



# **HOPITAL GLENGARRY MEMORIAL HOSPITAL STRATEGIC ENERGY MANAGEMENT PLAN FOR 2014 TO 2019**





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## Introduction

The purpose of **Hôpital Glengarry Memorial Hospital's** energy management plan and policies is to promote good stewardship of our environment and community resources. In keeping with our core values of Efficiency and Financial Responsibility, **Hôpital Glengarry Memorial Hospital's** energy management program will reduce operating costs and enable us to provide compassionate service to a greater number of persons in the community.

- Utility and energy related costs are a significant part of overall operating costs
  - Utility costs in 2012 were \$270,718.00 annually.
  - The Hospital's Energy Use Index (EUI) was 79.2 ekWh/ft<sup>2</sup>
  - Facility related O&M costs are \$40,828.80 annually
  - Facility capital project costs are projected at **\$890,000.00** over 5 years
- With energy management an integral part of business decisions, **Hôpital Glengarry Memorial Hospital** can expect the following:
  - 8% reduction in energy use
  - \$18,948 annually to the bottom line (\$189,480 over 10 years)
- Recent activity associated with managing these costs included an energy audit that identified the areas for improvement in energy consumption.
- To further strengthen and obtain full value from energy management activities, a strategic approach will be taken: the organization will fully integrate energy management into its business decision-making, policies, and operating procedures.
- Active management of energy related costs and risks in this manner will provide a significant economic return to the organization and will support other key organizational objectives.



## Energy Management Vision

VISION: **Hôpital Glengarry Memorial Hospital's** mission is to improve the health of the community we serve. In recognition of the critical linkages between environmental health and public health, it is **Hôpital Glengarry Memorial Hospital's** desire to limit adverse impacts upon the environment resulting from the siting, design, construction and operation of our health care facilities. We will address the life cycle impacts of facilities through design and construction standards, selection of materials and equipment, and maintenance practices.

As a recognized leader in health care services **Hôpital Glengarry Memorial Hospital** is committed to extending that leadership to responsible environmental impact management. We will operate our facility efficiently with a goal of always looking to the horizon towards improvement and conservation.



## Guiding Principles for Strategic Energy Management

Hôpital Glengarry Memorial Hospital's/System's energy management will be guided by these principles:

***Taking A Strategic Approach:*** While Hôpital Glengarry Memorial Hospital's/System's] actively manages energy costs by implementing opportunities as they are identified, by acting strategically, **services Hôpital Glengarry Memorial Hospital** can significantly improve its energy-related performance. Internalizing energy management into our organization's every-day decision-making, policies, and operating procedures will help assure substantial and long-lasting reductions in energy use throughout **Hôpital Glengarry Memorial Hospital**.

***Supporting Mission-Critical Goals:*** Strategic energy management, will directly support **Hôpital Glengarry Memorial Hospital's** mission-critical goals of caring for the environment and the community; optimizing the healing and working environment; improving the hospital's financial bottom line by reducing unnecessary energy costs; optimizing the capacity of existing energy systems to meet current and expanding operational needs. The impacts **Hôpital Glengarry Memorial Hospital's** energy management efforts on those goals will be tracked and reported wherever possible.

***Pursuing Long-Term Change to Core Business Practices:*** The core of a strategic approach is the consistent incorporation of energy management into our organization's core practices and decision making such as the strategic planning and budgeting processes. Change in energy-related business practice will cover all applications of energy management – new construction and major renovations, existing facility operations and upgrades, and the economic analysis and procurement practices underlying these practices.

***Fostering Organizational Commitment and Involvement:*** Executive and organizational commitment and involvement is critical to successful strategic energy management. Top management at **Hôpital Glengarry Memorial Hospital** will work with facility managers and other key staff to ensure that adequate organizational support and resources are provided to maximize the benefits of energy management to **Hôpital Glengarry Memorial Hospital** energy management will be integrated into the strategic planning and capital budgeting processes.

***Obtaining Solid Economic Returns:*** Energy management investments will yield solid economic returns that meet **Hôpital Glengarry Memorial Hospital's** standard of **achieving 12-15% return on investment** requirements applied through the hospital's capital budgeting process. **Hôpital Glengarry Memorial Hospital** will apply consistent financial analysis methods that consider life-cycle to reduce total cost of facility ownership and operation.



***Using Available Resources and Assistance:*** Use national, regional, and local sources of strategic, technical, and financial assistance to help achieve our energy management goals. These include utilities, government and firms specializing in energy conservation and management.



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

Below are the central business arguments for **Hôpital Glengarry Memorial Hospital's** pursuit of strategic energy management. Section VI then presents the business proposition – the results of analysis of the energy efficiency opportunities and their associated costs and internal rate of return.

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

Energy management is a visible, public commitment to the community and environment. Through aggressive energy management, the hospital can provide leadership in promoting sustainable communities, efficient business practices, and environmental stewardship. Faced with a tough market environment that has forced cut backs on hospital support for community activities, this is an excellent opportunity to provide leadership and reduce costs at the same time.

### ***Enhanced Healing and Working Environment***

In existing facilities, efficient operating practices improve patient as well as employee comfort with more stable air temperature, and better indoor air quality and lighting. In new facilities more daylight and personal control of comfort contribute to a healing and patient-focused environment, and an improved working environment. Recent research has found that daylight eases surgical pain and contributes to substantial savings in pharmacy costs.

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

Strategic energy management presents a highly leveraged opportunity to reduce operating costs and positively impact **Hôpital Glengarry Memorial Hospital's** bottom line. Dollars of operating cost savings directly improve the operating margin. Further, investments in energy projects typically have a lower risk of performance over time relative to other investments and savings from energy projects are easier to forecast reliably than savings or revenue increases expected from more variable investments.

### ***Optimization of Capacity to Meet Current and Expanding Operational Needs***

Energy efficiency optimizes overall equipment/system operation so that system capacity can be reclaimed for current and expanding operational needs. This “free capacity” can eliminate the need to add major new energy capacity and be much less expensive.



## Business Proposition

- It was identified in the energy audit of 2011 that installation of Direct Digital Controls (DDC) would provide the most significant return on investment, implementing functional controls of our electricity and gas consumption by setting timers would reduce equipment run hours. Reducing run hours of equipment would also reduce repair costs (the digital systems are less costly to maintain than the pneumatic systems). DDC would prolong equipment life, increase system reliability and at the same time provide a more comfortable temperature/environment for patients and staff.
- A project budget of approximately \$360,000.00 is anticipated. It is assumed that incentives will still be available from Enbridge and or the Ontario Energy Authority to be the amount stipulated in the audit of \$15,955.00. In addition through a current energy savings program providing low interest rates for energy management loans HGMH would benefit by incorporating such a project. The project would significantly reduce energy expenses and the hospital would see a return on investment within 5-7 years.
- If energy management considerations are integral to relevant business practices, policies, procedures, and decision-making processes, **Hôpital Glengarry Memorial Hospital's** energy-related costs can be reduced by an *additional* 20% over a 10-year period.
- Based on 2012 utility rates, this will result in \$75,497 in annual value to the bottom line based, or a total \$377,484 over a 5-year period. Integration of energy management into organizational decision making and business practices will continue to produce value annually for a much longer period of time.
- To support the achievement of these financial benefits, **Hôpital Glengarry Memorial Hospital** will invest in energy related capital and operating improvements, meeting an Internal Rate of Return (IRR) that is acceptable to its Board of Directors and Executive Officers.



## Energy Management Goals

The following outlines some of the energy management goals that will be adopted **by Hôpital Glengarry Memorial Hospital**. They include, but are not limited to, the following:

- SEMP Approval, Resources to Implement
- Implement Financial Practices and Decision Making Processes; Establish Funding Resources
- Implement Strategic Energy Management Practices
  - Purchasing/Procurement Procedures and Specifications
  - Enhanced Design & Construction Practices
  - Enhanced Facility Operating Practices
  - Cost-Effective Facility Upgrades
  - Active Commodity Management
- Monitoring, Track, & Improve Performance

### Goal: SEMP Approval, Resources to Implement

- Executive approval and resources.
- Support from key staff (financial management, purchasing/procurement, construction, building operations, etc.).
- Creation of mechanisms/processes to make resources available.
- Clarification and communication of staff roles and responsibilities, performance goals, and energy management reporting.

### Goal: Implement Financial Practices and Decision Making Processes

- Money spent to achieve energy efficiency is viewed as an investment, not a cost.
- Financial decision makers consistently use life cycle cost analysis (LCCA) on all new construction, major renovations, and equipment replacements over lowest cost.
  - Internal rate of return (IRR) as “pre-approved” by the Hospital Board and Administration.
  - Train staff on Life Cycle Cost Analysis (LCCA) and financial requirements and decision making process.
- Decisions about energy management investments will be part of **Hôpital Glengarry Memorial Hospital’s** high-level, long range process of budgeting for capital and operations.



### **Goal: Establish Purchasing Specifications for Energy Efficient Equipment and Services**

- Establish and consistently use purchasing specifications that minimize life-cycle costs for energy efficient equipment and services.
  - Establish efficiency specifications for standard equipment routinely replaced (e.g. lights, motors, and unitary HVAC equipment).
  - Establish efficiency guidelines that apply LCCA for custom equipment purchases (e.g. chillers).
  - Establish efficiency standards for design and construction, and for building operations and maintenance services.

### **Goal: Implement Enhanced Design & Construction (D&C) Practices**

- Implement improved new construction practices in all capital projects that specify early team collaboration and “integrated design” (ID).
  - Integrated design required for funding.
  - RFPs, contract terms & conditions, & fee structures will support ID.
  - Apply LCCA and financial hurdle rates described above to design decisions.
  - Apply established purchasing procedures and specifications.
  - Include incentives and tax credits wherever available.
  - Educate all owner’s project managers or construction managers and contractors on integrated design and their respective roles in master planning pre-design, design, construction, testing, commissioning, and monitoring.
- Set and meet clear energy performance targets for new buildings; measure and improve over time.
  - Establish baseline for measuring performance goals (e.g. code, or national reference standards like ASHRAE 90.1).
  - Set targets.
  - Measure performance and improve over time.
- Specify commissioning as a standard procedure.
  - Retain the services of an independent third-party commissioning agent.
  - 100 percent of fundamental building systems and elements will be designed, installed, and calibrated to operate as designed.
  - Design team, commissioning agent, and building operators will work closely throughout the design process and occupancy to ensure good transition.



### **Goal: Improve Building Operating Performance**

- Equipment tune-up and improved operations and maintenance (O&M) will achieve the following results while supporting patient care, and facility comfort and safety.
  - Achieve reductions in operating costs for existing facilities by an average of 5% over 5 years and continue to improve by 1% per year for 5 years thereafter.
  - Reduce the system-wide EUI from 79.2 ekWh/ft<sup>2</sup> to 75.2 ekWh/ft<sup>2</sup> by 2019. The EUI will be adjusted for variances in patient days and IT intensity.
  - Reduce energy consumption by 17,992.8 kWh per year.
  - Improve ENERGYSTAR rating.

### **Goal: Implement Cost-Effective Facility Upgrades**

- Implement equipment and system upgrades where justified by life-cycle cost analysis.
- Expand use of qualified service providers as needed. Develop standard RFP documents, contract terms, and reporting standards.

### **Goal: Actively Manage Energy Commodity**

- Minimize utility costs and exposure to market risks. Utility costs include natural gas, electricity, water, and sewer.
- Participate in the energy/utility regulatory process.

### **Goal: Monitor, Track, and Reward Progress**

- Track progress on SEMP
- Track energy reductions [quarterly][annually].
- Reward staff for successes.



## **Baseline Energy Use**

The baseline energy profile has been selected using the most recent full fiscal year with available utility data, which is 2012. This baseline was used to calibrate energy end-use estimates and as the reference case for calculating energy savings. Exhibit 1 presents the baseline energy use and costs; Exhibits 3, 4, and 5 present the data in graphic format.

### **Key Observations:**

A review of the baseline energy cost profile reveals that:

The total annual utility costs for the site in 2012 were \$270,718. Electricity represents the largest cost at 75% of total cost, natural gas costs were 22% of total cost, and water costs were 3% of total cost.

The annual electrical consumption is 1799 MWh, and the annual gas consumption is 2556 eMWh, resulting in a total site energy intensity of 79.2 ekWh/ft<sup>2</sup>/yr. This places Hôpital Glengarry Memorial Hospital on par with similar facilities in Ontario at 78.8 ekWh/ft<sup>2</sup>/yr based on values obtained from Energy Star.

Water consumption in the facility is approximately 150 L/ft<sup>2</sup>.



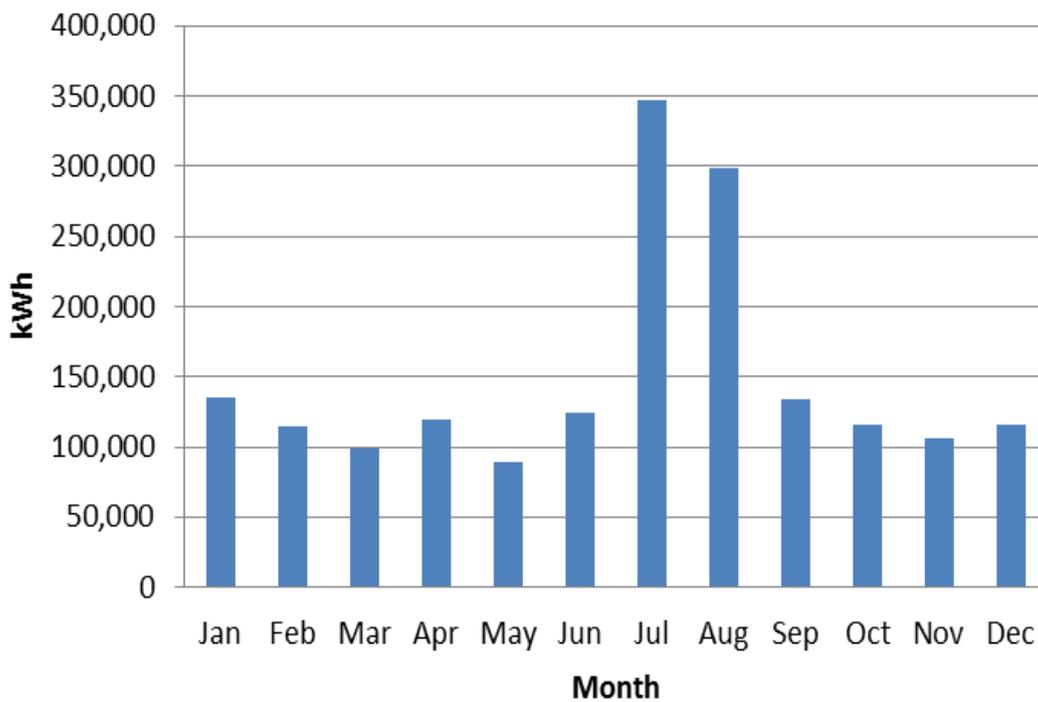
### Exhibit 1 Baseline Energy Consumption

2012	Electricity					Natural Gas				Water			Total			
	Demand	Usage	Intensity	GHG Emissions	Cost	Usage	Intensity	GHG Emissions	Cost	Usage	Intensity	Cost	Usage	Intensity	GHG Emissions	Cost
Month	(kW)	(kWh)	(kWh/ft <sup>2</sup> )	(teCO <sub>2</sub> )	(\$)	(m <sup>3</sup> )	(ekWh/ft <sup>2</sup> )	(teCO <sub>2</sub> )	(\$)	(m <sup>3</sup> )	(L/ft <sup>2</sup> )	(\$)	(ekWh)	(ekWh/ft <sup>2</sup> )	(teCO <sub>2</sub> )	(\$)
Jan	240.00	135,360	2.5	28.4	\$ 15,688	47268	9.0	90.0	\$ 11,115	656	11.93	\$ 668	632838	11.5	118.4	\$ 27,470
Feb	201.00	114,720	2.1	24.1	\$ 12,965	36342	7.0	69.2	\$ 8,606	796	14.47	\$ 810	497206	9.0	93.3	\$ 22,382
Mar	153.00	98,880	1.8	20.8	\$ 10,971	27858	5.3	53.0	\$ 6,645	604	10.98	\$ 615	392075	7.1	73.8	\$ 18,231
Apr	230.00	119,760	2.2	25.1	\$ 13,287	24941	4.8	47.5	\$ 5,955	660	12.00	\$ 672	382255	7.0	72.6	\$ 19,915
May	246.00	89,640	1.6	18.8	\$ 9,900	14077	2.7	26.8	\$ 3,438	696	12.65	\$ 709	237795	4.3	45.6	\$ 14,046
Jun	271.00	123,840	2.3	26.0	\$ 13,677	5689	1.1	10.8	\$ 1,472	602	10.95	\$ 613	183715	3.3	36.8	\$ 15,762
Jul	291.00	346,320	6.3	72.7	\$ 38,248	7800	1.5	14.8	\$ 1,975	701	12.75	\$ 714	428412	7.8	87.6	\$ 40,937
Aug	284.00	298,782	5.4	62.7	\$ 33,329	7933	1.5	15.1	\$ 2,007	687	12.49	\$ 699	382274	7.0	77.8	\$ 36,036
Sep	284.00	133,938	2.4	28.1	\$ 15,040	10409	2.0	19.8	\$ 2,590	696	12.65	\$ 709	243489	4.4	47.9	\$ 18,338
Oct	258.00	116,280	2.1	24.4	\$ 14,168	8829	1.7	16.8	\$ 2,222	673	12.24	\$ 685	209202	3.8	41.2	\$ 17,075
Nov	209.00	105,840	1.9	22.2	\$ 12,884	23274	4.5	44.3	\$ 5,597	733	13.33	\$ 746	350790	6.4	66.5	\$ 19,227
Dec	207.00	115,920	2.1	24.3	\$ 13,770	28449	5.4	54.1	\$ 6,801	716	13.02	\$ 729	415335	7.6	78.5	\$ 21,300
<b>Total</b>	<b>291.00</b>	<b>1,799,280</b>	<b>32.7</b>	<b>377.8</b>	<b>\$ 203,926</b>	<b>242869</b>	<b>46.5</b>	<b>462.2</b>	<b>\$ 58,422</b>	<b>\$8,220</b>	<b>149.45</b>	<b>\$8,369</b>	<b>4355384</b>	<b>79.2</b>	<b>840.0</b>	<b>\$270,718</b>



**Exhibit 2** shows the monthly electricity use profile. The profile is highly skewed due to problems with metering and billing. The kWh usage for the summer was billed in bulk over a 3 month period and was distributed using cooling degree days. This is likely not representative of the actual monthly distribution.

### **Exhibit 2 Baseline Electricity Use Profile**





**Exhibit 3** shows the monthly natural gas use profile. Approximately 1/4 of the gas is being used for the base load, and there is a predictable winter increase that corresponds well with the heating demand.

### Exhibit 3 Baseline Natural Gas Use Profile

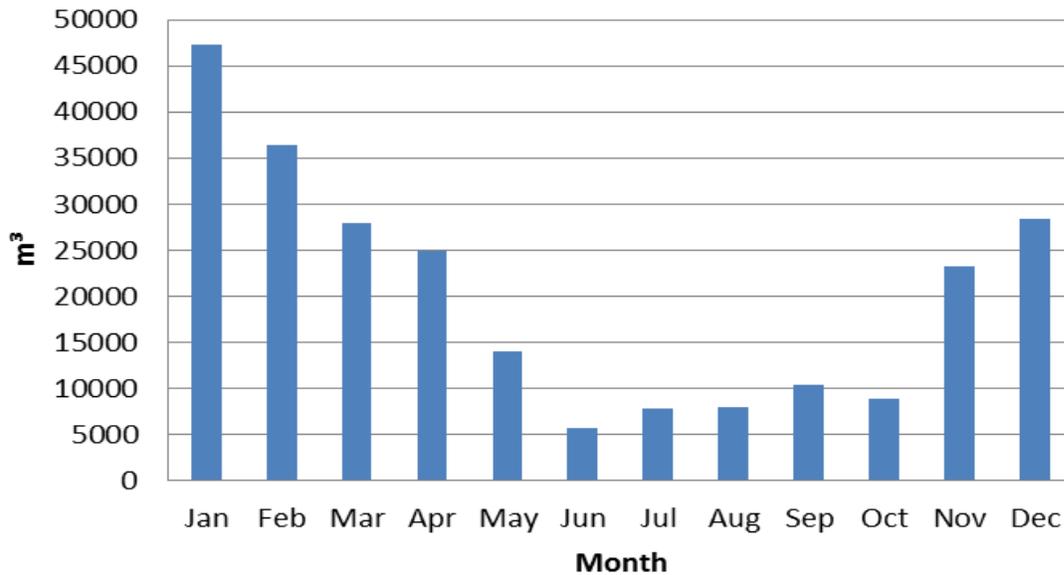
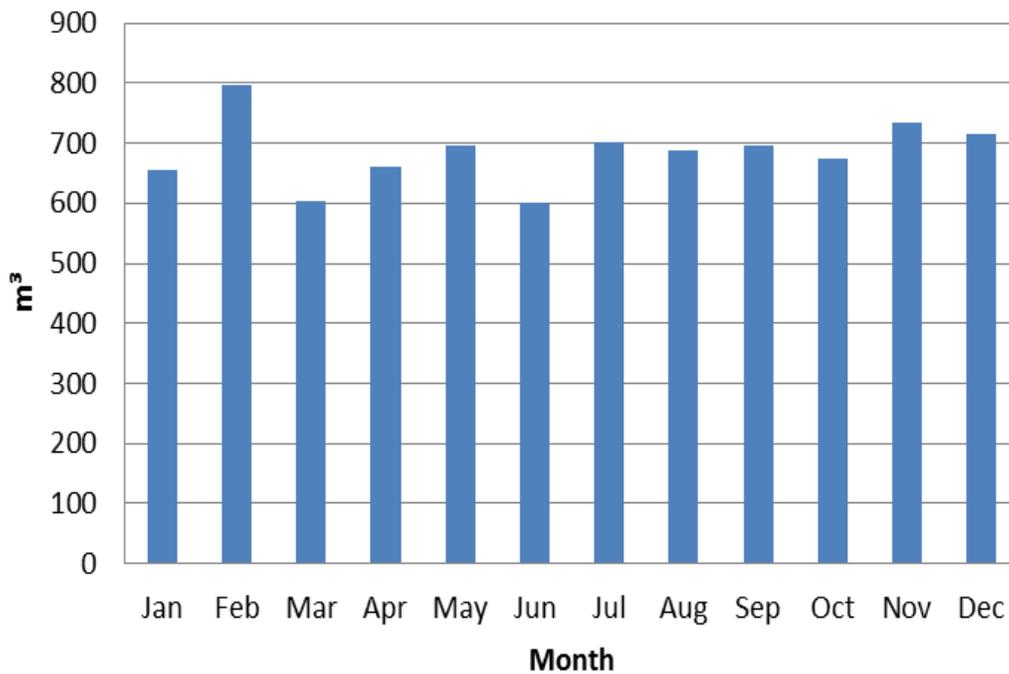




Exhibit 4 shows the monthly water use profile. The profile is rather stable as would be expected with the types of equipment used on site.

#### Exhibit 4 Baseline Water Use Profile





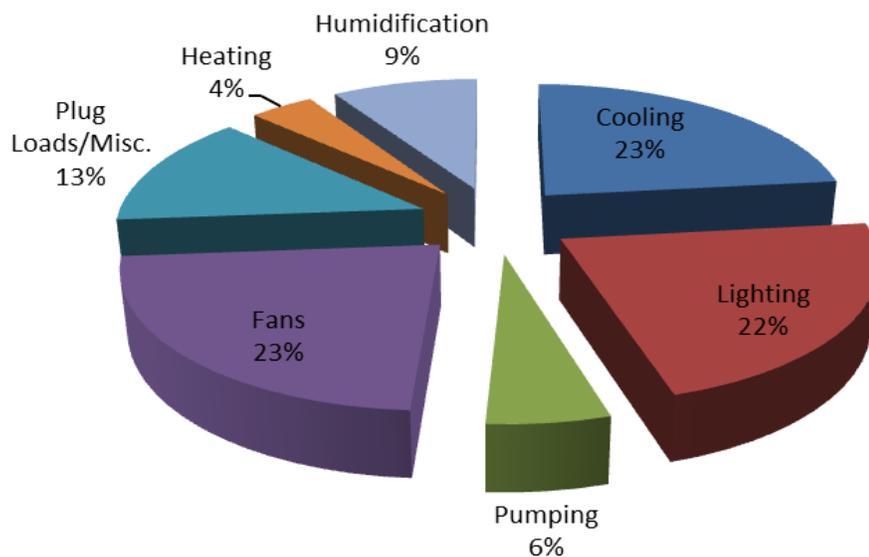
## Energy End Use Breakdown

Energy end-use estimates were calculated using spreadsheet-based tools in conjunction with a review of utility profiles. Information obtained during site visits, interviews with staff and industry standards were used in the development of this profile.

### Electricity

Exhibit 5 illustrates the electrical energy end-use distribution.

**Exhibit 5 Electricity End-Use Breakdown**



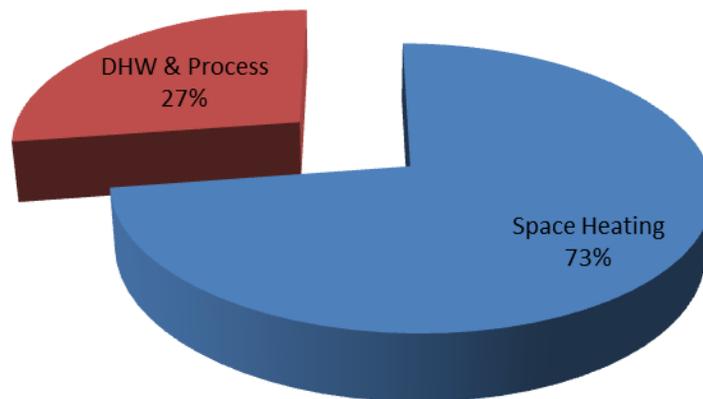
This electrical profile distribution demonstrates that the cooling is a larger than expected component of the total electrical consumption, normally it would be expected to be 12-15% of the annual consumption.



## Natural Gas

Exhibit 6 illustrates the natural gas energy end-use distribution.

**Exhibit 6 Natural Gas End-Use Breakdown**



Process loads include Kitchen use, Dryers and Sterilization. The space heating taking 73% of the natural gas usage is within expected range. The space heating is comprised of HVAC and perimeter heating.

## Energy Saving Opportunities

During an analysis of the facility in 2011, it was determined that there are several opportunities to reduce energy consumption and operating costs. Among the recommended measures were:

- 1) Lighting
- 2) BAS upgrade
- 3) Boiler Replacement
- 4) Replacement of Boilers
- 5) Replacement of aged AHU's
- 6) Solar Array
- 7) Building Envelope improvement

The resulting project would have had a 11 year payback. Costs savings and incentives would need to be reevaluated at this date.



### Timeline for Plan Adoption and Implementation

Key Dates	Description	Date
<b>Plan Adoption</b>	The current plan will be reviewed by the Senior Management Team and Board of Directors.	(10/01/2014)
<b>Implementation</b>	Assuming that incentives are available and energy management program loans are not greater than 4% interest. Assuming that the installation of direct digital controls is the preferred project.	(10/29/2015)
<b>Substantial Completion Date</b>	Substantial Completion is the date at which the project has sufficiently completed any construction, renovation, or program implementation activities such that monitoring of environmental and financial benefits can be initiated.	(12/29/2016)
<b>Initial Savings Verification Date</b>	The initial savings verification is the date at which the project has been operating long enough to provide an initial confirmation that environmental and financial benefits are being achieved. The project must be able to demonstrate project outcomes and verify any cost-savings within 18 months of project award.	(03/28/2017)
<b>Project End Date</b>	The project will conclude with a final report summarizing the project with validated and projected environmental and financial benefits.	(03/28/2017)