Green Hospital Scorecard 2019 Report

JULY 2021

Canadian Coalition for Green Health Care

The Canadian Coalition for Green Health Care
Coalition canadienne pour un système de santé écologique

2019 Green Hospital Scorecard Participants

Health Sciences North
Horizon Santé-Nord

The logos on this page do not reflect the number of participating sites, but rather the participating hospitals and health systems. Each hospital/health system typically has multiple participating sites.

Sponsors

The Green Hospital Scorecard is a comprehensive tool for health care providers across Canada and is entering its eighth year of operation. Through the support of various organisations, the Canadian Coalition for Green Health Care has been able to support hospitals to gain an awareness of their environmental impact.

We want to thank the Independent Electricity System Operator's (IESO) program Save on Energy for sponsoring our Energy and Energy Behaviour Awards, and thank Medtronic Canada for sponsoring the Green Hospital of the Year Awards. If your organisation is interested in becoming a sponsor for our upcoming Green Hospital Scorecard awards, email our Executive Director Neil Ritchie at neil.ritchie@greenhealthcare.ca.

Authors

The primary authors of this report are Coalition staff and contractors:

- Shawn Shi, P.Eng., who oversaw the software component of the survey data;
- Dan Ritchie, MSc. who undertook data verification and analysis;
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1. Introduction

1.1 Overview of the Health Care Sector in Canada

Hospitals provide health services 24 hours a day, seven days a week, and in the process consume products and natural resources which result in a notable environmental footprint. It is of paramount importance to ensure that this environmental footprint is mitigated through initiatives and programs focused on energy savings, reduction in water consumption, appropriate waste diversion practices, and a plethora of other components that play an equally important role.

With the continuous improvement in health care technologies and a growing awareness of environmentally responsible practices, there is an amplified opportunity to reduce the health sector's environmental footprint. Environmental contaminants have been associated with compromised health status, including cancer, birth defects, respiratory and cardiovascular illness, gastrointestinal ailments and death — and an increased demand for a range of health care services. Although there are important health, financial and ethical reasons for adopting such practices in the health sector, a number of challenges exist, including financial, technical and administrative[1].

The health sector continues to be a significant part of Canada's economy, estimated at having contributed approximately 11.5% of gross domestic product (GDP) and utilized a sizeable $265.5 billion dollars nationally in 2019. Based on the total expenditure of health spending in Canada in 2019, hospital costs were the largest component at 26.4%, followed by physician fees at 14.9%, and prescribed pharmaceuticals at 13%[2]. Across Canada, health sector spending represents the largest budgetary outlay for every provincial and territorial governments. Hospitals are often one of the largest employers in a community with a health and social services workforce of 2 million Canadians in 2019[3].

In the period of 2018-2019, there were a total 628 hospitals across Canada with a combined 91,325 hospital beds[4].

[1] Joint Position Statement (JPS, 2009): Toward an Environmentally Responsible Canadian Health Sector, 2009. Accessed from: https://greenhealthcare.ca/wp-content/uploads/2015/04/Joint-Statement-CCGHC.pdf
[2] Canadian Institute of Health Information (CIHI). 2020. National Health Expenditure Trends, 2020. https://www.cihi.ca/sites/default/files/document/nhex-trends-2020-narrative-report-en.pdf
[3] Statistics Canada (SC). 2019. Employment by industry, annual. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410020201
[4] Canadian Institute for Health Information (CIHI). Hospital Beds Staffed and In Operation, 2018–2019. Ottawa, ON: CIHI; 2020. https://www.cihi.ca/en/access-data-reports/results?query=Hospital+Beds+Staffed+and+In+Operation%2C+2018%E2%80%932019&Search+Submit=

1.2 Background on the Green Hospital Scorecard

In 2013, the Ontario Hospital Association (OHA) developed the Green Hospital Scorecard (GHS) with a steering committee of hospital staff and health care experts. The OHA administered the GHS through the Green Hospital Champion Fund program and funding support from the Ontario Ministry of Consumer and Government Services. Once the OHA program ended in 2016, the Canadian Coalition for Green Health Care (The Coalition) was asked to continue the delivery of the GHS program. The Coalition has been a historic collaborator with the OHA on the development of the GHS since its inception and as well as the annual Green Health Care Awards. The 2019 GHS program is the seventh year that the GHS program has been offered.

1.3 Green Hospital Scorecard

The GHS is a benchmarking and recognition tool measuring hospital's energy conservation, water conservation, waste management, pollution prevention, and corporate leadership, planning and management. This year saw the introduction of one new category: Anaesthetic gases. Participating hospitals report on their environmental and sustainability initiatives through the online GHS survey, receive a scorecard summarizing their environmental performance, and receive a Gold, Silver or Bronze rating, relative to their peers. This program allows for enhancement of existing benchmarking data, refinement of collection methodologies and the creation of meaningful reporting data to inform the hospitals and its executives. The purpose of the scorecard is to raise the hospital's awareness, motivate behavioural change for future conservation efforts, and incite improvements in the environmental initiatives by recognizing each hospital's achievements. In addition to the above, the GHS:

- Provides detailed analysis of the organisation's environmental performance against a backdrop of de-identified peer data;
- Supports identifying potential areas for improvements to environmental performance and operational efficiency;
- Creates a benchmarking platform for hospitals to compare efficiencies;
- Offers the opportunity to be individually recognized through annual Gold, Silver and Bronze level achievements; and
- Encourages excellence in environmental performance by honouring top performing organisations with annual Green Health Awards.

This report subscribes to the following reporting conventions:

- 2019 GHS Program will report on data for the 2018 calendar year (January to December)
- 2018 GHS Program will report on data for the 2017 calendar year (January to December)

1.4 Methodology

The methodology for developing the 2019 GHS participant's environmental performance results included survey design, distribution, response and analysis.

Survey design

Questions included in the GHS survey are organised into eleven main sections

Section	Focus
General Information	General information about the hospital site and contact information
Energy section	Energy consumption, type of energy usage, conservation initiatives and their benefits.
Water section	Water consumption, both for buildings and ground maintenance, billing information, conservation initiatives and their benefits.
Waste section	Type of waste, recycling, disposal methods, as well as, waste reduction initiatives and their benefits.
Pollution Prevention	Policy, targets, action plans and initiatives and their benefits.
Corporate Leadership, Planning and Management	Policies, action plans and outreach programs.
Transportation	Active and clean energy initiatives and infrastructure, along with adoption of telemedicine.
Food	Healthy food policies, along with food procurement, and perceived barriers.
Climate Change	Management policies affects and experiences around Climate Change related events and vulnerability assessment.
Anesthetic Gases	Anesthetic gas carriers used, recycling practices, and awareness of environmental impacts.
Energy Behaviour	Staff engagement and awareness, along with energy conservation policies and programs.

Table 1: 2019 Green Hospital Scorecard survey design

Distribution

The survey was set up on the web-based platform, Cognito Forms, and was available in English. It was promoted via direct email invitations to past participants of the program, as well as potential participants that had expressed interest in previous scorecards but had yet to participate. In addition, the survey was promoted through the Coalition's newsletter, The Green Digest, direct email to other Coalition program participants, and social media channels, including Twitter and Facebook. Coalition partners and supporters such as the Canadian Healthcare Engineering Society (CHES) and the Ontario Healthcare Housekeeping Association (OHHA) also promoted participation in the GHS to their networks.

Response

There was a total of 83 responses from this year's GHS program. The survey was completed by hospitals from various provinces across Canada such as British Columbia, Alberta, and Ontario. However, the overall response rate for the 2019 GHS was lower than previous years due to the unexpectedly intense strain on hospital resources due to the COVID-19 pandemic.

Analysis

This report is based on a descriptive analysis of the survey data, including a content analysis of the free-text answers. The quantitative questions were analyzed using descriptive statistics and visualized using Excel. Qualitative questions were analyzed using content analysis, frequently mentioned themes and other content that were derived and summarized. Information presented in this report was compiled and interpreted exclusively for the purpose of this GHS document. The Coalition exercised reasonable skill and consideration in order to validate all data acquired during the preparation of the report but makes no warranties as to the accuracy or completeness of the information. All information contained in this report is based upon data and insights provided by the GHS participants, which is believed to be accurate but cannot be fully guaranteed.

2019 GHS Top Performers

2. 2019 GHS Top Performers

The 2019 GHS program recognized the following top performers in each category and peer group:

Highest Overall Scores - **Sponsored by Medtronic**

- Michael Garron Hospital (Community)
- University Health Network - Toronto Rehab (Academic)
- Holland Bloorview Kids Rehabilitation Hospital (Non-Acute)
- Kemptville District Hospital (Small)

Highest Energy Scores - Sponsored by Save on Energy

- Ross Memorial Hospital (Community)
- Providence Healthcare (Academic)
- St. Joseph's Health Care, London - Parkwood RMHC (Non-Acute)
- Strathroy Middlesex General Hospital (Small)

Energy Behaviour Award - Sponsored by Save on Energy

- Winner: UHN - Toronto General Hospital
- Honorable Mention: London Health Sciences Centre
- Honorable Mention: St. Joseph's Healthcare, London

Highest Water Scores

- Ross Memorial Hospital (Community)
- The Ottawa Hospital- General Hospital (Academic)
- The Royal Ottawa Mental Health Centre (Non-Acute)
- Four Counties Health Services (Small)

Highest Waste Scores

- Ross Memorial Hospital (Community)
- Trillium Health Partners - Queensway Health Centre (Academic)
- The Royal Ottawa Mental Health Centre (Non-Acute)
- Kemptville District Hospital (Small)

Highest Pollution Prevention Scores

- Markham Stouffville Hospital (Community)
- St. Michael's Hospital – Main Building, Bond Street (Academic)
- Holland Bloorview Kids Rehabilitation Hospital (Non-Acute)
- Kemptville District Hospital (Small)

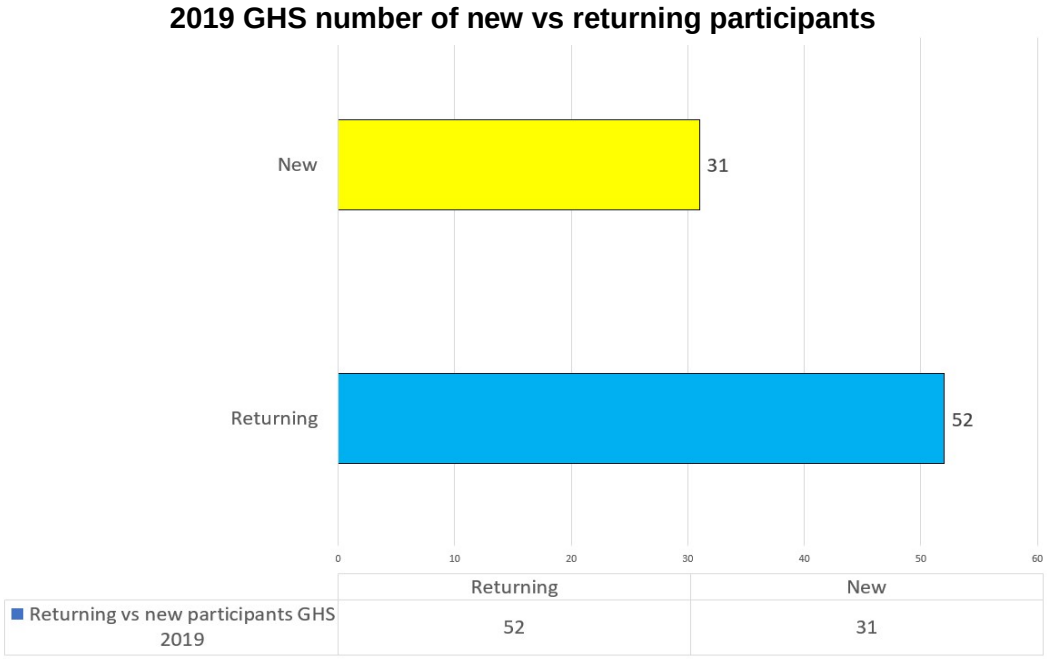
Highest Leadership Scores

- Michael Garron Hospital (Community)
- University Health Network (Academic)
- West Park Healthcare Centre (Non-Acute)
- Kemptville District Hospital (Small)

Program Details

3. Program Details

Over the seven years of the GHS program, the survey has been shifting and evolving. In the 2019 GHS, 83 hospital sites participated in the survey, with the majority of participants from Ontario, with some from other Canadian provinces as far west as British Columbia. The goal of the program is to encourage facilities from across the country, and outside of Canada to participate. The following Figures explore participation within the GHS program. Below, *Figure 1* shows the number of new vs returning participants.



Canadian Coalition for Green Health Care, 2019

Figure 1. 2019 GHS new vs returning participants

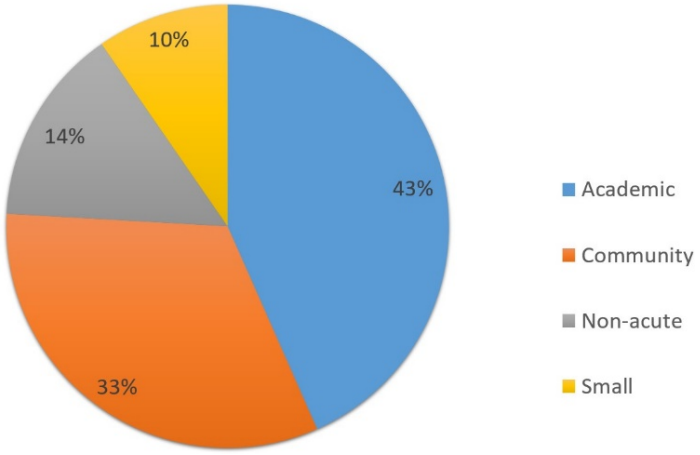
3.1 Peer Groups

Each year, GHS participants are asked to identify as one of four peer groups:

1. **Community Hospitals:** Acute care hospitals that do not fit the definition of a small or academic (teaching) hospital.
2. **Academic Hospitals:** All acute general and pediatric hospitals that are members of the Council of Academic Hospitals of Ontario (CAHO).
3. **Non-Acute Hospitals:** Complex Continuing Care (CCC), rehabilitation, and mental health hospitals. Have standalone CCC or Rehabilitation beds. They may or may not be members of CAHO.
4. **Small Hospitals:** Provides less than 3,500 weighted cases, have a referral population of less than 20,000, and is the only hospital in the community.

Participating sites represent academic, community, non-acute and small hospitals, and included in those categories are other associated facilities such as outpatient clinics, mental health facilities, and research buildings. *Figure 2* shows the percent of participants in each peer group.

2019 GHS participants by peer group



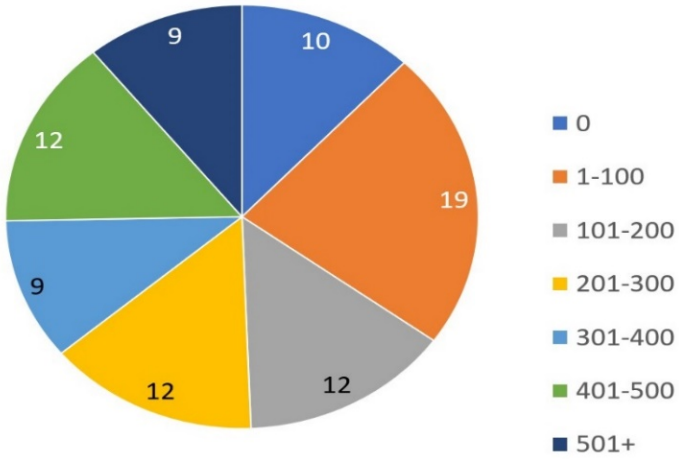
Canadian Coalition for Green Health Care, 2019

Figure 2: 2019 GHS participants by peer group (percentage)

3.2 Number of Beds

Each year the participants are asked to provide the number of beds within each of their hospital sites. The sites that included a bed count of zero indicated the nature of their operations as either outpatient clinic or administrative buildings. A total of 10 sites identified having a zero bed count. *Figure 3* shows the range of bed counts for all sites, with the most frequently cited (19) between one and 100 beds, with 37% of the sites consisting between one and 200 beds.

2019 GHS participants by total bed count

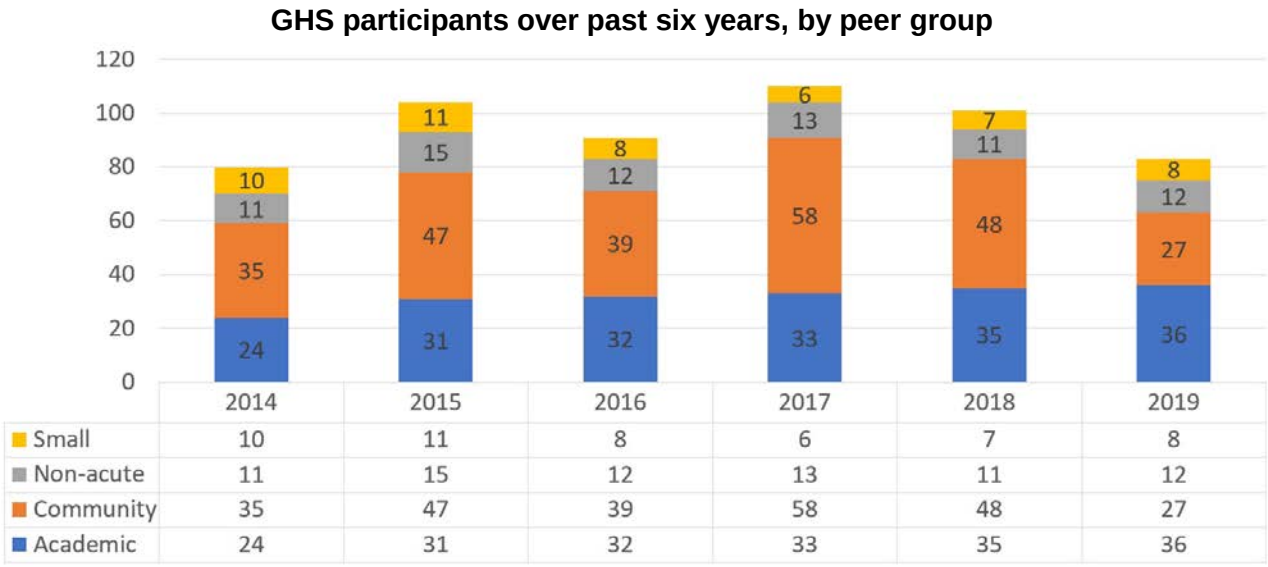


Canadian Coalition for Green Health Care, 2019

Figure 3: 2019 GHS participants by total bed count.

3.3 Hospital Participation over Previous Years

Over the previous six years, participation in the GHS had a gradual increasing trend with minor variance from year to year. The 2019 GHS saw a notable decline of 18 hospitals from the previous year. This can be attributed to the unexpected COVID-19 pandemic that strained hospitals' resources, thereby causing a drop in participants. However, newer hospitals from outside of Ontario have participated in the survey, allowing for a broader spectrum of benchmarking comparisons. *Figure 4* shows the number of GHS participants over the last six years by peer group.



	2014	2015	2016	2017	2018	2019
Small	10	11	8	6	7	8
Non-acute	11	15	12	13	11	12
Community	35	47	39	58	48	27
Academic	24	31	32	33	35	36

Canadian Coalition for Green Health Care, 2019

Figure 4: GHS Participants over six years by peer group

General Information and Sector Summaries

4. General Information and Sector Summaries

4.1 General Information

The General Information section of the survey collects data on the hospital site, its area, number of beds, inpatient days, outpatient visits and contact information. Each hospital provides data throughout the various sectors highlighted in the scorecard consistently with these figures and only inclusive of conditioned buildings at the site. Similar to the previous scorecard, organisations with multiple hospital sites were required to generate a unique survey for each site.
Within the General Information category there were several questions pertaining to the following five listed areas, as shown in *Table 2* below.

General Information	Summary
Conditioned floor area	Conditioned floor area is restricted to climate-controlled areas excluding underground parking and other large, maintained areas that are not common to all hospitals. Area includes all medical buildings as well as non-medical buildings if data for these buildings were reported throughout the survey.
Number of beds	Each hospital provides the number of beds in place during 2018. For those hospitals that had a bed count of zero, it indicates that it is another type of building such as outpatient clinic, administration or research building.
Inpatient days	The days during which services are provided to an inpatient where the day of admission is counted as an inpatient day but the day of separation is not. When the service recipient is admitted and separation on the same day, one inpatient day is counted.
Outpatient visits	A patient who is not hospitalized overnight but who visits a hospital, clinic, or associated facility for diagnosis or treatment. It includes ambulatory visits, surgical cases and any face to face visits.
Contact information	First and last name, email address, phone number and title.

Table 2: General information from GHS survey

4.2 Sector Summaries

GHS sector reports provide a summary of a hospital's environmental performance and are comprised of the five main sections of the GHS survey: Energy, Water, Waste, Pollution Prevention, and Corporate Leadership, Planning, and Management, Transportation, Food, Climate Change and Energy Behaviour. Sector data entries are collected, analysed and presented annually and by peer groups (Academic, Non-Acute, Community, and Small), and represent the averages for the hospital sites that participated in the GHS. The sector and peer group averages might show an increase or decrease from one year to the next as the organisations participating in the program may differ slightly each year. *Table 3* provides an overview of each of the sector summaries.

Sector Summary	Content/Purpose
Energy	Summarizes participant's energy use and sources, and considers the greenhouse gas implication of participant's energy use.
Water	Summarizes water use and management.
Waste	Summarizes waste management activities.
Pollution prevention	Summarizes organisation's commitments to purchase less toxic and more environmentally preferred materials for use within the hospital, and consideration of the impacts of building construction on the environment and within the hospital.
Corporate leadership, planning and management	Summarizes measures that capture hospital's corporate commitment to an environmentally sustainable culture and integration of green objectives into corporate planning and regular business.
Transportation	Summarizes transportation initiatives such as Electric Vehicle infrastructure within sites and telemedicine.
Food	Summarizes initiatives focusing on healthy food systems, these include meat-based alternatives, local food procurement and food waste management.
Climate Change	Summarizes climate change policy, extreme weather events, along with hospital adaptation and response.
Energy Behavior	Summarizes organisation's understanding and adoption of energy behavior.
Anaesthetic Gases	Anaesthetic gas carriers used, recycling practices, and awareness of environmental impacts

Table 3: Sector summaries overview

Energy

5. Building Energy and Building Greenhouse Gas Emissions

5.1 Background

In 2018, the Canadian hospital sector had one of the highest energy usages within the commercial and institutional sectors at 160.5 petajoules (1 petajoule = $1x10^{15}$ joules), second only to the retail trade sector[5]. The building energy used by the health sector results in greenhouse gas (GHG) emissions, which need to be addressed in order to reduce the negative impact on the environment and atmosphere. However, not all of the GHS emitted results from building energy use; for more information on the GHG emissions from sources other than building energy see Section 12 on Climate Change in this report.

Where and how energy is used can vary by site, but generally the usage hierarchy follows the itemized list below, in order of magnitude:

- space heating
- auxiliary equipment
- auxiliary motors
- lighting / water heating, and
- space cooling[6]

As illustrated in *Table 4*, the hospital sector has an aging infrastructure, with over 40% of hospital buildings over 51 years since the year of construction. This age of facility accounts for over 50% of the floor space[7]. Note that the total number of hospitals reported in *Table 4* is 798 hospitals which is higher than the 2018 - 2019 number of 628 hospitals due to a broader window.

[5] Table 2: Secondary Energy Use and GHG Emissions by Activity Type – Including Electricity-Related Emissions 2017-2018. Natural Resources Canada. Available from: https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP&sector=com&juris=ca&rn=2&page=0#footnotes

[6] Major Energy Retrofit Guidelines for Commercial and Institutional Buildings. HOSPITALS. Natural Resources Canada, 2018. Page 4. Available from: https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oee/buildings/pdf/NRCan_Hospital_e.pdf

[7] Hospitals. From OEE table 18. Building characteristics, energy use and energy intensity by primary activity and year of construction, 2014. Available from: http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=SC&sector=aaa&juris=ca&rn=18&page=1

Hospitals				
Year of Construction	**# Buildings**	**Floor Space (millions m^2)**	**Energy Use (PJ)**	**Energy Intensity (GJ/m^2)**
Total	798	15.4	37.7	2.45
Before 1920	23	1.1	2.2	1.99
1920 - 1959	162	4.4	11.8	2.68
1960-1969	148	2.4	5.7	2.41
1970-1979	124	1.6	4.6	2.98
1980-1989	102	2.0	4.2	2.08
1990-1999	58	1.9	4.2	2.24
2000-2009	158	1.1	2.5	2.36
2010 or later	23	1.0	2.5	2.40

Table 4: Age, floor space, energy use and energy intensity of hospital buildings

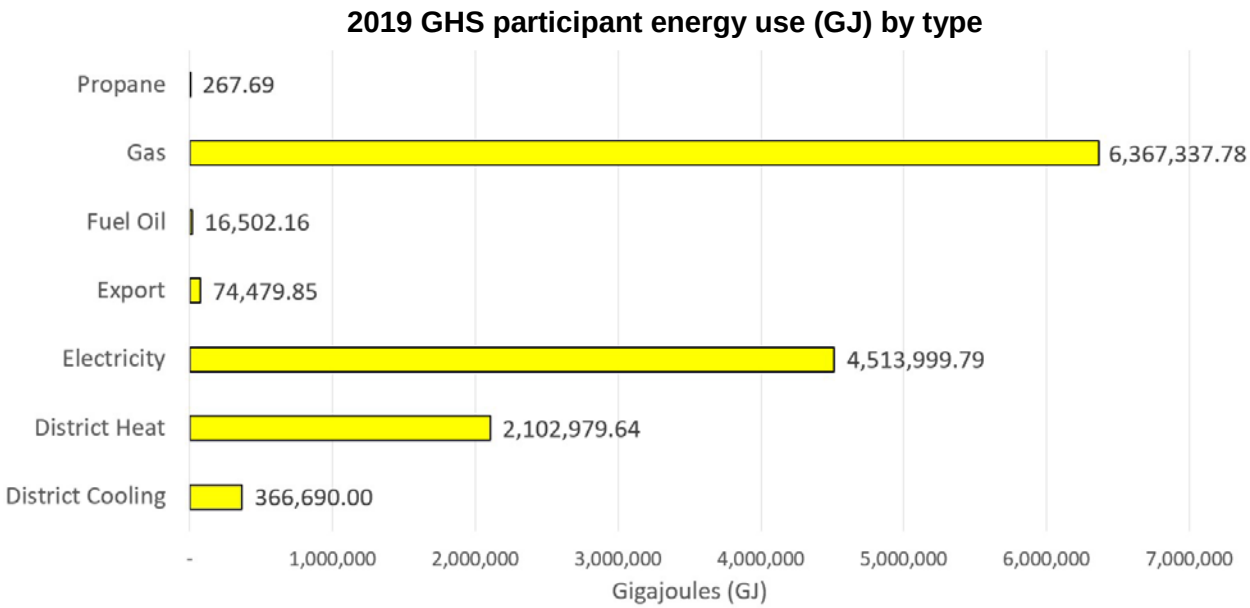
To assist hospital staff address their building GHG emissions, the Coalition developed the GHG+H20 toolkit. Examples of hospital energy-related conservation initiatives that can results in GHG reductions from building operations include those identified in the checklist section of the report including undertaking benchmarking exercises, lighting, HVAC, and control systems.

5.2 Results

The combined total energy use from all 83 participants was 13,293,297 GJ, with the total conditioned floor area within participating sites ranging from several thousand meters squared (m^2) up to more than 270,000 m^2.

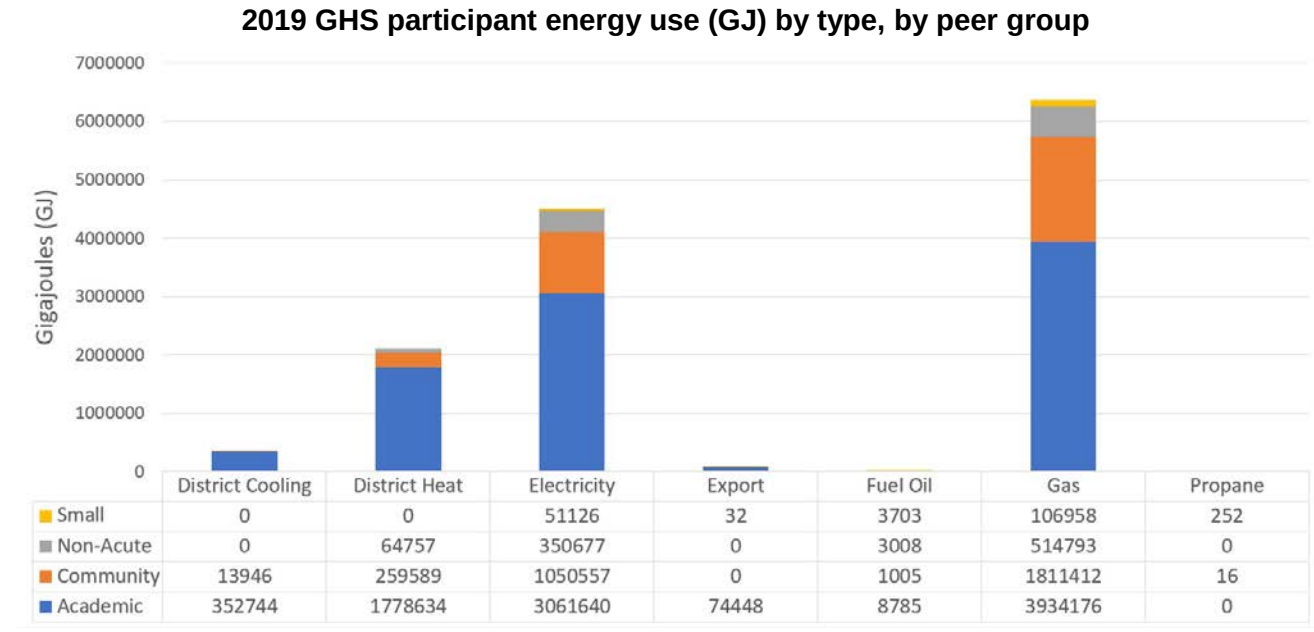
5.2.1 Energy Use by Type

Participants reported on the type of energy used in the 2018 calendar year as per the following categories: electricity, natural gas, propane, fuel oil, district heat, district cooling and exported energy. Below, *Figure 5* shows energy use, in gigajoules (GJ), by type, and *Figure 6* shows this distribution of energy use between the 4 peer groups.



Canadian Coalition for Green Health Care, 2019

Figure 5: 2019 GHS participant energy use (GJ) by type



	District Cooling	District Heat	Electricity	Export	Fuel Oil	Gas	Propane
Small	0	0	51126	32	3703	106958	252
Non-Acute	0	64757	350677	0	3008	514793	0
Community	13946	259589	1050557	0	1005	1811412	16
Academic	352744	1778634	3061640	74448	8785	3934176	0

Canadian Coalition for Green Health Care, 2019

Figure 6: 2019 GHS participant energy use (GJ) by type per peer group

5.2.2 Energy Use Intensities

Energy Use Intensity (EUI) captures a building's annual energy use as a function of its size. It is a measure that determines the building's energy performance and is useful for benchmarking and setting targets. EUI's are Environmental Performance Indicators (EPI) that hospitals can compare on an annual basis to see improvements.

Energy data reported by participants was converted to GJ to maintain consistency, and so various energy types could be compiled and then divided by the reported floor area (m^2) to calculate a final EUI (GJ/m^2). The total average EUI across all hospitals was calculated to be 2.8 GJ/m^2/year.

Figure 7 captures the average EUI by peer group (based on 2018 data). The highest EUI was found in Community hospitals, at 2.8 GJ/m^2/year. *Figure 8* shows the long-term EUI trends for each of the peer groups over the past five years. EUI has been fluctuating differently among the four peer groups, with the community peer groups seeing the biggest jump. Academic and non-acute hospitals saw a relatively minor hike in EUI while small hospital peer group's EUI remained the same as that in 2017.

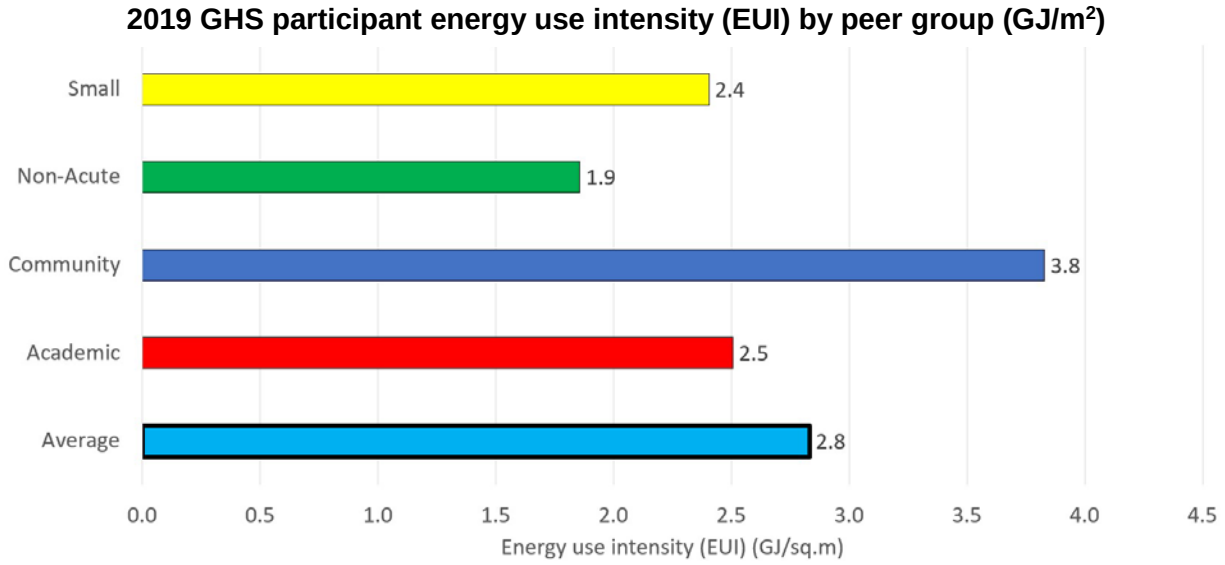


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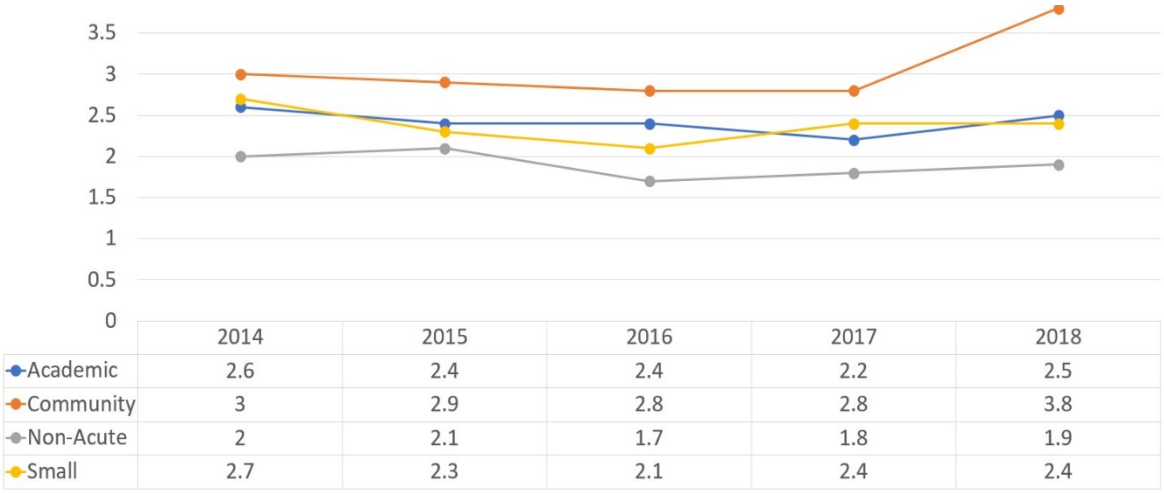
Figure 7: 2019 GHS participant average energy use intensity (EUI) by peer group (GJ/m^2)

GHS participants' average energy use intensity (EUI) comparison over five years by peer group (GJ/m²)



	2014	2015	2016	2017	2018
Academic	2.6	2.4	2.4	2.2	2.5
Community	3	2.9	2.8	2.8	3.8
Non-Acute	2	2.1	1.7	1.8	1.9
Small	2.7	2.3	2.1	2.4	2.4

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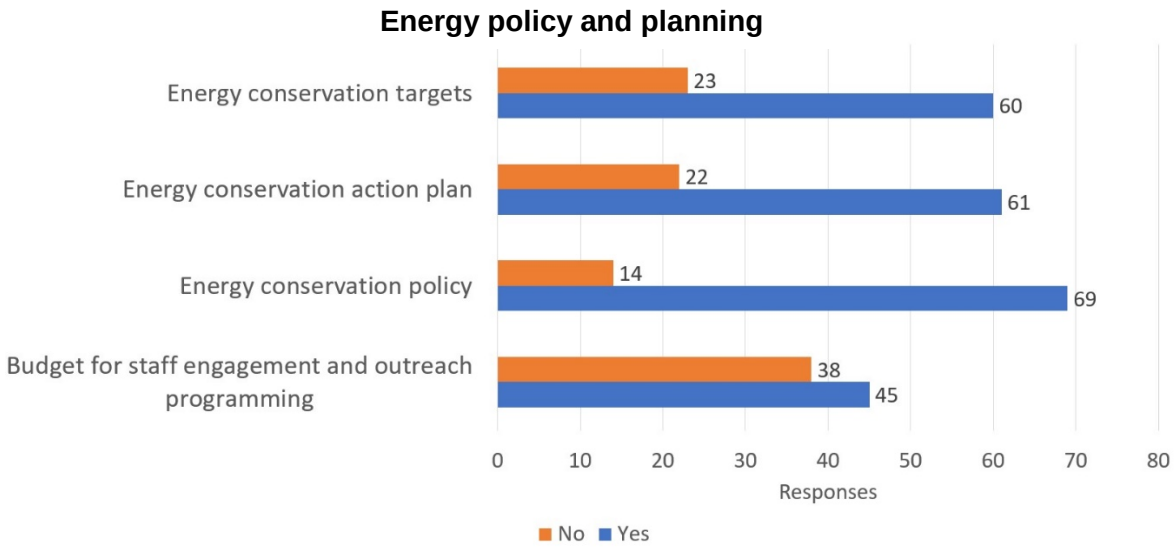
Figure 8: EUI comparisons over previous four years by peer group

5.2.3 Monitoring and Management

Participants identified how often they are tracking and reviewing their utility billing data, and 63 out of 83 hospitals stated that they are tracking their data monthly. The second most frequent time frame for tracking data was identified as quarterly by 14 sites.

5.2.4 Energy Leadership, Initiatives and Innovations

According to data displayed in *Figure 9*, about one half of the hospitals report that they have budgets for staff engagement and outreach programming. 83% of hospitals have energy conservation policies, and 72% stated having energy targets. 73% of the participants reported that they have energy action plans. Although the raw numbers and percentages are not high, it is an improvement over the previous year.



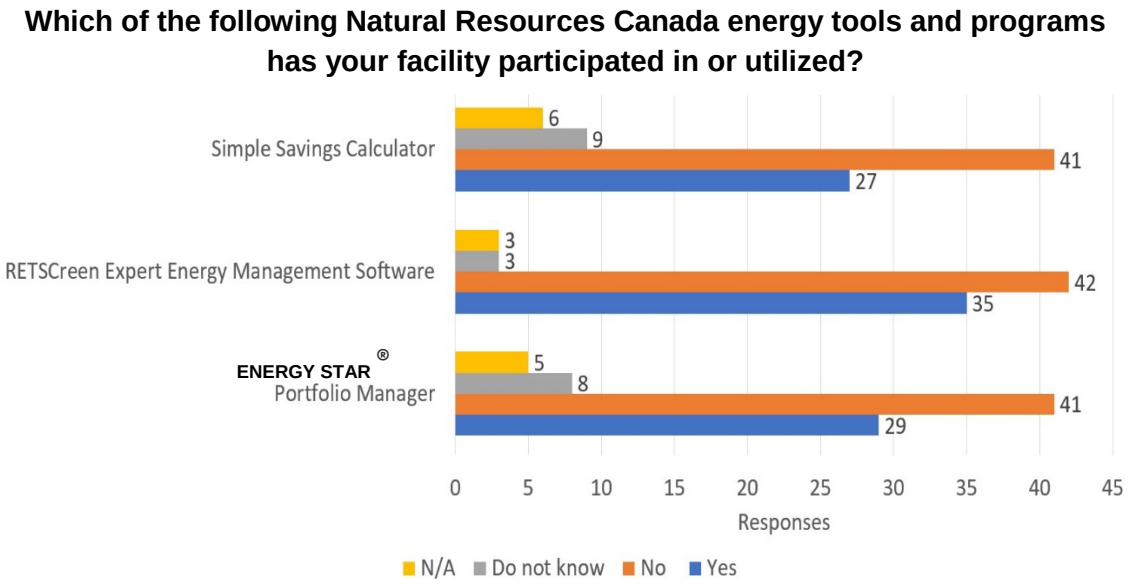
Canadian Coalition for Green Health Care, 2019

Figure 9: Number of 2019 GHS participants with energy conservation policies, targets and action plans.

District energy sources play a role at several sites through the following examples:

- Our data showed that 15 sites have stated that they received purchased steam from either utility companies or other partnering organisation powerplants. Six sites referenced Enwave as a source of steam. Alternatively, several sites partnered with other hospitals or local universities to use energy plants to supply energy demands.
- A total of four sites explained their use of cogeneration sites to reach energy needs. It was calculated that capacity of cogeneration (cogen) systems was around 30.25 MW between these four sites. Seven sites in total use cogen systems for heating, cooling, humidification and sterilization.

Examples of available resources which hospital staff have access to which can help them save energy include National Resources Canada's (NRCan) online energy tools Portfolio Manager and RETScreen, and ENERGY STAR products, which can assist in identifying and meeting energy reduction targets. *Figure 10* illustrates that only about 32% of responding hospitals have used the Simple Savings Calculator, with about the same proportion of hospitals reporting that they use Portfolio Manager. NRCan's RETScreen program saw more users compared to the previous year, with 42% of the respondents indicating so.



Canadian Coalition for Green Health Care, 2019

Figure 10: Use of NRCan's energy tools programs

There are numerous ways hospitals can incorporate energy conservation measures at their site, ranging from sustainable energy technologies to building automation. Below are some examples of what hospitals implemented in 2018. Examples of initiatives hospitals have taken related to energy management include:

- Seven sites continued to provide e-Learning/education to staff on energy conservation.
- Five sites upgraded to high efficiency filters.
- Four sites are inputting data into a database that compares their data along with other members and normalizes weather. This database is considered to be very similar to Energy Star's Portfolio Manager Program.
- 10 sites installed variable frequency drives (VFD)
- 17 sites upgraded their lighting system to energy efficient LEDs
- One site replaced two obsolete 375 tonne absorption chillers with new models. These chillers make use of excess steam produced at the power plant through summer-time operation of co-generation units, saving 864,000 kWh annually and reducing summer peak demand by 916 kW.

Some innovations that hospitals are undertaking also increase their use of energy, with 18% of hospitals reporting that they have set up electric vehicle charging systems for staff or visitors.

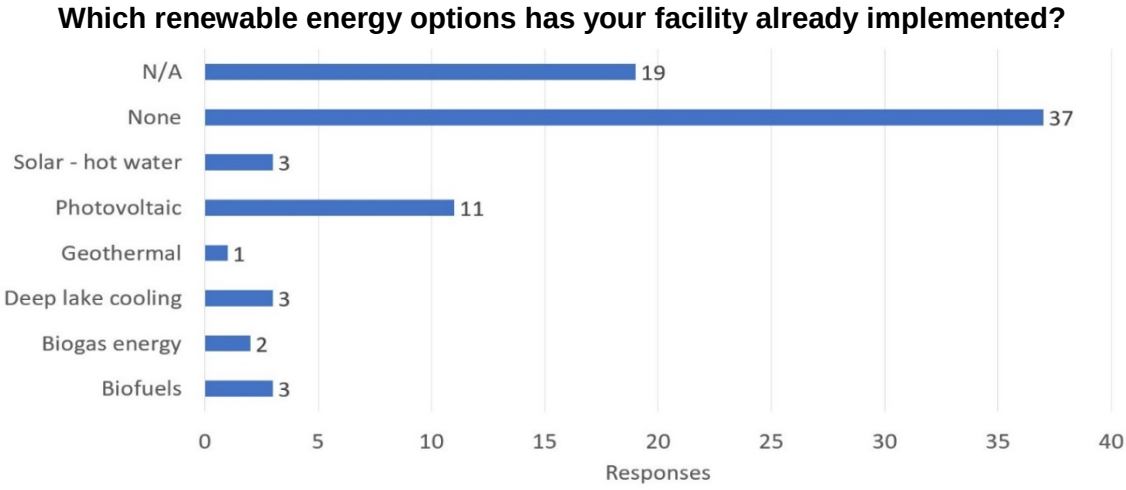
5.2.5 Renewable Energy

Across Canada in general, renewable electricity generation has increased by 17% between 2010 and 2016, with solar and wind having the largest growth[8].

Within the health care sector, 45% of the participants reported that no renewable energy options were implemented at their facility, with a further 23% responding 'Not Applicable' as shown in *Figure 11* below. Where renewable energy has been implemented, solar photovoltaics were the most popular at 13%. A total of 23 confirmed renewable energy projects were reported by participants, which is a higher proportion compared to the 26 (among 101 participants) projects in the previous year. Almost half of the respondents that currently do not have a renewable energy initiative reported they are considering renewable energy in the future, with a primary focus on solar-photovoltaics (*Figure 12)*. Other secondary renewable energy options under consideration include micro hydro, geothermal, and solar hot water systems. However, there are still about 21% of participants that reported either no renewable energy will be considered or that this option was not applicable.

Participants reported on some examples of current and future use of renewable energy

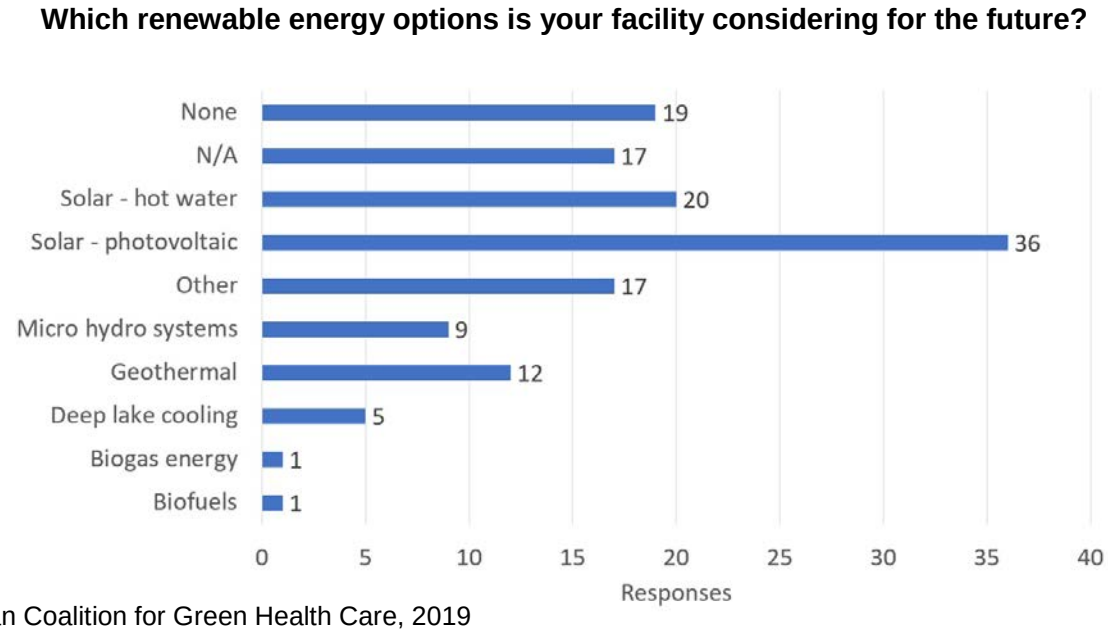
- One site has been considering CHP unit to displace electrical demand from grid.
- Two sites are reviewing the viability of a waste heat recovery process.
- Three sites incorporate Lake Water Cooling as a form of renewable energy
- Three sites are currently offering biofuels as part of their back up fuel system



Canadian Coalition for Green Health Care, 2019

Figure 11: Which renewable energy options has your facility already implemented?

[8] Natural Resources Canada Renewable Energy Facts. Available from: https://www.nrcan.gc.ca/science-data/data-analysis/energy-data-analysis/energy-facts/renewable-energy-facts/20069



Canadian Coalition for Green Health Care, 2019

Figure 12: Which renewable energy option is your facility considering in the future?

5.2.6 Building Energy Use CO_2 Equivalencies

Each participating hospital was provided with a Green Hospital Scorecard listing their building GHG emissions expresses as tonnes of CO_2. This total was calculated by incorporating hospital building total energy use and type of energy used. *Figure 13* depicts the equivalent energy consumed by all the participants. In contrast, *Figure 14* depicts the required trees to sequester the sum total CO_2 from all 2019 GHS participating sites. The tool used to calculate these totals was the NRCan GHG calculator referenced below.

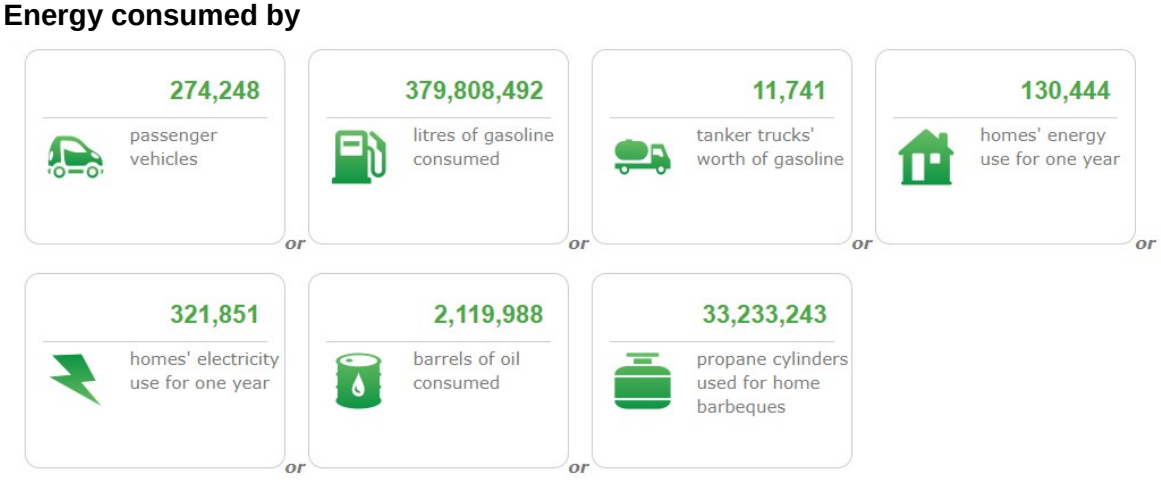


Figure 13: Building energy CO_2 equivalent for all participants
http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/calculator/ghg-calculator.cfm

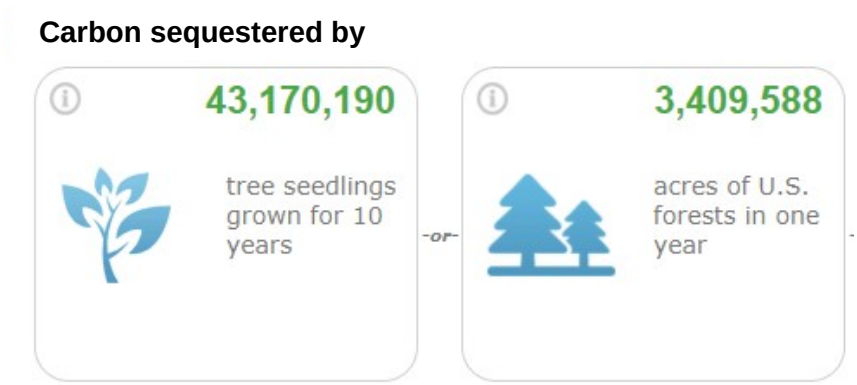


Figure 14: Predicted number of trees required to sequester total CO_2 equivalent
https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

Water

6. Water

6.1 Background

Canada possesses an abundance of freshwater resources relative to most other nations - roughly eight percent of the world's renewable freshwater resources are located in Canada. Consequently, the total supply of water in Canada from renewable sources significantly exceeds total national water-use demand. This rich supply of water resources has caused Canada to lag behind most of the rest of the world in water system efficiency and the implementation of sound water conservation practices. Per capita, Canadians consume more water than citizens of almost any other developed nation.

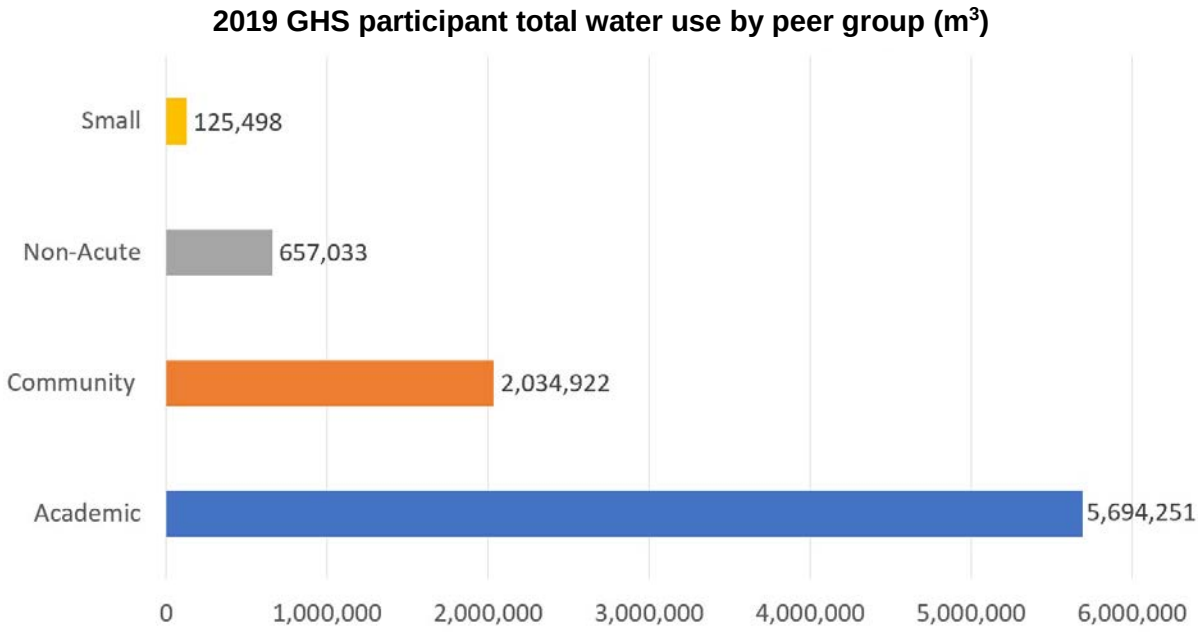
Health care operations can be very water-intensive and are often the largest water users in their communities. Furthermore, the health sector faces unique challenges with respect to water conservation. In particular, infection control and prevention requirements make the implementation of some common routes for conserving water challenging or unfeasible from a practical standpoint[9].

Examples of water conservation techniques for hospitals can be found in the GHG+H20 toolkit developed by the Canadian Coalition for Green Health Care.

6.2 Results

The total water use by all participants in 2018 was 8,543,242 cubic metres (m^3) of water across 83 hospitals, excluding any water volume used for grounds maintenance. Compared to the previous year, this was a decline of 2,154,703 m^3 of water, and can be attributed to the smaller group of participants. *Figure 15* illustrates the total water use by peer group.

[9] Canadian Coalition for Green Health Care. GHG+H2O Green Facility Toolkit. Available from https://greenhealthcare.ca/ghgwater



Canadian Coalition for Green Health Care, 2019

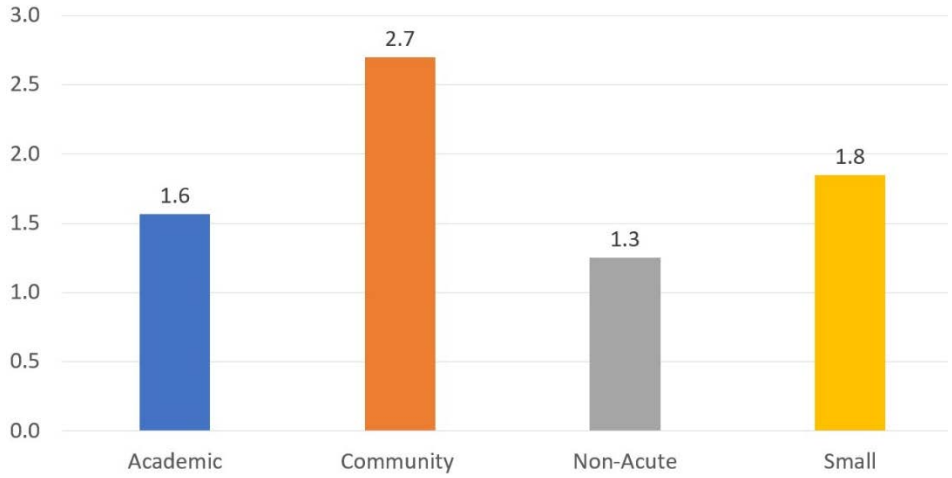
Figure 15: 2019 GHS participant total water use (m^3) by per peer group

6.2.1 Water Use Intensity

Water Use Intensity (WUI) is expressed as the hospital's annual water use relative to the total conditioned floor area. It is a measure that is used to determine the building's water performance and is useful for benchmarking and setting targets. WUIs are Environmental Performance Indicators that hospitals can compare on an annual basis to see improvements. Participant water data was converted to cubic metres (m^3) and divided by the reported conditioned floor area (m^2) to calculate a final WUI (m^3/m^2).

The total average WUI across all hospitals was calculated to be 1.84 m^3/m^2/year. *Figure 16* highlights the average WUI's for each peer group for 2019 GHS participants based on 2017 data. Community Hospitals had the highest WUI at 2.7 m^3/m^2/year while Non-Acute Hospitals had the lowest at 1.25 m^3/m^2/year. Both peer groups saw an increase from the previous year. *Figure 17* shows the average WUI over the last five years by peer group. While all hospital peer groups saw fluctuations in their water consumption about over the five years, only small hospitals showed a minute decline in water consumption compared to 2017.

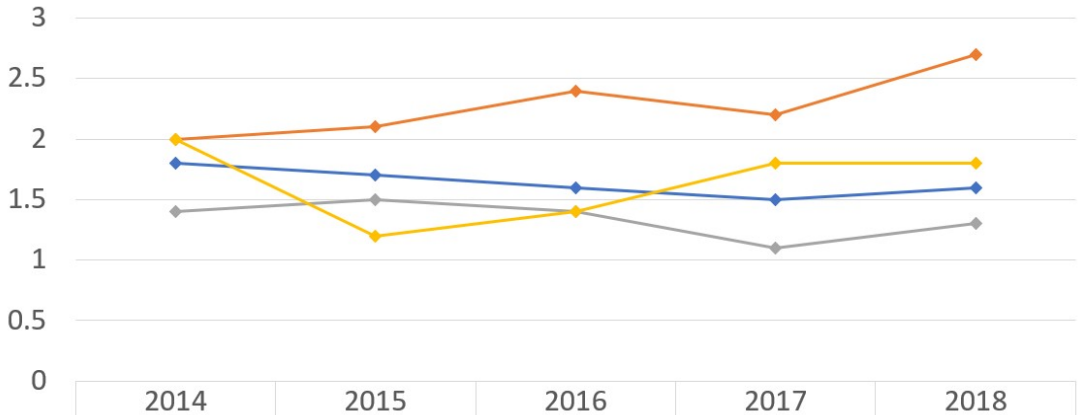
2019 GHS participant average water use intensity (WUI) by peer group (m^3/m^2)



Canadian Coalition for Green Health Care, 2019

Figure 16: 2019 GHS participant average water use intensity by peer group

GHS participants' average water use intensity (WUI) comparison over five years by peer group (m^3/m^2)



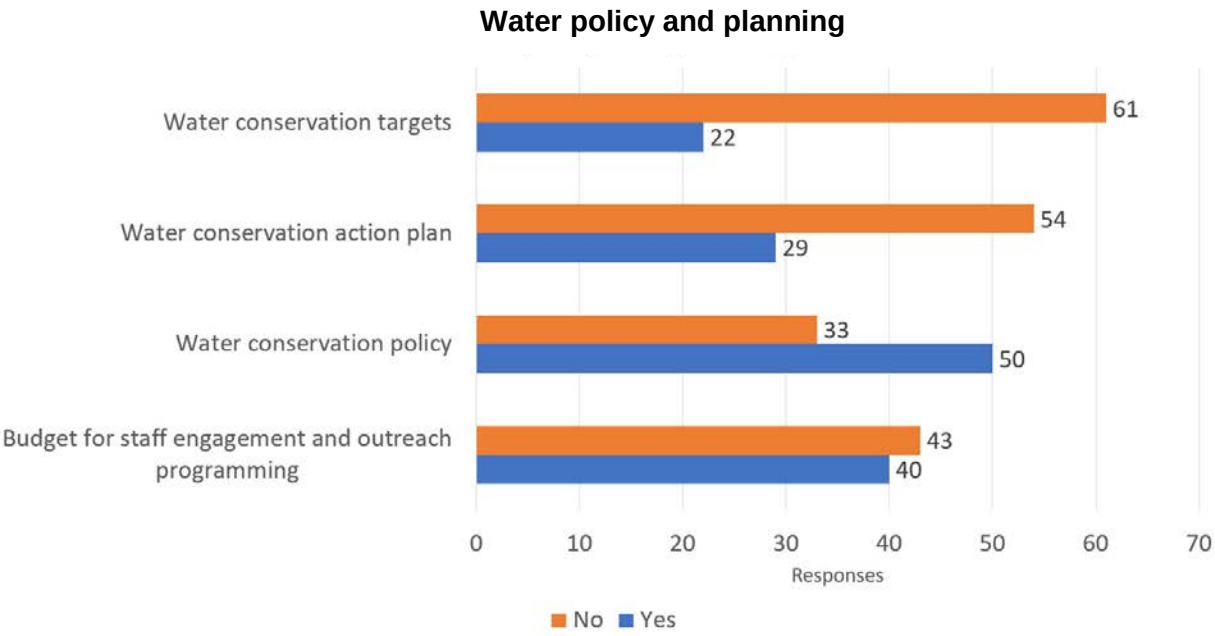
	2014	2015	2016	2017	2018
Academic	1.8	1.7	1.6	1.5	1.6
Community	2	2.1	2.4	2.2	2.7
Non-Acute	1.4	1.5	1.4	1.1	1.3
Small	2	1.2	1.4	1.8	1.8

Canadian Coalition for Green Health Care, 2019

Figure 17: Average WUI per peer group over last five years

6.2.2 Water Conservation Leadership, Initiatives and Innovations

Figure 18 provides insight into water policy and planning activities at hospitals. Only 48% of the hospitals report that they have budgets for staff engagement and outreach programming. 60% of hospitals have water conservation policies, and 27% stated having water conservation targets. Finally, just 35% reported that they have water action plans. The overall trend with respect to water policy and planning in hospitals is concerning, and calls for firm steps to be taken by leadership.



Canadian Coalition for Green Health Care, 2019

Figure 18: Participants with water conservation policies, targets and action plans in place during 2018.

Some examples of water conservation initiatives that participants have reported include:

- One site replaced five walk-in fridge coolers, two walk-in freezers, one beverage cooler and one deli counter with air cooled units and saved 59,690 litres of water per day.
- Another site had water data along with personal water use reduction tips strategically shared during Earth Day events and through monthly poster campaigns.
- Several sites regularly review of water consumption data to identify areas for potential improvement and discuss opportunities for savings.
- Four sites incorporated low-flow water fixtures to save water.

Waste

7. Waste

7.1 Background

There are over 35 million Canadians creating garbage. Natural Resources Canada claims the average North American will, in his or her lifetime, throw away 600 times their adult weight in garbage. By this estimate, a 68 kg adult will leave a legacy of 40,825 kg of trash, or about 41 tonnes.

Sustainable waste management demands that we be financially responsible in how we deal with our waste while doing so in a socially-acceptable and environmentally-sound manner. We need to assume responsibility for the waste we create, and help those tasked with the job of disposing of it so that the fewest resources possible are used. Embracing the 3Rs hierarchy: Reduce, Reuse and Recycle - in that order - is the first step to sustainably managing waste[10].

In 2001, hospitals were responsible for one percent of total solid waste in Canada[11]. Hospitals use a significant quantity of single-use products, many of these are plastic, and are tasked with complying with infection control practices while providing excellent care. The aforementioned reduce, reuse and recycle approach is important, but the current model of resource usage and waste management is still resulting in large quantities of waste disposed because the system has not been designed to optimize reduction, reuse and recycling. One of the major challenges with waste management in health care is the sheer number of varied waste streams that are generated between hazardous and non-hazardous waste. In Canada, just hazardous waste streams can add up to 500 metric tonnes in a single day[12].

Another equally crucial aspect of waste generation is the food and organic waste generated by hospitals. Based on a recent report titled Overview of Organic Waste Management in Canada's Industrial, Commercial & Institutional (ICI) Sector (AET Group Inc., 2021), waste disposed by hospitals consisted of 21.24% food and organic waste. Most of the food and organic waste would likely have come from patient meals, with some from staff and visitor meals. 61% of the surveyed facilities had a food and organic waste diversion program. Forward-thinking health care facilities are starting to seek products for health services that result in less waste. At the same time, some manufacturers are starting to provide products

[10] Canadian Coalition for Green Health Care. Waste Management. Available from: https://greenhealthcare.ca/waste/
[11] Yoan Kagoma, Nathan Stall, Edward Rubinstein and Douglas Naudie. People, planet and profits: the case for greening operating rooms. CMAJ November 20, 2012 184 (17) Available from: https://www.cmaj.ca/content/184/17/1905
[12] Chris Strashok, Ann Dale, Yuill Herbert, Rebecca Foon. Greening Canadian Hospitals. Available from: https://www.crcresearch.org/files-crcresearch_v2/File/Discussion_Paper-7_Greening_Canadian_Hospitals.pdf

and services for the health care sector which have been redesigned to reduce the use of resources and be easily reused or recycled, while also creating safer products with lower toxicity. This shift from a linear approach to resource use (take-make-waste) towards a more circular model of managing wastes, is known as the Circular Economy[13].

This section provides information on the quantities of non-hazardous waste, recyclable materials, and biomedical waste. Non-hazardous materials are generally managed through landfill (or in some municipalities through their incinerators) and is the largest component of hospital waste. Recyclable materials include blue bin (which includes plastic, glass or metal/cans and paper), green bin (organic wastes), and other recyclable materials with specific diversion markets such as electronic wastes, and scrap metal. In some facilities recyclable materials can make up 40% or more of the total waste disposed[14].

Biomedical waste poses potential risks to public health and our environment and therefore must be segregated and managed accordingly. In Ontario, the definition of biomedical wastes is provided in the Environmental Protection Act[15] as:

a. Human anatomical,
b. Human blood waste,
c. Animal anatomical waste,
d. Animal blood waste,
e. Microbiology laboratory waste,
f. Sharps waste,
g. Cytotoxic waste,
h. Waste that has come into contact with human blood waste that is infected or suspected of being infected with any infectious substance (human), or
i. Waste containing or derived from one or more wastes described in clauses (a) through (h), but does not include amongst other things,
j. Treated biomedical waste, or
k. Dialysis waste not saturated with blood or blood products that is tubing, filters, towels or disposable sheets.

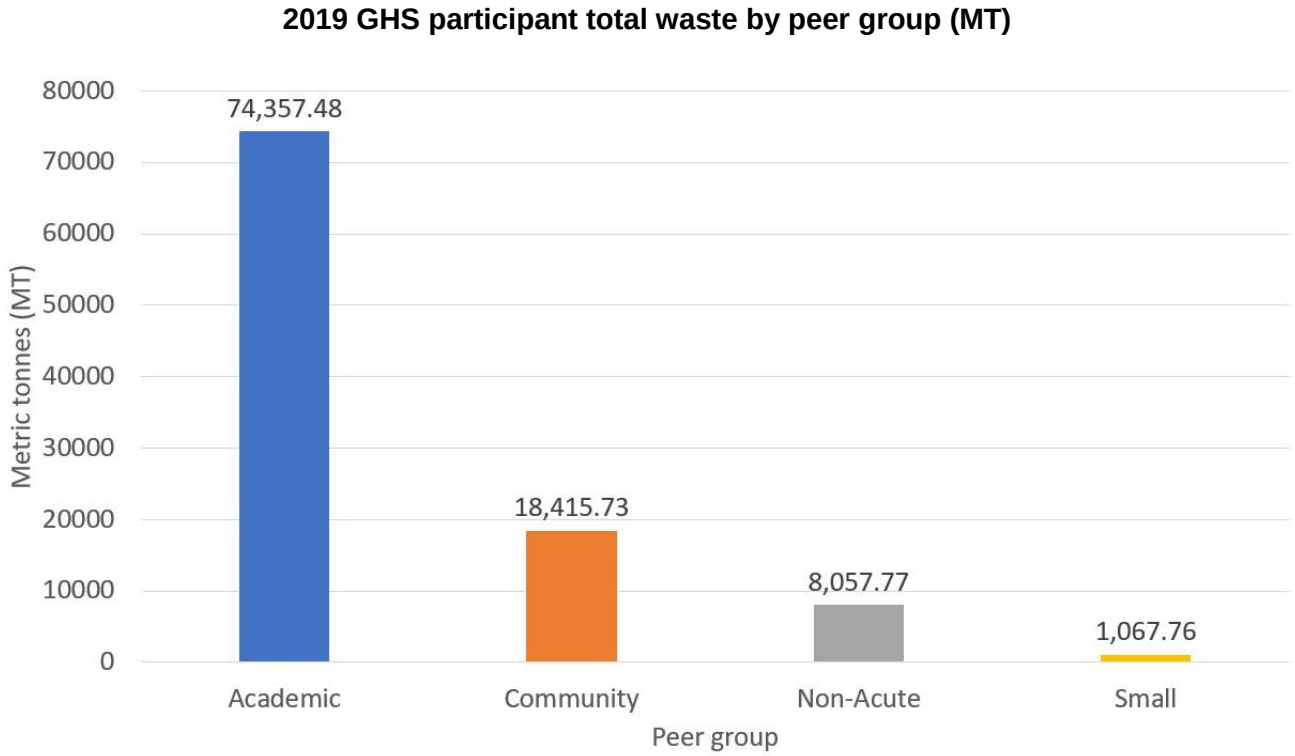
Biomedical wastes are more expensive to dispose. Most facilities generate less than 10% of their total waste as biomedical wastes. If the percentage is higher, then the biomedical waste is contaminated with non-hazardous wastes or recyclable wastes and the facility will pay

[13] Ellen MacArthur Foundation, 2020
[14] CMAJ, 2012
[15] Management of Biomedical Waste in Ontario https://www.ontario.ca/page/c-4-management-biomedical-waste-ontario

higher disposal costs. Training staff on proper segregation of wastes can reduce these disposal costs.

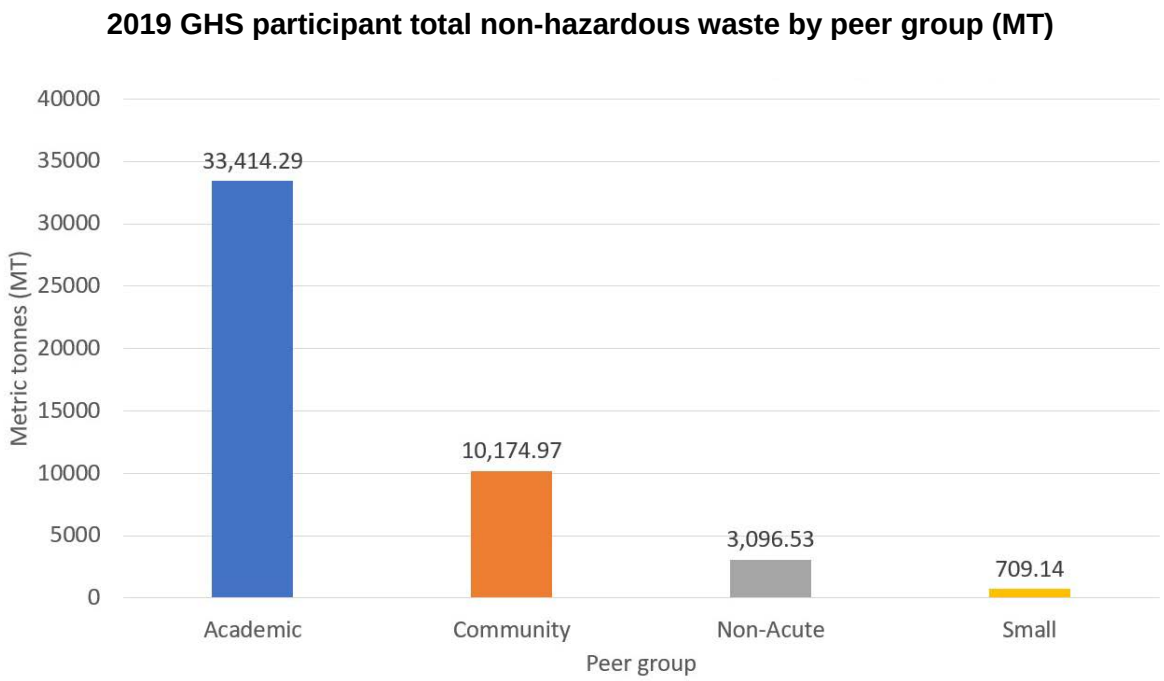
7.2 Results

Participants generated a total of 101,898 Metric Tonnes (MT). This total is a drastic increase compared to the total of 78,011 MT from the previous year. The primary Environmental Performance Indicator (EPI) for waste is the Waste Diversion Rate. Collectively, all GHS participants diverted 39,946 MT from landfill, which is 39% of the total waste. Compared to the previous year's 24% waste diversion, the 2019 GHS saw a notable increase in the proportion of recyclables and other forms of non-disposable waste diverted from landfill. Total waste, non-hazardous and biomedical waste are shown by peer groups *in Figures 19, 20,* and *21* below, where Academic Hospitals always produced the highest amount.



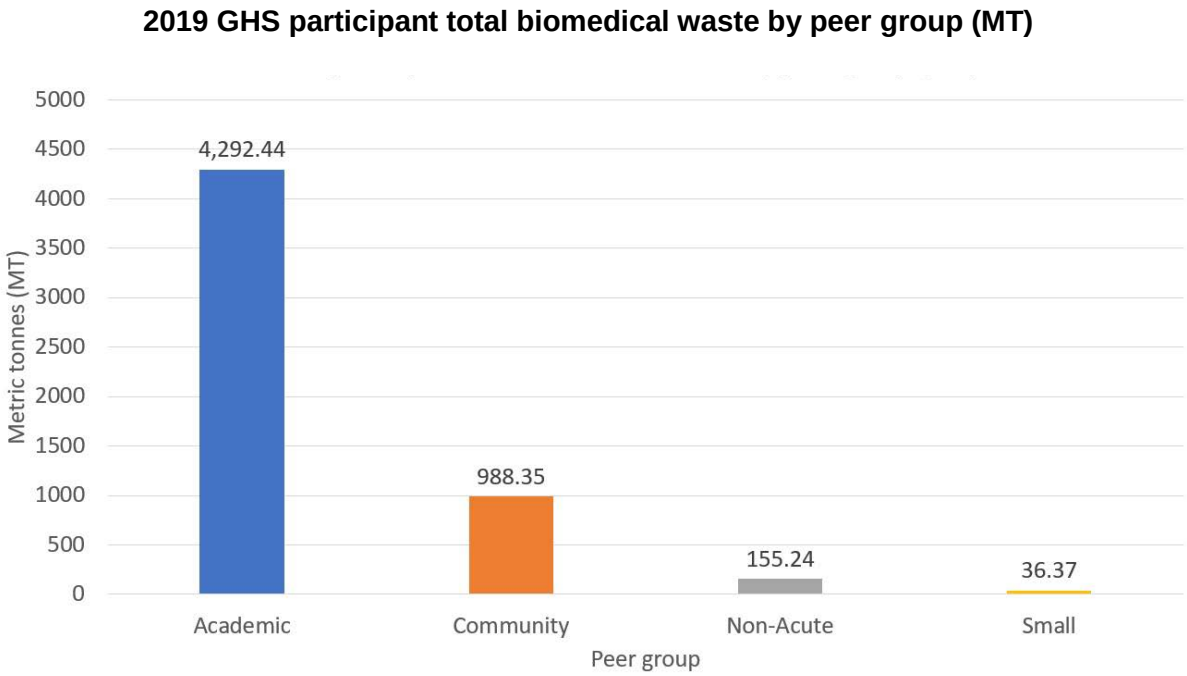
Canadian Coalition for Green Health Care, 2019

Figure 19: Total waste generated per peer group



Canadian Coalition for Green Health Care, 2019

Figure 20: Total non-hazardous waste generated by peer group



Canadian Coalition for Green Health Care, 2019

Figure 21: Total biomedical waste generation by peer group

7.2.1 Waste Generation by Type

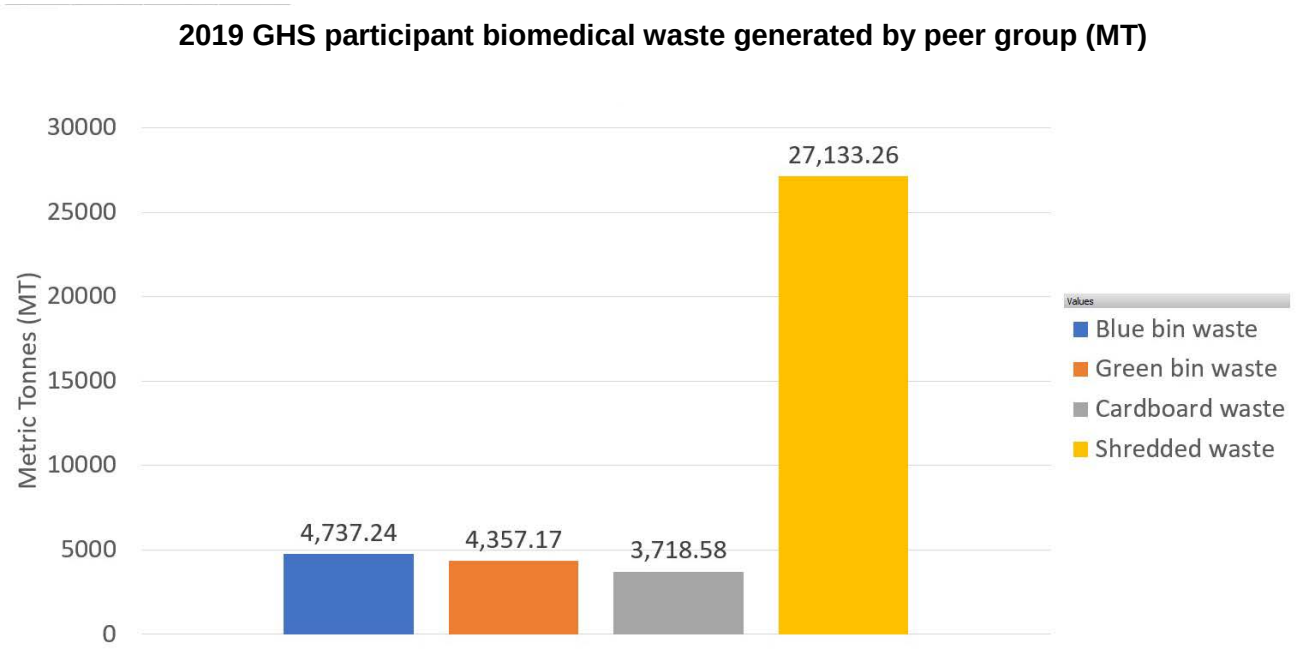
For all 2019 GHS participants the following waste quantity information and percentage of waste type is summarized below:

Waste Type	Total waste/material generated (MT)	Average percentage of total waste
General non-hazardous	47,395	47%
Recyclable materials or other non-disposable wastes	39,946	39%
Biomedical waste	9, 228	12%
Total waste/materials	101,898	-

Table 5: Percentage and Total waste generated by all participating hospitals

The summary from *Table 5* reveals that the average recycling rate by all participants is 31%. Based on the types of recyclable materials and their quantities in *Figure 24*, shredded paper makes up the largest quantity of recyclable materials, followed by blue bin materials, cardboard, and green bin (organic or food wastes).

The average percentage of biomedical waste is twelve percent, which is higher than the expected ten percent. The data shows that there are facilities that might be paying a greater cost for waste disposal than they would have if they properly segregated materials and placed only biomedical waste in the biomedical waste containers.



Canadian Coalition for Green Health Care, 2019

Figure 22: Participant total recycling and diversion by material type

7.2.2 Waste Intensity

A benchmarking comparison can be made between the total waste generated by hospitals for the 2019 GHS data collected, based on similar peer groups. As the GHS participants were classified under four specific peer groups, a waste intensity comparison can be made by relating the waste for each peer group to the floor area, number of beds, inpatient days, and outpatient visits. With respect to waste management in hospitals, an EPI that is commonly used to analyse hospital waste generation is the comparison of weight of waste (MT) to number of beds. *Table 6* shows that participants had a total average waste intensity of 3.15 MT/bed. A comparison can be made to the previous year's 2018 GHS average waste intensity of 3.317 MT/bed, showing a drop of 5%. In order to display this information more clearly, *Table 6* outlines the average waste KPI's for each peer group. The average waste intensity is highest in Academic Hospitals, while the others see slight variances in their WUI. The average waste per bed is lowest in Non-Acute Hospitals and greatest in Academic Hospitals. The average waste per in-patient day is greatest in Academic Hospitals and the average waste per outpatient visits is greatest in Non-Acute Hospitals.

Peer Group	Average Waste Intensity (MT/m2)	Average Waste MT/ Bed	Average Waste MT/ Inpatient day	Average Waste MT/ Outpatient Visit
Community	0.021	3.50	0.015	0.006
Academic	0.027	4.01	0.045	0.009
Non-Acute	0.010	2.07	0.007	0.012
Small	0.015	3.01	0.013	0.005
All	0.018	3.15	0.002	0.008

Table 6: Average waste intensity by KPIs and peer group

7.2.3 Waste Management Leadership, Initiatives and Innovations

The purpose of a waste management policy is to clearly define the goals and objectives for hospitals with respect to their waste reduction, reuse and recycling. Hospitals with an appointed committee of waste management champions, dedicated to green initiatives (i.e. Green Team) can provide leadership in creating waste management policies. Each hospital could benefit from having an Environmental Management System (EMS) that starts off with developing policies and procedures so that hospital staff can follow them as a template for waste management.

Figure 23 illustrates the percent of participants with waste management policies, targets and action plans in place during 2018. A little over 50% of the hospitals report that they have budgets for staff engagement and outreach programming. 75% of hospitals have waste management policies, and 29% stated having waste management targets. However, close to 40% of hospitals reported that they have waste action plans. In some provinces, like Ontario, waste reduction action plans are mandatory for a certain size of hospitals.

Participants provided a range in identified targets to reduce waste. These ranged from increasing waste diversion rates to increasing recycling recovery rates and decreasing use of non-recyclables.

Canadian Coalition for Green Health Care, 2019

Figure 23: Participants with waste policy and planning initiatives

Pollution Prevention

8. Pollution Prevention

8.1 Background

Pollution Prevention is a concept that focuses on selecting less toxic and more environmentally preferred materials for use within the hospital, and considering the impacts of building construction on the environment and within the hospital. In the Green Hospital Scorecard, supporting a "Do no harm" philosophy in health care recognises a need for health care providers to reduce and phase out materials that pose a threat to human health and the environment.

Pollution Prevention consists of:

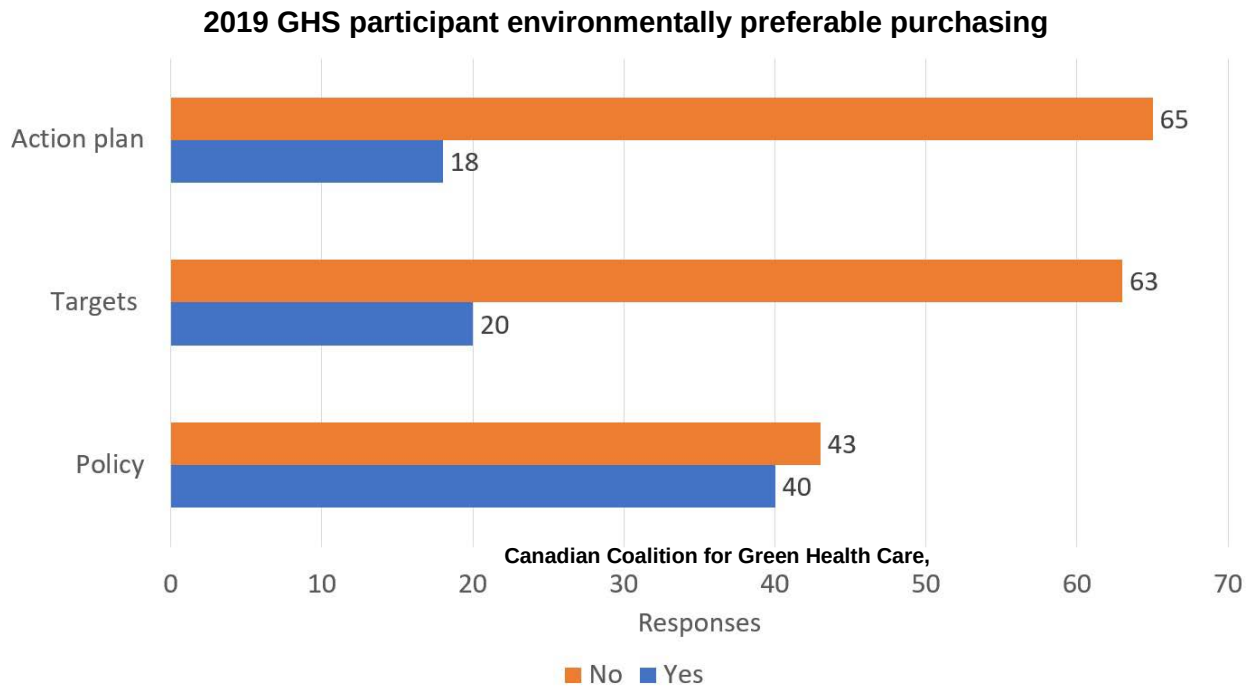
- Environmentally preferable purchasing, which aims to reduce an organisation's environmental impact upstream through the purchase of products which have environmentally preferred qualities
- Toxins management, which aims to reduce the downstream impacts caused by managing materials, products and services within hospital that are considered toxic to human health and environment, as well as the appropriate disposal of special and toxic wastes.
- Sustainable construction/renovation practices, which aim to reduce the environmental impact of hospital sites through the selection and use of sustainable construction and renovation materials and engagement of sustainable construction/renovation practices.

8.2 Results

Figure 24 shows information about Environmental Purchasing policies, where only 18 hospitals report having an Environmentally Preferable Purchasing Action Plan, and a marginally higher 20 hospitals have Environmental Preferable Purchasing Targets.

The following is an adaptation of one site's Environmentally Preferable Purchasing criteria when selecting products and services:

1. Assess the environmental impact of the product's life cycle (raw material acquisition, manufacturing, packaging, distribution, use and disposal);
2. The reusability of a product or supply (Circular Economy);
3. Product packaging and recyclability;
4. Complying and ahead of legislative, regulatory, and other requirements
5. The toxic ingredients of a product (priority given to those with few or no toxic ingredients, especially Mercury and PVC) and;
6. Transportation involved with manufacturing and receiving products
7. Energy efficiency of the product.

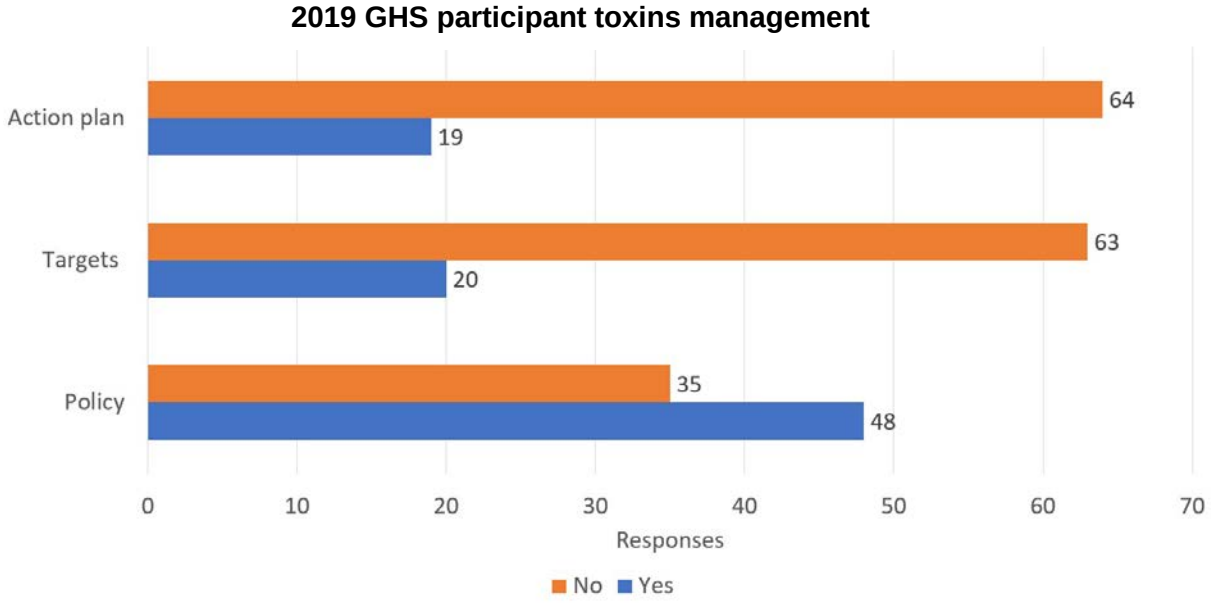


Canadian Coalition for Green Health Care, 2019

Figure 24: Participant targets and action plans for environmentally preferable purchasing

8.2.1 Toxins Management Initiatives

With respect to Toxics Management, *Figure 25* illustrates that 58% have Toxics Management Policies, while only about 24% have Targets. Action plans had a slightly lower number, with 23% of the sites indicating that they have a toxins management action plan.



Canadian Coalition for Green Health Care, 2019

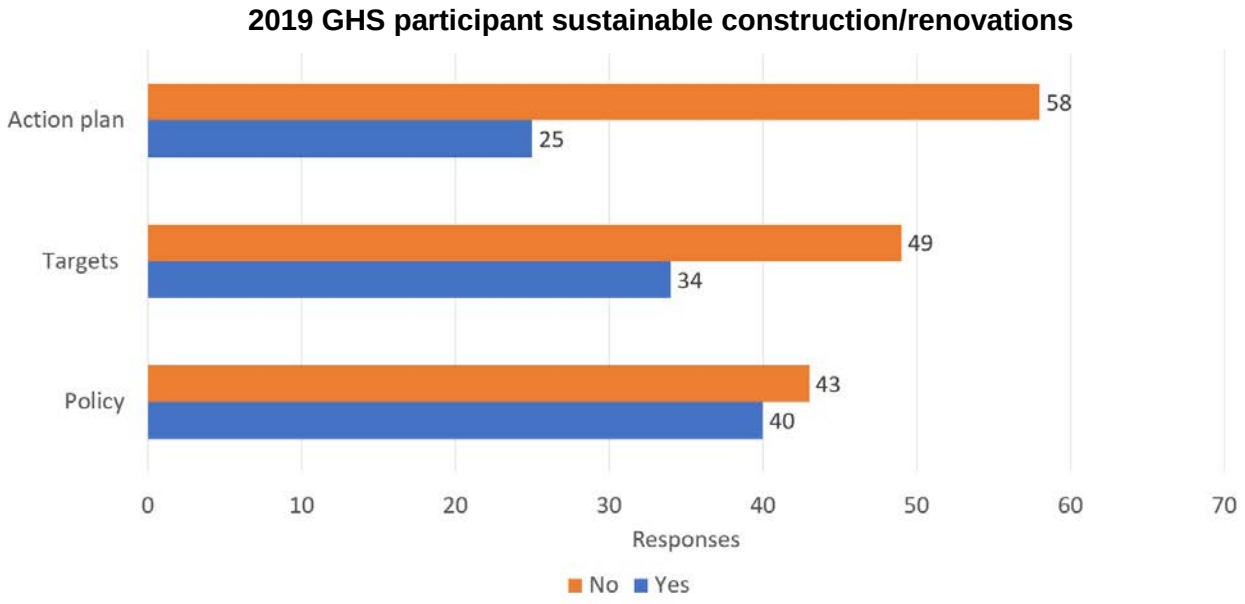
Figure 25: Participant toxins management policies, targets and actions

Examples of toxics reduction initiatives reported by participants include:

- Undertaking an annual internal hazardous waste manifest audit.
- Framing policies and procedures for management of cytotoxic, biomedical and pharmaceutical waste
- Having a decontamination holding tank on the exterior of the building, that acts as a plumber to the Emergency Department, to shower patients who may have been exposed to any toxic substances. This water is contained and pumped to alleviate toxins from going to drain.

8.2.2 Sustainable Construction/ Renovation Initiatives

With respect to sustainable construction and renovations policies, targets and actions, 48% of participants reported having policies in place, and 41% having targets. Fewer participants (30%) indicated that they have a Sustainable Construction and Renovation Action Plan, as indicated by *Figure 26* below.



Canadian Coalition for Green Health Care, 2019

Figure 26: Participant sustainable construction and renovations policies, targets and actions

Examples of sustainable construction and renovations initiatives reported by participants include:

- Three sites mentioned that they recycle construction materials when possible.

- One site got LEED Certified Gold, which requires a preferential procurement of materials with recycled content, products made from renewable resources, energy efficient lighting and mechanical systems, low-flow water fixtures.
- One site carried out tree and pollinator garden planting, including 14 native species of trees and over 500 native species of pollinator plants.

8.2.3 Other Pollution Prevention Initiatives

Examples of other Pollution Prevention initiatives reported by participants include:

- One site made an organisation-wide switch to environmentally friendly paper that has been certified by the Forest Stewardship Council.
- One site has a "Disposal of Assets" policy which requires the end user to find a "home" for equipment or furniture, either through resale or donation.
- One hospital runs two buses to transport staff and patients between all three sites.
- One site executed several energy efficiency projects, which together resulted in annual GHG emissions abatements of 199,335 kg CO2e.

Corporate Leadership, Planning and Management

9. Corporate Leadership, Planning and Management

9.1 Background

Corporate leadership, planning and management, measure an organisation's commitment to a culture of environmental sustainability and integration of green objectives into corporate planning and regular business. The presence or absence of a policy justifies a corporate commitment, while it may lack a holistic view on the level of commitment and engagement from hospital staff. Corporate commitment focuses on the following three areas:

1. Leadership: A measure of corporate commitment to environmental sustainability as gauged by the presence of formalized organisation-wide support and outreach for green initiatives;
2. Planning: A measure of a hospital's progress in environmental planning and target-setting with action plans; and
3. Monitoring & Management: A measure of a hospital's commitment to tracking and monitoring regular resource expenditures.

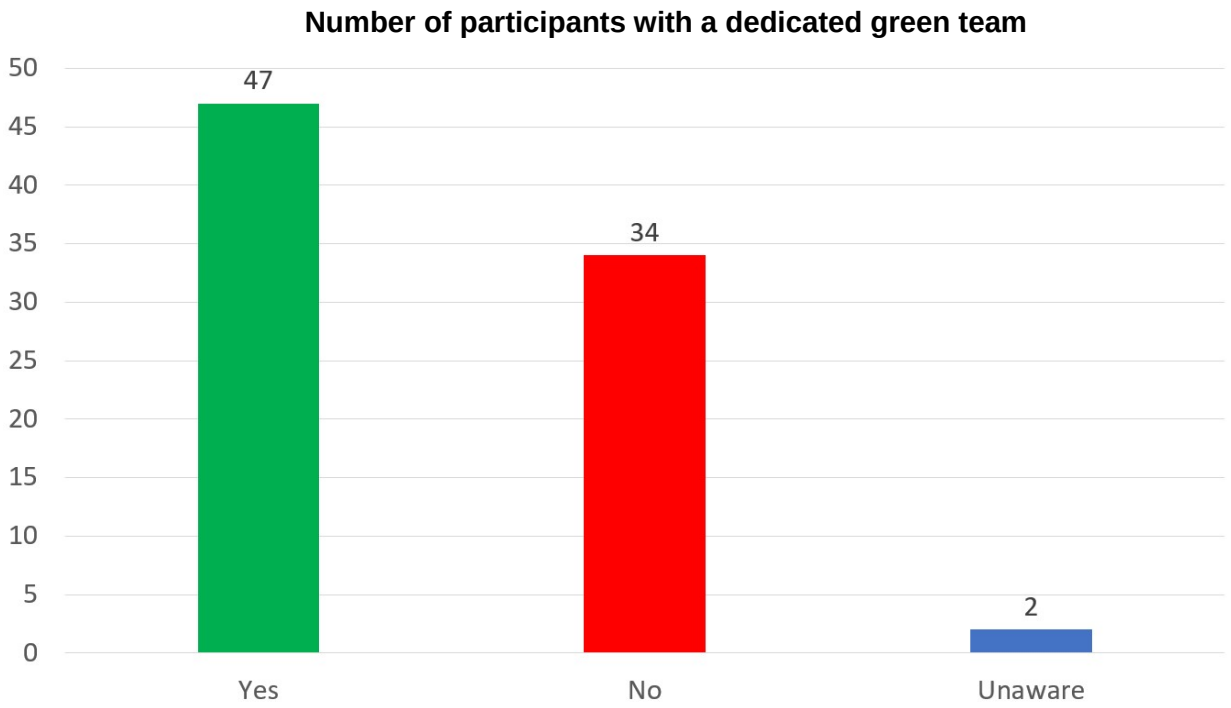
9.2 Results

9.2.1 Corporate Leadership

The 2019 GHS measures corporate leadership qualitatively, through the presence of formal commitments, corporate-level programs, and policies that support green initiatives within hospitals. A total of 83 participants provided responses to these questions for policies, targets and action plans which were in place during the 2018 data collection period.

Given below are some metrics related to corporate commitment to green initiatives:

- 63 GHS participating hospitals have a corporately recognized environmental mandate or commitment;
- 66 GHS participants have an executive champion accountable for the overall hospital environmental strategy;
- 46 GHS participants have a full-time employee dedicated to environmental initiatives; and
- 47 participating sites have a green team, as shown in *Figure 27*.



Canadian Coalition for Green Health Care, 2019

Figure 27: Participating sites with green teams

9.2.2 Programming

The following programming areas were revealed in the data analysis:

1. Participants were asked if they offer staff engagement and outreach programming for the following areas:
    - 67 participants have energy conservation
    - 68 participants stated that they have waste management
    - 51 participants have water conservation
    - 60 respondents in green events such as Earth Day

2. Participants were asked if they allocate a budget for staff and engagement for the follow areas:
    - 46 in green events such as Earth Day
    - 45 participants in energy conservation
    - 40 participants in water conservation
    - 42 participants in waste management

9.2.3 Planning

A hospital's corporate commitment to environmental performance improvements include creating policies, setting clearly defined targets and having an action plan in place stating how that target will be achieved. Through the 2019 GHS, 83 participants provided responses to questions for policies, targets and action plans which were in place during the 2018 data collection period for energy, water and waste.

Transportation

10. Transportation

10.1 Background

This relatively newer category focuses on the policies, and infrastructure to support active and clean transportation. According to the Government of Canada, active transportation is using your own power to get from one place to another and includes walking, jogging and biking, whereas, clean transportation includes public transit, car-polling, shuttles and low-emission vehicles[16]. A low-emission vehicle is a motor vehicle that emits relatively low levels of motor vehicle emissions. Zero emission vehicles (ZEVs) are those vehicles that can operate without tailpipe emissions and include battery electric, plug-in hybrid electric and hydrogen fuel cell electric vehicles.

The Canadian transportation sector is responsible for the second largest source of greenhouse gas (GHG) emissions in Canada with light duty vehicle (LDV) emissions accounting for approximately 50% of Canada's transportation-related GHG emissions, and 25% of the country's total emissions. Canada is committed to decarbonizing the transportation sector and leading the transformation with zero emission vehicles. Transportation Canada is estimating zero emission vehicle sales of four to six percent of all new light-duty vehicles purchased by 2025 and five to ten percent by 2030. Furthermore, the target has been set at having 100% of light-duty vehicles sold to be zero emission by 2040, with a projected 14 million such vehicles on the road by 2040[17].

For additional information see the Coalition's website on the zero emissions vehicle project: https://greenhealthcare.ca/zev/

10.2 Results

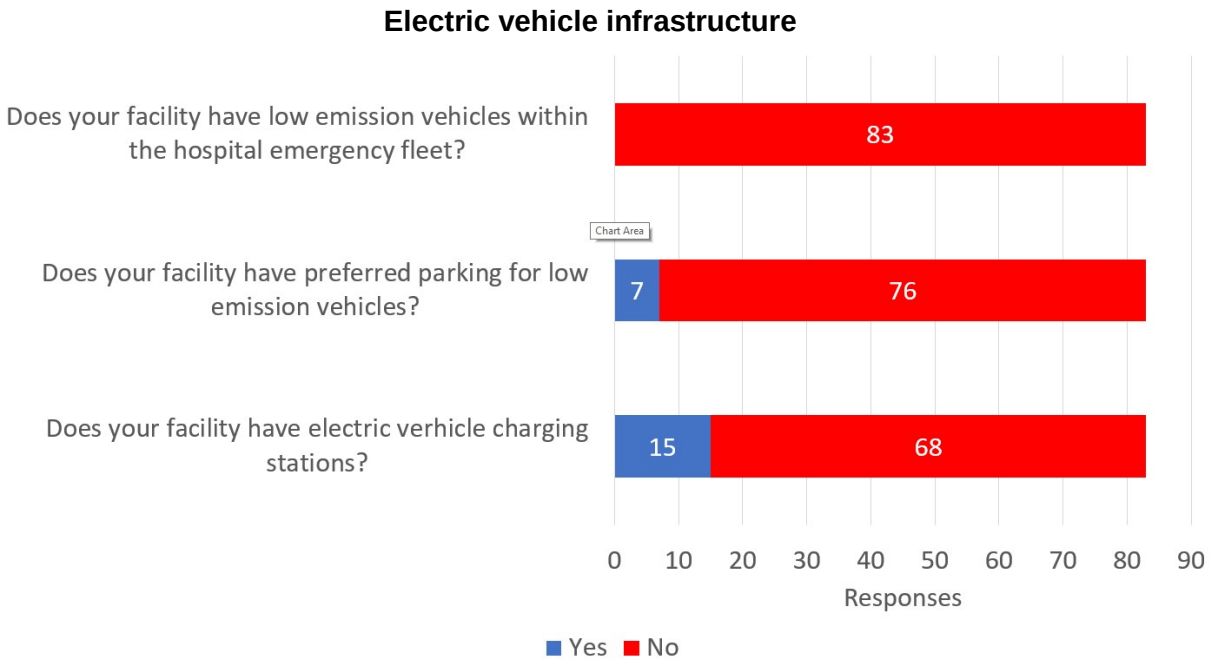
Fifty-five percent of participants report that they have a program in place to promote alternative transportation to replace privately owned vehicles.

10.2.1 Zero Emission Vehicles

With the expected increase in demand for electric vehicles, hospitals have an opportunity to support low emission technology. Less than a quarter of respondents have been taking the lead with only about 18% of facilities reporting that they have electric vehicle charging stations and a mere eight percent have preferred parking for low emissions vehicles (*Figure*

[16] Government of Canada, 2014
[17] Transport Canada, 2019

28). Unfortunately, none of the respondents reported that their hospital fleets include low emissions vehicles.



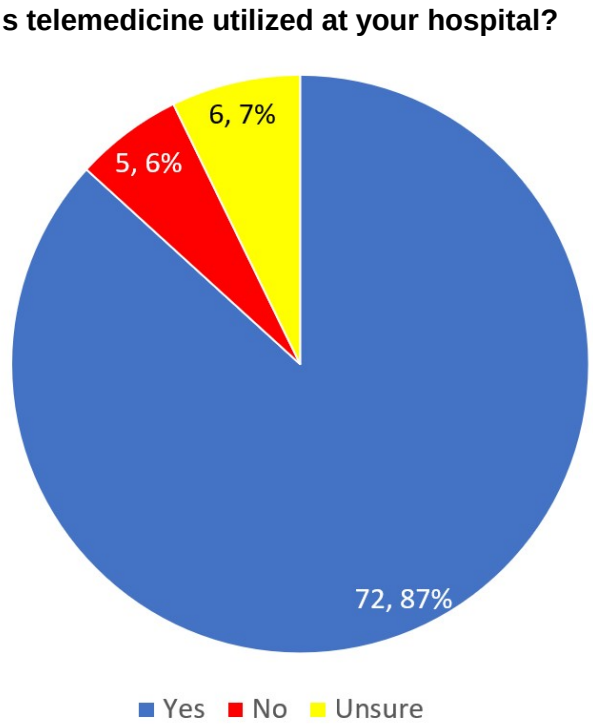
Canadian Coalition for Green Health Care, 2019

Figure 28: Electric Vehicle Infrastructure

10.2.2 Telemedicine

According to the Ontario Telemedicine Network, telemedicine (also known as virtual care) uses telecommunications technology to provide clinical health care at a distance. This helps improve access to medical services that often would not be available consistently in distant rural communities[18]. The aim of these questions is to understand how Canadian health care facilities are adopting telemedicine, along with any perceived barriers. According to the data shown in *Figure 29*, 87% of GHS participants reported that their site incorporates telemedicine into the delivery of health services.

[18] OTN, https://otn.ca/



Canadian Coalition for Green Health Care, 2019

Figure 29: Telemedicine utilisation at participant sites

Other active and clean transportation Initiatives reported by participants include:

- A couple of sites installed bike racks to encourage employees to bike to work.
- Several sites installed new electric vehicle charging stations.
- Three sites switched their passenger buses to smaller buses for shuttle services.
- One site offers secure and public bike spaces, shower facilities, bicycle tune-up station as well as Workplace Flexibility Policy
- Two sites increased their employee transit discount program participation.

Food

11. Food

Last year's GHS confirmed that health care facilities have begun to adopt policies and practices to support a healthy food system. We continue to build our database on the food initiatives that hospitals are implementing across their various sites. This is a system that includes environmental sustainability, improves nutritional quality, supports a shift to low-carbon foods, builds healthy communities, and supports culturally appropriate and sustainable foods. The Nourish Program was developed with the belief that food is fundamental to patient, community and planetary health and well-being, and is one of the health care targeted healthy and sustainable food initiatives in Canada.

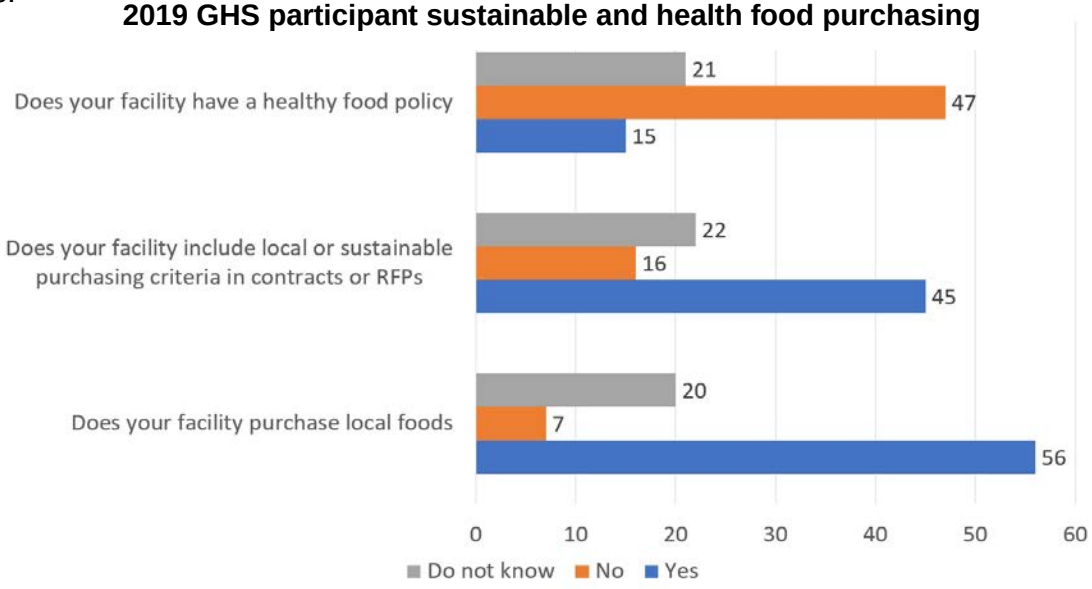
11.1 Results

This section of the GHS will demonstrate how hospitals policies and programming are attempting to support a healthy food system. While acting as a significant purchaser of food products, health care has the opportunity to shape sustainable food systems.

11.1.1 Food Policies

While hospitals had high levels of food waste policies along with diet and educational programming, only 18% of the participants had formalized healthy food policies (*Figure 30*), while a quarter of the participants did not know if they had a food policy. Moreover, according to the data shown on *Figure 30*, 67% of 2019 GHS participants purchase local food for their site. Over 50% of the sites have local or sustainable purchasing criteria within their contracts or RFPs.

2019 GHS participant sustainable and health food purchasing

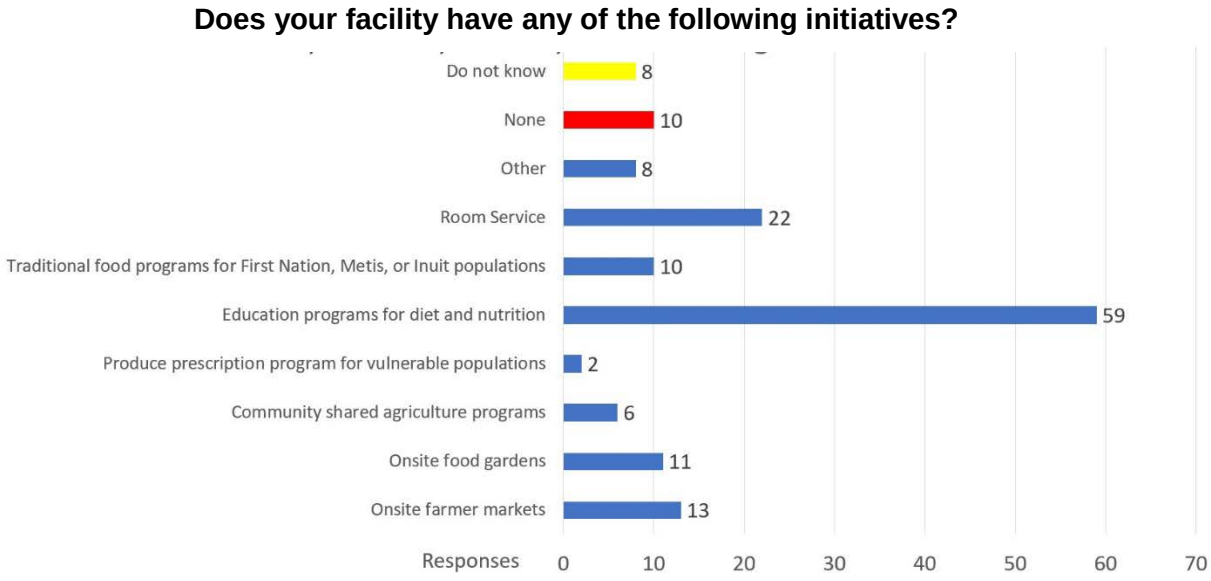


Canadian Coalition for Green Health Care, 2019

Figure 30: Participant sustainable and healthy food purchasing initiatives

11.2 Food Initiatives

Hospitals provided insights into their growing number of initiatives dedicated to food systems. The 2019 GHS survey involved introducing questions around which food services were offered within hospital sites. According to the information on *Figure 31*, 71% of respondents stated that their site offers diet and nutrition education programming, 27% of sites are offering room service, 16% have onsite farmers markets, and 13% have onsite food gardens. However, 12% of the sites did not engage in any of the eight food initiatives listed in the chart below.

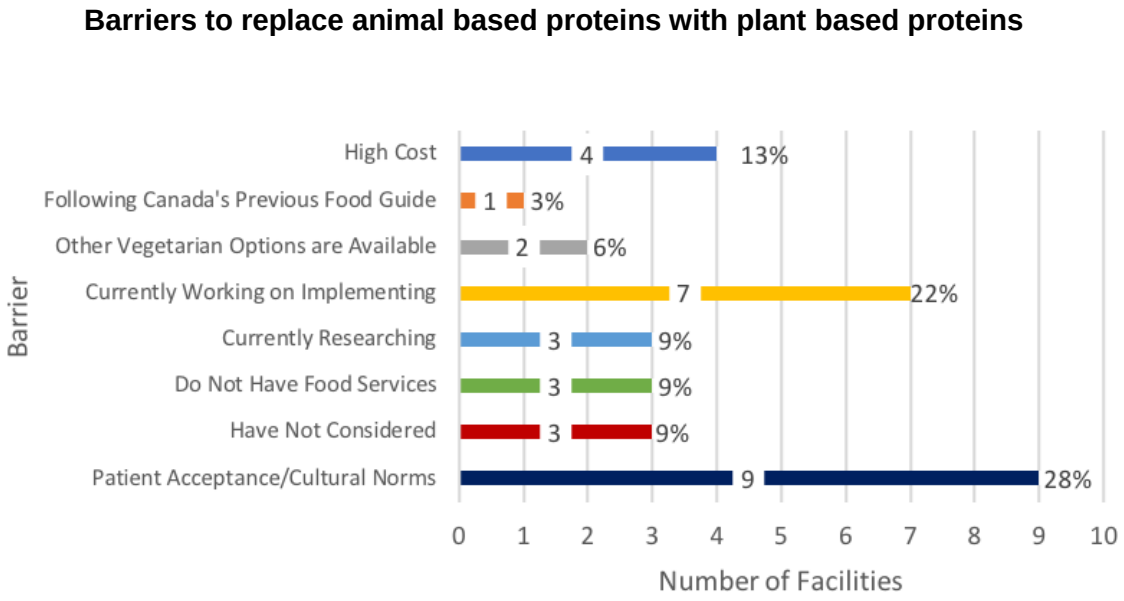


Canadian Coalition for Green Health Care, 2019

Figure 31: Hospital healthy and sustainable food system initiatives

Along with policies, and initiatives, survey respondents were also asked about perceived barriers towards replacing animal-based products with plant-based products, which can also contribute to reduction of GHGs.

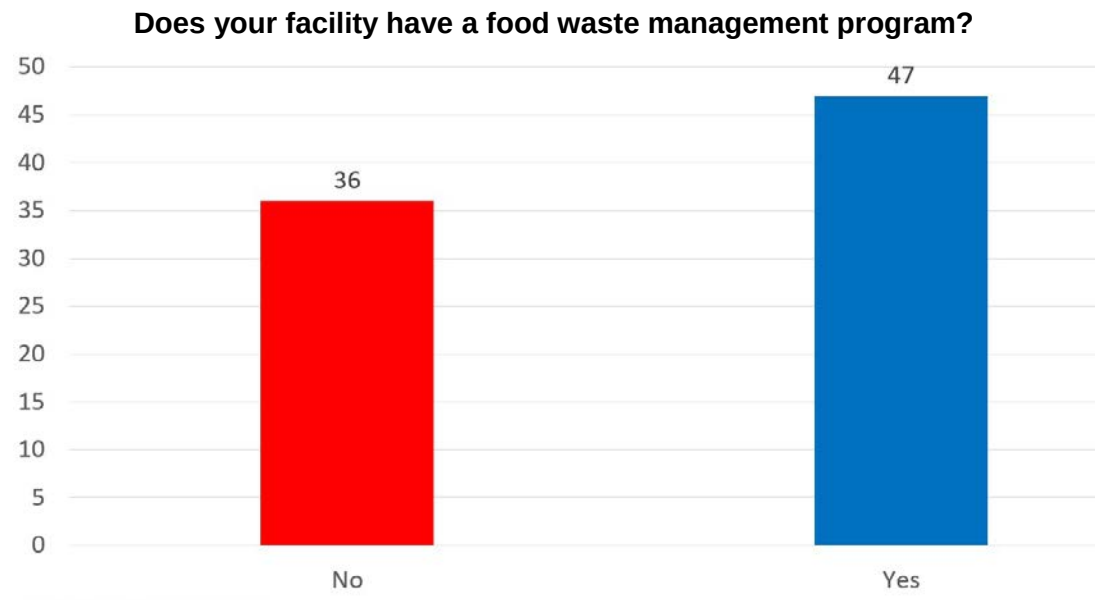
Figure 32 below illustrates that patient acceptance and cultural norms are the biggest barrier to replace animal protein with plant based protein.



Canadian Coalition for Green Health Care, 2019

Figure 32: Perceived barriers towards replacing animal products with plant-based products

Almost half (43%) of the respondents reported that they do not have a food waste management program (*Figure 33*).



Canadian Coalition for Green Health Care, 2019

Figure 33: Hospital food waste management programs

Climate Change

12. Climate Change

Climate-related events are already impacting hospitals in Canada[19]. The frequency and magnitude of severe weather events such as extreme heat, cold, rain, ice, snow, winds and storms have increased, as forecast by the Intergovernmental Panel on Climate Change (IPCC)[20]. Increasing, global temperatures will also result in rising sea levels, melting permafrost and droughts and dry conditions which will spur on wildfires. To help reduce the catastrophic effaces of climate change, Canada has committed to an economy-wide target for GHG emissions reductions of 30% relative to 2005 levels by 2030[21].

Canada's health care sector is a significant contributor to GHGs. A 2018 study reported that GHGs emitted from Canada's health care sector life-cycle, which includes direct emissions from hospital buildings and indirect emissions from their supply chain, represented an estimated 4.6% of the total national GHG emissions in 2015 or 0.0330 Gigatonnes (GT) CO2 eq[22]. GHG emissions in the health sector are increasing at double the rate of the national average; ten percent compared to five percent between the years 2009 to 2015. Given its increasing annual contribution to Canada's total GHG output, targeted support programs to reduce emissions in the health sector could play an important role in national climate change mitigation efforts. Eckelman et al. (2018) also report that the most significant GHG emissions in the health sector are from: prescribed and non-prescribed pharmaceuticals (25%); hospitals (24%); and physician services (13%).

Canada's health care sector GHG emission sources have been estimated from the three scopes of GHG analysis which are provided below[23], along with examples.

- Scope 1: 26%
    - Stationary, on-site combustion for the generation of electricity, heat or steam,
    - Combustion of fuels in company owned/controlled vehicles,
    - Anesthetic gases and nitrous oxide,
    - Other fugitive emissions e.g., air conditioning and fire suppression chemicals
- Scope 2: 13%
    - Electricity purchased by the health care organisation
    - Indirect emissions associated with electricity transmission and distribution losses

[19] Waddington et al. 2013
[20] IPCC, 201
[21] Canada, 2017
[22] Eckelman et al. 2018
[23] HCWH & Arup, 2019

- Scope 3: 61%
    - Waste disposal
    - Water supply and disposal
    - Staff travel (business)
    - Staff travel (commuting)
    - Patient/visitor travel
    - Supply chain (pharmaceuticals)
    - Supply chain (medical devices)
    - Supply chain (food)
    - Supply chain (construction)
    - Supply chain (other - general)

This is further illustrated in *Figure 34*, which shows that most of the GHG emissions from the health sector are from Scope 3 – The health system supply chain.

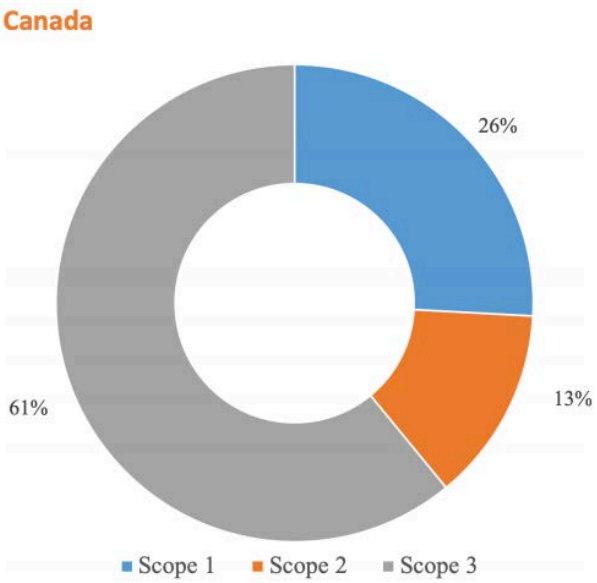


Figure 34: Canada's health care climate footprint (HCWH 2019 report)

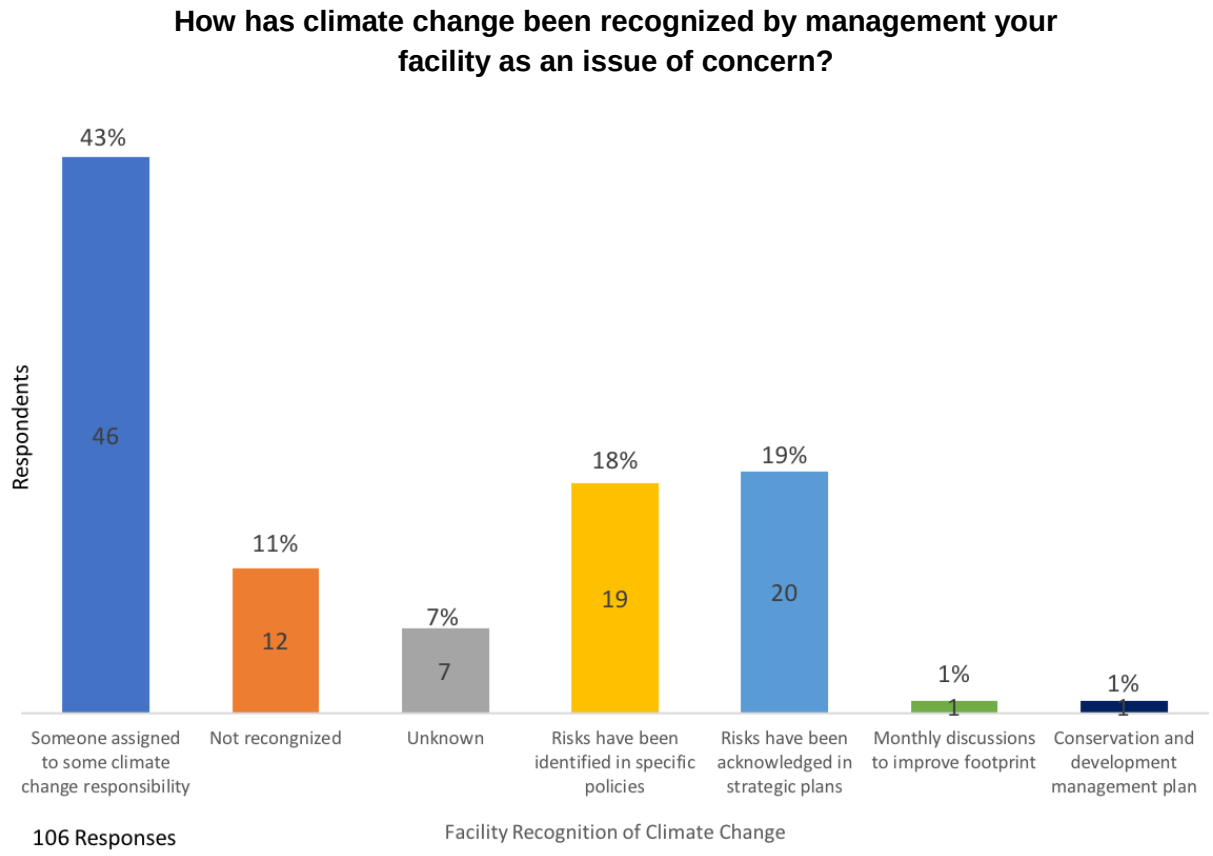
Hospitals can take GHG mitigation actions and reduce their emissions, through use of clean technology, undertaking energy efficiency, and through changes in behaviour as well as addressing GHGs from their supply chain. Hospitals can also become more resilient and adapt to the increased prevalence of extreme climate related events while at the same time becoming more sustainable. For additional information see 'Taking Action on Climate Change at Health Facilities'[24].

[24] CAPE, 2019, Module 6.

12.1 Results

12.1.1 Recognition of climate change as an issue of concern

The first step to action at a health care facility is recognition of climate-related impacts as an issue of concern by senior management. *Figure 35* reveals that most participant sites have some level of recognition of climate change as an issue of concern. Fifty five percent of participants reported that their facility has assigned at least one person with some climate change responsibility, 24% have included climate change risk in their facility Strategic Plan, and in specific policies. Fourteen percent of participants have not yet recognized climate change as an issue of concern, and eight percent of respondents did not know.

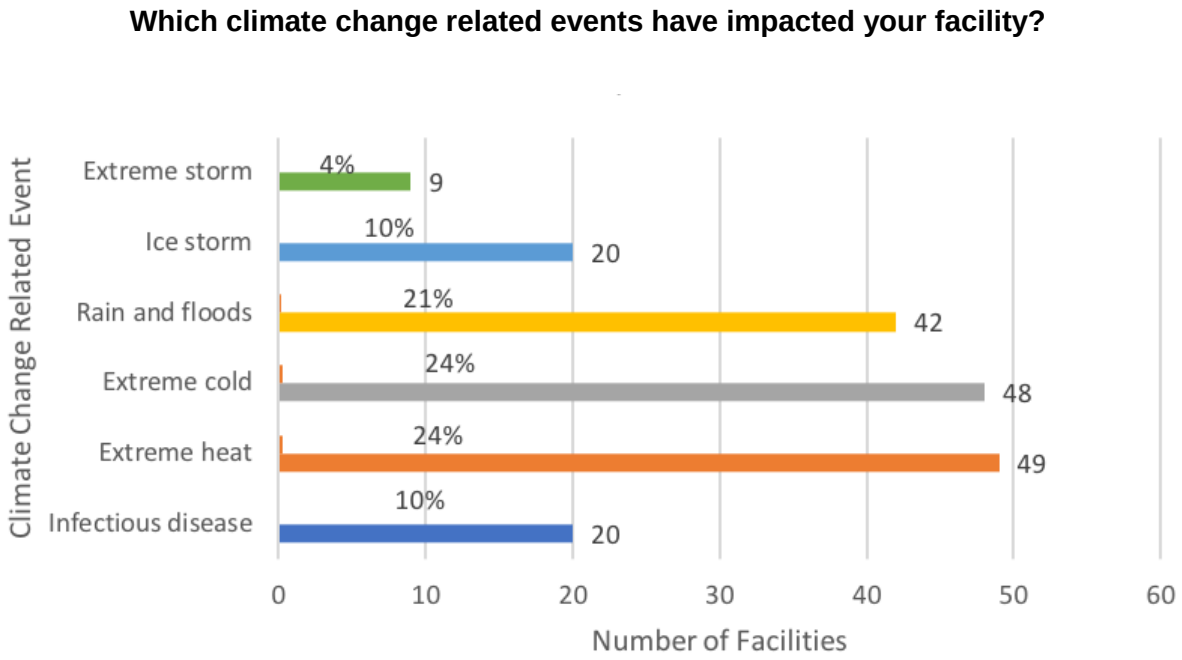


Canadian Coalition for Green Health Care, 2019

Figure 35: Number of hospitals with management recognizing climate change as an issue of concern

12.2.1 Climate-related events affecting hospitals

Figure 36 provides details on what kinds of climate-related events the hospitals have experienced. Many participants reported more than one type of event. The most common events were extreme heat, including extended periods of heat, reported by over half of the participants (59%). A close 58% reported experiencing extreme cold while 50% reported experiencing flooding.

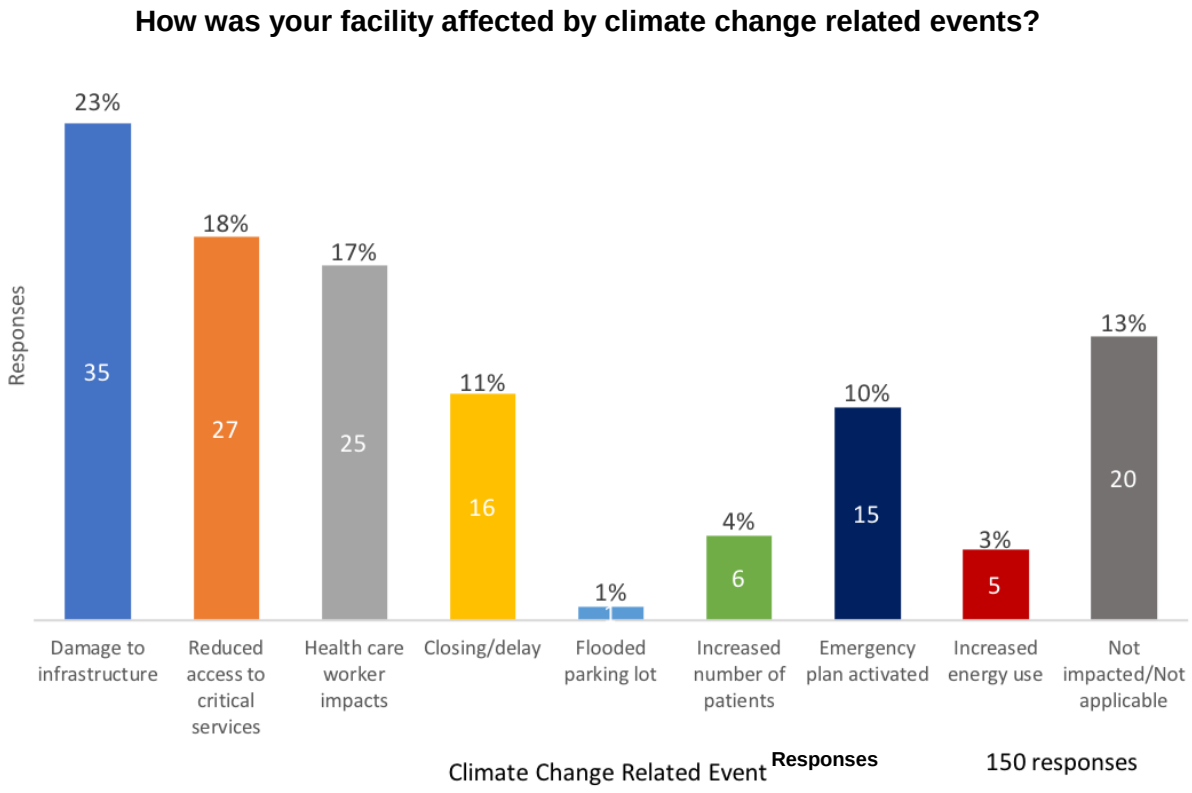


Canadian Coalition for Green Health Care, 2019

Figure 36: Climate change-related events impacting hospitals

12.2.2 Climate-related impacts on hospitals

Figure 37 illustrates how the hospitals have been impacted by climate-related events, with many participants reporting experiencing more than one type of shock to their facilities. Infrastructure damage was reported by the greatest number of participants (42%); 32% reported that patients experienced reduced access to hospital services while 30% of participating hospitals experienced impacts on health care workers as a result of climate-related events. Twenty four percent reported no impacts to their facilities from climate-related events.



Canadian Coalition for Green Health Care, 2019
Figure 37: How a facility was affected by climate change-related events

12.2.3 Resiliency and Vulnerability Assessments

The 2019 GHS Survey respondents were asked if they had completed a resilience assessment or a vulnerability assessment. Of the health care facility staff responders (83 responders), just 16% reported having completed resilience assessments while only 13% have completed vulnerability assessments. These numbers while still quite low, are an increase from the previous year's 9% and 4% having completed the resiliency and vulnerability assessments respectively. The majority of those that have reported completing a resilience assessment were participants in the Coalition's Climate Change Resilience Mentoring program.

Anaesthetic Gases

13. Anaesthetic Gases

13.1 Background

Anaesthetic gases are one of the main components in a surgical procedure and are meant to remove the pain or discomfort factor associated with being surgically operated on. However, while it is highly beneficial for the patient and the surgical procedure, the environmental side-effect of using anaesthetic gases can be quite detrimental. Anaesthetic gases used for surgeries under general anaesthesia are potent greenhouse gases which hospitals regularly discharge unabated into the atmosphere. In England, the National Health Service (NHS) discovered the following[25]:

1. Being commonly used as a part of everyday surgeries, anaesthetic gases alone are responsible for over 2% of all NHS emissions.
2. Amongst the anaesthetic gases, Desflurane is one of the most common, but also one of the most harmful.
3. It has 60 times the environmental impact of other less harmful greenhouse gases and using a bottle has the same global warming effect as burning 440 kg of coal.

Measuring, monitoring and reporting carbon dioxide equivalent emissions is crucial for reducing emissions. The anaesthetic gases section is new to the Green Hospital Scorecard survey and the 2019 GHS is the first one to collect this information. Although the anaesthetic gases data gathered is of paramount importance, this kind of data has not previously been collected in Canada. Consequently, we still don't fully know the quantity or usage of these products by health care professionals.

13.2 Results

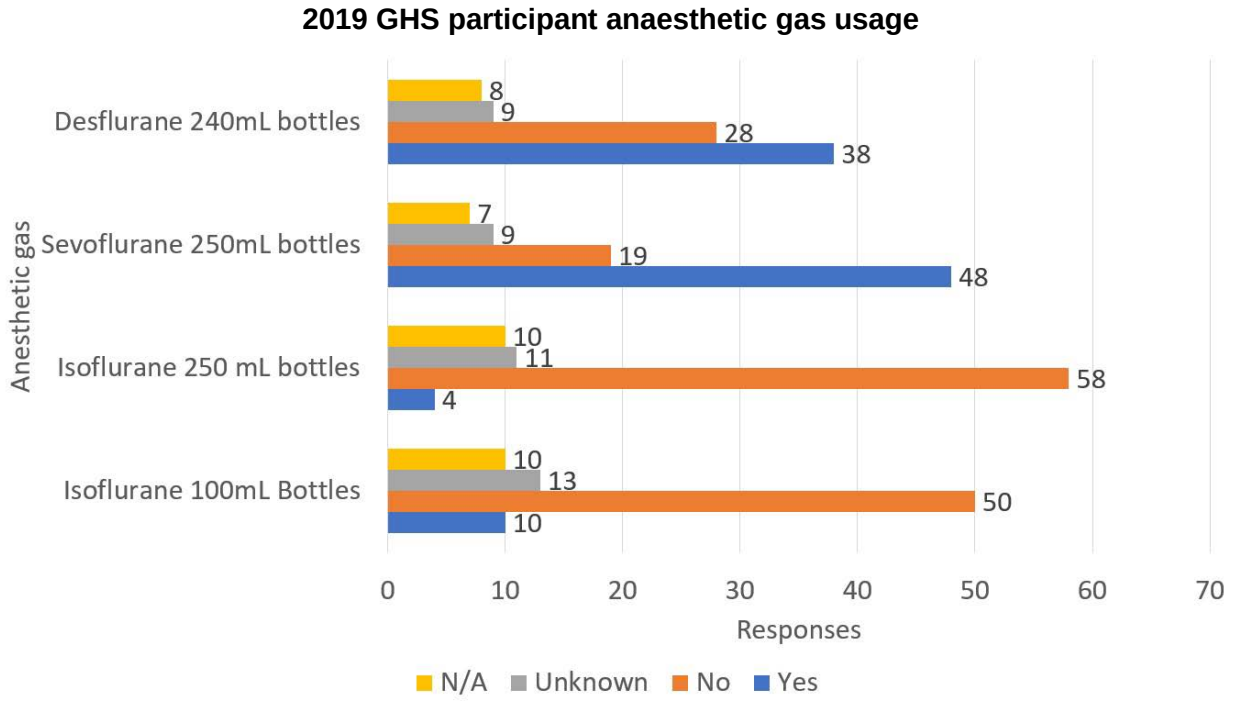
13.2.1 Anaesthetic gas usage

The 2019 GHS survey collected data pertaining to the number of bottles purchased for the most common anaesthetic gases: Isoflurane, Sevoflurane, Desflurane, and Nitrous oxide. Since this was the first-time anaesthetic gas data was collected by the GHS, one of the primary aspects of analyzing this data was figuring out the usage of the aforementioned anaesthetic gases. *Figure 42* illustrates the responses provided by the participating sites. Note that about eight to ten hospitals responded with "N/A", and nine to thirteen hospitals responded with "unknown" showing that almost a quarter of the participants did not have data related anaesthetic gas usage. Isoflurane saw the least usage by participants, with 50

[25] Greener NHS. Putting anaesthetic-generated emissions to bed. Available from: https://www.england.nhs.uk/greenernhs/whats-already-happening/putting-anaesthetic-generated-emissions-to-bed/#:~:text=Across%20the%20NHS%2C%20anaesthetic%20gases,one%20of%20the%20most%20harmful.

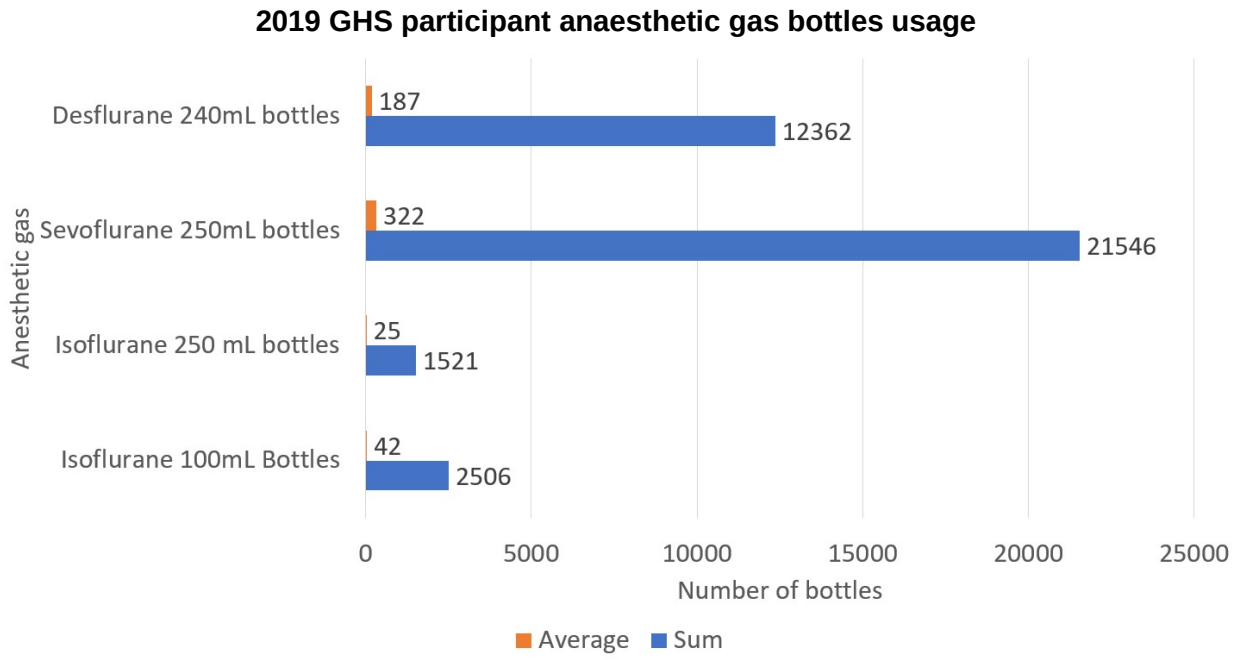
participants indicating they did not use 100mL Isoflurane bottles, and 58 participants not having used the 250mL Isoflurane bottles. However, Sevoflurane and Desflurane had relatively higher usage among the participants. A little over half (58%) of the participants indicated that they used 250mL Sevoflurane and 46% of the participants indicated usage of 240mL Desflurane bottles.

In addition to collecting information on anaesthetic gas usage, the 2019 GHS survey also collected the numbers related to the different anaesthetic gas bottles used. *Figure 43* illustrates this information in more detail. It is once again evident that both the average and total sum of bottles of Desflurane and Sevoflurane and significantly higher than that of Isoflurane.



Canadian Coalition for Green Health Care, 2019

Figure 38: Anaesthetic gas usage by 2019 GHS participants



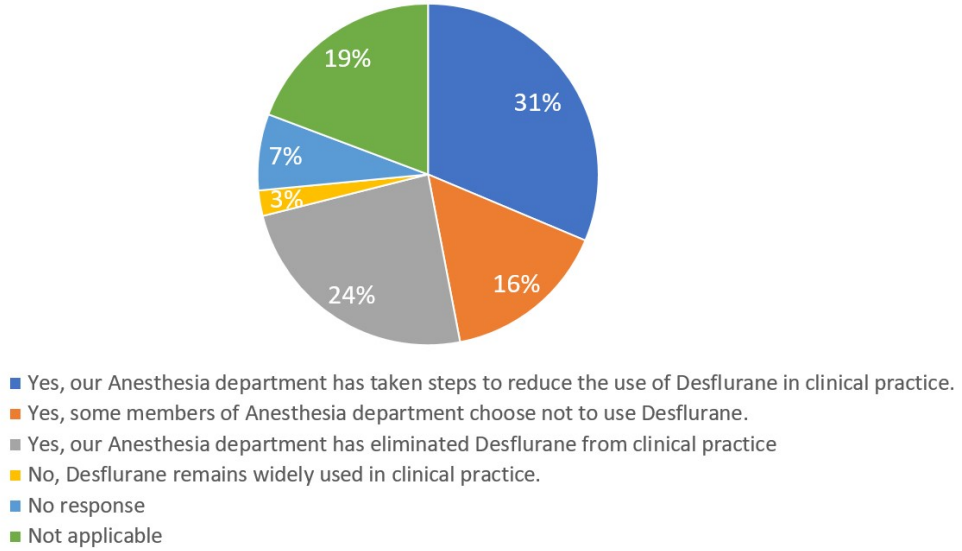
Canadian Coalition for Green Health Care, 2019

Figure 39: Anaesthetic gas bottles usage by 2019 GHS participants

While it is important to have knowledge of the anaesthetic gas usage by participating sites, it is equally important to learn of their efforts and attitudes towards reduction in environmentally harmful anaesthetic gases such as Desflurane. *Figure 44* below illustrates anaesthesia departments' varying responses to eliminating (or reducing) Desflurane at hospitals. It is definitely a good sign that just three percent of participants have Desflurane in wide usage, while seven percent did not respond and 19% indicated that this is not applicable to their site. Although this does not mean that 71% have moved away from using Desflurane, it is a very good step in the right direction, since 24% of participants have eliminated Desflurane from clinical practice and 31% are taking steps to reduce Desflurane usage.

While participants indicated that they are aware of technology that is used to capture waste volatile anaesthetic gases prior to discharge, for the purpose of recycling, 54% of participants did not use this technology. Only nine percent of the participants used this technology in all operating rooms, and 13% used it in some operating rooms. Participants also indicated they mostly used Blue Zone Technologies' anaesthetic gas recovery model either over a trial period or over multiple years of full use.

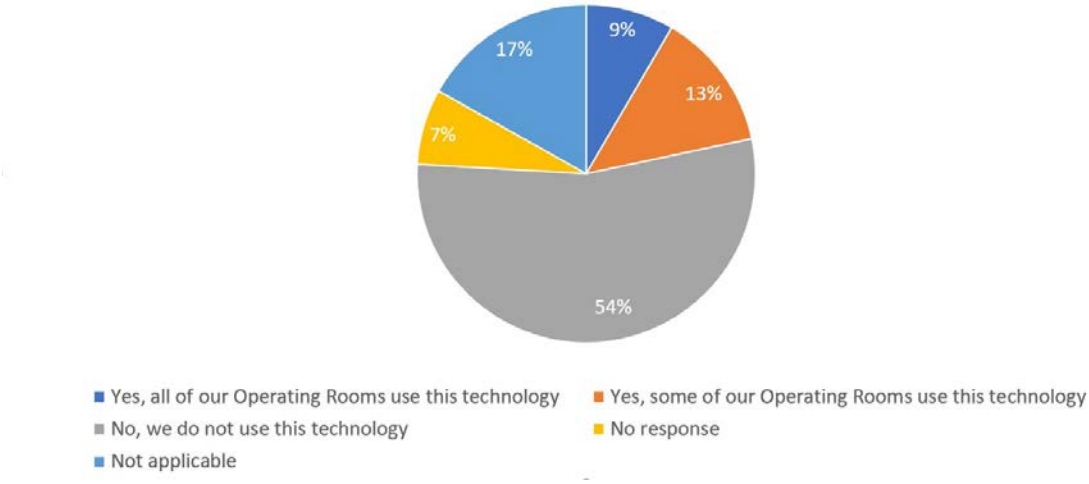
Are anaesthesiologists in your anaesthesia department choosing to eliminate or reduce Desflurane use due to the GHG emissions from wasted anaesthetic gases?



Canadian Coalition for Green Health Care, 2019

Figure 40: Desflurane gas usage by 2019 GHS participants

Does your facility use any existing technology to capture waste volatile anaesthetic gases such as Desflurane, Sevoflurane and Isoflurane prior to discharge, for the purpose of recycling?



Canadian Coalition for Green Health Care, 2019

Figure 41: Anaesthetic gas recycling by 2019 GHS participants

Energy Behaviour

14. Energy Behaviour

14.1 Background

Accounting for human behaviour patterns in energy management in addition to technology can potentially result in greater energy savings and persist for longer periods of time than if the human element is ignored[26].

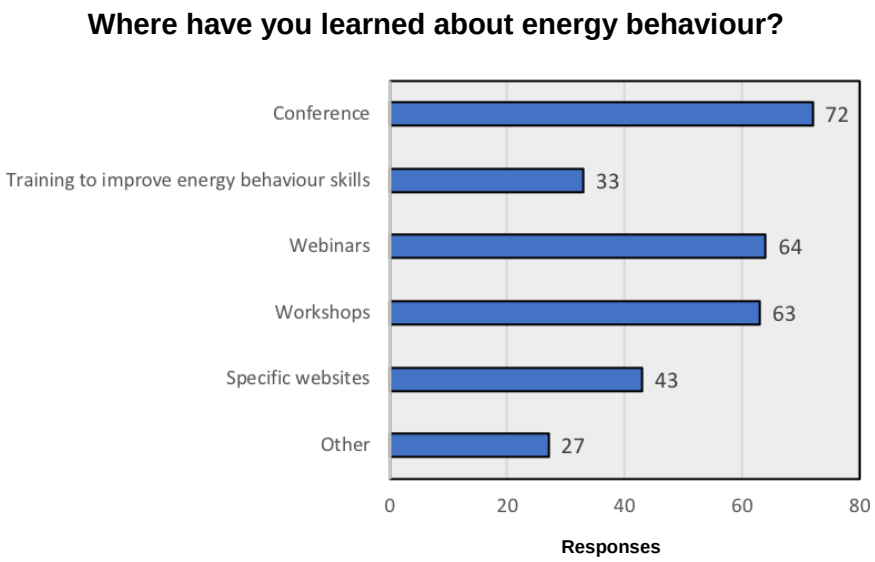
While human behaviour has been well studied in projects directed at the residential sector, not as much is known about how the industrial, commercial and institutional sectors can benefit by including a human focus to energy management. Similar to the previous year, the 2019 GHS survey also asked questions related to energy behaviour to better understand the extent of knowledge of key actors, initiatives, norms and goals around energy behaviour in hospitals. The goal is for organisations to incorporate the principles of energy behaviour, thereby incentivizing conscious energy use by staff and patients and operationalize savings through planning, supporting, investing in, and implementing energy savings projects.

14.2 Results

14.2.1 Energy Behaviour Awareness

Figure 38 shows that a majority of participants became aware of energy behaviour through conferences (87%). Webinars and workshops had a very close response at 67% and 66% respectively. There were smaller number of participants that have learned through formalized training (40%), and an even smaller portion (32%) that have become aware through other means.

[26] Cowan et al. Chapter 21, Behaviour and Energy Facility Management



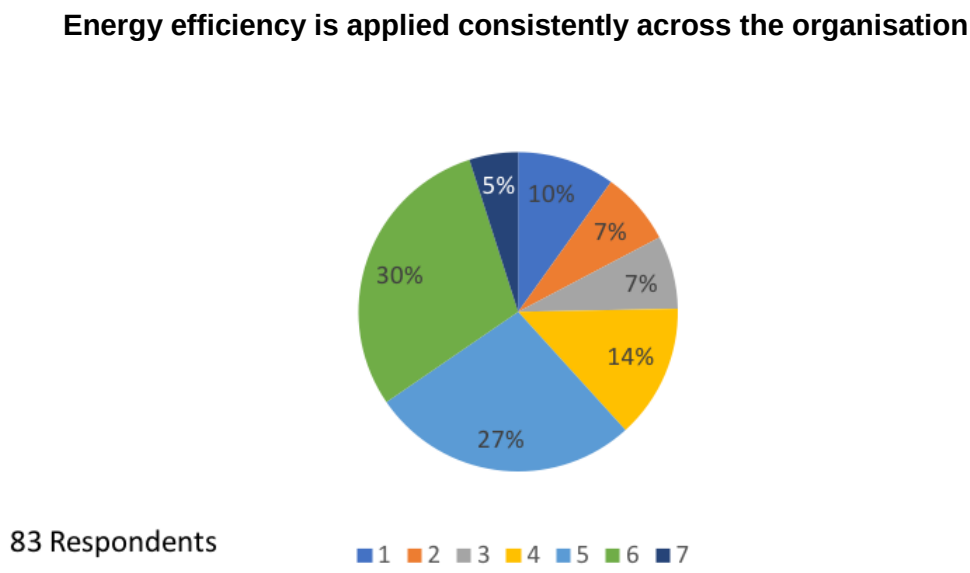
Canadian Coalition for Green Health Care, 2019

Figure 42: Participant awareness of Energy Behaviour

14.2.2 Energy Behaviour Policy

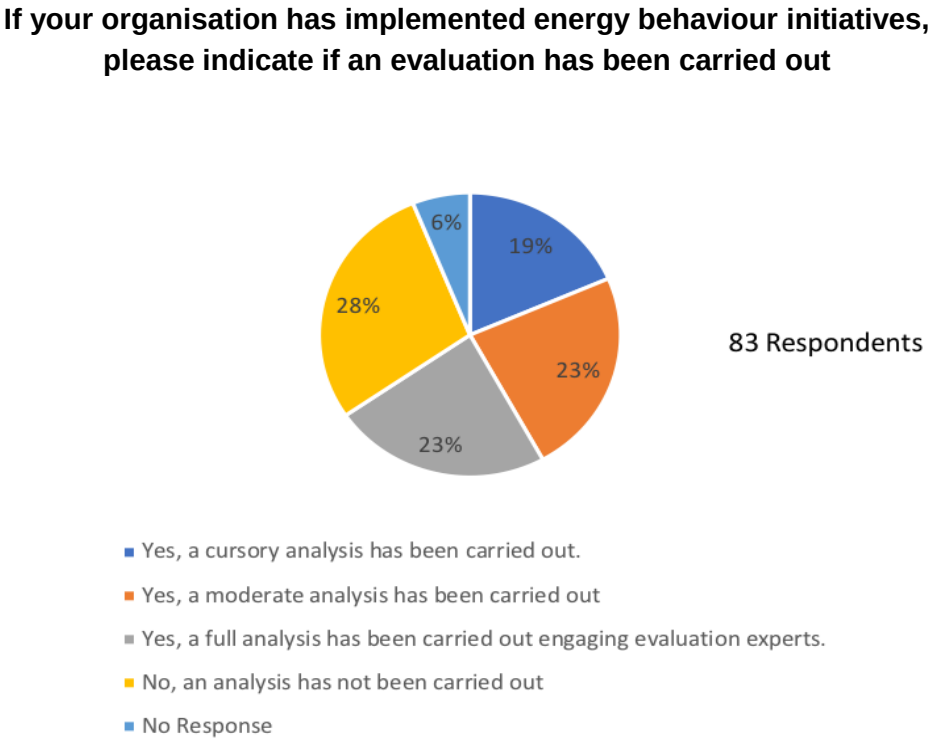
A crucial part of implementing energy behaviour involves leadership, and having a dedicated full-time-equivalent (FTE), or energy champion to support staff. 80% of the responders reported that their facilities have a dedicated energy champion whereas only a little over half (55%) reported having a dedicated FTE. A similar proportion of participating sites (57%) reported having a formal green team.

In addition to the information above, the energy behaviour section of the 2019 GHS survey collected data related to energy behaviour implementation and approaches in facilities. Furthermore, this section also saw some changes in terms of the data collection methodology. Whereas the previous year's energy behaviour section relied on yes/no type questions with only the energy behaviour integration required a rating response, the 2019 GHS expanded upon this to include more questions in the rating format in order to allow for a more non-binary input of energy behaviour data. This was done by including a rating scale ranging from one (the lowest score) to seven (the highest score). *Figures 39* and *40* provide insights into the rating we received for participants' energy behaviour approach and energy behaviour implementation respectively. While it is difficult to compare to previous years' data, the 2019 GHS data on *Figure 39* shows that a majority of the participants were rated four, five and six, adding up to 71% of the participating sites.



Canadian Coalition for Green Health Care, 2019

Figure 43: Participant energy behaviour approach

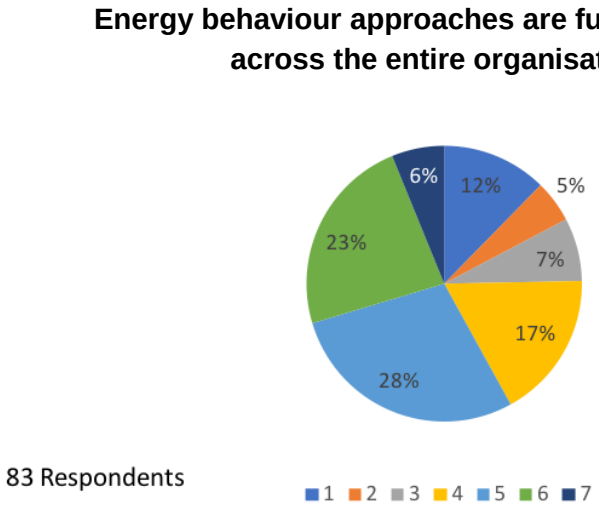


Canadian Coalition for Green Health Care, 2019

Figure 44: Participant energy behaviour implementation

14.2.3 Energy Behaviour Integration at Facility

GHS participants stated how they viewed integration of energy behaviour within their particular site. Similar to previous rating systems, participants rated the integration of EB across their entire organisation. *Figure 41* below illustrates that majority of the participants fall in the four, five and six rating range, with fewer participants being rated at one, two, three and seven. However, this shows that 24% of the participants still have a low score and need improvement in this area.



Canadian Coalition for Green Health Care, 2019

Figure 45: Integration of energy behaviour principles across the organisation: self-ranking within 2019 GHS participating sites

14.2.4 Energy Behaviour Award

This was the second year for the Ontario Green Health Care Energy Behaviour Award, sponsored by Save on Energy. Winning hospitals were selected by analyzing the responses to the survey questions, which included hospital engagement and knowledge around energy behaviour. University Health Network in Toronto was the inaugural winner through their advanced knowledge and integration of energy behaviour into their facility. Two hospitals shared Honourable Mention: St. Joseph's Healthcare London, and London Health Sciences Centre.

A noteworthy fact is that all three hospital sites are high energy performers as well (Section 5). Furthermore, the same group of three hospitals were the top performers in energy behaviour in the previous year, albeit with slightly different rankings. This year, University Health Network also won the overall highest score and the leadership award for the Academic Hospital category. For more information on these programs, visit the CCGHC's Energy Behaviour website https://greenhealthcare.ca/energy-behaviour/.

15. Conclusion

Over the past seven years, the Canadian Coalition for Green Health Care has been a part of generating a total of 657 individualized scorecards for hospitals. In addition to the scorecards, hospitals have been celebrated during the Green Health Care Awards, and have helped outline current trends within health care and sustainability. Furthermore, the latest GHS saw two new award categories that provided recognition to hospitals: Leadership and Pollution Prevention.

The 2019 GHS showed the total energy use across all participants (83 hospitals) to be 13,293,297 GJ. While the total average energy use intensity (EUI) across all hospitals was calculated to be 2.8 GJ/m^2/year. Hospitals used a total of 8,543,242 cubic metres of water during the 2018 calendar year, while participants had an average water use intensity (WUI) of 1.84 m^3/m^2/year. In terms of waste, hospitals generated a total of 101,898 metric tonnes (MT) of waste, of which, 39,946 MT of recyclables and other forms of non-disposable waste were diverted from landfill. Participants diverted around 39% of waste from landfill and an average waste intensity of 3.15 MT/bed.

Hospitals are consistently increasing their green initiatives in the following areas: preferable purchasing, toxins management, sustainable construction/ renovation, energy conservation, water conservation and waste management policies, targets and action plans. The latest GHS saw the introduction of a new category called anaesthetic gases, which has helped us get started on building a picture of the anaesthetic gas usage in the Canadian health sector.

From the Canadian Coalition for Green Health Care, we invite you to get involved and continue greening Canada’s health care system. Through seven years of providing this free resource to hospitals, the GHS acts as a key tool to supporting the transition towards environmental sustainability in the health care sector.

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