



Greening Health Care Sector Report: Utility Conservation and Management

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Contents

Introduction	3
Managing Energy and Water Environmental Footprint	5
Energy Sources	7
Energy Use Intensity	9
Water Use Intensity	13
Resources	18

List of Figures

Figure 1: Number of Participating Hospital Sites by Year and Peer Group	4
Figure 2: GHS Hospitals Greenhouse Gas Emissions	6
Figure 3: GHS Hospitals Energy Use by Fuel Type	7
Figure 4: Frequency Distribution of GHS Energy Use Intensity	9
Figure 5: GHS Energy Use Intensity by Peer Group	11
Figure 6: Hospital Energy Use Intensity by Energy Performance Program	12
Figure 7: Frequency Distribution of GHS Water Use Intensity	14
Figure 8: GHS Water Use Intensity by Peer Group	15
Figure 9: Hospital Water Use Intensity (m ³ /m ²) by Water Performance Program	17
Figure 10: Hospital Water Use Intensity (m ³ /bed/day) by Water Performance Program	17

List of Tables

Table 1a: GHS Hospitals' Scale Factors by Energy Use Intensity, 2012	10
Table 1b: GHS Hospitals' Scale Factors by Energy Use Intensity, 2013	10
Table 2a: GHS Hospitals' Scale Factors with best Energy Use Intensity, 2012	11
Table 2b: GHS Hospitals' Scale Factors with best Energy Use Intensity, 2013	12
Table 3a: GHS Hospitals' Scale Factors by Water Use Intensity, 2012	14
Table 3b: GHS Hospitals' Scale Factors by Water Use Intensity, 2013	15
Table 4a: GHS Hospitals' Scale Factors with best Water Use Intensity, 2012	16
Table 4b: GHS Hospitals' Scale Factors with best Water Use Intensity, 2013	16

Introduction

The Green Hospital Scorecard (GHS) is a benchmarking and recognition program which aims to reflect hospitals' environmental performance as indicated by their operations, management, and policies. Hospitals that participate in the GHS program receive an individual GHS report, which is created using the data submitted through the GHS Survey. The individual report allows hospitals to benchmark their own year-over-year performance, as well as their performance relative to their peers.

To provide Ontario Hospital Association (OHA) members with a sector-wide view of hospitals' environmental performance, GHS data from the first two years of the program was aggregated into sector reports. These reports provide a de-identified summary of participating hospitals' environmental performance in the areas of leadership, planning and management, waste management, and utility conservation and management as defined within the GHS Survey.

The sector data have been aggregated and are presented by year and peer group (Community, Non-Acute, Small and Academic) for the hospital sites that participated in the GHS. Figure 1 shows the number of hospital sites that participated in the first (reporting year 2012) and second (reporting year 2013) year of the program.

The **Global Reporting Initiative** (GRI) reporting principles were utilized when determining the report's content. GRI is an organization that promotes the use of sustainability reporting as a way for organizations to become more sustainable. The guidelines recommend having at least two previous periods in addition to the current reporting year before reporting on trends. For this reason, this first report mainly summarizes the 2012 and 2013 participating hospital sites' energy and water performance measures. Continuing with the GHS program will enable the future monitoring of trends with respect to Ontario hospitals' environmental performance and their contribution to achieving environmental sustainability.

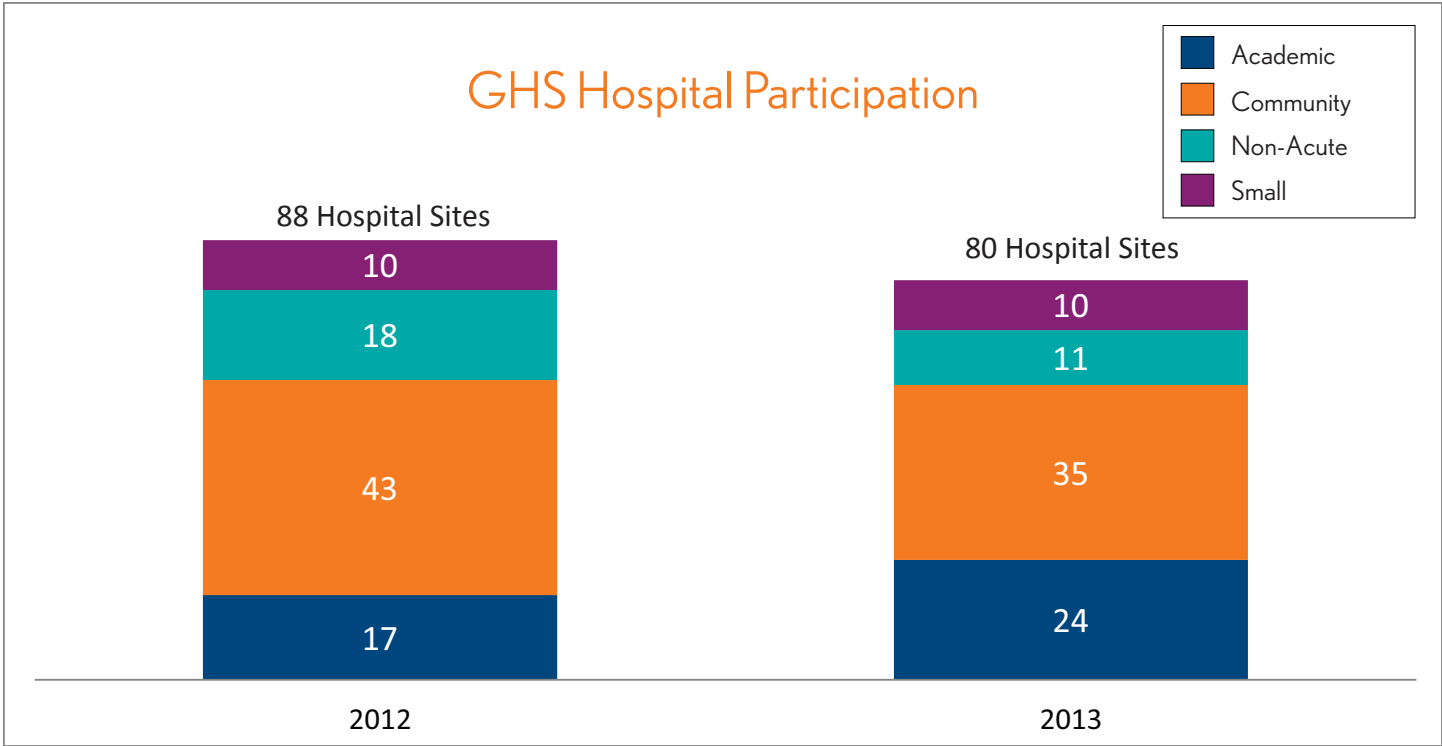
Sector Reports

The "Greening Health Care Sector Report: Utility Conservation and Management" is the third and final report in a series that provide a sector-wide view of hospitals' environmental performance. This third installment captures energy use and sources, and water management. It is based on questions in the Energy and Water sections of the survey.

The first sector report, "Greening Health Care Sector Report: Corporate Leadership, Planning and Management," is available for download at the [OHA Knowledge Centre](#). It summarizes measures that capture hospitals' corporate commitment to an environmentally sustainable culture and integration of green objectives into corporate planning and regular business. The report was based on questions in the Pollution Prevention and Corporate Leadership, Planning and Management sections of the GHS Survey.

The second report, "Greening Health Care Sector Report: Waste Management," summarized waste management activities and is also available for download at the [OHA Knowledge Centre](#). It was drawn from questions in the Waste section of the GHS Survey.

Figure 1: Number of Participating Hospital Sites by Year and Peer Group



Peer Group

- 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 stand-alone CCC or rehabilitation beds. They may or may not be members of CAHO.
- Small Hospitals – Provides less than 3,500 weighted cases, a referral population of less than 20,000, and is the only hospital in the community.

Managing Energy and Water Environmental Footprint

Health care facilities in developed countries have been estimated to contribute 3% to 8% to the climate change footprint (Frost & Sullivan, 2011). For example, in 2012, England's National Health Service's (NHS) carbon footprint was 25 million tonnes of carbon dioxide equivalents (MtCO₂e), which is approximately 4% of the country's greenhouse gas emissions (GHG). The NHS footprint is composed of procurement, building energy, travel and commissioning. (Department of Energy & Climate Change, 2014; Sustainable Development Unit, 2014).

The GHS GHG data, shown in Figure 2, indicate that the 2013 participants' building energy has generated 539,777 tonnes of carbon dioxide equivalent (CO₂e), which is:

Equivalent to ¹	Sequestered by ²	Represent approximately ³
113,636 passenger vehicles, each travelling 18,000 km in one year	442,435 acres of average forests in one year	0.3% of Ontario greenhouse gas emissions

In 2013, GHS participants, which represent about 40% of hospitals in Ontario, used approximately 0.8% of Ontario's electricity and 0.5% of the province's natural gas consumption.

As one of the most energy-intensive building sectors in Canada, hospitals' efforts to reduce energy use will have an impact on GHG emissions levels. 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).

In 2013, GHS participants used 16 million cubic metres of water which represents approximately 0.8% of Ontario's water consumption⁴. 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).

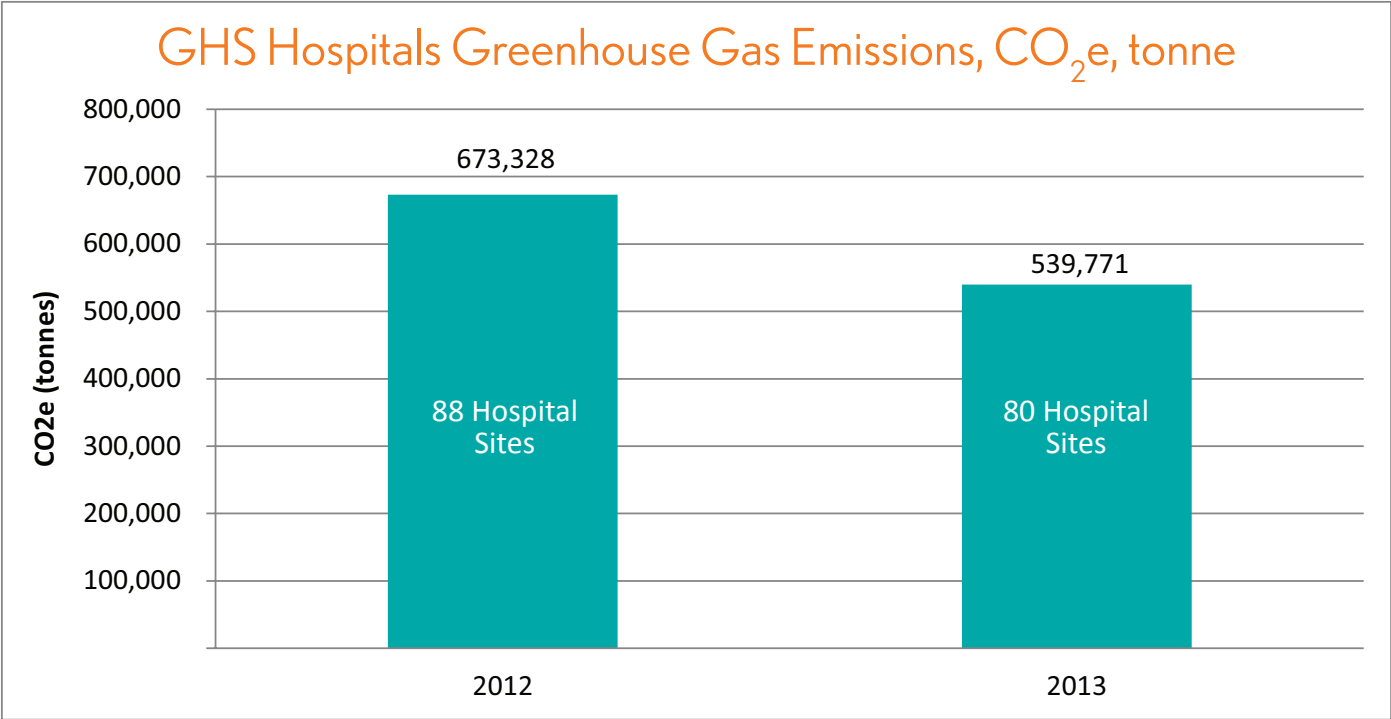
¹ 'Equivalent to' based on the US Environmental Protection Agency, Greenhouse Gas Equivalencies Calculator.

² 'Sequestered by' based on the US Environmental Protection Agency, Greenhouse Gas Equivalencies Calculator.

³ 'Represent approximately' based on the Environment Canada's 2012 Greenhouse Gas Emissions Data.

⁴ Ontario consumption is based on the Environment Canada's 2011 Municipal Water Use Report, Total Water Use per Capita.

Figure 2: GHS Hospitals Greenhouse Gas Emissions⁵

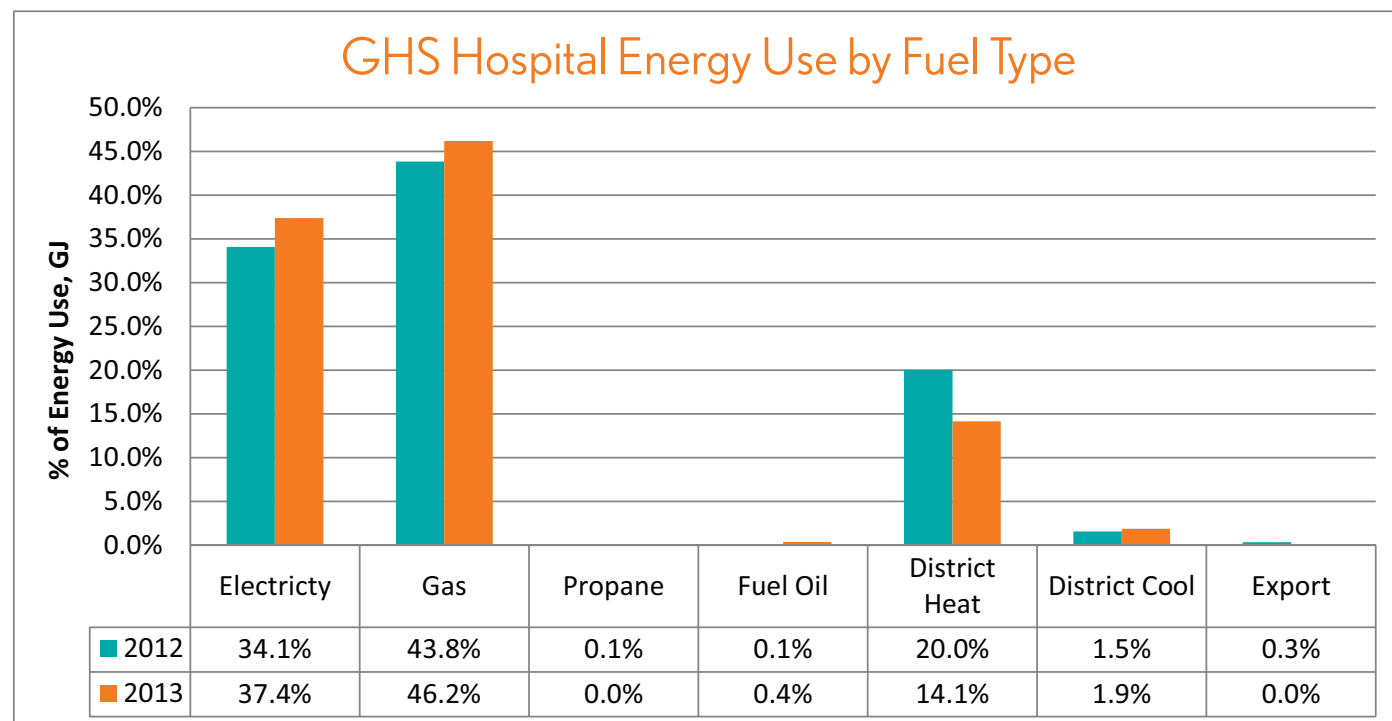


⁵ Carbon dioxide equivalencies (CO₂e) were determined using Energy Star Portfolio Manager Greenhouse Gas Emissions factors (Energy Star Portfolio Manager, 2014).

Energy Sources

This section segregates the 2012 and 2013 GHS participants' fuel types which are shown in Figure 3. It also lists hospitals energy conservation and GHG reduction initiatives.

Figure 3: GHS Hospitals Energy Use by Fuel Type



In 2013, approximately 8% of GHS participants indicated that they have implemented solar panels:

- Solar thermal panels for instantaneous hot water heating.
- One of the hospitals has two solar panels on its rooftops. One panel produces a maximum of 52 kWh, and the other produces 5 kWh. In 2013, 58,725 kWh of electricity was produced by the rooftop units. As a member of the Independent Electricity System Operator (previously the Ontario Power Authority) Feed-In Tariff Program, the hospital has recovered approximately \$41,000 from this production. This energy was used within the hospital and allowed the hospital to offset purchasing electricity from the utility company. The energy produced by the 5 kWh installation is used directly by the facility. It is not metered, but is estimated to produce 5,000 kWh per year.
- Another hospital has a 100 kw solar panel rooftop system. It is not used as source of power for the hospital, but supplies power to the grid and offers revenue generation.

Other energy conservation and GHG reduction initiatives

The following list describes some of the energy conservation and GHG reduction initiatives participating hospitals have implemented:

- Heat recovery ventilators
- One of the hospitals has a cogeneration unit, which generated approximately 4.5 million kWh in 2012
- Pay-and-display machines with solar panels
- Security Company uses hybrid cars to patrol hospital grounds
- Security Company patrols the grounds on bikes from April to October
- Bus transports patients, staff and visitors between hospital sites

Energy Use Intensity

Energy use intensity (EUI) captures buildings' annual energy use as a function of its size. It is a measure that determines the building's energy performance and it is useful for benchmarking and setting targets.

Figure 4 illustrates the frequency distribution of EUI for GHS participants. Tables 1a and 1b capture participating hospitals' average scale factors including size (m^2), beds and peer group for each EUI range. GHS participants' average EUI by peer group is shown in Figure 5. Tables 2a and 2b capture scale factors of GHS hospitals with the best EUI in each peer group.

Figure 6 compares average hospital EUIs from different energy performance programs. EUIs are determined using the hospitals' actual (unadjusted for weather) billed energy use. GHCF EAP 2010 is the Green Hospital Champion Fund Environmental Audit Program from 2010. The GHS program for reporting years 2012 and 2013 is represented by GHS 2012 and GHS 2013. The GHCF EAP and GHS programs' EUI is determined using the hospital site total (billed) energy use and 'conditioned floor space' in square meters (m^2). The Energy Star Portfolio Manager determines the EUI using the hospital site total actual (billed) energy use and total gross floor area of the building. The energy data submitted under the *Green Energy Act* is represented by GEA for reporting years GEA 2011 and GEA 2012.

Figure 4: Frequency Distribution of GHS Energy Use Intensity

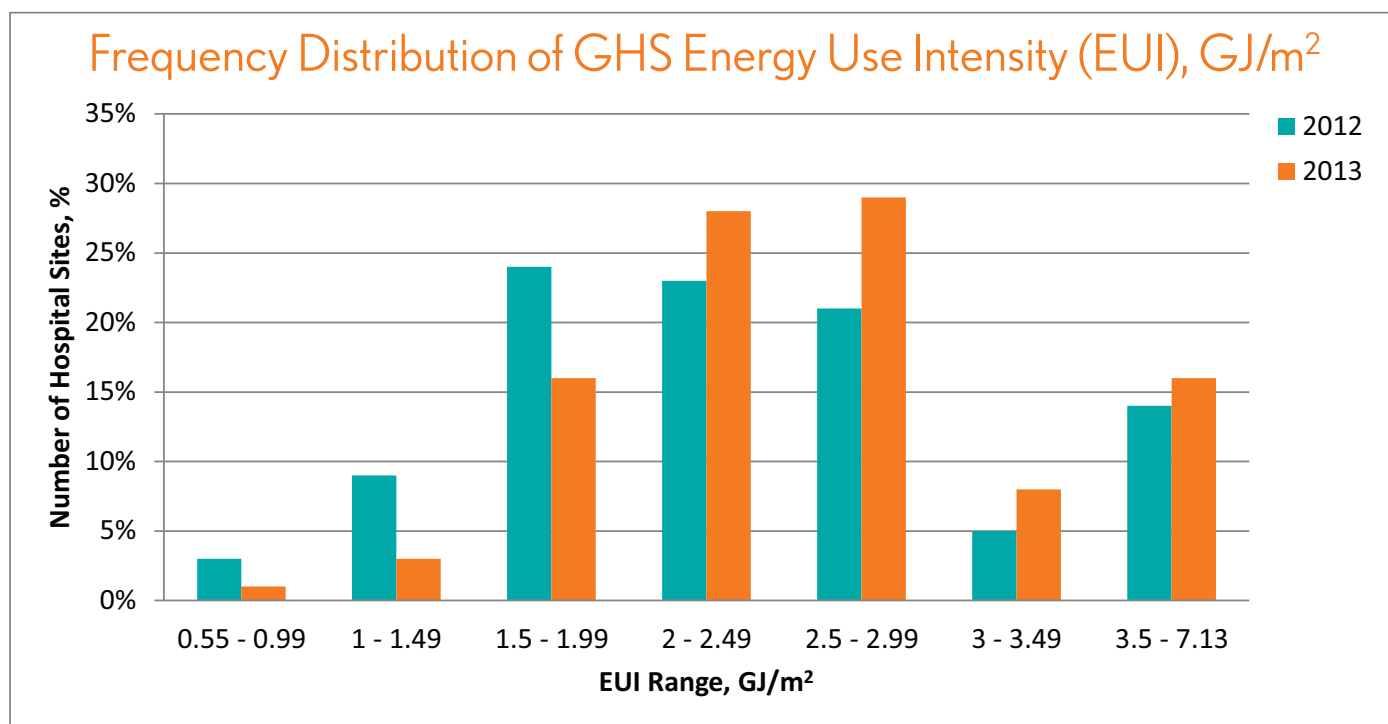


Table 1a. GHS Hospitals' Scale Factors by Energy Use Intensity, 2012

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

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

Table 1b. GHS Hospitals' Scale Factors by Energy Use Intensity, 2013

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

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 the 1 - 1.49 EUI range. There are only 2 hospital sites in that range.

Figure 5: GHS Energy Use Intensity by Peer Group

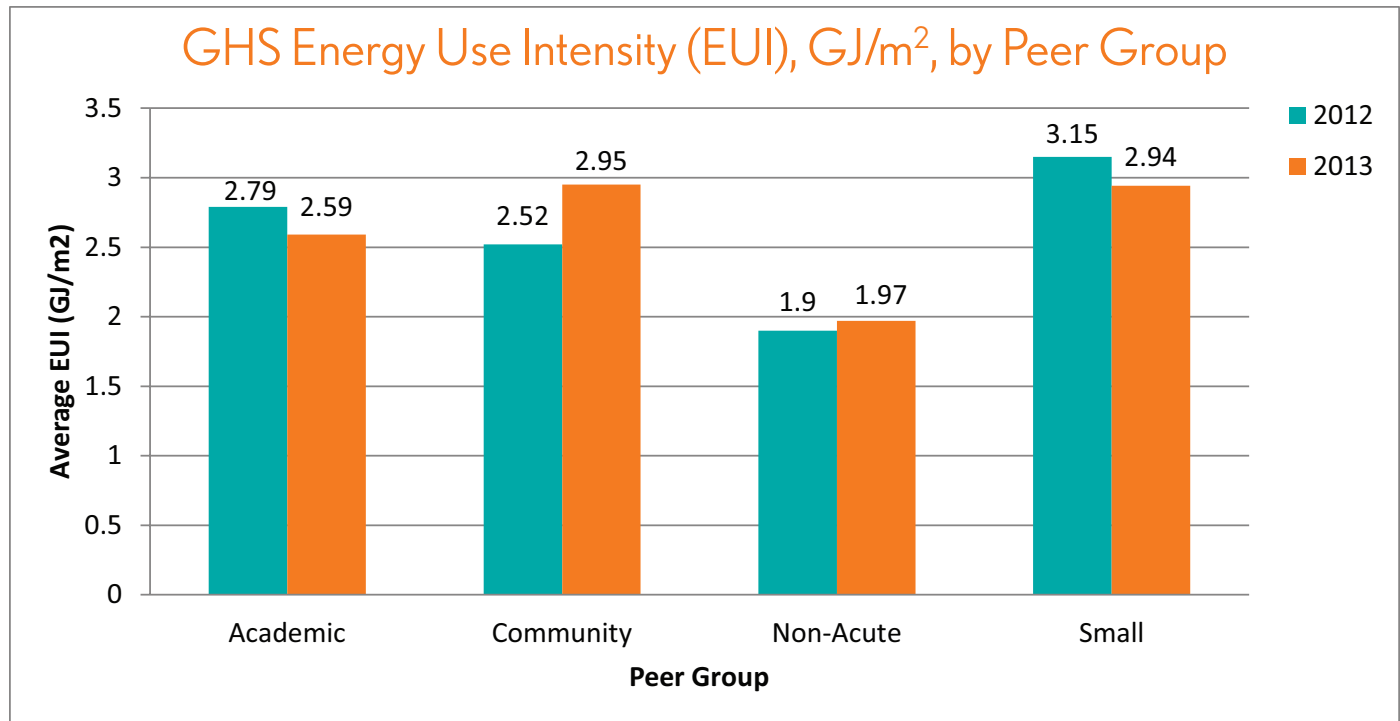


Table 2a. GHS Hospitals' Scale Factors with best Energy Use Intensity by Peer Group, 2012

Peer Group	EUI	No. of Beds	Area (m ²)	No. of Inpatient Days
Academic ¹	1.53	0	43,765	0
	1.82	208	20,017	65,516
Community	1.16	335	57,054	94,543
Non-Acute	1.39	284	38,276	75,869
Small	0.99	92	16,909	Not Available

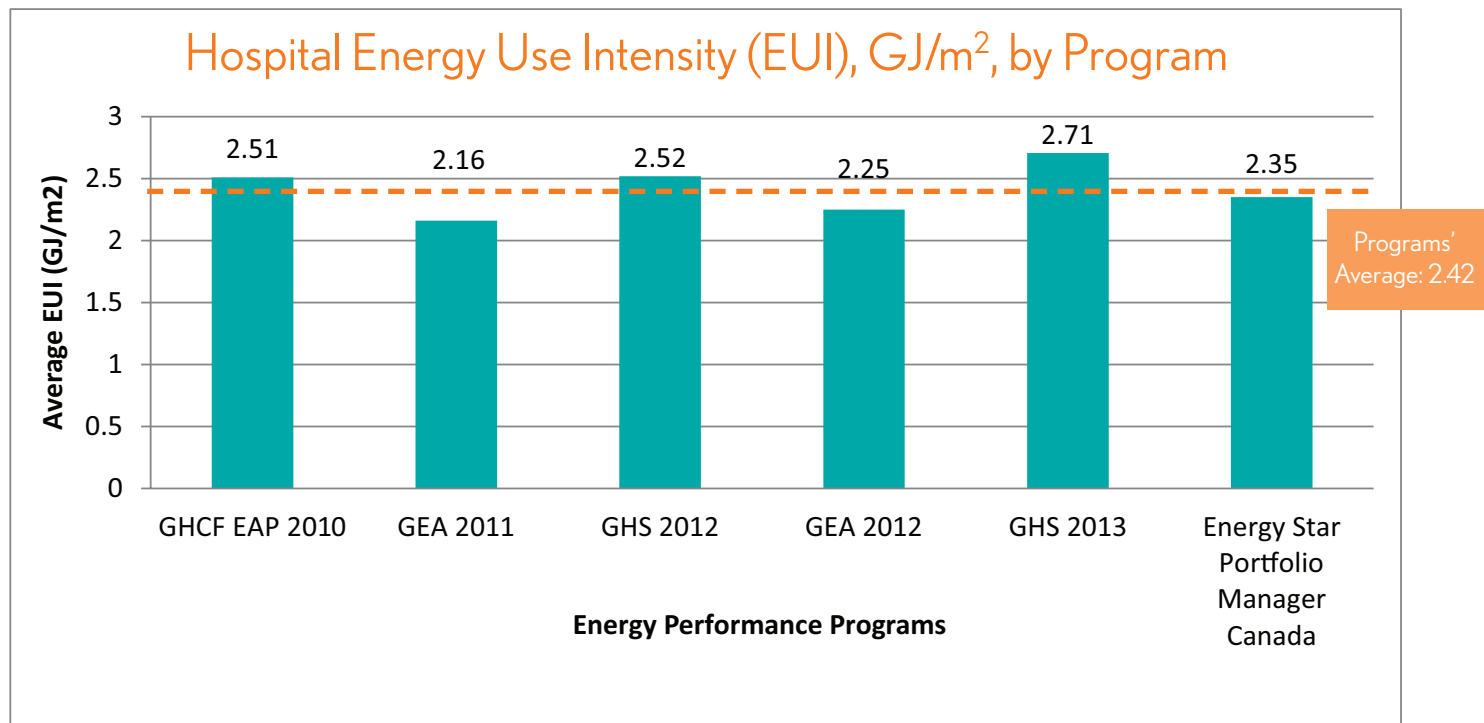
¹ Best EUI for academic hospitals with and without beds/inpatient days.

Table 2b. GHS Hospitals' Scale Factors with best Energy Use Intensity by Peer Group, 2013

Peer Group	EUI	No. of Beds	Area (m ²)	No. of Inpatient Days
Academic ¹	0.8	0	8,409	0
	1.66	375	272,771	103,989
Community	1.6	54	18,275	16,332
Non-Acute	1.5	284	38,276	76,027
Small	1.2	19	2,279	4,430

¹ Best EUI for academic hospitals with and without beds/inpatient days.

Figure 6: Hospital Energy Use Intensity by Energy Performance Program



Water Use Intensity

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

Figure 7 illustrates the frequency distribution of water use intensity in GHS 2012 and 2013 participants. Tables 3a and 3b capture participating hospitals' average scale factors including size (m^2), beds and peer group for each Water Use Intensity range. GHS participants' average Water Use Intensity by peer group is shown in Figure 8. Tables 4a and 4b capture scale factors of GHS hospitals with the best Water Use Intensity in each peer group.

Figure 9 compares average hospital water use intensities (m^3/m^2) across different energy performance programs. The GHS program for reporting years 2012 and 2013 is represented by GHS 2012 and GHS 2013. GHS Water Use Intensity is determined using the hospital site indoor water use and 'conditioned floor space.' The Energy Star Portfolio Manager determines the Water Use Intensity using the hospital indoor water use and total gross floor area of the building. The Portfolio Manager average is based on water use data for buildings benchmarked between 2006 and 2012 (Energy Star Portfolio Manager, 2012).

Figure 10 compares average hospital water use per bed, per day ($\text{m}^3/\text{bed}/\text{day}$) for two water performance programs. The GHS program for reporting years 2012 and 2013 is represented by GHS 2012 and GHS 2013, The Portfolio Manager average is based on water use data for buildings benchmarked between 2006 and 2012 (Energy Star Portfolio Manager, 2012).

Figure 7: Frequency Distribution of GHS Water Use Intensity

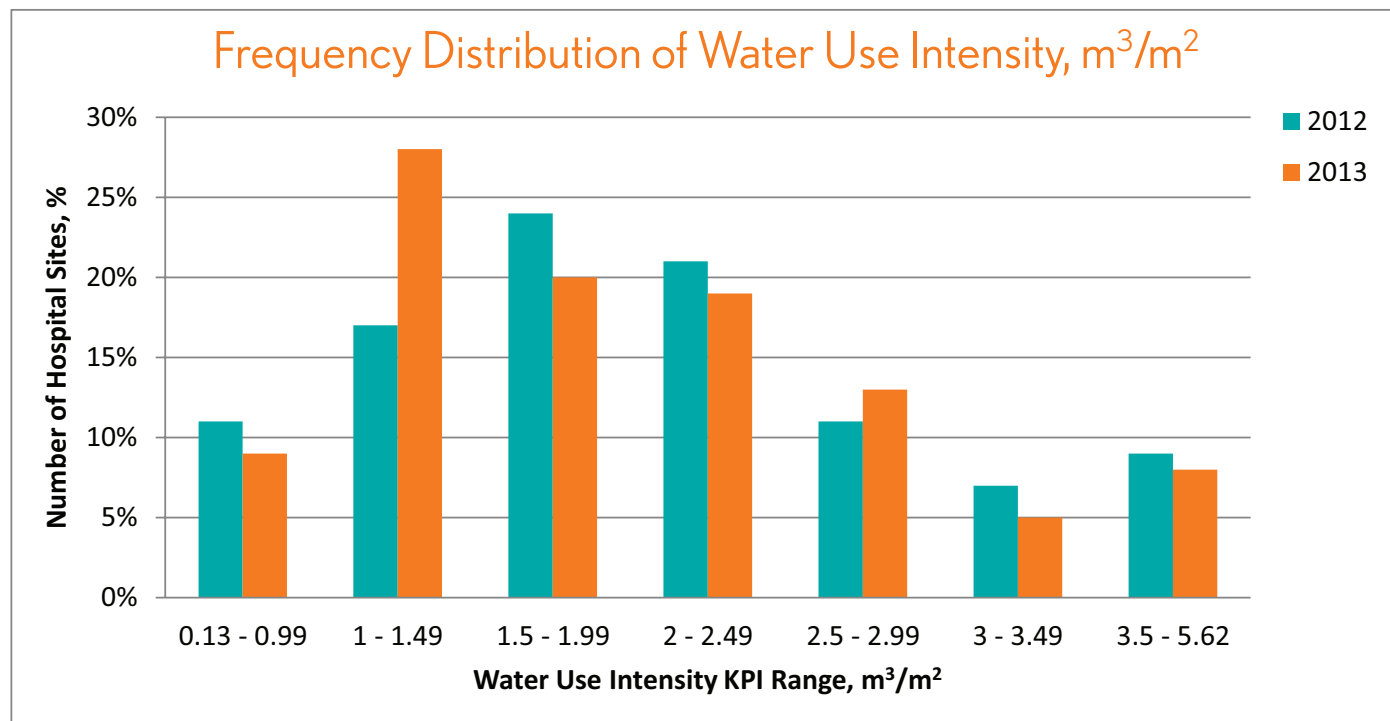


Table 3a. GHS Hospitals' Scale Factors by Water Use Intensity, 2012

WUI Range	No. of Hospital Sites	Average Beds	Average Area (m ²)	Peer Group ¹
0.13 - 0.99	10	166	38,232	Non-Acute, Small, Academic, Community
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

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

Table 3b. GHS Hospitals' Scale Factors by Water Use Intensity, 2013

WUI Range	No. of Hospital Sites	Average Beds	Average Area (m ²)	Average Inpatient Days	Peer Group ¹
0.13 - 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

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

Figure 8: GHS Water Use Intensity by Peer Group

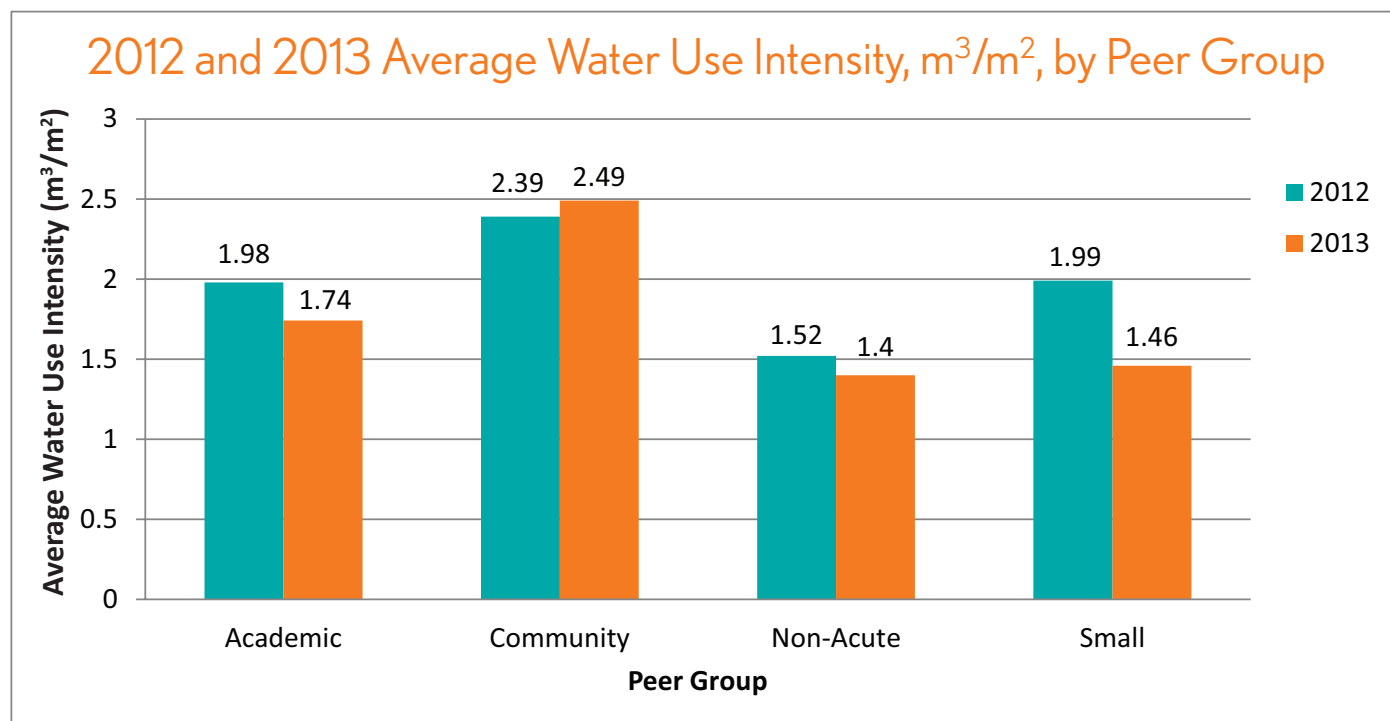


Table 4a. GHS Hospitals' Scale Factors with best Water Use Intensity (WUI) by Peer Group, 2012

Peer Group	WUI	No. of Beds	Area (m ²)	No. of Inpatient Days
Academic ¹	1.29	0	43,765	0
	0.98	155	41,462	31,398
Community	0.98	604	201,003	212,470
Non-Acute	0.63	64	5,110	23,147
Small	0.76	18	4,348	Not available

¹ Best EUI for academic hospitals with and without beds/inpatient days.

Table 4b. GHS Hospitals' Scale Factors with best Water Use Intensity (WUI) by Peer Group, 2013

Peer Group	WUI	No. of Beds	Area (m ²)	No. of Inpatient Days
Academic ¹	1.07	0	8,409	0
	0.62	519	119,245	158,948
Community	0.57	220	65,961	77,293
Non-Acute	0.68	64	5,110	23,212
Small	0.61	10	4,396	2,912

¹ Best EUI for academic hospitals with and without beds/inpatient days.

Figure 9: Hospital Water Use Intensity (m³/m²) by Water Performance Program

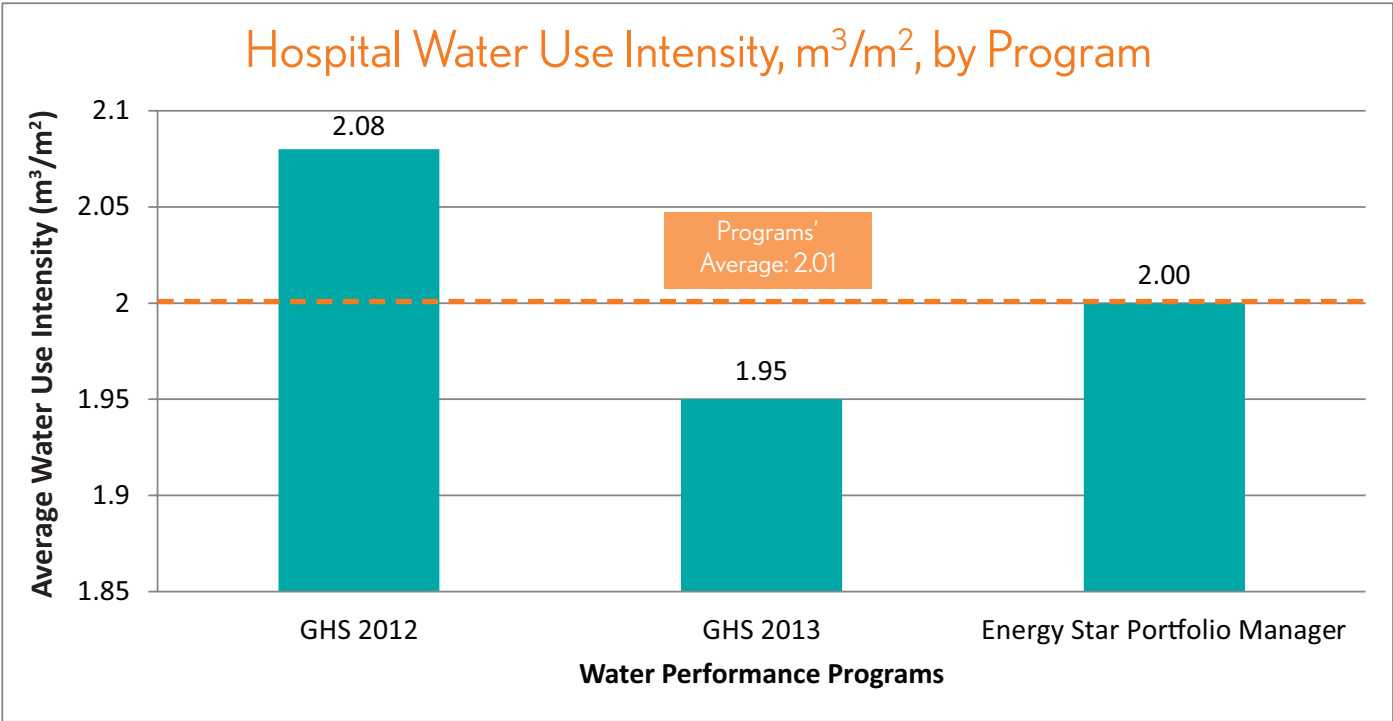
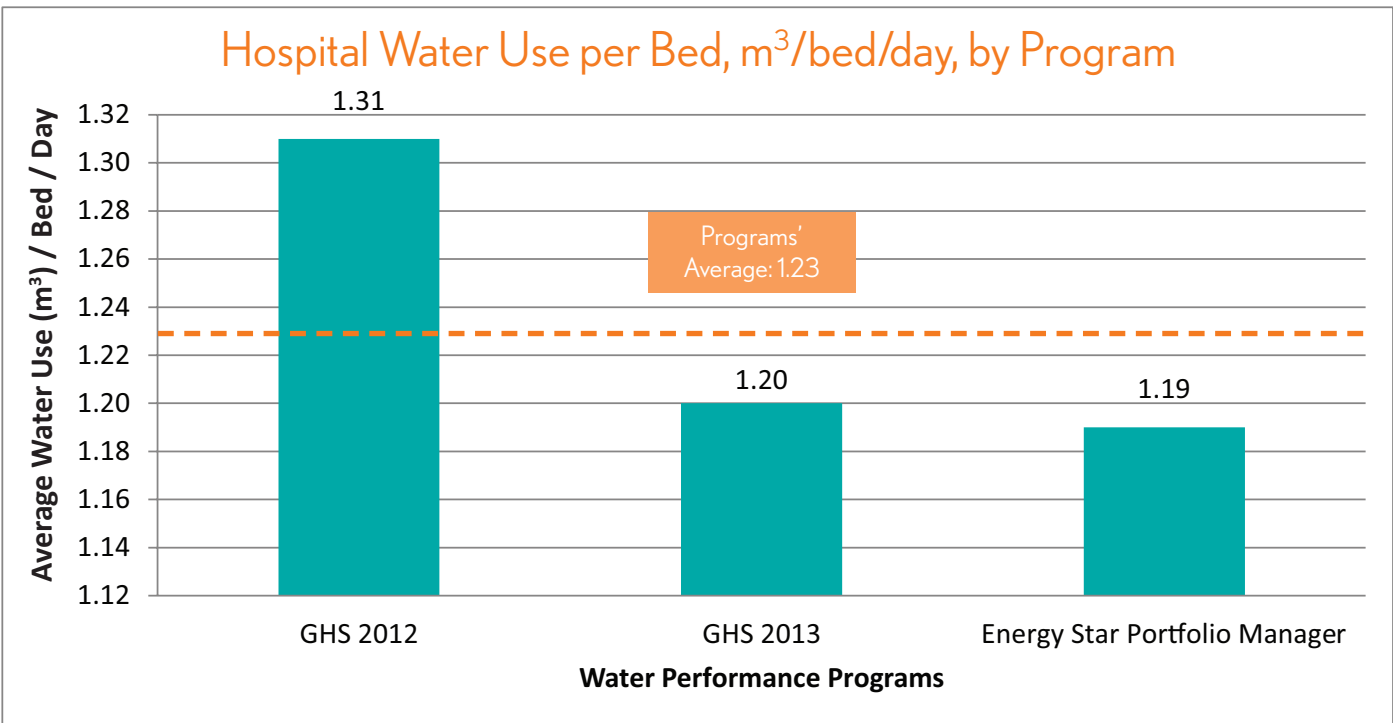


Figure 10: Hospital Water Use Intensity (m³/bed/day) by Water Performance Program



Resources

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