



CORE
GEOSCIENCE
SERVICES

NET ZERO CHALLENGE

PRELIMINARY NET ZERO PLAN

November 2024

Prepared for:

**Environment and Climate
Change Canada**

LIST OF ACRONYMS

CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide equivalent
CoreGeo	Core Geoscience Services Inc.
EPA	United States Environmental Protection Agency
GHG	Greenhouse Gases
GHGRP	Greenhouse Gas Reporting Program
SME	Small- or Medium-Sized Enterprise

TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	ADMINISTRATIVE INFORMATION	1
1.2	NET ZERO TARGET.....	1
2	BASELINE GREENHOUSE GASES INVENTORY	2
2.1	METHODS.....	2
2.2	INVENTORY BOUNDARIES.....	2
2.2.1	<i>Geographical Boundaries</i>	2
2.2.2	<i>Organizational Boundaries</i>	2
2.2.3	<i>Emissions Scopes</i>	3
2.3	EMISSIONS SOURCES	3
2.3.1	<i>Scope 1 Emissions</i>	3
2.3.2	<i>Scope 2 Emissions</i>	4
2.3.3	<i>Scope 3 Emissions</i>	5
2.4	SUMMARY	6
3	REFERENCES	7

LIST OF TABLES

Table 2-1: CoreGeo’s GHG Emissions for the 2023-2024 Fiscal Year.....	6
---	---

1 INTRODUCTION

Core Geoscience Services Inc. (CoreGeo), a Yukon-owned environmental consulting firm, specializes in projects tailored for northern climates, including environmental assessments, contaminated site services, and regulatory support. CoreGeo's commitment to environmental stewardship aligns with its participation in Canada's Net-Zero Challenge. This plan outlines CoreGeo's commitment to achieving net-zero Scope 1 and Scope 2 emissions, by 2050, focusing on mobile sources and electricity consumption within its operational boundaries. CoreGeo is also including the most relevant Scope 3 category (business travel) in its inventory and net zero plan.

1.1 ADMINISTRATIVE INFORMATION

- **Company Name:** Core Geoscience Services Inc.
- **Participation Stream:** Stream 3 (All other companies, including small- and medium-sized enterprises)
- **Small- or Medium-Sized Enterprise (SME):** Yes
 - **Number of Employees:** 24
 - **Parent Company:** None
- **Canadian-Based:** Yes
 - **Subsidiary in Canada:** n/a
- **Government Reporting Requirements:** Core Geoscience Services Inc. does not have any facilities reporting to the Government of Canada's Greenhouse Gas Reporting Program (GHGRP).
- **Net-Zero Plan Scope:** Canadian-specific
- **Contact:** info@coregeo.ca | (867) 336-2673

Core Geoscience Services Inc. operates from its headquarters in Whitehorse, Yukon, and serves northern Canadian regions with a commitment to sustainability.

1.2 NET ZERO TARGET

CoreGeo is targeting net-zero emissions for its direct operations (aggregated Scope 1 and Scope 2) and the most relevant (disaggregated) Scope 3 category by 2050, in accordance with Canada's Net-Zero Challenge. This target encompasses operational emissions associated with mobile equipment, electricity use across all CoreGeo sites and business travel.

2 BASELINE GREENHOUSE GASES INVENTORY

2.1 METHODS

To establish an accurate baseline greenhouse gas (GHG) inventory, CoreGeo followed a methodology based on the Greenhouse Gas Protocol, supplemented by the U.S. Environmental Protection Agency (EPA) Simplified GHG Emissions Calculator (EPA, 2023). The calculator tool is designed as a simplified calculation method to help organizations estimate and inventory their annual greenhouse gases emissions and is based on the most current Center for Corporate Climate Leadership Greenhouse Gas inventory Guidance Documents and the Emission Factor Hub. There are three primary steps in completing a GHG inventory. Each emission source also has these three steps.

- (1) **DEFINE:** The first step in completing a GHG inventory is to determine the boundaries and emissions sources included within those boundaries. After having defined organizational and operational boundaries, determine which emissions sources are relevant to the business.
- (2) **COLLECT:** The second step is to collect data for the defined annual period. The EPA Calculator has help sheets with suggestions and guidance for each emissions source and a general help sheet for data management.
- (3) **QUANTIFY:** The third step is to calculate emissions. The EPA Calculator is designed to complete the emissions quantification step. Once the user enters data in this MS Excel spreadsheet, the emissions will be calculated and totaled on the "Summary" sheet.

CoreGeo chose the most recent complete fiscal year (March 1, 2023 to February 29, 2024) as its baseline year for GHG inventory.

2.2 INVENTORY BOUNDARIES

2.2.1 Geographical Boundaries

Since CoreGeo is a Canadian-based company and operates exclusively in Canada, its net-zero target and plans are inherently Canadian-specific. This aligns with the Challenge's recommendation that participating companies concentrate on developing domestic net-zero strategies, contributing to the collaborative push toward a low-carbon future in Canada.

2.2.2 Organizational Boundaries

The emissions inventory covers CoreGeo's direct operations, including offices, project sites, and mobile operations, ensuring that activities directly managed by CoreGeo are included.

2.2.3 Emissions Scopes

CoreGeo chose to include the following emissions scopes in its inventory:

- **Scope 1:** Emissions from sources that are owned and controlled by the company;
- **Scope 2:** Indirect emissions from electricity, heating, cooling or steam that a company purchases for its own use; and
- **Scope 3:** Indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions. CoreGeo chose to include the single most relevant scope 3 emissions category, namely business travel.

2.3 EMISSIONS SOURCES

2.3.1 Scope 1 Emissions

Scope 1 emissions include:

- **Stationary Combustion:** Facilities that burn fuels on-site (e.g. natural as, propane, coal, fuel oil for heating, diesel fuel for backup generators, biomass fuels);
- **Mobile Sources:** Vehicles falling within the organization boundary, i.e. owned by the company (e.g. cars, trucks, propane forklifts, aircrafts, boats);
- **Refrigeration and Air Conditioning:** Refrigeration or air conditioning equipment (gas) used by the company;
- **Fire Suppression:** Chemical suppressants used by the company; and
- **Purchased Gases:** Industrial gases purchased for use in the business (e.g. for manufacturing, testing or laboratories).

In the case of CoreGeo, only mobile sources are applicable under Scope 1. During the 2023-2024 fiscal year, CoreGeo owned two pickup trucks (a 2021 Toyota Tundra and a 2023 Toyota Tundra), and a 2008 Toyota Matrix. CoreGeo occasionally used rental vehicles (pickup trucks) or employees' personal vehicles in addition to company vehicles. CoreGeo also owned two ATVs and one snowmobile.

Emissions relative to mobile sources were inventoried by compiling all gas receipts for the year. The average gas price of \$1.7844/L (Yukon Bureau of Statistics, 2024) was used to convert gas expenses into liters and an emission factor of 2.3 kg of CO₂ per liter (NRCan, 2014) was used to calculate emissions. This includes emissions from all company owned and rental vehicles. Note that a very small fraction of

purchased fuel would have been used for the company owned Yamaha 2000-watt gas generator but is insignificant compared to fuel used by vehicles.

For employees' personal vehicles, total mileage was compiled for the 2023-2024 fiscal year. Average fuel consumption of 10 L/100 km (NRCan, 2022) was used to convert total mileage in liters and the same factor of 2.3 kg of CO₂ per liter was used to calculate emissions.

Total Scope 1 emissions for the fiscal year 2023-2024 are estimated at **26,916 kg** of CO₂.

2.3.2 Scope 2 Emissions

Scope 2 emissions include:

- Electricity: Facilities that use electricity
- Steam: Steam purchased for heating or cooling the company's facilities

CoreGeo only uses electricity (no steam) at three locations:

- The Whitehorse office
- The Whitehorse field room
- The Little Fox Lake air quality monitoring station

Electricity bills for those three locations were compiled for the fiscal year 2023-2024 and the greenhouse gas intensity of Yukon's electricity grid, measured as the GHGs emitted in the generation of the territory's electric power of 70 grams of CO₂e per kWh electricity generated in 2022 (Canada Energy Regulator, 2024), was used to calculate resulting emissions.

Whitehorse Office

The Whitehorse Office comprises rented office space in two units on the second floor of a multi-unit building in the downtown area. The two combined units total approximately 2437 square feet. Since electricity is included within rent, an alternative approach using an online energy use calculator, based on Yukon Rates ([Energy calculator | inCharge Yukon](#)), was used to estimate Whitehorse Office energy usage. The following energy using appliances were assumed, based on current office occupancy and use:

- Heating & cooling based on square footage – 1188 kWh/month
- Office appliances:
 - 9 laptop computers – 710 kWh/month
 - 1 laser printer/multifunction device – 9 kWh/month
- Lighting – 48 CFL/LEDs – 750 kWh/month

Whitehorse Office Total – 2657 kWh/month

Whitehorse Field Room

The Whitehorse field room comprises a converted garage building in the downtown area. The space totals approximately 400 square feet. Since electricity is included within rent, an alternative approach using an online energy use calculator, based on Yukon Rates ([Energy calculator | inCharge Yukon](#)), was used to estimate Whitehorse Office energy usage. The following energy using appliances were assumed, based on current office occupancy and use:

- Heating & cooling occasional seasonal use – 20 kWh/month
- Lighting – 8 CFL/LEDs – 203 kWh/month

Whitehorse Field Room Total – 223 kWh/month

Little Fox Lake Air Quality Monitoring Station

The Little Fox Lake air quality monitoring station is operated on behalf of Environment and Climate Change Canada and comprises a small building with scientific monitoring equipment. Energy is supplied directly by Yukon Energy Corp, and total energy use total was 5694 kWh for the full year for an average of 474.5 kWh/month.

Using the numbers above, the total energy use at the 3 locations for the fiscal year 2023-2024 was estimated at 40,254 kWh. When multiplied by the greenhouse gas intensity of the Yukon grid of 70 grams of CO₂e per kWh electricity generated, total Scope 2 emissions for the fiscal year 2023-2024 are estimated at **2,818 kg** of CO₂e.

2.3.3 Scope 3 Emissions

Scope 3 emissions include:

- Business Travel: Employees traveling for business using transportation other than owned or leased vehicles (e.g., commercial airline flights, rental cars, trains);
- Employee Commuting: Employees commuting to work in personal vehicles or public transportation;
- Upstream Transportation and Distribution: Other companies hired to transport products or other materials to or from the company's facilities;
- Waste Generated in Operations: Waste generated that is disposed of in a facility owned by another organization; and
- Offsets: Purchased GHG offsets.

The most relevant Scope 3 category for CoreGeo is business travel. Emissions in this category were estimated by compiling all flights used by CoreGeo staff for business during the 2023-2024 fiscal year. The aircraft type, flight times and passenger count for each flight were tabulated. The fuel burned per hour for each aircraft type was estimated based on emissions factors from the literature (Abbott, 2023; Flex Air Flight School, 2024; Airliners.net, 2024). Total fuel burned was estimated based on flight time and prorated by passenger. CO₂e emissions were then estimated using an emissions factor of 3.16 kg of CO₂e per kg of jet fuel combusted (ICAO, 2017).

CoreGeo’s Scope 3 emissions for the business travels category and the fiscal year 2023-2024 were **3,117 kg** of CO₂e.

2.4 SUMMARY

Disaggregated and aggregated results are presented in Table 2-1 below. CoreGeo’s combined Scope 1 and Scope 2 emissions for the fiscal year 2023-2024 were 29,734 kg CO₂e. When including business travel (Scope 3), the total is 32,851 kg CO₂e. The average Small and medium-sized enterprise (SME) in Canada, which would include small environmental consulting firms, produces an estimated average of 165 tonnes of CO₂ equivalent per business annually, which likely include Scope 1 and 2 emissions mainly. (BDC, 2024) Due to the nature of its services, an environmental consulting company’s emissions are expected to be lower than the average SME.

Table 2-1: CoreGeo’s GHG Emissions for the 2023-2024 Fiscal Year

Emission Scope	kg CO ₂ e
Scope 1 Emissions	26,916
Scope 2 Emissions	2,818
Aggregated Scope 1 and 2 emissions	29,734
Scope 3 Emissions – Business Travel	3,117
Total (Scope 1, 2 and 3-Business Travel)	32,851

3 REFERENCES

- Abbott, Ian. 2023. How much fuel does a 737-800 burn per hour? NCESC.COM
<https://www.ncesc.com/how-much-fuel-does-a-737-800-burn-per-hour/>
- Airliners.net. 2024. Fuel Consumption Table. <https://www.airliners.net/forum/viewtopic.php?t=1355819>
- BDC, 2024. How to measure your carbon footprint. <https://www.bdc.ca/en/articles-tools/sustainability/climate-action-centre/articles/how-measure-your-carbon-footprint>
- Canada Energy Regulator. 2024. Provincial and Territorial Energy Profile – Yukon. <https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/provincial-territorial-energy-profiles/provincial-territorial-energy-profiles-yukon.html#:~:text=The%20greenhouse%20gas%20intensity%20of,CO2e%20per%20kWh>
- Environment and Climate Change Canada (ECCC). 2022. Net-Zero Challenge Technical Guide. <https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/net-zero-emissions-2050/challenge/technical-guide.html>
- Flex Air Flight School. 2024. How much fuel does a commercial plane use? General FAQs. <https://aviex.goflexair.com/flight-school-training-faq/how-much-fuel-do-commercial-planes-use>
- International Civil Aviation Organization (ICAO). 2017. ICAO Carbon Emissions Calculator Methodology. Version 10. June 2017. https://www.icao.int/environmental-protection/CarbonOffset/Documents/Methodology%20ICAO%20Carbon%20Calculator_v10-2017.pdf
- Natural Resources Canada (NRCan). 2014. AutoSmart. Learn the Facts: Emissions from your vehicle. https://natural-resources.canada.ca/sites/nrcan/files/oeef/pdf/transportation/fuel-efficient-technologies/autosmart_factsheet_9_e.pdf
- Natural Resources Canada (NRCan). 2022. 2022 Fuel Consumption Guide. <https://natural-resources.canada.ca/sites/nrcan/files/oeef/pdf/transportation/fuel-efficient-technologies/2022%20Fuel%20Consumption%20Guide.pdf>
- US Environmental Protection Agency (EPA). 2023. EPA Simplified GHG Emissions Calculator.
- Yukon Bureau of Statistics. 2024. Yukon Fuel Price Survey February 2024. Retail Motor Fuel Prices, by Community. https://yukon.ca/sites/yukon.ca/files/ybs/fin-yukon-fuel-price-survey-february-2024_0.pdf
- Yukon Energy Corporation. 2019. In Charge. Energy Calculator. [Energy calculator | inCharge Yukon](#)