GHG Inventory

Exploration at McIlvenna Bay

2011 to 2020

FORAN MINING CORPORATION

Prepared For	Foran Mining Corporation
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Completed	4/15/2021

synergy

About This Report

This report measures greenhouse gas (GHG) emissions from mineral exploration activities at Foran Mining Corporation's ("Foran") wholly owned flagship asset, McIlvenna Bay. McIlvenna Bay is the largest undeveloped copper-zinc VMS deposit along the prolific Flin Flon Greenstone Belt, located in mining friendly Saskatchewan, and the site will be home to the world's first carbon neutral copper mine.

As Foran develops the Feasibility Study for McIlvenna Bay, the company is focused on securing clean power and electrifying equipment so as to avoid as many emissions as possible. In addition and to account for unavoidable emissions from historical activity, Foran intends to use this GHG inventory to purchase verified carbon offsets and achieve carbon neutrality for the last ten years of exploration.

Inventory Information

Company Name	Foran Mining Corporation		
Company Description	Foran Mining Corporation is a copper-zinc exploration and development company headquartered in Vancouver, Canada and listed on the TSX-V under the trading symbol FOM. Led by a management team with a proven record of adding shareholder value and taking projects to production, the Company is focused on advancing its flagship asset McIlvenna Bay to production.		
Contact Information	Mona Forster	mforster@foranmining.com	778-688-0389
Temporal Boundary	January 1st, 2011 to December 31st, 2020 Justification: 2011 marks the beginning of new company management at Foran.		
Geographic Boundary	The McIlvenna Bay site, a 20,382 hectare property located in east-central Saskatchewan, approximately 65 km west of Flin Flon, Manitoba.		
Organizational Boundary	All emissions associated with exploration activities at McIlvenna Bay. Does not include emissions associated with Foran's other properties.		
Consolidation Approach	Operational Control: Accounting for 100% of emissions from operations over which the company has operational control.		
Emission Sources (Operational Boundary)	**Scope 1 (Direct Emissions)** - Aviation Gas, Gasoline, Propane, Diesel, Land Use Changes		
	Scope 2 (Indirect Emissions from Purchased Electricity) - N/A		
	Scope 3 (Indirect Emissions from Other Sources) - Company Travel		
Excluded Emission Sources	Purchased Electricity Justification: The McIlvenna Bay site has an existing 1.2 MVA power line, however it was de-activated over the period covered by this inventory.		
	Energy, Paper & Waste from Foran's Vancouver Office Justification: Emissions were estimated and proved de minimis.		
	Third Party Shipments to/from the McIlvenna Bay Camp Justification: Emissions were estimated and proved de minimis.		
GHGs Measured	Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O)		
Primary Measurement	Carbon Dioxide Equivalent (CO_2e)		
Reporting Guidelines	Aligned with those defined in *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, Revised Edition.*		

Inventory Results

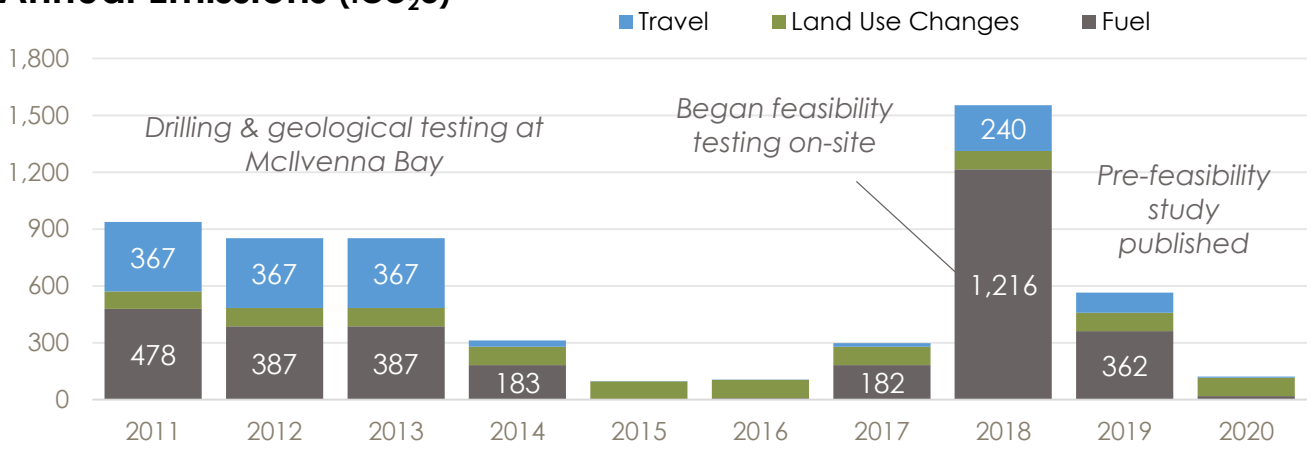
Total emissions from exploration activities at McIlvenna Bay over the last ten years come to 5,745 tonnes of carbon dioxide equivalent (tCO_2e).

The majority of emissions (56%) come from fuel, which is used for power generation, drilling equipment, vehicles and camp heating. Business travel to and from camp is the second largest emission source (26%), followed by land use changes related to forest clearing for camp and access roads (17%).

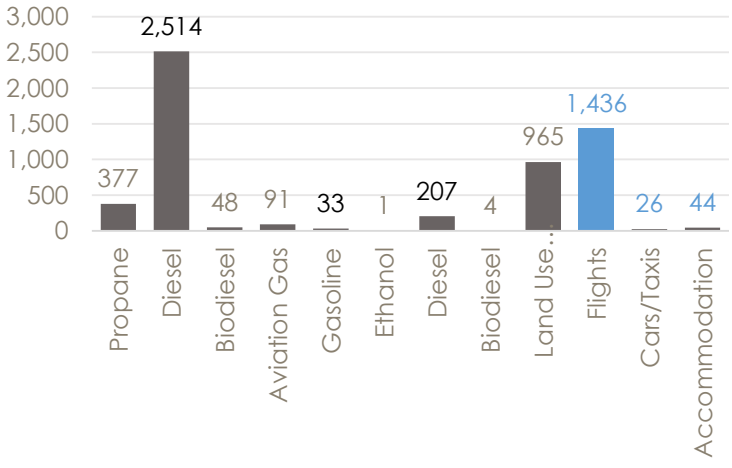
Emissions are highest in 2018, when feasibility testing began in anticipation of the publication of the pre-feasibility study.

Year	Emissions (tCO_2e)	%
2011	943.4	16%
2012	857.4	15%
2013	857.4	15%
2014	315.0	5%
2015	97.4	2%
2016	105.2	2%
2017	301.0	5%
2018	1,575.3	27%
2019	570.6	10%
2020	122.4	2%
Total:	**5,745.0**	**100%**

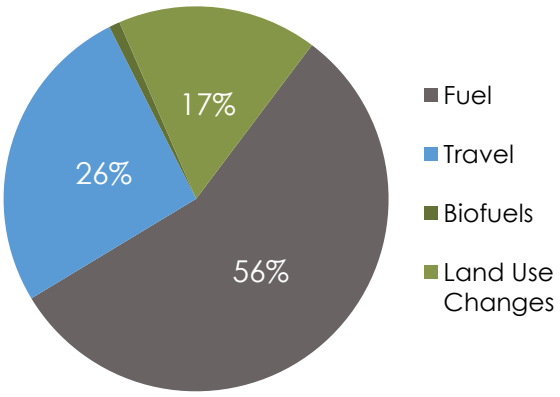
Annual Emissions (tCO_2e)



Emissions by Activity (tCO_2e)



Emissions by Source (%)



Scope 1 | **Scope 2** | **Scope 3** | **Biogenics**

1,301,508 **Litres of Fuel**

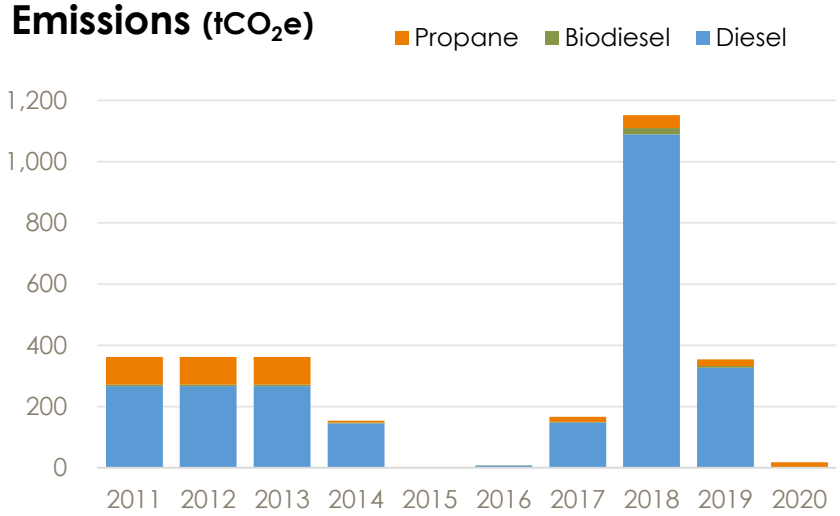
4.29 **Hectares Cleared**

6,801,058 **Passenger-kms**

5,745 **Tonnes of CO2e**

Fuel for Stationary Equipment

Emissions (tCO_2e)



Analysis

Fuel use for stationary equipment accounted for 2,939 tCO_2e, just over half of the total.

Without an activated power line, Foran relies on diesel generators for site power. Diesel is also used for other stationary equipment including drills, frost fighters, and pumps. Propane is used for heating & hot water.

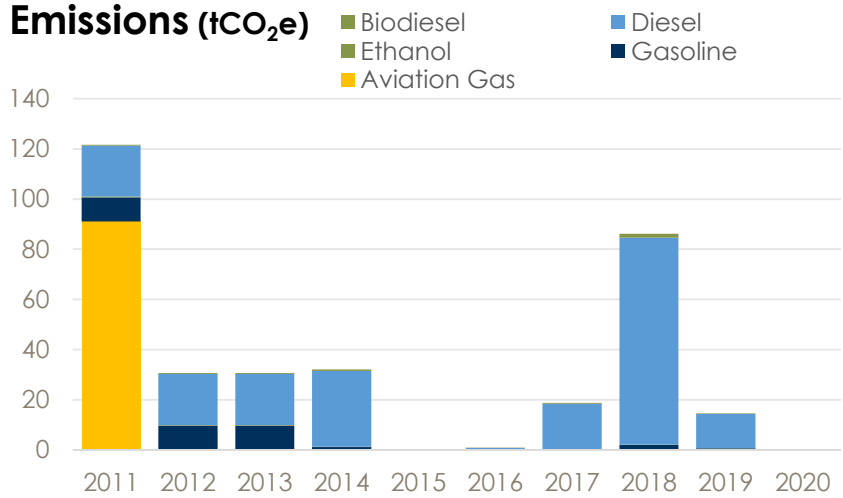
Foran is working to secure clean electrical power to reduce emissions from stationary equipment.

** Note: 2011-2013 emissions have been averaged, as activity data was only available in one lump sum. Biodiesel is recorded with biogenic emissions, separate from Scope 1, and are not offset.*

Avg. L/Yr	26,400	9,270 Barrels of Oil	% of Total	51.2%	tCO_2e	2,939

Fuel for Mobile Equipment

Emissions (tCO_2e)



Analysis

Fuel use for mobile equipment accounted for 336 tCO_2e, or 5.8% of the total inventory.

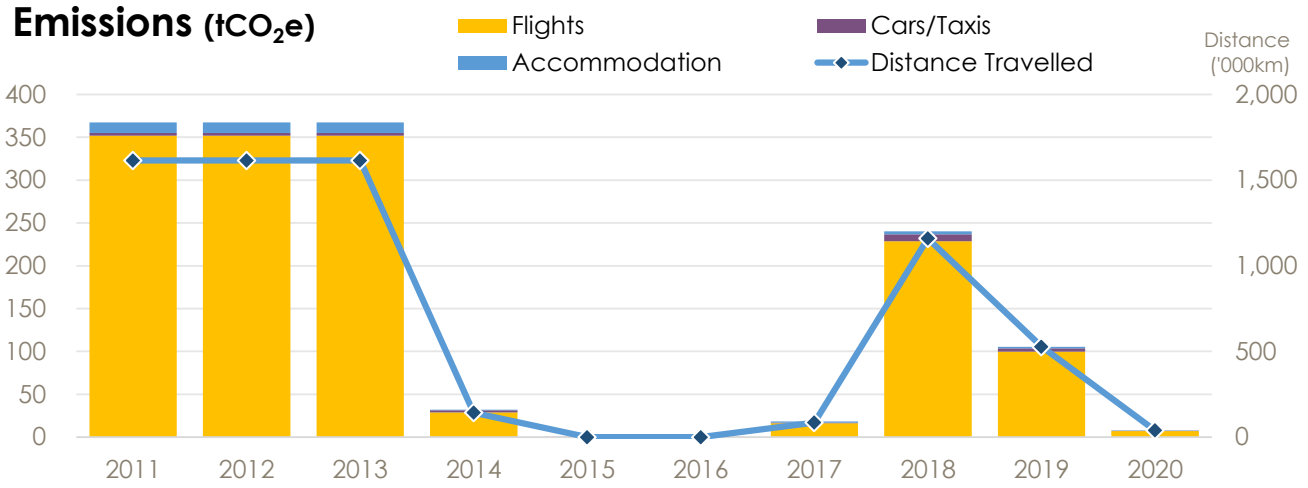
Mobile equipment includes cats, skidders, tractors and trucks. In 2011, Foran completed a helicopter-borne geophysical survey of the site that resulted in emissions from aviation gas.

Foran is developing partnership with OEMs that are producing BEV mobile equipment.

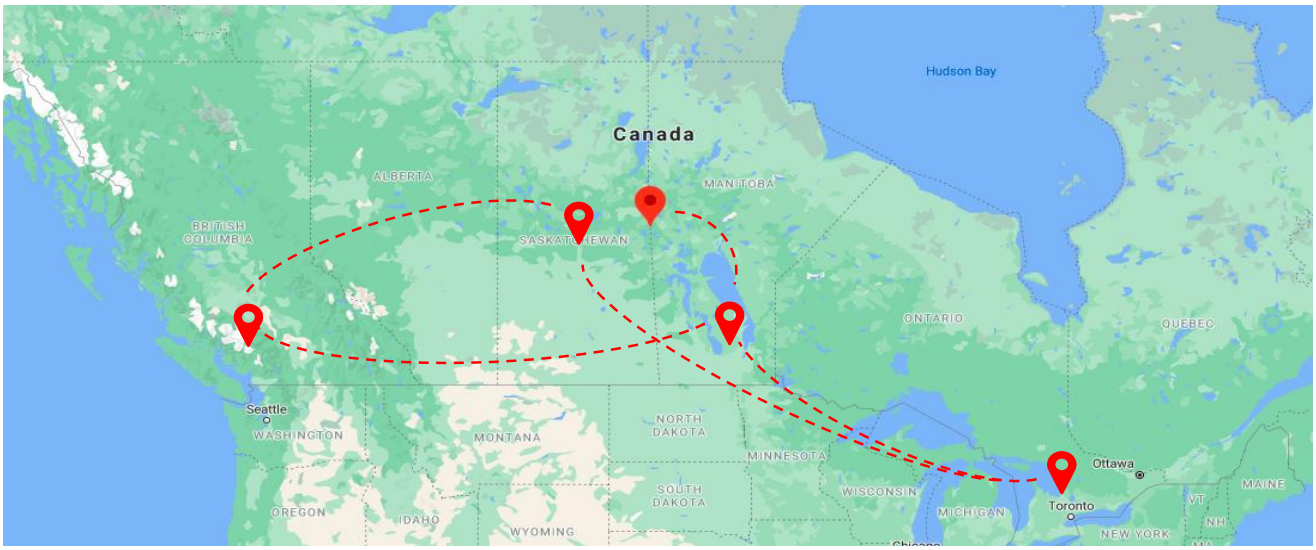
** Note: With the exception of aviation gas, 2011-2013 emissions have been averaged, as activity data was only available in one lump sum. Biodiesel & ethanol are recorded with biogenic emissions, separate from Scope 1, and are not offset.*

Avg. L/Yr	3,797	1,059 Barrels of Oil	% of Total	5.8%	tCO_2e	336

Company Travel



** Note: 2011-2013 emissions have been averaged, as activity data was only available in one lump sum.*



Analysis

Over the last ten years, Foran team members took over 5,000 flights to and from the McIlvenna Bay site, resulting in 1,436 tCO_2e. When emissions from accommodations, taxis and employee mileage are included, emissions from travel total 1,506 tCO_2e and account for 26% of the total inventory.

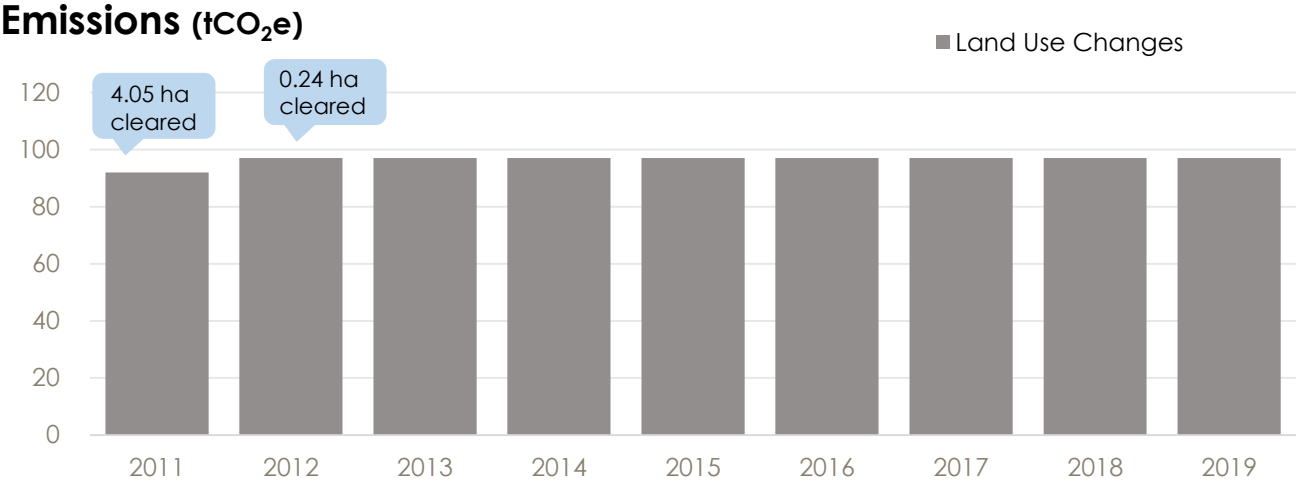
Common flight routes included Vancouver or Toronto to Saskatoon or Winnipeg, and Winnipeg to Flin Flon.

Travel was most intensive in the early years of exploration (2011 to 2013), but peaked again when the pre-feasibility drill program began in 2018.

Avg. tCO_2e / Yr	151
386 Cars / Year	
% of Total	26.2%
tCO_2e	1,506

Land Use Changes

Emissions (tCO_2e)



** Note: Land cleared prior to Foran's purchase of the site has not been included in this inventory as it is out of scope.*

Food and Agriculture Organization of the United Nations

EX-Ante Carbon-balance Tool | EX-ACT

Climate:	Boreal
Moisture Regime:	Moist
Soil Type:	HAC Soils
Forest Type:	Boreal coniferous

Analysis

In order to establish a work camp at McIlvenna Bay, Foran cleared a total of 4.29 hectares of boreal coniferous forest for the access road, the camp pad and the wastewater lagoon.

Total emissions from land clearing are 965 tCO_2e, or 17% of the total inventory. As McIlvenna Bay will be an underground mine with a dry tailings management facility,, Foran will avoid significant deforestation once mine development begins. The company is exploring additional ways to restore the site during the closure phase.

Emissions from land use changes were calculated using the Food and Agriculture Organization of the United Nation's EX-Ante Carbon-balance tool using the inputs listed above. For more information on this tool, please visit:
http://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/456265/

Hectares Cleared	4.29
247 Cars / Year	
% of Total	16.8%
tCO_2e	965

Methodology

Synergy completed a thorough analysis of the carbon footprint of the McIlvenna Bay mine site exploration, following the GHG Protocol Corporate Accounting Standard. As this was a historical analysis, some estimations were required where complete data was not available. In these instances, estimates were always conservative; in other words, all potential errors are over-estimates.

Foran Mining provided financial records from 2011-2020 for all purchases connected to travel, fuel and equipment, Pre-Feasibility and Feasibility work. The first task was determining which data was relevant to the carbon footprint, so all entries were reviewed and sorted into the following categories: Fuel (diesel, propane, jet fuel, gasoline), Airfare, Reimbursed Mileage, Taxis, Car Rentals, Accommodations, and Excluded.

Data was excluded if it did not directly generate carbon emissions: meals and entertainment, parking, vehicle maintenance and equipment purchases, baggage and seat selection fees. Expenses from the Bigstone, Balsam and Comeback Bay exploration activities were not included, as they are not related to the McIlvenna Bay project. All Pre-Feasibility and Feasibility engineering and design services were excluded, although travel from contractors hired to complete that work was included. Airfare charges under $100 were assumed to be baggage or seat selection fees, and any charge under $20 was de minimis.

All data was sorted by year of purchase. Fuel data was divided into stationary and mobile use based on equipment lists and utilization estimates previously conducted by Foran in relation to the Saskatchewan Fuel Tax Rebate. The total reimbursed kilometers were used to estimate the fuel consumed, based on the average fuel efficiency of a light truck (from US EPA data 2011-2019). It was assumed that most employees who submitted a mileage claim were operating a personal vehicle (gasoline most common), and many likely driving a truck due to the nature of Foran's work.

Emissions calculations were completed using the appropriate emissions factor. See pages 8 & 9 for the complete list of emissions factors used.

Data Limitations, Estimates & Assumptions

Diesel
When total Liters not included in purchase description, used avg. $/L in Winnipeg & Saskatoon to calculate Liters purchased from financial records

Gasoline
Used annual avg. $/L in Winnipeg & Saskatoon to calculate Liters purchased from financial records

Source: StatsCan Avg. Retail Prices for Gasoline & Diesel

Land Use Changes
Emissions from land use changes were calculated using the Food and Agriculture Organization of the United Nation's EX-Ante Carbon-balance tool

Travel - Flights
-all unknown flight paths assumed YVR to Flin Flon
-Used avg. flight cost to determine # passengers per flight expense entry - likely overestimated as some costs likely inc. fees, last-minute high-cost flights, etc.

Propane
When total Liters not included in purchase description, used avg. $/L in Winnipeg per year

Source: NRCAN Weekly Avg. Retail Prices for Auto Propane

Other Fuel
-Jet Fuel assumed to be aviation gasoline
-"Oil" purchases were lubricants for machinery, not combusted (excluded)

Travel - Accomodations
-When location not included in entry description, assumed to be Saskatoon
-# of nights/stay calculated by avg. cost/night in SK

Travel - Taxis, Rental Cars and Mileage
-Total km traveled by taxi high estimate based on avg. $/km rate (did not remove base fees, etc.)
-Rental cars: assumed 1 tank fuel used for each rental, other fuel purchases included in Scope 1

Emissions Factors

Stationary Combustion

	Year	$kgCO_2e/L$	Reference
Diesel	2011	**2.679**	2011 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 9 Table 2
	2012	**2.679**	2012 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 12 Table 2
	2013	**2.679**	2013 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 12 Table 2
	2014 - 2015	**2.679**	2014 & 2015 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 12 Table 2
	2016	**2.705**	2016/17 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 12 Table 2
	2017	**2.705**	2017 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 14 Table 2
	2018 - 2020	**2.705**	2018 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 14 Table 2
Propane	2011	**1.539**	2011 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 9 Table 2
	2012	**1.539**	2012 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 12 Table 2
	2013	**1.536**	2013 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 12 Table 2
	2014 - 2015	**1.536**	2014 & 2015 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 12 Table 2
	2016	**1.544**	2016/17 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 12 Table 2
	2017	**1.544**	2017 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 14 Table 2
	2018 - 2020	**1.544**	2018 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 14 Table 2

Mobile Combustion

	Year	$kgCO_2e/L$	Reference
Gasoline	2011	**2.449**	NIR (Part 2) 1990-2011: GHG Emission Sources and Sinks, Pg. 198 Table A8-11
	2012	**2.449**	NIR (Part 2) 1990-2012: GHG Emission Sources and Sinks, Pg. 188 Table A8-11
	2013	**2.476**	NIR (Part 2) 1990-2013: GHG Emission Sources and Sinks, Pg. 199 Table A6-11
	2014	**2.447**	NIR (Part 2) 1990-2014: GHG Emission Sources and Sinks, Pg. 198 Table A6-12
	2015	**2.476**	NIR (Part 2) 1990-2015: GHG Emission Sources and Sinks, Pg. 240 Table A6-12
	2016	**2.467**	NIR (Part 2) 1990-2016: GHG Emission Sources and Sinks, Pg. 216 Table A6-12
	2017	**2.467**	NIR (Part 2) 1990-2017: GHG Emission Sources and Sinks, Pg. 226 Table A6.1-13
	2018 - 2020	**2.467**	NIR (Part 2) 1990-2018: GHG Emission Sources and Sinks, Pg. 226 Table A6.1-13
Ethanol	2011	**0.160**	2011 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 18 Table 7
	2012	**0.160**	2012 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 21 Table 7
	2013	**0.160**	2013 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 22 Table 7
	2014 - 2015	**0.131**	2014 & 2015 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 22 Table 7
	2016	**0.160**	2016/17 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 22 Table 7
	2017	**0.160**	2017 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 24 Table 7
	2018 - 2020	**0.160**	2018 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 24 Table 7
Diesel	2011	**2.706**	NIR (Part 2) 1990-2011: GHG Emission Sources and Sinks, Pg. 198 Table A8-11
	2012	**2.706**	NIR (Part 2) 1990-2012: GHG Emission Sources and Sinks, Pg. 188 Table A8-11
	2013	**2.733**	NIR (Part 2) 1990-2013: GHG Emission Sources and Sinks, Pg. 199 Table A6-11
	2014	**2.733**	NIR (Part 2) 1990-2014: GHG Emission Sources and Sinks, Pg. 198 Table A6-12
	2015	**2.733**	NIR (Part 2) 1990-2015: GHG Emission Sources and Sinks, Pg. 240 Table A6-12
	2016	**2.724**	NIR (Part 2) 1990-2016: GHG Emission Sources and Sinks, Pg. 216 Table A6-12
	2017	**2.724**	NIR (Part 2) 1990-2017: GHG Emission Sources and Sinks, Pg. 226 Table A6.1-13
	2018 - 2020	**2.724**	NIR (Part 2) 1990-2018: GHG Emission Sources and Sinks, Pg. 226 Table A6.1-13

Emissions Factors (cont'd)

Mobile Combustion (cont'd)

	Year	$kgCO_2e/L$	Reference
Biodiesel	2011	**0.043**	2011 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 18 Table 7
	2012	**0.043**	2012 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 21 Table 7
	2013	**0.043**	2013 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 22 Table 7
	2014 - 2015	**0.043**	2014 & 2015 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 22 Table 7
	2016	**0.043**	2016/17 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 22 Table 7
	2017	**0.043**	2017 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 24 Table 7
	2018 - 2020	**0.043**	2018 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 24 Table 7
Av Gas	2011	**2.554**	NIR (Part 2) 1990-2011: Greenhouse Gas Emission Sources and Sinks, pg 198 Table A8-11
	2012	**2.554**	NIR (Part 2) 1990-2011: Greenhouse Gas Emission Sources and Sinks, pg 198 Table A8-12
	2013	**2.554**	NIR (Part 2) 1990-2011: Greenhouse Gas Emission Sources and Sinks, pg 198 Table A8-13

Flights

	KgCO2e/psg-km (includes radiative forcing)								
Flight Type	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Short Haul (<463km)	**0.34387**	**0.3266**	**0.29316**	**0.29795**	**0.27867**	**0.26744**	**0.29832**	**0.25493**	**0.2443**
Medium (463-1108km)	**0.196299**	**0.1925**	**0.16625**	**0.16972**	**0.16844**	**0.16103**	**0.16236**	**0.15832**	**0.1555**
Long Haul (>1108km)	**0.224606**	**0.2265**	**0.2102**	**0.19813**	**0.19162**	**0.19745**	**0.21256**	**0.19562**	**0.1909**
Reference	UK DEFRA Emissions Factors, Business Travel - Air Tab (published each year, starting in 2012)								

Other Travel

	Year	$kgCO_2e/km$	Reference
Taxi - Gasoline	2011	**0.238**	2011 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 22 Table 10
	2012	**0.238**	2012 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 25 Table 10
	2013	**0.240**	2013 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 26 Table 10
	2014-2015	**0.239**	2014 & 2015 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 26 Table 10
	2016	**0.216**	2016/17 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 26 Table 10
	2017	**0.216**	2017 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 50 Table 24
	2018 - 2020	**0.216**	2018 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 50 Table 24
	$kgCO_2e$/room night		**Reference**
Accommodations	2011-2013	**31.150**	2015 Cornell Hotel Benchmark Sustainability Tool (2013 data set) - 'AB Province' Mean
	2014	**12.610**	2014 & 2015 BC Best Practices Methodology for Quantifying GHG Emissions, pg. 29 Table 12
	2014	**31.150**	2016 Cornell Hotel Benchmark Sustainability Tool (2014 data set) - 'AB Province' Mean
	2017	**35.110**	2019 Cornell Hotel Benchmark Sustainability Tool (2017 data set) - 'AB Province' Mean
	2018-2019	**7.700**	2020 Cornell Hotel Benchmark Sustainability Tool (2018 data set) - 'Toronto' Mean
	2018-2020	**31.210**	2020 Cornell Hotel Benchmark Sustainability Tool (2018 data set) - 'AB Province' Mean

Global Warming Potential (GWP)

Common Name	Formula	GWP (AR5)
Carbon Dioxide	CO_2	1
Methane	CH_4	28
Nitrous Oxide	N_2O	265

Emissions factors have been reviewed and approved by:

carbonzero

Emissions References

1. 2011/18 B.C. Best Practices Methodology for Quantifying Greenhouse Gas Emissions
http://www2.gov.bc.ca/gov/content/environment/climate-change/policy-legislation-programs/carbon-neutral-government/measure

2. Environment Canada's National Inventory Report (1990-2020); Part 2 & 3.
http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/can-2017-nir-13apr17.zip

3. Department for Environment, Food & Rural Affairs (UK) Carbon Factors
https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017

4. Intergovernmental Panel on Climate Change (Global Warming Potentials)
http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html

Policy for Base Year Recalculation:
Base year emissions, and other previous emissions, shall be retroactively recalculated if a change in organizational structure or data quality is expected to exceed a significance threshold of 10% of base year emissions. These changes may arise from structural changes such as mergers, acquisitions, divestments, outsourcing or insourcing, changes in calculation methodology and improvements in accuracy, or discovery of significant errors.

Glossary of Terms

Term	Description
GHG	**Greenhouse Gas (emissions):** Atmospheric gasses contributing to the greenhouse effect, including Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O), etc.
GJ	**Gigajoule**: Unit of natural gas equal to 26.137 m^3 or 0.947 MMBtu
kWh	**Kilowatt-Hour**: Common unit for measuring electrical consumption
L	**Litres**: Unit of measurement, typically for fuel volumes
psg-km	**Passenger-Kilometer**: Unit separating total emissions between passengers per km
tCO_2e	**Tonnes of Carbon Dioxide Equivalent**: GHGs have different warming potentials, measured collectively as CO_2 equivalent (hence "e")
t-km	**Tonne-kilometer**: A unit of measurement used in shipping
BEV	**Battery Electric Vehicle**: A vehicle that runs on battery electric power.

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