



# Energy management plan for Toronto General Hospital





# Energy management plan for Toronto General Hospital: 2009-2012



INDECO 



 **TORONTO** Atmospheric Fund



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# Contents

<b>Executive summary</b> .....	<b>v</b>
<b>1 Introduction</b> .....	<b>1</b>
1.1 Background .....	1
1.2 Planning horizon and scope .....	3
1.3 Planning framework.....	3
1.4 Purpose and objectives .....	5
<b>2 Plan elements</b> .....	<b>7</b>
<b>3 Conclusions and next steps</b> .....	<b>16</b>
<b>Appendix A. Planning process</b> .....	<b>17</b>
<b>Appendix B. Present state</b> .....	<b>19</b>
B.1 Energy use at TGH.....	19
B.2 Organizational commitment .....	22
B.3 Opportunity identification and implementation .....	23
B.4 Awareness and engagement.....	24
B.5 Monitoring and tracking .....	24



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## Executive summary

This energy management plan for Toronto General Hospital (TGH) is a three-year plan covering the period from June 2009 to June 2012.

This energy management plan was produced using a planning framework that consists of the following four components:

- **Organizational commitment** - a demonstrated commitment that the organization is committed to the concept of energy efficiency in its day to day operations and planning
- **Opportunity identification and initiative implementation** – on-going process or processes to identify energy efficiency opportunities, followed by the planning and implementation of energy efficiency initiatives
- **Awareness and engagement** - an energy awareness campaign for staff, clients, partners or the community at large
- **Monitoring and tracking** - a system to track, analyze and report on energy consumption and costs over time

Based on a strategic planning session held with members of the TLC Project Team, UHN staff, members of the TGH Energy Team and selected Facilities staff this energy management plan was developed and the following priority actions were identified:

- Develop and implement a strategy for on-going communication with Public Affairs regarding energy. Integrate into Energy & Environment communication plan.
- Develop and implement a strategy to keep senior management engaged in the TLC program. Integrate into Energy & Environment communication plan.
- Maintain relationships and retain external consultants in the long-term to assist with the maintenance of the TLC program.
- Continue to develop and foster relationships for the sharing of best practices in energy management. Actively contribute to related forums and participate in joint energy opportunities where feasible.
- Continue ongoing scan of energy management technologies and approaches and table at monthly Energy Team meetings. Incorporate retro-commissioning, energy and related facility audits.
- Continue to promote Energy & Environment components of UHN's Construction & Design Guidelines. Ensure commissioning is incorporated into scope of projects where appropriate. Participate in Green Guide for Health Care activities.
- Continue to promote and raise awareness of UHN's Green Procurement policy, particularly around energy efficiency and product life cycle into costing. Develop a strategy for communicating with vendors and purchasing groups. Participate in the Global Health and Safety Initiative's green procurement activities.
- Incorporate maintaining and increasing free cooling capacity as part of new construction. Continue to identify opportunities to maximize free cooling.
- Develop policy and procedure, including response to tenant complaints for space temperature settings. Continue to raise and lower the temperature settings in the hospital to more moderate levels.
- Continue to integrate social marketing and employee engagement messages into communication tools used by Energy & Environment.
- Continue to include utility information in Energy & Environment annual report.
- Continue to monitor and track energy savings against objectives.
- Maintain the current monitoring and tracking system.



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# 1 Introduction

## 1.1 Background

Over a decade ago UHN began to formally address energy and environmental issues and opportunities in their hospitals – Toronto Western Hospital, Toronto General Hospital and Princess Margaret Hospital - based on the ISO 14001, Environmental Management System. The issues targeted included toxics; solid, hazardous and biomedical waste; water and energy efficiency; and other sustainability issues. As a result of this on-going work UHN has reduced the negative environmental impacts associated with the day-to-day activities in all of the target areas and has been recognized with numerous awards for its environmental and energy activities. UHN has also actively participated in sharing best practices with other healthcare facilities across the country.

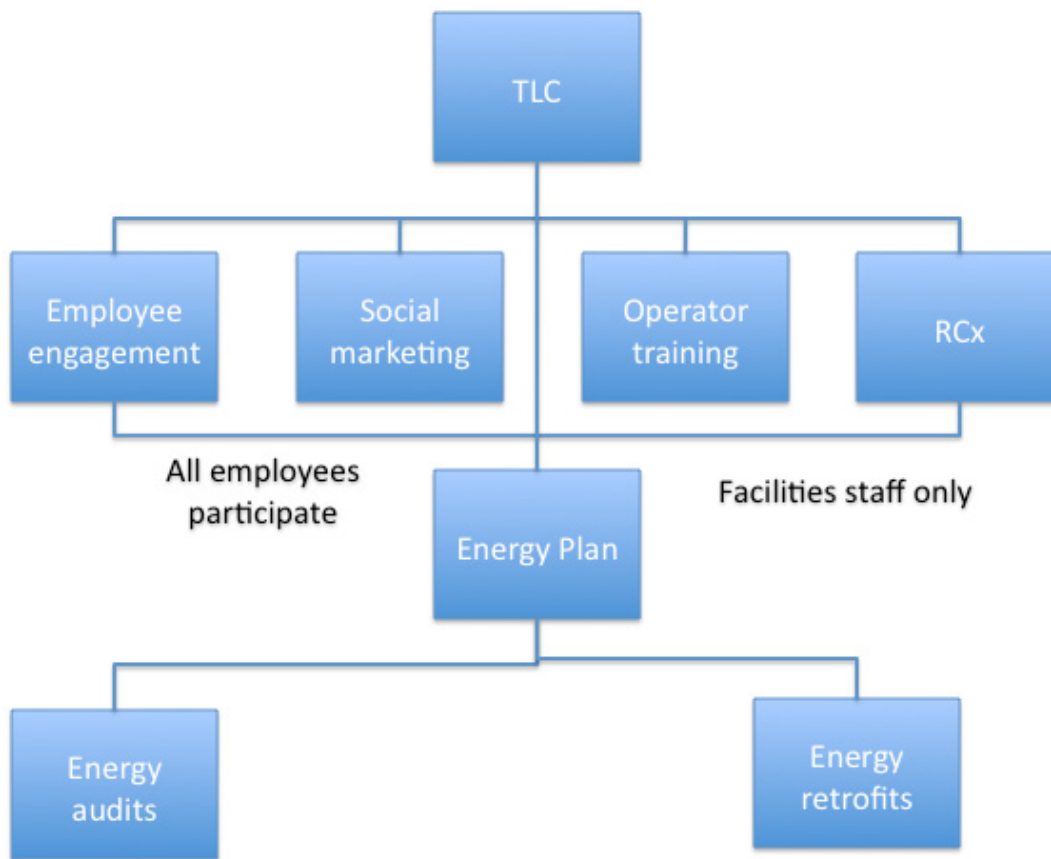
Building on these successes, in 2007 UHN received funding to pilot a comprehensive energy management and engagement program in all three hospitals over three years. This energy management and engagement program branded as TLC (which stands for Thermostats, Lights and Controls and has the tagline Care to Conserve) is a tool for engaging all members of the hospital community to work together to make behavioural, process and equipment changes that will increase awareness and reduce consumption of energy and production of GHGs.

TLC consists of four major components: Employee Engagement, Social Marketing, Operator Training, and Retro-commissioning (RCx)<sup>1</sup>. This program also involves the development of a comprehensive and integrated energy plan and the implementation of energy audits and retrofits. A schematic representation of the TLC program is shown Figure 1 below.

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<sup>1</sup> RCx is a systematic, documented process that identifies low-cost operational and maintenance improvements in existing buildings and equipment and brings the buildings and equipment up to the design intentions of its current usage. RCx focuses on optimizing existing system performance, rather than relying on major equipment replacement.

Figure 1 Schematic representation of the TLC program



In the first year of the pilot (June 2007 – June 2008) the TLC program was introduced at Toronto Western Hospital and the four major program components were implemented. In the second year (June 2008 – June 2009) implementation of the TLC program continued at TWH and the program was also introduced at Toronto General Hospital. The second year of this pilot culminated in the development of a comprehensive and integrated energy management plan for Toronto General Hospital, which is documented in this report. This plan provides a framework for all energy management activities taking place at TGH including, but not limited to, the comprehensive audit and retrofits and continued development and implementation of the four TLC program components.

The TLC program is designed and implemented at TGH by a Project Team, which consists of staff from the UHN Energy and Environment Department and external consultants (IndEco Strategic Consulting, Finn Projects and the University of Toronto Sustainability Office) in

collaboration with the TGH Energy Team, which is made of senior Facilities staff from the hospital and the UHN Energy and Environment Department.

## 1.2 *Planning horizon and scope*

The energy management plan for Toronto General Hospital is a three-year plan covering the period from June 2009 to June 2012. A three-year planning horizon was selected for a number of reasons including:

- It is consistent with the planning horizons for energy management utilized by other organizations such as gas and electric utilities
- It allows TGH to be more proactive and avoid year-to-year or project-to-project energy planning
- The timeframe is not too long that the actions laid out in the plan seem to be in the distant future and therefore unreachable
- A three year timeframe limits the datedness of the plan components to a manageable level, which can be accommodated by yearly plan updates rather than a new plan

This energy management plan provides a framework for all energy management activities taking place at TGH including, but not limited to, the comprehensive audit and retrofits and continued development and implementation of the four TLC program components.

## 1.3 *Planning framework*

The energy management plan for TGH was produced using the planning framework shown in the diagram below. This framework has four components:

- **Organizational commitment** - a demonstrated commitment that the organization is committed to the concept of energy efficiency in its day to day operations and planning
- **Opportunity identification and implementation** – on-going process or processes to identify energy efficiency opportunities, followed by the planning and implementation of energy efficiency initiatives

- **Awareness and engagement** - an energy awareness campaign for staff, clients, partners or the community at large
- **Monitoring and tracking** - a system to track, analyze and report on energy consumption and costs over time

Figure 2 below shows these framework components and the interaction between them.

**Figure 2 Framework for the energy management plan for Toronto General Hospital**



This framework is based on the energy management plan framework developed by UHN.

Within this framework the components have also been further broken down into major elements. These elements are:

- **Organizational commitment**
- **Opportunity identification and implementation**
  - Retrocommissioning (RCx)
  - Audits and retrofits
- **Awareness and engagement**
  - Operator training
  - Social marketing
  - Employee engagement
- **Monitoring and tracking program**

The planning process that led to the energy management plan, which was developed under this framework, can be found in Appendix A.

## **1.4 Purpose and objectives**

The objectives of the energy management plan are as follows:

- A 25% reduction in electricity and natural gas use by June 2010 including:
  - A 10% reduction in electricity use through implementation of the four program components (Social Marketing, Employee Engagement, Operator Training and RCx)
  - A 5% reduction in natural gas use through implementation of the four program components (Social Marketing, Employee Engagement, Operator Training and RCx)

- A 15% reduction in electricity use through the implementation of audits and retrofits
  - A 20% reduction in natural gas use through the implementation of audits and retrofits
- A corresponding reduction in greenhouse gas emissions of between 20-25%
- A total retrofit budget for 2008 of \$6.5 million

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## 2 Plan elements

Tables 1 through 3 below list all of the actions to be completed as part of the TGH energy management plan. Each action is accompanied by an associated preferred state of energy use at TGH, which represents TGH's vision of how energy should be used and managed in TGH in the next three years (to June 2012).

These actions represent ways to transform the current energy situation at TGH (the present state) into a desired state of energy management and use (preferred state). The present state of energy management and usage is described in Appendix B.

The preferred state and actions presented in this plan were developed based on the following:

- An initial brainstorming and visioning session held with members of the Project Team (IndEco Strategic Consulting and Finn Projects)
- A brainstorming and visioning session held with members of the Project Team (UHN Energy and Environment Department, IndEco Strategic Consulting and Finn Projects), the TGH Energy Team and selected TGH Facilities staff

The actions identified have been prioritized to determine which ones should be implemented first at TGH. Two types of actions have been identified that are to be considered priorities for implementation. These are:

1. Those actions that are already underway or on-going at TGH that should continue (shown in Table 1)
2. Those actions that need to get started immediately - defined as within the first six months of the plan (shown in Table 2)

Table 3 presents those actions that should be undertaken in the longer term - within the duration of the plan (3 years). The identified actions that are already underway at TGH were considered the highest priority. The remaining actions (those that should take place immediately and those within the duration of the plan) were prioritized based on their importance and ease of implementation.

The actions and their associated preferred state are divided according to the four components of the energy management framework.

**Table 1 Actions, and the associated preferred state, that are on-going at TGH and that should continue**

<b>Actions, and the associated preferred state, already underway to be continued</b>		
<b>Plan element</b>	<b>Preferred state</b>	<b>Actions</b>
Organizational commitment	UHN's annual report recognizes and references TLC activities and achievements.	Develop and implement a strategy for on-going communication with Public Affairs regarding energy. Integrate into Energy & Environment communication plan.
Organizational commitment	Senior management at TGH are engaged in the TLC program.	Develop and implement a strategy to keep senior management engaged in the TLC program. Integrate into Energy & Environment communication plan.
Organizational commitment	Where appropriate, there is continuous support from external consultants to assist in maintaining the TLC program.	Maintain relationships and retain external consultants in the long-term to assist with the maintenance of the TLC program.
Opportunity identification & implementation	The energy management plan is informed by and contributes to the sharing of best practices, energy management strategies and related information.	Continue to develop and foster relationships for the sharing of best practices in energy management. Actively contribute to related forums and participate in joint energy opportunities where feasible.
Opportunity identification & implementation	Energy efficiency opportunities are identified on an ongoing basis, including opportunities to partner and pilot emerging technologies.	Continue ongoing scan of energy management technologies and approaches and table at monthly Energy Team meetings. Incorporate retro-commissioning, energy and related facility audits.



<b>Actions, and the associated preferred state, already underway to be continued</b>		
<b>Plan element</b>	<b>Preferred state</b>	<b>Actions</b>
Opportunity identification & implementation	Energy and environmental impacts are taken into account for all projects. All new construction built to LEED platinum standards and existing buildings brought up to LEED-EB standards.	Continue to promote Energy & Environment components of UHN's Construction & Design Guidelines. Ensure commissioning is incorporated into scope of projects where appropriate. Participate in Green Guide for Health Care activities.
Opportunity identification & implementation	All decisions related to procurement take into consideration the life cycle assessment of products and services, including energy considerations.	Continue to promote and raise awareness of UHN's Green Procurement policy, particularly around energy efficiency and product life cycle into costing. Develop a strategy for communicating with vendors and purchasing groups. Participate in the Global Health and Safety Initiative's green procurement activities.
Opportunity identification & implementation	Maximize use of free cooling.	Incorporate maintaining and increasing free cooling capacity as part of new construction. Continue to identify opportunities to maximize free cooling.
Opportunity identification & implementation	Temperature in the hospital is moderated in both summer and winter.	Develop policy and procedure, including response to tenant complaints for space temperature settings. Continue to raise and lower the temperature settings in the hospital to more moderate levels.
Awareness & engagement	Energy education and awareness is part of all routine staff training provided by Energy and Environment.	Continue to integrate social marketing and employee engagement messages into communication tools used by Energy & Environment.

<b>Actions, and the associated preferred state, already underway to be continued</b>		
<b>Plan element</b>	<b>Preferred state</b>	<b>Actions</b>
Monitoring & tracking	Annual reports of utility consumption and energy efficiency savings are presented to senior management and all staff.	Continue to include utility information in Energy & Environment annual report.
Monitoring & tracking	There is a proven track record of energy saving ideas implemented and rewarded.	Continue to monitor and track energy savings against objectives.
Monitoring & tracking	Energy savings and consumption are verified on a monthly basis.	Maintain the current monitoring and tracking system.

**Table 2 Actions, and associated preferred state, that need to get started immediately - within the first six months of the plan**

<b>Actions, and the associated preferred state, to start immediately – within the next six months</b>		
<b>Plan element</b>	<b>Preferred state</b>	<b>Actions</b>
Organizational commitment	There is a demonstrated commitment by TGH to the concept of energy efficiency in day to day operations and planning.	Develop a strategy to integrate the TLC program into TGH activities.
Organizational commitment	TGH is proactive in the efficient management of energy.	Develop a process to continually update the energy management plan, with a full review every three years.
Organizational commitment	The energy management plan and TLC program are incorporated into the Energy & Environment approach and ongoing activities.	Develop a work plan to integrate the TLC program into Energy & Environment framework and tools.
Opportunity identification & implementation	There is a detailed annual review of building energy performance.	Develop an annual review process and incorporate process into monthly Energy Team meetings.

<b>Actions, and the associated preferred state, to start immediately – within the next six months</b>		
<b>Plan element</b>	<b>Preferred state</b>	<b>Actions</b>
Opportunity identification & implementation	All BAS changes to equipment and systems are routinely logged.	Develop a process to ensure that all BAS changes are logged. Incorporate process into monthly Energy Team meetings.
Opportunity identification & implementation	Savings achieved through retrocommissioning are sustained.	Develop a strategy for regularly reviewing and updating set points and operating parameters. Incorporate strategy into monthly Energy Team meetings.
Opportunity identification & implementation	Energy usage and opportunities for energy savings are fully explored.	Conduct a comprehensive energy audit.
Awareness & engagement	Operator Training is an internalized and routine activity and includes site visits to other hospitals, in order to observe energy efficiency opportunities in their facilities, and possible integration into outside training programs.	Develop Operator Training program that includes training on monitoring of daily load profiles and monthly energy use. Explore opportunities for delivery of Operator Training. Integrate Operator Training into Energy & Environment communication plan.
Awareness & engagement	Training is provided to all Facilities staff which allows them to identify opportunities for energy savings and share best practices.	Develop energy efficiency training, including opportunities for feedback, for Facilities staff. Integrate into Energy & Environment communication plan.
Awareness & engagement	Best practices for trades and equipment are routinely utilized.	Develop and implement a strategy for identifying, updating and using trade and equipment specific best practices and incorporate into Facilities training.
Awareness & engagement	The social marketing and employee engagement components are an internalized and routine activity.	Continue development of social marketing and employee engagement programs, including processes to determine efficiency and continually improve. Integrate into Energy & Environment communication plan.

<b>Actions, and the associated preferred state, to start immediately – within the next six months</b>		
<b>Plan element</b>	<b>Preferred state</b>	<b>Actions</b>
Awareness & engagement	Participation in employee engagement is recognized as a valuable asset.	Develop recognition and reward program and integrate into Energy & Environment communication plan.
Awareness & engagement	Utility consumption data is easily accessible to Facilities staff.	Develop a process of presenting utility consumption data and incorporate the process into Energy & Environment communication plan. Present monthly utility consumption data to Energy Team.
Awareness & engagement	Employee engagement is effectively integrated into Facilities work order system. Timely feedback is provided to Facilities staff regarding the results of their submissions.	Review and enhance the existing TLC work order mechanism.
Awareness & engagement	There is a Facilities specific reward and recognition program for participating in TLC and employee engagement, in particular.	Develop and implement a Facilities specific reward and recognition program.
Awareness & engagement	All manuals for facility equipment are kept current and accessible.	Update current manuals. Develop a process to review and maintain on a regular basis and incorporate the process into monthly Energy Team meetings.
Awareness & engagement	Detailed training is provided to HVAC operators.	Design and implement a training program specific for HVAC equipment operators. Integrate the program into Energy & Environment communication plan.
Monitoring & tracking	Facilities staff continually monitor daily load profiles and monthly energy use.	Develop a strategy to build monitoring into the daily routine of appropriate staff.

**Table 3 Actions, and associated preferred state, to start in the longer term - within the duration of the plan**

<b>Actions, and associated preferred state, to start in the longer term – within the duration of the plan</b>		
<b>Plan element</b>	<b>Preferred state</b>	<b>Actions</b>
Organizational commitment	TGH uses space in the most efficient manner possible, particularly in plans for future expansion	TGH Master Plan takes into account energy efficiency.
Organizational commitment	Dollars produced from energy savings are distributed to the sites that achieved the energy savings.	Develop a process for allowing sites to keep the cost savings resulting from energy efficiency measures they implement.
Organizational commitment	Energy management is a line item in Facilities operational budget.	Seek approval for energy management to be included as a line item in Facilities operational budget.
Organizational commitment	There is a TGH specific Facilities Energy Steward.	Investigate the possibility of hiring a TGH specific Facilities Energy Steward.
Opportunity identification & implementation	The use of renewable energy is increased over time.	Review options for purchase or generation of renewable power.
Opportunity identification & implementation	Opportunities for participation in demand response are investigated and, where feasible, utilized.	Identify opportunities for demand response and develop implementation strategy.
Opportunity identification & implementation	Lighting levels (emergency and non-emergency) in the hospital are reduced in accordance with updated building codes.	Conduct a thorough review of current lighting levels (emergency and non-emergency) and reduce where appropriate.
Opportunity identification & implementation	All BAS controls are state of the art with web-based access, including interval monitoring for utilities. The full functionality of the BAS is utilized.	Investigate upgrading BAS.

<b>Actions, and associated preferred state, to start in the longer term – within the duration of the plan</b>		
<b>Plan element</b>	<b>Preferred state</b>	<b>Actions</b>
Opportunity identification & implementation	The equipment maintenance program goes beyond maintenance and compliance and is geared towards saving energy.	Develop a comprehensive maintenance program that is geared towards saving energy.
Opportunity identification & implementation	Energy management is included in the process of recapitalization.	Investigate ways to include energy management into recapitalization process.
Awareness & engagement	TLC activities are highly visible and well recognized in the community and across the province.	Develop and implement a strategy to engage the community in energy planning and delivery.
Awareness & engagement	Staff feedback is regularly incorporated in to assessment of energy programs.	Develop a process for receiving feedback from staff (e.g. surveys, etc.).
Awareness & engagement	The TLC brand is universally recognized across TGH.	Develop and conduct annual surveys to test brand recognition.
Awareness & engagement	The Green Team consists of experienced, engaged and effective staff from across a range of hospital departments.	Assess the composition of the Green Team annually and recruit new members as required.
Awareness & engagement	Staff are aware and proud of their contribution to energy savings.	Develop a communication strategy on staff contribution to saving energy at UHN.
Awareness & engagement	The employee engagement decision making process is transparent and documented.	Develop a process to document all employee engagement decisions and the rationale for the decision made.
Awareness & engagement	TGH is recognized as a leader in energy and energy efficiency.	Promote TGH as a leader in energy and energy efficiency including the development of highly visible projects (e.g. solar panels, green roof, wind turbines).

<b>Actions, and associated preferred state, to start in the longer term – within the duration of the plan</b>		
<b>Plan element</b>	<b>Preferred state</b>	<b>Actions</b>
Monitoring & tracking	Energy account centres are sub-metered and integrated with the BAS.	Identify sub-metering locations for energy account centres and develop an implementation plan.
Monitoring & tracking	The TLC approach is validated through successful implementation at other healthcare facilities.	Develop a strategy to implement integrated energy management systems based on TLC at other healthcare facilities.
Monitoring & tracking	Minimize the carbon footprint of TGH.	Calculate the carbon footprint of TGH and investigate ways in which to minimize the size of the footprint.
Monitoring & tracking	There is a comprehensive energy management system for tracking energy usage, projects and savings. This energy management system has a reporting function.	Develop a comprehensive energy management system for tracking energy usage, projects and savings; and with the capability of generating reports.

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### 3 Conclusions and next steps

This energy management plan provides a framework for all energy management activities taking place at TGH. In the development of this plan a vision of where energy management and use should be at TGH was identified (preferred state), the current situation of energy management and use at TGH was documented (present state), actions to move from the present to the preferred state were developed and those actions were prioritized in order to determine which actions should be implemented first.

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

- Continue to implement those actions that move TGH from the present to the preferred state and that have been identified as activities that are already on-going within the hospital
- Begin to plan and implement those new actions that have been identified as priorities to be implemented within the first six months of the plan

This energy management plan will also feed into and assist the TLC Project Team in preparing the annual workplans and budgets for the TLC program for the duration of the pilot and beyond. The plan will also be integrated with other sustainability plans that may be developed at TGH during the planning period.

It is important to keep the energy management plan current. The plan will be reviewed and updated annually. The annual review involves confirming the preferred state and objectives and making relatively minor adjustments to the actions and priorities, as needed, particularly if additional funding is obtained.

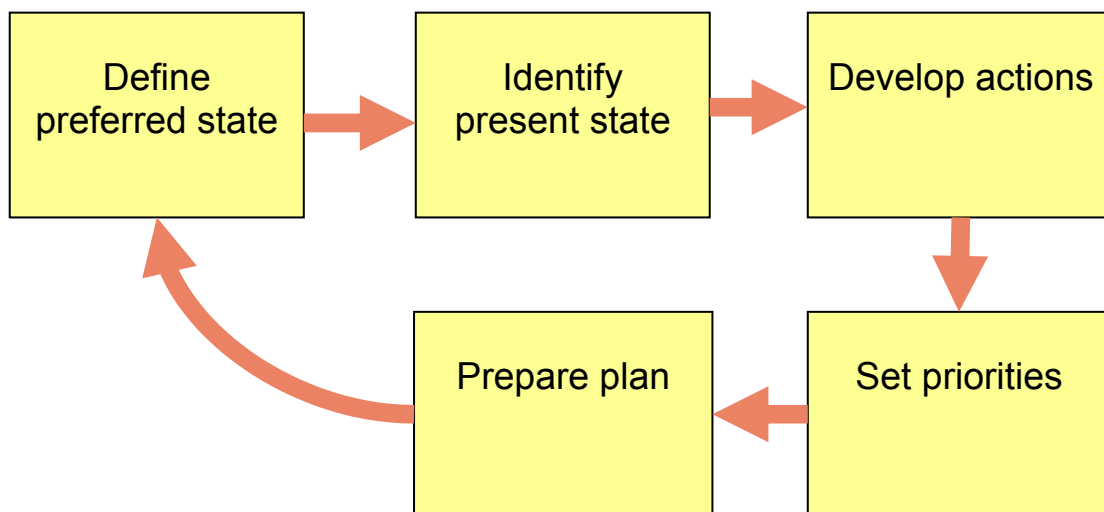
A major review of the plan will be conducted every three years near plan expiry. This will involve a review and update of the preferred state, an update of the present state and a fresh look at actions and priorities to move from the present to the preferred state.



## Appendix A. Planning process

Figure 3 depicts the major steps in the energy planning process that were used to facilitate the development of the energy management plan for TGH.

Figure 3 Planning process employed in the development of the energy management plan for Toronto General Hospital



The major steps in the planning process were as follows:

- **Define the preferred state** – where TGH would like to be regarding energy management and use was defined through brainstorming and visioning session held with members of the Project Team (UHN Energy and Environment Department, IndEco Strategic Consulting and Finn Projects), the TGH Energy Team and selected TGH Facilities staff. This preferred state set the overall direction for energy management for the planning period - from June 2009 to June 2012
- **Identify the present state** - the current situation of energy management and use at TGH was identified based on informal interviews with UHN and information collected from Project Team members through the implementation of TLC
- **Develop actions** – actions to transform the current energy situation into a desired state of energy management and use at TGH were developed through brainstorming conducted during a strategic planning session

- **Set priorities** – priorities were set to assist in determining which actions identified in the plan should be implemented first at TGH. Actions that are already underway at TGH were considered the highest priority. The remaining actions were prioritized based on their importance and ease of implementation. This led to two additional sets of priority actions: those actions that should be implemented immediately within the first six months of plan implementation and those less immediate that should be implemented over the duration of the plan (3 years)
- **Prepare plan** – the results of this planning process were documented this energy management plan

As shown in Figure 3 the energy plan links back to the preferred state to demonstrate the continual revision and improvement of the plan over time. As described in the conclusions and next steps section of the main body of this report, the plan will be reviewed and updated annually. The annual review will involve confirming the preferred state and objectives and making relatively minor adjustments to the actions and priorities, as needed, particularly if additional funding is obtained. A major review of the plan will be conducted every three years near plan expiry. This will involve a review and update of the preferred state, an update of the present state and a fresh look at actions and priorities to move from the present to the preferred state.

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## Appendix B. Present state

The present state is the current situation of energy management and use at TGH. It gives an indication of how far away the present state is away from the desired future (preferred state). The purpose of identifying the present state is to understand where TGH is now, what resources are available to move towards the preferred state and what obstacles may be encountered. The identification of the present state enables actions to be developed that will take TGH towards the preferred state of energy use.

As with the other elements of the plan the present state are divided according to the four components of the energy management framework.

### *B.1 Energy use at TGH*

The three main types of fuel used at UHN are electricity, gas and steam. The main source of heating for TGH is from steam. The natural gas consumption in TGH is relatively low.

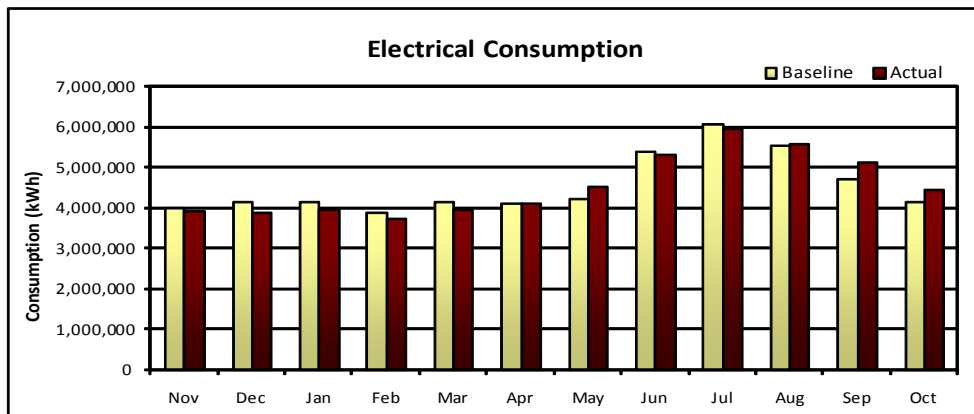
TGH consumed 54,666,956 kWh of electricity between November 2007 and October 2008. The baseline and actual electricity consumptions are show in Figure 4 below.

Figure 4 2007-2008 electricity baseline comparison at the Toronto General Hospital

### Toronto General Hospital 2007-2008 Electricity Consumption Baseline Comparison

	Adjusted Baseline for 2007-2008 Consumption (kWh)	Actual 2007-2008 Consumption (kWh)	Variance Consumption (kWh)
Nov	4,021,801	3,951,505	70,296
Dec	4,155,861	3,904,023	251,838
Jan	4,155,861	3,982,705	173,156
Feb	3,887,741	3,743,442	144,300
Mar	4,155,861	3,988,844	167,017
Apr	4,115,195	4,123,251	(8,056)
May	4,243,919	4,535,300	(291,382)
Jun	5,393,361	5,318,384	74,977
Jul	6,101,128	5,961,525	139,603
Aug	5,548,769	5,577,037	(28,269)
Sep	4,712,918	5,133,250	(420,332)
Oct	4,174,540	4,447,690	(273,150)
<b>Total</b>	<b>54,666,956</b>	<b>54,666,955</b>	<b>1</b>

Note: +=Savings ( ) = Overrun



The electrical demand for TGH is summarized in Figure 5 below.

Figure 5 2007 electricity demand performance at the Toronto General Hospital

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Year 2007-2008	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-07	Dec-07	Total
Scenario: Baseline	6,581	6,141	6,578	7,991	8,409	9,749	10,808	10,309	9,355	8,496	7,053	6,550	98,018
Scenario: Actual	6,581	6,141	6,578	7,991	8,409	9,749	10,808	10,309	9,355	8,496	7,053	6,550	98,018
Base-Actual	0	0	0	0	0	0	0	0	0	0	0	0	0
Variance	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

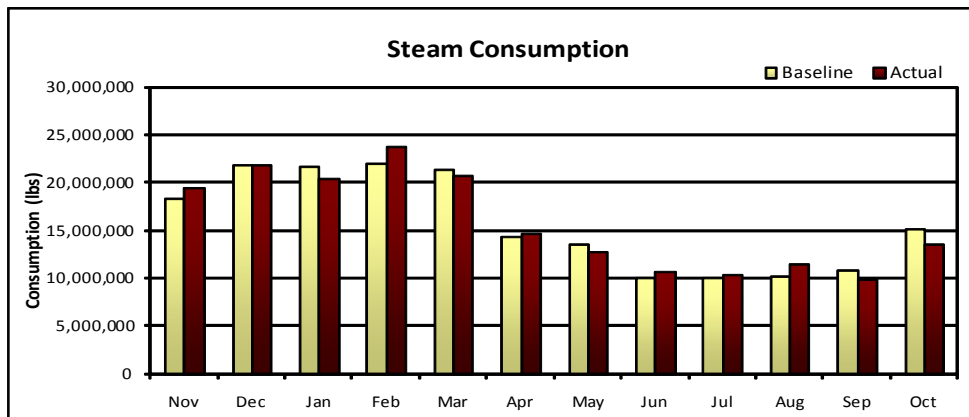
TGH consumed 190,107,964 lbs of steam between in November 2007 and October 2008. The baseline and actual steam consumptions are shown in Figure 6 below.

**Figure 6 2007 steam baseline comparison at the Toronto General Hospital**

**Toronto General Hospital  
2007-2008 Steam Consumption Baseline Comparison**

	Adjusted Baseline for 2007-2008 Consumption (lbs)	Actual 2007-2008 Consumption (lbs)	Variance Consumption (lbs)
<b>Nov</b>	18,397,236	19,527,870	(1,130,634)
<b>Dec</b>	21,895,638	21,836,744	58,894
<b>Jan</b>	21,795,848	20,452,686	1,343,162
<b>Feb</b>	22,073,220	23,860,622	(1,787,402)
<b>Mar</b>	21,496,478	20,786,050	710,428
<b>Apr</b>	14,452,899	14,636,407	(183,508)
<b>May</b>	13,641,417	12,814,905	826,512
<b>Jun</b>	10,089,443	10,655,766	(566,323)
<b>Jul</b>	9,998,551	10,408,057	(409,506)
<b>Aug</b>	10,224,393	11,517,063	(1,292,670)
<b>Sep</b>	10,801,630	9,948,177	853,453
<b>Oct</b>	15,241,211	13,663,615	1,577,596
<b>Total</b>	190,107,964	190,107,962	2

Note: +=Savings () = Overrun



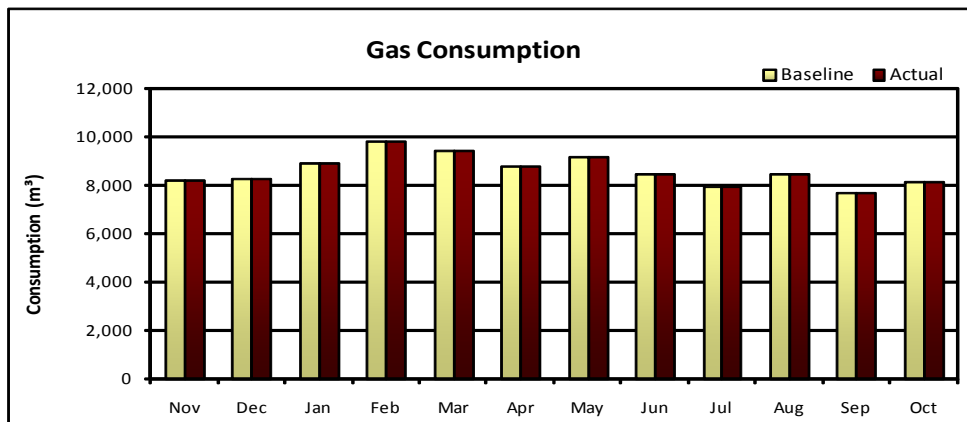
TGH consumed 103,685 cubic meters of natural gas from November 2007 to October 2008. The baseline and actual gas consumptions are shown in Figure 7 below.

Figure 7 2007 gas baseline comparison at the Toronto General Hospital

### Toronto General Hospital 2007-2008 Gas Consumption Baseline Comparison

	Adjusted Baseline for 2007-2008 Consumption (m <sup>3</sup> )	Actual 2007-2008 Consumption (m <sup>3</sup> )	Variance Consumption (m <sup>3</sup> )
Nov	8,209	8,209	-
Dec	8,317	8,317	-
Jan	8,961	8,961	-
Feb	9,862	9,862	-
Mar	9,472	9,472	-
Apr	8,790	8,790	-
May	9,229	9,229	-
Jun	8,491	8,491	-
Jul	7,976	7,976	-
Aug	8,519	8,519	-
Sep	7,710	7,710	-
Oct	8,150	8,150	-
<b>Total</b>	<b>103,685</b>	<b>103,685</b>	<b>-</b>

Note: +=Savings () = Overrun



## B.2 Organizational commitment

There already exists significant organizational commitment to energy efficiency in planning and the day to day operations at TGH. Some of the most significant activities that demonstrate this organizational commitment include:

- Hiring a staff member dedicated to the issue of energy management and responsible for the development and implementation of the TLC program (UHN Energy Steward)
- Establishing a team to act on energy issues and opportunities that arise in the hospital and to provide support for the development and implementation of the TLC program (TGH Energy Team)

- Senior management publicly declaring support for energy efficiency and the TLC program (e.g. Bob Bell, President and CEO of UHN signing a letter introduction to the TLC program and Marnie Escaf (VP and Site Lead, TGH) and Rick Pews (Director, Infrastructure Facilities, UHN) speaking at the TLC program launch for TGH)
- TGH is also committed to adhering to a number of energy and environmental policies developed by UHN including: the Environmental Policy, the Energy and Water Conservation Policy and the Green Procurement Policy.

### *B.3 Opportunity identification and implementation*

Many energy efficiency opportunities have already been identified and initiatives implemented at TGH. Some of the most significant include:

- Cooperation between UHN and other healthcare facilities in the Greater Toronto Area and across Canada on energy efficiency related projects and the sharing of information and best practices
- Energy and energy use is incorporated into routine staff training provided to TGH hospital departments by the UHN Energy and Environment Department
- Energy use and efficiency is incorporated into procurement policies and procedures
- UHN's Construction and Design Guidelines, which set guidelines for construction and design with the hospitals including TGH, have an energy and environment component
- The TGH Energy Team meets regularly to identify and act on energy issues and opportunities that arise in the hospital
- TGH has begun implementing the TLC program including completion of a retrocommissioning audit and implementation of some identified RCx measures
- A wide range of retrofit activities have been conducted over the last few years. These retrofits have been implemented on a project-by-project basis

## *B.4 Awareness and engagement*

TGH has implemented many activities related to energy awareness under the following three components of the TLC program: operator training, social marketing and employee engagement. These activities include:

- A detailed operator training session was designed for TGH and delivered to all Facilities staff during two half-day sessions. This training provided the Facilities staff with information on: energy use, energy basics, mechanical equipment and lighting systems, building automation systems, energy saving opportunities
- A social marketing campaign was developed and implemented at four test departments at TGH. This social marketing campaign used community-based social marketing tools to encourage TGH staff to make simple changes in their daily energy behaviours
- A rigorous Employee Engagement process was developed and implemented which allowed TGH staff to submit their ideas on how to save energy in the hospital and to receive feedback on the status of their implementation

## *B.5 Monitoring and tracking*

TGH monitors and tracks utility consumption based on the monthly bills provided by the utilities - there are 2 natural gas meters, 1 electricity meter, 1 steam meter and 5 water meters for the site. The hospital has an electricity interval meter and Toronto Hydro provides the hourly data for the meter. The utility consumption is analyzed on a monthly basis once the utility bills are received by the UHN Energy and Environment Department and entered into its tracking system. Since the implementation of TLC, consumption patterns are analyzed by Finn Projects and the analysis is reported to the UHN Energy and Environmental Department and TGH via quarterly consumption reports for consideration and potential action. These quarterly reports include information on the energy consumed for the two month period, and year-to-date, with comparisons to the energy baselines that have been established, as well as comparisons to the previous periods. The energy savings are identified along with the reductions in GHG emissions.







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