

ORGANIZATIONAL GHG EMISSIONS MEASUREMENT: OPPORTUNITIES AND GUIDANCE CHART

POTENTIAL FOR REGULAR ESTIMATION	EMISSIONS SOURCE	GHG PROTOCOL SCOPE	SOURCE OF ACTIVITY DATA	SOURCE OF EMISSION FACTOR	POLICY/ GUIDANCE IN CANADA AND SELECTED JURISDICTIONS
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ENERGY RELATED EMISSIONS

REGULARLY ESTIMATED BY LARGE HEALTHCARE FACILITIES IN MOST PROVINCES AND TERRITORIES

<p>Stationary fuel combustion (e.g., natural gas, oil, diesel)</p>	Scope 1	Utility bills/invoices	<ul style="list-style-type: none"> National Inventory Report¹ Base Carbone 	<ul style="list-style-type: none"> In Canada: <ul style="list-style-type: none"> Routinely done and/or encouraged by policy Outside Canada, recommended/guidance provided by: <ul style="list-style-type: none"> NHS (2022) AHRQ (2022) ADEME (2020) AKDN (2021) 	
<p>CONSIDERATIONS</p> <ul style="list-style-type: none"> May require place-based assessment of emissions based on infrastructure in different provinces and territories Additional methodological considerations may be required to account for combustion of biofuels. For example, CO₂ emissions from the combustion of biomass fall outside of the GHG Protocol's Scopes 1, 2 and 3; the Corporate Value Chain Standard specifies that these CO₂ emissions be reported separately in a memo item.² CH₄ and N₂O emissions from the combustion of biomass must be reported. Where possible, providers should be asked to automatically upload this information into energy management software to reduce risk of data entry errors and the workload of the reporting organization 					
<p>Purchased electricity</p>	Scope 2	Utility bills	<ul style="list-style-type: none"> National Inventory Report³ Provincial inventories Integrated Resource Plans (available from utility providers) 	<ul style="list-style-type: none"> In Canada: <ul style="list-style-type: none"> Routinely done and/or encouraged by policy Outside Canada, recommended/guidance provided by: <ul style="list-style-type: none"> NHS (2022) AHRQ (2022) ADEME (2020) AKDN (2021) GHGP Scope 2 Guidance (2015) 	
<p>CONSIDERATIONS</p> <ul style="list-style-type: none"> As energy generation mixes change and grids move toward sustainability, emissions will also change. Up to date emissions factors will be necessary. Emissions will be place-based Carefully select emissions factors to get the most complete picture of GHG emissions associated with electricity.⁴ Given these considerations, it may be most appropriate to ask the grid operator to provide this information. 					
<p>Purchased heating/cooling (e.g., steam, chilled water)</p>	Scope 2	Utility bills	<ul style="list-style-type: none"> Canadian Emission Factor⁵ Local data 	<ul style="list-style-type: none"> In Canada: <ul style="list-style-type: none"> Routinely done and/or encouraged by policy Outside Canada, recommended/ guidance provided by: <ul style="list-style-type: none"> NHS (2022) AHRQ (2022) ADEME (2020) AKDN (2021) GHGP Scope 2 Guidance (2015) 	
<p>CONSIDERATIONS</p> <ul style="list-style-type: none"> As energy generation mixes change, emissions will also change. Emissions factors may not be as easily accessible; utility providers should be transparent in their methods for calculating emissions Emissions will be place-based Given these considerations, it may be most appropriate to ask the grid operator to provide this information. 					

DIRECTLY CONTROLLED GAS RELEASES/EMISSIONS

HIGH

<p>Halogenated volatile anesthetics</p>	Scope 1	<ul style="list-style-type: none"> Procurement data Usage records 	<ul style="list-style-type: none"> Published literature⁶ Yale Gassing Greener Anesthesia Carbon Calculator 	<ul style="list-style-type: none"> In Canada: <ul style="list-style-type: none"> AHS (2020) Outside Canada, recommended/guidance provided by: <ul style="list-style-type: none"> NHS (2022) AHRQ (2022) ADEME (2020) AKDN (2021) 	
<p>CONSIDERATIONS</p> <ul style="list-style-type: none"> If technology is in place to capture gas, this needs to be considered Clinical engagement will be necessary to make change 					
<p>Nitrous oxide</p>	Scope 1	<ul style="list-style-type: none"> Procurement data 	<ul style="list-style-type: none"> National Inventory Report⁷ IPCC Emissions Factor Database Yale Gassing Greener Nitrous analgesia carbon calculator 	<ul style="list-style-type: none"> In Canada: <ul style="list-style-type: none"> AHS (2020) Outside Canada, recommended/guidance provided by: <ul style="list-style-type: none"> NHS (2022) AHRQ (2022) AKDN (2021) 	
<p>CONSIDERATIONS</p> <ul style="list-style-type: none"> Account for clinical use as well as losses through leaks Clinical engagement will be necessary to make change 					

1. See Annex 6 section A6.1 "Fuel Combustion" for tables with different fuel types. See table A6.6-1 for biomass combustion
 2. GHG Protocol Calculation Tools Frequently Asked Questions. "Why are emissions from the burning of biomass not included in Scope 1, 2, or 3? How should I report them?" Retrieved 2022-07-06 from <https://ghgprotocol.org/calculation-tools-faq>
 3. See Annex 13
 4. For more information, see Appendix B "Accounting for Energy-Related Emissions Throughout the Value Chain" in the GHGP Scope 2 Guidance.
 5. Portfolio Manager calculates emissions from district steam, hot water and chilled water using a single emissions factor for the country (p. 4 <https://portfoliomanager.energystar.gov/pdf/reference/Emissions.pdf>)
 6. Langbein T, Sonntag H, Trapp D, Hoffmann A, Malm W, Röth EP, et al. Volatile anaesthetics and the atmosphere: atmospheric lifetimes and atmospheric effects of halothane, enflurane, isoflurane, desflurane and sevoflurane. Br J Anaesth. 1999 Jan;82(1):66-73. and Sulbaek Andersen MP, Nielsen OJ, Karpichev B, Wallington T, and Sander SP. Atmospheric chemistry of isoflurane, desflurane, and sevoflurane: kinetics and mechanisms of reactions with chlorine atoms and OH radical and global warming potentials. J Phys Chem. 2012;116:5806-5820.
 7. See Annex 6 Table A6.3-1 Emissions Factor for N2O Usage (Medical and Propellant)

POTENTIAL FOR REGULAR ESTIMATION

EMISSIONS SOURCE

GHG PROTOCOL SCOPE

SOURCE OF ACTIVITY DATA

SOURCE OF EMISSION FACTOR

POLICY/ GUIDANCE IN CANADA AND SELECTED JURISDICTIONS

TRAVEL RELATED EMISSIONS

HIGH

Fuel use from owned and leased vehicles and equipment
(e.g., facility and grounds maintenance)

Scope 1

- Procurement card
- Invoices
- Mileage

- National Inventory Report⁸
- Provincial data⁹
- Base Carbone

- In Canada:
 - AHS (2020)
 - BC (2022)
- Outside Canada, recommended/guidance provided by:
 - NHS (2022)
 - AHRQ (2022)
 - ADEME (2020)
 - AKDN (2021)

CONSIDERATIONS

- This may be challenging to track for small sites and/or sites in more remote locations
- If fuel is purchased in a variety of ways (e.g., through purchase card, provincial depots, etc.) then data collection will be more challenging
- Contracted services (snow removal, landscaping, etc.) are not accounted for here

OTHER SCOPE 3 EMISSIONS

HIGH

Business travel
(air, train, bus, rental car, marine)

Scope 3

Travel unit or expense filing – by fuel use, distance covered or spend¹⁰

- National Inventory Report¹¹
- Base Carbone

- In Canada:
 - AHS (2020)
- Outside Canada, recommended/guidance provided by:
 - NHS (2022)
 - AHRQ (2022)
 - ADEME (2020)
 - AKDN (2021)
 - GHGP Scope 3 Guidance (2013)

CONSIDERATIONS

- Administrative policies may be a useful lever to help reduce emissions (encouraging direct flights, train travel, and/or reducing non-essential travel)
- Assumptions about vehicle type, distance traveled, and so on will need to be well documented
- Organizations will need to be clear about whether this includes only employee travel, or any travel undertaken on behalf of the organization
- The use of personal vehicles for business travel would need to be accounted for separately
- Calculating emissions from hotel stays could be included. Country-specific conversion factors for hotel stays are available [here](#) (Source: UK Government Conversion Factors)

Waste¹²
(off-site treatment/disposal)

Scope 3

Invoices (need information on weight)

- National Inventory Report¹³
- IPCC Emissions Factor Database
- Local – waste handlers and/or municipalities

- In Canada:
 - AHS (2020)
- Outside Canada, recommended/guidance provided by:
 - NHS (2022)
 - ADEME (2020)
 - AKDN (2021)
 - GHGP Scope 3 Guidance (2013)

CONSIDERATIONS

- Emissions factors use weight; GHG emissions from waste will be difficult if invoices do not include weight. Waste management service providers could be engaged to provide this information.
- GHG emissions vary by waste treatment method and waste stream. Accounting for different waste streams (and disposal methods) will be necessary but may be challenging
- Education about proper waste disposal accompanied by waste audits may be useful levers
- Opportunities for reductions exist without GHG measurement (i.e., by focusing on the activity)

Purchased paper

Scope 3

Procurement

[Paper Calculator](#)

- In Canada:
 - AHS (2020)
 - BC (2022)
- Outside Canada, recommended/guidance provided by:
 - NHS (2022), (included as purchased good)

CONSIDERATIONS

- Tracking paper usage is uncomplicated and there are opportunities for reduction or replacement (e.g. using paper with more recycled content). Tracking emissions associated with purchased paper may serve as an introduction to emissions tracking for purchased goods.¹⁴
- Could be included in other categories, such as waste or purchased goods

Use of metered-dose inhalers (MDI)

Scope 3

- Procurement
- Pharmacy prescriptions

CASCADES Climate Conscious Inhaler Prescribing in Primary care playbook – [Detailed Inhaler Comparison Chart](#)

- Outside Canada, recommended/guidance provided by:
 - NHS (2022)
 - AKDN (2021)

CONSIDERATIONS

- Will require clinical engagement to make change

8. See Annex 6 table A6.1-14. By vehicle and fuel type.

9. Some provinces may provide emissions factors for different vehicle and fuel types. For example, see Table 7 in 2020 B.C Best Practices Methodology for Quantifying Greenhouse Gas Emissions

10. Estimating by spend will provide a rougher estimate than using distance or fuel use

11. See Annex 6 table A6.1-14. By vehicle and fuel type.

12. The GHG Protocol Technical Guidance for Calculating Scope 3 Emissions identifies the minimum boundary as: the scope 1 and scope 2 emissions of waste management suppliers that occur during disposal or treatment; optionally, the organization could include emissions from the transportation of waste (p. 72).

13. See Annex 6 section A6.7

14. Paper usage has been included in this table because it has been encouraged by policy in AHS and BC.

POTENTIAL FOR REGULAR ESTIMATION

EMISSIONS SOURCE

GHG PROTOCOL SCOPE

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SOURCE OF EMISSION FACTOR

POLICY/ GUIDANCE IN CANADA AND SELECTED JURISDICTIONS

DIRECTLY CONTROLLED GAS RELEASES

SOME POTENTIAL
Data may be a challenge

Fugitive emissions
(leaks from refrigeration, air conditioning, fire suppression systems)

Scope 1

- Procurement data
- Track refills

- National Inventory Report¹⁵
- UK Government: Conversion factors (2021)

- In Canada:
 - AHS (2020) - specific to refrigeration
 - BC (2022)
- Outside Canada, recommended/guidance provided by:
 - ADEME (2020)
 - AKDN (2021)

CONSIDERATIONS

- Refrigeration, HVAC systems, etc. are often serviced by third parties. Getting data from these service providers may be challenging
- Some regulations exist for reporting the release of these gases

TRAVEL RELATED EMISSIONS

SOME POTENTIAL

Employee commuting¹⁶

Scope 3

- Employee survey
- Parking lot survey
- HR Postal Code data

- Provincial data on average vehicle carbon intensity¹⁷
- Base Carbone

- Outside Canada, recommended/guidance provided by:
 - NHS (2022)
 - ADEME (2020)
 - GHGP Scope 3 Guidance (2013)

CONSIDERATIONS

- Organizations will need to consider whether teleworking is included
- Any assumptions about commuting behaviour (e.g., travelling directly from Point A to Point B, carpooling, etc.) will need to be documented
- Education and financial support programs may be a lever

SOME POTENTIAL
May require collection of new data

Patient travel

Scope 3

- Estimate of distance (using postal code)
- Survey

- Provincial data on average vehicle carbon intensity
- Base Carbone

- Outside Canada, recommended/ guidance provided by:
 - NHS (2022)
 - ADEME (2020)

CONSIDERATIONS

- These data may be difficult to collect. Identifying trends in patient travel may be a starting point
- There may be opportunities to get information from virtual care programs

LOW POTENTIAL

Upstream transportation & distribution

- Logistics from tier 1 suppliers/ GPOs
- Couriers

Scope 3

From GPOs, Vendors

- National Inventory Report¹⁸
- Provincial data

- Outside Canada, recommended/ guidance provided by:
 - NHS (2022)
 - AKDN (2021)
 - GHGP Scope 3 Guidance (2013)

CONSIDERATIONS

- Many experts felt that this should not be regularly estimated by healthcare organizations because of the difficulty in getting data and that this should be the responsibility of the distribution companies.

15. See Annex 6, table A6.2-11

16. The GHG Protocol Technical Guidance for Calculating Scope 3 requires the emissions from the transportation of employees between their homes and worksites; it is optional to include emissions from employee teleworking (p. 87)

17. See the [CASCADES virtual care carbon calculator](#)

18. See Annex 6 table A6.1-14. By vehicle and fuel type.

Survey respondents were asked about visitor travel. Most felt that this should not be included in regular GHG emission estimates because it would be very difficult to get data and there would be limited ability to influence change.

This table is not comprehensive, and it is possible to estimate emissions from other sources. There are many other sources of emissions from purchased products and services (Scope 3 emissions), including but not limited to:

- Cleaning supplies, housekeeping services
- Construction materials
- Maintenance/hardware supplies
- Food
- IT equipment
- Laundry equipment and services
- Linens
- Laboratory supplies, chemicals
- Medical equipment
- Surgical equipment, sterilization supplies
- Office supplies
- Pharmaceuticals
- Heating and cooling equipment
- Professional fees, training and education fees
- And other goods and services