



 **GREENING HEALTH CARE**
working together for healthier communities

Bigger and Better in 2018

Feature Webinar: April 4th, 2018

Sponsored by:



Program partners:





2017 Program in Review

- **Feb 15 Special Webinar: Class A Designation**
 - Global Adjustment analysis, recommendations
- **Mar 1 Webinar: Ready for 2017**
 - The power of energy components in finding savings
- **Jul 12 Webinar: Fault Detection and Diagnostics**
 - Technical panel and Trillium case study
- **Oct 25 Webinar: Making Energy Efficiency Happen**
 - Markham Stouffville Hospital case study
- **Dec 13 Webinar: Making Energy Efficiency Happen**
 - Ventilation systems update
 - Interval gas and electricity analysis to identify savings opportunities
- **Apr 5 Workshop: Base Electricity – Where the Big Savings Are!**
 - Base electricity interval profiles and measures
 - high performance cooling plants
- **JUNE 7-8 FORUM 2017**
 - Executive Panel, technical panels, case studies
 - Site tours
- **Sep 27 Workshop: Making Energy Efficiency Happen**
 - Facilities Management panel
 - Markham Stouffville Hospital case study
- **Nov 29 Workshop: Making Energy Efficiency Happen**
 - Interval gas and electricity analysis to identify savings opportunities



Market Update

ENERGY STAR Certification for Canadian Commercial and Institutional Buildings is NOW LIVE!

The banner features a blue header with the Natural Resources Canada logo and website. The main image shows a stylized blue maple leaf containing a city skyline, set against a background of red and white fireworks. The ENERGY STAR logo and tagline are prominently displayed at the bottom of the image.

ENERGY STAR® Certification for Canadian Commercial and Institutional Buildings IS NOW LIVE!

ENERGY STAR® certification is now available in Canada for commercial and institutional buildings. The sector will never be the same. Now, building owners and managers throughout the country can take advantage of the launch and accept the "Who Will Be the First?" challenge! Earn not only the prestige of ENERGY STAR certification but also the added recognition and benefits of being one of the Firsts in Canada.

ENERGY STAR certification is here to stay, but the "Who Will Be the First?" challenge runs only **until April 30, 2018, 11:59 p.m. PDT**. Submit your application today through ENERGY STAR Portfolio Manager.

ENERGY STAR certified buildings save energy, save money and generate fewer greenhouse gas emissions than non-certified buildings. They often see higher rental and occupancy rates and greater engagement with clients and their communities.

Learn more about [ENERGY STAR certification](#) and make sure your facility is one of the Firsts in Canada to earn ENERGY STAR certification!

Canada

OEE InfoBulletin | 1-877-380-9500 | info.bulletin@nrcan.gc.ca | nrcan.gc.ca



2017 Savings - Recognizing Success

In 2017 we (you) achieved \$2,736,000 in utility cost savings!

2017 savings against 2016 baseline:

28 hospitals with electricity cost savings of \$1,723,000

29 hospitals with thermal cost savings of \$504,000

19 hospitals with water cost savings of \$509,000

Greenhouse gas emissions reduction: 5,266 tonnes



Case Study: Baycrest





Case Study: Drumheller Health Care





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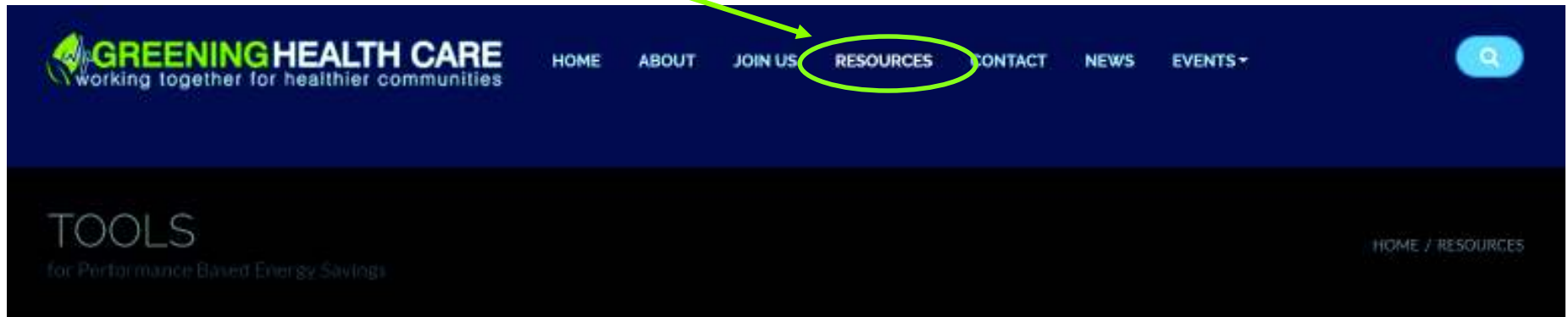
Technical Corner
Greening Health Care
Applied Research





2016 - OR Ventilation Best Practices

www.greeninghc.com



Greening Health Care Research Projects

Best Practices for Boiler Plant Operations and Controls- Coming Soon !!!

Greening Health Care is initiating a collaborative research project with member hospitals, utility companies and industry experts to develop a best practices guide for use by facility managers in making their boiler plant performance the best it can be. Over the past 5 years, members have implemented a range of boiler plant retrofit and replacement projects which have produced a range of gas savings results. We have tracked gas use for newly built hospitals, existing boiler plant replacements and major controls upgrades for several member hospitals. Through interval gas metering we can now directly compare the actual operating performance of these hospitals against each other. All of this provides a rich body of data from which best operational and control practices can be learned, shared and applied to all member hospitals.



For more information contact jason.choy@trca.on.ca.

Operating Room Ventilation Systems Best Practices Guide for Energy Efficiency, Health and Safety

At the beginning of 2016, Greening Health Care initiated an applied research project aimed at documenting best practices for Operating Room ventilation design, retrofit, operation and controls, for use by member hospitals in optimizing the energy performance of their





Boiler Plant Operation and Controls

2017 Research Project

- The GHC database shows a wide range of thermal energy performance between hospitals, in large part attributed to boiler plant performance
- Case studies demonstrate big savings through improved plant operation and controls
- A collaboration among member hospitals, gas companies and industry experts
- **Best Practices Guide to be issued in May 2018**



Scope of Best Practices

- Plant options (retrofit or new):
 - heat exchanger surface area, economizer
 - summer boiler
 - combination hot water and steam boiler plant
 - linkage-less controls
 - modulating burner control
 - VFD FD fan
 - VFD feedwater pump
 - back-pressure valves
- Pressure/temperature control:
 - reduce/reset steam pressure, primary HW temperature
 - seasonal steam line shutdown

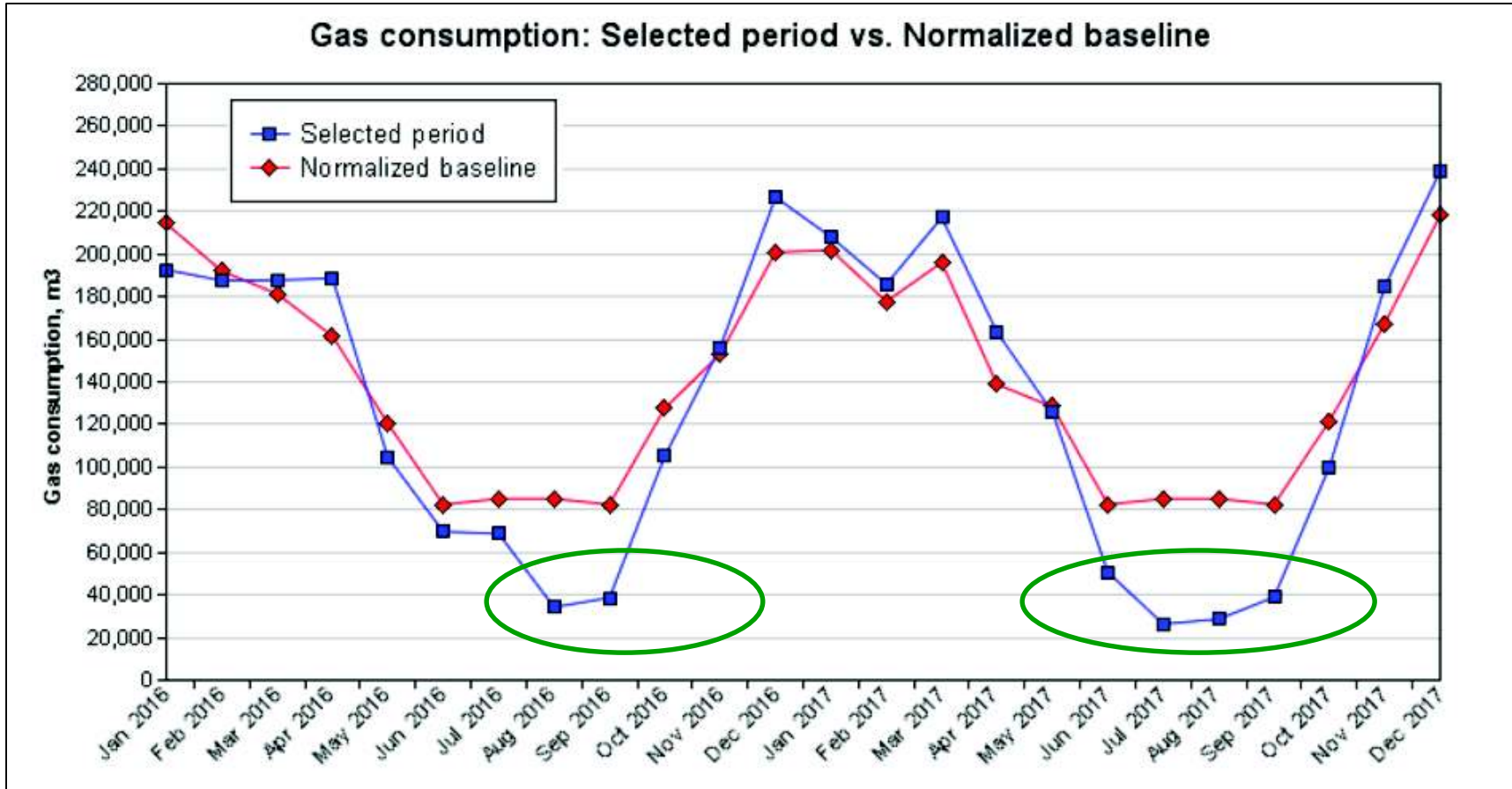


Initial Best Practices

- Boiler testing:
 - test upstream and downstream of economizers
 - tune burners, refurbish boilers to increase efficiency
 - sequence boilers to maximize plant efficiency
- Water treatment:
 - increase condensate return
 - optimize water makeup
 - monitor and maximize percent in control
- Operating logs:
 - implement electronic recording and reporting
 - monitor and respond to trends
- HVAC Systems' control:
 - implement demand-based heating pump control, ventilation supply air temperature reset



Steam Line Shut Down



Steam Meter Savings for:

Aug/16-Sep/16: 56.5% - 94,673 m3, \$30,326

Jun/17-Sep/17: 56.9% - 190,626 m3, \$58,366



Steam Line Shut Down

- Planning and Design:
 - identify steam lines for shut down in summer or overnight
 - consider lines for nitrogen protection
 - consider steam equipment modifications to expand shutdown
- Spring shutdown:
 - valve off identified lines
 - drain and blow through residual condensate
 - activate nitrogen protection
- Fall start-up:
 - reopen valves SLOWLY!
 - monitor iron levels in condensate return, discharge to drain until within limits
- GHC research:
 - prior experience with steam line shutdown, best practices



2018 Project Launch

2018 Research Project – Chilled Water Plants

- Recruitment of hospitals and sponsors March – April 2018
- Initial webinar April 2018
- Data collection and analysis May – October 2018
- Review of findings and conclusions November – December 2018
- Final Best Practices Guide Spring 2019



Water Conservation





Water Balance

Processes	Flow Rate (LPM)	Operating Hours (Hrs/day)	Estimated Water Consumption		% of total	Estimation Method*
			(m ³ /d)	(m ³ /year)		
1 Domestic consumption						Engineering estimate
1a 4.8 LPF toilets	-	-	8.3	3,030		
1b 6 LPF toilets	-	-	20.7	7,556		
1c 1.9 LPF urinals	-	-	3.1	1,132		
1d 1.9 LPM faucets	-	-	2.8	1,022		
1e 5.7 LPM faucets	-	-	38.2	13,943		
1f 8.3 LPM faucets	-	-	55.6	20,294		
1g 7.6 LPM showers	-	-	15.1	5,512		
1h 9.5 LPM showers	-	-	18.8	6,862		
Domestic sub-total	-	-	162.6	59,351	31%	
2 Autoclaves	-	-	47.8	17,464	9%	Engineering estimate
3 Cooling Tower Makeup Water	-	-	-	11,091	6%	Sub-meter Data
4 Kitchen Water Use (sinks, water in food, etc.)			20.6	7,508	4%	Engineering estimate
5 Air Conditioners						
5a Server Room	-	-	5.2	1,881	1%	Measured Data
5b Nursing Station Bell Room	4.6	9.6	2.6	967	1%	Engineering estimate
5c Chiller Room	6.3	24	9.1	3,311	2%	Measured Data
5d South Elevator Room	4.6	9.6	2.6	967	1%	Engineering estimate
Air Conditioners sub-total			19.5	7,126	4%	
6 Boiler Makeup Water	-	-	-	4,211	2%	Sub-meter Data
7 Compressors (8)	-	-	10.6	3,856	2%	Measured Data
8 Kitchen Flight Dishwasher			6.5	2,354	1%	Engineering estimate
9 Reverse Osmosis	-	-	0.7	250	0.1%	Engineering estimate
10 Unaccounted for (equipment washers, background consumption, irrigation, etc.)			213.3	77,844	41%	Mass balance
Total				191,056	100%	

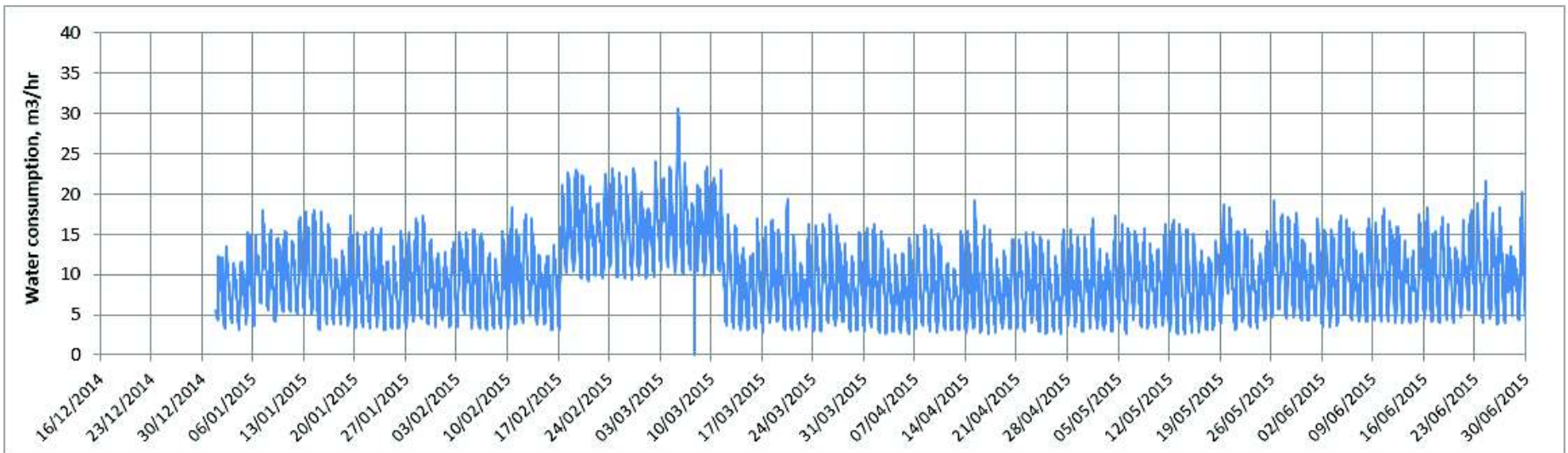


Action Plan

Ref.	Opportunity Description	Recommended next action	Eligible for incentive
Recommended for immediate investigation			
6.1	Install 1.9 LPM Laminar Flow Aerator on Faucets	• Order low-flow laminar faucets for one floor as trial	No
6.2	Install 5.7 LPM Showers Heads	• Order 5.7 LPM shower heads for one floor as trial	No
6.3	Change Compressors to Rooftop Cooling Unit	• Obtain quote for converting compressors to rooftop unit	Yes
6.4	Change AC to Rooftop Unit (Chiller Room)	• Obtain quote for converting AC to rooftop unit	Yes
6.5	Change AC to Rooftop Unit (Server Room)	• Obtain quote for converting AC to rooftop unit	Yes
6.6	Change AC to Rooftop Unit (Elevator Room)	• Contact Toronto Water to meter AC	Yes
6.7	Change AC to Rooftop Unit (Nursing Station)	• Contact Toronto Water to meter AC	Yes
6.8	Install Sub-Meter for Irrigation	• Obtain quote for sub-metering irrigation water	No
6.9	Investigate Unaccounted for Consumption	• Analyze AMR data and/or complete 7-day flow monitoring of incoming water	No
Recommended for further investigation			
6.10	Install Efficient Dishwasher	• Contact Toronto Water to meter dishwasher	Yes
6.11	Install 4.8 LPF Toilets (as needed)	• As needed, replace 6 LPF toilet with 4.8 LPF ones	No



Monitor Interval Water to Find Leaks





Greening Health Care - Next Steps

2018 Schedule

- May 30-31st – Forum 2018 and site tour
- July 11th – Webinar 2
- September 26th – Workshop 3
- October 24th – Webinar 3
- November 27th – Workshop 4
- December 12th – Webinar 4

Reporting

- take part in the 2018 chiller plant project
- sign annual utility release letters
- access the online system, review savings reports, make the connections, be a case study
- collect and send in your water data

Workshop Evaluation

- help us ensure continuous program improvement