

# Carbon Footprint Data Research – Executive Summary

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Canadian Roundtable for Sustainable Beef

## Purpose of This Work

The Canadian Roundtable for Sustainable Beef (CRSB) engaged MNP to understand how information that producers already collect for financial and program reporting could be used to support greenhouse gas (GHG) emissions estimations. The goal was not to calculate the full farm-level carbon footprint. Instead, the objective was to determine what emissions information can reasonably be estimated today, what data is missing, and what practical steps could improve emissions reporting over time.

This work responds to growing interest from supply chains, financial institutions, and other stakeholders in understanding on-farm emissions, while recognizing the importance of keeping data requests realistic and manageable for producers.

## Producer Sample and Data Reviewed

A sample of 12 beef producers was selected, with a focus on cow-calf and livestock operations and an effort to reflect geographic diversity across Canada. MNP provides year-end financial statement preparation and tax compliance services to all producers in the sample. All producers had general ledger data that was sufficiently detailed and consistent to support emissions-related analysis. However, one producer's data did not contain sufficient information to support Scope 1 and Scope 2 emissions estimation, only Scope 3.

The analysis focused primarily on general ledger financial data, which captures how producers spend money on key inputs such as electricity, fuel, utilities, feed, transportation, and capital equipment.

## What the Data Can Be Used for Today

The review confirmed that most producers already collect financial information that is relevant to emissions estimation. This data can be used to develop early-stage, indicative emissions estimates using established proxy methods.

Two estimation approaches were considered:

1. Data extrapolation was used to illustrate indicative Scope 1 and Scope 2 emissions by converting financial spend into estimated energy and fuel consumption using provincial pricing averages.
2. Spend-based estimation (EEIO) was used for Scope 3 screening purposes, where financial data is an accepted proxy methodology.

These approaches are commonly used when direct measurements, such as fuel volumes or electricity usage, are not available. They allow emissions-relevant insights to be generated without requiring producers to change how they currently track information.

Using these methods, existing data can support:

- Awareness of which activities are likely to be emissions-intensive.
- High-level screening of emissions sources across operations.
- Identification of areas where better data would most improve accuracy.

## Key Limitations Identified

While relevant information exists, the analysis clearly shows that current data is almost entirely financial in nature. It does not include the activity-level detail required to calculate Scope 1 and Scope 2 emissions in line with the GHG protocol methodology.

Examples of missing Scope 1 and 2 information include:

- Electricity usage measured in kilowatt hours.
- Fuel consumption and natural gas measured in litres, cubic meters, or gigajoules.
- Differentiation between fuel types (gasoline, propane, diesel) and specific uses.

As a result, emissions estimates produced using existing data are indicative only. This finding was consistent across production types. Because expenses are often grouped together in financial records, differences between cow-calf, feedlot, or mixed operations are not distinguishable in the current datasets.

This assessment reflects data that was available and accessible at the time of the project. While individual producers may have more detailed activity records, this information was not aggregated in a consistent manner for the purposes of this analysis.

## Why This Matters

Producers often indicate that they are already collecting the information required for emissions reporting. This assessment confirms that while relevant data does exist, it is not being captured in a way that supports the level of rigour increasingly expected by reporting standards and frameworks.

The value of this work lies in clearly defining:

1. Which data points are already available.
2. What the data can reasonably be used for.
3. Where the most important gaps exist.

This clarity provides a stronger foundation for productive conversations about next steps rather than continuing uncertainty about data readiness.

As noted above, much of this information is often captured at the individual farm or producer level but is not currently consolidated or standardized in a way that supports aggregation or consistent emissions reporting.

## Example Calculation – Farm #1: Extrapolation Methodology

**Step 1** - Convert Expense Data: Where only dollar values are available in the GL, provincial averages are used to estimate consumption for Scope 1 and 2 emissions.

- Electricity: Electricity expenses for Farm #1 totalled \$20,908. This amount was divided by the Alberta average electricity price of \$0.06 per kilowatt-hour, resulting in an estimated 348,465 kWh of electricity consumed.
- Natural Gas: Natural gas expenses for Farm #1 totalled \$7,011. This amount was divided by the Alberta average natural gas price of \$1.43 per gigajoule (GJ), resulting in an estimated 4,903 GJ of natural gas consumed. Because the applicable emission factors for natural gas are expressed

in cubic metres, the estimated consumption was converted from gigajoules to 107,711 m<sup>3</sup> of natural gas.

- Fuel and Oil: Fuel and oil expenses totalled \$187,120. This amount was divided by the Canadian average diesel price of \$1.319 per litre, resulting in an estimated 141,865 litres of fuel consumed.
- Where fuel type was not specified in the general ledger, diesel was assumed as the representative fuel.

Table 1: Data Extrapolation for Farm #1.

GL Expense Line Item	GL Expense – Spend	Provincial / Regional Consumption Average	Extrapolated Consumption
Electricity Expense	\$20,908	\$0.06 / kWh	348,465 kWh
Natural Gas Expense	\$7,011	\$1.43 / GJ	4,903 GJ (107,711 m <sup>3</sup> )
Fuel & Oil Expense	\$187,120	\$1.32 / Litre (diesel)	141,865 Litres

Note: Average prices reflect publicly available provincial annual averages and are intended for high-level extrapolation only.

**Step 2** - Apply Emission Factors: Emission factors published in the Canadian National Inventory Report were applied based on the activity type and province.

**Formula: Estimated Activity Consumption × Emission Factor = Total Emissions (tonnes)**

Fuel combustion and natural gas were treated as Scope 1 emissions, while purchased electricity was treated as a Scope 2 emission source.

**Step 3** - Calculate Total Scope 1 and 2 Emissions: Emissions from each source were converted to tonnes of carbon dioxide equivalent (CO<sub>2</sub>e) and summed by scope. Global warming potential values from the IPCC Fifth Assessment Report (AR5) were applied to methane and nitrous oxide to calculate CO<sub>2</sub>e.

**Formula: Total Emissions (tonnes) × AR5 global warming potential values = CO<sub>2</sub>e**

Activity Breakdown	Emissions (tonnes CO <sub>2</sub> e)
<b>Scope 1 Emissions (tCO<sub>2</sub>e)</b>	
Natural Gas	213
Fuel (diesel)	388
<b>Scope 1 Total :</b>	601
<b>Scope 2 Emissions (tCO<sub>2</sub>e)</b>	

Electricity	687
Scope 2 Total :	687
Scope 1 & 2 Emissions (tCO <sub>2</sub> e)	
Scope 1 & 2 Total :	1,288

Note: These Scope 1 and 2 estimates are indicative only and do not meet GHG Protocol requirements for activity-based reporting.

### A Practical Path Forward

This assessment supports a phased and realistic approach to improving emissions data over time. In the short term, CRSB can use existing financial data to build awareness and establish an indicative baseline of emissions-relevant activities. Over the medium to longer term, targeted improvements can significantly increase accuracy without creating an unnecessary burden. Examples include collecting electricity, fuel, and natural gas usage that is already documented in utility bills and purchase records. By focusing first on the most material sources and using information producers already have, emissions reporting can become more accurate, more credible, and more useful over time.



## ABOUT MNP

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