



2019
Carbon Footprint
and
Reduction Plan



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Executive Summary

Firefly GHG Consulting is a specialist GHG consultant based in Calgary, AB, Canada. We are an office-based business, but also travel to meetings with clients, for on-site work and for attendance at conferences. Our carbon footprint comes from heating, lighting and power for our office, and from emissions associated with cars, buses and planes for our corporate travel.

Our 2019 greenhouse gas emissions inventory was prepared in line with ISO 14064-1:2018, the international standard for organizational GHG inventories.

Our footprint in 2019 was 1.78 tonnes CO₂e, of which approximately half came from our office (heating, lighting, power and hot water) and half from our travel (cars, buses and planes).

During 2019, we undertook some emission reduction initiatives - for example: switching from an internal combustion engine vehicle to a battery electric vehicle for most local business trips; specifying energy-efficient upgrades during an office retrofit and making low-no carbon travel choices wherever possible. Not all of these actions could be quantified. However, those that could show that **we reduced our footprint by at least 0.15 tonnes CO₂e**.

In addition, we purchased 100% ECO Logo certified green electricity, **which offset our footprint by another 0.39 tonnes CO₂e**, reducing our active emissions to 1.4 tonnes CO₂e.

The science of climate change is clear and there is a need to reduce global GHG emissions quickly, and to net zero by 2050. **Firefly is determined to play our part. We will achieve net zero emissions from 2020 onwards.** This will be achieved through a combination of emissions avoidance and reduction actions, the continued purchase of green electricity, and the purchase of high-quality, third-party verified offsets.

For more information on Firefly GHG Consulting and how we can help you understand and reduce your carbon footprint, please visit us online at www.fireflyGHG.eco.

About Firefly

Firefly GHG Consulting is a specialist greenhouse gas management consultancy based in Calgary, AB, Canada.

Climate change is probably the greatest environmental problem that humanity has faced; we envision a future where our children can be proud of the actions that we took to be a part of the solution.

Firefly was founded in 2016 and offers professional support to organizations to reduce their carbon footprint through services such as: greenhouse gas inventories, reduction and offset projects, grant applications, market assessments, validation/pre-verification screening and GHG training.

Our **mission** is to help you be a proud part of the climate change solution.

Our **vision** is that, working with our clients, we will identify >1 million tonnes CO₂e (carbon dioxide equivalents) of viable emission reductions by the end of 2021, and work to support their implementation.

Firefly has three core **values**:



Respect is our foundation. We will conduct all of our activities with respect. This means respect for ourselves, through looking after health, wellbeing

and family and refusing to compromise on our ethics; respect for our clients, by always providing professional, honest and competent work and advice; and respect for our environment, by always working with its best interests at heart.



We will add value. We will engage only in projects where we believe that our contribution will make a difference. We will choose to work with clients who genuinely want to effect change.



We will walk the talk. We will be the change we want to see. We will understand our own carbon footprint and take actions to minimize it.

We currently have one full-time employee, and are a home-based business.

A dramatic sunset or sunrise over the ocean. The sky is filled with dark, heavy clouds, with a bright orange and yellow glow from the sun breaking through near the horizon. The ocean below is dark blue with small, choppy waves.

Our climate is changing.

Change with it

and be
part of the
solution.

Our Carbon Footprint

To manage and reduce our greenhouse gas emissions it is essential that we understand them; what activities are contributing to our footprint, and in what proportion. This understanding provides the foundation for an effective, targeted plan of action. This is our first greenhouse gas inventory and is therefore also our baseline, against which our targets will be set and our future inventories will be compared.

Firefly's carbon footprint has been calculated following our *Corporate Greenhouse Gas Inventory Methodology Document of May, 2019*. In accordance with best practice, this is based on international standard ISO 14064-1:2018 ('the ISO standard'). The following summarises the key components of our quantification approach:

- Natural gas and electricity consumption volumes are calculated from invoices, apportioned for floor area.
- Car travel is tracked and distances are converted into fuel volumes.
- Emission factors for fuel consumption are taken from Canada's *National Inventory Report* (2019).
- Fuel heating values are from the National Energy Board.

- Vehicle fuel efficiencies are from the US EPA (www.fueleconomy.gov).
- Bus emissions intensity is from Canada's Office of Energy Efficiency.
- Air travel emissions are calculated using the International Civil Aviation Organization (ICAO) Carbon Emissions Calculator.
- 100-year Global Warming Potentials are from the most recent IPCC publication (the 5th Assessment Report).

Our key emission sources are:



Our office. Direct emissions are created by combusting natural gas for space and water heating. Indirect emissions are created when electricity is consumed for lighting, power and secondary space heating.



Our corporate travel. Direct emissions are created when an employee travels using their own car, and indirect emissions when using a taxi, bus or airplane to meet clients, attend conferences on to go on-site.

The results of our 2019 inventory are presented by reporting category, ISO 14064-1 category, energy type, source and GHG species.

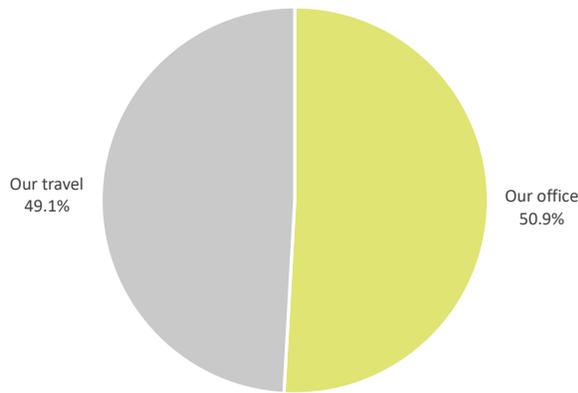
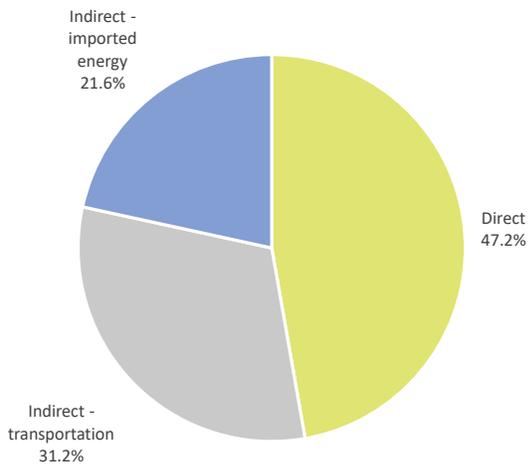


Figure 1 shows that our 2019 emissions were split almost equally between our two reporting categories, with marginally more emissions arising from our office than from our travel.

Figure 1 - GHG Emissions by Reporting Category



As shown in Figure 2, slightly less than half of our emissions were under our direct control. Around a third came from indirect transportation sources, and about a fifth from imported energy (in our case, electricity).

Figure 2 - GHG Emissions by ISO 14064-1 Category

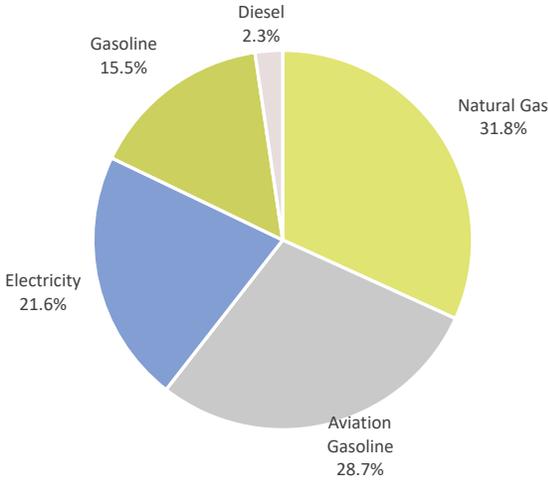


Figure 3 - GHG Emissions by Energy Type

Figure 3 shows that four types of energy made up over 97% of our carbon footprint: natural gas, aviation gasoline, electricity and gasoline.

It should be noted that Firefly only took one flight during 2019 - a round-trip from Calgary to Houston to deliver a GHG training course - which demonstrates the high impact of air travel on GHG emissions for a small business.

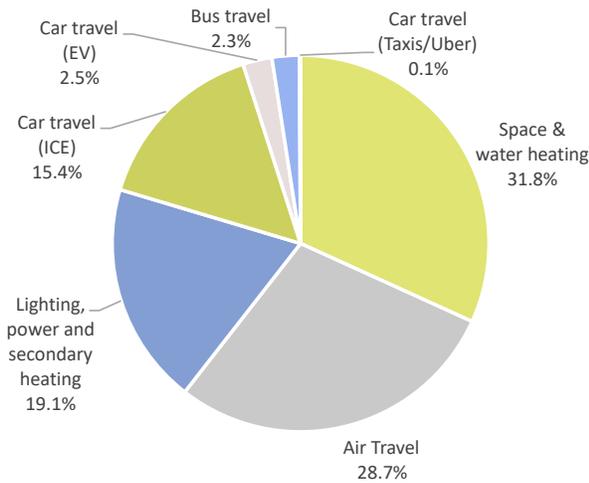
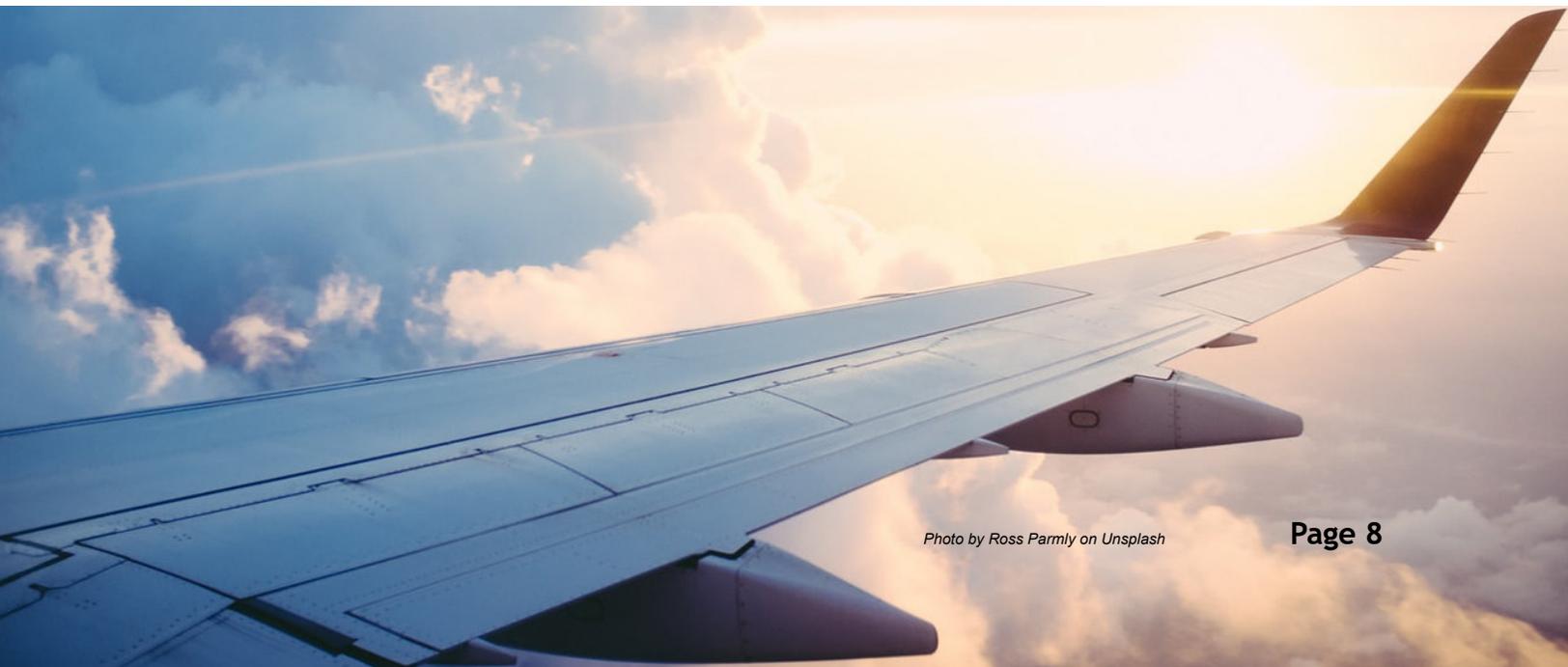


Figure 4 - GHG Emissions by Source

As shown in Figure 4, most emissions came from space and water heating for our office space - closely followed by air travel. Together these made up around three-fifths of our GHG emissions. Power consumption for our office made up another fifth, and the remaining two-fifths came from various transportation sources, including ICE (internal combustion engine) and EV (electric vehicle) cars.



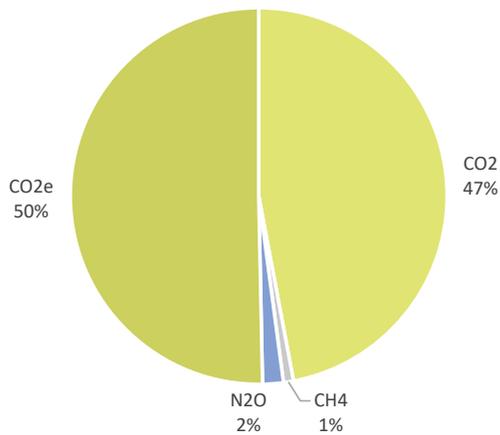


Figure 5 - GHG Emissions by GHG Species

Finally, Figure 5 shows that almost all of our emissions were released as CO₂.

Note that emissions associated with electricity consumption and air travel are calculated directly as 'CO₂e' (carbon dioxide-equivalents).



Our 2019 carbon footprint
was 1.78 tonnes CO₂e.

Our Emission Reductions

Firefly has already implemented a number of projects to reduce our carbon footprint. These actions reduced our footprint by 0.15 tonnes CO₂e. In addition, Firefly voluntarily purchased 100%, ECO Logo-certified green electricity. This offset a further 0.39 tonnes CO₂e of our footprint. In total, our 2019 footprint was 0.54 tonnes CO₂e smaller than it would have been - a saving of 28%.



Our office is not sub-metered and so changes to energy consumption at the office cannot be explicitly quantified. However, the following emission reduction actions were taken at the office in 2019, which will have reduced emissions associated with electricity consumption, space heating and the use of domestic hot water.

Energy efficient office retrofit - Firefly's office underwent an extensive retrofit during October and November 2019. Two windows were added to the space to allow natural daylight in, and the internal walls, ceiling and lights were completely replaced. Firefly chose to install triple glazed, low-e, argon filled windows; installed wall and ceiling insulation where previously there was none, and specified LED lighting.

Reduced hot water tank temperature setpoint - in August 2019, Firefly reduced the setpoint on the domestic

hot water tank from 65 C to 60 C (the minimum safe temperature, which kills *legionella* bacteria).



Several actions have been taken to reduce **our corporate travel** footprint. The impact of these actions has been calculated based on known travel distances.



Electric vehicle - up until August 2019, the main vehicle which Firefly had access to for business travel was a gasoline-powered 2015 Toyota RAV4.

This has now been replaced by a 2015 Chevrolet Spark EV, which is currently charged from the Alberta electricity grid.

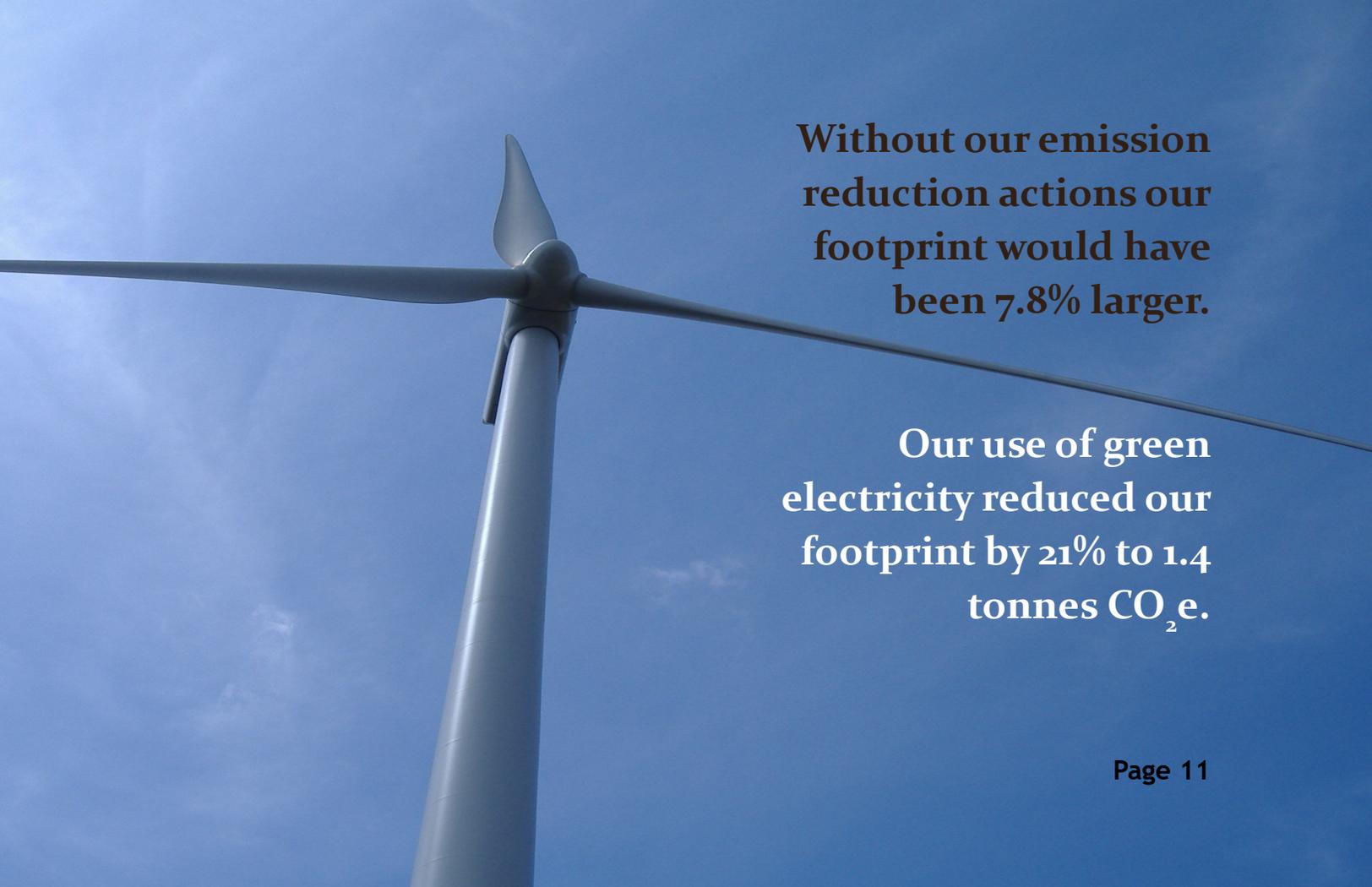
In total, 320.6 business kms were travelled in the Spark in 2019, avoiding ~0.09 tonnes CO₂e.

Making low carbon travel choices - In 2019, Firefly attended a conference in Edmonton, which is >300kms from Calgary. Firefly elected to travel using the Red Arrow long-haul bus service instead of flying and using taxis. This reduced our footprint by ~0.06 tonnes CO₂e. Firefly also attended meetings in downtown Calgary by bus or cycling

wherever possible. However, as this was not tracked during 2019, the impact cannot be quantified. This is an area for improvement in future inventories.

In total, our actions reduced our footprint by 0.15 tonnes of CO₂e, so that our 2019 carbon emissions were 7.8% lower than they would otherwise have been.

In addition to these direct emission reduction actions, Firefly also elected to pay a premium to purchase 100% ECO Logo-certified green electricity. This further reduced our footprint by 0.39 tonnes CO₂e.



Without our emission reduction actions our footprint would have been 7.8% larger.

Our use of green electricity reduced our footprint by 21% to 1.4 tonnes CO₂e.

Our Target & Action Plan

Completing our first corporate GHG inventory is only the first part of our journey. The science of climate change is clear, and the Intergovernmental Panel on Climate Change (IPCC) has calculated that the world needs to move to net zero GHG emissions by 2050 in order to limit global average temperature rise to 1.5 degrees C and therefore avoid the worst impacts of climate change. We are determined to do our part.



**Firefly will
achieve net zero
emissions from
2020 onwards**

To achieve this, we will:

- *Avoid and/or reduce travel-related emissions* - we have most control over our travel footprint and will focus our reduction and avoidance activities in this area by choosing low or no carbon travel options (our EV, long-haul bus travel, bicycles) or arranging alternatives to travel such as video conferencing.

- *Use green electricity* - we will continue to purchase 100% ECO Logo certified green electricity, ensuring that all of our electricity consumption is matched by 100% green electricity production, and
- *Purchase high-quality emission offsets* - for emissions that we cannot reduce we will purchase high-quality, third-party verified emission offsets.

However, our preference is to reduce or avoid our emissions wherever possible. During 2020, we will therefore work with the owner of our office heating, power and DHW systems to explore the following low- and no-carbon alternatives:

- Solar Photovoltaics (PV),
- Air Source Heat Pump (ASHP) and
- Solar Thermal.



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