A Primer on Scope 3 Emissions
Category 1: Purchased Goods and Services

This resource was developed as part of the *Decarbonization in Action* project, supporting Canadian hospitals to reduce greenhouse gas emissions across building systems, clinical activities, and organizational processes.

This project is a partnership of the Canadian Coalition for Green Health Care and MaRS Discovery District, and made possible by the Peter Gilgan Foundation.

THE PURPOSE OF THIS DOCUMENT

This is a stand-alone education deck that explains the **concept, relevance, and calculation approaches** to Scope 3 emissions, with focus on Category 1 Purchased Goods and Services (PG&S).

This document will:

- Explain what are Scope 3 emissions, and what PG&S emissions entail;
- Explain why hospitals should quantify Scope 3 emissions, and in particular PG&S emissions;
- Summarize existing work and methodology on PG&S quantification in the healthcare sector;
- Provide a step-by-step guide on how to approach PG&S emissions accounting and interpret the results.

Intended Audience:

- **Sustainability leads:** e.g. sustainability managers, executives, and committee members
- **Initiative leads:** e.g. operations managers, clinical champions and green team members
- **Key stakeholders and data owners:** e.g. procurement leads, finance controllers, database administrators

Disclaimer: This resource was developed as part of the *Decarbonization in Action* project as a high-level reference drawing on existing literature, resources, standards, and methodology guidance available at the time of publication (2026). It is intended to support hospitals with general information and guidance, but its applicability will depend on each organization's specific context, priorities, data, and operational circumstances. Users should consider local factors when interpreting or applying this resource, and note that relevant external standards and guidance may change over time.

TABLE OF CONTENT

Section 1: Overview

Carbon Accounting & Scope 3 Emissions for Healthcare

What is a carbon footprint

A carbon footprint is an **estimate** of the total amount of greenhouse gases (GHGs) that are emitted into the atmosphere each year. Carbon footprints can be calculated at different scales, e.g. for corporate/organization, products/services, or specific projects/processes. This guide focuses on organization-level carbon footprints.

The GHG Protocol requires the calculation of **six GHGs** emitted from human activities, including **carbon dioxide (CO_2), methane (CH_4)** and **nitrous oxide (N_2O)** which trap heat in the atmosphere, causing global warming.

A **carbon footprint** is expressed in terms of **carbon dioxide equivalent (CO_2e)**, which allows for the comparison of emissions from different GHGs based on their relative warming potential.

Source: Carbon footprinting in hospitals, Geneva Sustainability Centre

How a carbon footprint is structured

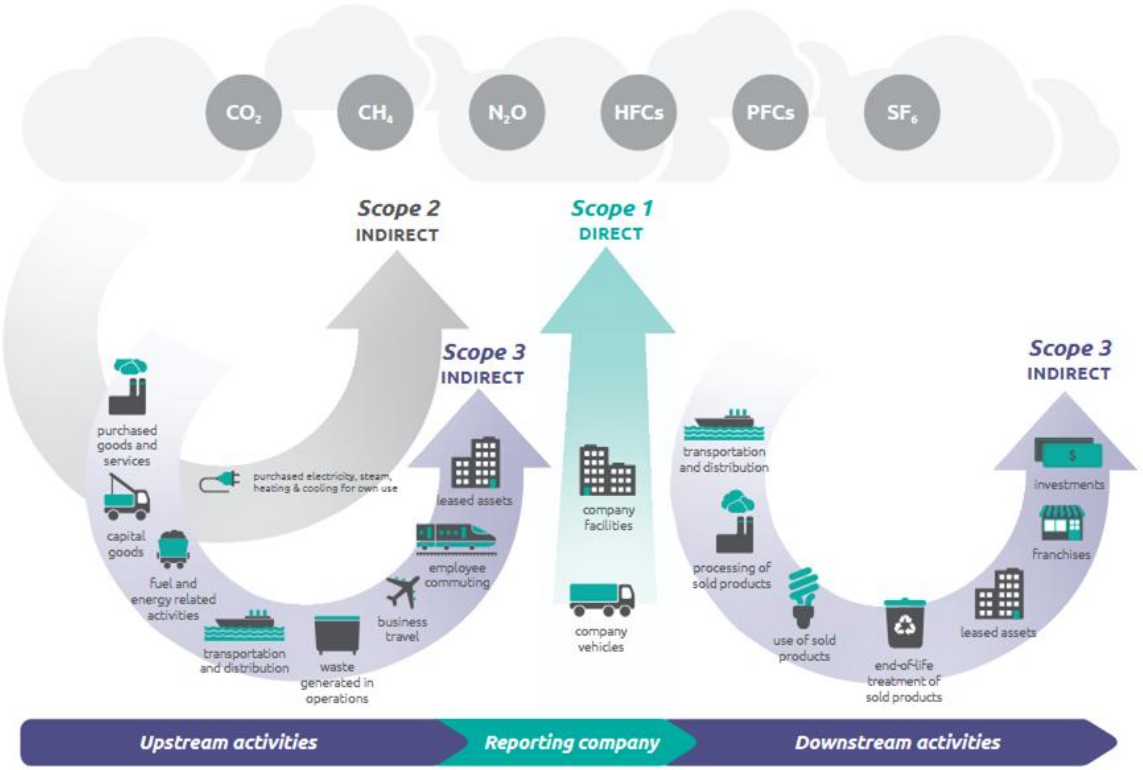


Image courtesy of GHG Protocol

GREENHOUSE GAS PROTOCOL

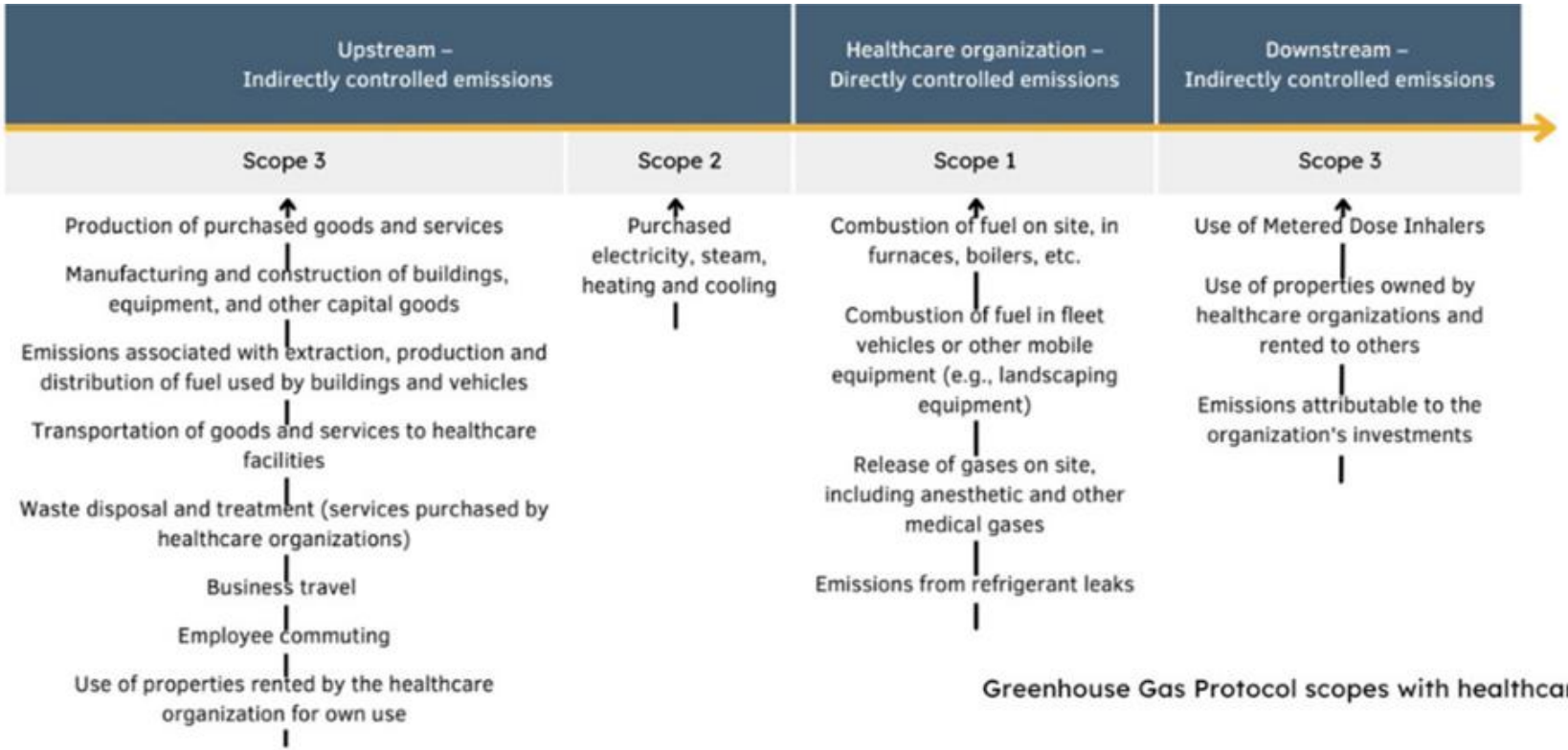
Scope 1: Direct emissions from sources owned or controlled by your organization

Scope 2: Indirect emissions from purchased energy such as electricity, heat, or steam

Scope 3: Indirect emissions across the value chain, both upstream and downstream

The future of GHG accounting standards: *GHG Protocol and International Organization for Standardization (ISO) have established a partnership to harmonize existing standards and co-develop new standards in the coming years.*

Healthcare examples of emission sources in each Scope

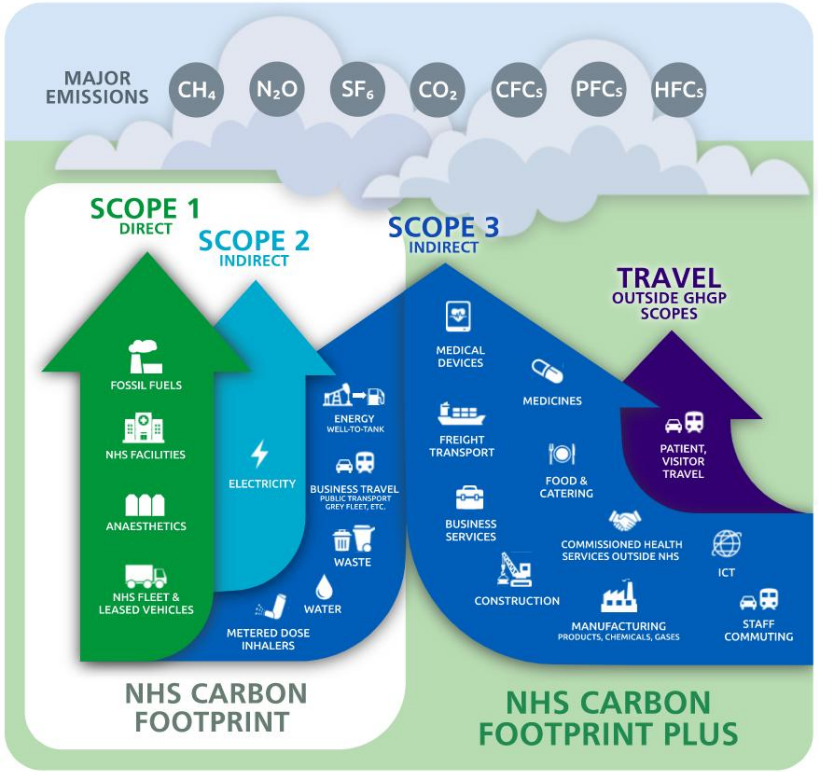


Greenhouse Gas Protocol scopes with healthcare examples

Source: Estimating greenhouse gas emissions from the health sector in Canada: Mind the gap

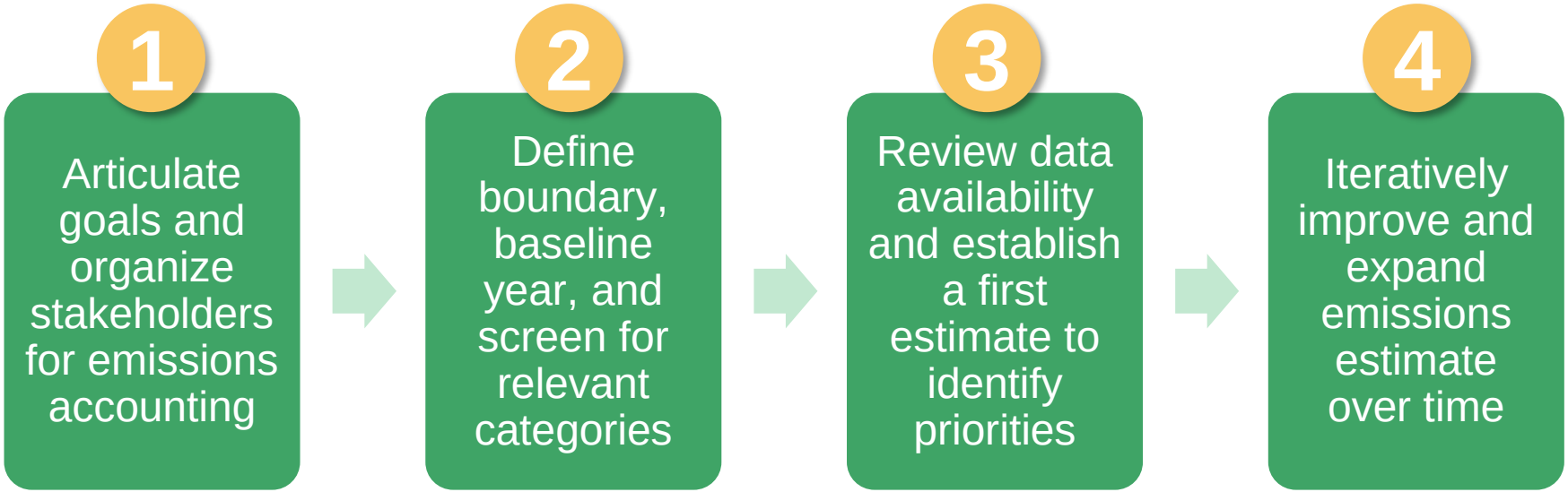
Why follow the GHG Protocol

- **Structured approach** to breaking down an organization's carbon footprint
- **Industry standard calculation methodology** facilitates year-over-year tracking and verification of impacts
- **Widely-adopted reporting framework** for communicating emission targets, progress and plans with stakeholders such as suppliers and funders
- Organizations can overlay other frameworks to support communication and decision-making.



Source: Delivering a net zero NHS

How to approach Scope 3 emissions accounting



Sources:
Measuring greenhouse gas emissions in health systems, ATACH
Scope 3 Inventory Guidance, EPA
How-To Guide to Scope 3 Emissions Accounting for Hospitals and Health Systems, ENGIE Impact and Health Care Without Harm

Why invest in Scope 3 emissions accounting

Organizations don't need to conduct full emissions accounting to narrow down the potential emission hotspots and reduction initiatives. However, having a comprehensive Scope 3 inventory helps to strategize, prioritize efforts, and track progress.

Manage Emissions

- Pinpoint emission hotspots
- Set KPIs and develop pathway to net zero
- Design targeted interventions
- Prioritize actions and investments
- Benchmark performance
- Track and verify impacts

Save Costs

- Identify and reduce waste and inefficiencies
- Identify best practices and opportunities to adopt solutions with lower total cost of ownership in the long run

Manage Risks

- Understand emissions contribution and risks exposure in operations and supply chain
- Build public and institutional trust
- Comply with current and future regulatory standards

Amplify Impact

- Provides the data to engage with supplier for value chain collaboration
- Educates internal teams to adopt a GHG lens in decision-making
- Empower patients to choose low-carbon products/services where suitable

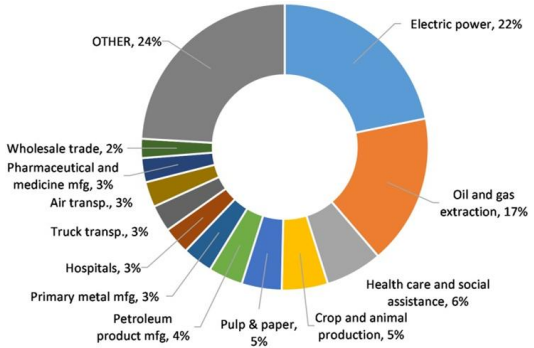
Scope 3 dominates healthcare emissions

At COP 30, the WHO-hosted network ATACH released technical guidance for measuring national health systems emissions.

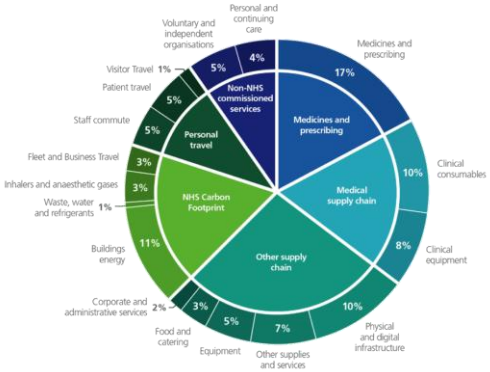
More top-down drive for understanding the wider healthcare emissions may be on the way.

Hospitals and hospital networks can prepare and show leadership by starting their own emissions baseline now.

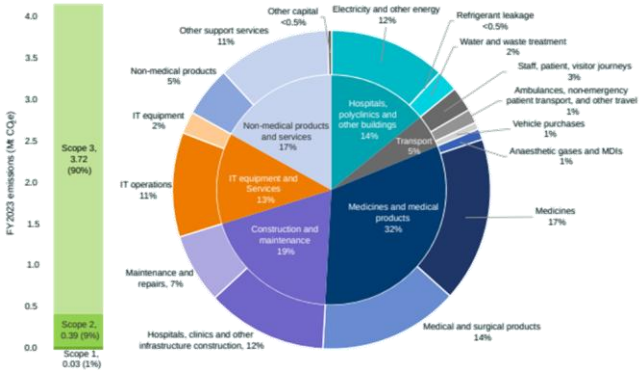
Canada: 61%



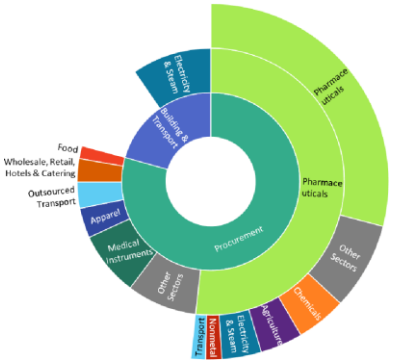
NHS England: >70%



Singapore: 90%



China: 84%



60–80% of the healthcare sector emissions are generated by the supply chain

Scope 3 Categories	Likely Significance*	Canada	NHS England	Singapore
1. Purchased goods and services	**High**	**52%**	**62%**	**65%**
2. Capital goods	Medium	N/A	N/A	16%
3. Fuel- and energy-related activities (not included in scope 1 or scope 2)	Dependent on Scope 1&2	N/A	N/A	N/A
4. Upstream transportation and distribution	N/A	N/A	N/A	N/A
5. Waste generated in operations	Low - Medium	N/A	5%	2%
6. Business travel	Low	N/A	4%	N/A
7. Employee commuting	Low	N/A	4%	3% (includes other travel)
8. Upstream leased assets	N/A	N/A	N/A	N/A
9. Downstream transportation and distribution	N/A	N/A	N/A	N/A
10. Processing of sold products	N/A	N/A	N/A	N/A
11. Use of sold products	Low – Medium	N/A	5% (MDIs + Scope 1 anesthetic gases)	1%
12. End-of-life treatment of sold products	N/A	N/A	N/A	N/A
13. Downstream leased assets	N/A	N/A	N/A	N/A
14. Franchises	N/A	N/A	N/A	N/A
15. Investments	Dependent on portfolio	N/A	N/A	N/A
Non-GHG Protocol (Patient & Visitor Travel)	Low – Medium	N/A	6%	1%

Note: All figures represent the % of total quantified national baselines for Scope 1, 2 and 3 emissions. *Thresholds: <5% - Low; 5% to 20% - Medium; >20% - High.

1 2 3 4 Source: Decarbonizing the healthcare supply chain: strategic actions for health systems

Example of a large US-based healthcare system

- **Getting started:** Select a representative baseline year and define a boundary:
  - What GHGs will be counted
  - What operations/facilities will be included
- **Likely relevant categories:** PG&S emissions and categories 2, 3, 5, 7, and potentially 15.
  - Your organization may a have different emission profile and should perform your own Scope 3 screening to determine the relevant categories.
  - See additional references for criteria to consider when defining relevance.
- **Likely irrelevant categories:** Category 10, 12, and 14.
  - Organizations should record the rationale for excluding any emission categories

Source: How-To Guide to Scope 3 Emissions Accounting for Hospitals and Health Systems, ENGIE Impact and Health Care Without Harm

Scope 3 Categories	Magnitude	Influence	Risk	Stakeholder Interest	Outsourcing	Sector Guidance	Overall Relevance
1. Purchased goods and services	High (>20%)	High	High	High	Med	High	Relevant
2. Capital goods	Med (5-20%)	High	High	High	Med	High	Relevant
3. Fuel- and energy-related activities	Med (5-20%)	Med	High	High	Low	High	Relevant
4. Upstream transportation and distribution	Low (<5%)	Med	Low	Med	Low	Low	Relevant
5. Waste generated in operations	Med (5-20%)	High	High	High	Low	High	Relevant
6. Business travel	Low (<5%)	Med	Low	Low	Low	Low	Relevant
7. Employee commuting	Med (5-20%)	Low	Med	High	Low	Med	Relevant
8. Upstream leased assets	Low (<5%)	Med	Low	Med	High	Med	Relevant
9. Downstream transportation and distribution	Low (<5%)	Med	Med	Med	Low	Med	Relevant
10. Processing of sold products	Likely not relevant						
11. Use of sold products	Low (<5%)	Med	Low	Med	Low	Med	Relevant
12. End-of-life treatment of sold products	Likely not relevant						
13. Downstream leased assets	Low (<5%)	High	Low	Med	High	Low	Relevant
14. Franchises	Likely not relevant						
15. Investments	High (>20%)	High	High	Med	Low	Med	Relevant

Simplest method and data source to estimate emissions by Scope 3 Category

Scope 3 categories	Simplest method	Data required	Where to find this data?
1. Purchased goods and services	**Spend-based**	**Quantity of money spent**	**Finance; Procurement**
2. Capital goods	Spend-based	Quantity of money spent	Finance; Procurement
3. Fuel- and energy related activities	Spend-based	Quantity of money spent	Finance; Procurement
4. Upstream transportation and distribution	Spend-based	Quantity of money spent	Finance; Procurement
5. Waste generated in operations	Spend-based	Quantity of money spent	Finance; Procurement
6. Business travel	Spend-based	Quantity of money spent	Finance; Procurement
7. Employee commuting	Average data	Number of employees	Human Resources
8. Upstream leased assets	Average data	Floor space of each leased asset	Operations; Facilities Management
9. Downstream transportation and distribution	Average data	Number of patient visits	Quality
10. Processing of sold products	Average data	Mass of intermediate products sold (e.g., in kg)	Sales; Business Development
11. Use of sold products	Average data	Number and types of MDIs sold or prescribed	Pharmacy
12. End-of-life treatment of sold products	Average data	Mass of sold products per waste treatment method	Pharmacy
13. Downstream leased assets	Average data	Floor space of each leased asset	Operations; Facilities Management
14. Franchises	Average data	Investee organization total revenue	Finance; Strategy
15. Investments	Average data	Amount of funds invested in each equity investment of the organization	Finance; Operations

Source: How-To Guide to Scope 3 Emissions Accounting for Hospitals and Health Systems, ENGIE Impact and Health Care Without Harm

Follow the data quality hierarchy

Recommended approach:

1. **Start with a first estimate:** use spend-based method and readily available spend-based emission factors (see additional references).

   Perfect is the enemy of good: work with simplified methods and crude/proxy data to start the process. Data quality can be improved later with targeted effort and wider industry actions.

1. **Identify priority product/service categories:** apply the Pareto rule, evaluate data availability and compile unit-based average emission factors for high-spend categories where you may have greater influence
2. **Target high-priority vendors and spend categories:** start developing a supplier engagement strategy to collect supplier-specific data for future work on Scope 3 emissions accounting and sustainable procurement
3. **Develop a GHG inventory management plan:** record your process and data sources to make it repeatable; and lay out the plan to improve data collection and quality for more product/service categories

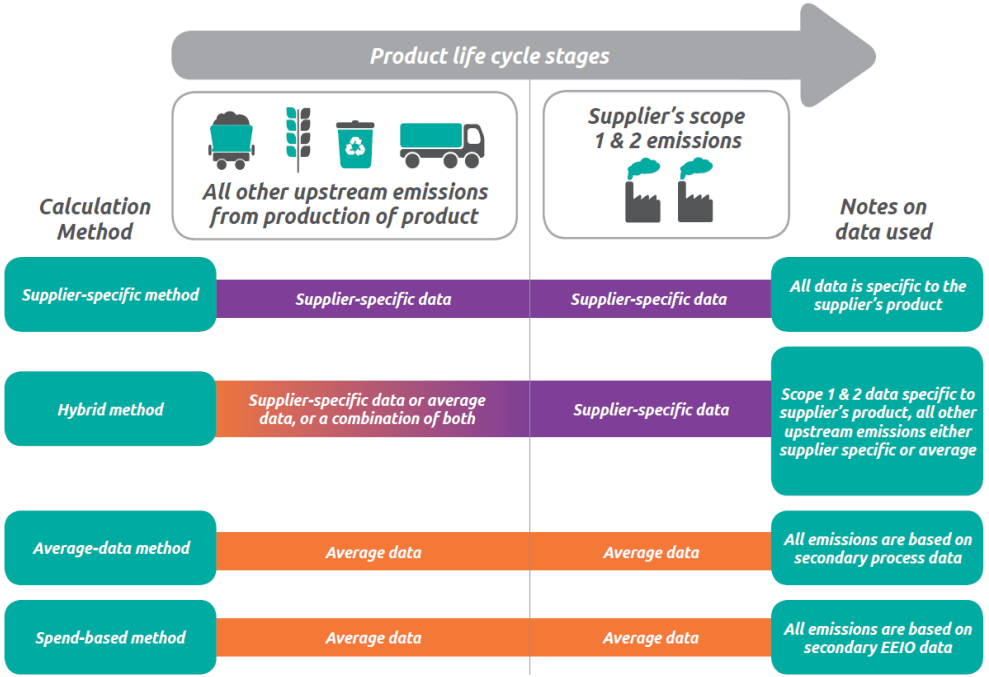


Image courtesy of GHG Protocol

Iterative process to improve data quality

Why aim for an average-data or hybrid approach over time:

- Signal your suppliers to quantify and reduce their own carbon footprint
- For strategic suppliers (e.g. in high-spend, high-concentration supply categories), share the evidence to push for low-carbon innovations

Drawbacks of spend-based approach:

- Spend-based factors tend to underestimate emissions.
- Spend-based or industry average data helps screen hotspots but provides limited insight into what actions you could take. This is because:
  - You cannot change the emission intensity factors, and therefore you can only lower your emissions by reducing your spending level or buying fewer products. It also does not allow you to claim the benefits of your initiatives in low-carbon procurement.
  - Prices can fluctuate due to market forces and do not reflect the underlying carbon footprint accurately.

Least accurate/informative and complex

Spend-based: Cost x Emission Factor
(e.g. average kg CO2e per CAD spent on IT services)

Average-data: Mass (or other unit) x Emission Factor
(e.g. average kg CO2e per kg of beef)

Hybrid: Supplier-specific data and secondary data to fill gaps

Supplier-specific: Product-level cradle-to-gate data

Most accurate/informative and complex

Additional References

Scope 3 categories descriptions

Scope 3 Categories	Description
1. Purchased goods and services	Emissions from the extraction, production, and transportation of products and services purchased or acquired by the organization . For example, medical supplies, pharmaceuticals, food, equipment, outsourced services, etc.
2. Capital goods	Emissions from the extraction, production, and transportation of capital goods. In financial accounting, capital goods are treated as fixed assets or as plant, property, and equipment (PP&E). Examples of capital goods include equipment, machinery, buildings, facilities, and vehicles.
3. Fuel- and energy-related activities (not included in scope 1 or scope 2)	Upstream emissions from fuel production and transmission and distribution losses in electricity.
4. Upstream transportation and distribution	• Transportation and distribution of purchased goods from Tier 1 suppliers (in vehicles and facilities not owned or controlled by the organization) • Transportation and distribution services purchased by the organization, including inbound logistics, outbound logistics, and transportation and distribution between an organization's own facilities (in vehicles and facilities not owned or controlled by the organization, e.g. leased shuttles)
5. Waste generated in operations	Emissions from the treatment and disposal of waste (off-site).
6. Business travel	Transportation of staff for business-related activities during the reporting year (in vehicles not owned or operated by the organization)

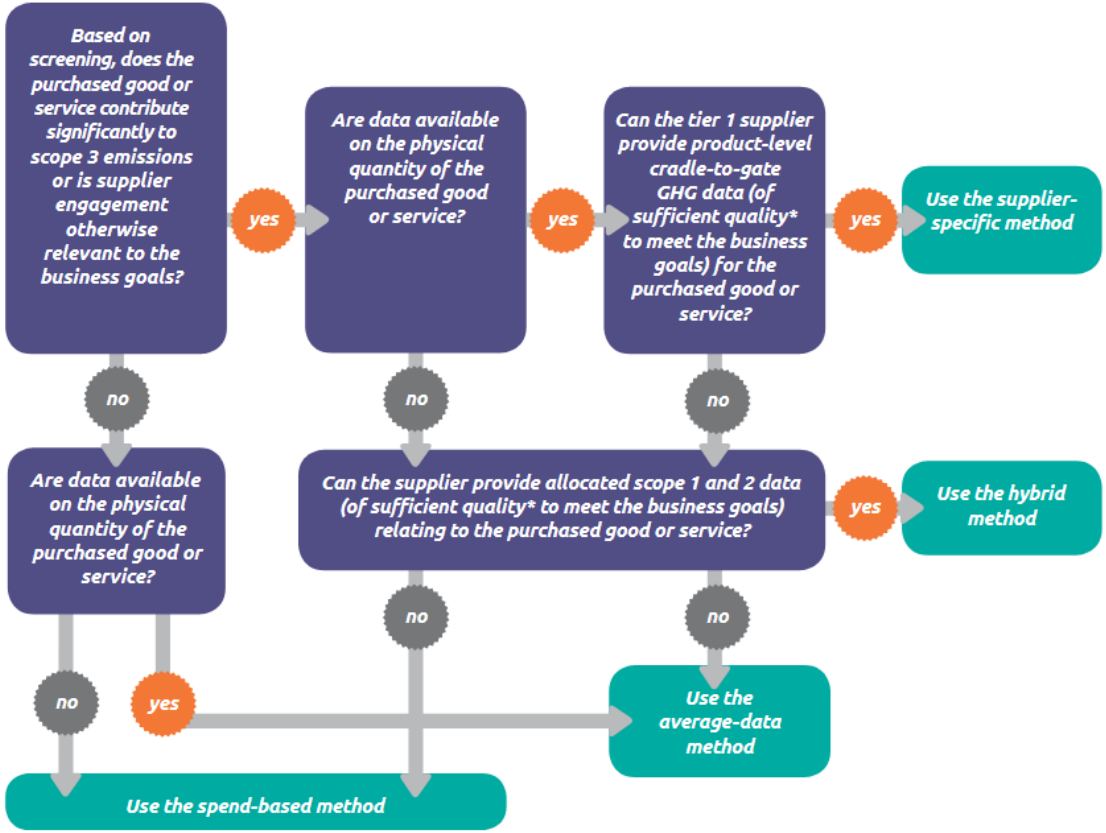
Scope 3 categories descriptions (cont'd)

Scope 3 Categories	Description
7. Employee commuting	Transportation of staff between their homes and worksites during the reporting year (in vehicles not owned or operated by the organization)
8. Upstream leased assets	Operation of assets leased by the reporting organization (lessee) in the reporting year and not included in scope 1 and scope 2 — reported by lessee
9. Downstream transportation and distribution	Transportation and distribution of products sold by the reporting organization in the reporting year between the reporting organization's operations and the end consumer (if not paid for by the reporting organization), including retail and storage (in vehicles and facilities not owned or controlled by the reporting organization).
10. Processing of sold products	Processing of intermediate products sold in the reporting year by downstream companies (e.g., manufacturers).
11. Use of sold products	End use of goods and services sold by the reporting organization in the reporting year.
12. End-of-life treatment of sold products	Waste disposal and treatment of products sold by the reporting organization (in the reporting year) at the end of their life.
13. Downstream leased assets	Operation of assets owned by the reporting organization (lessor) and leased to other entities in the reporting year, not included in scope 1 and scope 2 — reported by lessor.
14. Franchises	Operation of franchises in the reporting year, not included in scope 1 and scope 2 — reported by franchisor.
15. Investments	Operation of investments (including equity and debt investments and project finance) in the reporting year, not included in scope 1 or scope 2.

Criteria for identifying relevant Scope 3 categories

Criteria	How to use criteria to identify relevant Scope 3 activities
Size	Do these activities contribute significantly to total anticipated Scope 3 emissions?
Influence	Do these activities offer potential emissions reductions that could be undertaken or influenced by your organization?
Risk	Do these activities contribute to the organization's risk exposure (e.g., climate change related risks such as financial, regulatory, supply chain, product and customer, litigation, and reputational risks)?
Stakeholders	Are these activities deemed critical by key internal/external stakeholders (e.g., customers, suppliers, investors, or civil society)?
Outsourcing	Do these activities include outsourced activities previously performed in-house or are they performed in-house by other organizations in the reporting organization's sector?
Sector guidance	Are these activities identified as significant by sector specific guidance?
Spending or revenue analysis	Do these activities require a high level of spending, generate a high level of revenue, and/or are sometimes correlated with high GHG emissions?
Other	Do these activities meet any additional criteria developed by the reporting organization or industry sector?

Decision tree for selecting a calculation method for emissions from purchased goods and services



Note * Companies should collect data of sufficient quality to ensure that the inventory:

- most appropriately reflects the GHG emissions of the company
- supports the company's business goals for conducting a GHG inventory
- serves the decision-making needs of users, both internal and external to the company.

For more information on how to determine whether data is of sufficient quality, see section 7.3 of the *Scope 3 Standard*

Source: World Resources Institute

Image courtesy of GHG Protocol

How to Quantify Purchased Goods & Services Emissions

Overview of steps

1 Project preparation

- 1.1 Define boundaries and baseline/reporting year
- 1.2 Map data sources and data owners

2 Data collection and processing

- 2.1 Gather granular spend data
- 2.2 Consolidate and clean the data
- 2.3 Prioritize high-spend line items
- 2.4 Classify spend data & create subcategories
- 2.5 Choose method and research emissions data
- 2.6 Quality assurance and data quality check (optional, recommended)

3 Emissions calculation and analysis

- 3.1 Calculate emissions and analyze by groupings (e.g. subcategory, vendor, department)
- 3.2 Identify hotspots for action

4 Continuous improvement

- 4.1 Document methodology
- 4.2 Build improvement plan for emissions accounting
- 4.3 Communication and targeted engagement of internal and external stakeholders

Step 1: Preparation 1 2 3 4

1.1 1.2

1.1 Define boundaries and baseline/reporting year

Action:

- Confirm which hospital entities, facilities, departments and spend types are included in PG&S
  - **What to exclude:** capital goods, transportation and distribution, waste management, and non-emitting services such as salaries, wages, payroll taxes and other pure financial fees.
  - **Note**: In certain cases, there may be ambiguity over whether a particular purchased product is a capital good (to be reported in category 2) or a purchased good (to be reported in category 1). The emissions accounting methodology should follow your organization's financial accounting procedures and definition of capital vs purchased goods, and not double count the emissions.
- Choose a representative baseline year (if not equal to the current reporting year), decide between calendar or fiscal year basis.

Stakeholder: Sustainability, Finance

Output: A record of the GHG inventory scope (part of the GHG Inventory Management Plan)

Step 1: Preparation

1.2 Map data sources and data owners

Action: Identify potential sources of spend data across the organization, e.g. Finance (e.g. general ledger), Procurement (purchase order database), Pharmacy, Research facilities, Food/catering, and vendor reports.

Stakeholder: Sustainability, Procurement, Finance, Other departments with separate purchasing or activity data

Output: A record of the data sources, data fields, and data owners associated with purchasing data across the organization

Step 2: Data collection and processing

1 2 3 4

2.1 2.2 2.3 2.4 2.5 2.6

2.1 Gather granular spend data

Action:

- Request spend data for the selected baseline year and organizational boundary
  - **Must-have**: Line description, quantity/unit purchased by line, and CAD spend amount by line.
  - **Nice-to-have:**
    - Commodity/general ledger code: for creating subcategories
    - Vendor name/ID by line: to analyze spend/emissions by vendor
    - Cost center/department by line: to analyze spend/emissions by department
    - CapEx flag: to avoid double-counting from Scope 3 Category 2 Capital Goods
  - **Note on basic vs purchaser price:**
    - If buying directly from manufacturers: your procurement team may be able to flag entries to use basic prices. This would allow you to use the lower emission factors (EFs) without margins.
    - If buying via a wholesaler/retailer/distributor: use purchaser prices and EFs with margins.
    - If unclear: you may default to use EFs with margins to be conservative (i.e. over-reporting rather than under-reporting).

Stakeholder: Finance, Sustainability, Other owners of spend data

Output: Final versions of raw data with the necessary data fields, for all in-scope spending

Step 2: Data collection and processing

1 2 3 4

2.1 2.2 2.3 2.4 2.5 2.6

2.2 Consolidate and clean the data

Action:

- Combine data files and formats, validate ambiguous line descriptions with data owners
- Conduct initial checks and data cleaning:
    - Remove duplicates, standardize vendor and department names
    - Remove capital goods, entries related to other emission categories (e.g. transportation and distribution, waste management), and non-emitting services such as salaries, wages, payroll taxes and other pure financial fees

Stakeholder: Finance, Sustainability, Other owners of spend data

Output:

- One master file for all in-scope spend data with standardized data fields and clear descriptions
- A record/change log of the edits made to the raw data for future reference

Step 2: Data collection and processing

2.3 Prioritize high-spend line items

Action:

- Sort line items by spend to find the top contributors.
- Decide on a cut-off point for emission calculations (e.g. 80% of spend) and create a short list.
- Flag likely high-GHG line items for further unit-based emission factor research. This could be a combination of costly goods in relatively small quantities (e.g. specialized tools) and low-cost but high-volume products (e.g. gloves).

Stakeholder: Sustainability

Output:

- A short list of top spend items for further categorization and calculation.
- Documentation of the methodology and key decisions (e.g. choice of cut-off point)

Step 2: Data collection and processing

1 2 3 4

2.1 2.2 2.3 2.4 2.5 2.6

2.4 Classify spend data and create subcategories

Action:

- In collaboration with data owners, create subcategories and map your spend categories to EEIO economic sectors/commodities using keyword searches and lookup tables.
  - **Recommendation:** Use Canada-specific factors where available, and use factors mapped to US or UK cost factors to fill gaps.
  - EEIO = Environmentally-Extended Input-Output models, they describe the interactions across economic sectors and the corresponding emissions impact by industry and by commodity (inputs and outputs for an industry). See additional references and accompanying Excel workbook for data sources and examples.

Stakeholder: Sustainability, Procurement, Other spend data owners

Output:

- A categorized short list, where each top spend line item has a baseline spend-based estimate to facilitate prioritization.
- Documentation of the methodology and key decisions (e.g. spend mapping and data sources)

Step 2: Data collection and processing

1 2 3 4

2.1 2.2 2.3 2.4 2.5 2.6

2.5 Choose method and research emissions data

Action:

- Sort the subcategories by level of aggregated spend. Prioritize activity-based approach for high-spend subcategories and other potential emission hotspots flagged in previous steps.
  - **If using a spend-based approach:** research spend-based emission factors (see accompanying Excel Workbook), convert to CAD basis where necessary and adjust for inflation if the publication year of the emission factors does not match your baseline year.
  - **If using an average-data or hybrid approach:** research activity/unit-based emission factors (see pages 41 and 42). Prioritize health care specific data sources (e.g. Healthcare LCA and peer-reviewed LCAs/carbon footprints). Check that the emission factor boundary is from cradle-to-gate to avoid overestimation (i.e. up to the point the product leaves the factory gates, excluding emissions from transportation, use phase, and disposal).

Stakeholder: Sustainability

Output:

- Consolidated file with subcategories, line items, supporting data fields, and corresponding emission factors based on the chosen methodology.
- Documentation of methodology, data sources, conversions (e.g. currency and inflation adjustments) and emission factor metadata: boundary (cradle-to-gate), GWP values (e.g. GWP100), data type (e.g. literature LCA, certified Environmental Product Declarations or Product Carbon Footprints), data assurance (e.g. whether the data is verified by third-parties to relevant standards)

Step 2: Data collection and processing

1 2 3 4

2.1 2.2 2.3 2.4 2.5 2.6

2.6 Quality assurance and data quality check (optional, recommended)

Action:

- Before calculating emissions, perform a QA check to confirm exclusions, verify subcategory mapping, and scan for obvious misclassifications (e.g. construction and other capital goods).
- Document data quality of emission factors compiled from the previous step:
  - Potential data quality ranking:
    - A: Supplier/product-specific data such as Environmental Product Declarations, Product Carbon Footprints or Product LCAs
    - B: Activity/unit-based factors from reputable sources such as published LCAs
    - C: Spend-based factors with a good mapping between line description and the economic sector
    - D: Spend-based factors with approximate/ambiguous mapping
    - E: Proxy/assumptions

Stakeholder: Sustainability, Procurement

Output: Record of QA and data quality ratings as part of the Inventory Management Plan for future improvement

Step 3: Emissions calculation and analysis

1 2 3 4

3.1 3.2

3.1 Calculate emissions and analyze by groupings (e.g. subcategory, vendor, department)

Action:

- **Spend-based method:** For each applicable line item, multiply spend by adjusted spend-based emission factors
- Average-data or hybrid method: For each applicable line item, multiply quantities purchased by the unit-based emission factors.
- Calculate the subtotals and total emissions.
- Create visualizations of different emission sources and segments: e.g. by subcategory, vendor, and contributing department.

Stakeholder: Sustainability

Output: Complete emissions calculations and preliminary analysis.

Step 3: Emissions calculation and analysis

1 2 3 4

3.1 3.2

3.2 Identify hotspots for action

Action:

- Identify the top subcategories, vendors and departments by contribution to total emissions for engagement.
    - **Suggested thresholds:**
        - High priority: categories and subcategories contributing >5% of total emissions
        - Medium priority: 1-5% of total emissions.
- Research and socialize emission reduction opportunities targeting emission hotspots.

Stakeholder: Sustainability, Procurement, Departments with high GHG contributions and Clinical Green Teams

Output: Summary of key findings and recommendations

Step 4: Continuous improvement

4.1 Document methodology

Action:

- Compile methodology throughout this process to establish a repeatable (and potentially auditable) process.
- This should cover (see more detailed guidance):
  - Organization information
  - Boundary conditions
  - Base/Reporting year
  - Emissions quantification methodologies
  - Sources of spend/procurement data and other internal activity data used in calculations
  - Emission factors and data sources
  - Data management processes (e.g. data cleaning, processing and validation)
  - Data management tools (if applicable)
  - Auditing and verification process (if applicable).

Stakeholder: Sustainability, Procurement, Finance, Other spend data owners

Output: A GHG Inventory Management Plan that serves as the reference for future emissions accounting efforts.

Step 4: Continuous improvement

4.2 Build improvement plan for emissions accounting

Action:

- Summarize data quality for this cycle:
  - Potential metrics:
    - % of spend covered in emissions calculations
    - % of emissions calculated from spend vs. activity-based factors
    - # of supplier outreach started
- Plan for improvements for the next cycle:
  - Potential actions:
    - Target certain subcategories to move up the data quality hierarchy (e.g. from spend-based to activity/unit-based factors; from average values to supplier-specific values)
    - Plan for potential supplier engagement (e.g. discuss your carbon footprint results and targets during supplier meetings, develop surveys and RFP criteria).

Stakeholder: Sustainability, Procurement, Finance, Other spend data owners

Output: A high-level roadmap with proposed actions, milestones, and task owners.

Step 4: Continuous improvement

4.3 Communication and targeted engagement of internal and external stakeholders

Action:

- Produce communication assets for various internal and external audiences to share key findings and recommendations.
- Potential internal audiences and messaging:
  - Executives and Board/Foundation: key findings and strategic direction
  - Finance: data management processes
  - Procurement: emission profile by spend category, emission hotspots and supplier asks
  - Clinical: emission profile by department, emission hotspots, potential reduction opportunities and co-benefits

Stakeholder: Sustainability, Procurement, Department Leads and Clinical Green Teams

Output: Potential assets include a full write-up of the process and results, executive summary, internal communications slides, supplier engagement template, and other knowledge translation outputs.

Additional References

Example subcategories and spend mapping (1/2)

Subcategory	Description & Examples
Medicines, pharmaceutical products, and vaccines	This subcategory includes medicines, reagents, pharmaceutical products (e.g., inhalers), and vaccines.
Medical supplies	This subcategory includes care-related consumables (e.g., prostheses, orthoses, wheelchairs, dressings, surgical masks, surgical gowns, surgical instruments, IV bags, thermometers, medical and surgical gloves, etc.).
Medical equipment	This subcategory includes capital equipment and items with a long service life (e.g., radiology equipment, ultrasound, and MRI machines, etc.).
Acquired services	This subcategory includes all services provided by vendors (e.g., research studies, training, IT maintenance, communications, etc.).
Administrative supplies and stationery	This subcategory includes various office consumables (e.g., paper, ink cartridges, etc.).
IT equipment	This subcategory includes computer hardware (e.g., computers, monitors, keyboards, etc.) and telecommunications equipment (e.g., mobile phones, landlines, etc.).
Hygiene and sanitation products	This subcategory includes chemical products (e.g., antiseptic soaps, aseptic agents, etc.), other cleaning products (e.g., disinfectant wipes, hand towels, nitrile gloves, etc.), and various supplies needed for waste management (e.g., containers or bags for biomedical waste, etc.).
Food	This subcategory includes products purchased for food services (e.g., food items, purchased meals, etc.).
Other expenses	This purchase subcategory includes all other items acquired by the institution (e.g., textiles, furniture, household appliances, heating and cooling equipment, etc.).

Source: Methodology for quantifying GHG emissions for healthcare and social services institutions in Quebec (in French), CIRAIG (2025)

Example subcategories and spend mapping (2/2)

Subcategory	Example spend mapping (not exhaustive)	Suggested method
Medicines, pharmaceutical products, and vaccines	Drugs and pharmaceuticals excluding anesthetics, e.g. antibiotics, pain relievers, vitamins, drug packaging, IV packaging. May further categorize by format (e.g. pills, patches, inhalers, liquids, etc.)	Average-data & Spend-based
Medical supplies	Prostheses and implants | Non-drug pharmacy supplies | Sterilization supplies | Lab supplies | Chemicals and ancillary agents | Medical products	Average-data & Spend-based
Medical equipment	Radiology equipment and radiosurgery device | MRI machines | Gastroscopes	Average-data & Spend-based
Acquired services	Non-salaried staff | Research studies | Technical equipment maintenance | Software | Cleaning services | Consultancy | Educational services and supplies | Contracts with third parties | Business operations | Telephone services	Spend-based
Administrative supplies and stationery	Office supplies | Office furniture | Paper | Cardboard containers	Average-data & Spend-based
IT equipment	Computer and electronic supplies	Spend-based
Hygiene and sanitation products	Toiletries (Disposable diapers and feminine hygiene products) | Paper hygiene products | Hazardous waste containers | Cleaning supplies (soaps, stain removers)	Spend-based
Food	Patient diets | Catering	Average-data & Spend-based
Other expenses	Textiles and linens | Other furniture (mattresses) | Non-medical appliances and hardware | Patient transportation | Building and facility maintenance | Water supply	Average-data & Spend-based

Sources: CIRAIG, B.C. hospital, CISSS de Laval, German hospital, Dutch hospital

Data sources for activity/unit-based emission factors

Source	Free/Paid	Type of Goods/Services	Notes
Healthcare LCA database	Free	Healthcare specific data on: equipment, procedures, pharmaceuticals, medical interventions, investigations, services, and system-level data.	• Some emission factors are expressed per functional unit (e.g., one use, one procedure) rather than per mass or number of units.
Cool Food Calculator (World Resource Institute)	Free (click "Download", option to skip sign-up and access files directly at the bottom of the pop-up box)	Food products	• High data granularity; data are specific to regional food systems (e.g. North America) • Provides breakdown of emissions by supply chain stage, and other factors such as food-related land use and carbon costs.
Carebone Tool (Assistance Publique – Hôpitaux de Paris)	Free	Pharmaceuticals, medical devices	• Data and methodology are specific to the French context. • No subcategorization to support with data look-up. • Emission factors are presented for the full life cycle. **Users need to manually extract the upstream emission factors (exclude waste treatment).**
ecoinvent	Paid	All	• **Paid database, LCA experience recommended.**
Life cycle inventory database for consumption in Québec	Free	Food products	• Data are specific to the Quebec context. • Medium data granularity by food group
CarbonCloud	Free (upon registration)	Food products	• Cradle-to-gate emission factors; data are available from global producers and verified by CarbonCloud.
Managed LCA Content (GaBi)	Paid	All	• Paid database, LCA experience recommended.
USLCI	Free	All	• Free life-cycle inventory database. Impact data are shown in building blocks (e.g. industrial processes). • Aggregate data of CO2e impact not available. LCA experience recommended.
Base Empreinte (FR)	Free	All	• Data are specific to a French context.
Agribalyse (FR)	Free	Food products	• Data are specific to French context and integrated in Base Empreinte.

Data sources for spend-based EFs or hybrid methods (see Excel Workbook)

Source	Free/Paid	Pros	Cons
Health Care Emissions Impact Calculator (Health Care without Harm, Practice Greenhealth)	Free (with request form)	• Detailed sector- and commodity- level data. • Built-in data navigation tools in the Excel workbook to help with spend-mapping.	• Based on US EEIO data and requires further inflation adjustment and currency conversion.
Carbon Management Tool (Aga Khan Development Network)	Free (with request form)	• Provides an example template for mapping spend categories to EEIO sectors. • Provides a collection of supplier-specific (mostly pharmaceuticals) emission factors based on corporate reporting of GHG emissions and revenue.	• Based on UK cost codes and emission factors, which may not be as relevant/ transferable for North American markets
Methodology of evaluating the carbon footprint of medicines (ADEME)	Free	• The carbon footprint covers the entire life cycle (Note: Users need to manually extract the upstream emission factors for PG&S) • The approach is standardized and reduces methodological variances across ad hoc LCAs	• The Excel tool is built for the French medicines system and uses the French Base Empreinte database • Some supply chain assumptions are France-specific
OpenIO-Canada (CIRAIG)	Free	• Detailed sector- and commodity-level information can be derived at province and territory level.	• The raw data can be difficult to understand and work with. **Prior experience working with EEIO data recommended.**
Canadian Emissions Intensity Database (Canadian Climate Institute)	Free	• The data is easy to understand and ready for use in emissions calculations - no prior experience with EEIO data required.	• The level of detail is limited compared to other sources (lack commodity level data).
Healthcare Supply Chain Emissions Calculator (Yale University, School of Public Health)	Free (upon registration)	• In addition to the carbon footprint, includes an estimate on the organization's water use and air pollution (PM2.5) impact. • One-step process where users upload aggregated spend data mapped by sector.	• Based on US EEIO data, but it is not clear whether the results are adjusted by inflation. • Manual conversion of CAD to USD required before data upload. • Upload of financial data (even aggregated and anonymized) could pose a challenge.
Shadow.eco	Paid services	• Carbon accounting software and advisory company with specialty in the health care sector, providing software platform for data management, calculations and analysis. • Currently working with Synergie Santé Environnement to support Montreal hospital systems measure and reduce emissions.	• Some emission factor sources may be proprietary • Hospitals should evaluate whether and how external software platforms suit their needs for emissions accounting and decarbonization action planning.

Examples of Canadian Hospital PG&S Emissions Accounting and Methodology Considerations

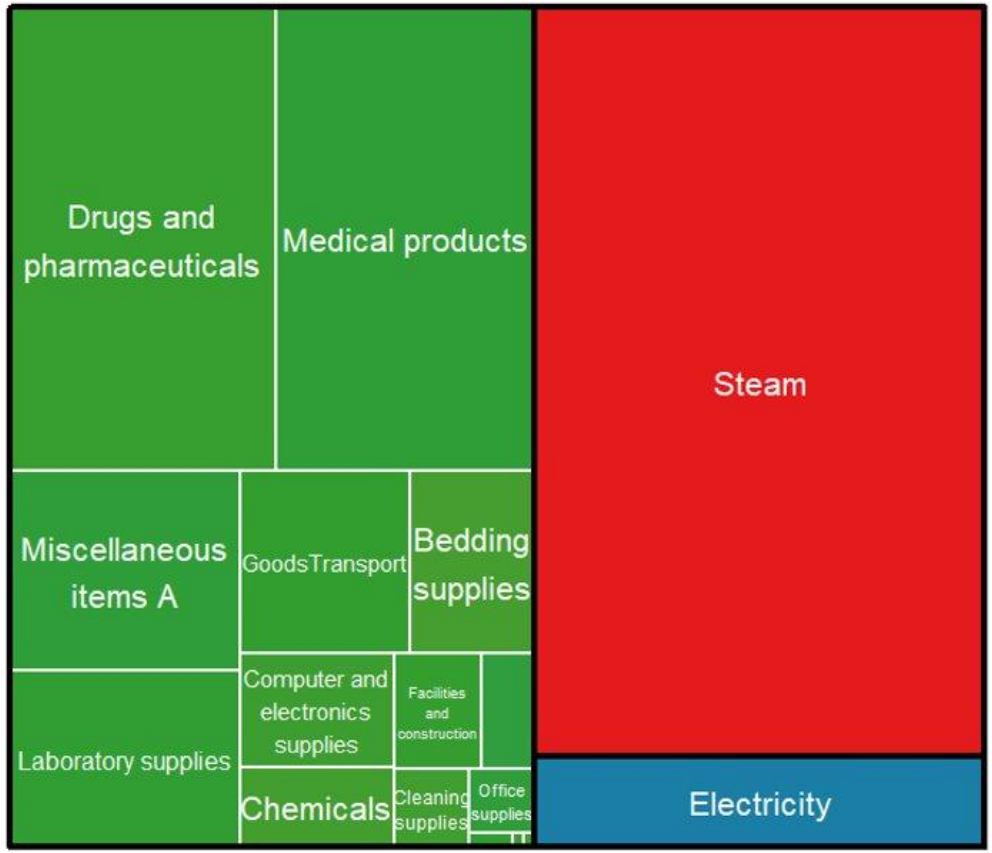
Children's Hospital of Eastern Ontario (CHEO)

Key takeaway:

- Perfect is the enemy of good enough, so don't delay the work due to data gaps.
- For organizations just starting to map their carbon impact, even crude data supports better decision making.
- Data quality can be iteratively improved over time, in pace with real-world action.

Methodology:

- Triage scope 3 into items with known, partially known and unknown CO2 emission factors
- Hybrid organizational emissions approach
- Pragmatic categories of scope 3 item. Randomly sampled LCA in each category to estimate that groups' emissions
- Method replicates the BC hospital example cited previously.
- Items with known emissions used their exact estimate instead of their category level emissions factor.
- Only the drugs category was based a simple emissions factor (with no 95% CI)



Source: Contribution by Dr Richard Webster, CHEO Research Institute

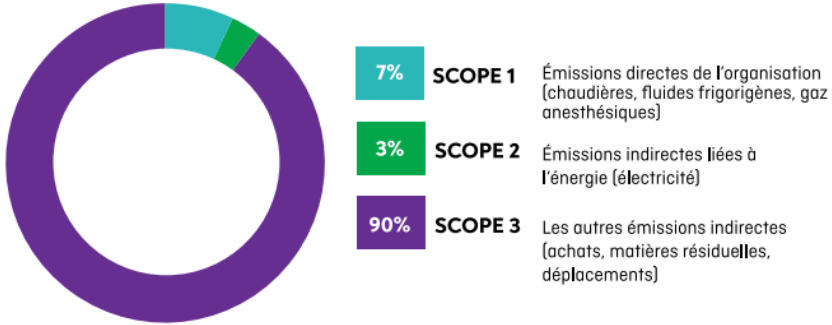
CISSS de Laval

Methodology related to PG&S:

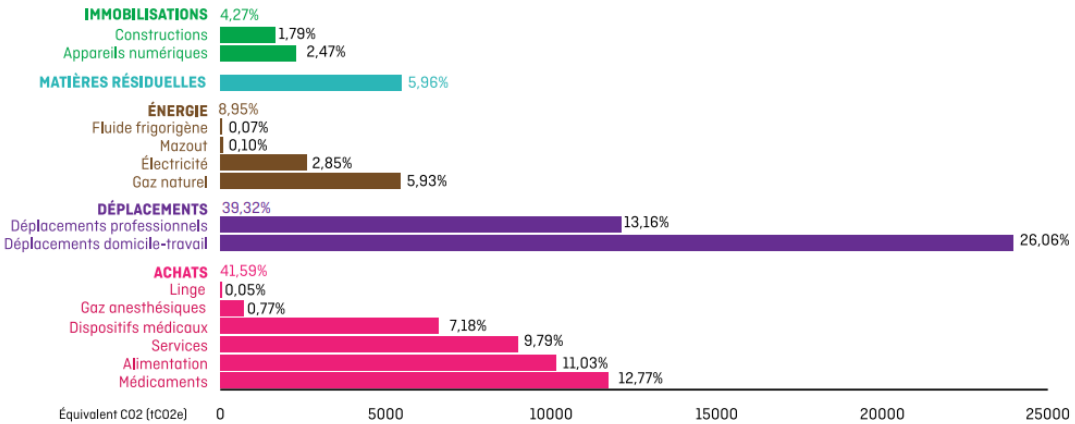
- Medicines: spend-based conversion published by ADEME and used by the National Health Services England, based on the carbon footprint of pharmaceutical industries and their revenue.
- Disposable medical devices: spend-based approach.
- Inhalers: based on quantities prescribed and carbon footprint per inhaler by type
- Food: based on quantities purchased (tonnes) by food categories

Source: Bilan des émissions de gaz À effet de serre: Générés par les activités du CISSS de Laval (scopes 1, 2 et 3)

Results of the carbon footprint extrapolated to the entire Laval CISSS by scope



Emissions (tCO2e) extrapolated by activity segments for the entire CISSS de Laval

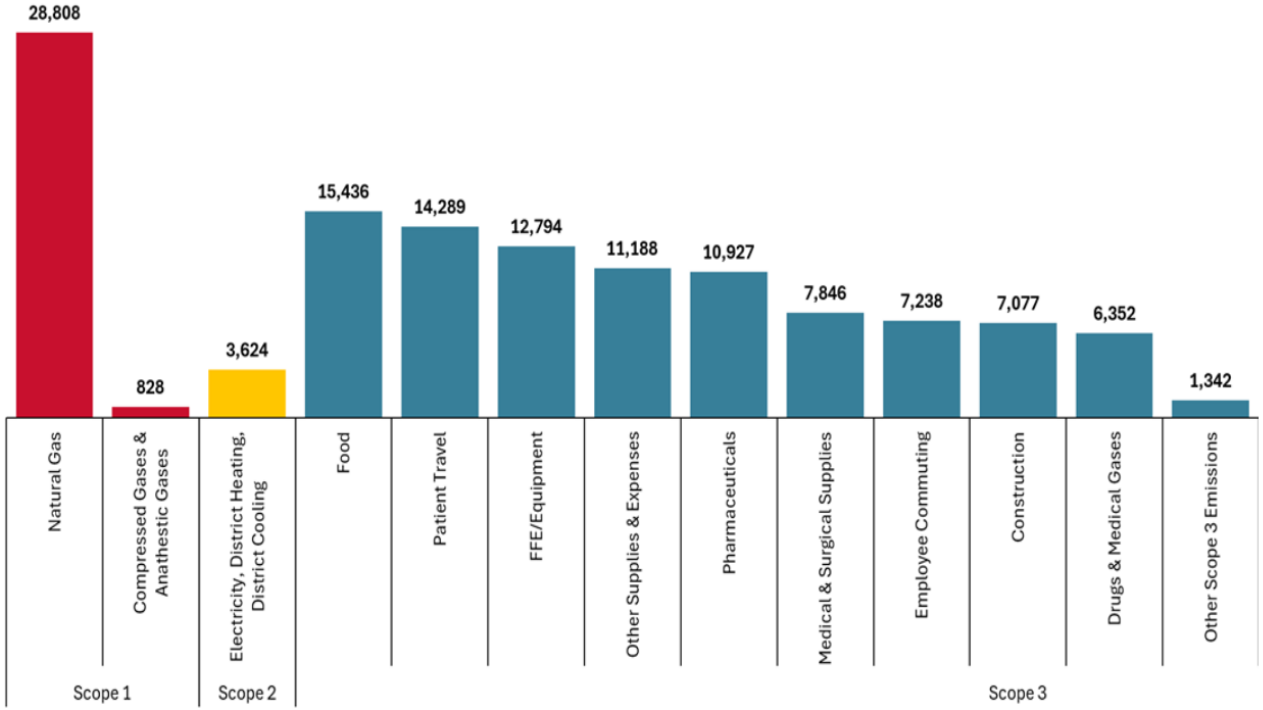


Hamilton Health Sciences (HHS)

Methodology related to PG&S:

- Developed organization-specific categories and subcategories of emission sources by mapping purchasing order data. Example PG&S categories include: pharmaceuticals, chemicals, various types of medical equipment, PPE, non-medical equipment, office supplies, food service ware, lab equipment and supplies, plastics, rubber, textiles, and paper, and other miscellaneous categories.
- Food-related emissions were quantified using unit-based emission factors provided by the Cool Food Pledge.
- HHS plans to publish the project findings and methodology in more detail. Please refer to upcoming HHS resources for more details.

GHG emissions by subcategory ($MtCO_2e$ metric tons of carbon dioxide equivalent)



Source: Busting the myth of recycling in healthcare webinar recording, contribution by Victoria Brzozowski, Hamilton Health Sciences

Additional References

Guidance for Emissions Accounting and Sustainable Procurement

Emissions accounting:

- ATACH: Measuring greenhouse gas emissions in health systems
- CASCADES: https://cascadescanada.ca/action-areas/measurement/
- Scope 3 Peer Group: https://www.scope3peergroup.com/resources#dataandtools

Sustainable procurement:

- ATACH: Decarbonizing the healthcare supply chain strategic actions for health systems
- Sustainable Purchasing Leadership Council, Collaborative for Healthcare Action to Reduce MedTech Emissions (CHARME): Catalyzing Collective Action to Decarbonize Healthcare