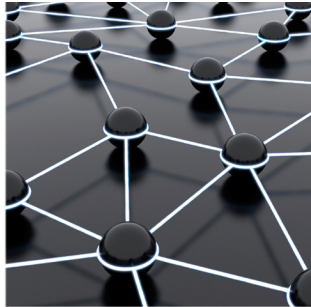


# PMH energy management plan





# Energy management plan for Princess Margaret Hospital: 2009-2013



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## Executive Summary

This energy management plan for Princess Margaret Hospital (PMH) is a three-year plan covering the period from June 2010 to June 2013.

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 PMH 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 and for them to publically demonstrate their commitment. Integrate into Energy & Environment communication plan.
- Develop a work plan to integrate the TLC program into Energy & Environment framework and tools.
- 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 and integrate into costing, particularly around energy efficiency and product life cycle. Develop a strategy for communicating with vendors and purchasing groups.
- 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 development of social marketing and employee engagement programs, including processes to determine efficiency and continually improve. Integrate into Energy & Environment communication plan.
- 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.
- Develop a process to document all employee engagement decisions and the rationale for the decision made.
- 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.
- Develop a comprehensive energy management system for tracking energy usage, projects and savings; and with the capability of generating reports.





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# Introduction

## *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.

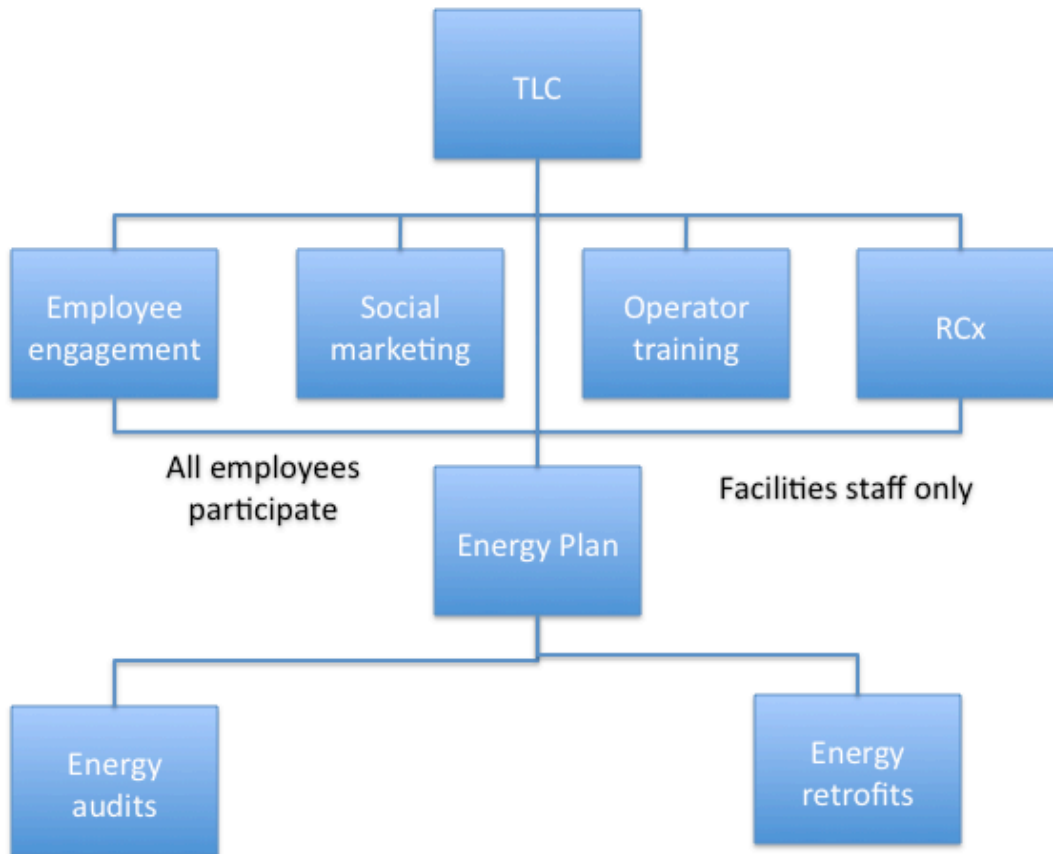
Building on these successes, in 2007 UHN received funding to pilot a comprehensive energy management and engagement program in all three hospitals over three years. This energy management and engagement program branded as TLC (which stands for Thermostats, Lights and Controls and has the tagline Care 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. In the third year (June 2009 – June 2010) implementation of the TLC program continued at TWH and TGH; the program was also introduced at Princess Margaret Hospital. The third and final year of this pilot culminated in the development of a comprehensive and integrated energy management plan for Princess Margaret Hospital, which is documented in this report. This plan provides a framework for all energy management activities taking place at PMH 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 PMH by a Project Team, which consists of staff from the UHN Energy and Environment Department and external consultants (IndEco Strategic Consulting and Finn Projects) in collaboration with the PMH Energy Team, which is made of senior Facilities staff from the hospital and the UHN Energy and Environment Department.

## *Planning horizon and scope*

The energy management plan for Princess Margaret Hospital is a three-year plan covering the period from June 2010 to June 2013. 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 PMH 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 PMH including, but not limited to, the comprehensive audit and retrofits and continued development and implementation of the four TLC program components.

## *Planning framework*

The energy management plan for PMH 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 Princess Margaret 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.

### *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 2010 of \$6.5 million

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## Plan elements

Tables 1 through 3 below list all of the actions to be completed as part of the PMH energy management plan. Each action is accompanied by an associated preferred state of energy use at PMH, which represents PMH's vision of how energy should be used and managed in PMH in the next three years (to June 2013).

These actions represent ways to transform the current energy situation at PMH (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 PMH Energy Team and selected PMH Facilities staff

The actions identified have been prioritized to determine which ones should be implemented first at PMH. 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 PMH 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 PMH 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 PMH and that should continue

Actions, and the associated preferred state, already underway - to be continued		
Plan element	Preferred state	Actions
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 PMH are engaged in the TLC program and publically demonstrate their commitment.	Develop and implement a strategy to keep senior management engaged in the TLC program and for them to publically demonstrate their commitment. Integrate into Energy & Environment communication plan.
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	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.
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.

Actions, and the associated preferred state, already underway - to be continued		
Plan element	Preferred state	Actions
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 and integrate into costing, particularly around energy efficiency and product life cycle. Develop a strategy for communicating with vendors and purchasing groups.
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.
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.
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	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.



<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.
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.

*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 PMH to the concept of energy efficiency in day to day operations and planning.	Develop a strategy to integrate the TLC program into PMH activities.
Organizational commitment	PMH 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.
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.

Actions, and the associated preferred state, to start immediately – within the next six months		
Plan element	Preferred state	Actions
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.
Opportunity identification & implementation	All PMH entrances and exits are accessible to all patients and are energy efficient.	Develop a strategy for making all PMH entrances and exits accessible and energy efficient including investigating replacing loading dock doors with a faster closing model.
Opportunity identification & implementation	The building envelope, including roofs, of PMH is upgraded to increase energy efficiency and to capture energy savings.	Develop a strategy for upgrading the building envelope including roofs at PMH.
Opportunity identification & implementation	Waste heat from condensate is captured.	Develop a strategy for capturing waste heat from condensate.
Opportunity identification & implementation	All windows are sealed from the inside.	Conduct a thorough review of the quality of the window seals and develop a strategy for resealing the windows.

Actions, and the associated preferred state, to start immediately – within the next six months		
Plan element	Preferred state	Actions
Awareness & engagement	Operator Training is an internalized and routine activity and includes information that is broader than just UHN including site visits to other hospitals, in order to observe energy efficiency opportunities in their facilities, information on new, leading edge technologies and possible integration into outside training programs. Detailed training is also provided to HVAC operators.	Develop an Operator Training program that includes training on monitoring of daily load profiles and monthly energy use. Explore opportunities for delivery of Operator Training. Design and implement a training program specific for HVAC equipment operators. Integrate Operator Training 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	Participation in employee engagement is recognized as a valuable asset.	Develop recognition and reward program and integrate into Energy & Environment communication plan.
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	Facilities staff energy saving ideas are considered, implemented, recognized and rewarded.	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.
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

Actions, and associated preferred state, to start in the longer term – within the duration of the plan		
Plan element	Preferred state	Actions
Organizational commitment	PMH uses space in the most efficient manner possible, particularly in plans for future expansion.	PMH 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	Facilities staff energy ideas are commercialized.	Develop a process for commercializing Facilities staff energy ideas.
Opportunity identification & implementation	The use of renewable energy is increased over time. PMH installs and operates renewable energy projects at PMH.	Review options for purchase or generation of renewable power. Explore options for PMH to install and operate renewable energy projects.
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	Advanced lighting control system is installed and operating at PMH.	Investigate the opportunity to install and operate an advanced lighting system at PMH.
Opportunity identification & implementation	All BAS controls are state of the art with web-based remote 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.
Opportunity identification & implementation	Zonal control is incorporated into the HVAC system.	Develop a strategy for improving the zonal control in the HVAC system.
Opportunity identification & implementation	Energy generated through the movement of elevators is captured.	Investigate the capture of energy from elevators.
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 PMH.	Develop and conduct annual surveys to test brand recognition.
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.

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## Conclusions and next steps

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

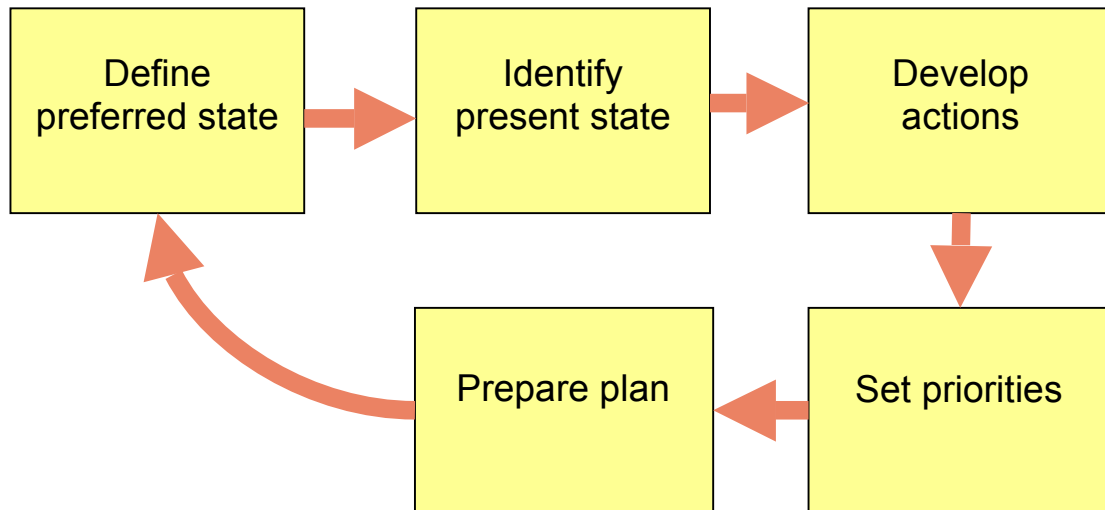
A major review of the plan will be conducted every three years near plan expiry. This will involve a review and update of the preferred state, an update of the present state and a fresh look at actions and priorities to move from the present to the preferred state.

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## 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 PMH.

*Figure 3 Planning process employed in the development of the energy management plan for Princess Margaret Hospital*



The major steps in the planning process were as follows:

- **Define the preferred state** – where PMH 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 PMH Energy Team and selected PMH Facilities staff. This preferred state set the overall direction for energy management for the planning period - from June 2010 to June 2013
- **Identify the present state** - the current situation of energy management and use at PMH 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 PMH 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 PMH. Actions that are already underway at PMH 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 PMH. It gives an indication of how far away the present state is from the desired future (preferred state). The purpose of identifying the present state is to understand where PMH 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 PMH towards the preferred state of energy use.

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

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

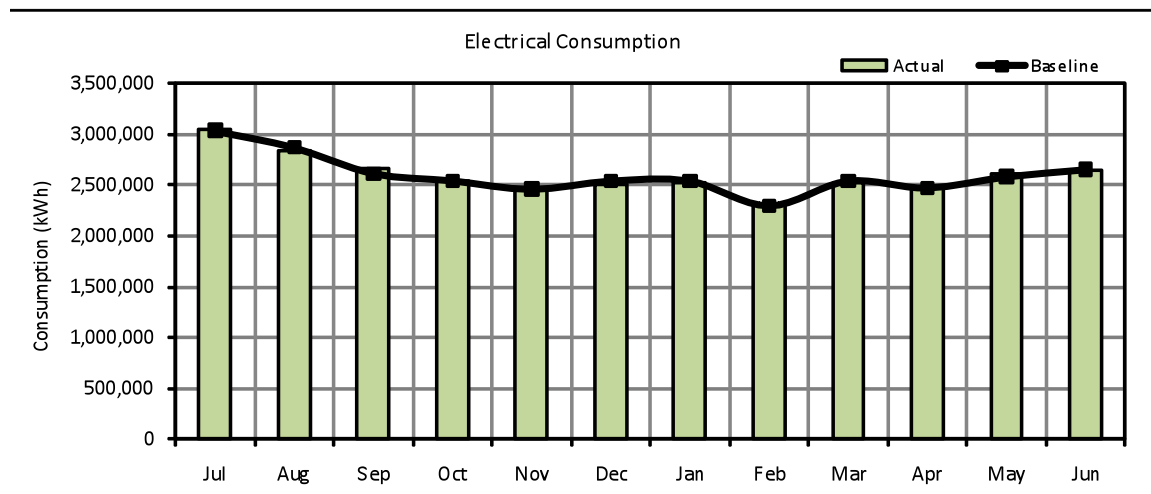
The three main types of fuel used at UHN are electricity, gas and steam. The main source of heating for PMH is from steam. Also, up until last year, PMH also imported hot and chilled water from a neighbouring building, but has since disconnected the lines. The natural gas consumption in PMH is relatively low.

PMH consumed 31,131,786 kWh of electricity between July 2008 and June 2009. The baseline and actual electricity consumptions are shown in Figure 4 below.

Figure 4 2008-2009 electricity baseline comparison at the Princess Margaret Hospital

Princess Margaret Hospital  
2008-2009 Electricity Consumption Baseline Comparison

	Adjusted Baseline for 2008-2009 Consumption (kWh)	Actual 2008-2009 Consumption (kWh)	Variance Consumption (kWh)
Jul	3,033,596	3,043,985	(10,389)
Aug	2,871,170	2,830,287	40,883
Sep	2,613,222	2,658,748	(45,526)
Oct	2,541,833	2,545,190	(3,357)
Nov	2,457,203	2,452,692	4,511
Dec	2,539,110	2,503,487	35,623
Jan	2,539,110	2,521,471	17,639
Feb	2,293,390	2,317,400	(24,010)
Mar	2,539,110	2,531,443	7,667
Apr	2,470,659	2,467,176	3,483
May	2,581,078	2,606,501	(25,423)
Jun	2,652,307	2,653,406	(1,100)
Total	31,131,788	31,131,786	1



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

Figure 5 2008-2009 electricity demand performance at the Princess Margaret Hospital

Princess Margaret Hospital  
Electricity Demand Performance

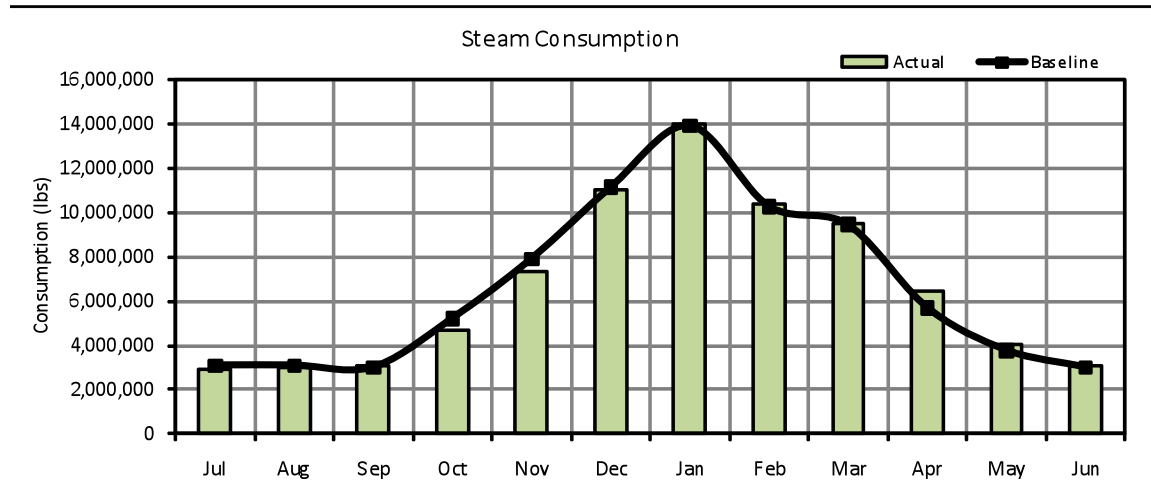
Year 2008-2009	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Total
Scenario: Baseline	5,150	4,827	4,795	4,118	4,008	4,008	4,008	4,008	4,008	4,376	4,666	5,053	53,025
Scenario: Actual	5,227	4,954	4,676	4,287	4,061	4,088	4,086	3,730	4,127	4,111	4,601	5,068	53,025
Base-Actual	-77	-137	119	-169	-53	-80	-78	278	-119	265	65	-15	0
Variance	-1%	-3%	2%	-4%	-1%	-2%	-2%	7%	-3%	6%	1%	0%	0%

PMH consumed 79,534,999 lbs of steam between July 2008 and June 2009. The baseline and actual steam consumptions are shown in Figure 6 below.

Figure 6 2008-2009 steam baseline comparison at the Princess Margaret Hospital

Princess Margaret Hospital  
2008-2009 Steam Consumption Baseline Comparison

	Adjusted Baseline for 2008-2009 Consumption (lbs)	Actual 2008-2009 Consumption (lbs)	Variance Consumption (lbs)
Jul	3,091,524	2,908,000	183,524
Aug	3,091,524	3,011,697	79,827
Sep	3,002,610	3,068,303	(65,693)
Oct	5,212,671	4,651,000	561,671
Nov	7,900,369	7,324,839	575,531
Dec	11,136,560	11,028,451	108,109
Jan	13,920,176	14,031,816	(111,640)
Feb	10,271,580	10,381,362	(109,782)
Mar	9,440,294	9,531,531	(91,237)
Apr	5,693,242	6,433,000	(739,759)
May	3,766,435	4,074,000	(307,566)
Jun	3,008,017	3,091,000	(82,983)
Total	79,535,001	79,534,999	2

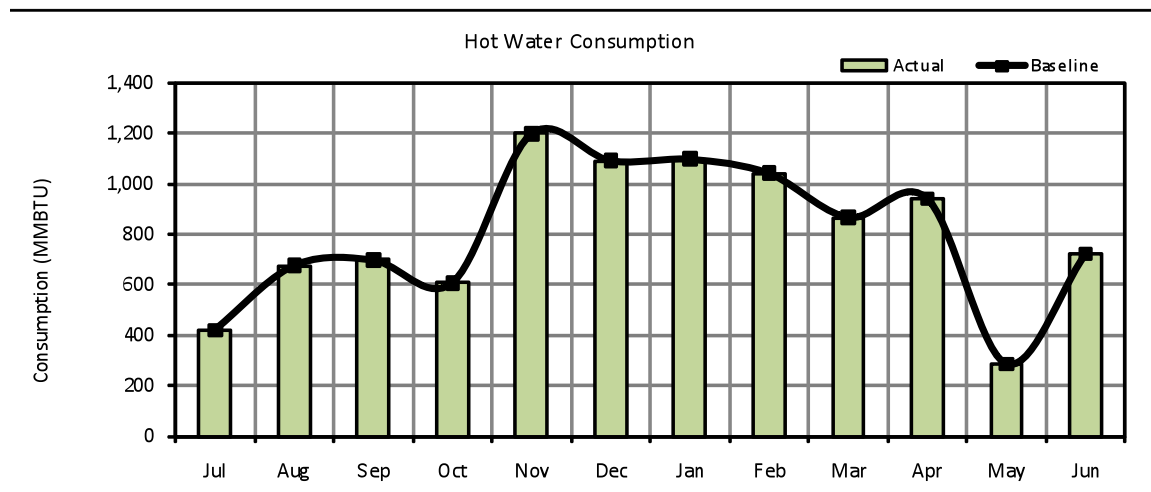


PMH consumed 9,644 MMBTU of hot water from July 2008 to June 2009. The baseline and actual hot water consumptions are shown in Figure 7 below.

Figure 7 2008-2009 hot water baseline comparison at the Princess Margaret Hospital

Princess Margaret Hospital  
2008-2009 Hot Water Consumption Baseline Comparison

	Adjusted Baseline for 2008-2009 Consumption (MMBTU)	Actual 2008-2009 Consumption (MMBTU)	Variance Consumption (MMBTU)
Jul	419	419	-
Aug	675	675	-
Sep	698	698	-
Oct	607	607	-
Nov	1,199	1,199	-
Dec	1,092	1,092	-
Jan	1,098	1,098	-
Feb	1,041	1,041	-
Mar	867	867	-
Apr	941	941	-
May	285	285	-
Jun	723	723	-
Total	9,644	9,644	-

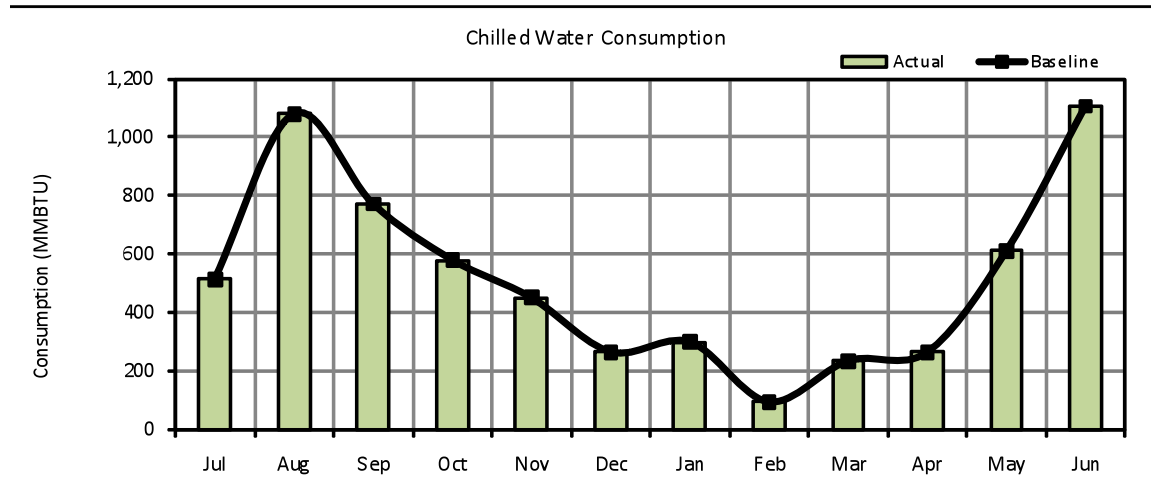


PMH consumed 6,265 MMBTU of chilled water from July 2008 to June 2009. The baseline and actual chilled water consumptions are shown in Figure 8 below.

Figure 8 2008-2009 chilled water baseline comparison at the Princess Margaret Hospital

Princess Margaret Hospital  
2008-2009 Chilled Water Consumption Baseline Comparison

	Adjusted Baseline for 2008-2009 Consumption (MMBTU)	Actual 2008-2009 Consumption (MMBTU)	Variance Consumption (MMBTU)
Jul	513	513	-
Aug	1,079	1,079	-
Sep	771	771	-
Oct	579	579	-
Nov	451	451	-
Dec	265	265	-
Jan	299	299	-
Feb	94	94	-
Mar	234	234	-
Apr	264	264	-
May	611	611	-
Jun	1,107	1,107	-
Total	6,265	6,265	-

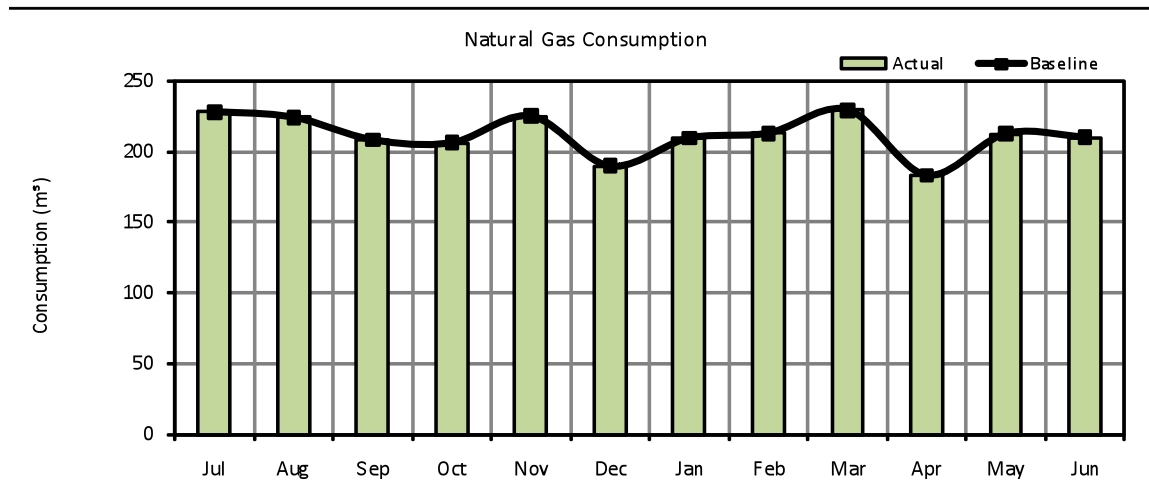


PMH consumed 2,538 cubic meters of natural gas from July 2008 to June 2009. The baseline and actual natural gas consumptions are shown in Figure 9 below.

Figure 9 2008-2009 chilled water baseline comparison at the Princess Margaret Hospital

Princess Margaret Hospital  
2008-2009 Natural Gas Consumption Baseline Comparison

	Adjusted Baseline for 2008-2009 Consumption (m <sup>3</sup> )	Actual 2008-2009 Consumption (m <sup>3</sup> )	Variance Consumption (m <sup>3</sup> )
Jul	228	228	-
Aug	224	224	-
Sep	208	208	-
Oct	206	206	-
Nov	225	225	-
Dec	190	190	-
Jan	209	209	-
Feb	213	213	-
Mar	229	229	-
Apr	183	183	-
May	213	213	-
Jun	210	210	-
Total	2,538	2,538	-



## B.2. Organizational commitment

There already exists significant organizational commitment to energy efficiency in planning and the day to day operations at PMH. 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 (PMH 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 Sarah Downey (VP and Site Lead, PMH) and Rick Pews (Director, Infrastructure Facilities, UHN) speaking at the TLC program launch for PMH)
- PMH 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 PMH. 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 PMH 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 PMH, have an energy and environment component
- The PMH Energy Team meets regularly to identify and act on energy issues and opportunities that arise in the hospital
- PMH 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*

PMH 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 PMH and delivered to all Facilities staff during a half-day session. 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 three test departments at PMH. This social marketing campaign used community-based social marketing tools to encourage PMH staff to make simple changes in their daily energy behaviours
- A rigorous Employee Engagement process was developed and implemented which allowed PMH 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*

PMH 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 2 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 PMH via quarterly consumption reports for consideration and potential action. These quarterly reports include information on the energy consumed for the three-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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