GREEN HOSPITAL SCORECARD

Final Project Report

May 31, 2017

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

http://greenhealthcare.ca

GREEN HOSPITAL SCORECARD

Final Project Report

Executive Summary

The Green Hospital Scorecard (GHS) Final Project Report is a public report profiling the 2016 GHS program, which reports on hospital data in the environmental sphere for the 2015 calendar year. The purpose of this report is to provide a sector-wide view of participating hospitals' environmental performance. It comprises a general introduction and profile of the current cohort, five sector reports based on the five sections of the GHS survey (Energy, Water, Waste, Pollution Prevention, and Corporate Leadership, Commitment, and Management), case study highlights, and de-identified information on environmental initiatives from program participants.

For clarification, the GHS uses the following conventions when referring to different years of the program:

2017 GHS Program: will report on data for the 2016 calendar year.
2016 GHS Program: reports on data for the 2015 calendar year.
2015 GHS Program: reports on data for the 2014 calendar year.
2014 GHS Program: reports on data for the 2013 calendar year.
2013 GHS Program: reports on data for the 2012 calendar year

This document is available for download at http://greenhealthcare.ca/ghs

2016 GHS Program funding support provided by the Ontario Ministry of Energy.

About the Canadian Coalition for Green Health Care

The Canadian Coalition for Green Health Care is Canada's premier integrated green health care resource network; a national voice and catalyst for environmental change. We are an alliance of committed Canadian health service organizations, associations and environmentally focused business associates that promotes the adoption of environmentally friendly and sustainable health care service delivery to complement the compassionate delivery of health care. We are a nationally incorporated not-for-profit organization.

Find out more at http://greenhealthcare.ca

Suggested citation for this document:

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List of Abreviations

CAHO: Council of Academic Hospitals of Ontario

CCC: Complex Continuing Care

CCGHC: The Canadian Coalition for Green Health Care

CO_2: Carbon dioxide

CO_2e: Carbon dioxide equivalents

ESCO: Energy Service Company

EUI: Energy Use Intensity

GHG: Greenhouse Gas

GHS: Green Hospital Scorecard

GJ: Gigajoules (one billion Joules, or 1 x 10^9 Joules)

KPI: Key Performance Indicator

LEED: Leadership in Energy and Environmenal Design

NHS: National Health Service

O_3: Ozone

OHA: Ontario Hospital Association

RFP: Request for Proposal

SAO: Stabilized aqueous ozone

The Coalition: The Canadian Coalition for Green Health Care

VOC: Volatile organic compounds

WUI: Water Use Intensity

*Throughout this report, the term “tonnes” refers to metric tonnes. 1 metric tonne = 1,000 kilograms.

Introduction

The Green Hospital Scorecard (GHS) is a benchmarking and recognition tool measuring hospitals' energy conservation, water conservation, waste management and recycling, corporate commitment and pollution prevention. Participating hospitals report on their environmental and sustainability initiatives through the online GHS survey and receive a Scorecard summarizing their environmental performance relative to their peers.

2016 marked the fourth year of the GHS program. In 2013, the Ontario Hospital Association (OHA) developed and administered the GHS through the Green Hospital Champion Fund and supportive funding from the Ministry of Consumer and Government Services. That program ended in early 2016, and after an internal review the OHA decided to seek an appropriate organization to assume ongoing operation of the GHS. The Canadian Coalition for Green Health Care (the Coalition) has been a historic collaborator with the OHA on the development of the GHS since its inception, on the OHA's Green Health Care Awards for the past 15 years, and has a long history of effectively promoting environmental sustainability in health care, making it a logical choice to carry forward the delivery of the GHS. With funding support from the Ministry of Energy, the Coalition was able to take over the 2016 program.

The main purpose of the GHS is to provide a vehicle for standardized, sector-specific environmental benchmarking and to connect hospitals with environmental information that will assist them in achieving improvements resulting in environmental and economic benefits such as reduced greenhouse gas emissions and improved energy and water efficiency. The program allows for enhancement of existing benchmark data, refinement of collection methodologies and the creation of meaningful reporting data to inform the sector, hospitals' executives and future conservation programming. The intent of the Scorecard is to raise the hospital organization's awareness, motivate change, and incite improvements in the environmental sphere by recognizing each participating hospital's achievements.

The Green Hospital Scorecard:

- Provides a high-level snapshot of the organization's environmental performance against a backdrop of de-identified peer data.
- Helps identify potential areas for improvements to environmental performance and operational efficiency
- Informs target-setting
- Offers the opportunity to be individually recognized through annual Gold, Silver and Bronze level achievements.
- Encourages excellence in environmental performance by honouring select participating organizations with annual Green Health Awards.

This report provides a sector-wide view of hospitals' environmental performance and includes five sector reports based on the five sections of the GHS survey: Energy, Water, Waste, Pollution Prevention, and Corporate Leadership, Commitment, and Management. GHS data from the first three years of the program has been included in some figures to provide context for the present cohort's data.

2016 GHS Top Performers

The 2016 GHS Program recognizes the following top five performers in each category:

Highest Overall Scores

- **St Michael's Hospital Main Building (Winner)**
- Michael Garron (Toronto East General)
- Northumberland Hills Hospital
- Chatham Kent Health Alliance
- Religious Hospitallers of St. Joseph of the Hotel Dieu of St. Catharines

Highest Energy Scorers

- **Niagara Health – Port Colborne Site (Winner)**
- Michael Garron Hospital
- SickKids
- South Muskoka Memorial Hospital
- Hamilton Health Sciences - Hamilton General Hospital

Highest Water Scorers

- **Geraldton District Hospital (Winner)**
- St Michael's Hospital Main Building
- Northumberland Hills Hospital
- Religious Hospitallers of St. Joseph of the Hotel Dieu of St. Catharines
- Holland Bloorview Kids Rehabilitation Hospital

Highest Waste Scorers

- **South Muskoka Memorial Hospital (Winner)**
- Trillium Health Partners - Queensway Health Centre
- Northumberland Hills Hospital
- Woodstock General Hospital
- SickKids

Sample Seals from the 2016 GHS Program:

GHS 2016 Program Details

This year, the Canadian Coalition for Green Health Care asked multi-site Ontario health care organizations, if possible, to submit separate surveys for each individual hospital site to help isolate strong performers and better identify areas for improvement.

Overall, 91 Ontario hospital sites submitted data to the GHS program from 55 unique health care organizations. The 91 program participants are broken down in the charts below.

Figure 1 shows the number of new versus returning participants. Figure 2 shows the number of participants by peer group, while Figure 3 shows the number of participants by number of beds. Figure 4 depicts the number of participating hospitals by peer group over the four years of GHS program delivery.

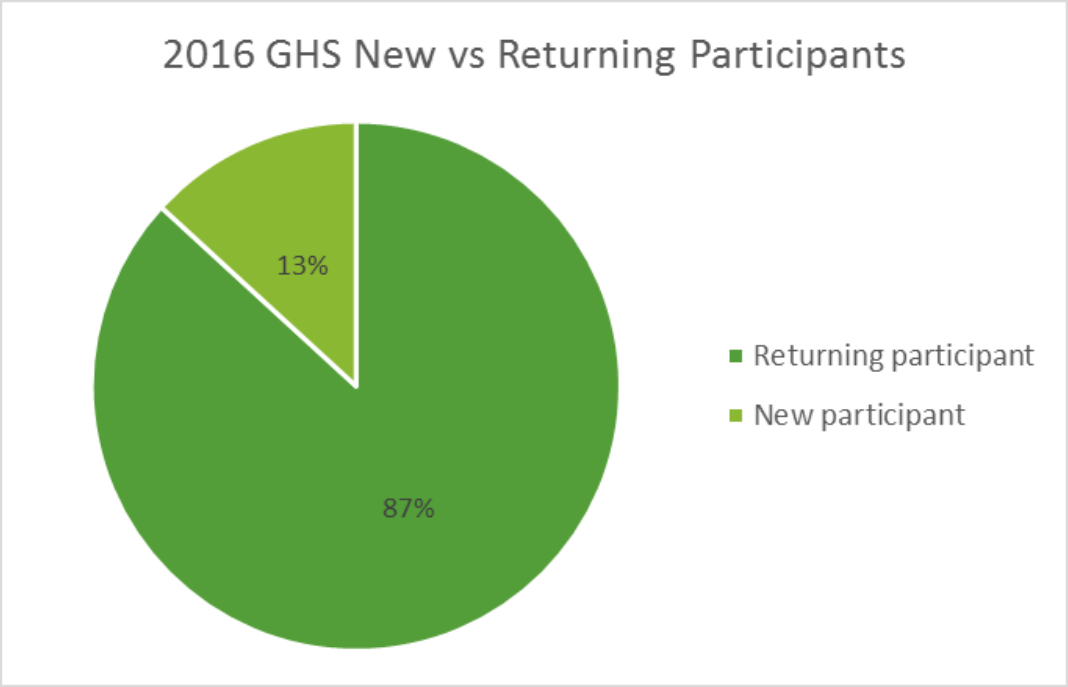

FIGURE 1. 2016 GHS NEW VS RETURNING PARTICIPANTS

Peer Groups

Each year, GHS participants are asked to self-identify with one of four peer groups:

- Academic Hospitals: All acute general and pediatric hospitals that are members of the Council of Academic Hospitals of Ontario (CAHO).
- Community Hospitals: Acute care hospitals that do not fit the definition of a small or academic (teaching) hospital.
- 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.
- 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.

Presently, the GHS program is open to all Ontario hospitals. The 2016 cohort contains academic, community, and small hospitals, as well as several non-acute hospitals including outpatient clinics, mental health facilities, and CCC. In the future, it is hoped that the program will be available to long-term care facilities and other medical institutions wishing to benchmark their environmental performance.

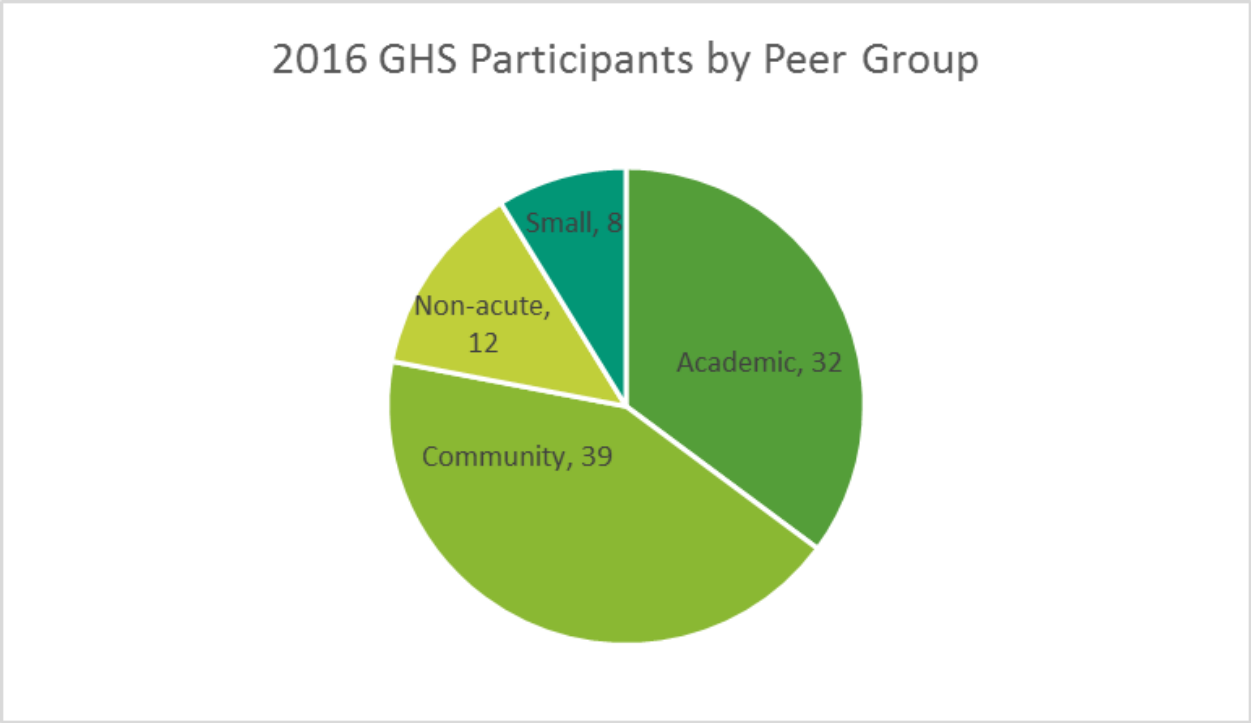

FIGURE 2. NUMBER OF 2016 GHS PARTICIPANTS BY PEER GROUP

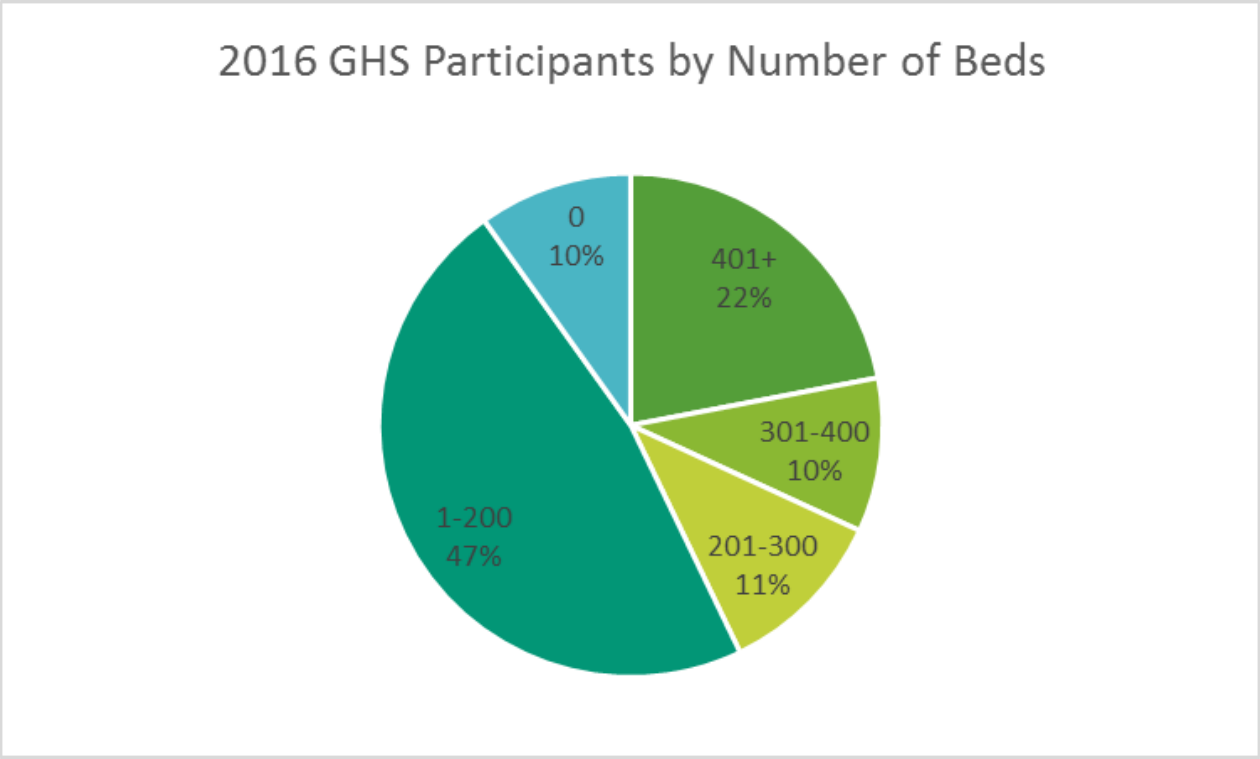

FIGURE 3. 2016 GHS PARTICIPANTS BY NUMBER OF BEDS

Note: A bed count of zero indicates an outpatient clinic.

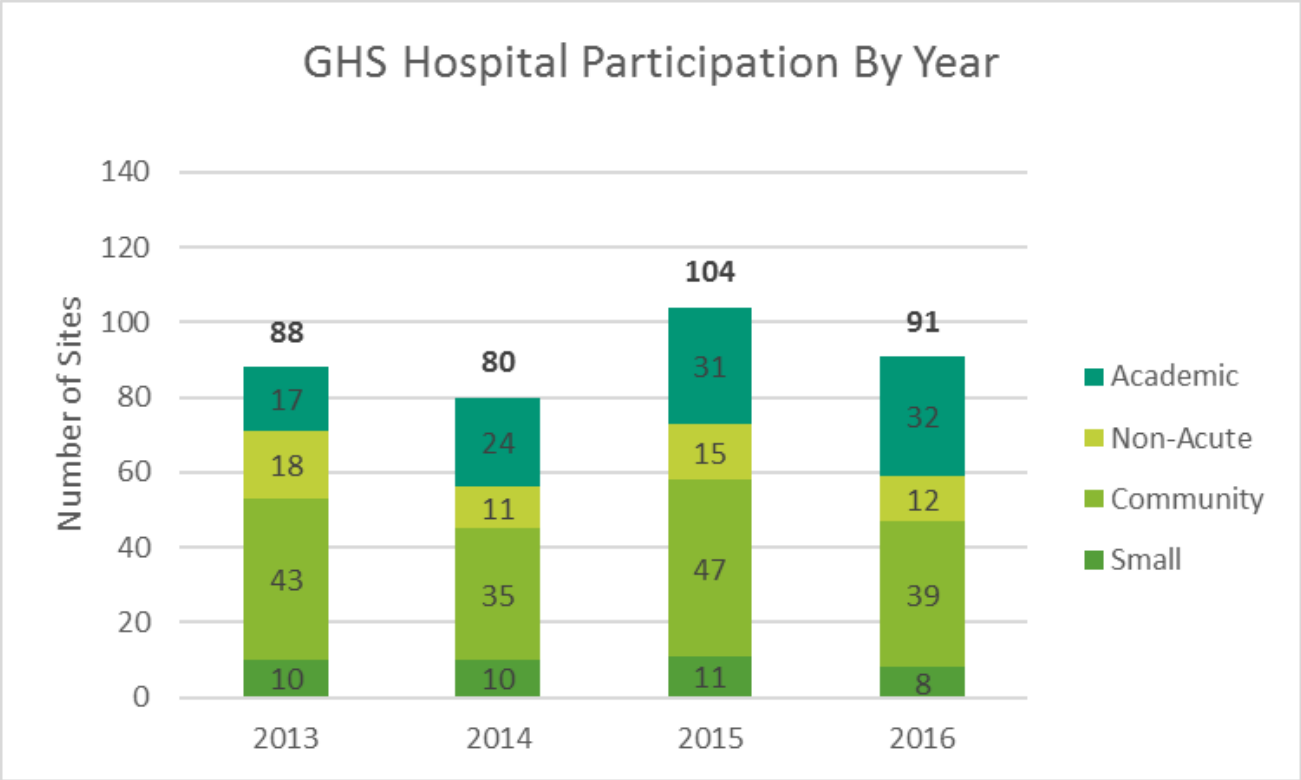

FIGURE 4. NUMBER OF PARTICIPATING HOSPITAL SITES BY YEAR AND PEER GROUP

Sector Summaries

GHS Sector Reports provide a sector-wide view of hospitals' environmental performance based on the five sections of the GHS survey: Energy, Water, Waste, Pollution Prevention, and Corporate Leadership, Planning, and Management. Sector data have been aggregated and are presented by year and peer group (Community, Non-Acute, Small and Academic), 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 organizations participating in the program differ slightly each year.

The Energy section summarizes participants' energy use and sources, and considers the greenhouse gas implication of participants' energy use; the Water section summarizes water use and management; the Waste section summarizes waste management activities; the Pollution Prevention section summarizes organizations' 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; the Corporate Leadership section summarizes measures that capture hospitals' corporate commitment to an environmentally sustainable culture and integration of green objectives into corporate planning and regular business.

This report is available for download at http://greenhealthcare.ca/ghs

Energy

Canada's greenhouse gas (GHG) emissions currently represent about 1.6% of the global total (Booth & Boudreault, 2016). Of that, 23% are emitted by Ontario (Environment and Climate Change Canada, 2014).

The health care industry in developed countries contributes significantly to global GHG emissions (Frost & Sullivan, 2011). For example, in 2012, England's National Health Service's (NHS) carbon footprint was 25 million tonnes of carbon dioxide equivalents (CO_2e), which is approximately 4% of the country's GHG emissions. Brazilian hospitals account for more than 10% of the country's total commercial energy consumption; American hospitals were recently found responsible for 8% of the country's total emissions; and in Australia, the health sector is responsible for 7% of carbon emissions from all buildings (Health Care Without Harm). Thus, the health care sector is an area of great potential as Canada takes action to meet its international GHG reduction commitments in the coming decades. By reducing hospitals' GHG emissions, the health care sector will be incorporating a more global vision of health and sustainability and reduce the increased risks of respiratory and cardiovascular problems and certain types of cancers that come with higher GHG levels (Environment Canada, 2013).

Figure 5 shows 2016 GHS participants' energy use by type. As the numbers for propane and fuel oil were a small fraction of types such as electricity and natural gas, a second graph in Figure 5B shows the same information with a logarithmic scale.

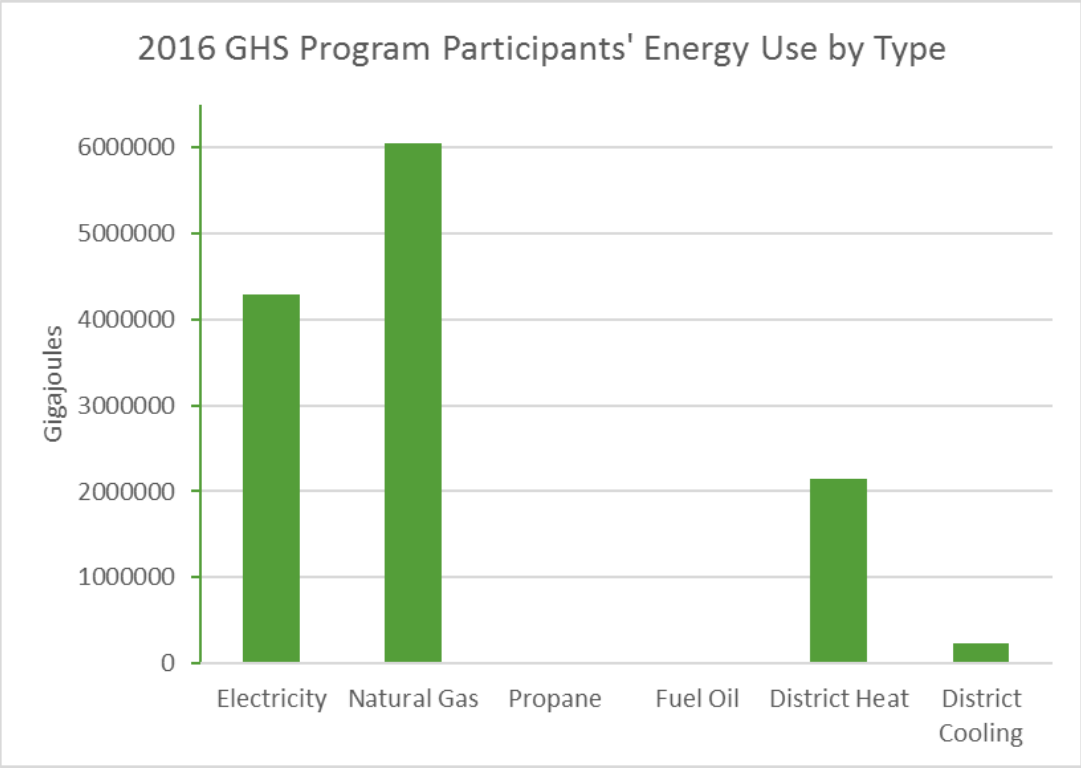

FIGURE 5. 2016 PROGRAM PARTICIPANTS' ENERGY USE BY TYPE

Note: Propane use was 419.6 GJ, and Fuel Oil was 21, 516.1 GJ. See figure 5B.

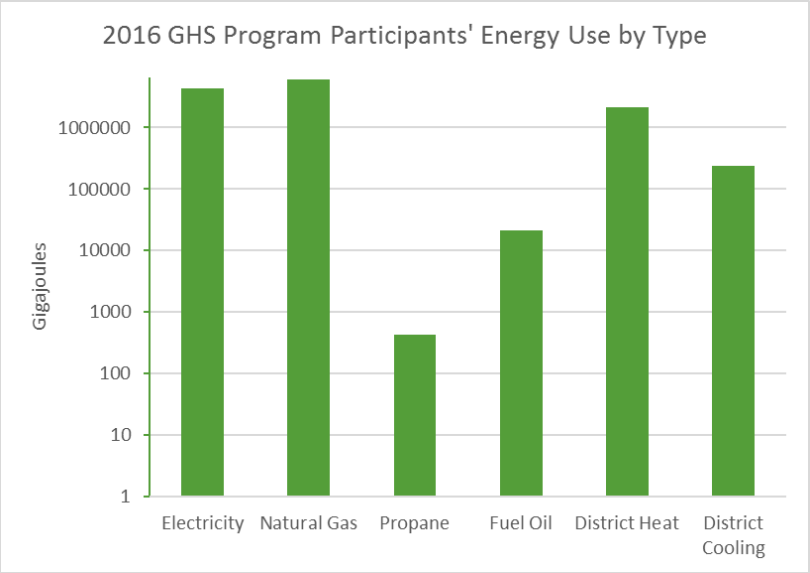

FIGURE 5B: 2016 PROGRAM PARTICIPANTS' ENERGY USE BY TYPE WITH LOGARITHMIC SCALE

The GHS GHG data, shown in Figure 5, indicate that the 2016 participants' building energy generated 2,471,662 tonnes CO_2e, which:

Is equivalent to
GHG emissions from 9 533 305 522 km driven by an average passenger vehicle[1].
Is sequestered by
2,339,685 acres of forests in one year[1].
Represents approximately
1.5% of Ontario's total greenhouse gas emissions[1].

TABLE 1. GHS PARTICIPANTS' ENERGY USE CO_2 EQUIVALENCIES

[1] Calculated using the EPA's Greenhouse Gas Equivalencies Calculator

Case Study

Many Ontario hospitals are recognizing the environmental and financial benefits of LED lighting retrofits. GHS case study *Lighting the Way Forward: Energy-Efficient Lighting Upgrades Save Money and Energy* profiles three Ontario health care providers that have completed different levels of energy-efficient lighting upgrades: Hamilton Health Sciences, Mackenzie Richmond Hill Hospital (Mackenzie Health) and St. Joseph's General Hospital Elliot Lake.

Case Study Highlights:

Since 2015, the parking garage lighting retrofit at Hamilton Health Sciences has converted 320 metal halide fixtures to 73 watt LED fixtures, resulting in an annual energy savings of 257,894 kWh, which is equivalent to reducing greenhouse gas emissions from driving a passenger vehicle 700,000 km!

After having an energy audit done by Healthcare Energy Leaders Ontario (HELO), St. Joseph's General Hospital at Elliot Lake received a cheque for more than $3000 from Hydro One, covering 50% of the audit costs.

Mackenzie Health has realized an annual energy savings of 1.6 million kWh,cut annual energy costs by $210,000, and saved 50% in hospital lighting operational costs. It is estimated that the energy savings over the life of the investment will exceed $1.1 million and the payback will be six years.

The full case study can be found at http://greenhealthcare.ca/LEDs.

Energy Use Intensity

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. Figure 6 illustrates the frequency distribution of EUI for GHS participants over four years, while Figure 7 shows 2016 participant EUI by peer group. Tables 2-5 capture participating hospitals' average scale factors including size (m^2), beds and peer group for each EUI range over the past four years.

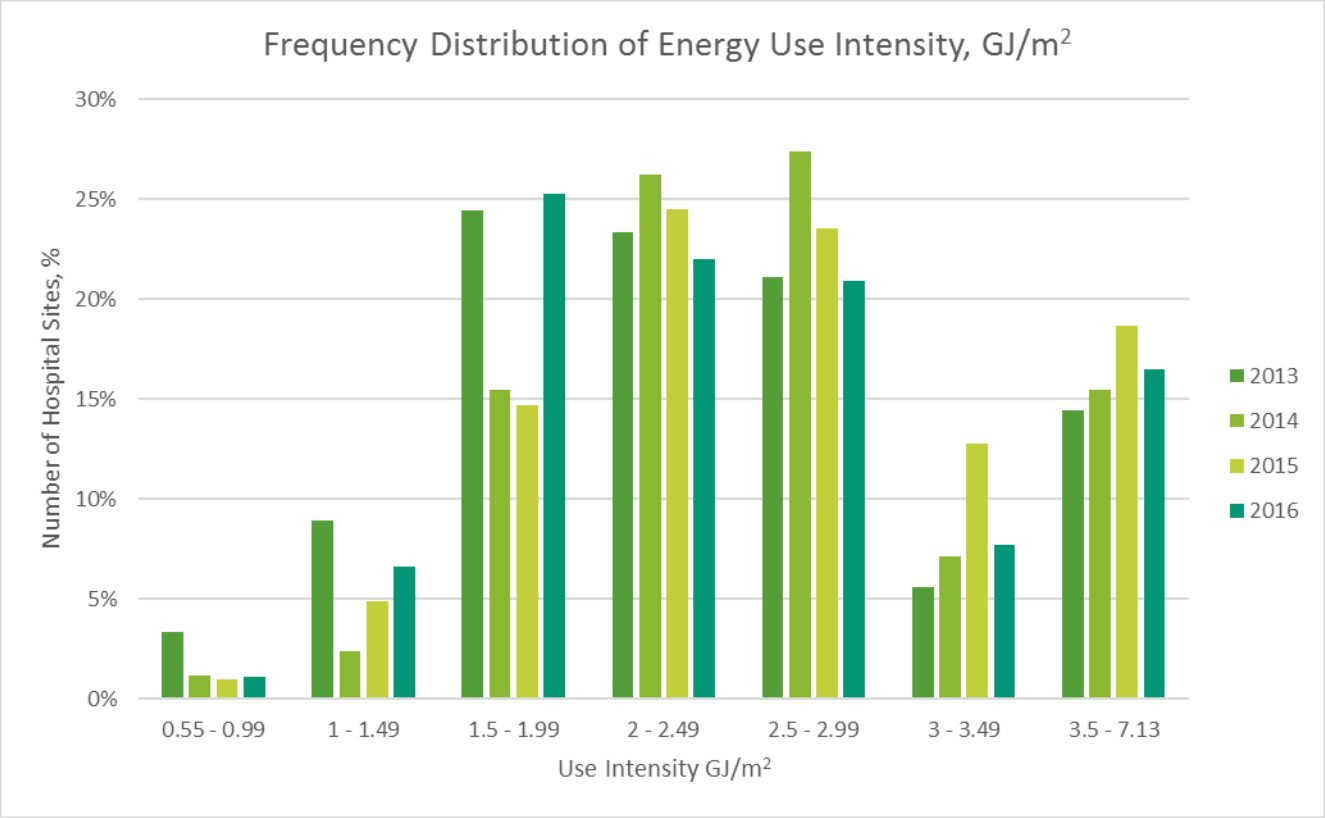

FIGURE 6. FREQUENCY DISTRIBUTION OF ENERGY USE INTENSITY

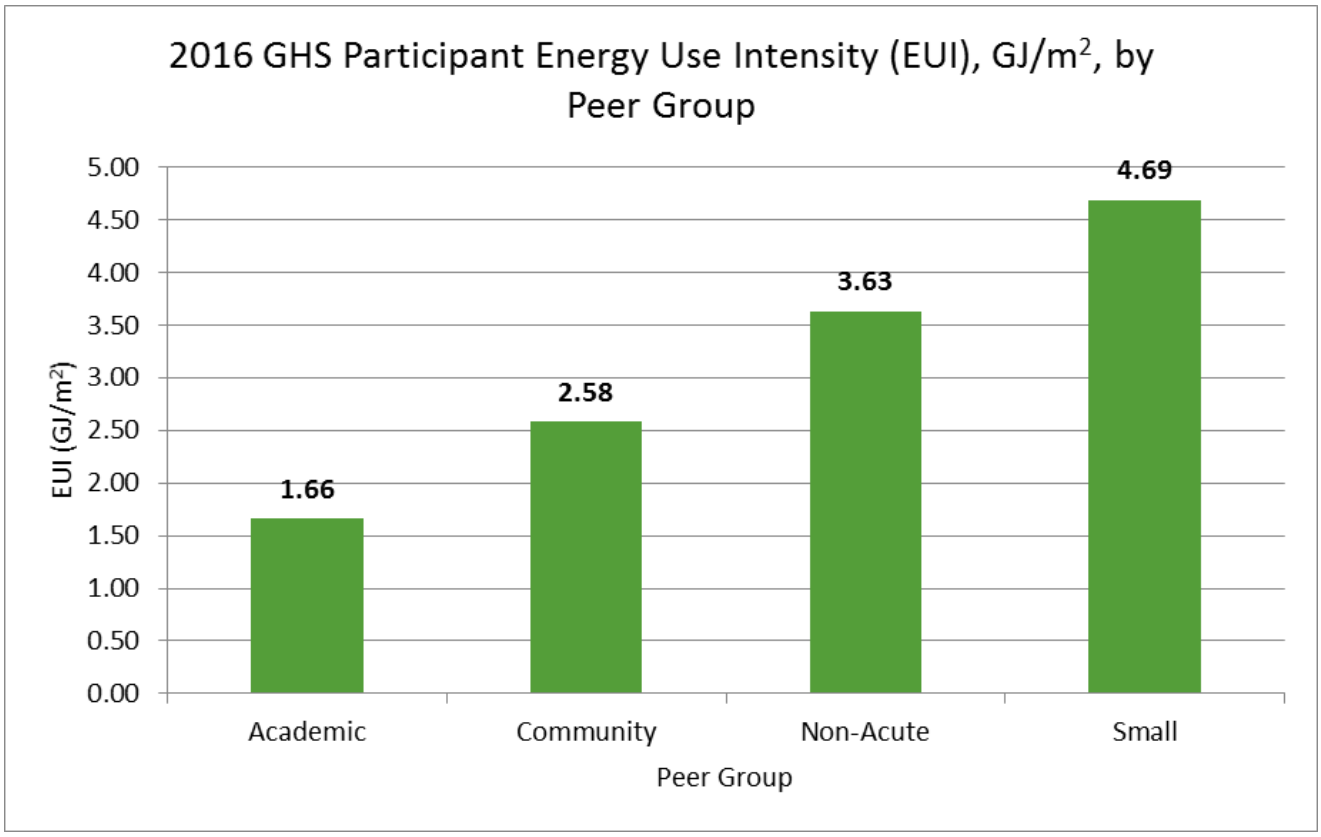

FIGURE 7. 2016 PARTICIPANT AVERAGE ENERGY USE INTENSITY BY PEER GROUP

EUI Range	No. of Hospital Sites	Average Beds	Average Area (m^2)	Peer group[1]
0.55 – 0.99	3	234	30,176	Community, Small, Academic
1 – 1.49	8	176	31,714	Community, Non-Acute, Small
1.5 – 1.99	22	224	47,521	Non-Acute, Community, Academic, Small
2 – 2.49	21	210	52,401	Community, Academic, Non-Acute, Small
2.5 – 2.99	19	340	72,720	Community, Academic, Small
3 – 3.49	5	274	48,798	Community, Academic
3.5 – 7.13	13	303	59,952	Community, Academic, Small

TABLE 2. GHS HOSPITALS' SCALE FACTORS BY ENERGY USE INTENSITY, 2013

[1] Peer groups are listed in order of occurrence within the range, from highest to lowest.

EUI Range	No. of Hospital Sites	Average Beds	Average Area (m^2)	Average Inpatient Days	Peer group[1]
0.55 – 0.99	1	0	8,409	0	Academic
1 – 1.49	2	19;665[2]	2,279 92,319[2]	4,430 238,026[2]	Small, Community
1.5 – 1.99	13	239	61,125	74,189	Non-Acute, Community, Academic, Small
2 – 2.49	22	215	52,191	63,546	Academic, Community, Non-Acute, Small
2.5 – 2.99	23	311	65,905	123,594	Community, Academic, Small
3 – 3.49	6	170	40,593	56,769	Community, Academic
3.5 – 7.13	13	229	37,675	80,366	Community, Academic, Small

TABLE 3. GHS HOSPITALS' SCALE FACTORS BY ENERGY USE INTENSITY, 2014

[1] Peer groups are listed in order of occurrence within the range, from highest to lowest.

[2] The actual number of beds, area, and number of inpatient days are listed in this row. There are only two hospital sites in this range.

EUI Range	No. of Hospital Sites	Average Beds	Average Area (m^2)	Inpatient Days	Peer group[1]
0.73 – 0.99	1	0	8,409	0	Academic
1 – 1.49	5	154	30,096	40,260	Community, Non-Acute, Small
1.5 – 1.99	15	149	34,661	49,003	Academic, Community, Non-Acute, Small
2 – 2.49	25	243	66,555	49,003	Non-Acute, Academic, Community
2.5 – 2.99	24	289	62,325	85,052	Community, Academic, Small
3 – 3.49	13	179	38,172	67,619	Community, Small, Academic
3.5 – 6.32	19	209	39,812	76,100	Community, Academic, Small

TABLE 4. GHS HOSPITALS' SCALE FACTORS BY ENERGY USE INTENSITY, 2015

[1] Peer groups are listed in order of occurrence within the range, from highest to lowest.

EUI Range	No. of Hospital Sites	Average Beds	Average Area (m^2)	Inpatient Days	Peer group[1]
0.86 – 0.99	1	0	11,581	0	Academic
1 – 1.49	6	64	16,332	15,421	Academic, Community, Non-Acute/ Small
1.5 – 1.99	23	163	39,508	47,279	Academic, Community, Non-Acute, Small
2 – 2.49	20	225	63,750	68,115	Academic, Community, Non-Acute, Small
2.5 – 2.99	19	292	66,816	99,125	Community, Academic, Non-Acute/Small
3 – 3.49	7	215	47,074	68,791	Community, Academic/Small
3.5 – 5.99	15	265	54,138	95,499	Community, Academic, Non-Acute/ Small

TABLE 5. GHS HOSPITALS' SCALE FACTORS BY ENERGY USE INTENSITY, 2016

[1] Peer groups are listed in order of occurrence within the range, from highest to lowest.

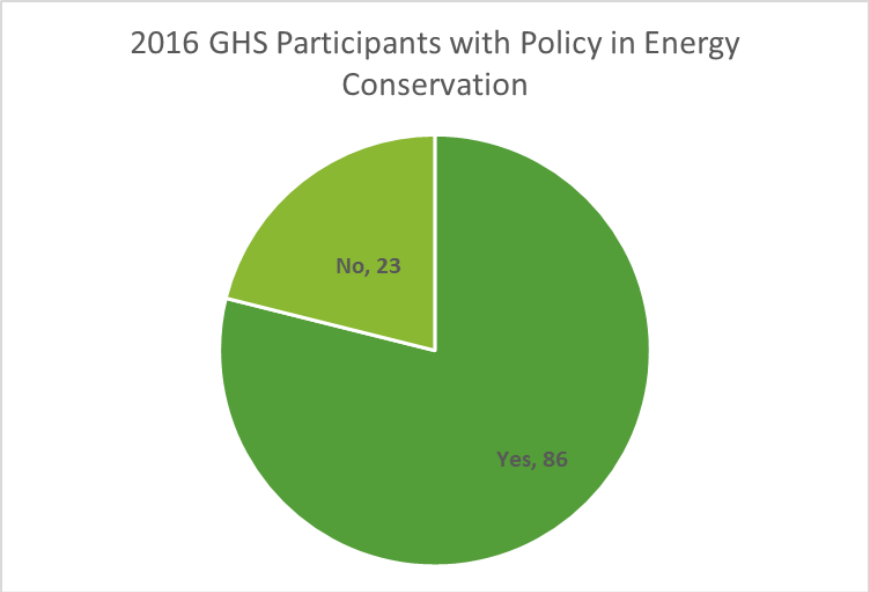

FIGURE 8. NUMBER OF 2016 PROGRAM PARTICIPANTS WITH ENERGY CONSERVATION POLICIES

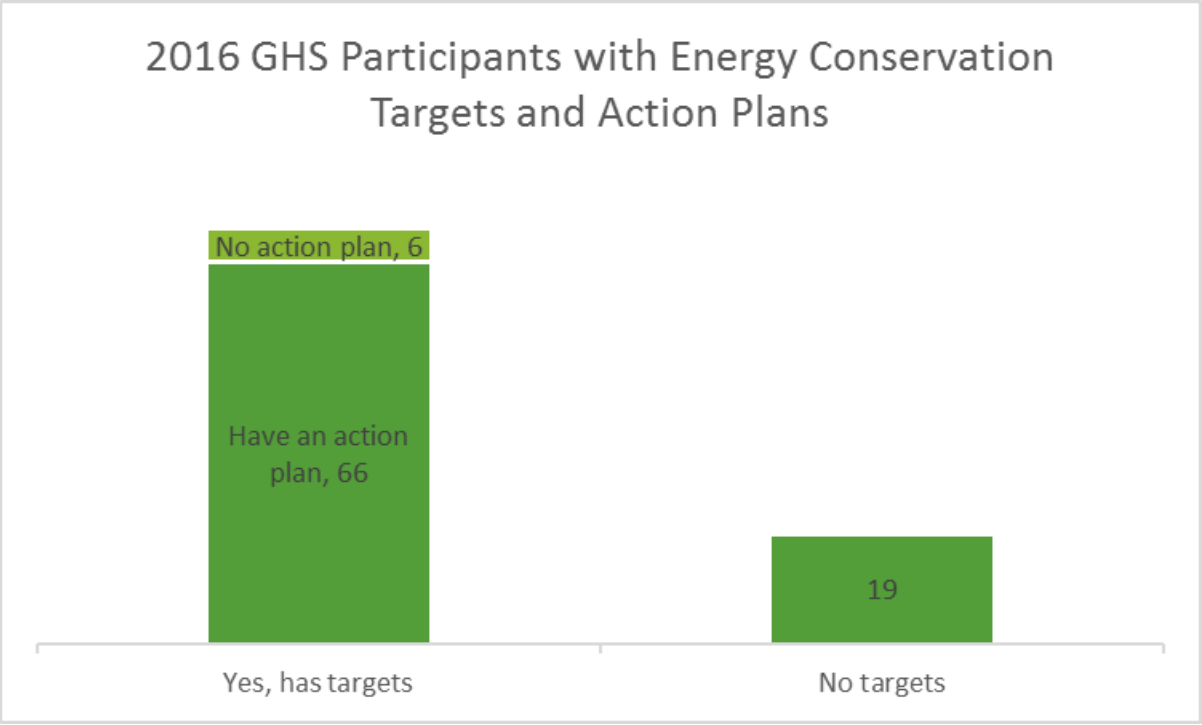

FIGURE 9. NUMBER OF 2016 PROGRAM PARTICIPANTS WITH ENERGY CONSERVATION TARGETS AND ACTION PLANS

Energy Conservation and GHG Reduction Initiatives

- Two hospitals report having rooftop solar arrays to either directly supply the hospital with power, or to sell back to local energy providers.
- Two sites report reclaiming waste anaesthetic gas.
- Several hospitals have undergone energy audits and installed LED retrofits. One hospital has undergone a 100% LED retrofit.
- One hospital received a 50% rebate on a recent energy audit done by the Coalition's Healthcare Energy Leaders Ontario (HELO) team.
- One hospital has implemented an ESCO energy project at three of its sites. At one site, the project resulted in overall electricity consumption savings of 960 MWh, electricity demand savings of 217.1 kW, natural gas consumption savings of 169,449 m^3, and water consumption savings of 10,897 m^3.
- Another hospital has implemented an energy project that has reduced carbon emissions by over 2,150 tonnes per year.

Water

2016 GHS participants used 8.7 million cubic metres of water in the 2015 calendar year. For every unit of water used, there is an energy requirement for moving, treating and heating water; thus, water conservation strategies directly improve environmental issues such as GHG emissions and water shortages, as well as economic issues such as expansion of water and wastewater infrastructures (Environment Canada, 2011).

Water Use Intensity (WUI) is expressed as the hospital's annual water use as a function of its size or other characteristics such as beds. Like EUI, WUI is a measure that is used to determine the building's water performance and is useful for benchmarking and setting targets.

Figure 10 illustrates the average annual water use of GHS participants by peer group. Figure 11 shows the frequency distribution of water use intensity of GHS participants over the last four years, and Figure 12 shows the average WUI of 2016 participants by peer group. Tables 6-9 capture participating hospitals' average scale factors including size (m^2), beds and peer group for each Water Use Intensity range from 2013-2016. Finally, Figures 13 and 14 show the number of 2016 participants with policy, targets, and action plans in water conservation.

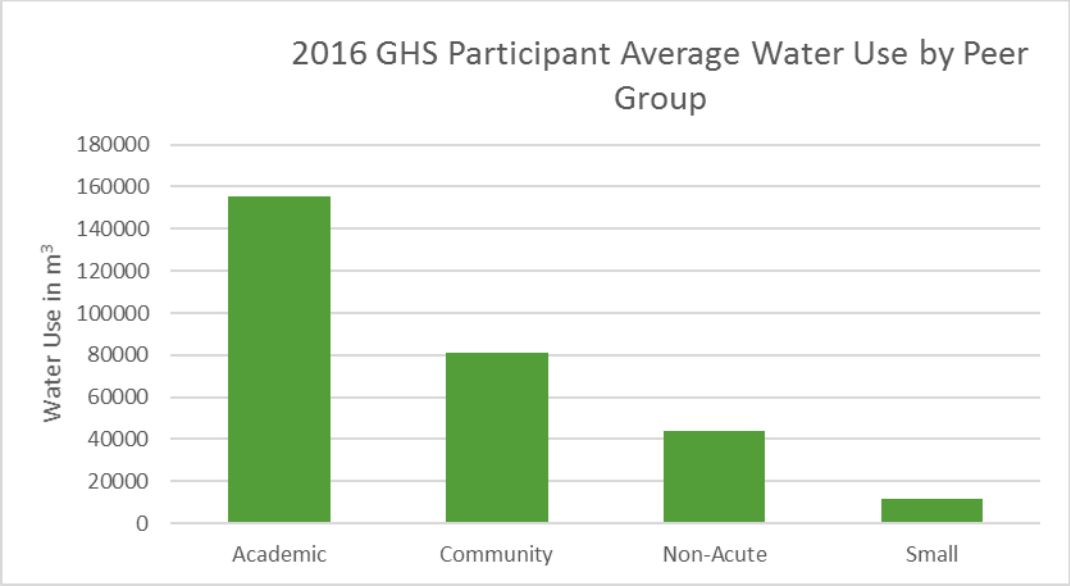

FIGURE 10. AVERAGE ANNUAL WATER USE BY PEER GROUP

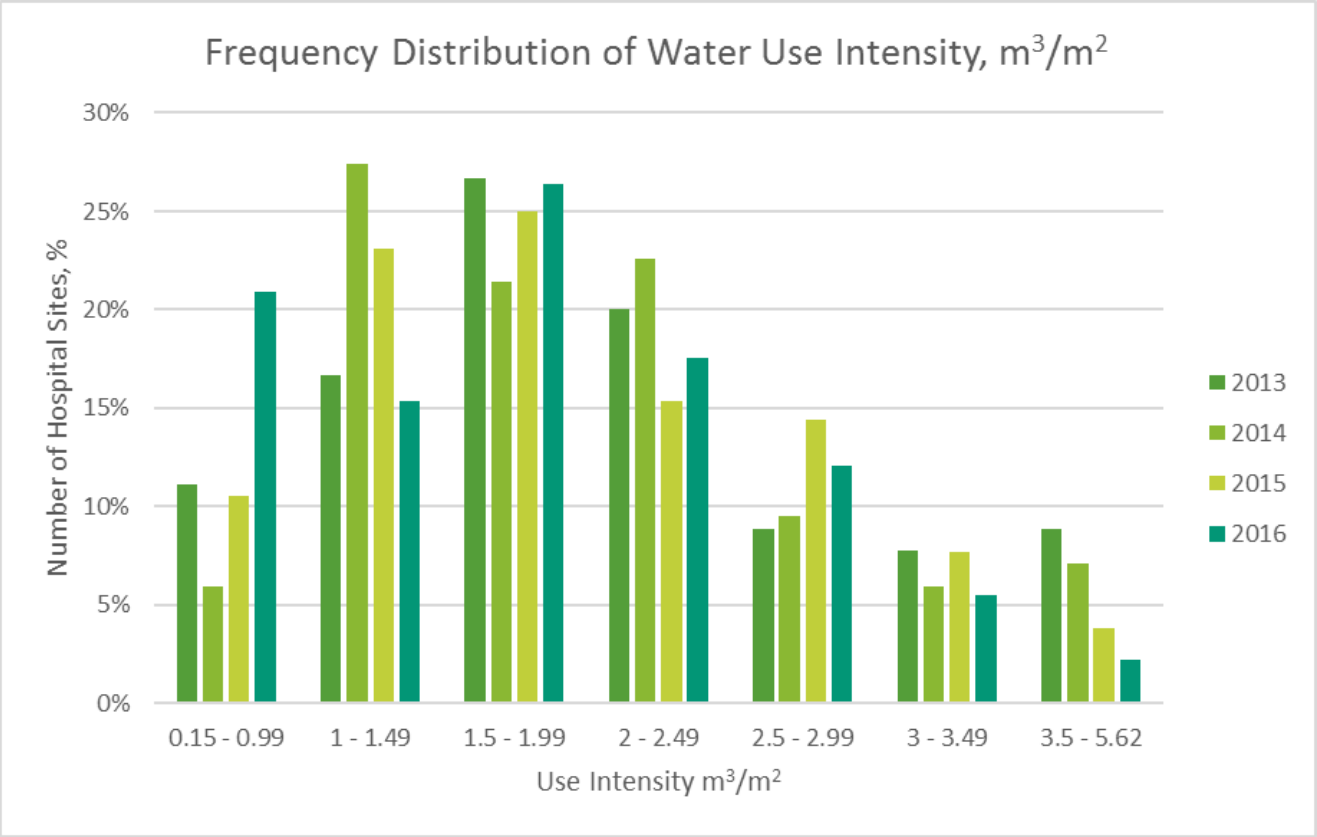

FIGURE 11. FREQUENCY DISTRIBUTION OF WATER USE INTENSITY

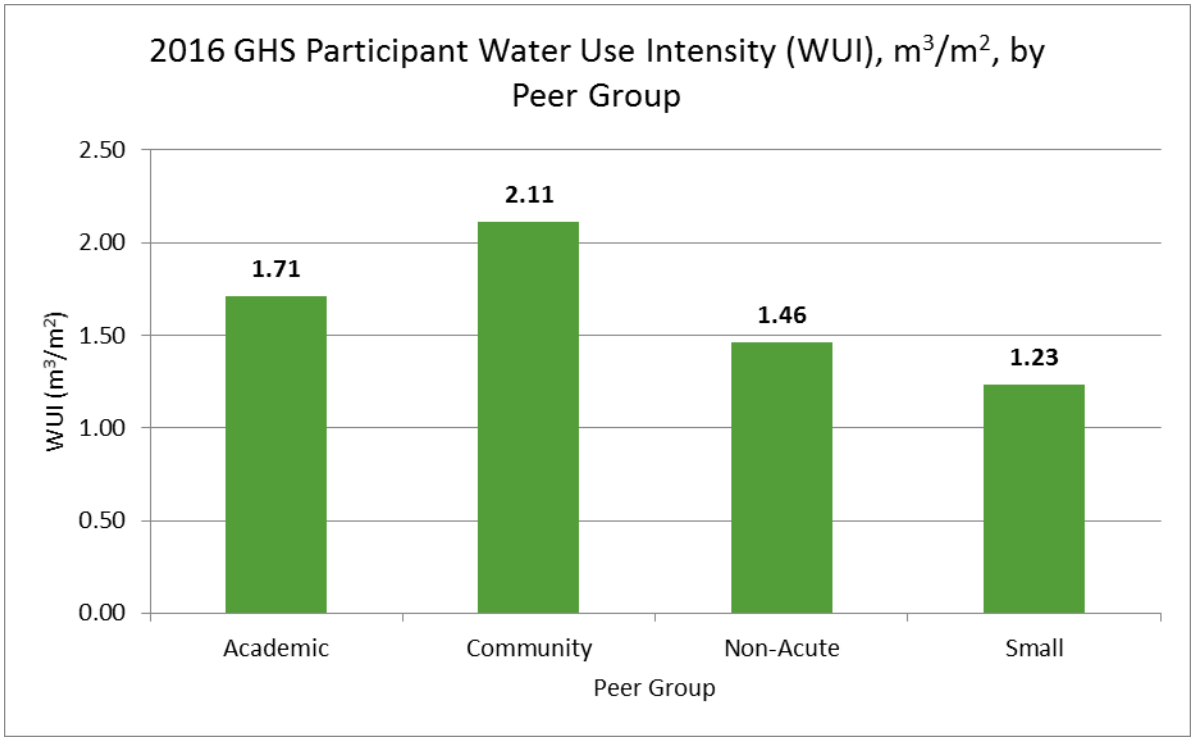

FIGURE 12. 2016 GHS PARTICIPANT AVERAGE WATER USE INTENSITY BY PEER GROUP

WUI Range	No. of Hospital Sites	Average Beds	Average Area (m^2)	Peer group[1]
0. – 0.99	10	166	38,232	Community, Small, Academic
1 – 1.49	15	230	54,354	Community, Non-Acute, Academic, Small
1.5 – 1.99	22	320	69,082	Academic, Community, Non-Acute, Small
2 – 2.49	19	252	48,478	Community, Small, Academic, Non-Acute
2.5 – 2.99	10	297	57,760	Community, Academic, Small
3 – 3.49	6	275	46,811	Community, Academic
3.5 – 5.62	8	243	37,403	Community, Non-Acute, Small

TABLE 6. GHS HOSPITALS' SCALE FACTORS BY WATER USE INTENSITY, 2013

[1] Peer groups are listed in order of occurrence within the range, from highest to lowest.

WUI Range	No. of Hospital Sites	Average Beds	Average Area (m^2)	Average Inpatient Days	Peer group[1]
0. – 0.99	7	195	42,616	57,632	Non-Acute, Academic, Community, Small
1 – 1.49	22	245	68,468	81,287	Academic, Community, Non-Acute, Small
1.5 – 1.99	16	227	40,079	68,822	Community, Small, Academic
2 – 2.49	15	303	70,405	135,101	Community, Academic, Non-Acute, Small
2.5 – 2.99	10	297	49,710	99,409	Academic, Community
3 – 3.49	4	258	43,597	97,246	Community
3.5 – 5.62	6	232	35,575	57,564	Community

TABLE 7. GHS HOSPITALS' SCALE FACTORS BY WATER USE INTENSITY, 2014

[1] Peer groups are listed in order of occurrence within the range, from highest to lowest.

WUI Range	No. of Hospital Sites	Average Beds	Average Area (m^2)	Average Inpatient Days	Peer group[1]
0.39 – 0.99	11	115	37166	37409	Academic/Non-Acute, Small
1 – 1.49	25	213	59913	71113	Academic, Community, Non-Acute/Small
1.5 – 1.99	26	218	47118	78596	Community, Academic/Non-Acute, Small
2 – 2.49	16	294	61003	92225	Community, Academic, Small, Non-Acute
2.5 – 2.99	15	232	42202	81877	Community, Academic, Non-Acute/Small
3 – 3.49	7	229	39537	83660	Community, Academic, Small
3.5 – 4.69	3	167	29215	56617	Community, Small

TABLE 8. GHS HOSPITALS' SCALE FACTORS BY WATER USE INTENSITY, 2015

[1] Peer groups are listed in order of occurrence within the range, from highest to lowest.

WUI Range	No. of Hospital Sites	Average Beds	Average Area (m^2)	Average Inpatient Days	Peer group[1]
0. – 0.99	19	83	28,846	24,451	Academic, Community/Non-Acute/Small
1 – 1.49	14	200	57,441	55,108	Academic/Community, Non-Acute, Small
1.5 – 1.99	24	282	70,807	92,849	Academic, Community/Non-Acute/Small
2 – 2.49	16	230	52,649	75,772	Community, Academic, Non-Acute/Small
2.5 – 2.99	11	326	52,007	111,761	Academic/Community, Non-Acute
3 – 3.49	5	197	32,764	70,768	Community
3.5 – 3.71	2	226;35[2]	73,284; 5,915[2]	70,913; 8,707[2]	Academic/Community

TABLE 9. GHS HOSPITALS' SCALE FACTORS BY WATER USE INTENSITY, 2016

[1] Peer groups are listed in order of occurrence within the range, from highest to lowest.
[2] The actual number of beds, area, and number of inpatient days are listed in this row. There are only two hospital sites in this range.

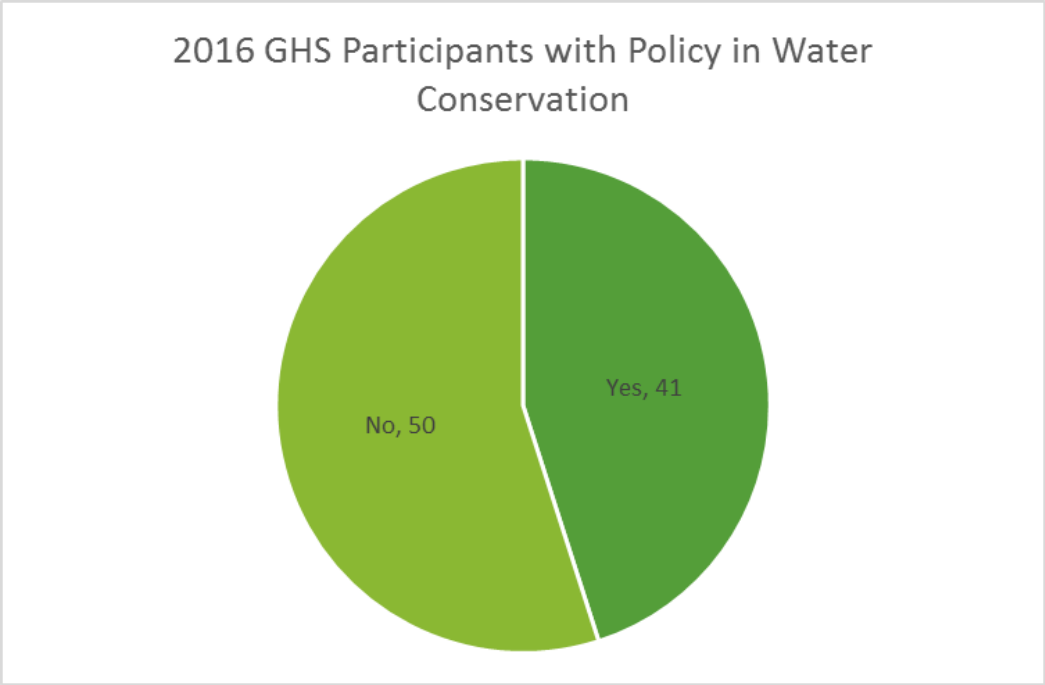

FIGURE 13. NUMBER OF 2016 GHS PARTICIPANTS WITH POLICY IN WATER CONSERVATION

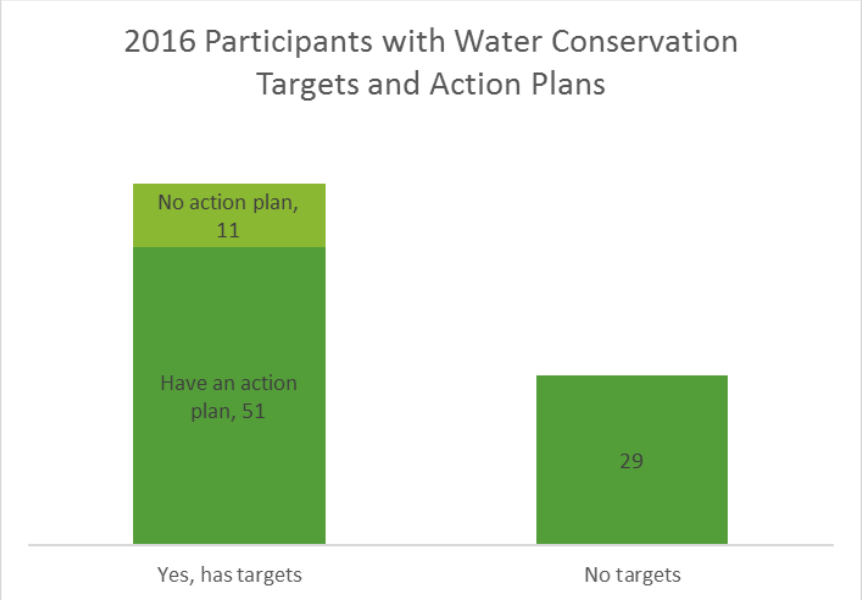

FIGURE 14. NUMBER OF 2016 GHS PARTICIPANTS WITH WATER CONSERVATION TARGETS AND ACTION PLANS

Case Study

For a quick and easy way to reduce paper waste at your facility, check out the GHS case study Cancelling Unused Magazine Subscriptions at Sunnybrook Health Sciences Centre at http://greenhealthcare.ca/magazines

Members of the palliative care consult team have been cancelling unwanted magazine subscriptions for three years, resulting in more than 90 cancelled subscriptions to their unit. This not only saves paper, it also reduces costs associated with waste hauling, resources associated with recycling, mail room delivery time, and saves doctors valuable time during working hours.

The case study is accompanied by a downloadable mini-toolkit for easy implementation at your facility.

Waste

In 2012, total waste disposal (solid, wastewater handling and waste incineration) in Canada contributed approximately 6% of Canada's greenhouse gas emissions (Environment Canada, 2014; Statistics Canada, 2012). According to Statistics Canada, the amount of waste that Ontario's non-residential sector disposed of into landfill in 2014 (which is the most recent year with published data from Statistics Canada) was 5,674,507 tonnes. Statistics Canada's non-residential sector disposed quantities consist of non-hazardous waste disposed of in public and private waste disposal facilities by industrial, commercial and institutions; table 10 has the disposed of quantities. Based on data from the 2016 GHS program, Ontario's hospital sector generated approximately 43,355 tonnes of general (non-hazardous) waste, 6,765 tonnes of biomedical waste, and diverted approximately 26,879 tonnes of waste from landfill[1].

Geography	Source for Waste Disposal	2014 waste (tonnes)
Canada	All sources of waste for disposal	25,103,034
	Non-residential sources of waste for disposal	15,136,259
Ontario	All sources of waste for disposal	9,165,299
	Non-residential sources of waste for disposal	5,674,507

TABLE 10. DISPOSAL OF WASTE, IN TONNES, BY SOURCE AND GEOGRAPHY

Collectively, 2016 GHS participants diverted more than

- 4,615 tonnes of blue bin recycling
- 4,232 tonnes of organic waste
- 4, 322 tonnes of cardboard
- 5,601 tonnes of shredded paper
- 246 tonnes of electronics
- 30 tonnes of light bulbs/ballasts, and tubes
- 419 tonnes of scrap metal
- 133 tonnes of scrap wood
- 43 tonnes of toner
- 59 tonnes of batteries

[1]26,879 tonnes of diverted waste consists of blue bin, green bin, cardboard, shredded paper, e-waste, batteries, lights, scrap metal, scrap wood, pallets and any diverted waste entered in the "other" category.

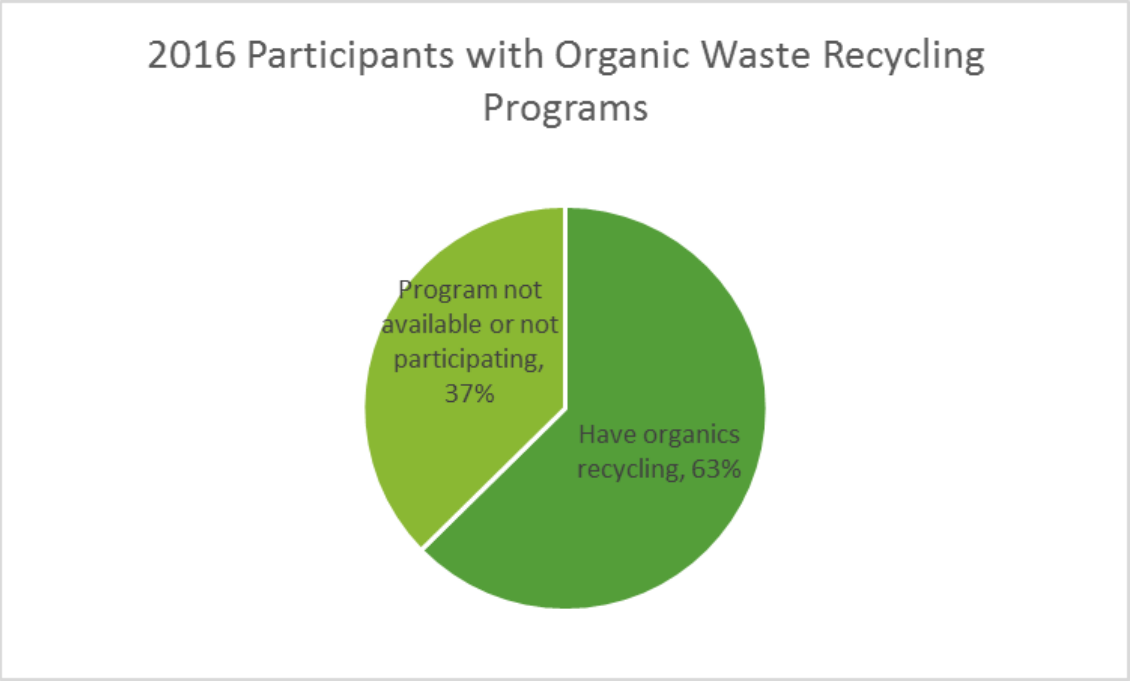

FIGURE 15. PERCENTAGE OF GHS PARTICIPANTS WITH GREEN BIN ORGANICS RECYCLING PROGRAMS

Other Waste diversion streams:

- Eight hospital participants are diverting kitchen grease waste. They collectively diverted 74.79 tonnes of kitchen grease.
- Eleven participants have a reusable sharps containers program, diverting 127.83 tonnes of plastic from landfills.
- Twenty-five participants are measuring diverted pharmaceutical waste, and diverted 50,700 kg of pharmaceutical waste from landfills.

Reducing Waste and GHG Emissions

Anaesthetic gas recovery at one hospital site has reclaimed a total of 132.98 CO_2e tonnes from 10 operating rooms.

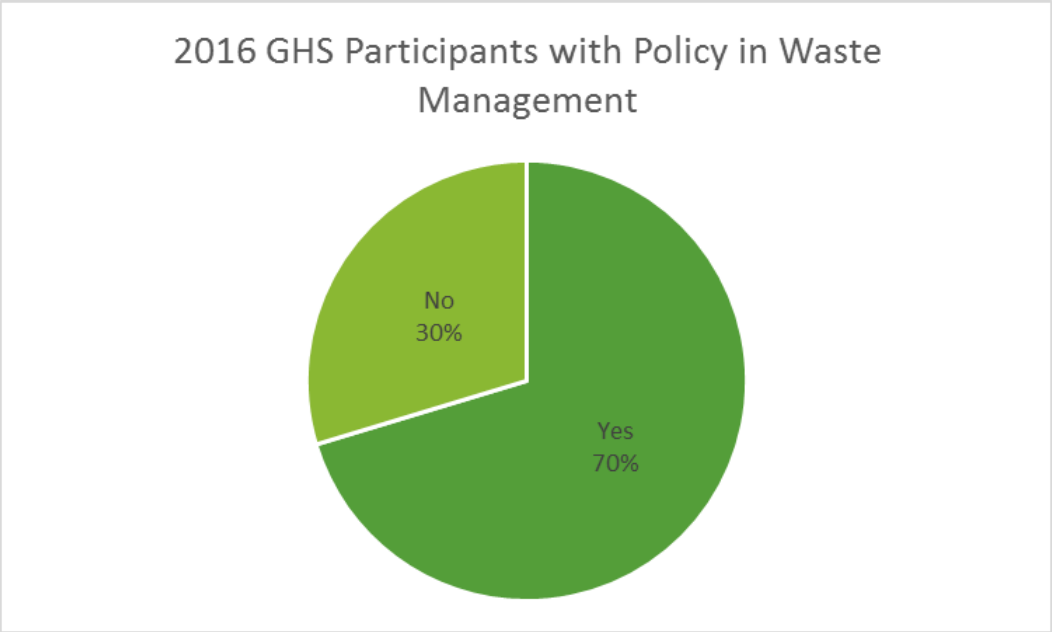

FIGURE 16. PERCENTAGE OF GHS PARTICIPANTS WITH WASTE MANAGEMENT

FIGURE 17. NUMBER OF GHS PARTICIPANTS WITH WASTE MANAGEMENT TARGETS AND ACTION PLANS

Other Waste Reduction Initiatives

- One hospital offers furniture, desks, and chairs to staff once they are out of service at the hospital. Another hospital offers staff reduced prices on decommissioned computers.
- Several hospitals are donating or selling used furniture locally or to developing countries.
- One hospital is using an EnviroPure System to digest all organic food waste from kitchens.
- One hospital reports collecting leaves from hospital grounds in the Spring and Fall, and transporting these to city drop-off locations for composting.
- One hospital has diverted an additional 2% of total waste by using reusable sharps containers and medication waste containers.
- Many hospitals are recovering silver from diagnostic imaging films and recycling diagnostic imaging lead and lead aprons.
- One hospital reports reusing metal drums and pails, as well as coolers and ice packs.
- One hospital has a partnership with a local linen company, which has a robust linen recycling program that prevents plastic surgical wraps making their way to the landfill.
- One hospital has an air filter recycling program that recycles old air filters through a recycling centre that removes metal content and cellulose material for recycling, resulting in 99% recycling rate.
- Through various recycling stream programs, one hospital diverted more than 120 tonnes of waste from landfill.

Pollution Prevention

Pollution Prevention is a concept that focuses on:

- Selecting less toxic and more environmentally preferred materials for use within the hospital.
- Considering the impacts of building construction on the environment and within the hospital.

Why measure Pollution Prevention?

Pollution Prevention aligns with the "Do no harm" philosophy in health care and recognizes that the health care system uses materials that are harmful to human health and the environment.

Pollution Prevention consists of:

- Environmentally preferable purchasing, which aims to reduce an organization'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.

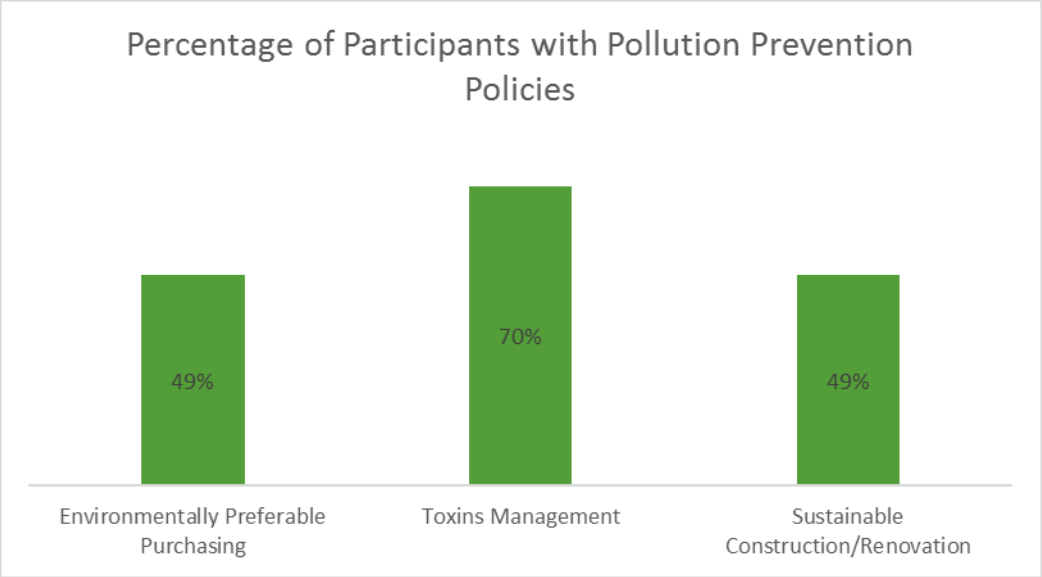

FIGURE 18. PERCENTAGE OF GHS PARTICIPANTS WITH POLICIES IN ENVIRONMENTALLY PREFERABLE PURCHASING, TOXINS MANAGEMENT, AND SUSTAINABLE CONSTRUCTION/RENOVATION

Green Procurement Checklist

One hospital asks all suppliers general questions pertaining to Environmental Issues, including:

- ❑ Any initiative taken by the supplier to minimize the amount and weight of packaging used for any goods supplied or used in providing the Services.
- ❑ Information on the ability to recycle any packaging and goods supplied or used in providing the services and other information on recycling. Goods that are recyclable include paper, cardboard, glass bottles, metal cans, #1 plastic, (polyethylene terphthalate), #2 plastic (high density polyethylene), hard #4 plastic (low density polyethylene) and #5 plastic (polypropylene).
- ❑ Information regarding any opportunity for the purchasers to return all or part of the goods and packaging used during the delivery of the services at no charge to the purchasers.
- ❑ A list of the "subject pollutants" listed under the applicable municipal sewer-use bylaw contained within the goods that the proponent will be using in delivering the services to the purchasers. This includes the quantity and type of hazardous materials contained in the goods if such information is not proprietary, and the federal material safety data sheets (MSDS) in accordance with the Workplace Hazardous Materials Information System (WHMIS).
- ❑ The overall environmental effect of any goods and packaging supplied in delivering the services, including, but not limited to:
    - (a) whether the goods or the services are certified under Canada's Environmental Choice Program, ENERGY STAR® program, or any other "eco-labelling" program;
    - (b) a list of materials which are used in any goods or packaging supplied or used during the delivery of the services, including recycled content;
    - (c) unit weights of any goods and packaging material supplied or used in the delivery of the services; and
    - (d) whether the proponent is ISO 14001 certified.
- ❑ Provision of a summary of the environmental initiatives undertaken by the proponent.

Spotlight on Green Products

One hospital has an extensive list of all products used by all sites, and uses a colour-coding system to grade products based on how environmentally friendly they are. If a product is third-party environmentally certified, it is green; if it is not certified but has no components of concern, it is yellow; if it has components of concern, it is marked as red. The goal is to switch from red to yellow and yellow to green for as many products as possible.

Case Study

For a green cleaning alternative that doesn't sacrifice quality, check out the GHS case study *A Cleaner Way to Clean,* which profiles the use of stabilized aqueous ozone (SAO) at North York General Hospital and Chatham-Kent Health Alliance.

SAO, also known as O_3, is created by passing electricity through water (H_20) and oxygen (O_2). A machine such as the Tersano SAO is required to do this (pictured below). O_3 readily gives up its third oxygen atom, oxidizing and killing microbes and breaking down dirt, grease, and other soils. SAO leaves only oxygen and water as by-products, which are harmless to the environment and safe to dispose of down the drain.

SAO can be used to clean carpet or tile floors, stainless steel (e.g. elevators, doors, autoclaves, fume hoods), glass, food preparation areas, and in hard-to-reach cracks where dirt builds up. NYGH says they have eliminated use of commercial floor cleaning chemicals by 90% since switching to SAO. Staff at CKHA have eliminated the use of glass cleaners and stainless steel spray, and reduced chemical costs by 35%.

To rea the full case study, visit http://greenhealthcare.ca/ozonatedwater

A wall-mounted Tersano SAO machine, which converts tap water into O_3.

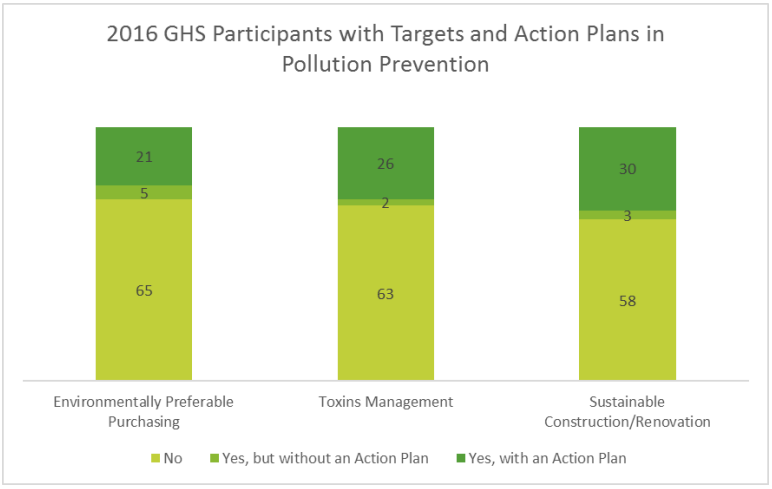

FIGURE 19. GHS PARTICIPANTS WITH TARGETS AND ACTION PLANS IN ENVIRONMENTALLY PREFERABLE PURCHASING, TOXINS MANAGEMENT, AND SUSTAINABLE CONSTRUCTION/RENOVATION

Other Pollution Prevention Initiatives:

- Some hospitals have eliminated the use of mercury thermometers.
- Two hospitals report using stabilized aqueous ozone (SAO, O_3) to clean floors, glass, and other non-high-touch surfaces.
- One hospital reports having an environmental impact section to all RFP initiatives, which includes consideration for environmental impacts and toxins reduction.
- One hospital reports recycling lead waste produced by moulds during radiation therapy.
- One hospital is working towards eliminating the use of ethylene glycol for the purposes of laying up the fans in the winter. They have currently eliminated approximately 50% of the ethylene glycol on-site by redesigning the air handling units to utilize air, rather than glycol, in the winter months to protect them from damage.

Corporate Leadership, Planning, and Management

Corporate Leadership, Planning and Management summarizes measures that capture an organization's commitment to an environmentally sustainable culture and integration of green objectives into corporate planning and regular business. It focuses on the following areas:

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

Overall Observations:

Of 91 participants:

- 62% have a corporately recognized environmental mandate or commitment.
- 71% have an executive champion accountable for the overall hospital environmental strategy.
- 34% have a full-time employee dedicated to environmental initiatives.
- 71% have a Green Team.

➢ 22% of participating hospitals have all four of the above corporate leadership items, 28% have 3/4, 24% have 2/4, 20% have 1/4, 6% have none.

Most participating hospitals offer staff engagement and outreach programming in one or more areas:

- 76% offer staff engagement in energy conservation and outreach programming.
- 54% offer staff engagement in water conservation and outreach programming.
- 86% offer staff engagement in waste management conservation and outreach programming.
- 70% are involved in Green events such as Earth Day.

Many participating hospitals provide a budget for staff engagement and outreach programming in one or more areas:

- 46% provide a budget for energy conservation staff engagement and outreach programming.
- 34% provide a budget for water conservation staff engagement and outreach programming.
- 45% provide a budget for waste management staff engagement and outreach programming.
- 56% provide a budget for Green events such as Earth Day.

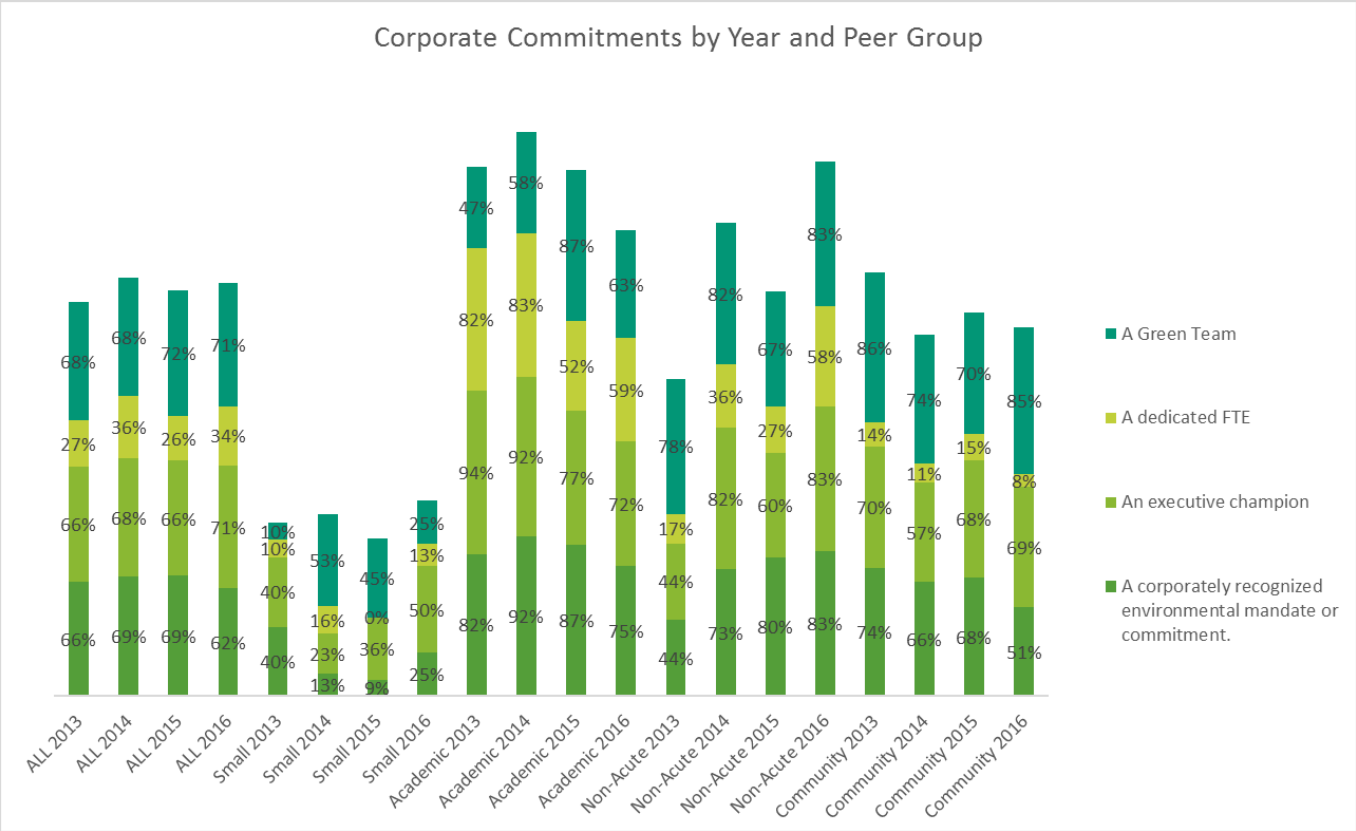

FIGURE 20. CORPORATE COMMITMENTS TO GREEN INITIATIVES BY YEAR AND PEER GROUP

Monitoring and Management

Utility Tracking measures hospitals' commitment to monitoring regular utility expenditures. Figure 21 shows how frequently participating hospital sites track and review their billing data: monthly, quarterly, biannually, annually, or not at all. 95% of 2016 participants are tracking their billing data monthly, 4% are tracking quarterly, and 1% track annually.

In addition, Tables 11 and 12 illustrate the relationship between utility use intensity and review frequency of utility billing data.

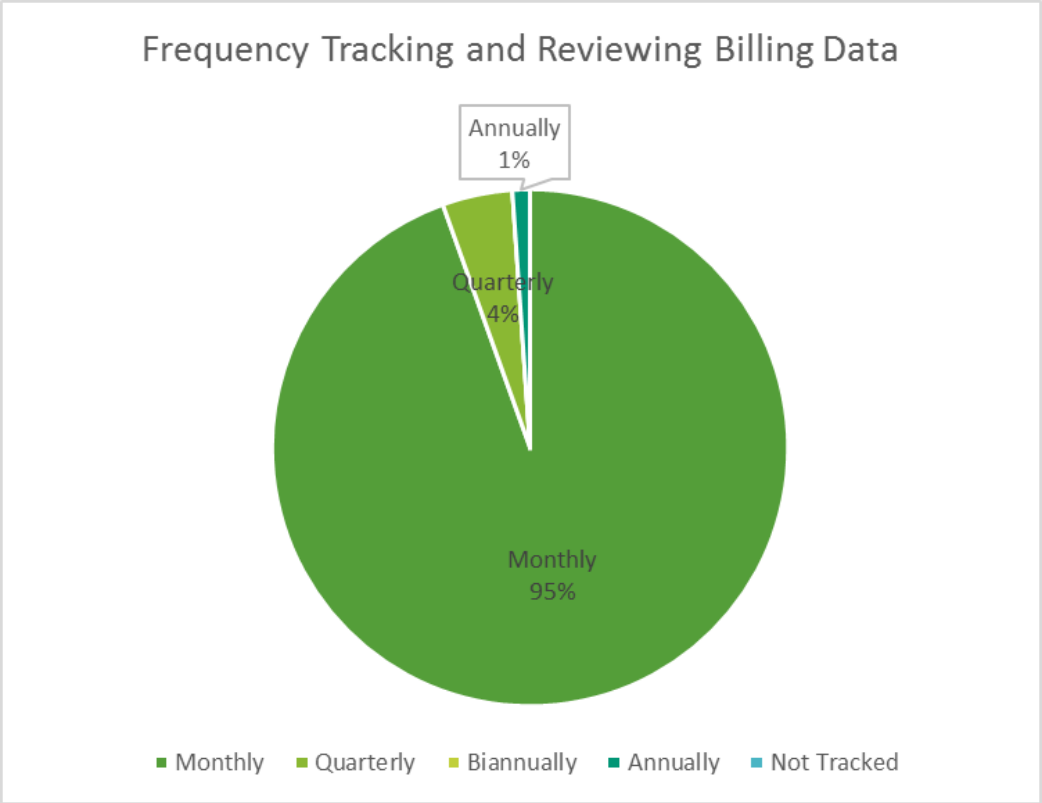

FIGURE 21. THE FREQUENCY WITH WHICH 2016 GHS PARTICIPANTS TRACK AND REVIEW BILLING DATA

The average utility use intensities, that is, energy and water use intensities, were determined for two types of review frequencies: monthly and quarterly or less. Responses for frequency of not tracked, annually, biannually and quarterly were low. To ensure that the average frequency was based on a sample size of at least five responses, these were grouped and averaged.

Frequency/year	2016
Monthly	2.58 GJ/m^2
Quarterly or less frequent	2.57 GJ/m^2

TABLE 11. ENERGY USE INTENSITY AND UTILITY BILL REVIEW FREQUENCY

GJ = gigajoule

m^2 = square metre

m^3 = cubic metre

Frequency/year	2016
Monthly	1.78 m^3/m^2
Quarterly or less frequent	2.30 m^3/m^2

TABLE 12. WATER USE INTENSITY AND UTILITY BILL REVIEW FREQUENCY

Other Corporate Environmental Initiatives

- One hospital reports providing secure bicycle storage on site and a Smart Commute Program for employees.
- Two participants are LEED Silver certified.
- One hospital reports Forbo Marmoleum (linoleum brand) flooring as a standard product used throughout the hospital, which is a bio-based tile floor made from 97% natural raw materials, 72% of which are renewable and will grow back within ten years.
- One hospital uses 100% biodegradable Benjamin Moore low/no volatile organic compound (VOC) paint as the standard paint throughout all sites.
- One hospital has several healing gardens, including one in the Breast Assessment Centre, and one near the ICU unit windows to provide comfort to patients, families, and staff.

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