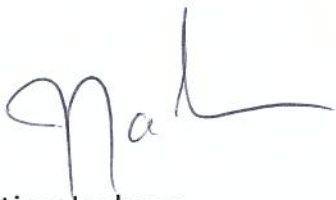




Environmental Stewardship, including the efficient use of energy and water, has long been a part of University Health Network (UHN). UHN ensures that its environmental commitment is carried out both internally, in coordination with business decisions and practices, and externally, by acting as an example for, and in partnership with, its clients, suppliers, other organizations, and the general public.

This latest update to UHN's Energy Management Plan continues our focus on using energy efficiently at our facilities and builds on the many initiatives we've implemented to date.

University Health Network is committed to excellence in health care, research, and teaching. I am confident that, in setting a course for the next five years, our Energy Management Plan will continue to support these commitments as well as overall excellence in patient care.



Justine Jackson  
Interim President and Chief Executive Officer  
University Health Network  
July 1, 2014





# University Health Network Energy Management Plan

2014  
to  
2019



Energy & Environment  
University Health Network  
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Updated July 2019

## **Background**

While the links between environmental health and human health have long been understood, the effect of climate change on health has only recently been receiving mainstream attention. At the University Health Network (UHN), energy management, and the implications of energy use for health and climate change, has been part of the hospital's Environmental Management System since 2000.

With the approval of UHN's *Energy and Water Conservation* policy in 2002, the hospital continued its long history of commitment to energy efficiency, with a number of large scale projects taking place several years before development of the policy. The policy, however, has served as a strong foundation for the implementation and growth of UHN's Energy & Water Conservation Program.

In 2007 UHN started the process of developing a comprehensive energy management plan and program. Branded *Operation TLC – Care to Conserve*, the program focused on integrating behaviour change, building operations and equipment efficiency to optimize the identification and implementation of energy efficiency measures.

UHN has been recognized numerous times for its leadership and stewardship in environmental and energy management.

## **Note 2017 Energy Plan Update**

While UHN's Energy Management Plan is reviewed annually, in 2017 it was updated to include buildings that were not part of UHN in 2012, including the Krembil Discover Tower and The Michener Institute of Education at UHN.

## **UHN's Energy Management Vision**

UHN's energy management vision, stated below, is part of the hospital's *Energy & Water Conservation* policy which was first approved in 2002 and is updated annually.

*“University Health Network (UHN) is aware of the global impact that energy and water consumption have on its environment and financial resources. UHN is committed to providing ongoing awareness and training to assist staff in mitigating these impacts. At UHN, all staff will endeavor to practice energy and water conservation where practical to do so.”*

## ***The Business Case for Energy Management***

UHN's business case for the development of an energy management program goes beyond simple financial payback. Combined, the elements of the business case, outlined below, form guiding principles for energy management at the hospital.

### ***Strengthened Community Leadership and Environmental Stewardship***

Energy management is a visible, public commitment to the community, environment, and human health. Through energy management, the hospital can provide leadership in promoting sustainable communities, efficient business practices, and environmental stewardship.

### ***Employee Engagement***

Staff at UHN have indicated that energy efficiency is important to them. Actively promoting energy management allows for the aligning of personal and organizational values and supports an engaged workplace. In return, engaged employees are more likely to contribute to UHN's energy management goals.

### ***Enhanced Patient Care and Working Environment***

Efficient building operations not only conserve energy, but also contribute to patient and employee comfort through more stable temperatures and better indoor air quality and lighting.

### ***Improved Financial Health and Operating Cost Reduction***

Utility costs are a significant portion of UHN's operating budget. The cost savings associated with investments in energy efficiency can be put towards patient care and other hospital needs.

### ***Optimization of Building Systems and Equipment***

Energy efficiency is often realized through the optimization of building equipment and systems. This operational efficiency, in turn, can often eliminate or delay the need to replace or add new building infrastructure.

## ***Energy Planning Horizon and Scope***

This energy management plan covers the five year period from 2014 to 2019 and builds upon energy plans developed at UHN between 2008 and 2010. The plan provides a framework for all energy management activities taking place at UHN, including strategic

planning and the continued development and implementation of the program components with a focus on the following locations.

- Toronto General Hospital
- Toronto Western Hospital
- Princess Margaret Cancer Centre
- Toronto Rehab (all locations)
- Princess Margaret Cancer Research Tower (formerly called Toronto Medical Discovery Tower)
- Krembil Discovery Tower
- The Michener Institute of Education at UHN

The planning horizon is divided in to three sections: ongoing, near future (1-2 years) and long term (3-5 years).

### ***Planning framework***

UHN's energy management plan draws from the strategic management framework shown in Figure 1. The framework has four interlinked elements:

**1. Demonstrate organizational commitment**

- a visible demonstration by UHN of its commitment to energy efficiency and conservation in day-to-day operations and planning activities

**2. Monitoring and tracking**

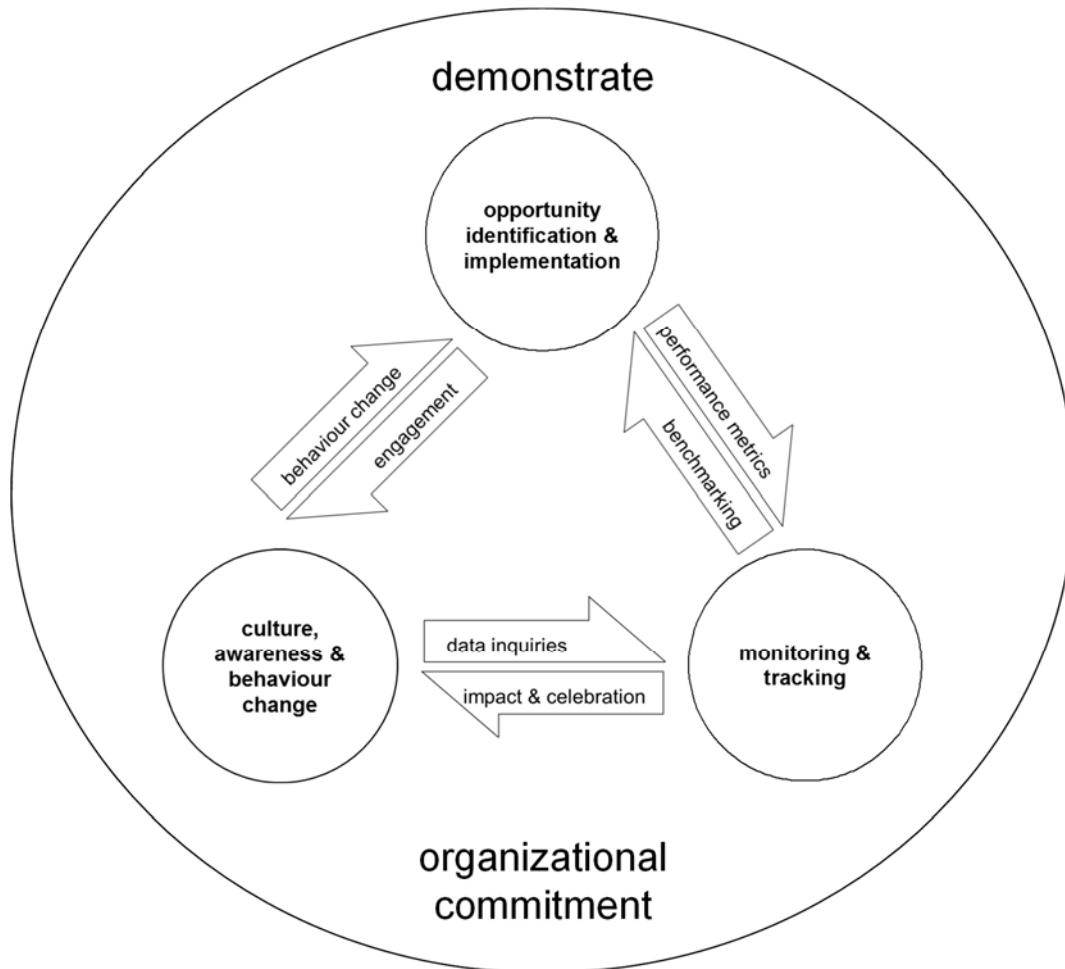
- implementation of systems to track, analyze and report on energy consumption, costs and changes over time

**3. Culture, awareness and behaviour change**

- use of behaviour change theories to engage staff, influence culture, and permanently change habits associated with energy use at UHN

**4. Opportunity identification and implementation**

- development of on-going processes to identify and implement energy efficiency opportunities



**Figure 1: UHN's Energy Management Framework**

## ***Planning Process***

This plan builds on the energy planning process developed by UHN in 2007. The major steps in the planning process are as follows:

- **Describe the current state of energy management at UHN** – review projects, plans and energy management processes already undertaken in order to understand what is working well and if possible why and what obstacles may be encountered.
- **Define the future state of energy management at UHN** – drawing on insights from a wide range of hospital departments (e.g., Energy & Environment, Facilities, Infrastructure, etc.) discuss future possibilities for energy management at UHN. Refine the ideas and assign a status of “ongoing”, “near term” or “long term” based

on collective understanding of organizational priorities and resources. All ideas are documented in “Action Tables” (included in Appendix A).

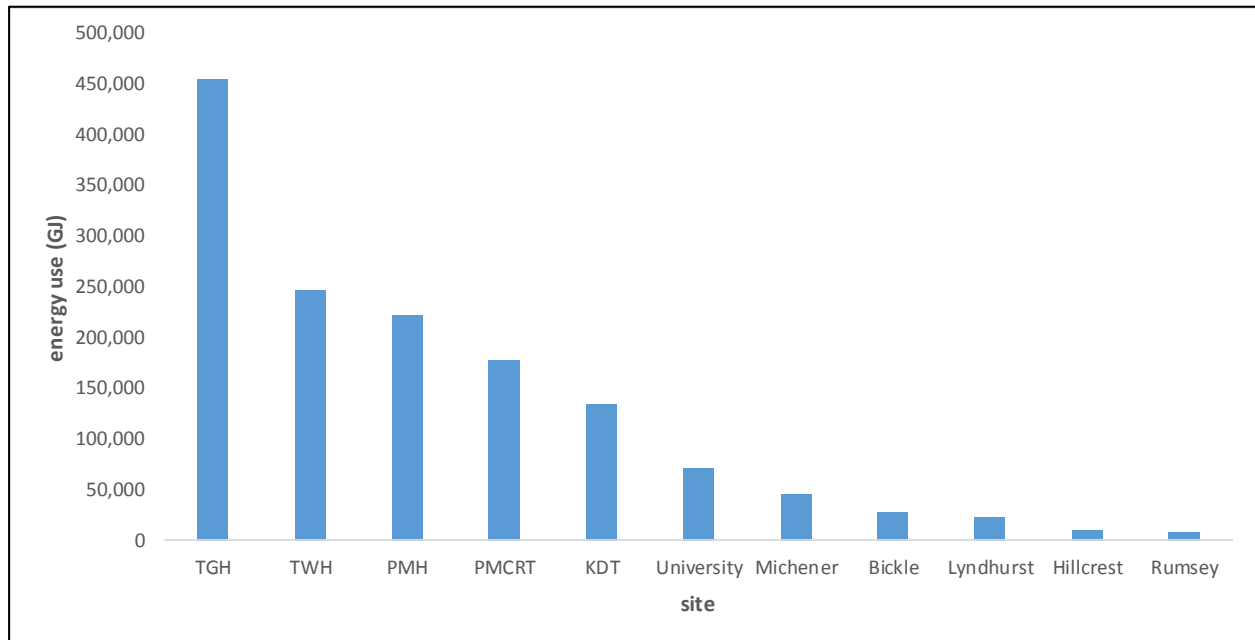
- **Define Measure of Success** – set measures of success to assist in recognizing when results have been accomplished and identify gaps along the process of continual improvement
- **Review the plan** – review and update the plan at least annually. The annual review will involve confirming the current state, updating progress to date and making relatively minor adjustments to measures of success. A major review of the plan will be conducted every five years near plan expiry.

### ***Current State of Energy Management at UHN***

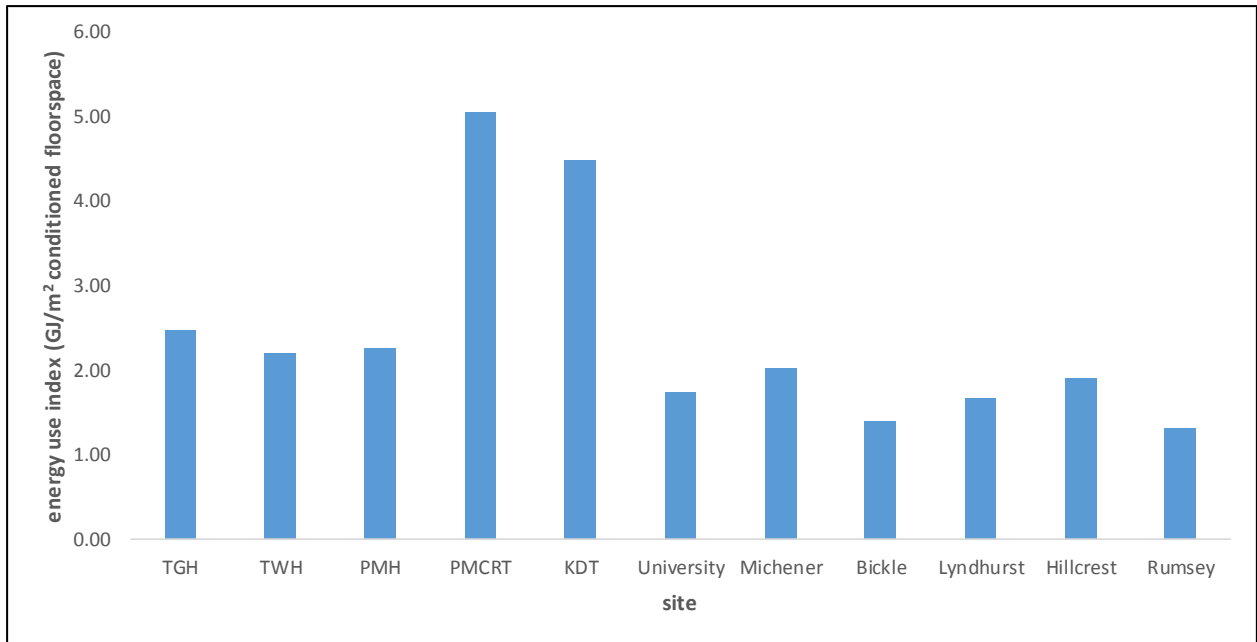
The current state describes how energy is used at UHN as well as how it is currently managed within the four elements of the strategic management framework.

#### *Energy Use at UHN*

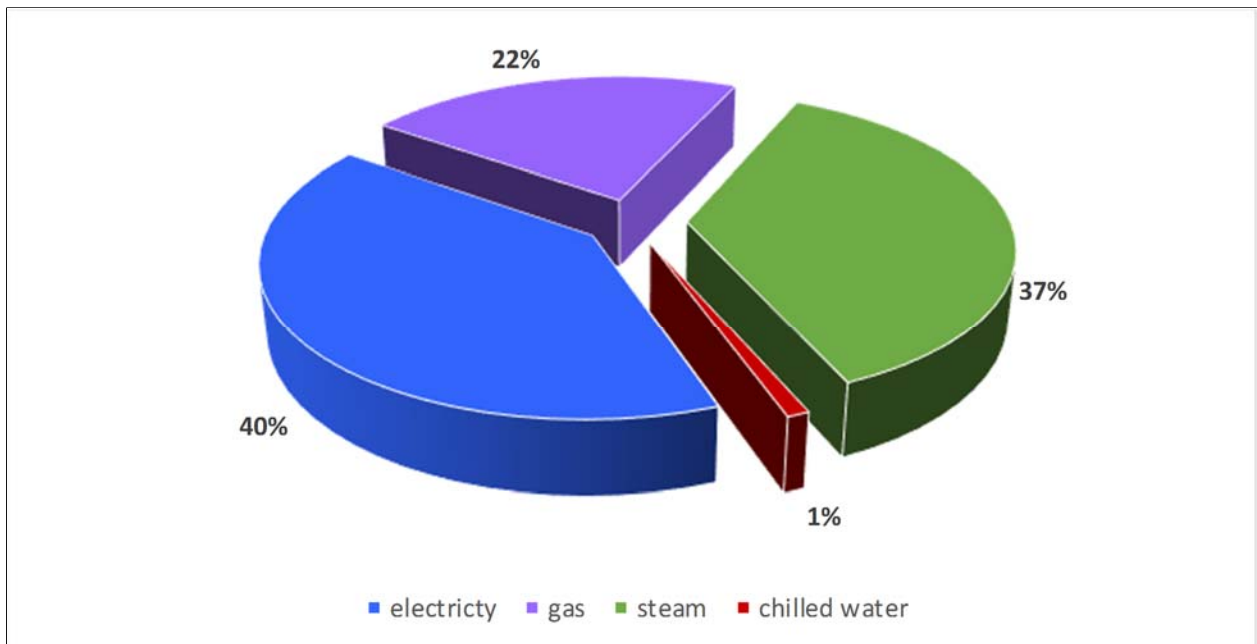
A breakdown of energy use at UHN in 2018 is provided in Figures 2 through 5 and includes data for the Krembil Discovery Tower, which was not available during initial writing of the plan and the The Michener Institute of Education at UHN which integrated with the hospital in January 2016.



**Figure 2: 2018 energy use by site.**

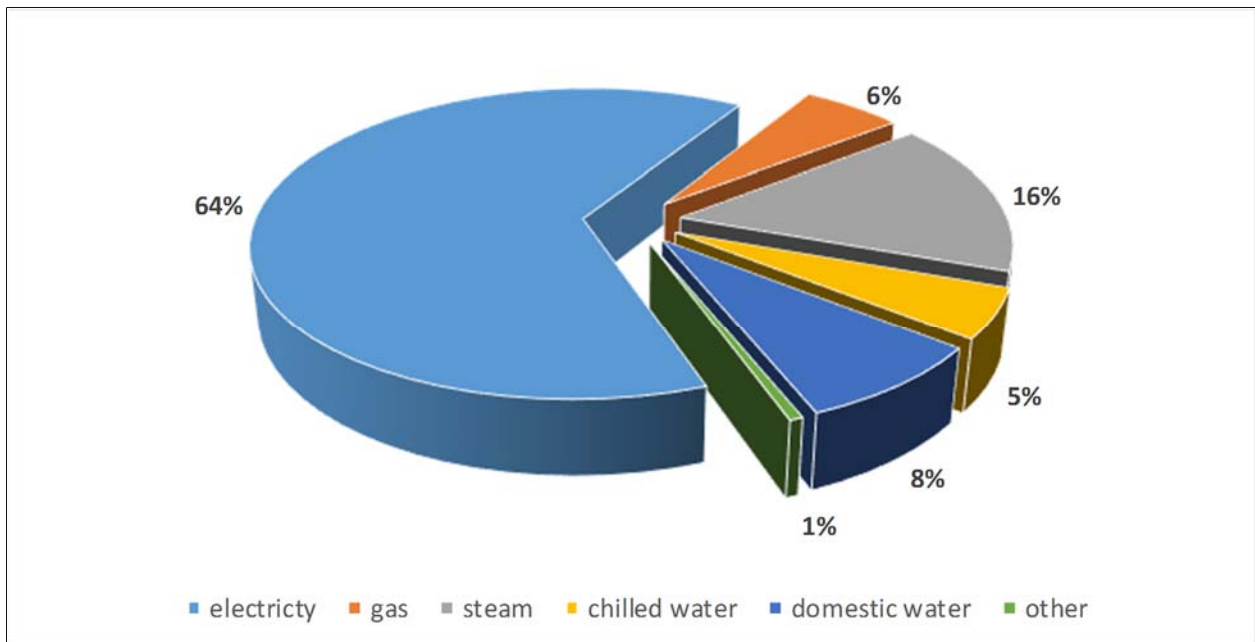


**Figure 3: 2018 Energy Use Index by site.**



**Figure 4: Breakdown of 2018 energy consumption by service.**





**Figure 5: Breakdown of 2018 utility costs by service.**

*Demonstrate organizational commitment*

UHN has demonstrated organizational commitment to energy efficiency in several ways, including:

- Executive approval and ongoing support for UHN’s *Energy and Water Conservation* policy.
- Inclusion of energy criteria in UHN’s *Green Procurement* policy.
- The formation of the hospital’s Energy & Environment department, accountable for all aspects of energy at UHN, including procurement, management and efficiency.
- The formation of Energy Teams at all main hospital locations, charged with the identification and implementation of site specific energy efficiency measures.
- The inclusion of energy efficiency requirements as part of UHN’s *Construction and Design Guidelines*.
- Launch and Executive support for *Operation TLC*, UHN’s most recent energy program with a goal of \$2.35 million in utility cost avoidance through retro-commissioning, retrofits and behaviour change.
- LEED silver candidacy for the Krembil Discovery Tower recently built at the Toronto Western Hospital campus.

### Monitoring and tracking

Utility use, costs and changes are tracked and reported at several levels:

- Monthly overall consumption reports and progress towards *Operation TLC* conservation targets provided to Site Executive and Facilities.
- Monthly cost reports, detailing the effects of utility rates, weather and changes in consumption (from both conservation efforts and the addition of new loads) provided to Site Executive and UHN Finance.
- Weekly electricity reports and progress towards *Operation TLC* conservation targets provided to Site Facilities.
- The availability of real-time electricity use to all UHN staff through the hospital intranet.
- Annual consumption and comparison to previous year consumption as part of Energy & Environment's annual report.
- A detailed list of recently completed, ongoing and potential energy projects at UHN is updated monthly.
- The installation of real-time utility monitoring systems at the Toronto Western Hospital and University Centre to help develop the business case for enterprise implementation throughout UHN.
- The requirement for an energy impact analysis, detailing net change in energy use, to be conducted for all capital projects affecting energy consumption at UHN.

### Culture, awareness and behaviour change

Creating a culture of conservation, based on staff awareness and engagement, is a key component of environmental and energy management at UHN. Key components include:

- The development of a behaviour change program based on theories of behavioural psychology and the principles of Community Based Social Marketing.
- Enrollment of over 700 Green Team members in support of energy efficiency and awareness throughout UHN.
- Regular presentations on *Operation TLC* to Site Leadership and Management.
- Face-to-face training of nearly 10,000 between January 2014 and July 2019 by UHN's Energy & Environment department as part of its communications strategy.
- The development and hospital wide distribution of energy awareness tools and prompts including intranet resources, banners, posters, stickers and postcards.
- Regular featuring of energy related stories as part of UHN's *Talkin' Trash* newsletter, *Talkin' Trash with UHN* blog, Energy & Environment social media sites and UHN Public Affairs initiatives.

### Opportunity identification and implementation

Energy conservation opportunities are identified in a number of ways.

- Building wide retro-commissioning and energy audits have been completed at all hospital locations.
- Numerous system specific energy efficiency audits (e.g., steam trap investigation, chiller plan commissioning, building envelope assessments, water use audits, etc.) have been completed or are currently underway at all locations and are planned on an ongoing basis.
- Site Energy Teams identify potential measures for further investigation and, where warranted, develop business cases and action plans for implementation.
- UHN's Energy Project Managers monitor building systems on an ongoing basis, including installation of metering and monitoring equipment, trending of BAS (Building Automation System) operations and investigation of specific equipment and/or systems.
- Energy & Environment is included throughout the capital project process to identify areas where energy efficiency may be realized as part of the project or through the addition of incremental funding.
- Energy & Environment conducts ongoing investigation of emerging technologies and behaviour change theories with the potential for energy efficiency.
- Through the *Operation TLC* culture, awareness and behaviour change program, all members of the UHN community are encouraged and able to present energy efficiency opportunities identified in their area of work.

### ***Moving Towards the Future State of Energy Management at UHN***

The actions described within the tables presented in Appendix A detail UHN's strategy to move from the current state of energy management to the future state.

The future state of energy use at UHN represents UHN's vision of how energy should be used and managed in the next five years and beyond. The action tables can be used at a glance to get a snapshot or pulse of active energy management at UHN. They can also be used as a more in depth summary of initiatives and plan for the coming five years. The action tables are designed to be easy to understand without being very familiar with UHN's energy management planning framework but also rigorous enough to be useful to UHN's Energy Teams working on implementing and sustaining the plan.

### ***Conclusions and Next Steps***

This energy management plan provides a framework for all energy management activities taking place at UHN. In the development of this plan the current situation of energy management and use at UHN was documented (the current state), a vision of where

energy management and use should be was identified (the future state), and actions to move from the current to the future state were developed.

The next steps in utilizing this energy management framework and plan include:

- Continuing to implement ongoing actions that move UHN from the current to the future state.
- Beginning to plan and implement those new actions that have been identified as priorities to be implemented in the near term.
- Integrating the plan with other sustainability plans developed at UHN during the planning period.

### ***More Information on UHN's Environmental Programs***

To learn more about Energy & Environment at UHN please stay connected with us.

Follow the **TALKIN' TRASH WITH UHN BLOG** <http://talkintrashwithuhn.com>

Like us on **FACEBOOK** <https://www.facebook.com/talkintrashwithuhn>

Follow us on **TWITTER** <https://twitter.com/UHNTalkinTrash>

## **Appendix A**

# **Energy Planning Action Tables**

# University Health Network Energy Plan: 2014-2019 \_ Ongoing Measures

Last Modified: 10-Jul-19

Area	Future State	Groups Involved	Measures of Success	July 2019 Progress Update
<b>Demonstrate Organizational Commitment</b>				
Energy management framework	Operation TLC energy management framework is accepted and easy to implement.	UHN Community	Continual improvement in energy management at UHN with annual reductions in the 3-5% range.	Operation TLC is well established in planning, construction and operational activity continual improvement has been embedded in the process. Net energy reduction of 12% between 2011 and 2018.
Resources for energy management	Resources are available for energy management at UHN.	Senior Leadership, Infrastructure, Energy and Environment, Facilities	Workload is managed and ongoing ability to identify and implement energy conservation measures is maintained.	Resources are available and evaluated on an annual basis as part of UHN's capital planning process.
Engaged leadership	Energy conservation and Operation TLC are a regular agenda item for UHN Senior Leadership.	Senior Leadership, Energy and Environment	Senior leaders understand their role in Operation TLC and are actively participating.	Operation TLC is actively supported and facilitated by Senior Leaders. Energy and Environment communication plan includes monthly Operation TLC update for Senior Leaders and Executive as well as annual reporting.
Policy	UHN Energy Policy is comprehensive and reflects both internal priorities and external circumstances to achieve maximum energy efficiency and conservation	Energy and Environment, Senior Leadership, Facilities	Energy policy is current and relevant.	UHN's Energy and Water Conservation policy approved since 2002 and is reviewed annually by key stakeholder departments including Facilities and Energy and Environment. All changes are approved by UHN Executive.
Engaged UHN sites	UHN sites work collaboratively with each other, Infrastructure, Energy and Environment and other key stakeholders to move projects and programs forward.	Facilities, Energy and Environment, Infrastructure	Continuous progress and improvement in energy projects and programs.	Site specific energy team meetings have been established. Detailed project tracking for each site based on current activities and archive of past achievements. Energy efficiency is integrated into day-to-day operations and planning.

# University Health Network Energy Plan: 2014-2019 \_ Ongoing Measures

Last Modified: 10-Jul-19

Area	Future State	Groups Involved	Measures of Success	July 2019 Progress Update
Capital and redevelopment projects	Energy efficiency is a central design component of all new capital and redevelopment projects.	Facilities, Energy and Environment, Infrastructure	All new projects include energy considerations in design phase.	UHN Energy Managers embedded into design and planning process. Regular meetings scheduled with key Planning and Construction teams as part of Energy and Environment communication strategy.
Capital and redevelopment projects	Resources and support are available to incorporate energy efficiency into capital and redevelopment projects.	Infrastructure, Facilities, Energy and Environment	Energy and Environment included throughout the project process. Dedicated resources available to ensure energy efficiency is incorporated into projects.	Energy and Environment incorporated into review of design, construction and specifications. Incremental funding for energy efficiency made available where supported by a business case.
<b>Monitoring and Tracking</b>				
Capital and redevelopment projects	Energy impact of new projects is determined	Energy and Environment, Infrastructure	All projects have detailed and quality energy impact analysis completed. Project designs modified where inefficiencies have been identified.	Energy impact estimated for major projects but completion is inconsistent. Improved efficiency measures recommended and, when supported by a business case, implemented if energy impact identifies opportunity for improvement.
Energy consumption data	Energy consumption data is accurate and accessible.	Energy and Environment	Reports and statistics are available and easy to use.	Energy consumption data is complete from 2000 to present for all major buildings (Michener data available from April 2014). Regular consumption reports, including weekly electricity reporting, are provided to Facilities and Senior Leaders.
Energy conservation project data	Savings resulting from energy conservation measures are obtained and accurate.	Energy and Environment	Reports and statistics are easy to use.	Energy saving estimates for individual projects are available from 2002 to present. Net energy savings are calculated as part of UHN utility use tracking. Summary of energy conservation and management is included in Energy and Environment annual report.

## University Health Network Energy Plan: 2014-2019 \_ Ongoing Measures

Last Modified: 10-Jul-19

Area	Future State	Groups Involved	Measures of Success	July 2019 Progress Update
Sub metering	Data obtained through sub-metering is available and utilized.	UHN Energy Teams, TLC Energy Experts, UHN Community	Access to information at point of influence	Real time electricity use for hospital locations available on UHN intranet. Interval electricity data available via web portals for all sites excluding Michener. Plans for broader metering strategy, including pilot installations, under development.
Energy management framework	Third party evaluation of energy management framework.	Energy and Environment	Third party evaluation report and recommendations complete.	Development of evaluation of protocol beyond energy "bottom line" has proven more challenging than anticipated. UHN currently involved with numerous international groups examining program and process evaluation options.
<b><i>Culture, Awareness and Behaviour Change</i></b>				
Energy management framework	Energy planning process is inclusive and comprehensive.	Energy and Environment, Infrastructure, Facilities	Plan helps to inform decisions to improve energy efficiency and conservation.	Energy plan is written, posted and reviewed annually.
Culture	Shift to "Culture of Conservation" is documented through behaviour change.	UHN Community	Metrics developed and tracked to demonstrate how Operation TLC is leading to culture and behaviour change at UHN.	Communications and engagement program, branded Operation TLC, has been developed based on social marketing and behaviour change theory, and incorporated into broader Energy and Environment strategies. Development of an evaluation protocol ongoing in consultation with numerous external groups.
Department champions (Energy Experts)	Energy efficiency championed at the departmental level throughout UHN.	UHN Community	Operation TLC brand is well recognized throughout UHN. In departments with Energy Experts 40% of staff publically demonstrate a commitment to reduce excess electricity use.	Recruitment of "Energy Expert" champions was completed for most departments, though role has been incorporated into broader "Green Team" environmental champions group.



## University Health Network Energy Plan: 2014-2019 \_ Ongoing Measures

Last Modified: 10-Jul-19

Area	Future State	Groups Involved	Measures of Success	July 2019 Progress Update
Staff training	Staff training is routinely provided for key departments (e.g., Facilities, Housekeeping, Energy and Environment, Infrastructure, etc.).	UHN Community	Communication and training strategy is reviewed annually and remains current.	Regular training provided internally by Energy and Environment. Some external training resources utilized for Energy and Environment. Gaps identified and action plan to address under development.
Recognition	Commitment to energy efficiency by UHN staff is recognized.	UHN Community	Golden Light Switch trophy is recognized throughout UHN as a measure of success.	"Golden Light Switch" trophy was presented to departments and individuals demonstrating commitment to Operation TLC. Program has been phased out for more general recognition via news and social media recognition.
Recognition	Commitment to energy efficiency by UHN staff is shared.	UHN Community	Success stories influence others around energy management and behaviour change.	Staff energy successes are documented, as part of broader sustainability recognition, on the public "Talkin' Trash With UHN" blog through addition to the "Green Wall of Fame" and posting of related stories as they occur.
Recognition	UHN viewed as a leader in energy management.	UHN Community, Community of Practice	Recognition of UHN as a leader in energy management influences internally around energy management and behaviour change.	UHN regularly requested as resource in the community to share expertise, process, technical and reporting advice, both for energy efficiency, as well as for climate change adaptation.
<b>Opportunity Identification and Implementation</b>				
Information sharing	The energy management plan is informed by and contributes to the sharing of best practices, strategies and related information.	Energy and Environment, Facilities, Infrastructure, External Partners	The exchange of ideas is active and robust with joint energy opportunities pursued where feasible.	Energy management process embedded into Facilities Operations, Project Planning and Redevelopment processes. Regular energy training and updates provided to key internal stakeholders.

## University Health Network Energy Plan: 2014-2019 \_ Ongoing Measures

Last Modified: 10-Jul-19

Area	Future State	Groups Involved	Measures of Success	July 2019 Progress Update
Emerging technologies	Opportunities are identified on an ongoing basis, including opportunities to partner and pilot new technologies.	Facilities, Energy and Environment, Infrastructure	New energy management technologies and approaches are regularly tabled at monthly energy team meetings.	Energy and Environment reviews publications, dialogues with energy management vendors and actively participates in several communities of practice. Active investigations and piloting being conducted in several areas, including lighting, utility monitoring, real-time commissioning, advanced fault detection, high efficiency filters and heat-pumps..
Idea solicitation	Two way flow of information in place for all UHN staff to solicit new ideas and provide feedback on submitted ideas.	UHN community	Feedback from the broader UHN community is incorporated into energy management projects and programs.	No formal process for collecting and document ideas, though all submitted Ideas are responded to in a timely way and, where applicable, investigated and potentially implemented.
Lighting	Energy efficient lighting with optimized controls is the standard for UHN.	Infrastructure, Facilities, Energy and Environment	All new lights purchased are efficient and have optimized controls. Lighting design ensures efficient use of light is optimized.	Most 24/7 lights have been retrofitted to LED with retrofit of remaining lights ongoing. UHN Lighting Standard has been implemented and in use for construction and redevelopment projects. Advanced lighting controls installed at TGH and being investigated for other sites.
Lighting sensors	Appropriate areas are equipped with motion or daylight sensors.	Facilities, Energy and Environment, Infrastructure	Sensors are installed in recommended areas.	Extensive use of lighting sensors, primarily in washrooms, exam rooms and offices, with retrofit of older areas ongoing. Lighting sensors specified for all new construction where applicable.
Identification of energy efficiency opportunities	Energy efficiency opportunities are identified on an ongoing basis.	Facilities, Energy and Environment, Infrastructure	List of identified energy efficiency opportunities remains active and current.	Energy efficiency opportunities tracked on an ongoing basis, both as stand alone projects and as part of other capital and redevelopment projects. Detailed lists maintained for all sites and discussed at site based Energy Team meetings.

## University Health Network Energy Plan: 2014-2019 \_ Ongoing Measures

Last Modified: 10-Jul-19

Area	Future State	Groups Involved	Measures of Success	July 2019 Progress Update
Identification of water efficiency opportunities	Water efficiency opportunities are identified on an ongoing basis.	Facilities, Energy and Environment, Infrastructure	List of identified water efficiency opportunities remains active and current.	Water efficiency audits completed at all sites with tracked on an ongoing basis, both as stand alone projects and as part of other capital and redevelopment projects. Detailed lists maintained for all sites and discussed at site based Energy Team meetings.
Retro-commissioning	\$2.35M in utility savings realized through retro-commissioning, improved building operations and related areas.	Energy and Environment, Facilities, Infrastructure	Retro-commissioning targets are met and sustained.	Retro-commissioning audits completed for all locations, with new opportunities added and addressed as part of overall energy management strategy. Cumulative utility savings of \$18.7M from 2012 until 2018.

# University Health Network Energy Plan: 2014-2019 \_ Near Future Measures

Last Modified: 10-Jul-19

Area	Future State	Groups Involved	Measures of Success	July 2019 Progress Update
<b>Demonstrate Organizational Commitment</b>				
Energy management framework	Sustainability and energy management programs are fully integrated; Operation TLC is bundled with other Energy and Environment sustainability activities.	Energy and Environment	Elements of energy plan are fully integrated into all sustainability initiatives at UHN.	Sustainability strategic plan has been developed with energy management fully integrated.
Engaged UHN sites	Succession planning is developed for Building Operators, with consistent transfer of building operations knowledge.	Facilities, Energy and Environment	Key building operations related to energy management are documented and process in place to ensure knowledge transfer.	"As built" documentation for BAS ongoing, with opportunities for implementing best practiced flagged. Engagement and training strategy for Building Operators in development and identified as a priority.
Resources	Long term sources of funding (internal and external) are secured for energy management.	Energy and Environment, Infrastructure, Finance	Resources secured to allow short, near future and long term energy planning.	Funding for energy management included in capital budget planning.
Energy management framework	Vision in place to focus UHN's Energy Management framework.	Energy and Environment, Facilities, Infrastructure, other internal stakeholders	Vision statement in place that compliments current work and actively guides and motivates future work.	Energy and Environment vision developed and used to focus planning and activities.
<b>Monitoring and Tracking</b>				
Real time utility monitoring	Real time utility data is available and utilized.	Infrastructure, Facilities, Energy and Environment	Real time utility data is available and used for on-going commissioning, identification of energy saving opportunities and measurement and verification for energy and capital projects.	Real time electricity data is available for all locations. Full utility real time system installed for TWH and UC using third party platforms, but need to be migrated to the BAS. Development of a metering plan identified as a priority and underway.

## University Health Network Energy Plan: 2014-2019 \_ Near Future Measures

Last Modified: 10-Jul-19

Area	Future State	Groups Involved	Measures of Success	July 2019 Progress Update
Departmental energy use reporting	Energy Experts identify and document opportunities for energy savings in their work areas.	Operation TLC Energy Experts, Energy and Environment	Implementation of energy efficiency opportunities identified by Energy Experts are documented and, where feasible, quantified.	Energy Expert role has been rolled into broader Green Team role, with over 700 self-identified members. Training, ongoing coaching and a variety of tools are available as needed. Implementation of energy saving and other sustainability opportunities completed when identified if feasible.
Energy conservation project data	Facilities work order system is adapted to identify and track energy saving opportunities associated with building maintenance.	Facilities, Energy and Environment	Energy efficiency fully incorporated into work order system with mechanism developed to provide feedback to Facilities staff.	Implementation of new UHN wide Integrated Work Management System underway. Energy and Environment actively involved in roll-out to ensure energy opportunities are identified and included where feasible.
<b>Culture, Awareness and Behaviour Change</b>				
Staff training	Regular face-to-face energy sessions are scheduled with Building Operators to discuss energy issues and opportunities.	Energy and Environment, Facilities	Discussions with Building Operators are held regularly and participants are invested.	Meetings with Building Operators held regularly on an as needed basis. Building Operators participate in Energy Team meetings as needed. Implementation of Building Operator energy huddles being considered.
Staff training	In-house Sustainability Training for staff involved with capital and redevelopment projects.	Energy and Environment, Infrastructure, Facilities	Internal training sessions have been conducted and future sessions are scheduled. Curriculum is current and engaging.	Energy and Environment training module developed and delivered to all capital and redevelopment project teams within FM-PRO portfolio. Training sessions incorporated into overall Energy and Environment communication plan.

## University Health Network Energy Plan: 2014-2019 \_ Near Future Measures

Last Modified: 10-Jul-19

Area	Future State	Groups Involved	Measures of Success	July 2019 Progress Update
Culture	Operation TLC brand recognition is universal at UHN.	UHN Community	Brand recognition is increased year over year.	Brand recognition survey distributed in 2013. Follow-up planned for 2016, but not delivered as use of survey is being re-evaluated in broader context of measuring implementation of behaviour and culture change programs.
Green Team	Green Team consists of experienced, engaged and effective staff from across a range of hospital departments.	UHN Community	Green Team members are enrolled in areas as required. Members are provided time and resources to complete sustainability initiatives.	New members are recruited where direct or related interest expressed. Training, ongoing coaching and a variety of tools are available as needed. Support provided for Green Team members to complete sustainability initiatives.
Social marketing	Operation TLC program is self-sustaining.	UHN Community	Documented increased participation of Energy Experts and demonstrated meeting of Operation TLC behaviour change goals.	Social Marketing tools passively incorporated into Energy and Environment communication strategy and during engagement of Green Team members.
Recognition	Recognition and reward program developed specifically for Facilities staff.	Facilities, Energy and Environment	Facilities staff are regularly recognized for commitment to energy management. Facilities department is proud of achievements.	Recognition of Facilities staff contribution to energy management on a project-by-project basis. Facilities staff are included in identification and planning of energy projects.
<b>Opportunity Identification and Implementation</b>				
Capital and redevelopment projects	Energy impact analysis included in capital project requests for proposal.	Procurement, Infrastructure, Energy and Environment	All requests for proposal include energy impact analysis requirements, where applicable.	Energy impact estimated for major projects only. Investigation into incorporation of broader operational impacts of capital projects ongoing.
Small renovation projects	Include energy and environmental considerations on all capital and redevelopment projects.	Facilities, Energy and Environment, Infrastructure	Consideration of energy and environmental items documented for all capital and redevelopment projects.	Energy and Environment project checklist developed. Energy Managers included in project planning and implementation where appropriate.

# University Health Network Energy Plan: 2014-2019 \_ Near Future Measures

Last Modified: 10-Jul-19

Area	Future State	Groups Involved	Measures of Success	July 2019 Progress Update
Building information	All buildings drawings are up-to-date and available in a database.	Energy and Environment, Infrastructure, Facilities	Appropriate drawings and information are available as needed for all of UHN.	Many architectural drawings have been identified and updated. An implementation strategy being considered to develop the database, migrate information, and implement a system for continued information maintenance.
Building information	Equipment manuals are current and accessible.	Facilities	Manuals are current and reviewed regularly as part of BAS maintenance program.	Not all manuals are current or available with review and updating done on an ad hoc basis. UHN working towards including full commissioning as a standard for all major capital projects.
Identification of energy efficiency opportunities	Building energy performance is regularly reviewed.	Energy and Environment	Building energy performance monitored on an ongoing basis by Facilities and other staff with opportunities identified and addressed in a timely fashion.	On-going building and system review and measurement conducted by Energy Managers. Utility data monitored monthly, with electricity reports provided on a weekly basis and used to identify issues and successes. Energy Teams meet regularly to discuss.
Building automation system (BAS)	BAS controls are state of the art with full functionality being utilized.	Energy and Environment, Infrastructure, Facilities	BAS at all sites is current and optimized.	BAS condition assessment completed for all sites. Upgrade of BAS and components included as part of capital and redevelopment project scope. Energy and Environment leading ongoing replacement of obsolete BAS and components as well as conversion from pneumatic to DDC.
Equipment inventory	Document high priority equipment for energy savings	Facilities	List of key equipment and systems with measured energy performance is available and up to date.	On-going building and system review and measurement conducted by Energy Managers. Items for follow-up are presented at Energy Team meetings and implementation progress tracked.

## University Health Network Energy Plan: 2014-2019 \_ Near Future Measures

Last Modified: 10-Jul-19

Area	Future State	Groups Involved	Measures of Success	July 2019 Progress Update
Building Envelope	Building envelope including roofs, windows and entrances are upgraded to increase energy efficiency.	Facilities	Efficiency of building envelopes is improved and maintained.	Audits completed. Energy considerations included in envelope projects with several already completed, including use of "cool roofs" and several currently in various stages of implementation.



# University Health Network Energy Plan: 2014-2019 \_ Long Term Measures

Last Modified: 10-Jul-19

Activity	Future State	Groups Involved	Measures of Success	July 2019 Progress Update
<b>Demonstrate Organizational Commitment</b>				
Resources	Energy management ideas and expertise from UHN staff are commercialized where feasible.	UHN Community, Facilities, Energy and Environment	Business plan(s) developed. Commercialization pursued where feasible.	Commercialization discussed but not actively pursued due to saturated market.
Master Planning	Space used in most efficient manner, particularly in plans for future expansion	Infrastructure, Energy and Environment	Space and Master Planning includes efficient use of utilities as key factor for consideration.	UHN Construction and Design guidelines include energy efficiency. Utility use considered during space planning. Energy and Environment included in ongoing development of UHN Master Plan.
<b>Monitoring and Tracking</b>				
TLC validation	Operation TLC validated through successful implementation at other healthcare facilities.	Energy and Environment, External Stakeholders	Operation TLC is adopted by at least one hospital.	Learnings from Operation TLC are shared with groups such as Practice Greenhealth, The Ontario Hospital Association and the Canadian Coalition for Green Health Care. Presentations made to other hospitals as requested. Several case studies and presentations delivered.
Occupant complaints	Capacity for building operators to address temperature complaints is optimized.	UHN Community, Facilities	Documented decrease in the number of temperature complaints.	Procedure for addressing temperature complaints developed and implemented. Temperature standards and work to address building issues are incorporated into Operation TLC communication strategy. Underlying issues, primarily BAS related, being identified and addressed on an ongoing basis. Anticipated that implementation of new Integrated Work Management System will allow for better collection of temperature complaints.
<b>Culture, Awareness and Behaviour Change</b>				

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Activity	Future State	Groups Involved	Measures of Success	July 2019 Progress Update
Staff feedback	Feedback from key staff is regularly incorporated into assessment of energy programs	UHN Community	Formal feedback process documented, implemented and maintained.	Informal feedback being collected on ad hoc basis. Development of a formal process not a priority.
<b>Opportunity Identification and Implementation</b>				
Preventative maintenance	All equipment maintained through preventative maintenance.	Facilities, Energy and Environment	Preventative maintenance performed according to equipment specifications or as per pre-determined schedules.	Schedules in place for preventative maintenance for a majority of equipment. Limited use of sensors and control points to determine preventative maintenance frequency. Ongoing trials fault detection software as a way for early identification of corrective maintenance. Anticipated that new Integrated Work Management System will include preventative maintenance requirements.
Zone control	Zone Control is optimized for HVAC and BAS systems.	Facilities, Energy and Environment, Infrastructure	Zone control implemented and optimized where feasible.	Work to upgrade BAS and control points ongoing, including Energy and Environment led project to replace obsolete VAV controllers followed by air balancing and scheduling.
Equipment Maintenance	Energy efficiency incorporated as a key element of equipment maintenance programs.	Facilities, Energy and Environment	Energy efficiency incorporated into maintenance checklists and work orders. Tools for assessing energy performance of equipment are available and used.	Anticipated that new Integrated Work Management System will include preventative maintenance requirements related to maintaining equipment energy efficiency.
Sub-meter integration	Sub-meters play an active part in Energy Management at UHN.	Facilities, Energy and Environment	Sub-metering plan is optimized and integrated into BAS. Information is readily available to all staff and incorporated into building management and behaviour change programs.	Preliminary sub-metering plans being developed with anticipated pilot implementation at Lyndhurst Centre in near future.

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Activity	Future State	Groups Involved	Measures of Success	July 2019 Progress Update
Lighting levels	Lighting levels are optimized.	Facilities, Fire and Life Safety, Security, Infrastructure	Lighting assessed throughout UHN and levels optimized so that over lighting is eliminated.	UHN wide lighting audits underway. Photometric plots and optimization of lighting levels included in projects.
Building information	Complete and up-to-date documentation of mechanical and electrical systems.	Infrastructure, Facilities, Energy and Environment	Mechanical and electrical systems fully documented on an current BIM (Building Information Management) system.	Many architectural drawings have been identified and updated. An implementation strategy being considered to develop a drawing database, migrate information, and implement a system for continued information maintenance.
Renewable Energy	Renewable energy use is increased over time.	Energy and Environment, Infrastructure, Facilities	Review of renewable energy use opportunities is document with implementation where feasible.	Deep Lake Water Cooling in place at University Centre and Toronto General Hospital with installation at Princess Margaret Cancer Centre ongoing. Renewable natural gas and ground-source heat pumps being investigated.
Demand and Peak Load shifting	Demand response and peak load shifting is investigated and where feasible utilized.	Energy and Environment, Facilities	Review of demand response opportunities is document with implementation where feasible.	Preliminary investigation for demand response opportunities investigated and discussed with Energy Teams. Decision to pursue permanent demand reduction because of higher reliability and stronger business case than for demand response. Energy storage being investigated.
Combined Heat and Power	Combined Heat and Power (CHP) is investigated and where feasible utilized.	Energy and Environment, Infrastructure	CHP feasibility study completed and implementation ongoing where feasible.	Preliminary assessments completed with preliminary design completed for Bickle Centre and Toronto Western Hospital. Investigations ongoing, but paused to allow for completion of UHN Master Plan.
Recapitalization	Recapitalization includes energy management	Senior leadership	This is considered part of a fully functioning and integrated energy management program	Energy management embedded into recapitalization planning and implementation process. Regular meetings scheduled for Energy and Environment and FCAP Planning (recapitalization planning) teams.

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Activity	Future State	Groups Involved	Measures of Success	July 2019 Progress Update
Approval for energy projects that result in dollar savings	A process in place to get projects implemented quickly and effectively	Infrastructure, Finance, Energy and Environment	UHN has ownership of buildings information	Short, medium and long term energy project planning, including development of business cases, underway. Funding provided as part of capital budget.
Energy mapping	Process in place to identify energy use and interactions within UHN.	Infrastructure, Facilities, Energy and Environment	Energy maps in place and actively used to identify energy efficiency and conservation opportunities.	Preliminary research started on how energy mapping might be applied at UHN though deferred to focus on higher priority opportunities.
Total cost of ownership	Life cycle assessment and costing, including energy use, are considered during the procurement of all equipment, products and services.	Energy and Environment, Infrastructure, Medical Engineering, Facilities, UHN Procurement, Plexxus	Life-cycle assessment used for all procurement decisions. Assessment criteria are actively communicated to vendors potentially selling equipment, products and/or services to UHN.	UHN Green Procurement policy approved. Life cycle costing incorporated into some procurement processes.