.

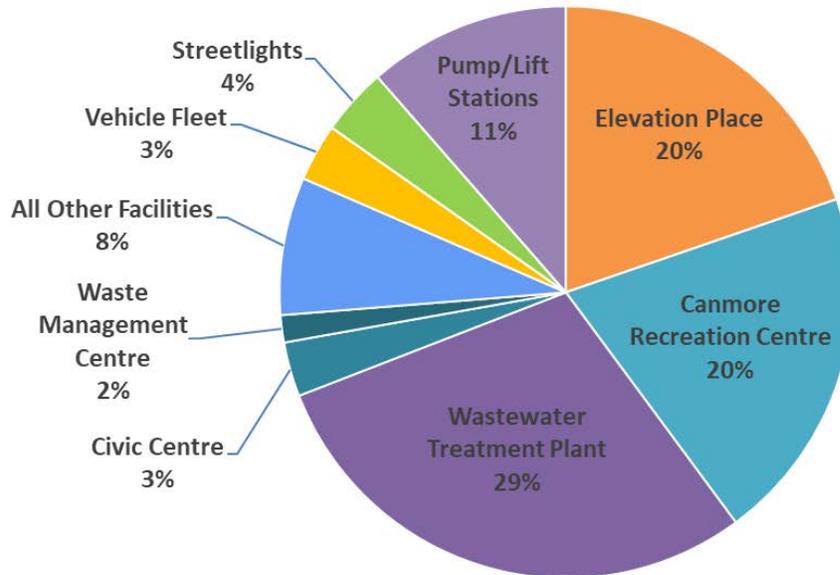


Figure 2: Town of Canmore 2018 Corporate GHG Sources

Figure 3 shows how Corporate GHGs are divided by fuel type. Electricity accounts for 72% of our GHG emissions. In total, the Town of Canmore spent \$1,847,534.38 on electricity and natural gas for operations and buildings and \$176,440 on gasoline and diesel for the vehicle and equipment fleet.

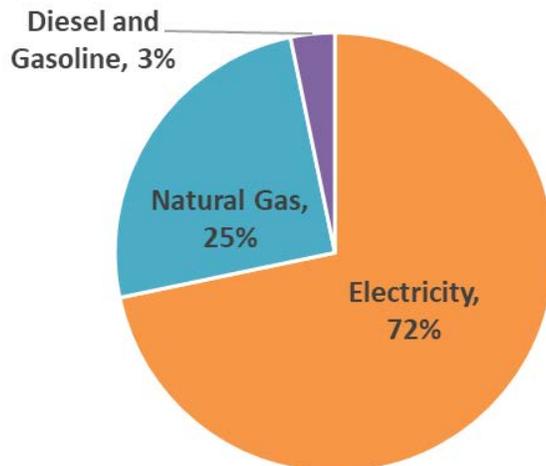


Figure 3: Town of Canmore 2018 GHGs by Fuel Type

Community GHG Inventory Summary

The Community Inventory (Figure 4) includes emissions from residential, commercial and institutional buildings, transportation and waste generated within the municipal boundaries of Canmore. Town of Canmore Corporate emissions account for 4% of total community GHGs.

Targets: Reduce GHG emissions by 30% by 2030 and 80% by 2050, compared to 2015.

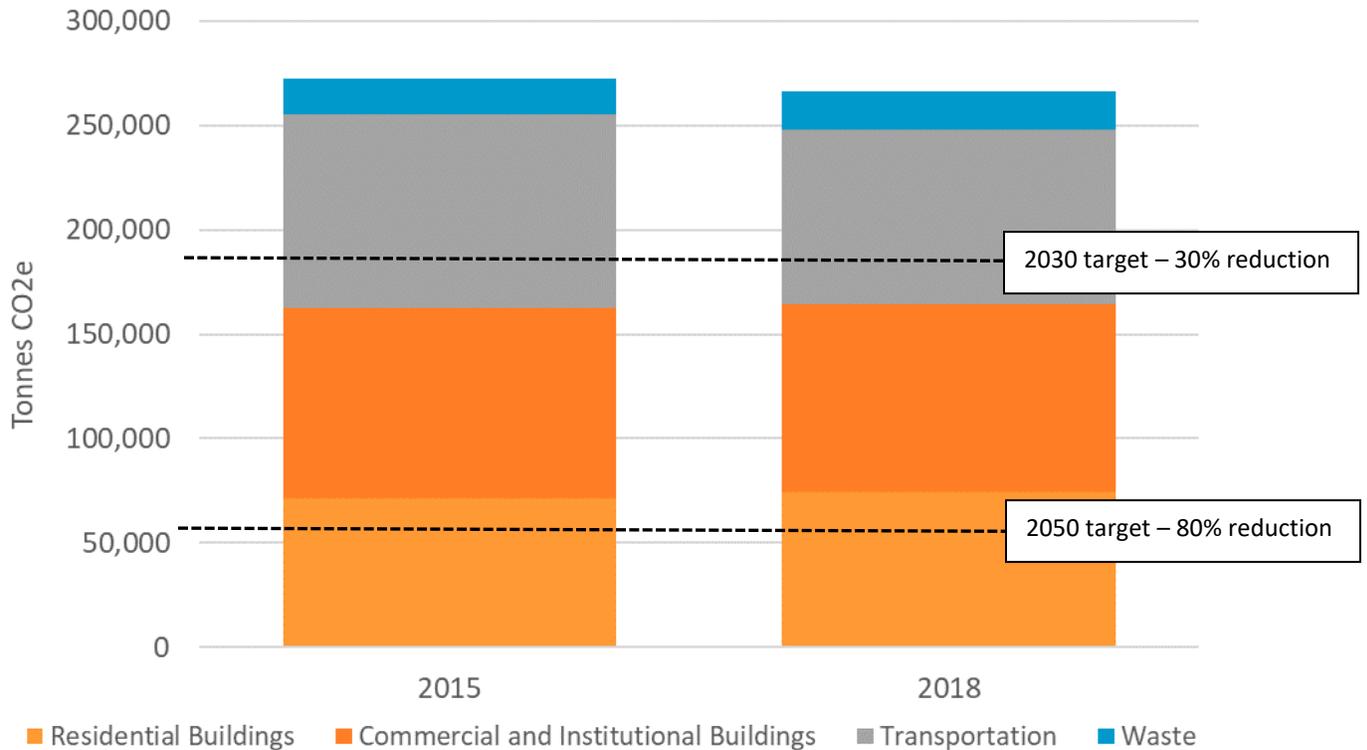


Figure 4: Canmore Community 2018 GHG Inventory

GHG emissions for the entire community of Canmore declined by 2%. This is attributed to a decrease in gasoline and diesel sales volumes, which are used to estimate our transportation emissions. In addition, while actual community-wide energy consumption in Canmore was higher in 2018, this was offset by a decrease in the amount of greenhouse gases from electricity production due to reduced coal-fired electricity generation and increased wind power since 2015.

It is estimated that total community expenditure on natural gas and electricity was over \$28 million in 2018.

In addition to the Community GHG inventory, we also track the following proxy data, which allows us to monitor trends in the interim years between full GHG inventories. Table 1 shows the data trends from 2015 to 2018.

Table 1: Energy, Transportation and Waste Data Trends from 2015 to 2018

Community-wide building energy	
Electricity consumed	3% increase
Natural gas consumed	16% increase
Solar PV installed kilowatts	383% increase
Transportation	
Gasoline sales from Canmore gas stations	10% decrease
Diesel sales from Canmore gas stations	15% decrease
Motor vehicles registered to a Canmore address	3% increase
Hybrid and Battery Electric Vehicles	1% of total vehicle registrations
Battery Electric Vehicle registrations	1,000% increase
Local Roam Transit ridership	46% increase*
Waste	
Solid waste landfilled	6% increase

* between 2017 and 2018 (2017 was the first full year of Roam Route 5)

As we move forward and more data becomes available we can include other metrics, such as mode share in the locations where we have traffic counters.

Discussion

In addition to Climate Action Plan initiatives undertaken by the Town, there will be external factors impacting this and future GHG inventories. As mentioned previously, a significant external influencing factor is the GHG or carbon intensity of electricity. This is a measure of the amount of GHG emissions produced by electricity generation and is used when calculating inventories. Alberta has the most GHG intensive electrical grid in Canada, due to coal-fired generation. This has been decreasing since 2015 and, as a result, the slight GHG increase from buildings in 2018 was not commensurate with the more significant increase in actual energy use. As coal-fired generation is phased out in Alberta, the GHGs produced from electricity consumption will continue to decrease. The forecast for 2030 is for the GHG intensity to be about half of what it is now. The Alberta Electric System Operator (AESO) is the not-for-profit entity responsible for the planning and operation of the Alberta Interconnected Electric System. In October 2019, AESO released their Long-term Outlook Report, looking at different growth models as well as economic and renewable energy development scenarios. The pie charts shown in Figure 5, showing the anticipated change in how electricity is generated, were taken from the Reference Case, which is AESO's main corporate forecast.

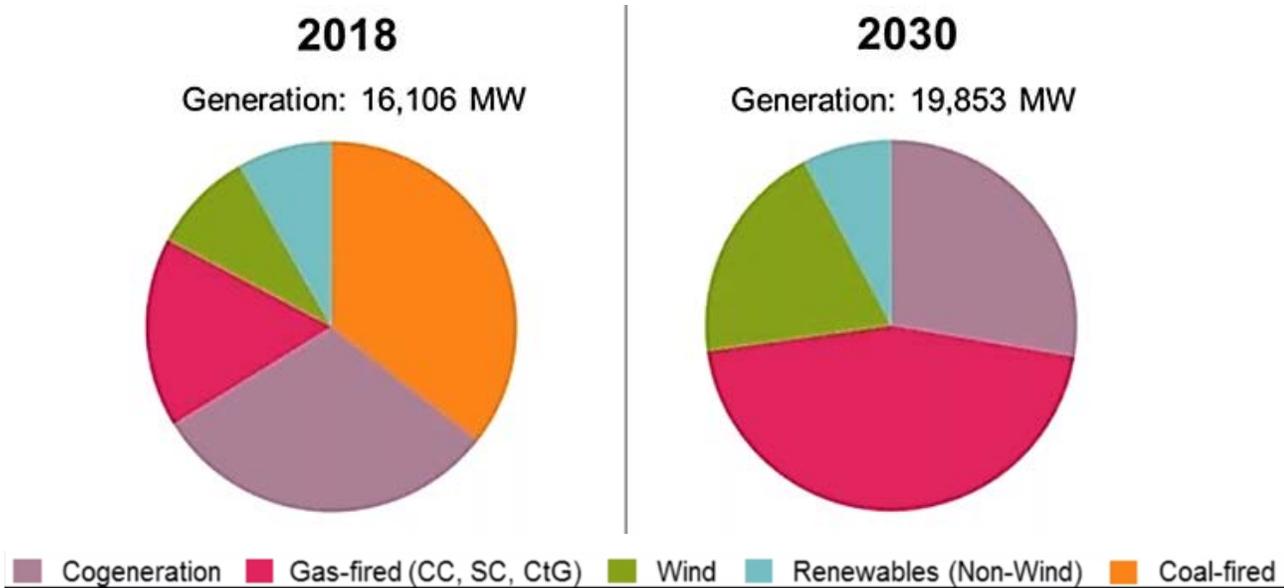


Figure 5: Current and Forecasted Alberta Electric System Installed Generation Mix

Source: AESO 2019 Long term-Outlook Reference Case Scenario, <https://www.aeso.ca/grid/forecasting/>

Weather also has significant influence on energy consumption. As seen in Figure 6, with data from our closest weather station in Banff, outdoor temperature correlates with natural gas consumption. The lower temperatures in early 2018 would contribute to community-wide natural gas consumption being 16% higher than it was in 2015.

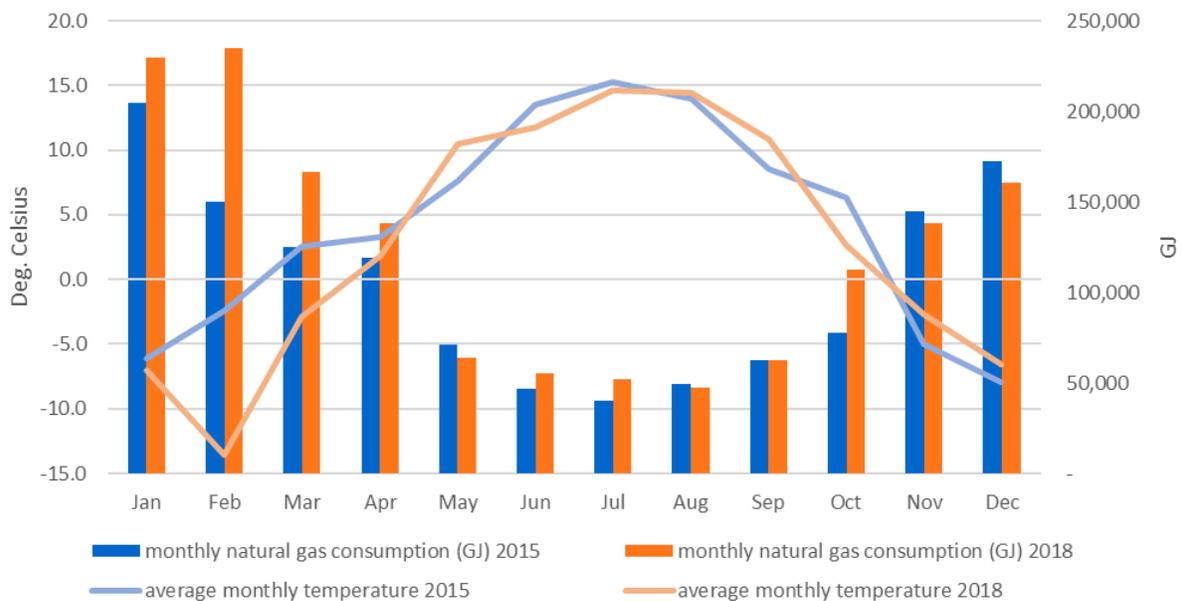


Figure 6: Outdoor Air Temperature vs Community Natural Gas Consumption for 2015 and 2018

Methodology

The scope of what is included in Canmore's greenhouse gas inventory is dictated by the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC), created by the World Resources Institute, C40 Cities Climate Leadership Group and ICLEI – Local Governments for Sustainability (ICLEI). Hundreds of cities across the globe use the GPC to report their greenhouse gas emissions.

Under the GPC, municipalities can elect to do a BASIC level, which reports on standard emission sources in a city, or a BASIC +, which includes emission sources such as industrial and agricultural processes and transboundary transportation. BASIC + are more complex, requiring increased data availability and are generally more applicable for larger centres. The figure below from C40 Cities shows how the GPC has organized sources and boundaries of city GHG emissions into different emission scopes. The red circles have been added to indicate the sources included in Canmore's community inventory. Like most municipalities, the Town of Canmore reports at the BASIC level, which includes stationary fuel combustion in buildings, grid-supplied energy, in-boundary transportation and waste generated inside the city and disposed of outside of the city.

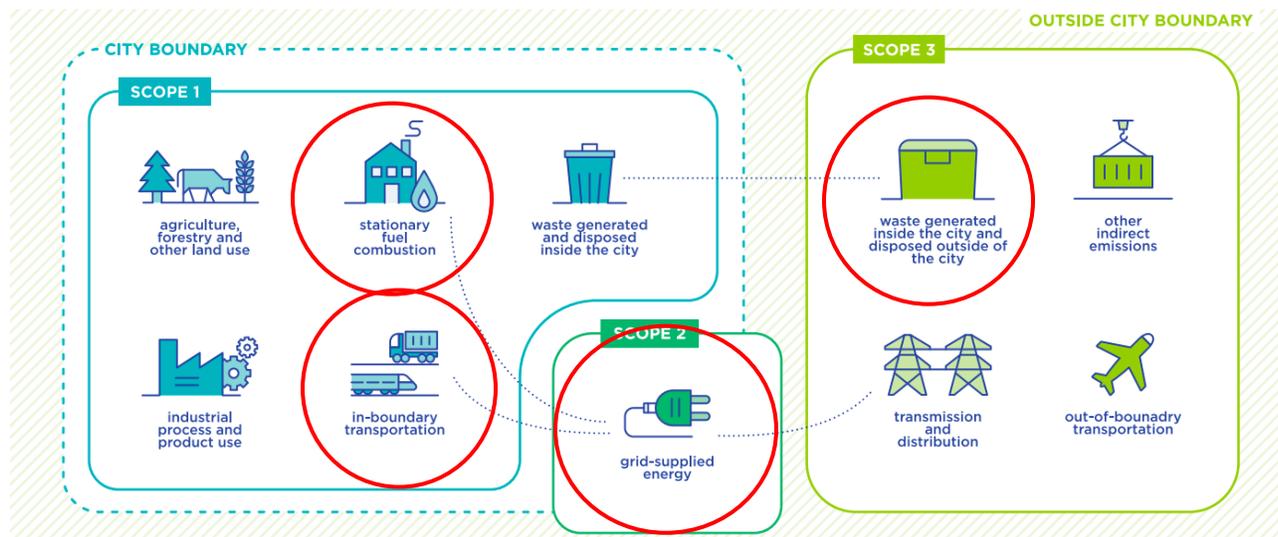


Figure 7: Sources and boundaries of GHG emissions sources for municipal GHG inventories

Source: C40 Cities, https://www.c40knowledgehub.org/s/article/Consumption-based-GHG-emissions-of-C40-cities?language=en_US

The 2018 inventory was completed using the Partners for Climate Protection Milestone Tool, a web-based GHG emissions inventory calculator. The tool was developed by ICLEI Canada, follows the GPC and uses emissions factors from the Canadian government's national greenhouse gas (GHG) inventory, which is submitted to the United Nations Framework Convention on Climate Change (UNFCCC).

Greenhouse gases emissions accounted for in the inventory include carbon dioxide (CO₂), nitrous oxide (N₂O) and methane (CH₄). As GPC protocols dictate, all have been reported as carbon dioxide equivalent (CO₂e). While there are fewer CH₄ and N₂O emissions compared to CO₂, they absorb more thermal infrared radiation and therefore have an increased contribution to global warming or global

warming potential (GWP). For instance, N₂O has 298 times the GWP as CO₂. To account for this, these emissions are converted into CO₂e, which is the amount of CO₂ which would have the equivalent GWP.

Data Sources

Corporate Inventory data sources:

- Electricity and natural gas consumption for all Town-owned facilities.
- Electricity and natural gas consumption for water and wastewater infrastructure.
- Electricity for street and traffic lights.
- Diesel and gasoline used by fleet vehicles and equipment.

Community Inventory data sources:

- Electricity and natural gas consumption for all residential, commercial and institutional buildings within the Town of Canmore's municipal boundaries. Local energy data provided by utilities is not broken down by building sector. The split between residential and commercial/institutional building GHGs in our inventory is estimated from provincial electricity and natural gas consumption for these sectors, as reported by Natural Resources Canada.
- Total diesel and gasoline sales volumes from Canmore gas stations.
- ROAM transit fuel use.
- Electric vehicle charging stations, where separate data is available.
- Estimated propane, based on extrapolated provincial data, as local propane sales data is not available.
- Landfilled waste, yard and garden material diverted to composting, and wastewater volumes.

Excluded GHG sources

GHG inventories are constrained by the availability and quality of data. They are dictated by specific protocols in order to provide consistency and comparability, but are not able to quantify all potential sources of GHGs. We cannot calculate the degree to which they contribute, but it is prudent to note that because of the following excluded sources of GHGs, our actual Canmore GHG footprint will be higher than what our inventories indicate.

Excluded Corporate GHGs:

- Any employee travel not occurring in a Town fleet vehicle.
- Waste generated in Town of Canmore buildings. While some municipalities are able to include this in their Corporate Inventories, Town of Canmore operational waste is not tracked separately from the broader community's. GHGs from waste generated by employees, Town operations and users in recreational facilities is included in the Community Inventory.

Excluded Community GHGs:

- Upstream emissions associated with the production and transportation of food, consumer goods and services and building materials.

- Domestic and international air travel by residents.
- Emissions specific to tourism. Energy consumed at visitor accommodations in Canmore is captured in our overall building GHGS, as well as fuel purchases by visitors at local gas stations and waste landfilled as part of our local collection system. The broader transportation impact of local and international visitors visiting Canmore, however, is not included in the inventory.
- Fugitive emissions, which include GHG emissions from discharges or leaks in wastewater treatment and refrigerants.

Notable Areas of Uncertainty

The biggest decline in community GHGs was from transportation, which account for about one third of our total community inventory. Transportation emissions are estimated from local fuel station sales volumes, which decreased in 2018. While this is an acceptable method prescribed by the GPC protocol, it contains inherent uncertainty. It does not capture Canmore residents and visitors that are fueling vehicles in other communities and, conversely, includes Trans-Canada Highway travelers only stopping in Canmore for fuel. The 2018 GHG Inventory estimates that 31% of total community emissions come from transportation. In comparison, the Town of Banff has recently completed a more robust inventory incorporating park visitation statistics and traffic counter data. With this additional data available to them they estimate a much higher GHG transportation impact: 51% of their total community emissions come from visitor vehicles and 5.8% from local vehicles.

Conclusion

The 2018 GHG inventory estimates a very slight decrease in emissions from 2015; 0.4% for Corporate emissions and 2% for Community. This can be viewed as a business as usual comparison given that the Climate Action Plan was not approved until December 2018. While this slight decline in GHGs over the 3 years since the baseline is positive, continuing along the same trajectory as we have from 2015 will not be enough to achieve the targets we've committed to. With anticipated population increase and development expected in Canmore between now and 2030, aggressive action is required in order to reach our 50% Corporate and 30% Community reduction targets.

The GHG Inventories should be considered living documents. As previously discussed, there is inherent uncertainty as well as external influences. As we progress towards our target years, better data may become available and protocols may be further refined and changed. The emission factors used to calculate GHGs are subject to updates and it is possible that retroactive changes to previous inventories may be required. The GHG inventories are an important tool to guide decision making and provide value in highlighting how different sectors compare to each other, but specific GHG tonnages should always be considered an estimate.

While the next full GHG Inventory update is not planned for until 2021, the proxy data included in this report can be tracked annually. Actual energy consumption data, mode share, transit ridership, waste diversion statistics and other data is accessible and will be able to provide a good picture of how the factors that influence GHGs are changing in response to the Climate Action Plan initiatives we are implementing.