The Greenhouse Gas (GHG) Emissions Report

2023

KPMG LLP
Tour KPMG
600 de Maisonneuve Blvd West, Suite 1500
Montréal, QC H3A 0A3
Canada
Telephone 514 840 2100
Fax 514 840 2187

INDEPENDENT PRACTITIONER'S LIMITED ASSURANCE REPORT

To the Management of the Canadian National Railway Company

We have undertaken a limited assurance engagement on certain performance metrics of Canadian National Railway Company ("CN" or the "Entity"), included in the accompanying Greenhouse Gas ("GHG") Emissions Report 2023 (the "Report"), for the years ended December 31, 2023 and December 31, 2022.

The scope of our limited assurance engagement, as agreed with management, comprises the following performance metrics (collectively, the "subject matter information"):

Subject Matter Information	Units of measure	2023	2022	Year over year changes (2023 - 2022)
Scope 1 emissions from diesel (locomotive) fuel consumption	tCO_2e	4,309,099	4,392,493	-1.90%
Scope 2 emissions from electricity (location-based)	tCO_2e	93,762	97,333	-3.67%
Scope 3 emissions from diesel (locomotive) fuel production	tCO_2e	1,329,713	1,354,737	-1.85%
Scope 3 emissions from purchased goods & services	tCO_2e	201,636	164,214	22.79%
Scope 3 emissions from capital goods	tCO_2e	506,688	376,522	34.57%

Subject Matter Information	Units of measure	2023	2022	Year over year changes (2023 - 2022)
Scope 3 emissions from upstream transportation and distribution	tCO_2e	65,336	47,000	39.01%
Energy consumption from diesel (locomotive) fuel consumption	MWh	15,899,227		
Energy consumption from electricity	MWh	394,950	404,606	

There are no mandatory requirements for the preparation or presentation of the subject matter information. As such, the Entity has applied the *Greenhouse Gas Protocol - Corporate Accounting and Reporting Standard (Revised Edition)* (the "Protocol"), which can be found on the Greenhouse Gas Protocol's website (the "applicable criteria").

Management's Responsibility

Management is responsible for the preparation and presentation of the subject matter information in accordance with the applicable criteria.

Management is also responsible for such internal control as management determines necessary to enable the preparation and presentation of the subject matter information that is free from material misstatement, whether due to fraud or error. This responsibility includes determining the Entity's objectives in respect of sustainability performance and reporting, identifying stakeholders and material issues, and selecting or developing appropriate criteria.

Our Responsibility

Our responsibility is to express a limited assurance conclusion on the subject matter information based on the procedures we have performed and the evidence we have obtained. We conducted our limited assurance engagement in accordance with Canadian Standards on Assurance Engagements (CSAE) 3410, *Assurance Engagements on Greenhouse Gas Statements*. This standard requires that we plan and perform our engagement to obtain limited assurance about whether the subject matter information is free from material misstatement.

A limited assurance engagement involves assessing the suitability of the criteria used by the Entity in preparing the subject matter information in the circumstances of the engagement, assessing the risks of material misstatement, whether due to fraud or error, and responding to the assessed risks as necessary in the circumstances.

We exercised professional judgment and maintained professional skepticism throughout the engagement. Our procedures were designed and performed to obtain evidence that is sufficient and appropriate to provide a basis for our conclusion. In carrying out our engagement, we:

- Evaluated the suitability of the Entity's use of the criteria, as the basis for preparing the subject matter information in the circumstances.
- Through inquiries, obtained an understanding of the Entity's control environment, processes and systems relevant to the preparation of the subject matter information, but did not evaluate the design of particular control activities, obtain evidence about their implementation or test their operating effectiveness.
- Evaluated whether the Entity's methods for developing estimates are appropriate and had been consistently applied.
- Inspected a limited number of items to or from supporting records, as appropriate, and, where relevant, re-performed calculations.
- Performed analytical procedures by comparing the expected GHGs emitted, based on the calorific value of fuel combusted during the period, to actual GHGs emitted and made inquiries of management to obtain explanations for any significant differences we identified.
- Considered the presentation and disclosure of the subject matter information.

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed.

Our Independence and Quality Management

We have complied with the independence and other ethical requirements of relevant rules of professional conduct/code of ethics applicable to the practice of public accounting and related to assurance engagements, issued by various professional accounting bodies, which are founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality, and professional behaviour.

The firm applies Canadian Standard on Quality Management 1, *Quality Management for Firms that Perform Audits or Reviews of Financial Statements, or Other Assurance or Related Services Engagements* which requires the firm to design, implement and operate a system of quality management, including policies or procedures regarding compliance with ethical requirements, professional standards, and applicable legal and regulatory requirements.

Significant Inherent Limitations

Historical non-financial information, such as that contained in the Report, is subject to more inherent limitations than historical financial information, given the qualitative characteristics of the underlying subject matter and methods used for determining this information. The absence of a significant body of established practice on which to draw allows for the selection of different but acceptable evaluation techniques, which can result in materially different measurements and can impact comparability. The nature and methods used to determine such information, as described in the applicable criteria, may change over time. It is important to read the Entity's reporting methodology disclosed in the Report.

Emphasis of Matter - Comparative information

As discussed in the Methodology and Assumptions section of the Report, the 2022 Scope 2 emissions from electricity (location-based) have been restated to reflect a change in methodology. Our conclusion is not modified in respect of this matter.

Conclusion

Our conclusion has been formed on the basis of, and is subject to, the matters outlined in this report. We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our conclusion.

Based on the procedures performed and evidence obtained, no matters have come to our attention to cause us to believe that the Entity's subject matter information for the years ended December 31, 2023 and December 31, 2022 is not prepared, in all material respects, in accordance with the applicable criteria.

Our conclusion on the subject matter information does not extend to any other information, reports or documents that accompany, are presented with, or contain the subject matter information and our assurance report.

Restriction on Use

Our report is intended solely for use by the CN for the purposes set out in our engagement agreement. Our report may not be suitable for any other purpose and is not intended for use or reliance by any third parties. While KPMG LLP acknowledges that disclosure of our report may be made, in full, by CN together with the Greenhouse Gas (GHG) Emissions Report 2023, KPMG LLP does not assume or accept any responsibility or liability to any third party in connection with the disclosure of our report.

KPMG LLP*

Montréal, Canada

June 18, 2024

*CPA auditor, public accountancy permit No. A131681

Introduction

Using an operational control approach, Canadian National Railway Company (hereafter 'CN') has determined its GHG emissions and energy consumption for the calendar year ended December 31, 2023, as outlined in the following table:

GHG inventory - January 1, 2023 to December 31, 2023			
Scope	**GHG sources**	**GHG (tCO2e)**	**Energy (MWh)**
Scope 1	Diesel (locomotive) fuel consumption	4,309,099	15,899,227
Scope 2	Electricity	93,762	394,950
Scope 3	Diesel (locomotive) fuel production	1,329,713	
Scope 3	Purchased goods & services	201,636	
Scope 3	Capital goods	506,688	
Scope 3	Upstream transportation & distribution	65,336	

In addition, CN calculated the following year-over-year changes in emissions:

GHG inventory - Year-over-year changes				
Scope	**GHG Sources**	**2023**	**Change vs previous year**	**2022**
		GHG (tCO2e)		**GHG (tCO2e)**
Scope 1	Diesel (locomotive) fuel consumption	4,309,099	-1.90%	4,392,493
Scope 2	Electricity*	93,762	-3.67%	97,333
Scope 3	Diesel (locomotive) fuel production	1,329,713	-1.85%	1,354,737
Scope 3	Purchased goods & services	201,636	22.79%	164,214
Scope 3	Capital goods	506,688	34.57%	376,522
Scope 3	Upstream transportation & distribution	65,336	39.01%	47,000

*CN also reviewed its methodology and recalculated consumption for Scope 2 Electricity for 2022 presented below:

Scope	**GHG sources**	**GHG (tCO2e)**	**Energy (MWh)**
Scope 2	Electricity	97,333	404,606

Methodology and Assumptions

Scope 1

These emissions are calculated based on the actual volumes of diesel consumed in relation to locomotives as follows:

- Volumes of diesel fuel consumed (liters) in 2023 by CN were extracted from the fuel data in SAP.
- Canadian biodiesel estimates were calculated using the jurisdictional level diesel purchase data scaled accordingly to the volume of diesel consumed. Each jurisdictional diesel volume consumed was then multiplied by the current provincial blend mandate. The Renewable Fuel Standard of 2% in Canada was applied across all Canadian provinces where a clean fuel standard is not in affect. US biodiesel is the total quantity of biodiesel known to be purchased in the U.S. Rather than assuming default percentages for each fuel code, the actual procured volume within each category was used to determine the percent biocontent. For this approach in the U.S., renewable diesel and biodiesel were not differentiated and all biocontent was treated as biodiesel.
- Emissions were calculated by multiplying fuel volumes by the diesel locomotive and biomass-based diesel (biodiesel) emission factors (combustion) taken from the Environment Canada National Inventory Report (National Inventory Report 1990-2021: Greenhouse Gas Sources and Sinks in Canada, Part 2). Canadian locomotive and biodiesel emission factors were applied to the volumes of fuel, regardless of location (i.e., to U.S. and Canadian locomotives).
- Emission factors, in tonnes of CO_2 equivalent, were calculated by multiplying the emission factor of each gas (N_2O, CH_4 and CO_2) by its global warming potential (GWP) and summing the total. GWPs used are from the IPCC Sixth Assessment Report, 2021, excluding climate-carbon feedbacks (GWP of CO_2 = 1, GWP of CH_4 = 27.9 and GWP of N_2O = 273).

Scope 2 (emissions and energy consumption)

Scope 2 emissions are calculated based on the best estimate of electricity consumption for all CN sites and buildings located in Canada and the U.S. for which CN has the operational control, determined as follows:

- A new methodology was implemented for 2023, where CN utilizes a hybrid approach that sources actual electricity consumption data for a portion of CN's total coverage merged with estimated electricity consumption data from spend on electricity by reporting period for specific site addresses using CN specific rate. In prior years, Scope 2 emissions were based solely on an estimate of electricity consumption based on spend data converted to energy consumption (MWh) using average electricity prices for the province or state.
- CN performs an account matching process to scope out the electricity consumption from the cost data which covers the overall population.
- GHG emissions are calculated for the consumption portion using total annual consumption per account provided in kWh. The formula used is: GHG Emissions (tCO_2e) = Electricity Consumption (kWh) * Electricity EF (tCO_2e/kWh).
- Electricity consumed (in kWh) from cost data was calculated using an estimated consumption based on spend per account multiplied by applicable provincial "CN rate" using the formula: Electricity Consumption (kWh) = Account Spend ($) * Electricity Rate (kWh/$). CN rates were developed by using weighted averages by jurisdiction that were determined using a selection of CN account specific rates. The weighted average is weighted on usage (consumption in kWh) for the regions provided by the consumption data and weighted on spend for the regions provided in the cost data.
- GHG emissions from cost data were then estimated using the formula: GHG Emissions (tCO_2e) = Electricity Consumption (kWh) * Electricity EF (tCO_2e/kWh).
- Total Scope 2 emissions are presented as a sum of consumption and cost data emissions.
- Data for TransX has not been integrated into CN's accounting system and is provided by the TransX accounting function. TransX emissions are estimated based on account spend multiplied by CN rates.
- Canadian emission factors were sourced from the National Inventory Report - (1990-2021 - part 3, Annex 13). U.S. emission factors were sourced from the egGrid2022 - released 1/31/2024.
- The change of methodology led to a restatement of Scope 2 emissions and energy consumption for 2022 from 140,543 tCO_2e to 97,333 tCO_2e and 533,786 MWh to 404,606 MWh, respectively, presented in the GHG inventory table above.

Scope 3 (locomotive diesel fuel production)

These emissions are calculated based on the actual volumes of diesel fuel purchased in relation to locomotives as follows:

- CN's diesel fuel purchases were summed by region of purchase. A percentage by region was then derived based on the total diesel purchase volume.
- The GHGenius model (Version 5.02) was used to determine an upstream GHG emission factor for each geographic region where diesel was purchased in Canada and the U.S.
- A weighted average diesel production emission factor of 904.3 g CO_2e/L was calculated by multiplying the percent purchased in each region by the emission factor for each region. This production emission factor was multiplied by the total volume of diesel fuel consumed by CN in 2023.
- The same approach was used to establish the emissions from the production of biomass-based diesel consumed in 2023. Using well-to-pump (upstream) emission factors of biodiesel from canola oil, the most prevalent biodiesel in Canada in 2023, a weighted average biodiesel production emission factor of 415.1 g CO_2e/L was calculated.

Scope 3 (purchased goods and capital goods)

These emissions are calculated based on the actual quantities and weight of goods purchased:

- CN's key goods purchases were identified based on spend and value to the business. These include locomotives, freight cars, containers, rail ties, ballast, and rail and other track materials.
- Quantities and weights of goods purchased by source location were calculated by summing supplier invoice data from SAP.
- Representative materials for each type of good were identified. Emissions factors for each material and source location were then applied to the corresponding total weight of goods purchased. Emissions factors applied were taken from various sources including GREET1_2021,GREET2_2021, GREET2_2023, ICE V3.0, ecoInvent 3.9.1,ecoinvent 3.10 and studies on primary aluminum production in China (Han Hao, Yong Geng and Wen Hang, 2016), and railroad cross ties (Christopher Bolin and Stephen Smith,2013).
- The split of Scope 3 emissions between capital goods and other goods purchased was derived based on 2023 capital vs operating expenses extract from SAP (excluding TransX intermodal purchased goods).

Scope 3 (purchased services and upstream transportation and distribution)

Emissions from purchased services are quantified following a spend-based methodology as follows:

- 2023 spend by vendor was extracted from SAP for vendors with spend greater than $2 million to capture top areas of spend.
- From this extract, spend dollars for purchased services were categorized by industry sector which was then mapped to a relevant economic sector.
- Economic input-output emission factors were developed based on emissions and GDP per economic sector for Canada from the World Input Output database. GDP data was adjusted for inflation and converted to Canadian dollars.
- These emission factors were applied to the 2023 CN spend by economic sector to calculate the estimated CN scope 3 emissions from purchased services.
- Emissions from the "Inland transport" economic sector were separated from other purchased services into the "Upstream transportation and distribution" scope 3 category.

Locomotives diesel fuel energy consumption

The energy consumption in MWh related to diesel fuel consumed by CN's locomotives is calculated as follows:

- Volumes of diesel fuel consumed (liters) in 2023 by CN were extracted from the fuel data in SAP. Volumes of biomass-based diesel consumed (litres) in 2023 were obtained by applying jurisdictional clean fuel standard requirements for each province and purchased biodiesel in the U.S. See Scope 1 details above.
- The diesel energy conversion factor in TJ/ML was taken from the Environment Canada National Inventory Report (National Inventory Report 1990-2021: Greenhouse Gas Sources and Sinks in Canada, Part 2, Table A4-2). The biomass-based diesel energy conversion factor in TJ/ML was taken from the Fuel Characteristics Table in GHGenius 5.02. These factors were converted into MWh/L by converting TJ to MWh (International Energy Agency unit converter, https://www.iea.org/reports/unit-converter-and-glossary).
- Energy consumption in MWh was calculated by multiplying the diesel fuel volumes in liters by the diesel energy conversion factor in MWh/L.

Year-on-year changes in emissions

The year-on-year changes in emissions are calculated as follows:

- The Scope 1 locomotive fuel emissions in 2022 were subtracted from the Scope 1 locomotive fuel emissions in 2023 to determine the year-on-year absolute difference. This number was then divided by the Scope 1 locomotive fuel emissions in 2022 to determine the year-on-year percent change in emissions.
- The Scope 2 electricity emissions in 2022 were subtracted from the Scope 2 electricity emissions in 2023 to determine the year-on-year absolute difference. This number was then divided by the Scope 2 electricity emissions in 2022 to determine the year-on-year percent change in emissions.
- The Scope 3 fuel production emissions in 2022 were subtracted from the Scope 3 fuel production emissions in 2023 to determine the year-on-year absolute difference. This number was then divided by the Scope 3 fuel production emissions in 2022 to determine the year-on-year percent change in emissions.

François Bélanger, Senior Director Sustainability

Signature: 

Date: June 18, 2024