

Quinte Health Care Energy Demand Management Plan



QHC Belleville General
Hospital



QHC North Hastings
Hospital



QHC Prince Edward
County Memorial Hospital



QHC Trenton Memorial
Hospital

Revised: July 2014

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QHC Energy and Environmental Stewardship – Summary

Quinte Health Care believes that as an employer and as an organization that provides health care to approximately 160,000 people over 7,000 square kilometers we have a corporate responsibility to ensure we deliver on our commitment to a greener environment. With this promise in mind, Quinte Health Care embarked on an environmental stewardship journey 28 years ago.

As a smaller community hospital with limited resources, QHC's approach has been to make a variety of incremental, sustainable changes. This has created a culture where people from across the organization – front line staff to the Board of Directors – have a role in identifying and implementing initiatives that will reduce QHC's environmental impact.

The overall goal has been to demonstrate the commitment of the QHC Senior Leadership and Board to energy conservation, environmental stewardship and sustainability, while also increasing comfort for our patients and staff and creating financial savings that can be redirected to patient care. This approach has netted significant results for QHC.

With a corporate-wide commitment to reducing its environmental footprint since 1986, QHC has achieved:

- 51% diversion of waste from landfills;
- A reduction of overall energy use by 38.5%, to 59ekWh/ft², with another 7% reduction targeted for 2014; and
- A reduction in its greenhouse gas emissions by 3,131 metric tons per year, the equivalent to removing 1,047 cars from local roads.

1. Introduction

Quinte Health Care (QHC) believes that environmental stewardship is not a single initiative or short-term project, but rather a long-term journey and organizational culture change that demonstrate a real commitment to making incremental and sustainable environmental impacts.

QHC's began its environmental stewardship journey in 1986. This long-standing commitment to continuous improvement has led to accountability across the organization so that people from front line staff to senior leaders are making an impact. As a result, there have been many different initiatives over the past 28 years that have had significant impacts to reduce waste, greenhouse gas emissions and energy consumption, while increasing patient and staff comfort. In addition, there have been substantial annual financial savings that have been redirected to patient care.

Between 1986 and 2011 energy management initiatives at QHC achieved a reduction in overall energy use by 38.5%. Other initiatives have increased recycling by 247% since 1994. QHC now diverts 54% of its waste from landfills annually.

It can be challenging for a community hospital with limited resources to implement large-scale environmental stewardship programs. QHC does not have the resources for a dedicated environmental stewardship resource. Most of our buildings are between 40 and 75 years old. However, QHC has demonstrated a commitment and ability to make incremental, sustainable changes despite these challenges. We believe every hospital can reduce their environmental impact by seeking out approaches that fit within their human and financial resources and by creating a culture where everyone can take ownership for making changes within their own area.

About QHC

Quinte Health Care (QHC) has 1,800 staff members and 320 medical staff who provide a wide range of high quality health care services to a region of 160,000 residents located over 7,000 square kilometers in south-eastern Ontario. Care is provided through four acute-care hospitals and includes inpatient services, four emergency departments, operating rooms, a rehabilitation day hospital, children's treatment centre, ambulatory care clinics, community mental health programs and a range of diagnostic services.

The four hospitals of QHC include:

1. QHC Belleville General Hospital (BGH) with a floor area of approximately 590,000 sq. ft. Most of BGH was built in phases between 1938 and 1970, although there was a five-story wing added in 2010; an emergency wing opened in 2013; and significant redevelopment of some other areas of the existing space that will be completed in 2014.

2. QHC North Hastings Hospital (NHH) with a floor area of approximately 20,000 sq. ft. The hospital is attached to a long-term care facility and professional building and was built in 2002.
3. QHC Prince Edward County Memorial Hospital (PECMH) with a floor area of approximately 56,000 sq. ft. The hospital was built in 1959 and a redevelopment of the emergency room and diagnostic services was completed in 2009.
4. QHC Trenton Memorial Hospital (TMH) with a floor area of approximately 144,000 sq. ft. The hospital was originally built in 1951 and redeveloped between 2000 and 2006.



QHC Belleville General Hospital



QHC North Hastings Hospital



QHC Prince Edward County Memorial Hospital



QHC Trenton Memorial Hospital

Evidence of Results

1986 – 1993

The first energy management program at QHC started in 1986, when BGH entered into one of the earliest energy services performance contracts in Ontario, with Canertech Conservation Inc. Energy reduction measures included:

- The first building automation system was installed, which provided opportunities for scheduling HVAC equipment and improved control.
- Conversion of some HVAC from 100% outdoor air to recirculation.
- Installation of two speed motors to permit scheduling of HVAC systems for the operating rooms.

The engineering report at the start of the project reported overall energy use before the project was 96 ekWh/ft². By 1993, this had dropped to 88.9 ekWh/ft², a 7.4% reduction.

1993 - 1998

In 1993, a second round of energy management initiatives were derived from an engineering review prepared by Rose Technology. Measures implemented following this report included:

- A complete retrofit of lighting systems from Fluorescent T12 fixtures to T-8 with electronic ballasts.
- Installation of magnetically fastened storm windows in all of the older buildings.

1998 – 2010

Between 1998 and 2010, QHC continued to undertake numerous energy efficiency measures, including:

- Heat wheel systems were included with air handlers used for redevelopment projects completed during this time.
- Chiller systems were replaced with more efficient models incorporating variable frequency drives on both the compressors and cooling tower fans.
- Window systems were replaced in the seven story patient tower, including air sealing and re-insulation of the exterior wall. Window systems were also replaced in the oldest buildings that were built in 1939 and 1956.
- High turndown burners (10:1) were installed in process steam boilers to improve part load performance.
- Operating rooms were retrofitted with individual room volume controls, permitting reductions in air change rates when unoccupied.
- Variable speed drives were installed on many HVAC systems, permitting scheduled operation.



By 2011, energy use had dropped to 59ekWh/ft², a 38.5% reduction since 1986.

2011 - 2013

In 2011, QHC engaged Honeywell to develop a performance contract with the overall goal of creating a more sustainable, healthy work environment, while reducing utility costs and greenhouse gas emissions. The work with Honeywell was completed throughout 2012 and included:

- Water conservation through the replacement of plumbing fixtures to more efficient versions. Water use was reduced by 37% at TMH; 33% at PECMH and 29% at BGH.
- Weather-sealing buildings and thermal insulation of piping at all QHC hospitals.
- 48 solar panels on the roof of BGH, estimated to generate 12,600 kWh/year of electricity.
- 2,400 lighting fixtures replaced with energy efficient models.
- Installation of two new 97% efficient gas condensing hot water tanks at PECMH.



During this time, other departments at QHC continued to create positive impact through their own environment stewardship initiatives:

- Housekeeping changed to green cleaning chemicals and introduced new microfibre mop heads and cleaning pads to



- reduce water use and chemical-based cleaning fluids from going down the drain.
- A new composting program was initiated at the BGH that has generating 1.58 metric tones a month and reduced the garbage going to the landfill by 37%.
- Nutrition and Food Services initiated another program to reduce food waste by 28%, a significant reduction in garbage and the amount of food we need to compost. Some of the initiatives were reducing the number of extra food trays they produced and better communication about patient discharges. In the first six months of the program (April to December 2013) waste from patient food dropped by 72% and cafeteria food waste dropped by 35%.
- QHC partnered with Stericycle and Stewardship Ontario to improve our battery recycling program.
- Support Services improved the labeling of recycling centers to help increase compliance.
- A new “Apollo Green Team” of staff and physician representatives was created to focus on reducing paper use at QHC. The first step will be to revolutionize the printing of patient lab reports, which is conservatively estimated to result in 500,000 less pages printed in one year.
- The Capital Projects Team has undertaken a building automation system (BAS) upgrade scheduled to be completed this year.

Green bin program in place at QHC

Latest step in environmental responsibility

Luke Hendry
QMI Agency

The bins are in at Quinte Health Care.

Though both Belleville and Quinte West have yet to implement public composting, the start of a so-called “green bin” composting program is QHC’s latest step toward environmental responsibility.

“Garbage is always our last stop,” said hospitality services manager Anne Krock.

“We try to get rid of everything either through reuse or recycling. Quinte Health Care Belleville General now trashes 22 per cent less total waste than it did in 1994.

Each year, 30 per cent of the waste QHC produces is diverted from the dump.

The latest effort is a composting program which began last November, not long after the opening of the new kitchen.

“It’s an obligation to the environment,” Krock said.

It now diverts about 53 kg of

have any way they can sell it they won’t take it.”

Fortunately, paper – about two tons a month – is still recycled, as are materials from cardboard to scrap metal.

“We always look at reuse initiatives as far as equipment goes,” said Krock.

There are limits to what can be done, especially with increasing attention paid to infection control.

“There are a lot of conflicts within a hospital,” she said.

Infection control has meant an increase in single-use items, such as the paper-based wrappers used to cover equipment being sterilized. But they and other items can be recycled.

Green programs must also be balanced with patient safety, the amount of labour required and other factors, Krock said.

New microfiber mop heads and cleaning pads mean a reduction in chemical-based cleaning fluids and water, Krock said the disposable mop heads are changed after every room.

“You’re preventing all that water with chemical in it going down the drain,” she said. It also means better ergonomics and less work for staff, who had to empty their buck-



Redevelopment

As mentioned, BGH has undergone a significant redevelopment between 2007 and 2014. The Ministry of Health & Long-Term Care does not generally financially support initiatives intended solely for energy conservation, so we must instead work towards cost-effective, sustainable design through:

- Improved standards for insulation of the building shell and windows.
- Use of heat wheels for heat recovery from exhausted ventilation air.
- Improved efficiency of chillers.
- Variable speed drives on large motors for HVAC and pumps.
- Controls to provide efficient regulation of ventilation rates and individual room temperature.
- Efficient lighting, including the use occupancy sensors where possible.
- Scheduling controls for lighting in public/common areas.

Overall Results

It is difficult to provide all figures showing the overall impact on utility savings and waste disposal/diversion since QHC first started its energy conservation 28 years ago. Since

1986, four hospitals were amalgamated together and new wings were added to the hospitals during various redevelopment projects.

However, we have been able to measure our impact in numerous ways and are proud to be able to share the following results:

- Between 1986 and 2011 energy management initiatives achieved a reduction in overall energy use by 38.5%.
- We expect to achieve sustainable operating rates below 55 ekwh/sq ft following the implementation of the BAS system upgrades that will be completed in 2014. This will be an additional 7% reduction. These rates are in line with the performance of LEED hospitals and particularly impressive given the climate in our area, age of our buildings and mandate as acute care hospitals.
- QHC conservation projects have realized significant reductions in greenhouse gases released to the atmosphere from energy used to operate our facilities. The estimated overall reduction of CO2 emissions between 1986 and 2010 is 3,131 metric tons per year, which is equivalent to removing 1047 medium sized cars from local roads.
- Each year, 51% of the waste QHC produces is diverted from landfills.
- Recycling has increased by 247% since 1994. 36 metric tons of material is recycled per month, including paper, cardboard and scrap metal.
- Another 19 metric tons of waste is redirected from landfills each year for reuse by other organizations, such as medical equipment going to a hospital in Zimbabwe and computers for not-for-profits.

2. Steps taken to ensure sustainability of the environmental initiatives, and organizational resources that are in place to help achieve the project's goals

Our ability to sustain current gains from our energy and environmental initiatives is central to our future success. QHC has taken the following steps:

- Continue to dedicate human and financial resources required to support a robust Facilities Management team and ongoing energy and environmental stewardship initiatives.
- New staff and physician "Green Team" at QHC that is initially looking at ways to reduce paper use.
- Expanded the composting program due to its success to our three other hospitals.
- Another \$1 million investment underway this year to upgrade the BAS system, which will net another 7% reduction in energy use and increase patient and staff comfort.

3. How these initiatives have resulted in improvements in the overall indoor environment for patients and staff

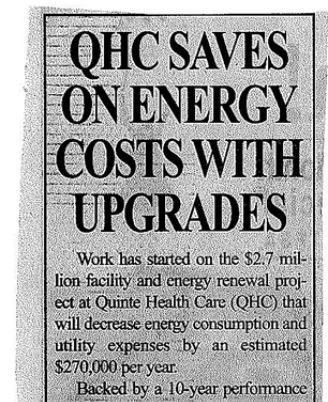
Through our initiatives, QHC has made substantial impacts to our overall environment, which includes our physical buildings and the environments of our communities. For example:

- The installation of individual room air volume controls in the operating rooms ensures air change rates are maintained according to standards and also ensures requirements for relative air pressure balance between rooms. This prevents cross contamination within the operating rooms and improved patient safety.
- The installation of individual room temperature controls in the oldest building at BGH (1938) improves patient and staff comfort.
- Air sealing buildings and upgrading windows has reduced drafts and improved patient and staff comfort.
- Prior to the upgrades to windows/exterior wall sealing, the Quinte tower was plagued by an annual infestation of common flies each fall. These upgrades have eliminated this problem, improving cleanliness and the indoor environment for patients and staff.
- Replacing the chiller plant in Belleville reduced environmental risk by replacing the charge of R-11 refrigerant with more “environmentally friendly” HFC-134A. A new chiller will be installed at TMH in 2014.
- The switch to microfibre mops has led to better ergonomics and less heavy lifting work for cleaners.
- Health concerns led to window blinds being replaced by PVC-free blinds to reduce the smell. The PVC blinds previously led to adverse reactions in at least six staff members.

4. Initiatives taken to engage staff and the community

QHC has also worked to include our staff, patients and the community in our environmental stewardship, and to celebrate our successes.

- In 2009, QHC participated in the Green Hospital initiative and worked with a team from Queens University Faculty of Engineering to review opportunities for energy management at BGH. Students also helped to design a composting program for BGH before there was a municipal green bin program in place.
- In 2010, QHC hired an engineering student from the University of Waterloo, through a provincial student employment initiative, to detail opportunities for energy management. The report was used for Senior Leadership and Board approval to proceed with the RFP for an energy performance contractors, which resulted in the contract with Honeywell.
- QHC is now partnering with Ontario Hydro/ Veridian on the “Roving Energy Manager” program to further develop projects which may be implemented with incentive funding from the utilities.



- QHC has garnered local media coverage to raise community awareness of QHC environmental initiatives.
- Each year staff participate in Earth Day celebrations at all hospitals. Two hospitality services staff members set up a display in the public corridor with tips on protecting the environment, sample of green products now in use at QHC and a box for people to donate their eyeglasses to the Lions Recycle for Sight program. There is also an environmental quiz in exchange for gardening seeds.
- Outdated medical equipment is donated to not-for-profit organizations and a hospital in Zimbabwe. Furniture and other materials have been sold to staff as a fundraiser for the hospital foundation and the local United Way.
- QHC collaborated with Honeywell to create staff education sessions about the retrofit program. Open-house style events at each of the hospitals included information about QHC's program with Honeywell, tips for energy efficient homes, giveaways and a grand prize draw for a bike.



5. Evidence that a culture of sustainability and environmental leadership are in line with the corporate business plan and is endorsed by the senior management team

QHC has four strategic directions, two of which exemplify how the senior leadership team, Board and the organization as a whole are committed to energy savings, waste and emission reductions:

- Create an Exceptional Patient Experience
- Be an Exceptional Workplace

Our ongoing energy and waste reduction initiatives are designed to make QHC an exceptional workplace and to create an exceptional patient experience. When patients and staff are provided with a safe and comfortable environment to work and heal in this enhances their exceptional patient experience and workplace. As well, there is a sense of pride staff feel knowing they have contributed to initiatives that will make their work and home environment safer and healthier.

Our efforts also have and will continue to result in significant cost savings for the organization, which allows us to redirect more funding to health care programs. The Honeywell initiative alone is a guaranteed \$276,000 in annual savings that can be redirected to patient care.

6. Conclusion

With a corporate-wide commitment to reducing its environmental footprint since 1986, QHC has achieved:

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Quinte Health Care believes that as an employer and as an organization that provides health care to a diverse region including approximately 160,000 people over 7,000 square kilometers we have a corporate responsibility to ensure we deliver on our commitment to a greener environment. With this promise in mind, Quinte Health Care and its predecessor hospitals began an environmental stewardship journey nearly three decades ago.

As a community hospital with limited resources, we have been successful thanks to a persistent focus on incremental improvements across the organization, led by individuals from front line staff to the Board of Directors. The result is a culture where everyone can take ownership for environmental stewardship initiatives so that QHC as a whole can continue to contribute to a better environment for our staff and the communities we serve.

Electrical Power and Gas Measurements from 2012

