FINAL REPORT

Carbon footprint of the Canadian federal government's procurement.

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This report was prepared by the International Reference Center for the Life Cycle of Products, Processes and Services (CIRAIG) in March 2026.

Founded in 2001, the CIRAIG was set up to provide companies and governments with cutting-edge academic expertise on sustainable development tools. The CIRAIG is one of the world's leading centers of life cycle expertise. It collaborates with numerous research centers around the world, and participates actively in the Life Cycle Initiative of the United Nations Environment Programme (UNEP) and the *Society of* Environmental Toxicology and Chemistry (SETAC).

The CIRAIG has developed recognized expertise in life cycle tools, including environmental life cycle assessment (LCA) and social life cycle assessment (SLCA). Complementing this expertise, its research work also covers life cycle cost analysis (LCCA) and other tools including carbon and water footprints. Its activities include applied research projects in a number of key sectors, including energy, aeronautics, agrifood, waste management, pulp and paper, mining and metals, chemicals, telecommunications, finance, urban infrastructure management, transportation, and green product design.

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CAD	Canadian Dollars
CPA	Classification of Products by Activity
CSA	Canadian Space Agency
CSC	Correctional Service Canada
DFO	Department of Fisheries and Oceans Canada
DND	Department of National Defence
EEIO	Environmentally Extended Input–Output
FG	Federal Government
FSDS	Federal Sustainable Development Strategy
GGS	Greening Government Strategy
GHG	Greenhouse gas
GSIN	Goods and Services Identification Number
GWP	Global Warming Potential
HiCAT	High-Impact Categories of procurement
IO	Input-Output
IOCC	Input-Output Commodity Classification
IRCC	Immigration, Refugees and Citizenship Canada
ISC	Indigenous Services Canada
IT	Information Technology
KPI	Key performance indicator
LCA	Life cycle assessment
LCCA	Life cycle cost analysis
LLM	Large Language Models
$MtCO_2e$	Megatonnes of carbon dioxide equivalent
NPRI	National Pollutant Release Inventory
PHAC	Public Health Agency of Canada
PoGP	Policy on Green Procurement
PSPC	Public Services and Procurement Canada
RCMP	Royal Canadia Mounted Police
SETAC	Society of Environmental Toxicology and Chemistry

SLCA	Social life cycle assessment
SSC	Shared Services Canada
TBS-CCG	Treasury Board of Canada Secretariat – Centre for Greening Government
TC	Transport Canada
UNEP	United Nations Environment Programme
UNSPSC	United Nations Standard Products and Services Code

Executive Summary

This report presents a comprehensive assessment of greenhouse gas (GHG) emissions associated with the procurement activities of the Government of Canada over five fiscal years (FY2020–2021 to FY2024–2025). Conducted by CIRAIG for the Treasury Board of Canada Secretariat, the study establishes a government-wide baseline of upstream (Scope 3) emissions embedded in purchased goods and services, supporting federal commitments under the Greening Government Strategy and related policies.

The study aims to identify High-Impact Categories of Procurement (HiCATs) and key departments driving emissions, enabling targeted action to reduce the federal government's supply chain carbon footprint. It uses an Environmentally Extended Input–Output (EEIO) model (OpenIO-Canada v2.11) applied to procurement data from the CanadaBuys dataset, which includes only contracts awarded by Public Services and Procurement Canada (PSPC) and does not include information technology (IT) procurement contracts awarded by Shared Services Canada (SSC). This spend-based methodology estimates life-cycle emissions per dollar spent, capturing upstream emissions across complex global supply chains.

Results indicate that federal procurement generated approximately 23.4 megatonnes of carbon dioxide equivalent ($MtCO_2e$) over the five-year period, corresponding to an annual average of about 4.7 $MtCO_2e$. This level is not directly comparable to previous estimates as the methodology and database used in this study have both been updated and improved compared to previous studies. Total procurement spending during the period amounted to $88.9 billion CAD, reflecting the significant scale at which procurement activities influence government-wide emissions.

Emissions are highly concentrated within a small number of federal organizations. The Department of National Defence accounts for 47.1% of the procurement carbon footprint, followed by Public Services and Procurement Canada at 24.1%, and Fisheries and Oceans Canada at 9.5%. This concentration is largely consistent with their share of total spending and reflects the carbon-intensive nature of defense, infrastructure, and marine operations. Other departments contribute smaller but still notable shares, with emissions typically linked to their core operational activities.

A relatively small number of procurement categories, referred to as High-Impact Categories of Procurement (HiCATs), are responsible for a large and disproportionate share of emissions. Aircraft, equipment and maintenance represent the largest contributor at 16% of total emissions, despite a smaller share of total spending, indicating high carbon intensity. Services, including engineering, consulting, and other professional services, collectively account for approximately 20% of emissions due to their large spending volumes and embedded supply chain impacts. Additional important contributors include energy (fuel production, 5.5%), ships and marine equipment (5.1%), scientific instruments and supplies (5.1%), and construction activities (3.9%). These findings highlight both capital-intensive sectors and service-based activities as major drivers of emissions.

From a geographic perspective, most procurement emissions are associated with domestic suppliers, which account for 85.1% of the total. The United States contributes approximately 10%, with smaller shares attributable to European countries such as the United Kingdom and Germany.

Several key insights emerge from the analysis. Procurement is confirmed to be a major source of federal emissions, particularly within Scope 3, underscoring its importance in achieving net-zero objectives. Emissions are strongly concentrated by both department and commodity, meaning that targeted

interventions in a limited number of areas could generate significant reductions. The results also demonstrate that services, often perceived as low-emission, contribute substantially due to their reliance on energy, infrastructure, and complex supply chains. Furthermore, capital-intensive sectors such as defense, transportation, and infrastructure dominate the emissions profile due to the high embodied carbon of equipment and construction activities.

The study acknowledges several methodological limitations. The EEIO approach relies on average sectoral emission factors rather than supplier-specific data, which limits the ability to reflect differences in supplier performance or mitigation efforts. The analysis also excludes contracts related to information technology (IT) managed by Shared Services Canada due to data availability constraints, leading to an underestimation of total emissions. In addition, the assumption that supplier location corresponds to production location introduces uncertainty in geographic attribution.

Despite these limitations, the study provides a robust and comprehensive baseline for understanding the carbon footprint of federal procurement. It identifies clear priority areas for policy action and supports the development of targeted strategies to reduce emissions. Key opportunities include focusing on high-impact sectors such as aerospace, marine equipment, fuels, pharmaceuticals, construction, and professional services, while improving data collection (particularly for IT procurement) and strengthening engagement with suppliers to reduce embodied emissions. The findings underscore that procurement transformation represents a critical lever for reducing Scope 3 emissions and advancing toward net-zero government operations.

1 Introduction

Government procurement represents a powerful economic lever for achieving net-zero outcomes, allowing the federal government (FG) to signal a market-wide demand for product and services associated with lower greenhouse gases (GHG) emissions through its vast purchasing power. Guided by the Federal Sustainable Development Strategy (FSDS), the Policy on Green Procurement (PoGP), and the Greening Government Strategy (GGS), Canada has intensified its focus on environmental stewardship, particularly following 2024 updates to the GGS that emphasize the reduction of Scope 3 GHG emissions and embodied carbon. In alignment with these mandates, this project was initiated by the Treasury Board of Canada Secretariat – Centre for Greening Government (TBS-CGG) to provide an updated estimate of GHG emissions across federal procurement and to identify high-impact categories within key departments. By establishing this analytical baseline, the project validates strategic priorities and provides the necessary framework for federal organizations to meet their regulatory commitments and implement targeted climate action.

To achieve this assessment, the analysis uses a spend-based approach relying on an Environmentally Extended Input–Output (EEIO) framework, implemented through OpenIO-Canada v2.11, a multi-regional EEIO model developed internally by CIRAIG. This method enables the estimation of life cycle GHG emissions across the government's entire procurement portfolio based on contract procurement data. Therefore, the method captures upstream emissions embedded in supply chains that extend across regional, national, and international boundaries.

The study focuses on fiscal years between FY2020-2021 and FY2024-2025, for a total of five fiscal years (from the 1st of April to the 31st of March). Contract procurement data were taken from the CanadaBuys dataset, which is available on the open government data portal. This data was then treated and analyzed to quantify total upstream scope 3 GHG emissions of the federal government and to identify High-Impact Categories of procurement (HiCATs) according to different commodity classifications. Complementary contribution analyses were conducted to examine emissions by end user and by supplier origin. Finally, HiCATs were also identified for the 30 end users with the biggest procurement carbon footprints.

All analytical procedures were developed to be reproducible, and the corresponding data and Jupyter Notebooks (Python code) will be transferred to TBS-CGG to facilitate reproducibility, contingent on available internal resources.

This report is organized as follows:

- Chapter 2 outlines the goal and scope of the study.
- Chapter 3 describes the methodological framework and analytical approach.
- Chapter 4 presents the results and discussion of the findings.
- Chapter 5 summarizes the conclusions and key insights of the study.

2 Goal and scope of the study

This chapter presents the objectives and scope of the study assessing the GHG emissions associated with the FG's procurement activities.

2.1 Objectives

This study aims to identify the FG's procurement categories with the greatest contribution to upstream scope 3 GHG emissions for the five fiscal years between FY2020-2021 and 2024-2025.

More specifically, the objectives of this study are as follows:

1. Build on existing procurement data to develop an economic profile of procurement activities, disaggregated by:
    a. Origin of procurement (based on supplier headquarters)
    b. FG entities (e.g., Department of National Defence)
    c. Commodity codes (GSIN/UNSPSC)
2. Estimate the scope 3 GHG emissions associated with the FG's procurement for the five fiscal years under study, with the following sub-objectives:
    a. Provide an overall estimate of the FG's scope 3 GHG emissions associated with procurement
    b. Identify the commodity codes contributing most to GHG emissions, a.k.a. HICATs (High Impacts Categories of Procurement)
    c. Disaggregate the results per FG entities
    d. Develop recommendations based on the results.

It is important to note that the primary goal of this study is to produce a high-level, yet comprehensive estimate of scope 3 GHG emissions associated with FG's procurement activities. Achieving a higher level of accuracy would require integrating physical procurement data (e.g., quantities expressed in mass, volume, or energy units) with emission factors based on those physical dimensions.

2.2 Scope of the study

The study analyzes the purchases of goods and services made by the FG. Note that unfortunately, data associated with contracts managed by Shared Services Canada was not available at the time of this study. As a result, most of the scope 3 GHG emissions associated with information technology (IT) procurement are excluded from this study. However, note that previous study often identify IT hardware as one of the high impact categories of procurement (HiCAT).

The analysis encompasses five fiscal years, from the 1st of April 2020 to the 31st of March 2025.

Regarding the scope of the study in terms of life cycle stages, Figure 1 illustrates how a product's life cycle is divided into successive stages.

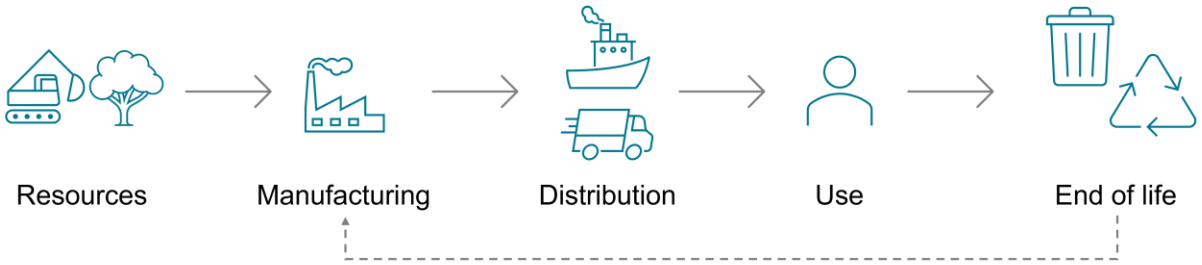

Figure 1: Life cycle stages of a product or service

However, not all life cycle stages of a product or service can be incorporated into a quantitative life cycle impact assessment based on an EEIO approach, as EEIO data are limited to the point of production of goods and services. Consequently, although it would be desirable to account for the entire life cycle of procured items, only the stages presented in Figure 2 are included in the GHG assessment of the goods and services considered in this study.

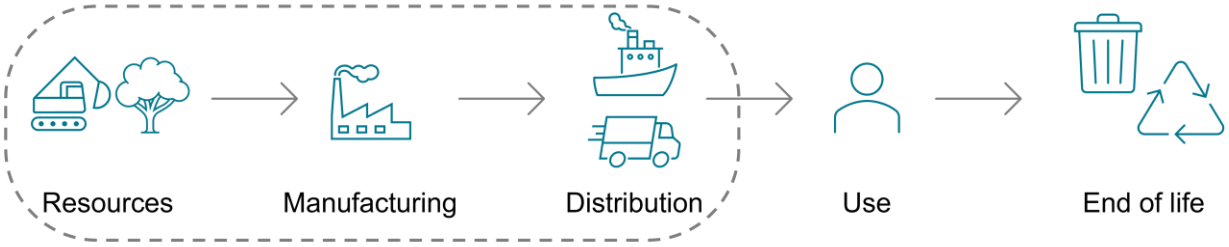

Figure 2: System boundaries of the study

In accordance with the terminology of the GHG Protocol (GHG Protocol, 2015), this study therefore focuses on upstream Scope 3 GHG emissions associated with the FG's procurement activities. It thus excludes Scope 1 and Scope 2 emissions, the latter being covered in other assessments from the FG. Note that a part of the downstream Scope 3 is covered, namely the downstream distribution and retailing activities of purchased commodities.

3 Methodology

This chapter presents the methodological framework employed for the implementation of the study. It first describes the modelling approach and analytical methods employed to quantify GHG emissions, followed by a description of the procurement data pipeline from raw data to processed data.

3.1 Environmentally Extended Input-Output

The methodology adopted in this study is based on EEIO analysis, an approach that extends the conventional Input–Output (IO) framework widely used in economics to model intersectoral relationships and the environmental implications of economic expenditures. EEIO analysis is particularly valuable when the conventional LCA approach, based on detailed process-level inventories of physical inputs and outputs, is impractical or insufficiently comprehensive. This limitation arises when the system under study encompasses a wide range of goods and services, as in the present GHG assessment of procurement activities. Conducting individual LCAs for each procurement item would be infeasible, given that process-specific data are often unavailable, costly, and time-intensive to collect and model, especially for service-related activities.

In EEIO analysis, environmental impacts are estimated based on the monetary value of purchased goods and services, classified according to their economic sector or product type. The model provides life cycle emission intensities per unit of expenditure (i.e., per Canadian dollar), allowing for a comprehensive estimation of indirect environmental impacts. Compared to traditional process-based LCA, the EEIO approach has the advantage of encompassing both goods and services (such as consulting, engineering, finance, insurance, and real estate).

However, a key limitation of EEIO lies in its relatively low level of product granularity, which yields results that are more generic and less specific to individual items. As a result, EEIO data does not provide supplier's specific data. Climate change mitigation strategies put in place by FG's suppliers are thus not taken into account in this data. Despite this constraint, the EEIO framework is well suited for hotspot analyses of complex supply chains involving thousands of diverse transactions.

3.1.1 The OpenIO-Canada database

This study employs OpenIO-Canada v2.11, a Canadian multi-regional EEIO model developed by the CIRAIG (Agez, 2025). This multicriteria assessment tool extends beyond GHG emissions by encompassing a range of environmental exchanges, including emissions from Environment and Climate Change Canada's *National Pollutant Release Inventory* (NPRI). It enables the evaluation of multiple impact categories such as acidification, ecotoxicity, human toxicity, and water withdrawal, among others.

Originally, the geographical scope of OpenIO-Canada was limited to the national economy, meaning that all goods and services, including imports, were modelled as if produced domestically. The model has since been enhanced through integration with the global EEIO database EXIOBASE, allowing for the quantification of life-cycle emissions from imported goods and services based on the technological profiles of the producing countries. Earlier versions of OpenIO-Canada represented data only at the national level, precluding differentiation between provinces. The current multi-regional version now covers all 13 Canadian provinces and territories, accounting for regional economic structures and energy mixes. For example, products manufactured in Quebec reflect electricity primarily sourced from

hydropower, whereas those produced in Alberta incorporate electricity derived mainly from coal and natural gas.

The model distinguishes 6,396 commodities produced across the 13 Canadian regions. For imports, OpenIO-Canada relies on EXIOBASE, which differentiates 200 sectors and 48 foreign countries or regions (49 total, excluding Canada), leading to 9,600 commodities. Consequently, two sectoral classification systems coexist within the model: the Input–Output Commodity Classification (IOCC) from Statistics Canada's Supply and Use Tables, and the Classification of Products by Activity (CPA) used in EXIOBASE.

For the EXIOBASE database, we selected to use the version 3.8.2 2019 reference year. While it is not the latest available version at the time of writing this report, we believe this still constitutes the most robust version of EXIOBASE. Indeed, the latest versions (3.9.4 to 3.10) include mistakes in their modeling of metals and minerals sector worldwide. Furthermore, using version 3.8.2 keeps the coherence with the EXIOBASE version that is used within the OpenIO-Canada database. For the reference year, we selected the 2019 period to avoid COVID-19 years which are most likely not representative of typical yearly operations. In addition, at the time of the 3.8.2, the 2020, 2021 and 2022 models of EXIOBASE were forecasted while not taking into account the effect of the pandemic on the global economy.

3.1.2 Assessment of GHG Emissions

The carbon footprint is quantified using the IMPACT World+ life cycle impact assessment method (Bulle et al., 2019), which evaluates cumulative radiative forcing over a 100-year time horizon. This approach is based on Global Warming Potentials (GWPs) established by the Intergovernmental Panel on Climate Change (IPCC) in its Sixth Assessment Report (AR6).

The OpenIO-Canada model accounts for GHG emissions reported in Statistics Canada's Physical Flow Accounts, specifically carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) and the national inventory declared to UNFCCC for other GHG emissions (e.g., SF6, HFCs, PFCs, etc.). In total, 32 different GHGs are covered. The climate change impact indicator is expressed in kilograms of carbon dioxide equivalent (kg CO_2-eq), representing the relative radiative forcing of each gas compared to CO_2.

It is important to note that the GWPs applied in this study differ from those used in Canada's National Inventory Report on GHG Sources and Sinks. The IMPACT World+ method adopts the IPCC AR6 GWP factors, which are more conservative than those used in the National Inventory. These updated values account for methane oxidation to carbon dioxide and positive climate feedback mechanisms associated with rising atmospheric GHG concentrations. This feedback enhances the radiative forcing potential of GHGs as their atmospheric abundance increases. For example, the 100-year GWP for CH_4 increases from ~28 in AR5 to ~30 in AR6.

It is essential to recognize that the results of this carbon footprint analysis represent potential environmental impacts rather than observed or measured effects. Consequently, these results should not be interpreted as evidence of exceedance of regulatory thresholds, environmental limits, or safety margins, but rather as indicators of the relative significance of emissions sources within the assessed system.

3.2 Project methodology

As the EEIO methodology provides emission factors (in kg CO_2eq/CAD) per economic sector of the OpenIO-Canada database (e.g., Real estate services), the methodology simply consists in multiplying each contract

value with its corresponding emission factor. This directly provides an estimation of the carbon footprint linked to the procurement of each contract. However, there are multiple methodological aspects to consider before executing this simple multiplication. In the following sub-sections, we describe these aspects.

3.2.1 Getting the raw procurement data

Procurement data comes from the CanadaBuys contract history dataset (Public Services and Procurement Canada, 2023) managed by Public Services and Procurement Canada (PSPC), an FG entity. This data source harmonizes contract information across the FG for all manner of contracts awarded by PSPC. Note that most IT related contract are not managed by PSPC but are rather managed by Shared Services Canada (SSC). We did not have access to their data in time for this study, hence why most IT related procurement contracts of the FG are excluded from the study.

Note that there is also a proactive disclosure dataset available, which also records contracts from the FG. This proactive disclosure dataset, in an ideal world, would include all contracts from the Canada Buys contract history as well as other contracts not directly managed by PSPC. In reality, the dataset is not completed systematically and thus has a lot of holes in its data. In addition, the dataset is not managed by any entity and is thus not well structured and not harmonized, making its use significantly harder. For all these reasons, we chose to rely on CanadaBuys data.

In the end, this provides 121,772 different contracts/amendments to contracts for the fiscal years between FY2020-2021 and FY2024-2025. For each entry there is a lot of information. The information relevant for this study consists of the reference number, the contract amount, the commodity code (either GSIN or UNSPSC), the supplier and its address (or at least country), the end user (i.e., the entity receiving the commodity).

3.2.2 Mapping contracts to their emission factors

3.2.2.1 Mapping with sectors

In order to identify which emission factor to use to estimate each contract's carbon footprint, we require a mapping between the commodity codes that are used for reporting procurement data and the economic sector on which the OpenIO-Canada database relies on. Namely, we have on one side the Goods and Services Identification Number (GSIN) and the United Nations Standard and Services Code (UNSPSC), each FG entity relying on either one of those, and on the other side, the Input-Output Commodity Classification (IOCC), which is the classification that is used in OpenIO-Canada, which comes from Statistics Canada's supply and use tables. Furthermore, there is also the Classification of Products by Activity (CPA) from EXIOBASE to link to GSINs and UNSPSC in order to model imported commodities.

This mapping was done manually linking 4,904 GSIN codes and 7,984 UNSPSC codes to the 492 sectors of OpenIO-Canada and the 200 sectors of EXIOBASE. These mappings are available in Excel files. While the mappings were generated manually by a human being, Large Language Models (LLM) (notably the Gemini3 LLM) were used to speed-up the research process and improving the understanding of both the IOCC and CPA classifications, but also of GSINs and UNSPSCs.

3.2.2.2 Mapping with regions

The region where the commodity was manufactured needs to be determined in order to reflect

geographical variation in the production systems around the world (e.g., Québec production tends to be less GHG-intensive than American ones, thanks to a decarbonized electric grid). Unfortunately, the manufacturing location of the purchased commodity of a contract is unknown. As a result, we rely on a simplifying assumption. That is, we consider that the address of the supplier, provided within CanadaBuys, is the same as the location where the manufacture takes place. This is obviously a simplification as the provided address will generally correspond to headquarters or to a local retailing address. In the absence of more information, it is our opinion that this is the best assumption that can be taken.

Provinces for contracts with Canadian suppliers are thus mapped to the provinces within the OpenIO-Canada database and the countries for international suppliers are linked to the regions of EXIOBASE.

3.2.3 Purchaser vs basic price

Input-Output databases can operate either at purchaser price or basic price. What is the difference? Basic price corresponds to the cost of production, plus the taxes on production minus the subsidies received from the government. In simpler terms, it is the money received by the producer of the commodity. Purchaser price, on the other hand, corresponds to the money received by the seller. The difference between the two prices is thus composed of the trade margins (i.e., the money earned by the retailer/wholesaler), the downstream transport margins (i.e., the money earned by transport companies moving the produced commodities either to a warehouse, to shelves of the retailers or directly to the consumer) and the taxes on products (e.g., GST). The values of contracts within CanadaBuys are in purchaser price, which means these prices include the trade margins, transport margins and taxes on products. As a result, the values of these contracts should be linked to purchaser price emission factors ($kgCO_2eq$/purchaser-price-CAD), as opposed to basic price emission factors ($kgCO_2eq$/basic-price-CAD). The OpenIO-Canada database provides such purchaser price emission factors. They can thus directly be multiplied with the contract values.

However, for international contracts, OpenIO-Canada relies on the EXIOBASE database. The latter only operates at basic prices. As such, the values of international contracts within the FG's procurements should be converted from purchaser price to basic price. To do so, we need to estimate what the average trade/transport margins and average taxes on products are, depending on the commodity and the country of manufacture. EXIOBASE itself does not provide such estimates. Therefore, as an approximation, we rely on the data from Statistics Canada. These estimates thus correspond to the Canadian average and are ultimately applied to other countries. This is obviously incorrect as trade margins, transport margins and taxes differ between countries. However, applying non-representative corrections, on average, should be closer to the corrected value than not correcting the values at all.

3.2.4 Inflation

The OpenIO-Canada v2.11 database contains economic and environmental data for the years 2014 to 2022. Consequently, the contracts signed over the 2020-2022 period can be models directly with OpenIO-Canada emission factors. However, there is no representation of the economy for 2023, 2024 and 2025 yet. There is usually a three-year lag period with Statistics Canada release of the supply and use accounts. As a result, to model contracts for these years, we rely on emission factors from the year 2022, adjusted for inflation.

We apply a single annual average, national inflation rate while not differentiating between commodities. The inflation factors were obtained from the Bank of Canada's Inflation Calculator (Bank of Canada, n.d.-b), yielding values of 1.0592, 1.0895 and 1.1101 between 2022 and 2023, 2022 and 2024, 2022 and 2025

respectively. Concretely, this means that a product priced at 1 CAD in 2022 would cost approximately 1.1101 CAD in 2025. Consequently, a contract of 1 million CAD in 2025 would be equal to a contract of 989109.9 CAD in 2022. All 2023, 2024 and 2025 contract values were thus adjusted, which ensures the temporal alignment of the procurement data with the reference year of the corresponding emission factors.

For international contracts, since we selected the 2019 reference year period for our EXIOBASE data, all international contract values are adjusted for inflation. Ideally, we would apply inflation rates per country. This is a complicated endeavor, especially considering the fact that EXIOBASE also includes broad regions such as “Africa except South Africa”. As a result, as a simplification, we apply Canadian inflation rates to all international contracts. The applied rates are: 1.0240, 1.0344, 1.0876, 1.1519, 1.1849 and 1.2073, for years 2020, 2021, 2022, 2023, 2024 and 2025 respectively.

3.2.5 Conversion of Canadian dollars to euros

For international contracts, GHG emissions were assessed using the EXIOBASE database, which uses the euro as its reference currency. As a result, contract values for non-Canadian suppliers were converted from Canadian dollars to euros to maintain consistency with EXIOBASE data.

The conversion was based on the 2019 annual exchange rate published by the Bank of Canada: 1 CAD = 0.673 EUR (or 1 EUR = 1.4856 CAD) (Bank of Canada, n.d.-a). This conversion rate is thus applied before any inflation rate is applied to international contracts.

3.2.6 Endogenization of capital goods

In Input-Output capital goods are defined as goods which are used for more than one year. Typical capital goods are buildings, machines, vehicles, IT hardware, software. Since Input-Output data are published yearly, the use of such goods would spread over multiple reference years, in other words, over multiple Input-Output tables. As a result, in traditional Input-Output, the construction of capital goods is often denoted as a sector of final demand, while the use (or consumption) of these capital goods is denoted as an index of their depreciation. In such a system, inputs of consumed capital are not associated with any GHG emissions, only the construction of new capital goods is. As a result, by default, any emission factor derived from Input-Output tables does not include the emissions associated with the construction of the capital goods that were required during the manufacture of a commodity. For instance, in such a system the manufacture of a laptop would not include the GHG emissions linked with the manufacture of the machines or the construction of the building where the laptop is manufactured. Such emission factors thus correspond to an underestimation of the environmental impacts of commodities.

Endogenization of capital goods consists in “bringing inside the matrix” these capital goods. Instead of having capital goods as an external final demand, each consumed capital is connected to its consuming economic sector, along with its own emissions. In life cycle assessment (LCA), an analogy would be to consider endogenization like adding an amortized infrastructure input into a manufacturing unit process (e.g., 1e-14 factory per unit of product). The OpenIO-Canada emission factors used in this study are based on a version of the database with endogenized capitals. The emissions associated with capital goods across the supply chains of the commodities purchased by the FG are thus included.

3.2.7 Dealing with amendments

Among the 121,772 entries within CanadaBuys, there are contracts and amendments. There are multiple

ways to account for amendments. For instance, they could all be gathered to the initial contract. However, there are amendments linked to extremely old contracts, e.g., yearly maintenance of helicopters amendments for the last 30 years, which means it would exclude all amendments linked to these old contracts. Amendments could also be accounted for separately. The issue here is that CanadaBuys include negative value amendments which correspond to a correction of the initial estimate of the contract value. These do not correspond to a physical interpretation but rather to bookkeeping practices.

In the end, we chose to aggregate all amendments to either the original contract (if the latter is within the five fiscal years period under study) or the earliest occurrence of an amendment. This ensures to not exclude amendments on extremely long running contracts. This also mostly deals with negative values as for most cases, the aggregate of all amendments corresponds to a positive value at the end. For the few cases where the aggregate corresponded to a negative value, all amendments connected to that aggregation were excluded from the study.

3.2.8 Multiple end users and codes

For some contracts there are multiple UNSPSC codes provided (10101500, 70121704, 70121900) or multiple end users provided (Business Development Bank of Canada / Department of Public Works and Government Services). For these cases, we take the assumption of splitting the contract values (and thus the emissions) equally between the commodity codes and/or the end users.

3.2.9 Harmonizing commodity codes

Since FG entities do not all rely on the same commodity codes (either GSIN or UNSPSC), contracts themselves are either connected to GSIN or to UNSPSC. For better analysis of the results, for each contract, we define both a GSIN and a UNSPSC following the mapping between the two classifications provided by the FG itself (Public Services and Procurement Canada, 2016). There were some gaps within this mapping which we completed manually. The resulting mapping file is available within the deliverables of this study.

4 Results and discussion

The first section of this chapter presents an economic overview of FG procurement for the years under study. Subsequently, the GHG emissions estimates associated with the procurement activities are presented and discussed for the FG overall. In the appendix of this report the same results are provided for the 30 end users of the FG with the biggest procurement carbon footprints.

4.1 Economic analysis of the FG procurement

After the data treatment of this study, the CanadaBuys data gives a total spending amount over the five fiscal years under study of 88.89 billion CAD. Of these near 90 billion dollars, 40.6% are linked to contracts from the Department of National defence (DND), 27.8% from Public Services and Procurement Canada (PSPC) and 9.5% from the Department of Fisheries and Oceans Canada (DFO) (Figure 3).

In terms of commodities, Figure 4 describes the top 40 spending GSIN commodities, along with their equivalent UNSPSC and IOCC classifications. These 40 commodities represent 64.4% of the total spending of the FG. We regrouped these commodities into larger groups which make the interpretation easier. We can thus see that the government spends most on services categories, either for architect and engineering services (21.3% of total spending) or other services (19.9%). In terms of goods, aircraft and its maintenance represent 10.1%, followed by drugs and biologicals (3.2%), ships and their maintenance (2.9%), construction (2.4%), software (2.0%), vehicles and their maintenance (2.0%) and energy (1.0%).

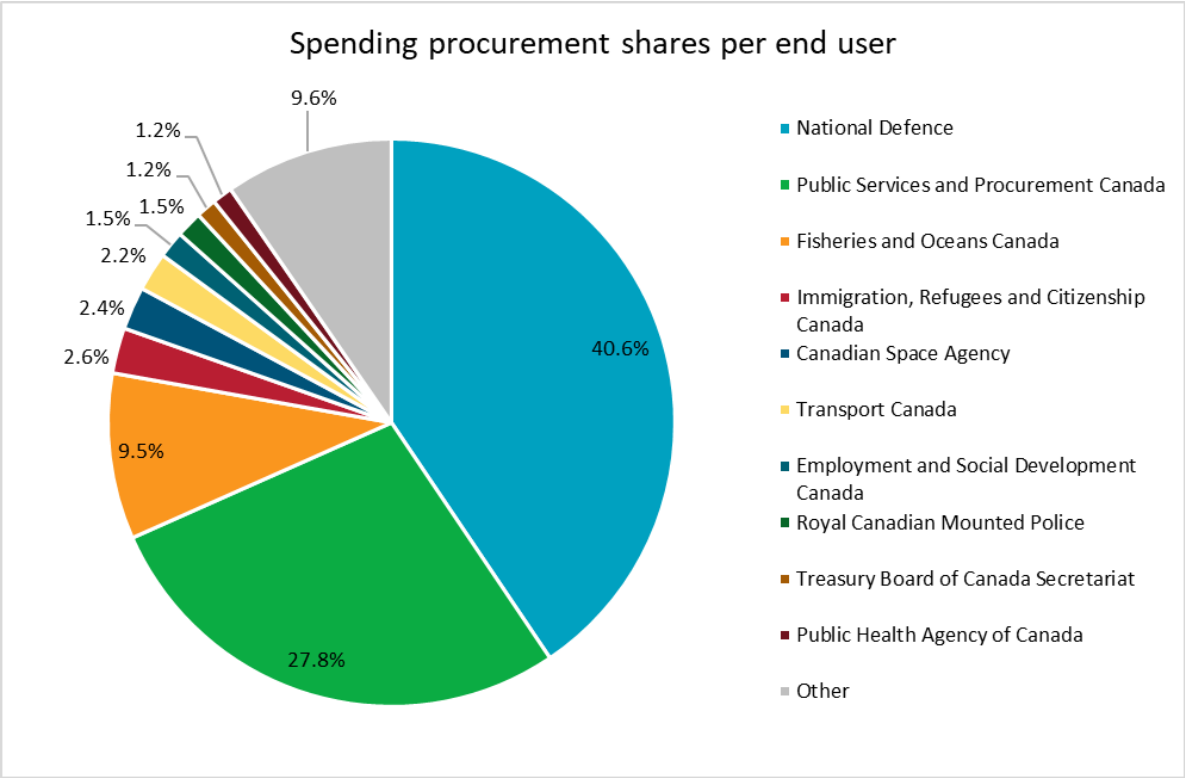

Figure 3: Federal government procurement spending per end user

gsin-nibs	GSIN description	contract amount (million CAD)	% total spending	Grouping	% total spending	unspsc	IOCC
C119	Other Buildings	614	0.7%	Architect and Engineering Services		81101513	MPS541300
C129	Other Non-Building Structures	815	0.9%	Architect and Engineering Services		81101503	MPS541300
C216A	Naval Architecture	3756	4.2%	Architect and Engineering Services		81101506	MPS541300
C216AB	Naval Architecture - Design Services	3455	3.9%	Architect and Engineering Services		81101506	MPS541300
C216BA	Marine Systems and Engineering	1145	1.3%	Architect and Engineering Services	21.3%	81102100	MPS541300
C216C	Marine Architect and Engineering Services	3618	4.1%	Architect and Engineering Services		81101506	MPS541300
C219	Other Architect and Engineering Services	2594	2.9%	Architect and Engineering Services		81100000	MPS541300
C219BF	Engineering and Technical Services - Aerospace Related, Military	633	0.7%	Architect and Engineering Services		81100000	MPS541300
C219BK	Engineering Services - Construction Management	2263	2.5%	Architect and Engineering Services		81100000	MPS541300
D302	OADP Systems Development Services	1135	1.3%	Other services		81110000	MPS541503
D302A	Informatics Professional Services	3488	3.9%	Other services		81110000	MPS541503
E108	Hazardous Substance Removal, Cleanup, and Disposal Services and Operational Support	557	0.6%	Other services		76120000	MPS562000
G009	Other Health Services	539	0.6%	Other services		85100000	MPS621A01
G009G	Health and Welfare Services	681	0.8%	Other services		85000000	MPS621A01
K199	Other Custodial and Related Services	825	0.9%	Other services		72100000	MPS23D000
L004CV	Claims Administration/Processing (insurance plans)	793	0.9%	Other services	19.5%	84131600	MPS524200
L099A	Financial and Related Services, N.E.S.	715	0.8%	Other services		84000000	MPS522300
M190	Other Buildings	572	0.6%	Other services		80161603	MPS561A00
M190A	Property and Facilities Management - Buildings	3592	4.0%	Other services		80131801	MPS561700
M190D	Operations & Maintenance of a Military Base	914	1.0%	Other services		92112300	MPS561700
R019BF	Human Resource Services, Business Consulting/Change Management; Project Management Services	1490	1.7%	Other services		80160000	MPS541600
R199	Other Administrative and Management Support Services	2051	2.3%	Other services		80101507	MPS541600
N1510	Aircraft, Fixed Wing	861	1.0%	Aircraft, equipment and maintenance		25131504	MPG336401
JX1510A	Aircraft, Fixed Wing - Repair and Overhaul (Military)	1379	1.6%	Aircraft, equipment and maintenance		25131700	MPS488002
N1520	Aircraft, Rotary Wing	1118	1.3%	Aircraft, equipment and maintenance		25131900	MPG336401
N1520B	Helicopters (Military)	798	0.9%	Aircraft, equipment and maintenance	10.1%	25131902	MPG336401
JX1520B	Helicopters (Military) Repair and Overhaul	1551	1.7%	Aircraft, equipment and maintenance		25131900	MPS488002
N1550	Unmanned Aircraft	1823	2.1%	Aircraft, equipment and maintenance		25132102	MPG336401
N1810	Space Vehicles	1488	1.7%	Aircraft, equipment and maintenance		25151500	MPG336403
N6505	Drugs and Biologicals	2852	3.2%	Scientific equipment and supplies	3.2%	51000000	MPG325400
J019A	Maintenance, Repair, Modification, Rebuilding & Installation of Equipment related to Ships	640	0.7%	Ships, equipment and maintenance		78182000	MPS488004
N1990	Vessels, Miscellaneous	1111	1.2%	Ships, equipment and maintenance	2.9%	25111500	MPG336601
JX1990A	Ships and Vessels (large) - Repair, Refits and Conversions (including Dry Docking)	801	0.9%	Ships, equipment and maintenance		25111500	MPS488004
5123	Construction Services of Industrial Buildings	1269	1.4%	Construction & Buildings	2.4%	72120000	MPG23B004
5129B	Construction of Other Buildings	834	0.9%	Construction & Buildings		72130000	MPG23B007
N7030	ADP Software	1792	2.0%	Software	2.0%	43232600	MPS511200
N2310	Passenger Motor Vehicles	488	0.5%	Vehicles, equipment and maintenance		25101500	MPG336111
N2320	Trucks and Truck Tractors, Wheeled	668	0.8%	Vehicles, equipment and maintenance	2.0%	25102100	MPG336120
N2350	Combat, Assault, and Tactical Vehicles, Tracked	633	0.7%	Vehicles, equipment and maintenance		25102000	MPG336900
N9140	Middle Distillate Fuels	905	1.0%	Energy	1.0%	15101500	ENE324112
	Total	88882	64.4%				

Figure 4: Federal government procurement spending per commodity

4.2 Carbon footprint of the FG procurement

The procurement carbon footprint of the FG over the five fiscal years under study amounts to around 23.4 $MtCO_2eq$. Normalizing this number per fiscal year provides an average of ~4.7 $MtCO_2eq$/year. A previous study also performed by CIRAIG with the OpenIO-Canada database had estimated to around 4.0 $MtCO_2eq$/year the procurements for the three fiscal years 2016-2017, 2017-2018 and 2018-2019. This may seem like an increase in procurement carbon footprint due to potential increased government procurement activities, or to a shift towards more carbon-intensive procurements. However, one must take into account that the methodology followed in this study, as well as the database used have both been updated and improved compared to the previous study. The increase might thus also be due to a more robust modeling of the carbon footprints of each contract. One thing that seems clear however, is that the carbon footprint of the FG procurement has most likely not decreased between the fiscal years of the previous study and the ones of this study.

4.2.1 Carbon footprint of the FG procurement per end user

Here we regroup the contracts and their associated carbon footprint per end user to have a picture of which end users have procurement that generate the most potential carbon emissions. From this analysis, three end users represent the majority of the FG procurement carbon footprint (Figure 5). The Department of National Defence (DND) represents 47.1% of the FG procurement carbon footprint, Public Services and Procurement Canada (PSPC) represents 24.1% while Fisheries and Oceans Canada (DFO) represents 9.5%. This is to be expected as these three end users already represent the majority of procurement spending from the FG. Other notable end users are the Canadian Space Agency (CSA) 2.5%, Immigration, Refugees and Citizenship Canada (IRCC) 1.9%, the Royal Canadia Mounted Police (RCMP) 1.6%, Transport Canada (TC) 1.6%, Public Health Agency of Canada (PHAC) 1.6%, Correctional Service Canada (CSC) 1.0% and Indigenous Services Canada (ISC) 0.8%. More details on the analysis of each of these end user's procurement carbon footprint are provided in the following sub-sections of this report.

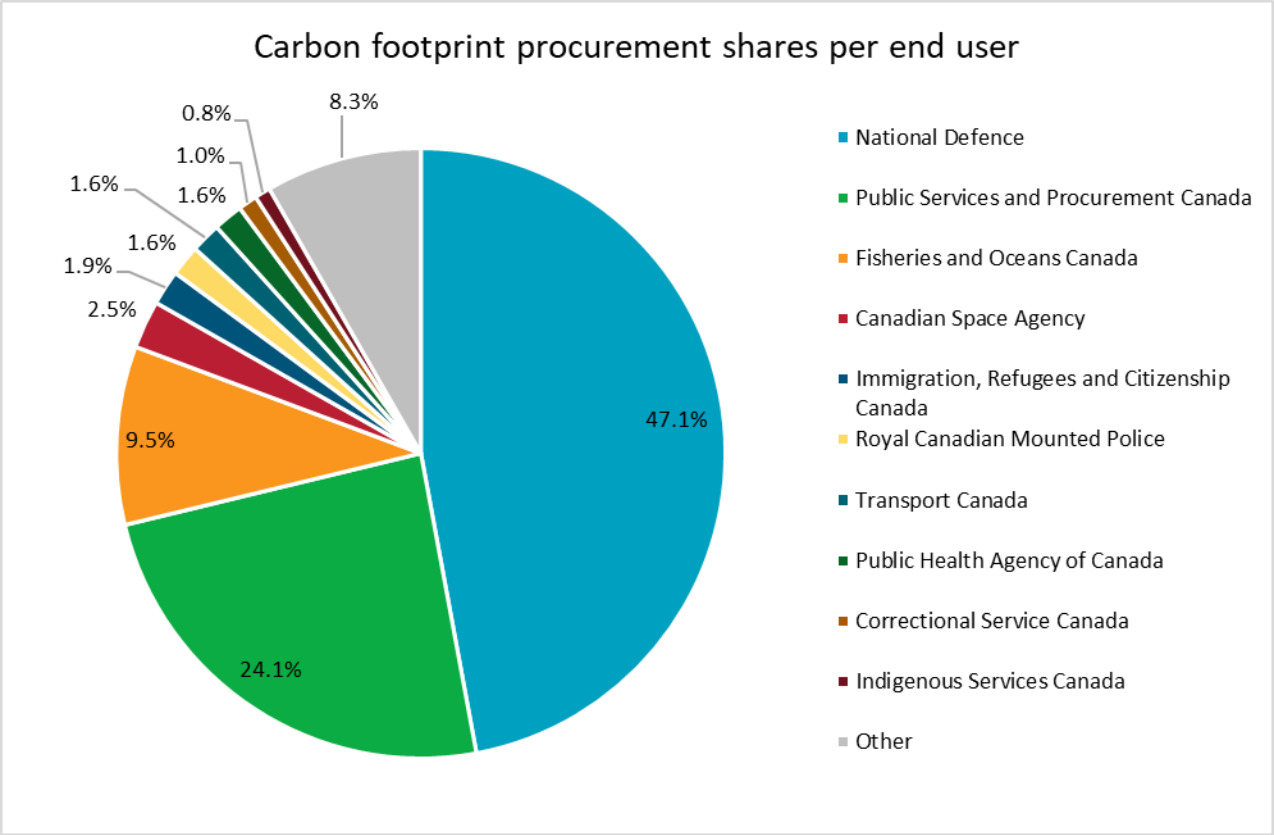

Figure 5: Federal government procurement carbon footprint per end user

4.2.2 Carbon footprint of the FG procurement per commodity

Here we regroup the contracts and their associated carbon footprint per GSIN commodity. Figure 6 shows the top 40 GSIN commodities HiCATs along with their equivalent UNSPSC and IOCC commodity codes. To ease the interpretation, we regroup the commodities into broader commodity groups. Note that the colors per group of Figure 6 match with those of Figure 4. We can see that the group contributing the most to the overall procurement carbon footprint of the FG is the Aircraft, equipment and maintenance group with 16.0%. In Figure 4 it only represented 10.1% of spending, being the third biggest contributor for the total spending. This indicates that the carbon intensity per CAD of this grouping is higher than the one for services, which makes sense. Other services and Architect and engineering services represent 10.2% and 9.7% respectively as the second and third biggest contributor of the overall procurement carbon footprint of the FG. This highlights that services represent a significant portion of the scope 3 GHG emissions of the FG, higher than vehicles or construction. The other groups among the top 40 commodities are Energy (5.5%) (reminder here than this study focuses on scope 3, emissions from the combustion of these fuels purchased by the FG are thus not included), Ships equipment and maintenance (5.1%), Scientific equipment and supplies (5.1%), Construction & Buildings (3.9%), Vehicles, equipment and maintenance (2.7%), Weapons (1.4%) and Software (1.4%). Among these HiCATs, the only group that was not part of the biggest contribution of the total spending is Weapons. This indicates an overall significant carbon intensity per CAD of commodities of that group.

gsin-nibs	GSIN description	ktCO2eq	% carbon footprint	Grouping	% carbon footprint	unspsc	IOCC
JX1510	Aircraft, Fixed Wing - (Military) Repair and Overhaul	161.8	0.7%	Aircraft, equipment and maintenance		25131700	MPS488002
N1510	Aircraft, Fixed Wing	329.4	1.4%	Aircraft, equipment and maintenance		25131504	MPG336401
JX1510A	Aircraft, Fixed Wing - Repair and Overhaul (Military)	677.9	2.9%	Aircraft, equipment and maintenance		25131700	MPS488002
N1520	Aircraft, Rotary Wing	328.5	1.4%	Aircraft, equipment and maintenance		25131900	MPG336401
JX1520B	Helicopters (Military) Repair and Overhaul	716.2	3.1%	Aircraft, equipment and maintenance	16.0%	25131900	MPS488002
N1520B	Helicopters (Military)	274.5	1.2%	Aircraft, equipment and maintenance		25131902	MPG336401
N1550	Unmanned Aircraft	602.8	2.6%	Aircraft, equipment and maintenance		25132102	MPG336401
N1810	Space Vehicles	503.0	2.1%	Aircraft, equipment and maintenance		25151500	MPG336403
N2840	Gas Turbines and Jet Engines, Aircraft, Prime Moving and Components	150.6	0.6%	Aircraft, equipment and maintenance		26101508	MPG336402
M190A	Property and Facilities Management - Buildings	913.4	3.9%	Other services		80131801	MPS561700
M190D	Operations & Maintenance of a Military Base	234.4	1.0%	Other services		92112300	MPS561700
D302	OADP Systems Development Services	139.9	0.6%	Other services		81110000	MPS541503
D302A	Informatics Professional Services	429.5	1.8%	Other services	10.2%	81110000	MPS541503
K199	Other Custodial and Related Services	177.4	0.8%	Other services		72100000	MPS561700
R019BF	Human Resource Services, Business Consulting	200.7	0.9%	Other services		80101507	MPS541600
R199	Other Administrative and Management Support Services	287.1	1.2%	Other services		80101507	MPS541909
C216A	Naval Architecture	408.6	1.7%	Architect and Engineering Services		81101506	MPS541300
C216AB	Naval Architecture - Design Services	577.2	2.5%	Architect and Engineering Services		81101506	MPS541300
C216BA	Marine Systems and Engineering	143.5	0.6%	Architect and Engineering Services	9.7%	81102100	MPS541300
C216C	Marine Architect and Engineering Services	553.6	2.4%	Architect and Engineering Services		81101506	MPS541300
C219	Other Architect and Engineering Services	308.8	1.3%	Architect and Engineering Services		81100000	MPS541300
C219BK	Engineering Services - Construction Management	283.8	1.2%	Architect and Engineering Services		81100000	MPS541300
N9130E	Aviation Fuel	447.9	1.9%	Energy	5.5%	15101504	ENE324114
N9140	Middle Distillate Fuels	850.0	3.6%	Energy		15101500	ENE324112
J019A	Maintenance, Repair, Modification, Rebuilding & Installation of Equipment related to Ships	245.8	1.0%	Ships, equipment and maintenance		78182000	MPS488004
JX1990A	Ships and Vessels (large) - Repair, Refits and Conversions (including Dry Docking)	320.6	1.4%	Ships, equipment and maintenance	5.1%	25111500	MPS488004
N1910	Transport Vessels, Passenger and Troop	139.5	0.6%	Ships, equipment and maintenance		25111500	MPG336601
N1990	Vessels, Miscellaneous	488.7	2.1%	Ships, equipment and maintenance		25111500	MPG336601
N6505	Drugs and Biologicals	1058.7	4.5%	Scientific equipment and supplies	5.1%	51000000	MPG325400
N6640	Laboratory Equipment and Supplies	135.6	0.6%	Scientific equipment and supplies		41100000	MPG334A06
5123	Construction Services of Industrial Buildings	329.1	1.4%	Construction & Buildings		72120000	MPG23B001
5129B	Construction of Other Buildings	270.3	1.2%	Construction & Buildings	3.9%	72130000	MPG23B007
5139D	General Marine Construction Work	134.4	0.6%	Construction & Buildings		72000000	MPG23C501
N5410	Prefabricated and Portable Buildings	185.7	0.8%	Construction & Buildings		30201500	MPG321904
N2310	Passenger Motor Vehicles	207.1	0.9%	Vehicles, equipment and maintenance		25101500	MPG336111
N2320	Trucks and Truck Tractors, Wheeled	271.2	1.2%	Vehicles, equipment and maintenance	2.7%	25102100	MPG336120
N2350	Combat, Assault, and Tactical Vehicles, Tracked	162.7	0.7%	Vehicles, equipment and maintenance		25102000	MPG336900
N1305	Ammunition, through 30mm	150.8	0.6%	Weapons	1.4%	46101601	MPG332A04
N1336	Guided Missile Warheads and Explosive Components	180.1	0.8%	Weapons		46121603	MPG332A04
N7030	ADP Software	317.2	1.4%	Software	1.4%	43232600	MPS511200
	Total	23437.4	61.0%				

Figure 6: Federal government procurement carbon footprint per GSIN commodity

4.2.3 Carbon footprint of the FG procurement per supplier country

One final assessment consists in regrouping the contracts and their associated carbon footprint per supplier country. As a reminder, our working hypothesis in this study is that we consider the country of supplier as the country where the commodity is produced, in the absence of better information. Without surprises, we can see in Figure 7 that most of the carbon footprint comes from Canadian suppliers (85.1%) which is in line with the Buy Canadian policy of the FG. American suppliers correspond to 10% of the carbon footprint, followed by British (1.6%) and German ones (0.9%).

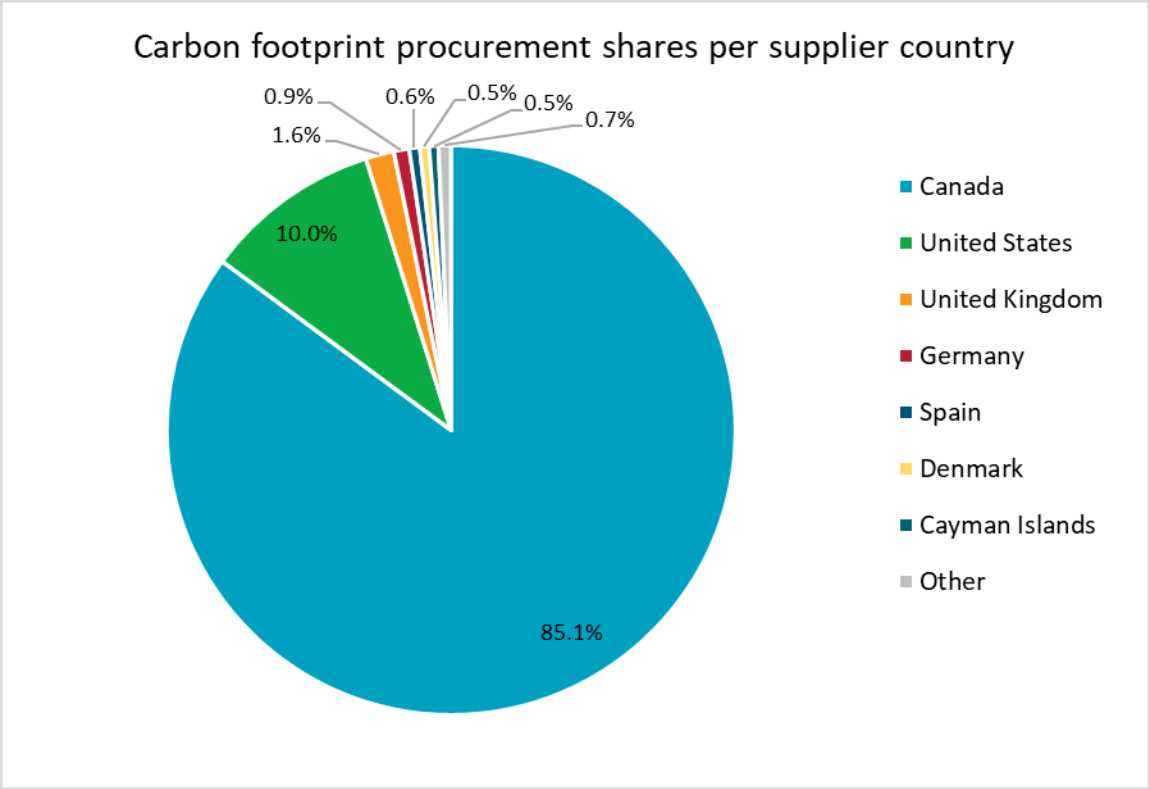

Figure 7: Federal government procurement carbon footprint per supplier country

5 Limitations

There are many limitations linked to this study. Here we described the three main limitations.

1. The main limitation of this study is the fact that we rely on Input-Output data. As a result, the data is not specific to the FG's suppliers. Instead, it represents average sectoral data. In addition, it does not reflect potential mitigation strategies that FG's supplier could have implemented. So, for contracts purchasing, e.g., "a spectrometer" we are using average emission factors for "Measuring, control and scientific instruments". So there are no differences (in $kgCO_2eq/CAD$) between a spectrometer and a thermometer, and there are also no differences (in $kgCO_2eq/CAD$) between two different types/brands/suppliers of spectrometers.
2. Another major limitation is the assumption that we adopted about using the location of manufacturing. Ince the information was not available in CanadaBuys data, we relied on the location of the signing entity of the company, which is provided within CanadaBuys data. However, in reality, the manufacturing site is not necessarily in the same province/country as the location of the signing entity. For many contracts, the manufacturing location is thus probably not the correct one.
3. Finally, data from IT-related procurement contracts were limited, because we only relied on CanadaBuys data. Most of the IT-related procurement contracts of the FG are managed by SSC and not by PSPC. The scope of the study is thus limited, which leads to an underestimation of the procurement carbon footprint of the FG. Adding SSC data to the study would increase the representativeness of this study.

The primary purpose of this study and its methodology is to identify HiCATs, in order to prioritize actions for reducing procurement carbon footprints. Yet, despite the limitations and uncertainty of this work, it could also be used as coarse key performance indicators (KPIs) to track progress across years, for departments with limited available internal experience. For departments that have access to more expertise, this study would most likely not provide a strong basis for KPIs by itself. Indeed, since this work relies on generic average emission factors, it is not possible to reflect progress made from suppliers themselves or from the department choosing less carbon intensive suppliers. Instead, communicating and obtaining emission factors from suppliers would make for much more robust KPIs. However, since it is very unlikely to obtain supplier specific emission factors for all the procurement of a given department, a hybrid approach mixing average data and supplier specific data would be a good, realistic compromise.

6 Conclusion

This study assessed the procurement carbon footprint of the whole Canadian federal government through the CanadaBuys dataset over five fiscal years from 2020 to 2025. The carbon footprint of all the contracts within this database were assessed by connecting them to their corresponding sector of the economy in the OpenIO-Canada database. This resulted in an estimated carbon footprint of around 23.4 $MtCO_2eq$, that is, an average 4.7 $MtCO_2eq$/year. This result corresponds to a Scope 3 (excluding direct emissions from the government and emissions due to electricity generation) cradle-to-gate approach (i.e., excluding use and end-of-life of contracts). Moreover, it excluded most IT related procurement as the latter are not contained within the CanadaBuys dataset.

This study allowed the identification of several High Impact Categories of procurement (HiCATs) within the government procurement. Depending on the product classification followed, these HiCATs can be slightly different. However, we can consistently observe the presence of a few commodities within the HiCATS regardless of the classification followed, that is, aircraft commodities, naval commodities, pharmaceutical products, fuels, engineering/computer services, management and construction of buildings. To these HiCATS we can certainly add IT hardware which is often responsible for a significant portion of carbon emissions, even though it was not included in this study.

In terms of end user entities, the majority of the procurement carbon footprint of the FG is concentrated in three departments: the Department of National Defence (DND) representing 47.1% of the total procurement carbon footprint, Public Services and Procurement Canada (PSPC) with 24.1% and the Fisheries and Oceans Canada (DFO) with 9.5%. The HiCATs identification was performed for the 30 end users generating the most carbon emissions over the reference period.

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8 Appendix

This appendix provides the detailed analyses of the procurement carbon footprint for the 30 end users that contributes the most to the overall procurement carbon footprint of the FG. For each of these 30 end users, we only focus on the identification of HiCATs through the lens of one of the classifications: the IOCC one. However, the Excel files provided per end user contains all the information to perform the same analysis with the two other classifications (GSIN and UNSPSC). We are simply selecting one indicator to avoid overloading this report.

8.1 Carbon footprint of National Defence (DND) procurement

Between 2020 and 2025, procurement contracts for the Department of National Defence (DND) generated a total of 10.98 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly the equivalent to driving around the Earth's equator 1,185,840 times or the equivalent of the average yearly emissions of 549,000 Canadians.

The data shows that emissions are highly concentrated in a few specific areas. Half of the department's procurement carbon footprint (51%) comes from just four categories: Aircraft maintenance (15%), the purchase of Aircraft (14%), Engineering services (12%) and Weapons and ammunitions (10%).

Key trends

- Heavy machinery and transport: A significant portion of the department's carbon footprint is driven by the manufacture and maintenance of vehicles—ranging from aircraft and ships to heavy-duty trucks.
- Support services: Beyond physical goods, high-value contracts for architectural and engineering services also carry a heavy carbon footprint due to embodied emissions in the materials and energy used to provide those services.
- The "Other" category: There are many small contracts, 31% of the carbon footprint is spread across a wide variety of smaller contributing commodities, suggesting that while the HiCATs items are the priority, total reduction will require department-wide changes.

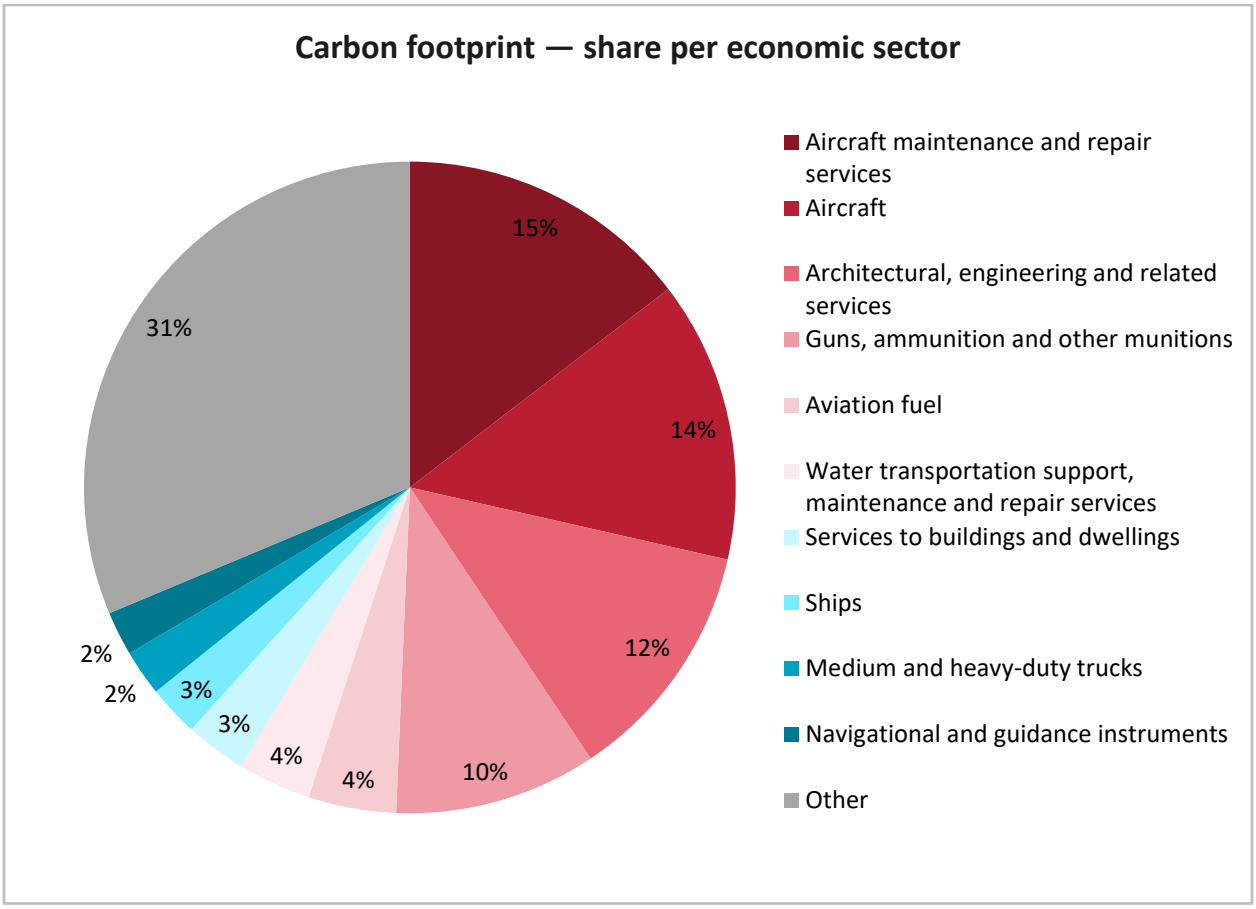

Figure 8: Department of National Defence procurement carbon footprint per IOCC commodity

8.2 Carbon footprint of Public Services and Procurement Canada (PSPC) procurement

Between 2020 and 2025, procurement contracts for the Department of Public Works and Government Services (PSPC) generated a total of 5.63 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 608,000 times or the equivalent of the average yearly emissions of 281,500 Canadians.

The data shows that emissions are concentrated in three main pillars: Building Operations, Healthcare, and Professional Services. Nearly half of the department's procurement carbon footprint (42%) comes from just three categories: Services to buildings and dwellings (17%), Pharmaceutical and medicinal products (13%), and Engineering services (12%).

Key trends

- Infrastructure and building maintenance: The largest single driver of emissions (17%) comes from maintaining and operating buildings. When combined with construction services and specialized building types, the "Built Environment" represents a major portion of the department's carbon footprint.

- Healthcare supply chain: Pharmaceuticals (13%) emerge as a top contributor. This reflects the high energy intensity required to manufacture, potentially refrigerate, and transport medical supplies, as well as the sheer number of pharmaceuticals purchased by the department.
- Professional and technical expertise: A fifth of the footprint (20%) is linked to "knowledge-based" services (Engineering and Consulting). This highlights that even non-industrial contracts carry significant "hidden" emissions from the material and energy used to carry out studies.
- The "Other" category: 25% of the footprint is spread across many smaller contributing commodities. Even though almost 50% of the contribution is concentrated in the top four categories, the non-negligeable “Other” category suggests that while the HiCATs items are the priority, total reduction will require department-wide changes.

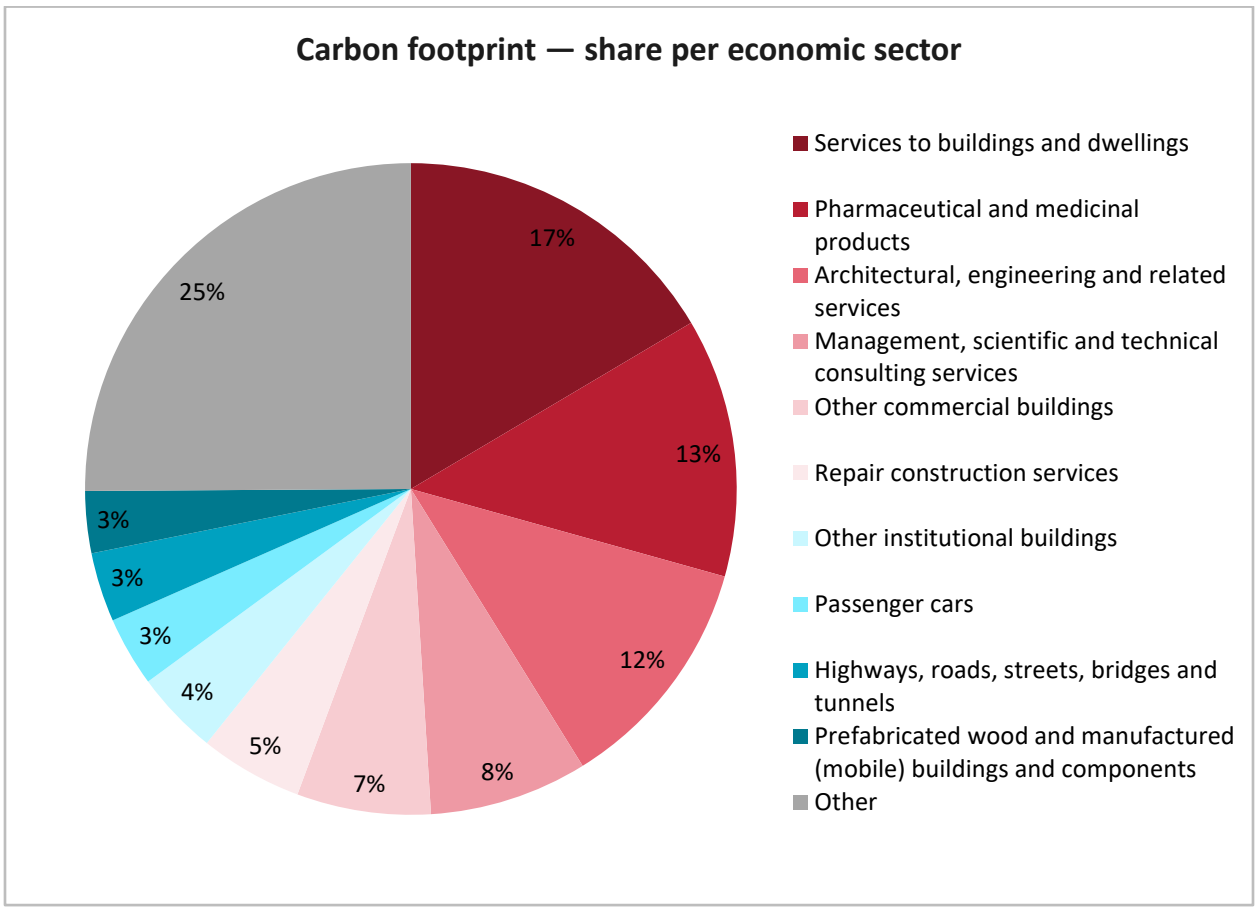

Figure 9: Department of Public Services and Procurement Canada procurement carbon footprint per IOCC commodity

8.3 Carbon footprint of Fisheries and Oceans Canada (DFO) procurement

Between 2020 and 2025, procurement contracts for Fisheries and Oceans Canada (DFO) generated a total of 2.20 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth’s equator 237,600 times or the equivalent of the average yearly emissions of

110,000 Canadians.

The data shows that emissions are extremely concentrated in the maritime sector and its associated professional services. Over half of the department's procurement carbon footprint (50%) comes from just two categories: Architectural and Engineering services (26%) and the purchase of Ships (24%).

Key trends

- Maritime operations: The department’s carbon footprint is overwhelmingly driven by its fleet. The purchase of ships, water transportation support, and marine-specific engineering account for the vast majority of the total footprint.
- Design and infrastructure: The largest single share (26%) comes from Architectural and Engineering services. This indicates that the carbon footprint of the department is heavily tied to the complex design and technical planning required for major marine vessels and coastal infrastructure.
- Fuel consumption: Beyond the vessels themselves, the purchase of Diesel and Biodiesel fuels (15%) represents a major ongoing source of emissions, highlighting the energy-intensive nature presence on the water. Do note however, that this study only accounts for the emissions from producing fuel, not from burning it in an engine.
- A concentrated footprint: The "Other" category’s contribution is 9%. This means that almost all of the department's carbon footprint is tied to a small number of high-impact industrial activities, providing a very clear roadmap for where reduction efforts should be focused.

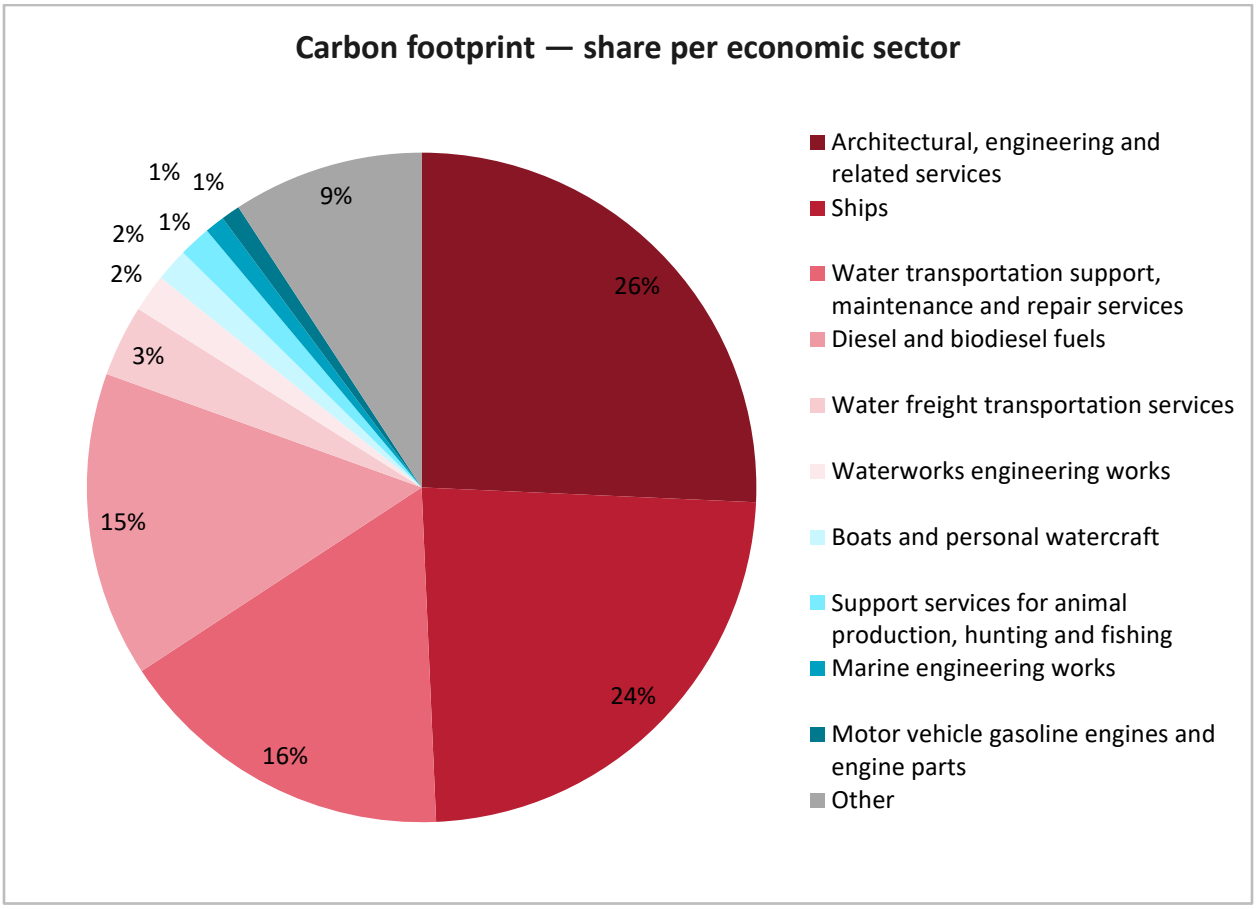

Figure 10: Department of Fisheries and Oceans Canada procurement carbon footprint per IOCC commodity

8.4 Carbon footprint of the Canadian Space Agency (CSA) procurement

Between 2020 and 2025, procurement contracts for the Canadian Space Agency (CSA) generated a total of 0.59 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 63,720 times or the equivalent of the average yearly emissions of 29,500 Canadians.

The data shows that emissions are extremely concentrated in one primary sector. Unlike a diversified footprint, the vast majority of the agency's procurement carbon footprint (85%) comes from a single category: Aircraft parts and other aerospace equipment. This is primarily linked to the Canadarm3 project.

Key trends

- Dominance of aerospace: The overwhelming driver of the agency's carbon footprint is the procurement of aerospace-related hardware. This suggests that decarbonization efforts must be centered almost exclusively on aerospace supply chains to achieve meaningful results.
- Professional services: While significantly smaller than Aerospace, Architectural, engineering, and related services (8%) and Research and development services (3%) represent the next largest

shares. These highlight the carbon weight associated with the high-level technical planning and innovation phases of procurement, which is linked to the embodied carbon emissions from energy and materials required to provide services.

- The long tail of commodities: The remaining 4% of the carbon footprint is spread across various sectors including data processing, fuels, and infrastructure. While these categories are numerous, their individual impact is marginal compared to the primary aerospace contracts, indicating that a "top-heavy" reduction strategy is required.

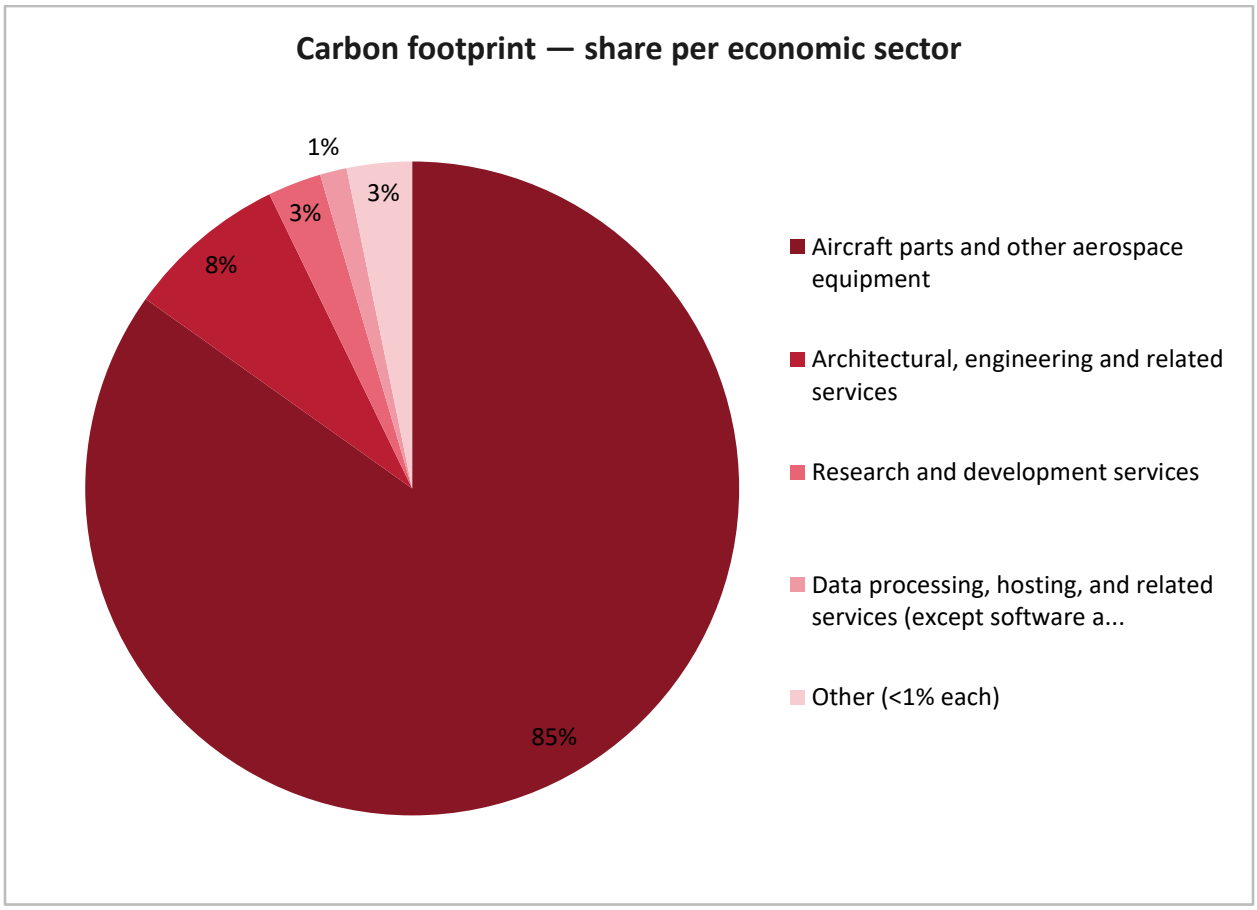

Figure 11: Canadian Space Agency procurement carbon footprint per IOCC commodity

8.5 Carbon footprint of Immigration, Refugees and Citizenship Canada (IRCC) procurement

Between 2020 and 2025, procurement contracts for Immigration, Refugees and Citizenship Canada (IRCC) generated a total of 0.43 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 46,440 times or the equivalent of the average yearly emissions of 21,500 Canadians.

The data shows that emissions are highly concentrated in service-oriented sectors. Remarkably, over three-quarters of the department's procurement carbon footprint (86%) comes from just four categories: Consulting services (30%), Accommodation (24%), Computer systems design (21%), and Transportation

(11%).

Key trends

- Professional and digital services: A significant portion of the department's carbon footprint is driven by knowledge-based sectors. Consulting and IT systems design alone account for over half the footprint (51%), due to the embodied carbon emissions from energy and materials required to provide services in general.
- Travel and logistics: The footprint is heavily influenced by the movement and housing of personnel. Accommodation services for travelers (24%) and Freight/Customs services (11%) represent a combined 35%, highlighting the carbon intensity of the department's travel and supply chain logistics.
- The "Other" category: The "Other" category representing contracts with less than 1% contribution, in addition to other remaining small contracts account for 14% of the footprint. This suggests that while department-wide changes are always beneficial, carbon reduction efforts will yield the most immediate results by targeting high-value service and travel contracts.

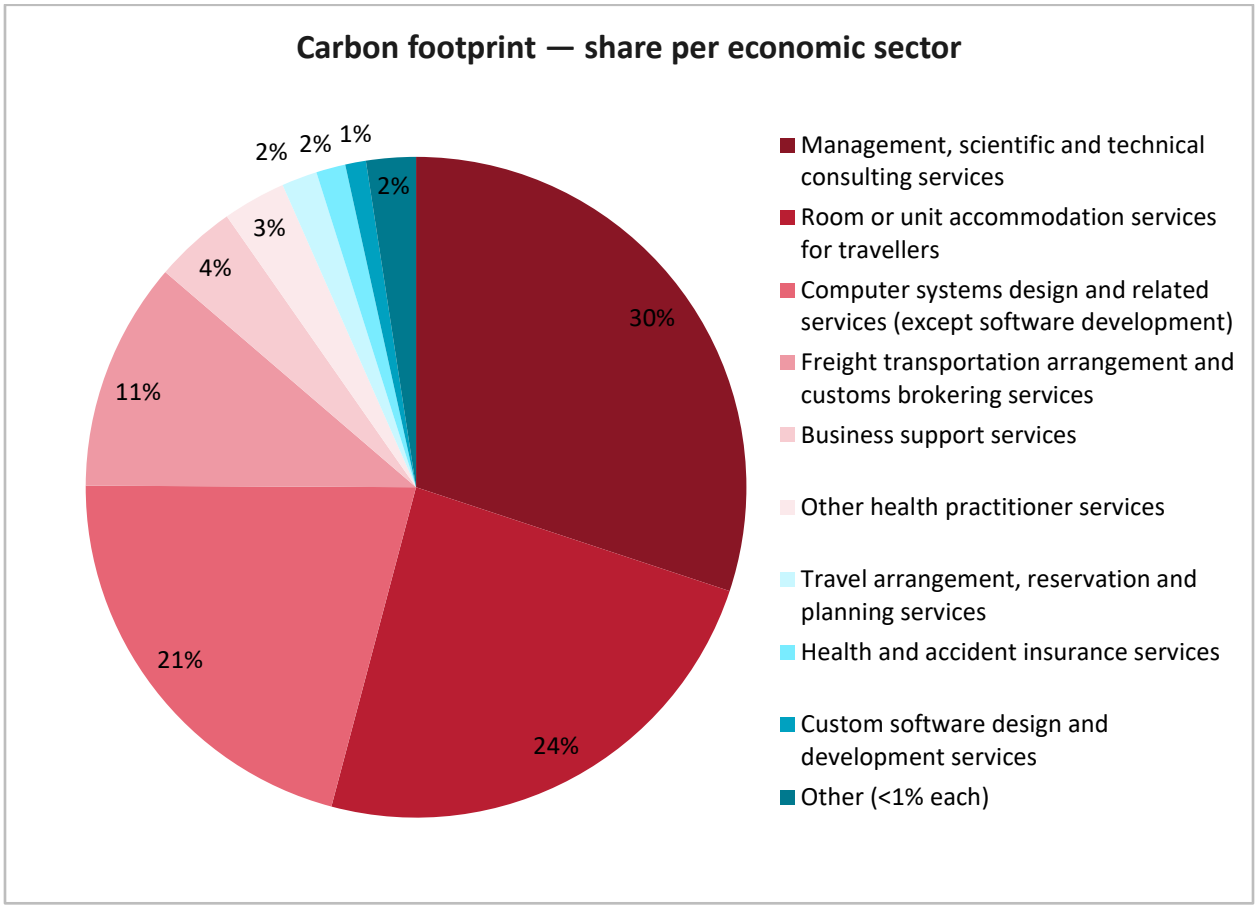

Figure 12: Immigration, Refugees and Citizenship Canada procurement carbon footprint

per IOCC commodity

8.6 Carbon footprint of the Royal Canadian Mounted Police (RCMP) procurement

Between 2020 and 2025, procurement contracts for the Royal Canadian Mounted Police (RCMP) generated a total of 0.38 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 41,040 times or the equivalent of the average yearly emissions of 19,000 Canadians.

The data shows that emissions are spread across multiple areas instead of being concentrated in a few specific ones. The department's procurement carbon footprint top contributing categories are Audio and video equipment (12%), Repair construction services (11%), Road transportation services for general freight (7%).

Key trends

- Technology and infrastructure: A dominant portion of the carbon footprint is driven by high-tech hardware and the maintenance of physical assets—specifically Audio and video equipment (which is most likely related to the body cameras of police officers), Other communications equipment and Repair construction services, which together account for more than a quarter of all emissions.
- Logistics and energy: Transportation remains a critical factor, with Road transportation services, Aviation fuel, Medium and heavy-duty trucks and Boats and personal watercraft representing a significant 20% of the total footprint.
- The "Other" Category: While the top categories are the priority for targeted reduction, 39% of the footprint is spread across a wide variety of smaller contribution commodities. This suggests that decarbonizing will require broad, department-wide changes rather than focusing solely on the highest-ranking categories.

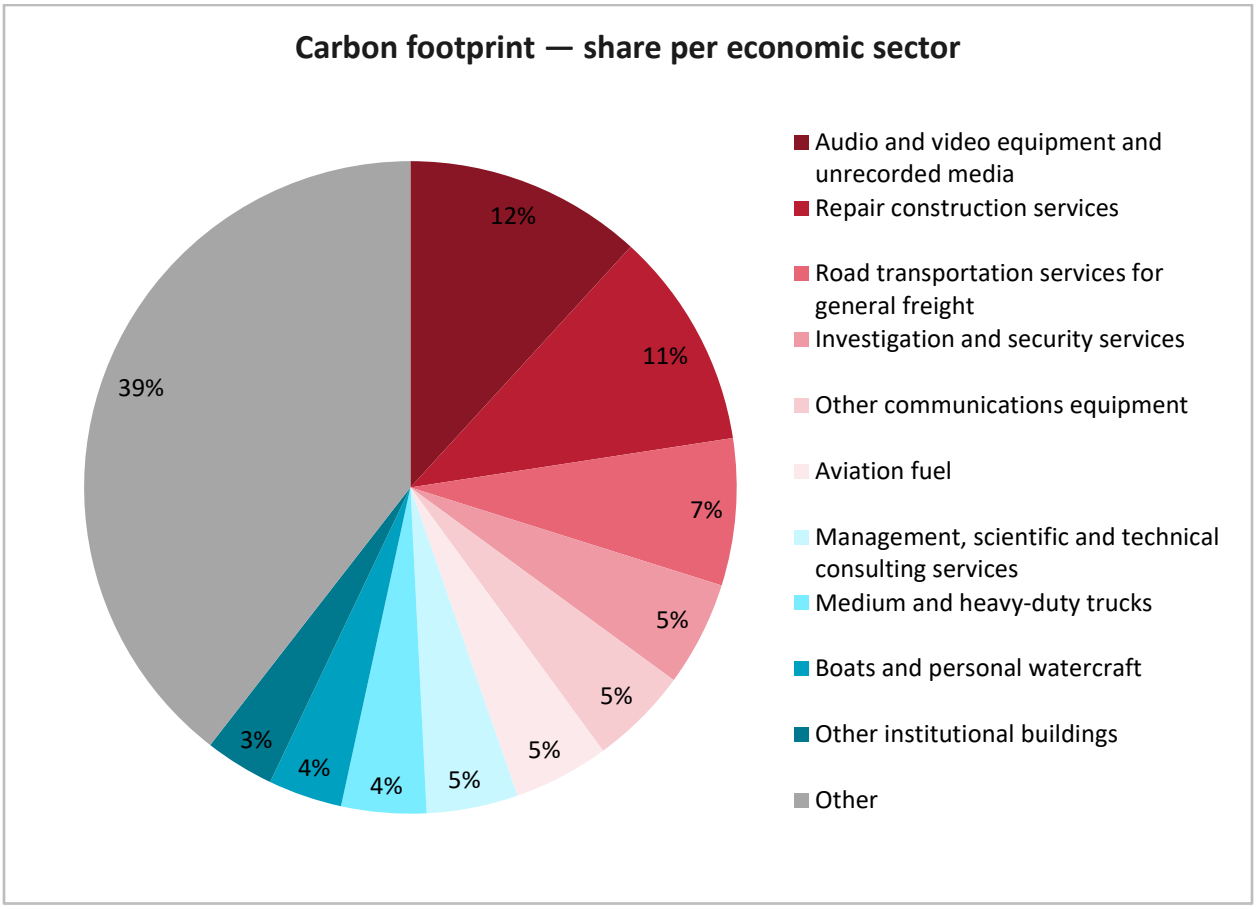

Figure 13: The Royal Canadian Mounted Police procurement carbon footprint per IOCC commodity

8.7 Carbon footprint of Transport Canada (TC) procurement

Between 2020 and 2025, procurement contracts for Transport Canada (TC) generated a total of 0.37 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 39,960 times or the equivalent of the average yearly emissions of 18,500 Canadians.

The data shows that emissions are highly concentrated in a few specific areas. Over three-quarters of the department's procurement carbon footprint (76%) comes from just four categories: Ships (26%), Facilities and other support services (21%), Architectural, engineering and related services (19%), and Aviation fuel (10%).

Key trends

- Maritime and air transport: An important portion of the department's carbon footprint is driven by the maritime sector, with Ships representing the single largest share at 26%. When combined with Aviation fuel (10%), Aircraft maintenance and repair services (4%) and Diesel and biodiesel fuels (1%), heavy transport and its energy requirements dominate the footprint. Note that this study only considers the GHG emissions from producing the fuel, and not from its combustion in

an engine.

- Infrastructure and professional services: Beyond physical assets, high-value contracts for Facilities and other support services (21%) and Architectural and engineering services (19%) carry a heavy carbon weight. This highlights the significant embodied emissions within the energy and materials required to provide services.
- The "Other" Category: The carbon footprint for TC's procurement is much more consolidated at the top. The "Other" category accounts for only 8% of the total, suggesting that while department-wide changes are always beneficial, the most impactful reductions will come from focusing on the top four high-emission sectors.

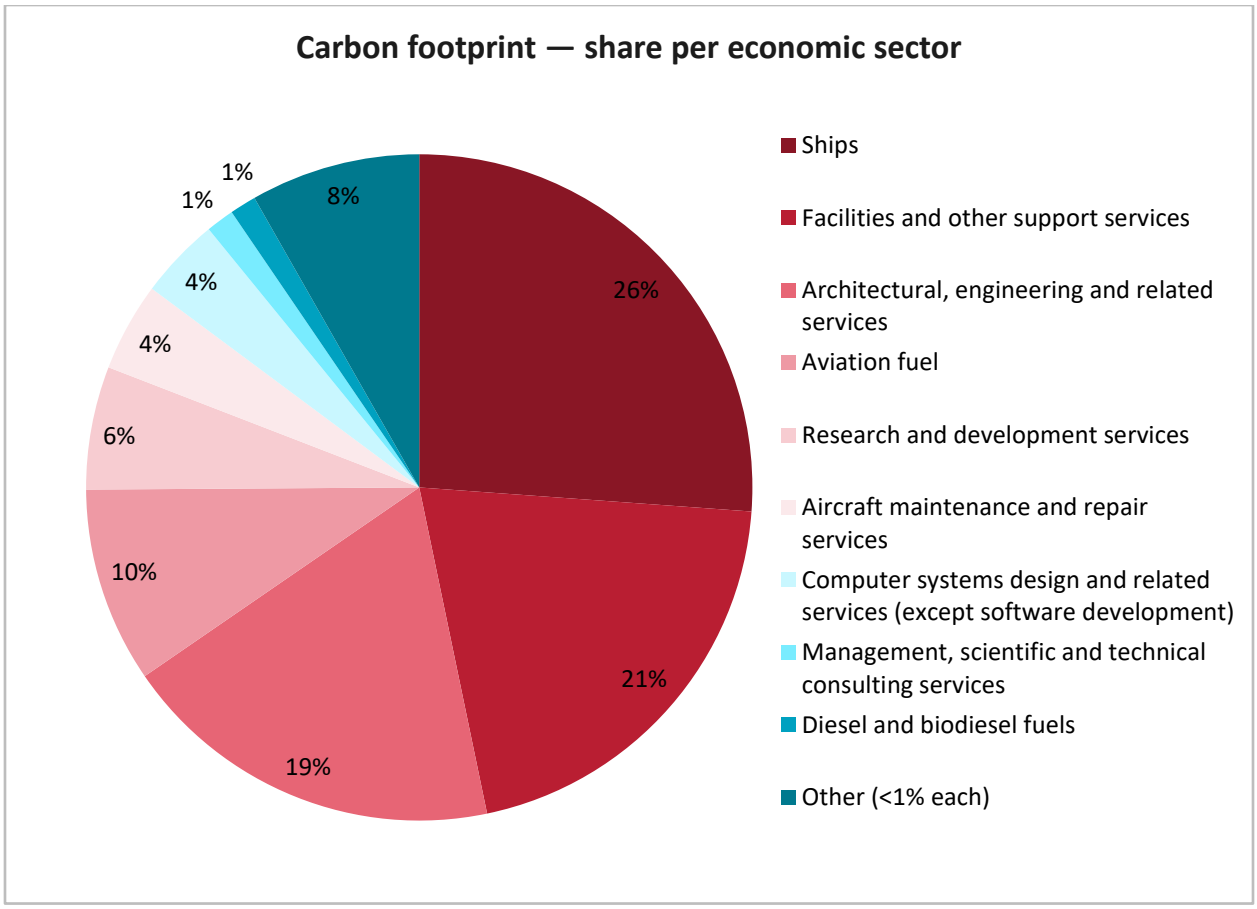

Figure 14: Transport Canada procurement carbon footprint per IOCC commodity

8.8 Carbon footprint of Public Health Agency of Canada (PHAC) procurement

Between 2020 and 2025, procurement contracts for the Public Health Agency of Canada (PHAC) generated a total of 0.36 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 38,880 times or the equivalent of the average yearly emissions of

18,000 Canadians.

The data shows that emissions are exceptionally concentrated in a few specific areas. Around nine tenths of the department's procurement carbon footprint (89%) comes from just four categories: Pharmaceutical and medicinal products (63%), Measuring, control and scientific instruments (19%), Services to buildings and dwellings (4%), and Warehousing and storage services (3%).

Key trends

- Pharmaceutical dominance: A massive portion of the department's carbon footprint, nearly two-thirds, is driven by the manufacture of Pharmaceutical and medicinal products (63%). This suggests that supply chain sustainability in the medical sector is the single most critical lever for carbon reduction.
- Scientific infrastructure: Beyond medications, high-value contracts for Measuring, control and scientific instruments account for nearly a fifth (19%) of the footprint. This reflects the high energy intensity and embodied emissions associated with manufacturing and maintaining precision medical and scientific hardware.
- The "Other" category: The "Other" category is quite small at only 6%. Unlike other departments where the footprint is spread across many smaller contributing commodities, the path to decarbonization here is very clearly defined: any significant progress must focus on the pharmaceuticals and scientific instruments supply chains.

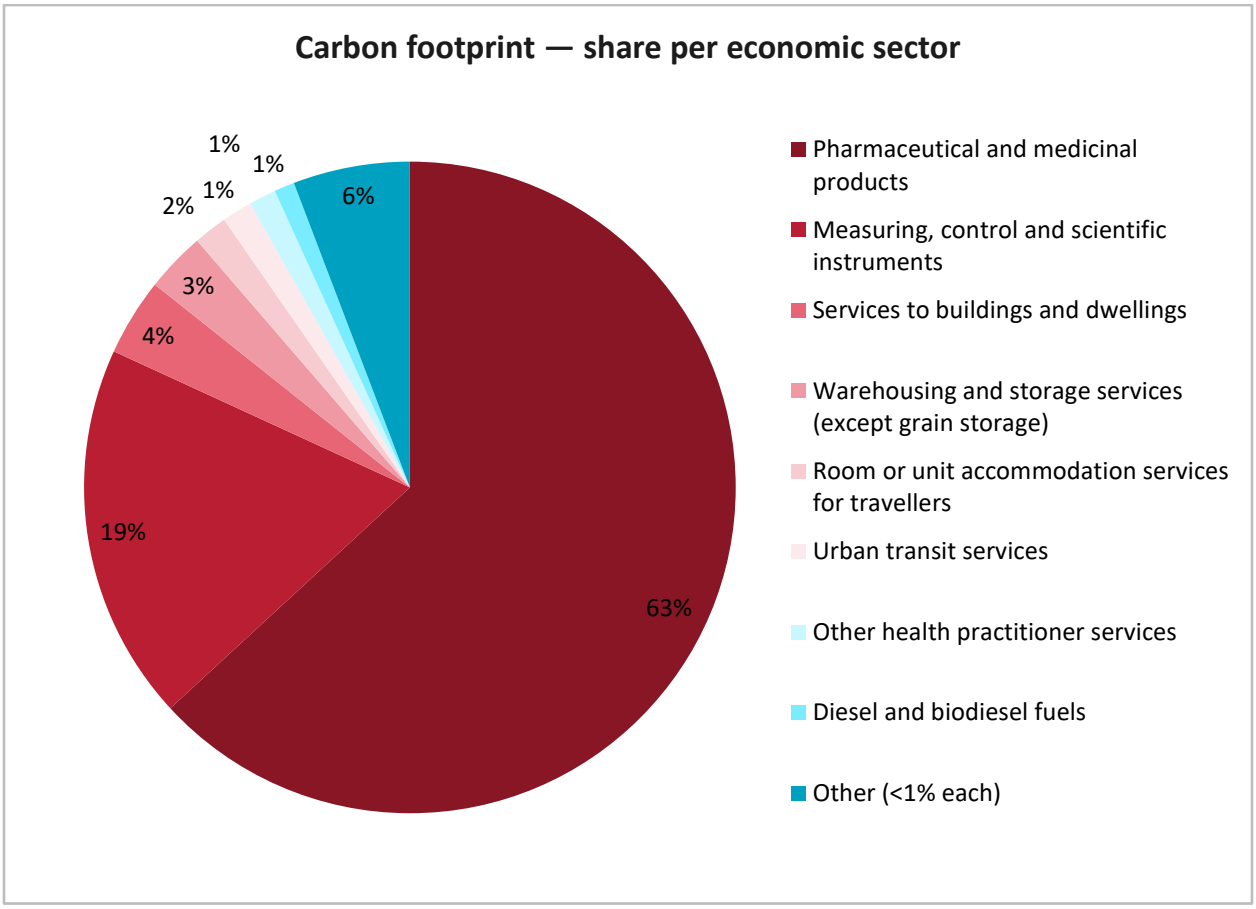

Figure 15: Public Health Agency of Canada procurement carbon footprint per IOCC commodity

8.9 Carbon footprint of Correctional Service Canada (CSC) procurement

Between 2020 and 2025, procurement contracts for Correctional Service Canada (CSC) generated a total of 0.24 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 25,920 times or the equivalent of the average yearly emissions of 12,000 Canadians.

The data shows that emissions are concentrated in professional services and food supply chains but still span over many different types of contracts. Over half of the department's procurement carbon footprint (55%) comes from five categories: Consulting services, Computer systems, Vegetables, Fruits, and Pharmaceuticals.

Key trends

- Professional and technical Services: The largest share of the footprint comes from the intelligence of the department. Management, scientific, and technical consulting (12%) combined with Computer systems design (10%) account for nearly a quarter of all procurement emissions. This suggests that the carbon emissions are tied to the digital and intellectual infrastructure required to run the organization.

- The agricultural footprint: Interestingly, food procurement is an important driver of emissions. When combining Fresh vegetables (8%), Fresh fruit and nuts (7%), Poultry (5%), and Bakery products (3%), the total food supply chain accounts for 23% of the total footprint, nearly equalling the impact of all technical consulting services.
- Maintenance and infrastructure: Physical upkeep and heavy maintenance operations also play a notable role. Repair and maintenance services (4%), Repair construction (4%), and Office furniture (3%) represent the ongoing physical requirements of maintaining operational facilities.
- The "Other" category: The footprint of CSC is relatively fragmented. The "Other" category is substantial at 39%, indicating that emissions are spread across a wide variety of smaller contracts. This suggests that reduction efforts cannot focus on just one or two "silver bullets" but will require a broad-based sustainability strategy across many diverse vendors and service providers.

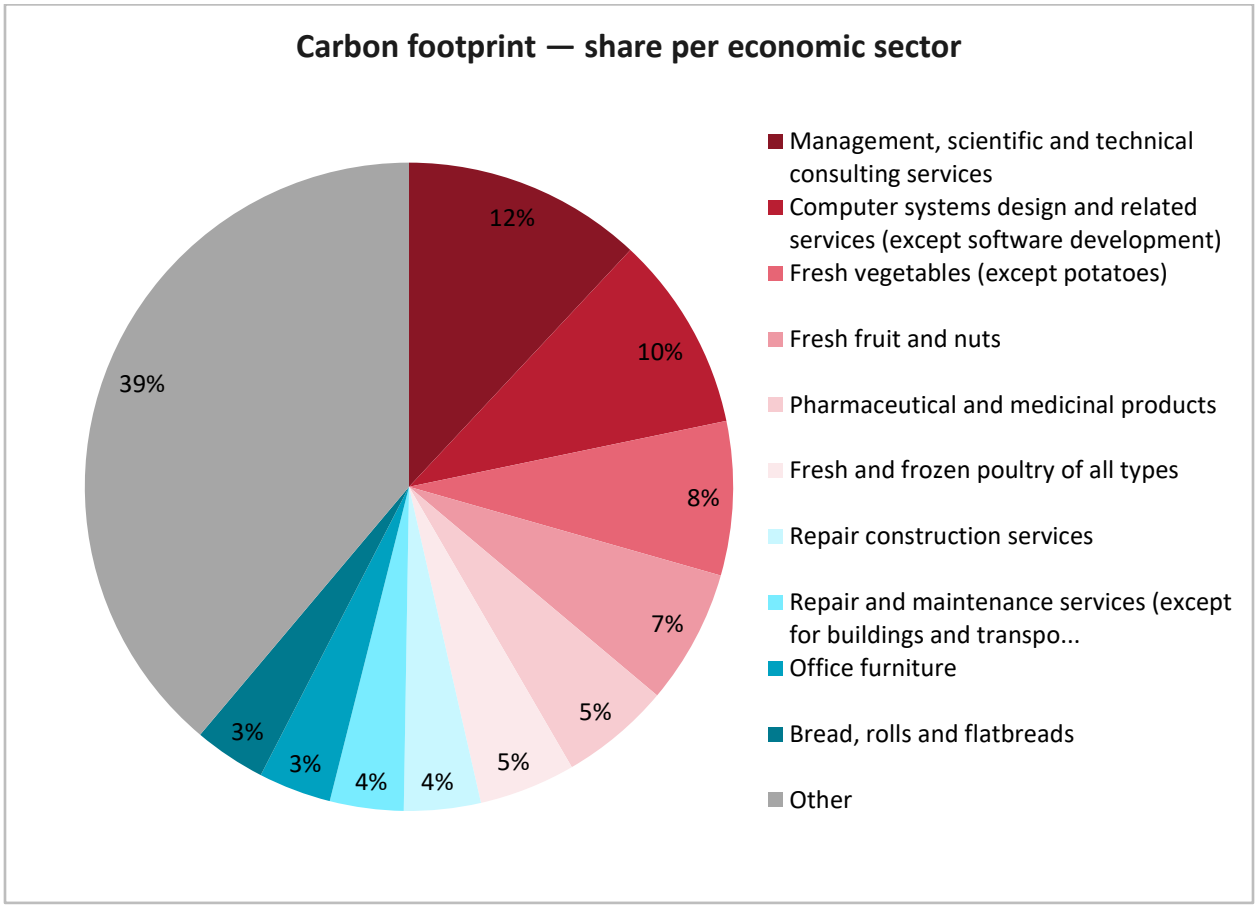

Figure 16: Correctional Service Canada procurement carbon footprint per IOCC commodity

8.10 Carbon footprint of Indigenous Services Canada (ISC) procurement

Between 2020 and 2025, procurement contracts for Indigenous Services Canada (ISC) generated a total of 0.19 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 20,520 times or the equivalent of the average yearly emissions of 9,500

Canadians.

The data shows that emissions are extremely concentrated in the aviation and healthcare services sectors. Nearly nine-tenths of the department's procurement carbon footprint (88%) comes from just two categories: Air passenger transportation (75%) and Other health practitioner services (13%).

Key trends

- Aviation and logistics: The department’s carbon footprint is overwhelmingly driven by air travel. With Air passenger transportation alone accounting for 75% of the total, the department's footprint is almost entirely defined by its flight requirements and associated travel logistics.
- Healthcare services: The second largest share (13%) comes from Other health practitioner services. Physician services also represent a non-negligible share of ISC’s procurement carbon footprint (2%). This indicates that a significant portion of the department's carbon emissions are tied to the procurement of healthcare support, which includes embodied carbon emission from procuring energy and materials to provide these services.
- Fuel and freight: Beyond direct passenger travel, the combination of Diesel and biodiesel fuels (2%) and Freight transportation (3%) represents an additional ongoing source of emissions, although this study only accounts for the production of these fuel and not their combustion.
- The "Other" category: Unlike other departments where the "Other" category shows a large contribution, here it is only 6%. This means that almost all of the department's carbon footprint is tied to a very small number of high-impact activities, providing an exceptionally clear roadmap for where reduction efforts, specifically regarding air travel, should be focused.

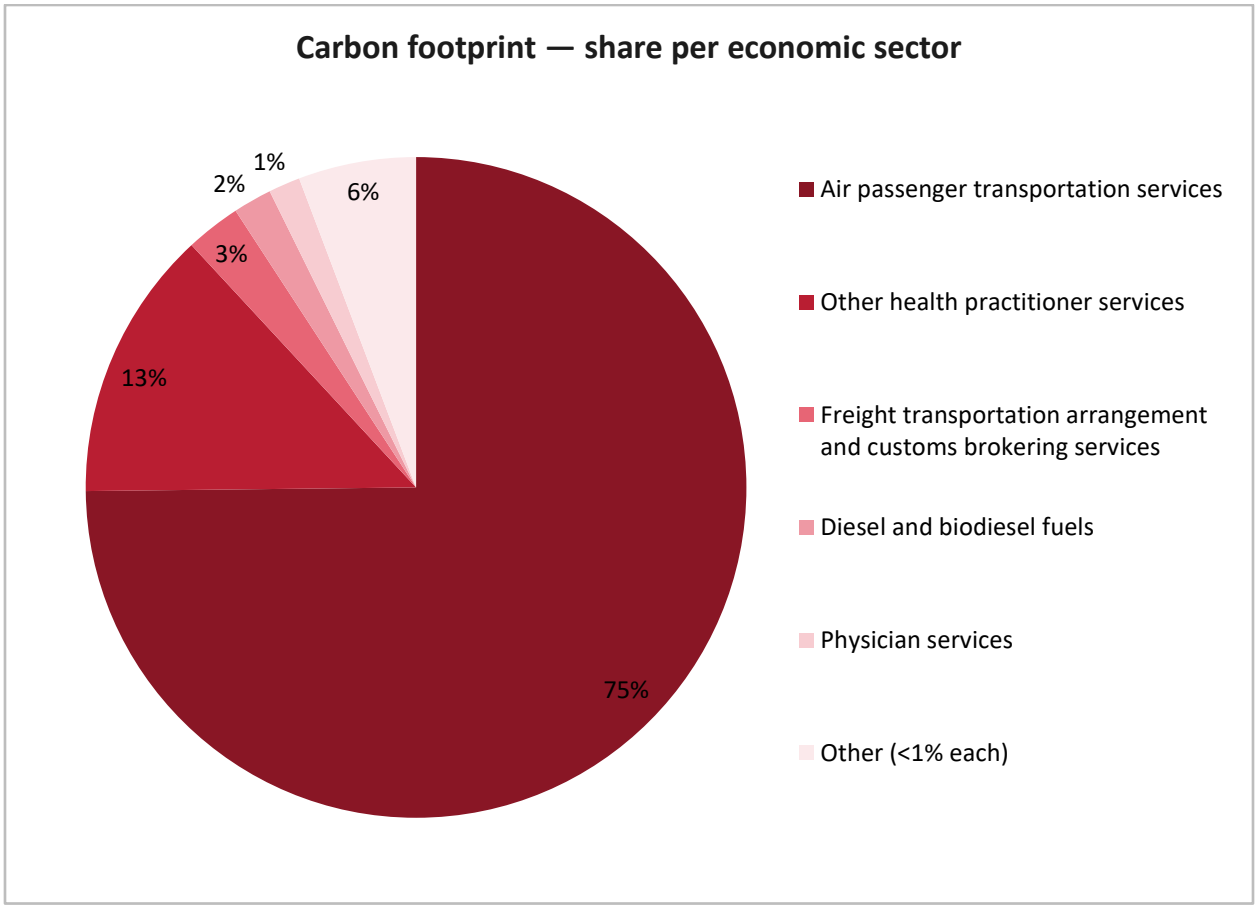

Figure 17: Indigenous Services Canada procurement carbon footprint per IOCC commodity

8.11 Carbon footprint of Employment and Social Development Canada (ESDC) procurement

Between 2020 and 2025, procurement contracts for Employment and Social Development Canada (ESDC) generated a total of 0.18 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 19,440 times or the equivalent of the average yearly emissions of 9,000 Canadians.

The data shows that emissions are heavily concentrated in digital infrastructure and professional consulting. Over half of the procurement carbon footprint (60%) comes from just two categories: Computer systems design and related services (34%) and Management, scientific, and technical consulting services (26%).

Key trends

- Digital and systems infrastructure: The largest single share of the footprint (34%) comes from Computer systems design. This indicates that the carbon emissions of the organization are tied to the energy-intensive data centers, hardware life cycles, and technical architecture required to maintain digital operations.
- Professional services and knowledge capital: A significant portion of the impact (26%) stems from

professional services spanning from consulting to advertising or health. This reflects a "Scope 3" heavy profile where the carbon footprint is embedded in the high volume of professional services procured rather than physical manufacturing.

- Financial and operational support: Beyond tech and consulting, Business support services (16%) and Credit intermediation services (12%) represent major ongoing sources of emissions. This highlights that even administrative and financial operations carry a substantial environmental weight in this specific procurement portfolio.
- Software vs. hardware: Interestingly, while systems design is the primary driver, General purpose software (6%) and Software licensing (1%) represent much smaller shares, suggesting that the primary carbon footprint lies in the services and hardware integration rather than the software products themselves.
- The "Other" category: ESDC's impact is effectively only spread across a few categories. Indeed, the "Other" category accounts for only 3%, meaning that nearly the entire carbon footprint is tied to a small number of service-oriented sectors. This provides a very clear roadmap: to achieve meaningful reductions, efforts must be focused on sustainable IT procurement and green service-level agreements with consulting partners.

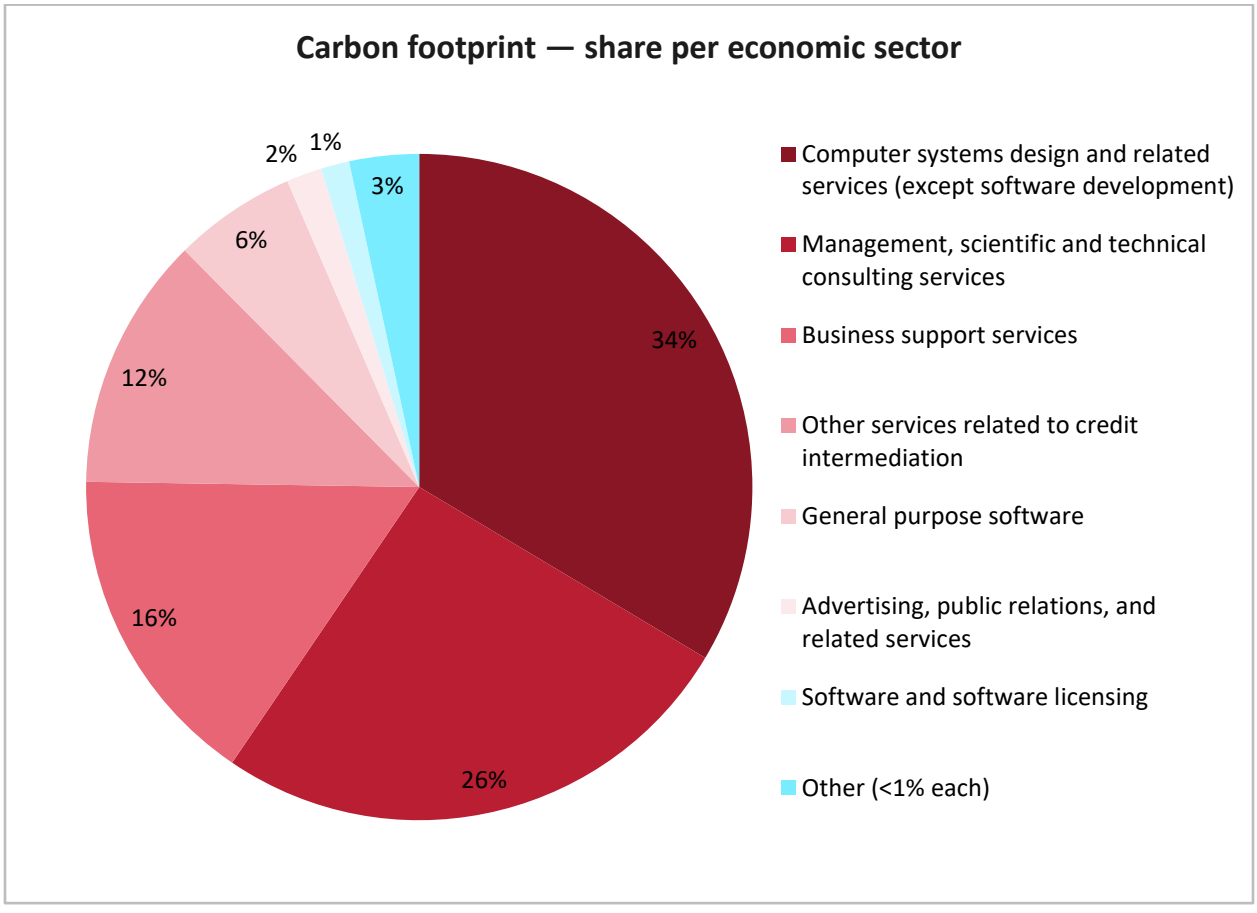

Figure 18: Employment and Social Development Canada procurement carbon footprint

8.12 Carbon footprint of Health Canada (HC) procurement

Between 2020 and 2025, procurement contracts for Health Canada (HC) generated a total of 0.17 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 18,360 times or the equivalent of the average yearly emissions of 8,500 Canadians.

The data shows that emissions are distributed across software, communication, and medical supply chains. Over half of the department's procurement carbon footprint (53%) comes from three primary categories: General purpose software (22%), Advertising and public relations services (16%), and Pharmaceutical products (15%).

Key trends

- Digital operations and software: The largest single share (22%) comes from General purpose software. This suggests that the department's carbon footprint is significantly influenced by the embodied carbon emissions within the energy and equipment required to produce software bought by the department. Working with software providers to diminish their own carbon footprint seems like a solid lead to reduce the department's carbon footprint.
- Communication and outreach: A substantial portion of the footprint (16%) is tied to Advertising, public relations, and related services. This indicates that the carbon emissions of the department include the large-scale logistical, digital and energetic requirements of public-facing campaigns and professional communication.
- Medical and care supply chains: A combined 24% of emissions stem from the healthcare sector, specifically Pharmaceutical products (15%) and Nursing and residential care services (9%). This highlights the carbon-intensive nature of medical manufacturing, sterile packaging, and the energy required to maintain specialized care facilities.
- Scientific and technical infrastructure: Beyond software, the procurement of Measuring, control, and scientific instruments (6%) and Computer systems design (5%) shows a reliance on high-tech hardware and precision engineering, which often carry high embodied carbon from specialized manufacturing processes.
- The "Other" category: In HC's case, the "Other" category is at 13%, and the remaining impact is spread across logistics (Warehousing, 5%) and travel (Air passenger services, 5%). This profile suggests that reduction efforts must be multifaceted, focusing on green software procurement, sustainable healthcare supply chains, and lower-impact communication strategies.

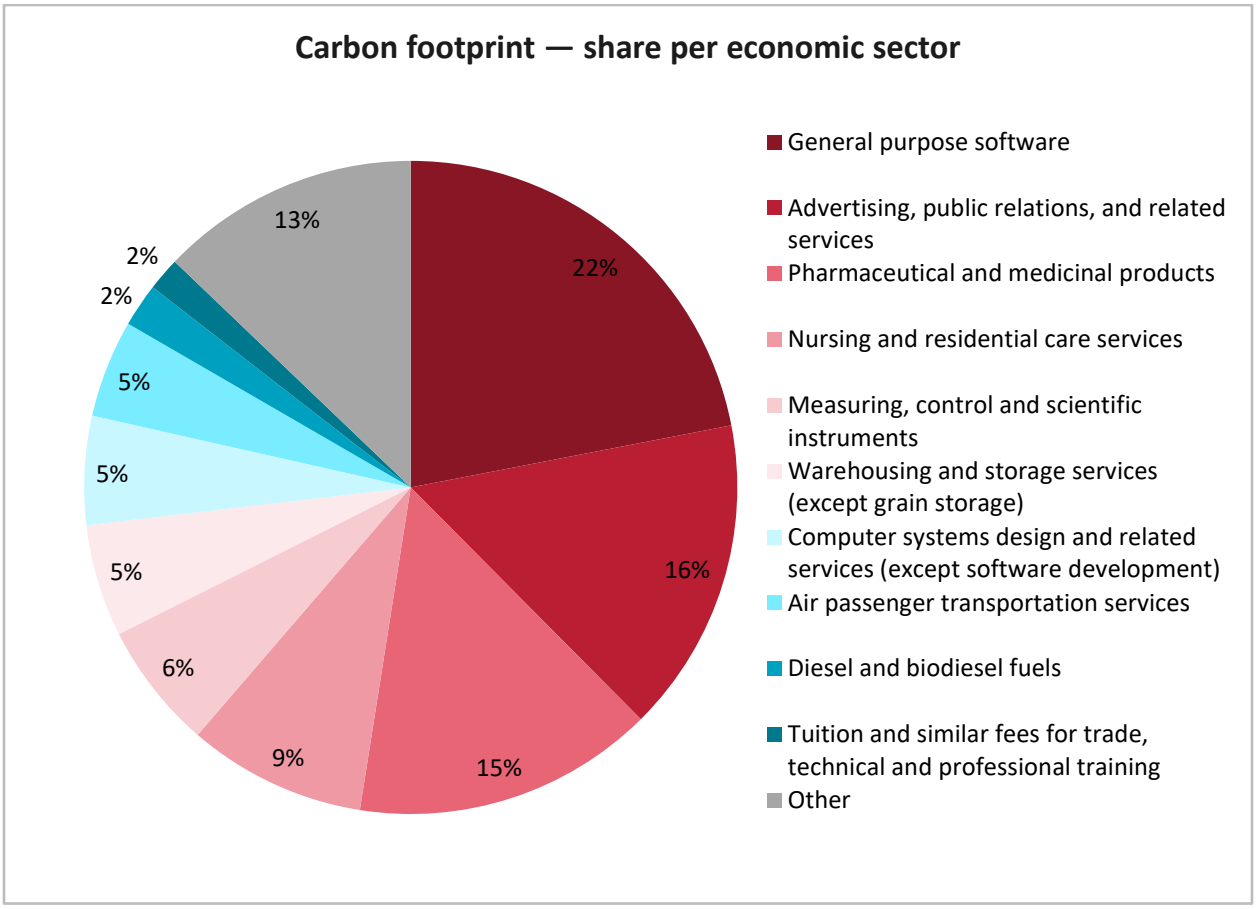

Figure 19: Health Canada procurement carbon footprint per IOCC commodity

8.13 Carbon footprint of Canada Border Services Agency (CBSA) procurement

Between 2020 and 2025, procurement contracts for the Canada Border Services Agency (CBSA) generated a total of 0.16 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 17,280 times or the equivalent of the average yearly emissions of 8,000 Canadians.

The data shows that emissions are significantly concentrated in IT infrastructure and security operations. Nearly half of the department's procurement carbon footprint (45%) comes from just two categories: Computer systems design and related services (29%) and Investigation and security services (16%).

Key trends

- Digital and tech infrastructure: The largest single share (29%) comes from Computer systems design. This indicates that the carbon emissions of the department are heavily tied to the energy-intensive data processing, hardware lifecycles, and technical architecture required to maintain specialized systems.
- Security and oversight: A major portion of the impact (26%) is driven by Investigation and security services and Measuring, control and scientific instruments. This reflects the carbon footprint of

maintaining a constant security presence, which often involves significant personnel movement and specialized operational equipment, as well as equipment such as X-ray baggage inspection systems.

- Personnel and logistics: Beyond technical services, a notable portion of the footprint is tied to the physical needs of staff, including Clothing (6%) (most likely uniforms), Prepared meals (4%), and Accommodation for travelers (2%). While smaller individually, these categories reflect the ongoing environmental cost of supporting a mobilized workforce.
- The "Other" category: In CBSA's case, the "Other" category is at 16%. This means that while IT and Security are the primary drivers, the department's carbon footprint is distributed across a wide range of activities. This suggests that reduction efforts must be comprehensive, targeting high-tech service providers and security contractors while also implementing sustainable supply chain standards for food, clothing, and travel.

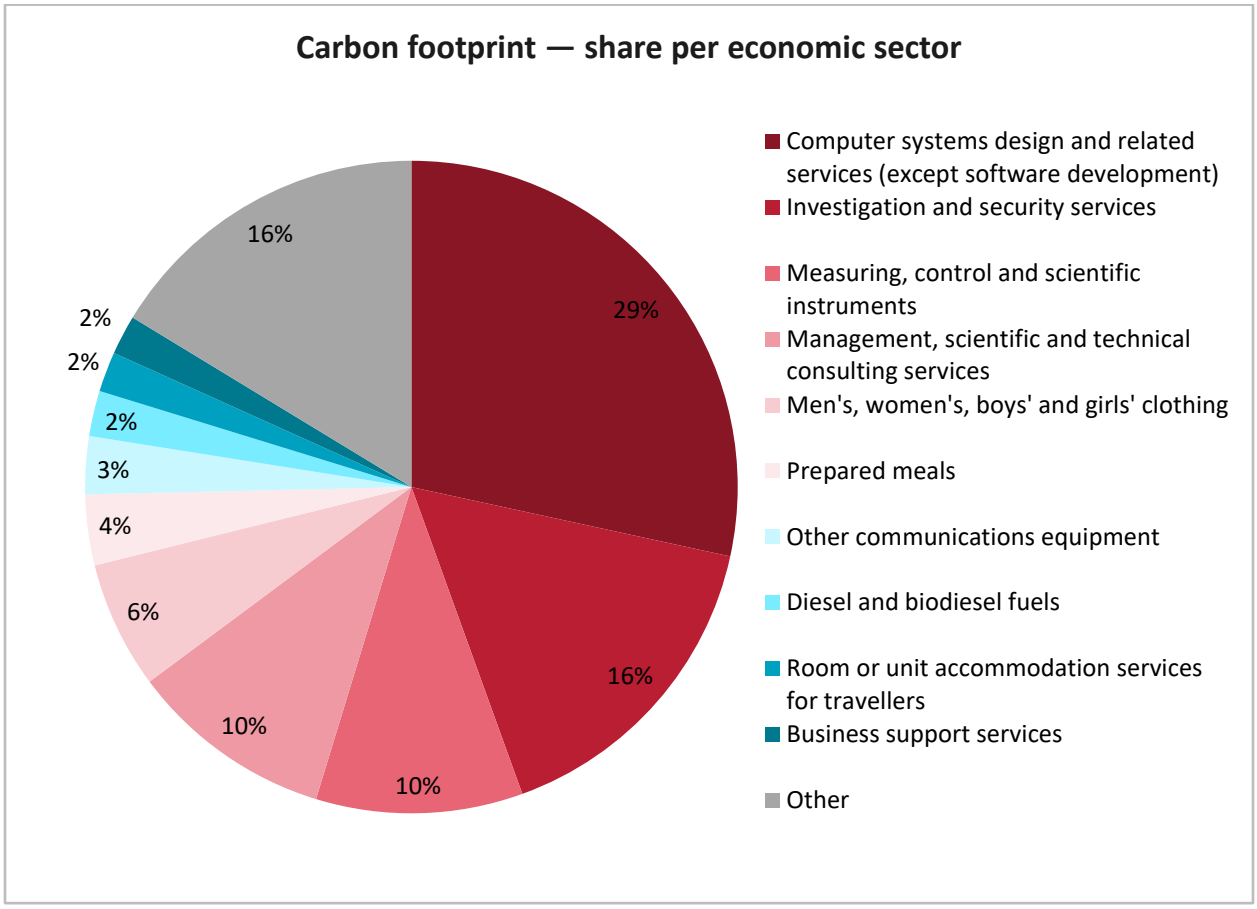

Figure 20: Canada Border Services Agency procurement carbon footprint per IOCC commodity

8.14 Carbon footprint of Environment and Climate Change Canada (ECCC) procurement

Between 2020 and 2025, procurement contracts for Environment and Climate Change Canada (ECCC)

generated a total of 0.13 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 14,040 times or the equivalent of the average yearly emissions of 6,500 Canadians.

The data shows that emissions are heavily concentrated in infrastructure operations, instrumentation, and fuel procurement. Unlike some departments, the carbon footprint here is driven by the physical construction and the highly technical tools required for operations.

Key trends

- Infrastructure and roads: The largest single share of the footprint (17%) comes from Highways, roads, streets, bridges, and tunnels. This category name is misleading as what the responsible contract is actually about is excavating and earthmoving, which are both mostly linked to the construction of roads within the OpenIO-Canada database. ECCC thus did not order the construction of a road, but rather operations of excavation/earthmoving, for whichever purpose. Nevertheless, this indicates that the department's carbon footprint is significantly tied to civil engineering and the carbon-intensive fuel consumption of the required heavy machinery for such operations.
- Scientific and technical precision: A combined 28% of the footprint stems from Measuring, control, and scientific instruments (14%), Industrial gases (8%) (mainly purchases of helium and argon), and Navigational and guidance instruments (6%). This suggests that the procurement of high-tech, precision hardware and scientific supplies are a major contributor to the supply chain's total emissions.
- Energy and aviation: Aviation fuel accounts for 12% of the footprint. When combined with Diesel and biodiesel fuels (5%) and it is clear that energy remains a primary lever for decarbonization. Please note here that this study only accounts for the production of fuels, not their combustion.
- Professional Expertise: Beyond physical goods, Management, scientific, and technical consulting services account for 9% of the footprint and Advertising and public relation services account for 2%, highlighting that the carbon emissions of the department also extend to the professional services required to oversee complex projects. These emissions are linked to the embodied carbon within the energy, materials and equipments required to provide such services.
- The "Other" category: The "Other" category represents 23% of the total. While the impact is still concentrated in specific areas like earthmoving and instrumentation, there is a broader tail of smaller contracts compared to other departments. However, focusing reduction efforts on the top four categories alone would address over half (52%) of the department's total procurement emissions.

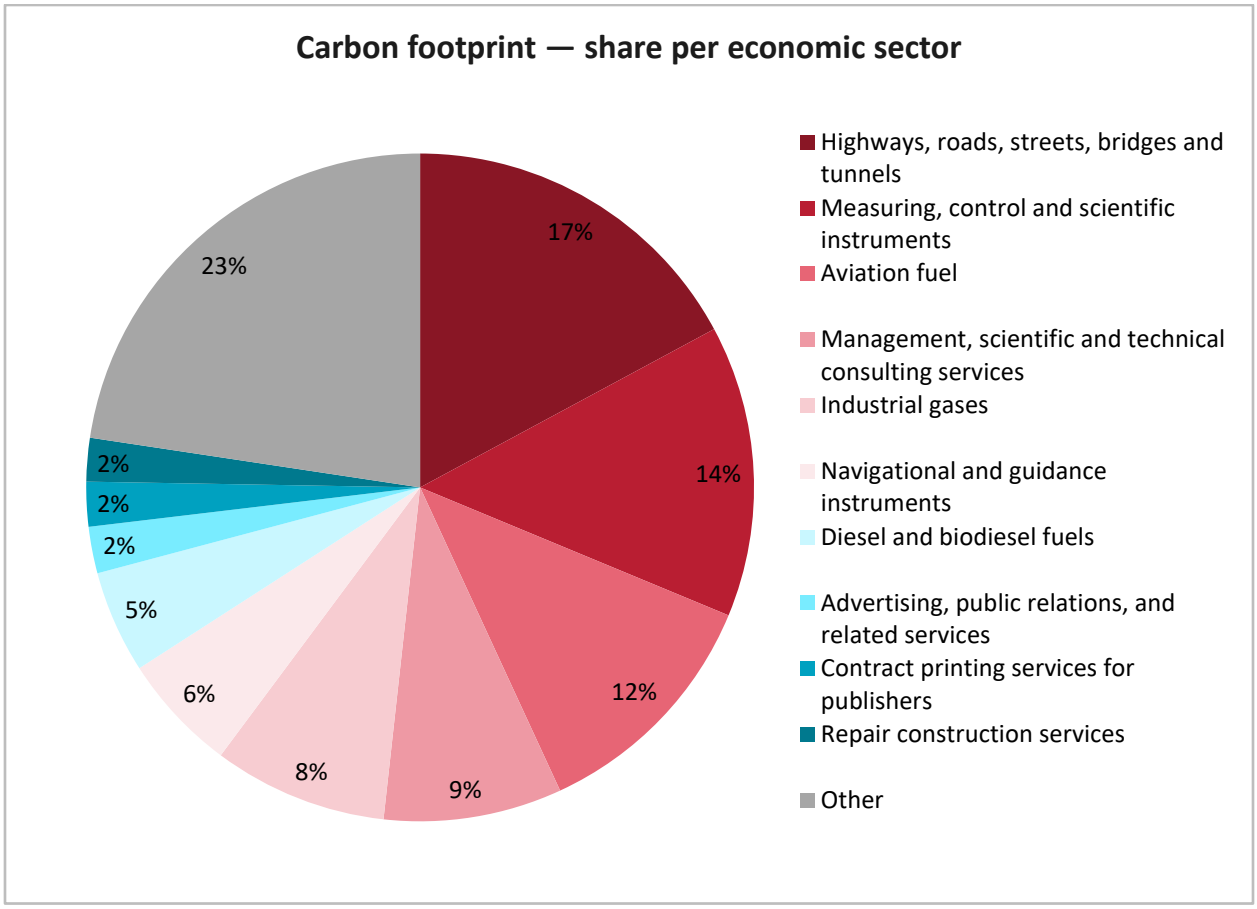

Figure 21: Environment and Climate Change Canada procurement carbon footprint per IOCC commodity

8.15 Carbon footprint of Global Affairs Canada (GAC) procurement

Between 2020 and 2025, procurement contracts for Global Affairs Canada (GAC) generated a total of 0.13 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 14,040 times or the equivalent of the average yearly emissions of 6,500 Canadians.

The data shows that emissions are heavily concentrated in professional and business support services. Nearly 40% of the department's procurement carbon footprint comes from just two categories: Management, scientific and technical consulting services (20%) and Business support services (19%).

Key trends

- Consultancy and support: The department's carbon footprint is overwhelmingly driven by "soft" services rather than industrial production. Consulting, general business support and accounting account for more than 40% of the total footprint, suggesting a high reliance on external human capital and operational outsourcing.
- Education and technology: A significant portion of the footprint stems from Tuition and

professional training (10%) and Computer systems design (9%). This indicates that the carbon emissions of the department are tied to workforce development and the digital infrastructure required to maintain modern operations.

- Facilities and travel: Beyond professional services, the maintenance of physical presence through Services to buildings (9%) and Accommodation for travellers (4%) represents a steady source of emissions. This highlights the environmental impact of maintaining a physical office footprint and the mobility of the workforce.
- The "Other" category: The "Other" category stands at 16%. The carbon footprint of GAC is very diversified across many different commodities. This indicates that focusing on a few key procurement categories will not be enough to substantially reduce the carbon footprint. Instead, department-wide actions will be required.

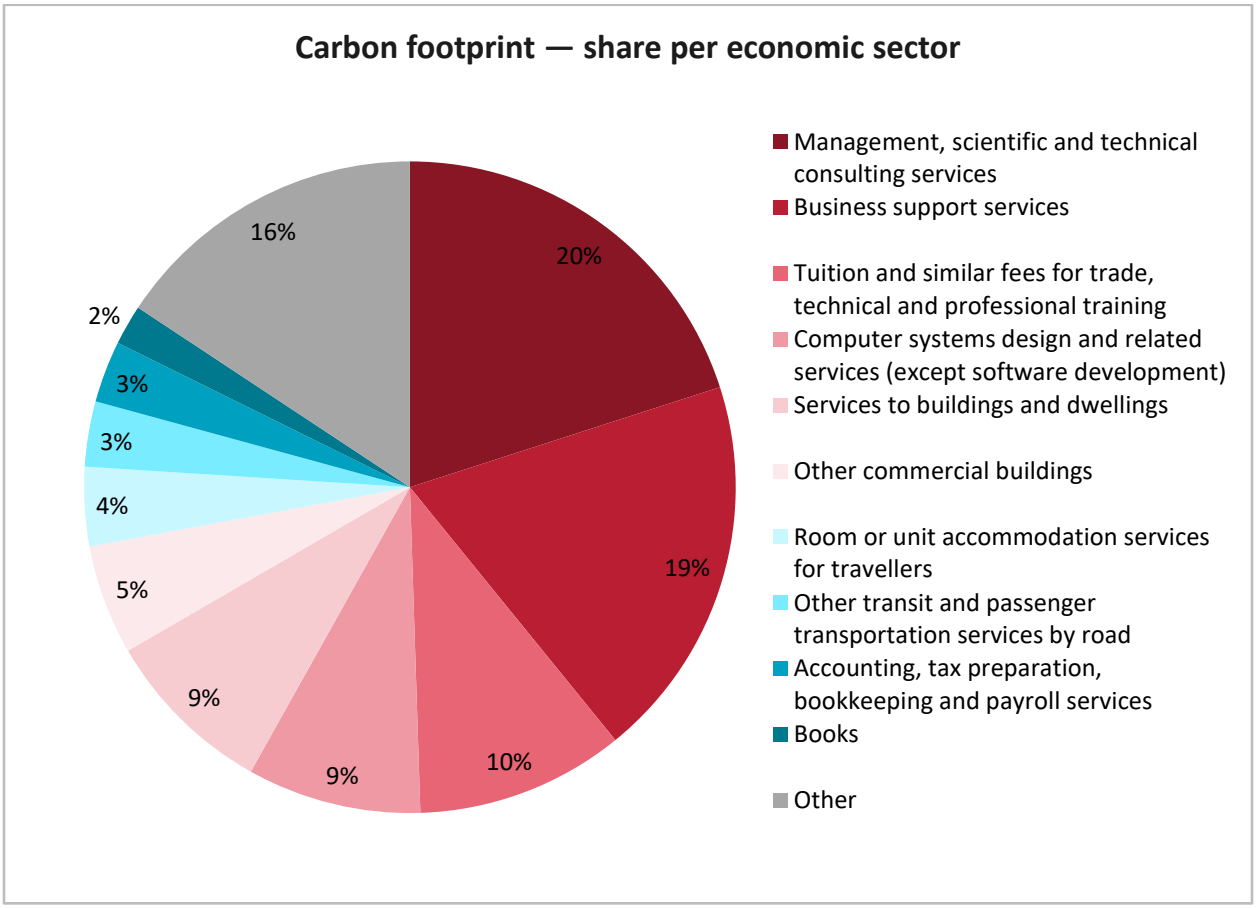

Figure 22: Global Affairs Canada procurement carbon footprint per IOCC commodity

8.16 Carbon footprint of Parks Canada (PC) procurement

Between 2020 and 2025, procurement contracts for Parks Canada (PC) generated a total of 0.12 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 12,960 times or the equivalent of the average yearly emissions of 6,000 Canadians.

The data shows that emissions are heavily concentrated in air travel and fuel acquisition. Nearly one-third of the department's procurement carbon footprint (29%) comes from just two categories: Air passenger transportation services (16%) and Aviation fuel (13%).

Key trends

- Aviation dominance: The department’s carbon footprint is significantly driven by flight operations. When combining passenger services and aviation fuel, air travel stands out as the primary contributor to the total footprint. Note that in this study only the production of the fuel is accounted, not the emissions due to the combustion of the fuel.
- Logistics and freight: Beyond direct flight, Medium and heavy-duty trucks (9%) and Freight transportation/customs services (8%) account for a combined 17% of emissions. In addition, non-aviation fuels (motor gasoline, heavy fuel oils and diesel and biodiesel fuels) also represent a significant share (11%) of the combined emissions. This indicates that the carbon emissions of the department are heavily tied to the movement of goods and personnel.
- De-icing operations: The procurement of basic inorganic chemicals and chemical products overall, used for the de-icing operations of PC, are responsible for 8% of the combined carbon emissions.
- The "Other" category: The "Other" category accounts for 33% of the total, suggesting a wider variety of smaller contributing contracts compared to more specialized departments. Decarbonization efforts will therefore require large and diversified actions to fully reduce the procurement carbon footprint. However, the clear lead held by transportation and fuel sectors provides a specific roadmap to tackle this low-hanging fruit.

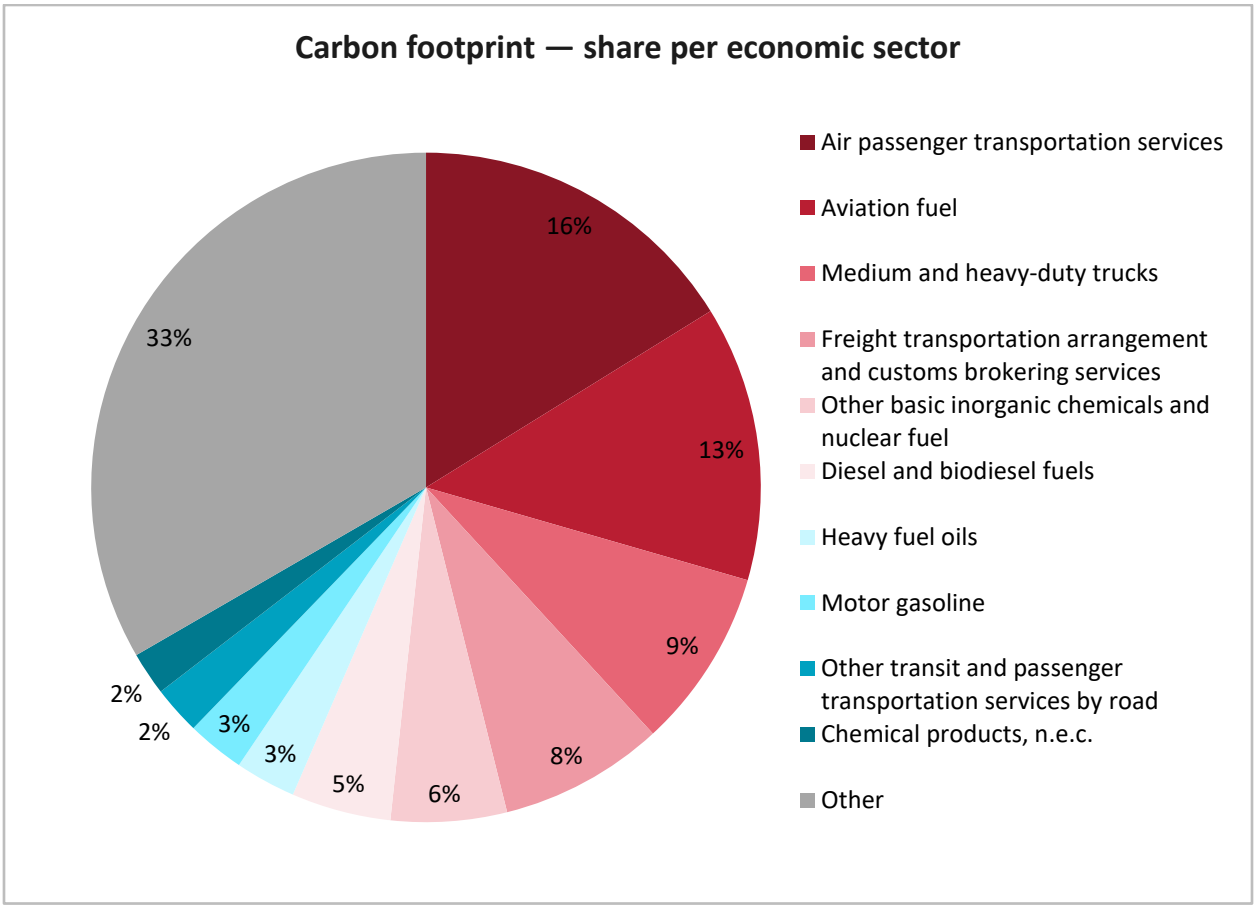

Figure 23: Parks Canada procurement carbon footprint per IOCC commodity

8.17 Carbon footprint of National Research Council Canada (NRC) procurement

Between 2020 and 2025, procurement contracts for the National Research Council Canada (NRC) generated a total of 0.12 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 12,960 times or the equivalent of the average yearly emissions of 6,000 Canadians.

The data shows that emissions are heavily concentrated in a few sectors. Nearly all the department's procurement carbon footprint (78%) comes from just four categories: Aviation fuel (29%), Architectural, engineering and related services (18%), Other institutional buildings (16%) and Measuring, control and scientific instruments (15%).

Key trends

- Energy and aviation: The department's carbon footprint is primarily driven by its energy needs, specifically for flight. Aviation fuel represents the largest single share at 29%, indicating that specialized air operations are a core driver of the carbon footprint. In addition, Diesel and biodiesel fuels also represent 3% of the combined emissions. Note that this study only accounts for the emissions from the production of fuels, and not from their combustion.

- Infrastructure and science: A significant portion of the footprint is tied to the physical and technical foundations of the department's work. From Architectural and Engineering services (18%) and Other institutional buildings (16%), it is clear that the design, construction, and maintenance of specialized facilities account for 34% of the total impact. Note that the construction item (Other institutional buildings) is related to the construction of the Atlantic Science Enterprise Centre (ASEC) in Moncton, New Brunswick.
- Technical instrumentation: Beyond large-scale infrastructure, the procurement of Measuring, control and scientific instruments (15%) represents a major ongoing source of emissions. This highlights the carbon-intensive nature of the high-precision manufacturing required for the department's technical mission.
- The "Other" category: The "Other" category accounts for 7% of the total. More than that, a staggering 78% of the emissions only stems from 4 procurement categories. This provides a very clear roadmap: reduction efforts should be focused almost exclusively on sustainable aviation energy, greener building practices and less carbon-intensive control/scientific equipment.

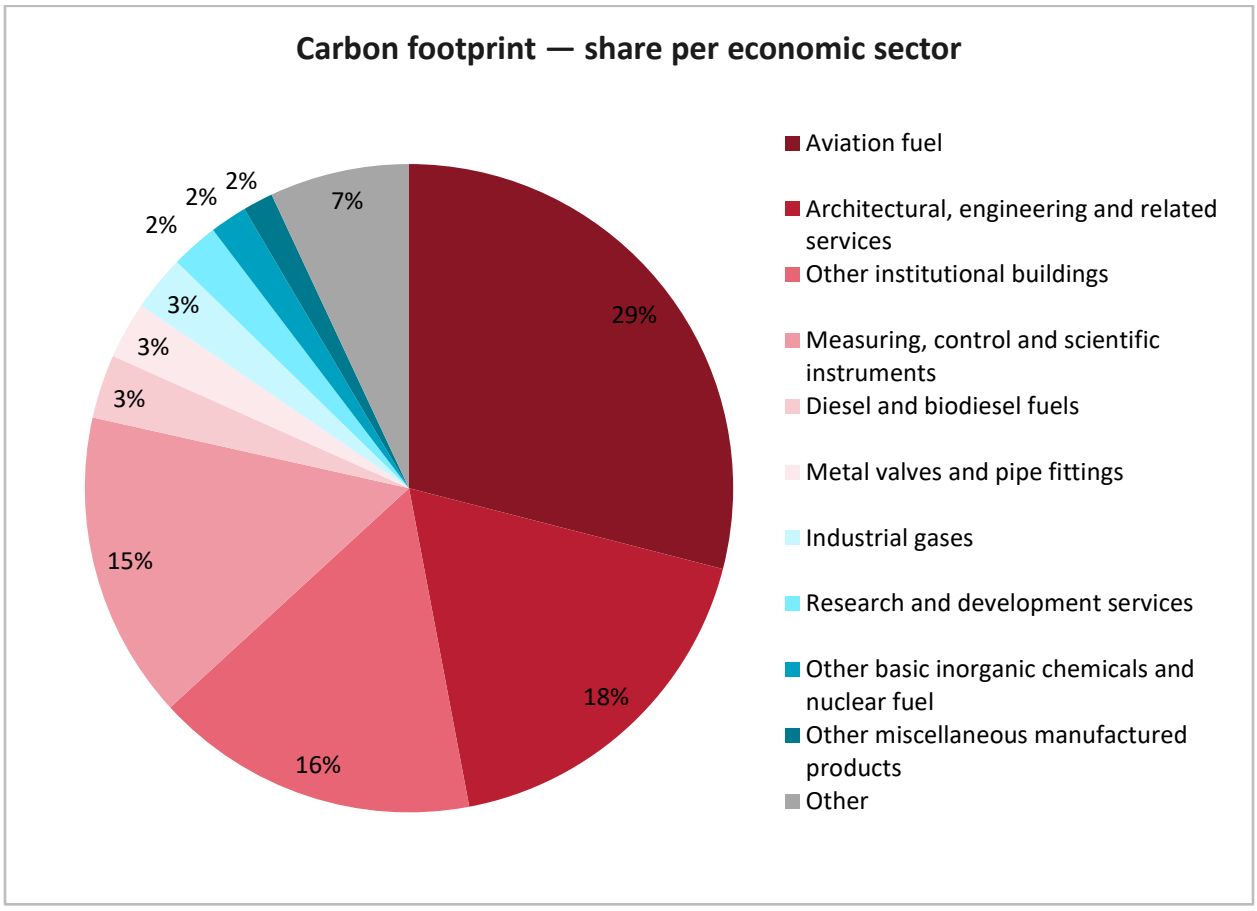

Figure 24: National Research Council Canada procurement carbon footprint per IOCC

8.18 Carbon footprint of Veteran Affairs Canada (VAC) procurement

Between 2020 and 2025, procurement contracts for Veteran Affairs Canada (VAC) generated a total of 0.11 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 11,880 times or the equivalent of the average yearly emissions of 5,500 Canadians.

The data shows that emissions are exceptionally concentrated in healthcare-related services and professional administration. Three-quarters of the department's procurement carbon footprint (75%) comes from just two categories: Other health practitioner services (60%) and Insurance brokerage and related services (15%).

Key trends

- Healthcare operations: The department's carbon footprint is overwhelmingly driven by its healthcare mission. With Other health practitioner services accounting for 60% of the total, the carbon footprint is largely defined by the clinical and professional labor required to provide care.
- Administrative and digital support: A significant portion of the remaining footprint is tied to the "back-office" and technical infrastructure needed to run a modern department. Insurance brokerage services (15%) and Computer systems design (11%) combined represent 26% of the total, indicating that high-level professional services are a major indirect source of emissions.
- Operational energy: Compared to other departments, fuel usage is a relatively minor contributor. The purchase of Diesel and biodiesel fuels (3%) and Motor gasoline (2%) represents a small ongoing source of emissions. Note: This study only accounts for the emissions generated during the production of these fuels, not the emissions from their combustion.
- The "Other" category: The "Other" category is remarkably small at only 3%. This indicates a highly specialized procurement profile where almost the entirety of the department's carbon footprint is tied to a very narrow range of professional and clinical services. This provides a precise roadmap for sustainability: reduction efforts must focus on the "greening" of service delivery and the supply chains of healthcare and IT providers.

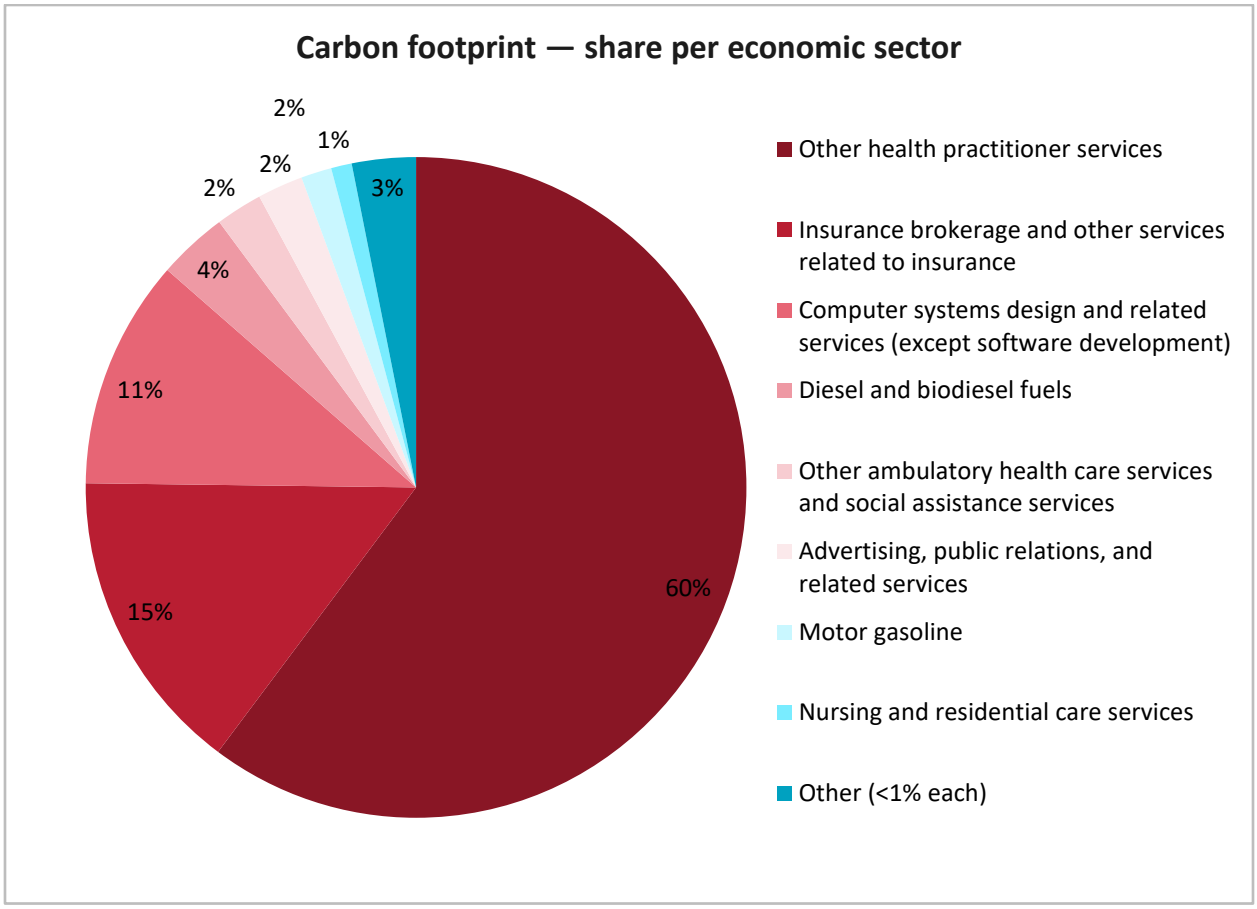

Figure 25: Veteran Affairs Canada procurement carbon footprint per IOCC commodity

8.19 Carbon footprint of Canadian Commercial Corporation (CCC) procurement

Between 2020 and 2025, procurement contracts for the Canadian Commercial Corporation (CCC) generated a total of 0.10 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 10,800 times or the equivalent of the average yearly emissions of 5,000 Canadians.

The data shows that emissions are extremely concentrated in the automotive sector and its associated supply chain. The entire procurement carbon footprint (100%) comes from just three categories: Other miscellaneous motor vehicle parts (77%), Motor vehicle repair and maintenance services (16%) and Other transportation equipment and related parts (7%).

Key trends

All procurement categories for CCC are exclusively linked to transportation. It provides a very clear roadmap: any meaningful reduction in the department's carbon footprint must focus directly on the automotive supply chain and vehicle lifecycle management

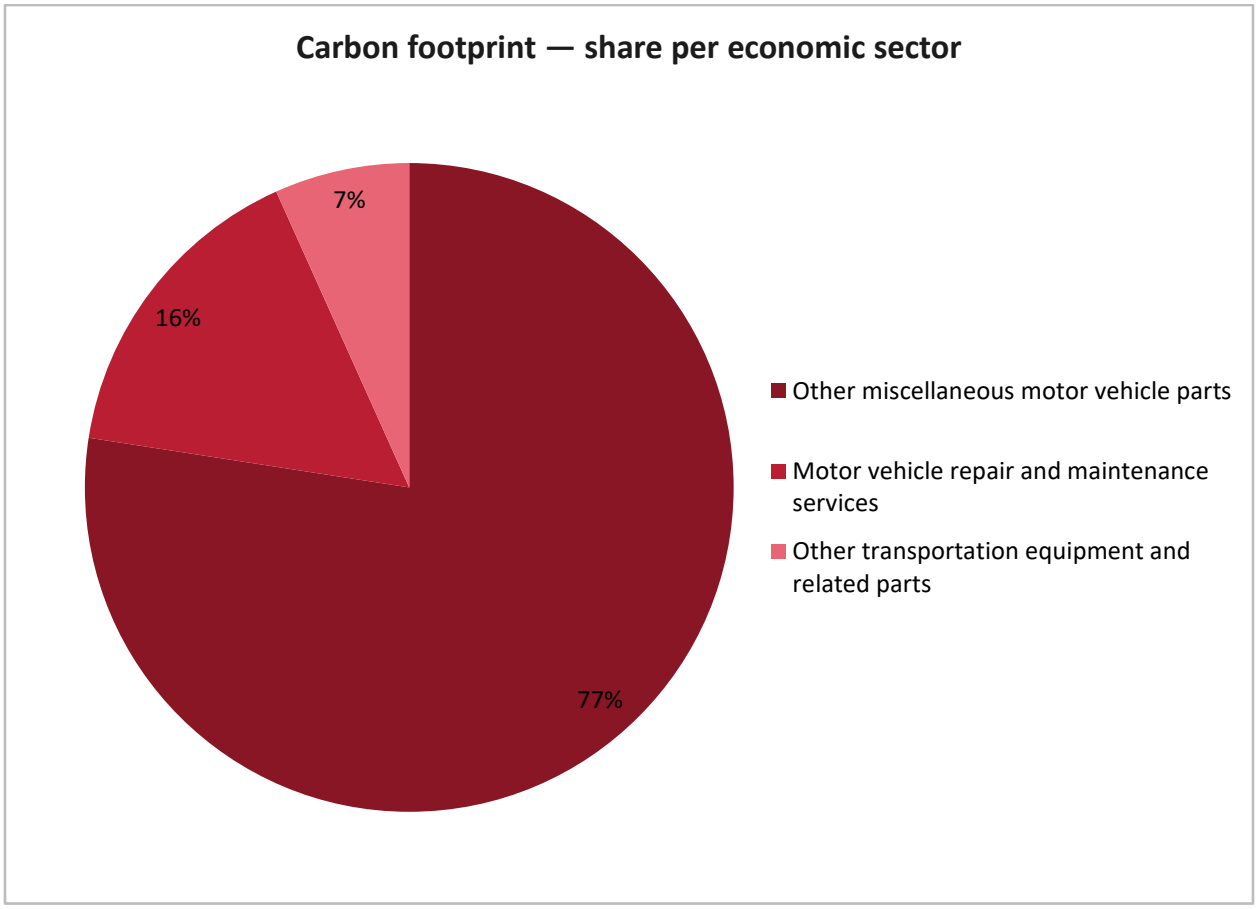

Figure 26: Canadian Commercial Corporation procurement carbon footprint per IOCC commodity

8.20 Carbon footprint of Treasury Board of Canada Secretariat (TBS) procurement

Between 2020 and 2025, procurement contracts for the Treasury Board of Canada Secretariat (TBS) generated a total of 0.10 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 10,800 times or the equivalent of the average yearly emissions of 5,000 Canadians.

The data shows that emissions are extremely concentrated in financial services and IT infrastructure. Nearly all of the department's procurement carbon footprint (96%) comes from just three categories: Insurance brokerage and related services (73%), Health and accident insurance services (12%) and Computer systems design ad related services (11%).

Key trends

- Financial and insurance dominance: The department's carbon footprint is overwhelmingly driven by its service-based contracts. General insurance brokerage and health and accident services account for 85% of the total footprint. This suggests that the indirect carbon cost of managing risk and personnel is the primary driver of emissions.

- Digital infrastructure: The largest non-financial share (11%) comes from Computer systems design and related services. This indicates that a significant portion of the department's carbon emissions are tied to the energy-intensive nature of maintaining digital systems, data centers, and IT consultancy.
- Specialized consultancy: Beyond insurance and IT, Other professional, scientific, and technical services (3%) represent a smaller ongoing source of emissions, highlighting that even the department's "brainpower" procurement has a measurable environmental impact.
- The "Other" category: The "Other" category is only 1%. This means that virtually the entire carbon footprint is tied to a very small number of service-oriented sectors. This provides a clear roadmap: reduction efforts should focus on engaging with high-impact service providers, specifically in the insurance and tech sectors, to ensure they are decarbonizing their own operations.

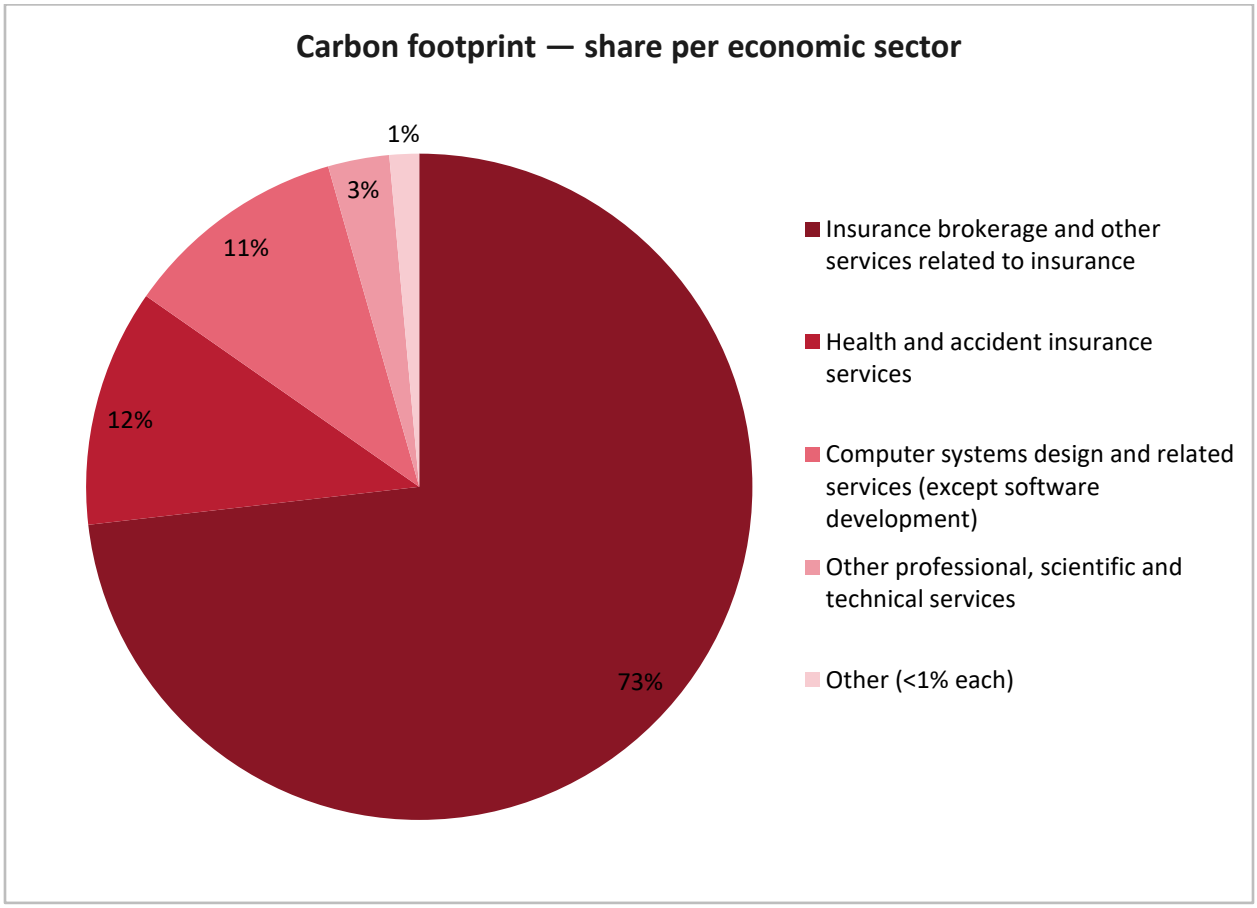

Figure 27: Treasury Board of Canada Secretariat procurement carbon footprint per IOCC commodity

8.21 Carbon footprint of Natural Resources Canada (NRCan) procurement

Between 2020 and 2025, procurement contracts for Natural Resources Canada (NRCan) generated a total of 0.09 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to

driving around the Earth’s equator 9,720 times or the equivalent of the average yearly emissions of 4,500 Canadians.

The data shows that emissions are heavily concentrated in the aviation sector and its supporting supply chain. Half of the department's procurement carbon footprint (50%) comes from just two categories: Air passenger transportation services (33%) and Aviation fuel (17%).

Key trends

- Aviation operations: The department’s carbon footprint is overwhelmingly driven by flight. Passenger transport and the procurement of aviation fuel account for exactly half of the total footprint. This highlights the high environmental cost of maintaining rapid, long-distance mobility. Note that this study only accounts for the emissions from the production of aviation fuel, and not from its combustion. However, the emissions of the combustion of fuel within the category “Air passenger transportation services” are accounted for.
- Scientific and technical support: A significant portion (22%) of the remaining footprint is tied to technical infrastructure. Measuring, control, and scientific instruments (9%), Repair and maintenance services (8%) (which is mainly linked to the maintenance of antennas), Research and development services (3%) and Books (2%) indicate that the carbon emissions of NRCan are also linked to the technical and knowledge requirements for the department's core mission.
- The "Other" category: The "Other" category stands at 16%. While aviation remains the primary target for reduction, the presence of various smaller contributors, from Custom software (5%) to R&D (3%), suggests that a broader, more multi-faceted sustainability strategy is required to address the total impact.

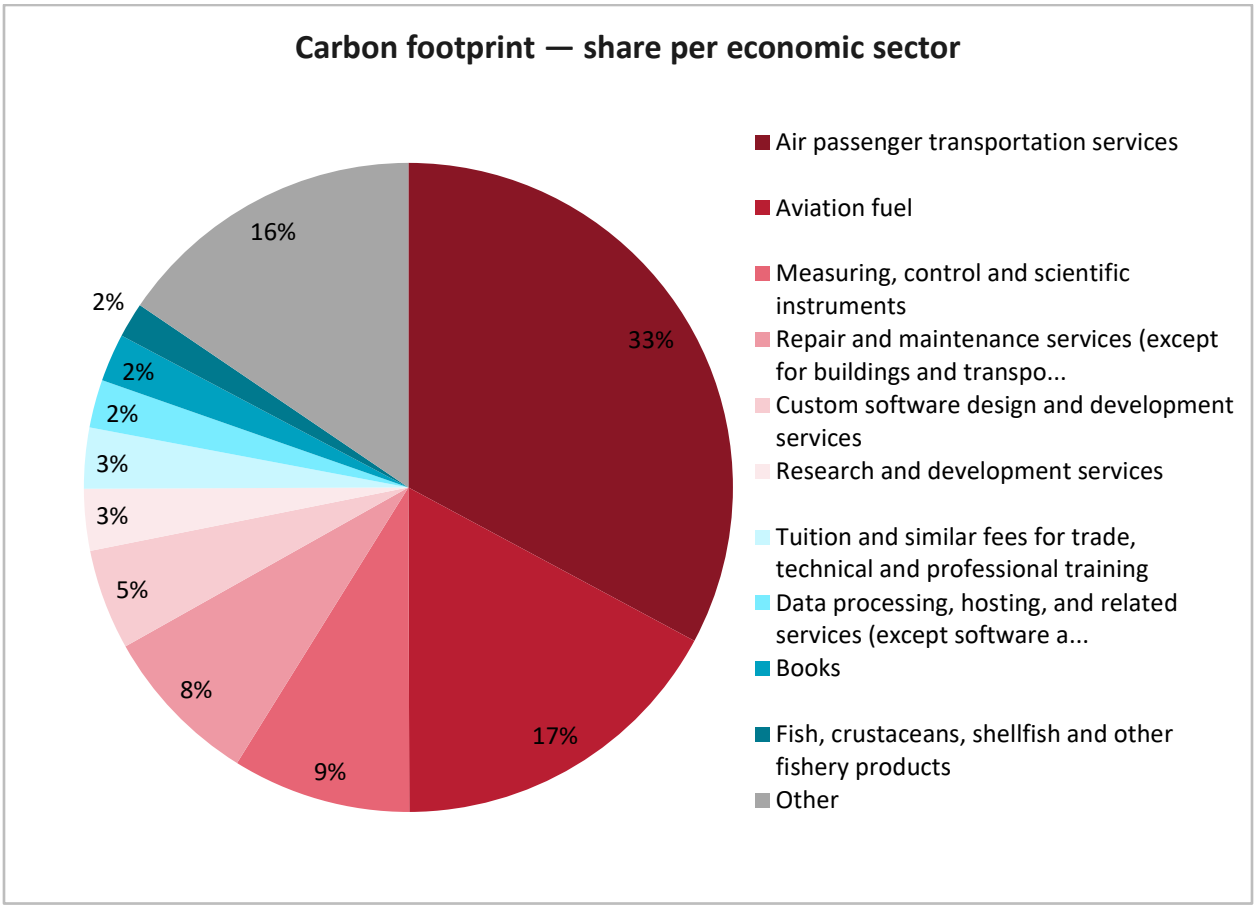

Figure 28: Natural Resources Canada procurement carbon footprint per IOCC commodity

8.22 Carbon footprint of Office of Infrastructure of Canada (INFC) procurement

Between 2020 and 2025, procurement contracts for the Office of Infrastructure of Canada (INFC) generated a total of 0.09 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 9,720 times or the equivalent of the average yearly emissions of 4,500 Canadians.

The data shows that emissions are almost entirely concentrated in the heavy civil construction sector. Unlike typical departments with diverse footprints, the carbon footprint here is dominated by a single category: Highways, roads, streets, bridges, and tunnels account for a staggering 99% of the total procurement carbon footprint. This is linked to a single contract: QA002-142501/001/NB, pertaining to the new Champlain bridge corridor in Montreal. Efforts to decarbonize this department must thus focus exclusively on low-carbon construction materials, sustainable paving technologies, and the electrification of heavy construction equipment in the construction/maintenance of infrastructure.

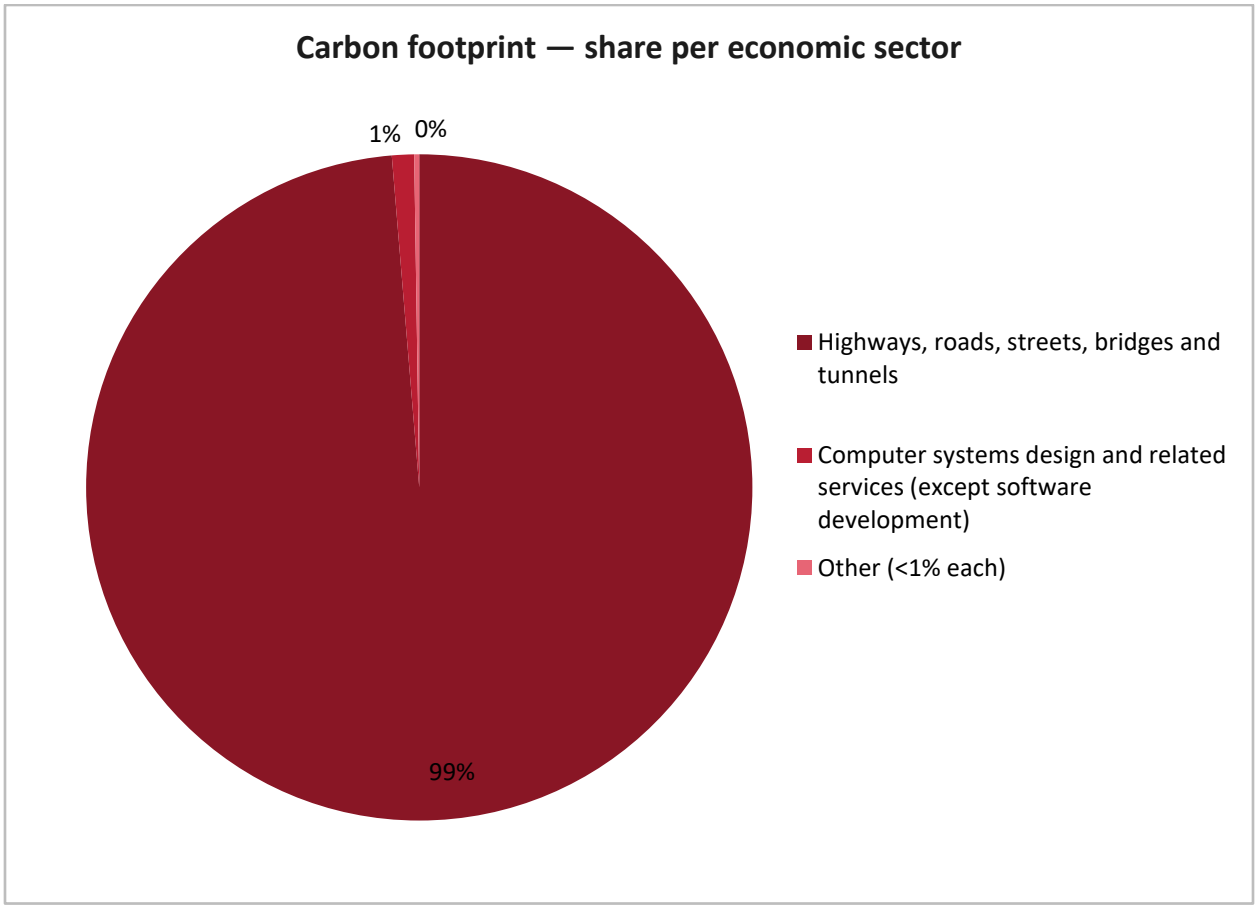

Figure 29: Office of Infrastructure of Canada procurement carbon footprint per IOCC commodity

8.23 Carbon footprint of Canadian Coast Guard (CCG) procurement

Between 2020 and 2025, procurement contracts for Canadian Coast Guard (CCG) generated a total of 0.08 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 8,640 times or the equivalent of the average yearly emissions of 4,000 Canadians.

The data shows that emissions are extremely concentrated in the maritime sector. 85% of the department's procurement carbon footprint comes from just two core categories: the purchase of Ships (50%) and Water transportation support, maintenance, and repair services (35%).

Key trends

- Fleet lifecycle dominance: The department's carbon footprint is overwhelmingly driven by its fleet. The purchase of ships with their ongoing maintenance and repair account for the vast majority of the total footprint. This indicates that both the "birth" and the "upkeep" of maritime vessels are the primary drivers of procurement emissions.
- Fuel production impact: The purchase of Diesel and Biodiesel fuels (4%), Motor gasoline (2%), and

Heavy fuel oils (1%) represents the upstream emissions of energy procurement, most likely energy that is used to power the fleet of the CCG. It is important to note that this study only accounts for the emissions generated during the production of these fuels, not the emissions from burning them during operations.

- Secondary equipment: Smaller shares are attributed to Boats and personal watercraft (2%) and Other engine and power transmission equipment (1%), further reinforcing that the department's carbon profile is essentially a reflection of its maritime machinery.
- The "Other" category: The "Other" category is a mere 2%. This means that nearly the entire carbon footprint is consolidated within a few high-impact maritime industrial activities. This provides a clear, high-priority roadmap: any significant reduction in the department's carbon footprint must begin with decarbonizing ship manufacturing and implementing "green" maintenance and repair protocols.

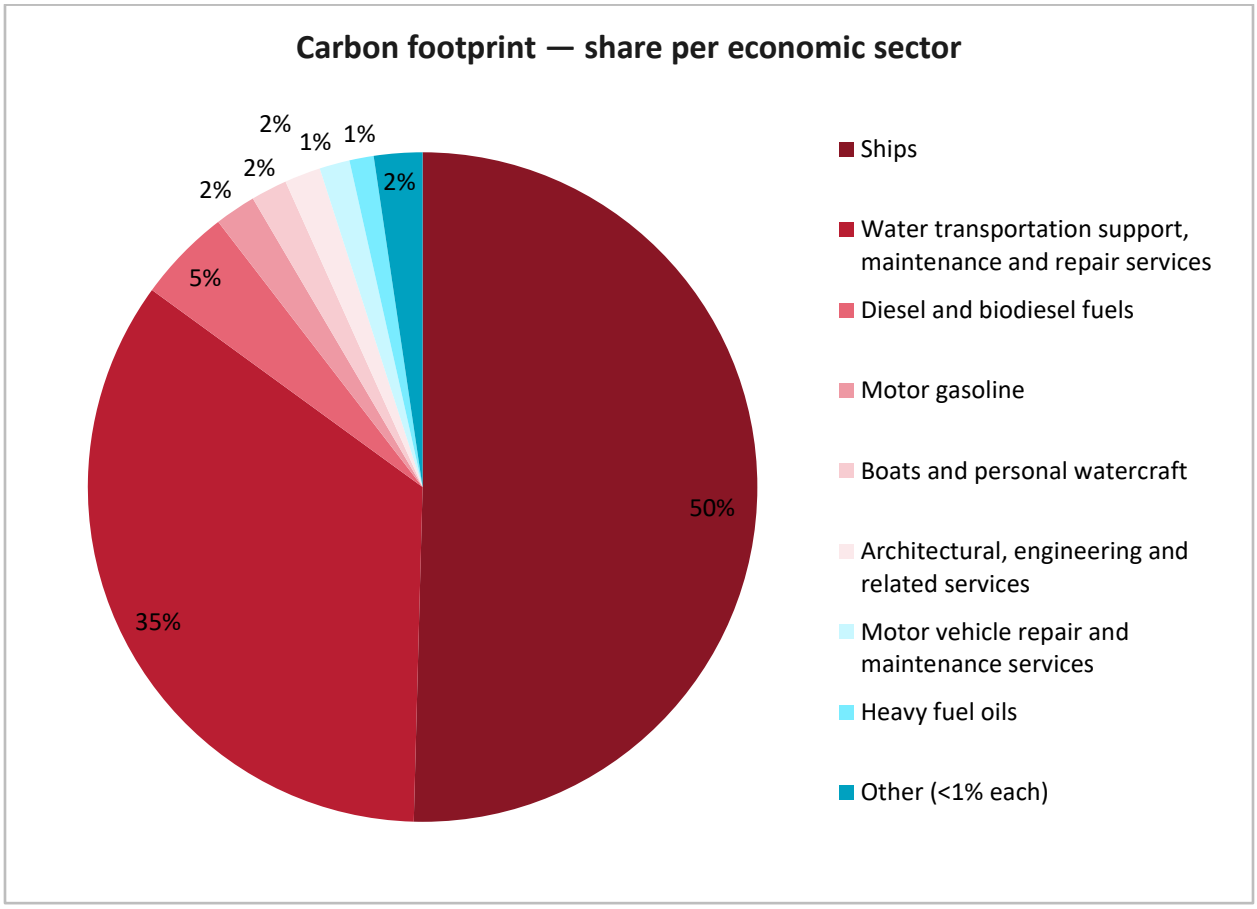

Figure 30: Canadian Coast Guard procurement carbon footprint per IOCC commodity

8.24 Carbon footprint of Innovation, Science and Economic Development Canada (ISED) procurement

Between 2020 and 2025, procurement contracts for Innovation, Science and Economic Development

Canada (ISED) generated a total of 0.06 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 6,480 times or the equivalent of the average yearly emissions of 3,000 Canadians.

The data shows that emissions are heavily driven by innovation and technical operations. Unlike hardware-heavy sectors, nearly half of the department's procurement carbon footprint (43%) stems from the combination of Research and Development (26%) and Computer Systems Design (17%).

Key trends

- Knowledge-based operations: The department's carbon footprint is primarily tied to the intelligence of ISED. The largest single share (26%) comes from Research and Development services, indicating that the carbon cost is embedded in the high-tech laboratories, specialized equipment, and intensive energy needs of the innovation pipeline. Moreover, Tuition and similar fees for trade, technical and professional training (3%) and research for Defense services (6%) also represent significant shares of the carbon emissions.
- Digital infrastructure: A significant portion of the footprint (17%) is driven by Computer systems design and related services. This highlights the department's reliance on complex digital architecture, data processing, and IT infrastructure as a core component of its carbon footprint.
- Consulting and communication: Professional services play a major role here, with Management, scientific, and technical consulting (10%), Mobile telecommunications (9%) and Advertising, public relations, and related services (3%) forming a substantial secondary tier of emissions.
- Fuel production: Fuels like Diesel and Biodiesel fuels (6%) and Motor gasoline (2%) represent a relatively small portion of the footprint. Note that this study only considers the carbon emissions linked to the production of fuels and not its combustion.
- The "Other" category: The "Other" category accounts for 13%, and the emissions associated with other contracts are spread across nearly a dozen diverse sectors. This suggests that reduction efforts cannot focus on a single industrial activity; instead, a broad strategy targeting green IT, sustainable laboratory management, and low-carbon consulting travel will be necessary to move the needle.

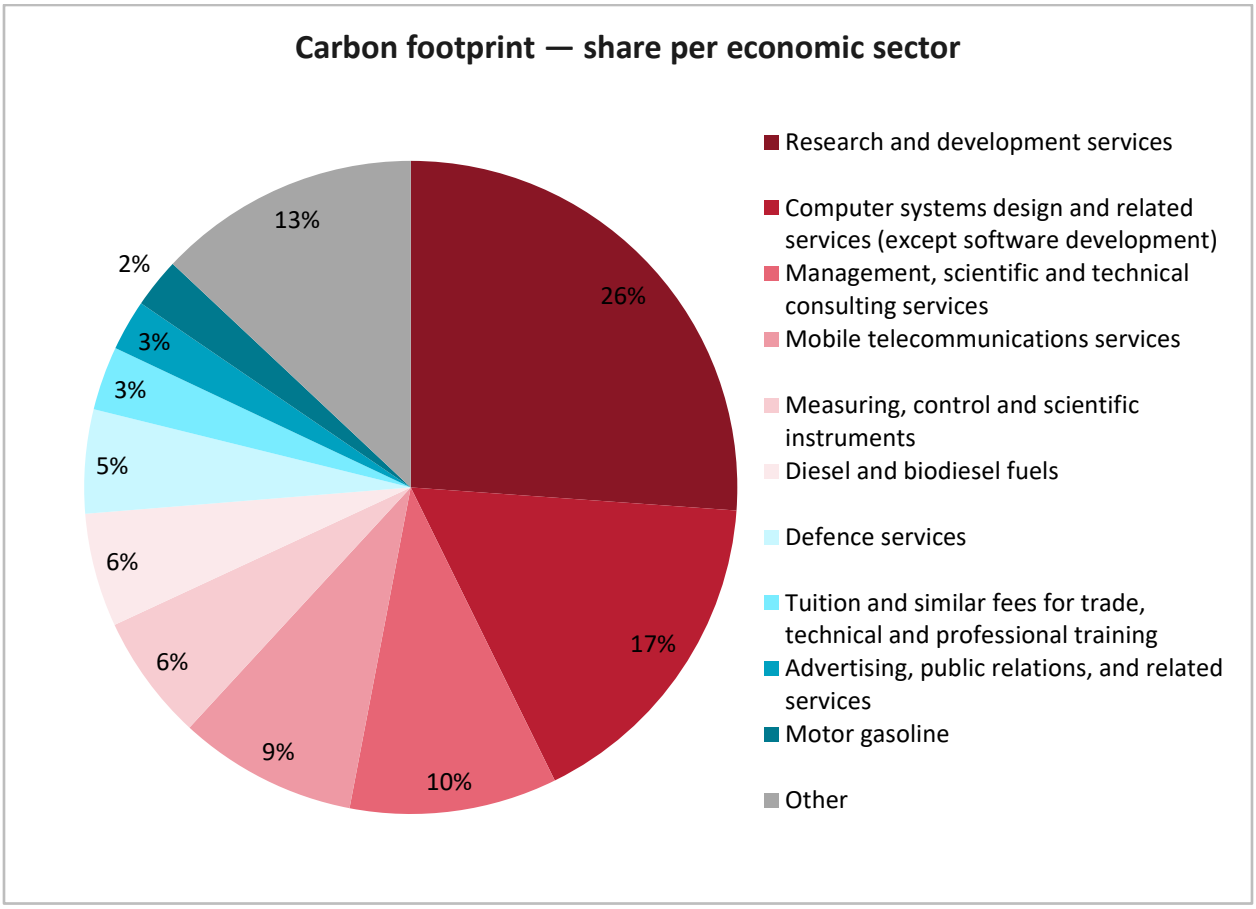

Figure 31: Innovation, Science and Economic Development Canada procurement carbon footprint per IOCC commodity

8.25 Carbon footprint of Canadian Food Inspection Agency (CFIA) procurement

Between 2020 and 2025, procurement contracts for the Canadian Food Inspection Agency (CFIA) generated a total of 0.05 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 5,400 times or the equivalent of the average yearly emissions of 2,500 Canadians.

The data shows that emissions are heavily concentrated in specialized industrial supplies and operational services. Over half of the department's procurement carbon footprint (53%) comes from just two categories: Industrial gases (35%) and Waste management and remediation services (18%).

Key trends

- Industrial and chemical operations: The department's carbon footprint is overwhelmingly driven by the procurement of Industrial gases, which represents the largest single share (35%). This suggests that high-intensity chemical or manufacturing processes are the primary contributors to the footprint.
- Waste management: Waste management and remediation services (18%) indicate that a

significant portion of the carbon emissions are tied to the handling of byproducts/waste, notably of hazardous and medical waste.

- Fuel and energy procurement: Combined, the purchase of Diesel and biodiesel fuels (8%), Motor gasoline (4%), and Heavy fuel oils (2%) represents 14% of the total. This highlights the energy-intensive nature of the department's logistical needs. Note: this study only accounts for the emissions from producing fuel, not from burning it.
- Specialized technical needs: Measuring, control and scientific instruments (9%), Architectural, engineering and related services (8%) and Management, scientific and technical consulting (4%) show a notable reliance on high-tech equipment and expert oversight, which carry their own embedded carbon costs.
- The "Other" category: The "Other" category accounts for 8% of the total carbon footprint of CFIA. This means that most of the department's carbon footprint is tied to a relatively small number of high-impact industrial activities, specifically gas procurement and waste management, providing a clear roadmap for where reduction efforts and supplier engagement should be focused.

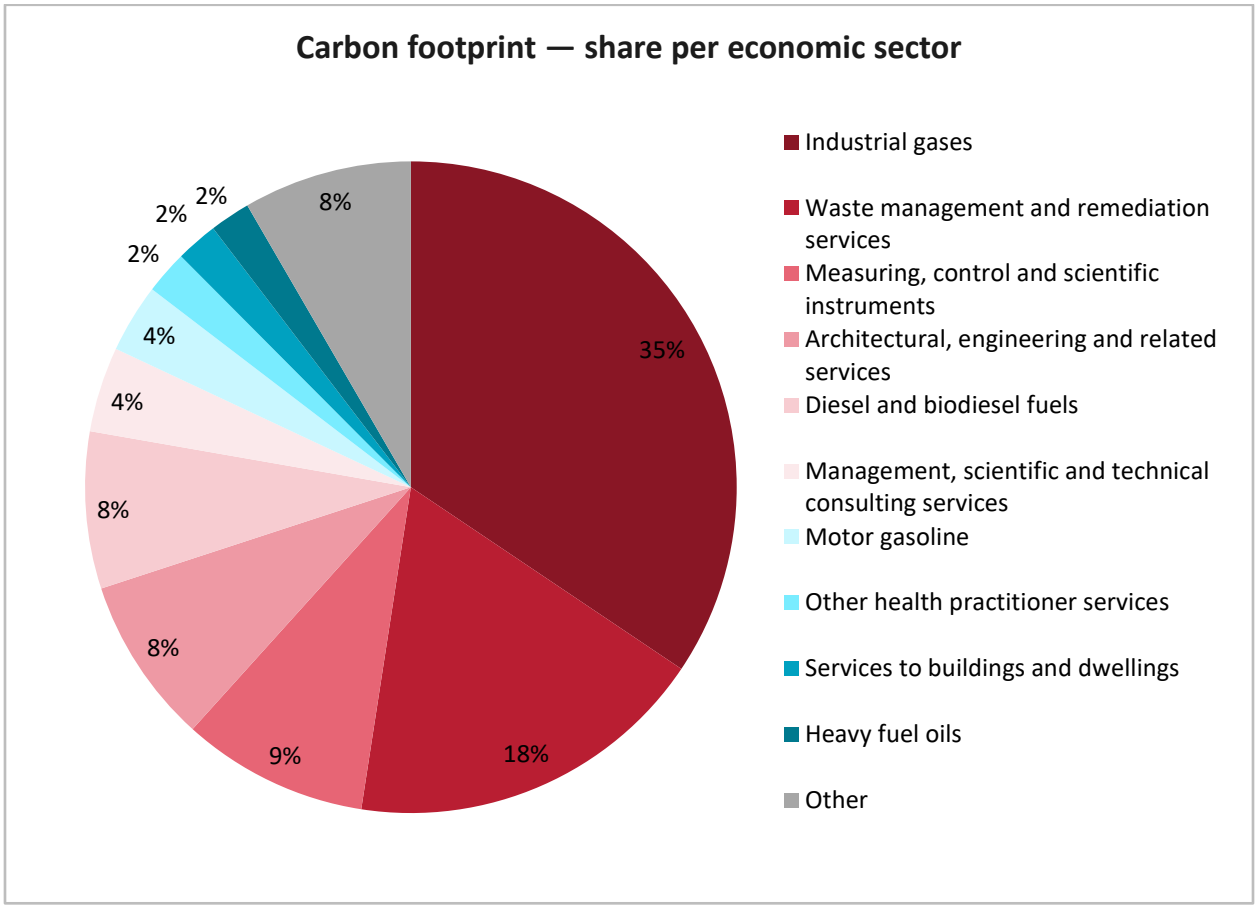

Figure 32: Canadian Food Inspection Agency procurement carbon footprint per IOCC

commodity

8.26 Carbon footprint of Agriculture and Agri-Food Canada (AAFC) procurement

Between 2020 and 2025, procurement contracts for Agriculture and Agri-Food Canada (AAFC) generated a total of 0.05 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 5,400 times or the equivalent of the average yearly emissions of 2,500 Canadians.

The data shows that emissions are driven largely by the technical and digital infrastructure required for modern operations. Nearly half of the department's procurement carbon footprint (40%) comes from the top three categories: Computer systems design (19%), Scientific instruments (11%), and Technical consulting (10%).

Key trends

- Digital and technical infrastructure: The department's carbon footprint is heavily influenced by its technological backbone. Computer systems design and related services represent the largest single share (19%), highlighting the high embedded carbon cost of hardware and digital infrastructure.
- Research and precision operations: A combined 21% of the footprint stems from Measuring, control and scientific instruments (11%) and Management, scientific and technical consulting services (10%). This indicates that the department's carbon emissions are closely tied to specialized research and high-level analytical support.
- Logistics and maintenance: Beyond digital needs, Diesel and biodiesel fuels (8%) and Motor gasoline (3%) represent significant operational emissions. Additionally, physical infrastructure maintenance through Highways, roads, and bridges (7%) and Repair construction services (4%) shows a steady footprint from maintaining physical facilities. Note: This study only accounts for the emissions generated during the production of these fuels, not the emissions from their combustion.
- Agricultural and chemical Inputs: The data reveals a notable impact from land-based activities, with Agricultural machinery (5%) and Ammonia and chemical fertilizers (3%) contributing to the total, suggesting significant land management or agricultural oversight responsibilities.
- The "Other" category: The "Other" category represents 23% of the total. While IT and scientific tools are the clear primary drivers, the carbon footprint is spread across a wider variety of industrial and service-based activities. This suggests that reduction efforts must be multifaceted, targeting both digital supply chains and physical maintenance contracts to be effective.

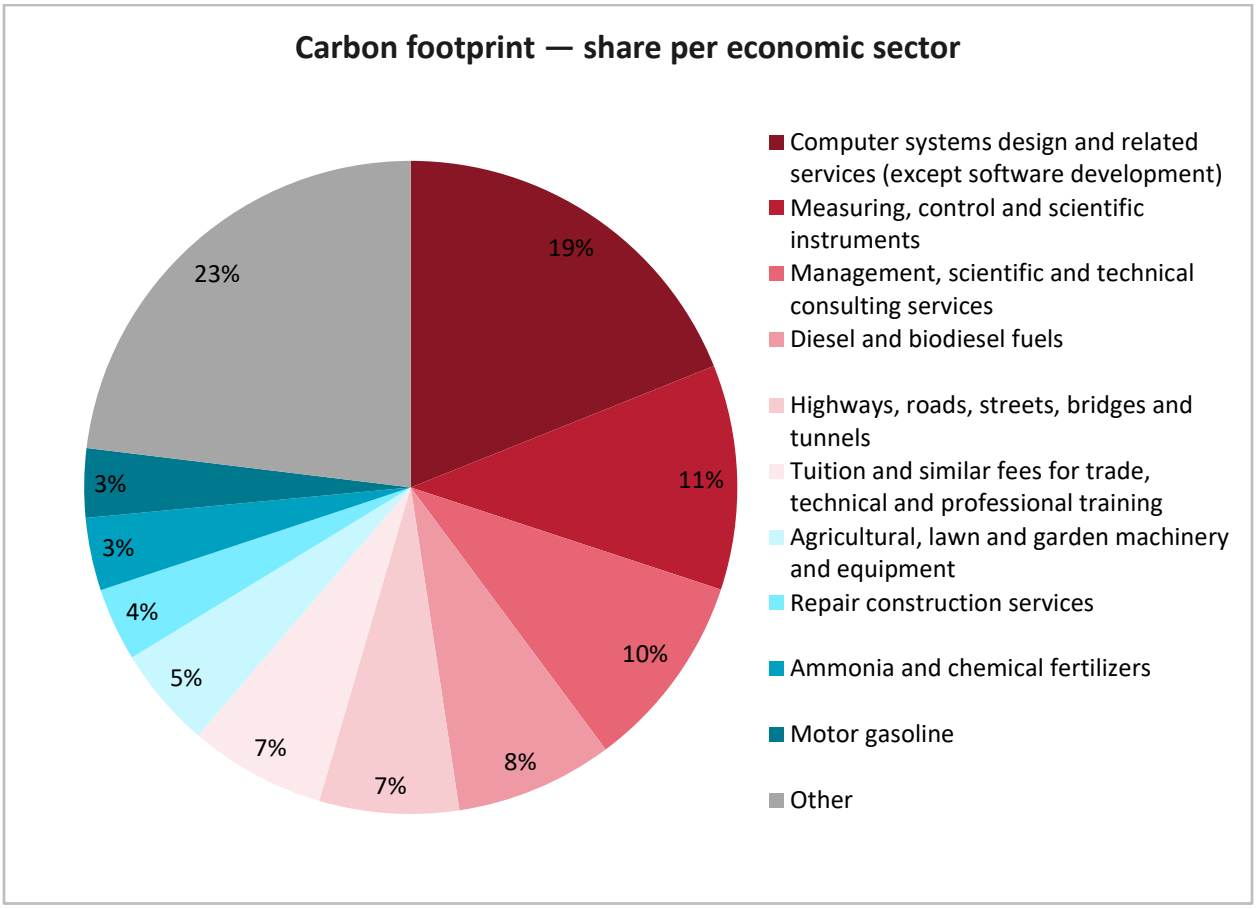

Figure 33: Agriculture and Agri-Food Canada procurement carbon footprint per IOCC commodity

8.27 Carbon footprint of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) procurement

Between 2020 and 2025, procurement contracts for Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) generated a total of 0.02 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 2,160 times or the equivalent of the average yearly emissions of 1,000 Canadians.

The data shows that emissions are exceptionally concentrated in professional services and information technology. Almost all of the department's procurement carbon emissions (97%) come from just four categories: Computer systems design and related services (38%), Accounting, tax, and payroll services (31%), Business support services (17%) and Management, scientific and technical consulting services (11%).

Key trends

- Digital infrastructure: The department's carbon footprint is primarily driven by its technological requirements. Computer systems design accounts for the largest single share (38%), reflecting the

significant embedded carbon in hardware procurement and data management services.

- Administrative and financial services: A massive portion of the footprint is tied to specialized office-based services. When combining Accounting and payroll services (31%) with Business support services (17%), nearly half of the total emissions are linked to the carbon overhead of administrative outsourcing. Note that for CIRNAC “Business support services” corresponds to the procurement of calling center services.
- Consulting and software: Beyond core operations, Management, scientific and technical consulting (11%) represents a major ongoing source of emissions. While individual software categories like General purpose software (1%) and Licensing (1%) appear small, they contribute to a total digital-service footprint that dominates the chart.
- The "Other" category: The "Other" category is only 2%. This means that virtually all of the department's carbon footprint is tied to just four high-impact service sectors. This provides an incredibly clear roadmap for reduction: the path to decarbonizing for this department lies almost exclusively in greening its IT supply chain and selecting professional service providers with robust sustainability commitments.

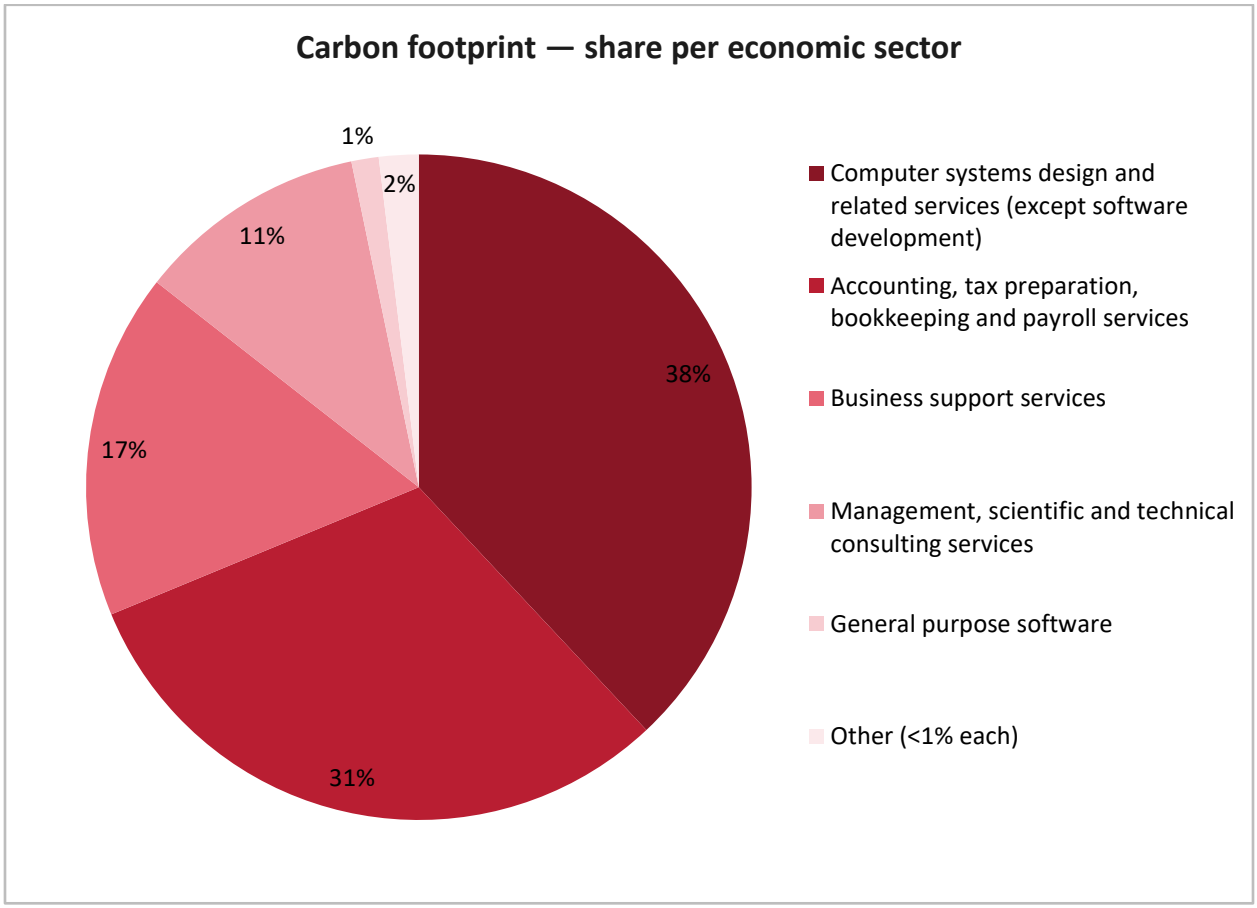

Figure 34: Crown-Indigenous Relations and Northern Affairs Canada procurement carbon

8.28 Carbon footprint of Defence Research and Development Canada (DRDC) procurement

Between 2020 and 2025, procurement contracts for Defence Research and Development Canada (DRDC) generated a total of 0.02 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 2,160 times or the equivalent of the average yearly emissions of 1,000 Canadians.

The data shows that emissions are heavily concentrated in technical services and fuel procurement. Over 40% of the procurement carbon footprint comes from just two categories: Architectural, engineering and related services (22%) and Diesel and biodiesel fuels (19%).

Key trends

- Engineering and technical design: The largest single share (22%) comes from Architectural, engineering and related services. This indicates that the carbon emissions are heavily tied to the complex design and technical planning required for major infrastructure and assets.
- Fuel Procurement: The purchase of Diesel and biodiesel fuels (19%) and Motor gasoline (9%) represents a major source of emissions. Combined, these fuel categories account for 28% of the total footprint. Note that this study only accounts for the emissions from producing fuel, not the from combustion of it during operation
- Specialized equipment: A significant portion of the footprint is driven by technical hardware, with Measuring, control and scientific instruments accounting for 11%, and Computer systems design contributing 9%.
- The "Other" category: The "Other" category is 7%. This means that 93% of the carbon footprint is tied to a specific set of high-impact industrial and professional activities, providing a very clear roadmap for where decarbonization and "green" procurement efforts should be focused.

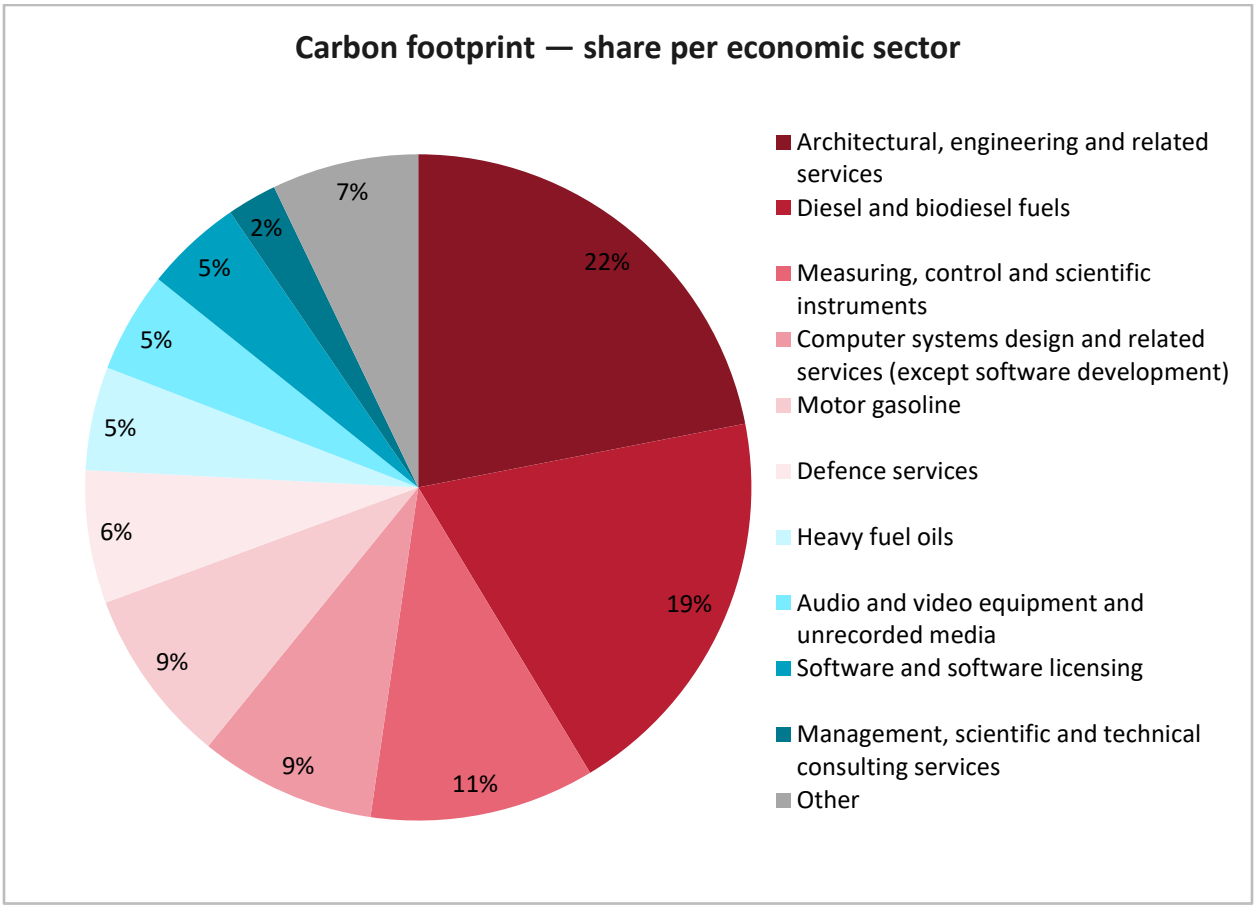

Figure 35: Defence Research and Development Canada procurement carbon footprint per IOCC commodity

8.29 Carbon footprint of Marine Atlantic Inc. (MAI) procurement

Between 2020 and 2025, procurement contracts for Marine Atlantic Inc. (MAI) generated a total of 0.01 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 1,080 times or the equivalent of the average yearly emissions of 500 Canadians.

The data shows that emissions are heavily concentrated in fuel procurement and technical maintenance. Over 40% of the department's procurement carbon footprint (42%) comes from just two categories: Diesel and biodiesel fuels (25%) and Water transportation support, maintenance and repair services (17%).

Key trends

- Fuel Procurement: The department's carbon footprint is overwhelmingly driven by energy requirements. When you combine Diesel and biodiesel fuels (25%), Motor gasoline (11%), and Heavy fuel oils (6%), fuel production accounts for 42% of the total footprint. Note that this study only accounts for the emissions from producing fuel, not from the combustion of it during the operation of a vehicle or vessel.

- Maintenance and repair: A major portion of the carbon cost is tied to keeping assets operational. Water transportation support (17%), general Repair and maintenance services (12%), and Motor vehicle repair (11%) collectively represent 40% of emissions, highlighting the high industrial impact of upkeep and servicing.
- Facility operations: Beyond mobile assets, Services to buildings and dwellings accounts for 7% of the footprint, showing that fixed infrastructure also plays a notable role in the procurement profile.
- The "Other" category: The miscellaneous "Other" sectors combined account for only 5%. This means that 95% of the department's carbon impact is tied to a small number of high-impact industrial activities, primarily fuel and maintenance, providing a very clear roadmap for where reduction efforts should be focused.

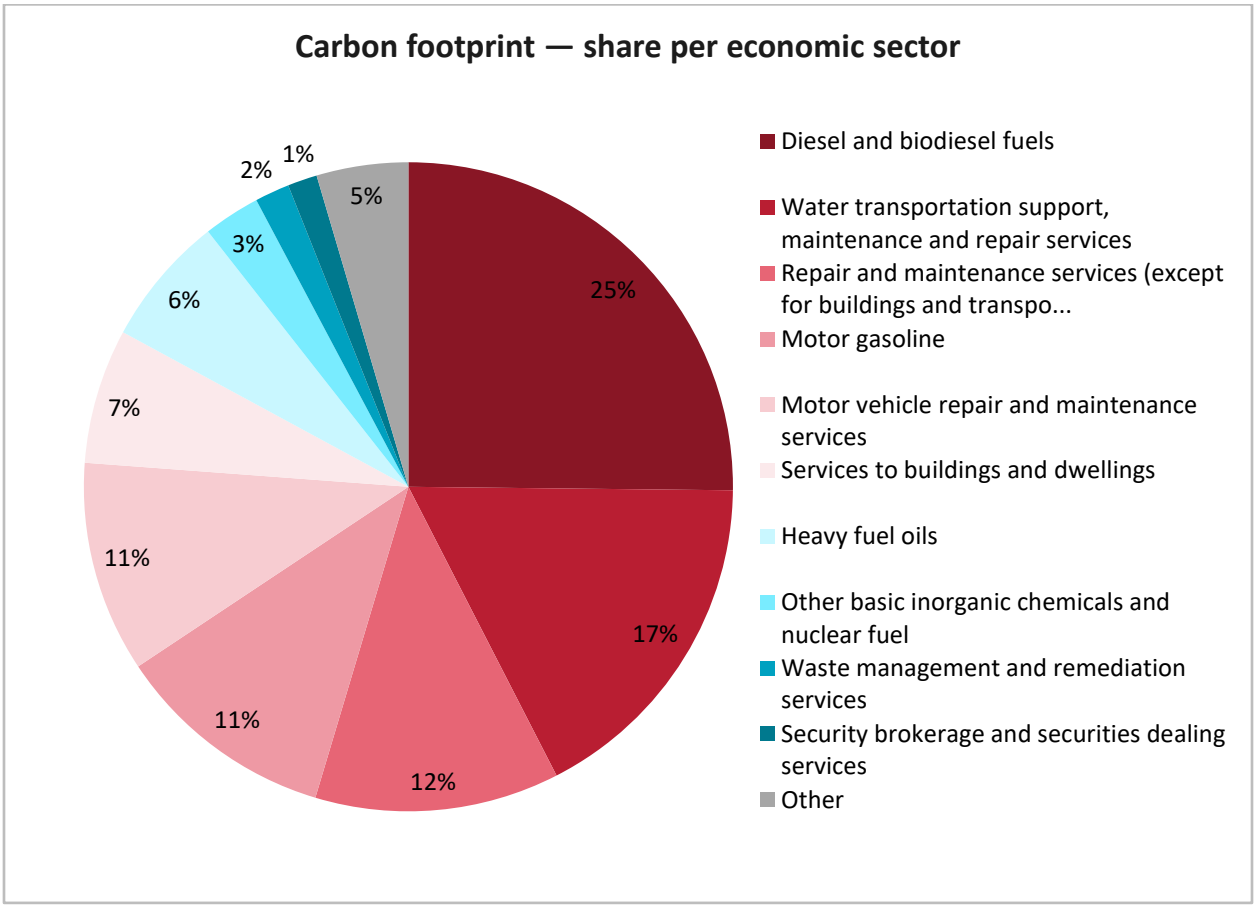

Figure 36: Marine Atlantic Inc. procurement carbon footprint per IOCC commodity

8.30 Carbon footprint of Statistics Canada (StatCan) procurement

Between 2020 and 2025, procurement contracts for Statistics Canada (StatCan) generated a total of 0.01 $MtCO_2eq$ in greenhouse gas emissions. To put this in perspective, this is roughly equivalent to driving around the Earth's equator 1,080 times or the equivalent of the average yearly emissions of 500

Canadians.

The data shows that emissions are extremely concentrated in the digital and software sectors. Over half of the department's procurement carbon footprint (62%) comes from just two categories: General purpose software (45%) and Advertising, public relations, and related services (17%).

Key trends

- Digital infrastructure: The department’s carbon footprint is overwhelmingly driven by its software stack. When you combine General purpose software (45%), Software and software licensing (7%), and Custom software design (3%), these digital assets account for 55% of the total footprint.
- Communication and outreach: The second-largest single share (17%) comes from Advertising, public relations, and related services. This indicates that the carbon emissions of the department are heavily tied to large-scale public engagement and communication campaigns.
- Facility operations: Beyond mobile assets, Services to buildings and dwellings accounts for 7% of the footprint, showing that fixed infrastructure also plays a notable role in the procurement profile.
- Professional services and training: Beyond software, a significant portion of the footprint is driven by human capital and knowledge services. Computer systems design (9%) and Tuition and professional training (6%) represent key ongoing sources of emissions, highlighting the carbon footprint of technical expertise and workforce development.
- The "Other" category: The “Other” category is only 4%. This means that 96% of the department's carbon impact is tied to a small number of high-impact activities, primarily software and communication, providing a very clear roadmap for where reduction efforts should be focused.

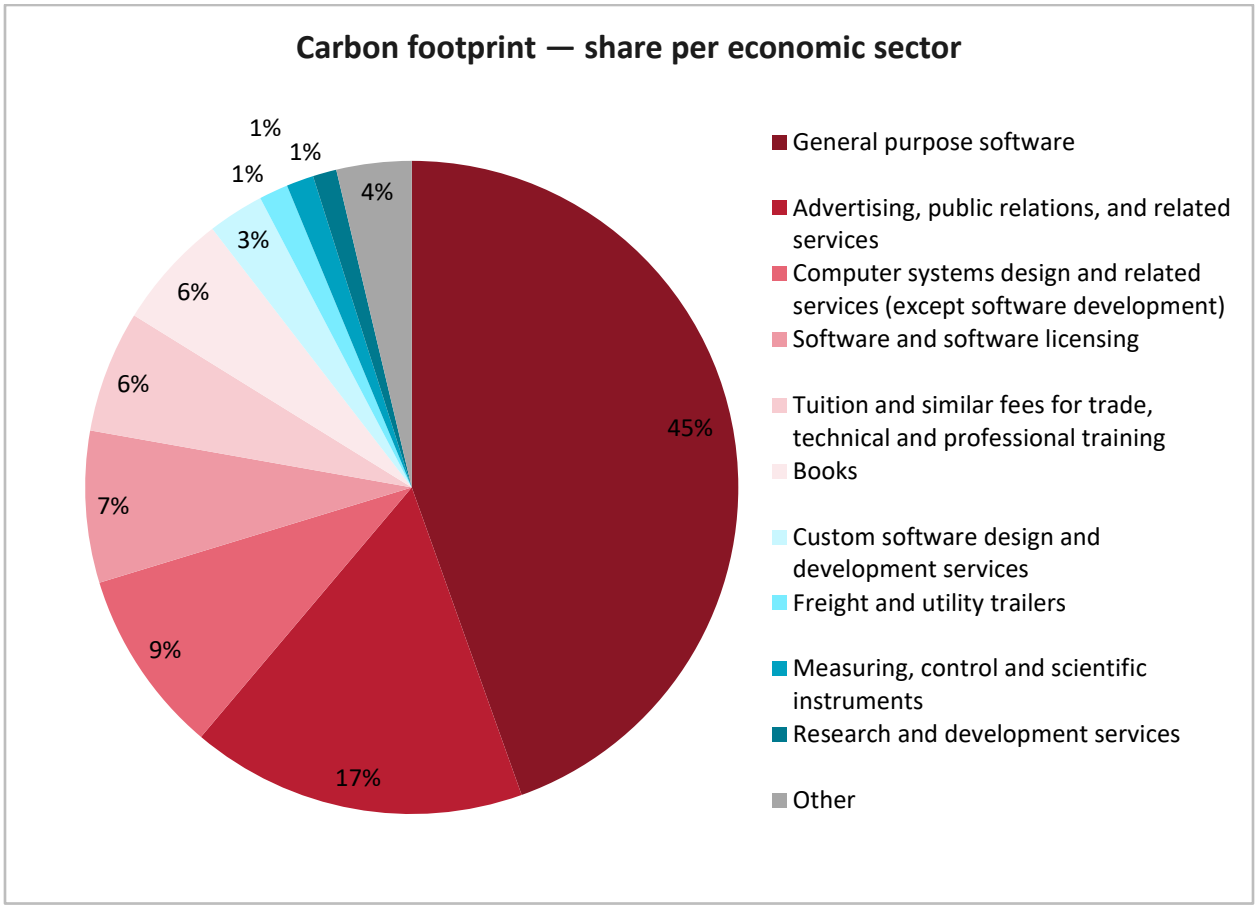

Figure 37: Statistics Canada procurement carbon footprint per IOCC commodity