Opportunity Assessment

Timmins and District Hospital

Draft Report

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Submitted to:
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Submitted by:
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Executive Summary

Under the auspices of the Ontario Power Authority's (OPA) saveONenergy program, Healthcare Energy Leaders Ontario (HELO) was retained by the Timmins and District Hospital to conduct a walk-though energy audit and preliminary assessment of energy management opportunities in their facility.

HELO is a joint energy-efficiency initiative of the CHES Ontario and the Canadian Coalition of Green Health Care serving Ontario's health care sector.

The objective of the assessment is to identify potential energy retrofit opportunities including lighting, HVAC, and combined heat & power (CHP); and the available incentives from the OPA to support the implementation of these projects. The results of this report will provide the Montfort Hospital with the business case to support the implementation of energy cost saving improvements in their facility operations.

The results of the assessment indicate that there is a potential for the implementation of cost effective energy reduction measures in the areas of HVAC equipment and power generation. As shown in Table ES.1 Business Case Summary overleaf, the total cost savings for the immediate implementation measures are estimated to be $29,425 per year, with an estimated incremental implementation cost of $362,970. The simple payback is 12.3 years, and the resulting GHG emissions reductions are 55.8 tonnes of eCO_2 per year. The total savings represent a 3% reduction in electricity consumption. The implementation of these measures would decrease the energy intensity from the present baseline of 96.2 $ekWh/ft^2/year$ to a post-retrofit intensity of 95.3 $ekWh/ft^2/year$, representing a 1% decrease in overall energy use.

The combined heat and power measure would generate 7,622 MWh of electricity annually, equivalent to 85% of the baseline electricity consumption. The measure would lead to a net annual increase of 737,136 m^3 of natural gas and a net decrease of 198 tonnes of eCO_2 per year.

It is estimated that the proposed measures would be eligible for $1,644,184 in incentives from the OPA's saveONenergy program, and would contribute 1,348 kW and 8,198 MWh of savings towards the OPA's DSM targets. Note that the savings potential is based on the preliminary opportunity assessment. A more accurate estimate of the savings will be available once the detailed assessments of the measures have been completed.

Energy Reduction Measure	Potential Incentives			
	Incentive Stream	[kW]	[kWh]	[$]
Chiller Plant	ERII Prescriptive	3.4	14,562	$2,284
Chiller Plant	ERII Custom	288.0	576,085	$230,434
Combined Heat & Power	PSUI	1,060.0	7,621,989	$1,413,750
Total		**1,348.0**	**8,198,073**	**$1,644,184**

Exhibit ES.1 Measure Summary

Energy Reduction Measure	Annual Savings: Electricity [kWh/yr]	Electricity [kW]	Electricity [$]	Natural Gas [m^3/yr]	Natural Gas [$]	Water [m^3/yr]	Water [$]	Total [$]	Estimated Total Cost [$]	Simple Payback [years]	GHG Reduction [teCO_2]
Chiller Plant	265,540	238.4	$33,671	0	$0	-1,719	-$4,245	$29,425	$362,970	12.3	55.8
Total	**265,540**	**238.4**	**$33,671**	**0**	**$0**	**-1,719**	**-$4,245**	**$29,425**	**$362,970**	**12.3**	**55.8**
Baseline Consumption	8,917,504		$892,458	2,020,625	$394,422	0	$0	$1,286,880			5,717.9
Estimated Savings	3%			0%				2%			1%
Post-Retrofit Target	8,651,964			2,020,625		1,719		$1,257,455			5,662.2

Energy Generation Opportunity	Annual Savings: Electricity [kWh/yr]	Electricity [kW]	Electricity [$][1]	Natural Gas [m^3/yr]	Natural Gas [$]	Water [m^3/yr]	Water [$]	Total [$]	Estimated Total Cost [$]	Simple Payback [years]	GHG Reduction [teCO_2]
Combined Heat & Power	7,621,989	1,060	$694,568	-737,136	-$143,888	0	$0	$550,681	$3,534,375	6.4	197.8

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1 Introduction

1.1 Background

The Ontario Power Authority retained ICF Marbek to conduct an opportunity assessment of hospitals throughout Ontario as part of the Commercial and Institutional Host Organizations program.

This report pertains to the Timmins and District Hospital, a fully accredited referral and teaching hospital located in Timmins, Ontario.

The objective of the audit was to identify and assess potential energy retrofit opportunities including lighting, HVAC and the building envelope, as well as water, renewable energy and other innovative measures. The results of the audit will provide the Timmins and District Hospital with information to plan and implement energy reduction strategies.

1.2 Scope and Methodology

The remainder of this report is structured as follows:

- ***Section 2 Facility Overview*** provides an overview of the facility's demographics including building type, age, size and construction.
- ***Section 3 Utility Data Analysis*** presents the results of the analysis of utility data including historical consumption, energy end-use analysis, and a utility billing overview.
- ***Section 4 Energy Conservation Strategies*** presents a summary of the economic justification for each proposed measure including the total project cost, energy cost savings, simple payback period and reduction in GHG emissions.

1.3 Acknowledgements

ICF Marbek gratefully acknowledges the assistance of the following people in carrying out this study:

- Tim Prokopetz, Manager, Materials - Biomedical Engineering

2 Facility Description

The Timmins and District Hospital is a fully accredited referral and teaching hospital located in Timmins, Ontario. The hospital was constructed in the early 1990’s and has a total conditioned floor space is 310,000 ft^2.

Major energy retrofits were conducted in 2002 and 2009 and affected the majority of systems in the facility.

The lighting system mostly consists of 32W T8 fluorescent fixtures. Outdoor fixtures are mostly HID.

Ventilation is provided by several constant volume air handling units equipped with terminal reheat coils. The units are located in the mechanical penthouse and at various rooftop locations.

Space heating is provided by hydronic heating coils located in the air handling units and perimeter radiant heaters. The hydronic heating loop is supplied with hot water from the central boiler plant.

Space cooling is provided by (4) air cooled Trane reciprocating chillers that supply the penthouse air handling units as well as localised DX units supplying the rooftop air handling units. There are also several split system AC units which provide spot cooling for diagnostic and IT equipment.

The central boiler was upgraded in 2009 with dedicated hot water and steam boilers in place of the original steam boiler plant. The hot water boilers supply the heating coils and DHW, and the steam boilers supply the humidification, cooking, laundry, and sterilization requirements.

The facility has a central building automation system that includes the majority of the mechanical systems. Most controls are a mix of pneumatic and DDC controls.

Other equipment includes specialized medical equipment, office equipment and computers, IT servers, and elevators.

From Left: Reciprocating chillers, rooftop air handling unit, emergency generator set

3 Utility Data Analysis

This section presents the results of the analysis of electricity and natural gas consumption data over the most recent full year of data and includes the following:

- Baseline energy use
- Energy end-use estimates
- Utility rates

Water consumption data was not available. The results of these analyses yielded valuable insights into all aspects of building energy performance and efficiency and helped to identify and inform the proposed energy-efficiency measures.

3.1 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 2, 3, and 4 present the data in graphic format.

Key Observations:

A review of the baseline energy cost profile reveals that:

- The total annual energy costs for the site in 2012 were $1,286,880. Electricity represents the largest cost at $892,458 (69% of total cost), while natural gas costs were estimated at $394,422 (31% of total cost). Natural gas cost data was not available, so costs were estimated from marginal utility rates.
- The annual electrical consumption is 8,918 MWh, and the annual gas consumption is 20,893 eMWh, resulting in a total site energy intensity of 96.2 ekWh/ft^2/yr. This places the Timmins and District Hospital 75% above the average of 54.8 ekWh/ft^2/yr based on an average of similar facilities in Ontario[1].
- At 28.8 kWh/ft^2, the electrical energy intensity is 49% above average, and the natural gas intensity is 89% above average at 67.4 ekWh/ft^2.

[1] Based on audits of 9 hospitals and long term care facilities in Ontario, 2009 to 2013.

Exhibit 1 Baseline Energy Consumption

2012	Electricity					Natural Gas				Total			
	Demand [kW]	Usage [kWh]	Intensity [kWh/ft^2]	GHG Emissions [teCO$_2$]	Cost [$]	Usage m^3	Intensity [ekWh/ft^2]	GHG Emissions [teCO$_2$]	Cost[1] [$]	Usage [ekWh]	Intensity [ekWh/ft^2]	GHG Emissions [teCO$_2$]	Cost [$]
Jan	1,137	673,361	2.2	141.4	$60,851	254,837	8.5	485.0	$49,744	3,308,376	10.7	626.4	$110,595
Feb	1,116	617,499	2.0	129.7	$58,173	213,280	7.1	405.9	$41,632	2,822,814	9.1	535.5	$99,805
Mar	1,811	688,465	2.2	144.6	$61,931	190,817	6.4	363.1	$37,247	2,661,513	8.6	507.7	$99,178
Apr	1,231	617,717	2.0	129.7	$71,391	179,995	6.0	342.5	$35,135	2,478,865	8.0	472.3	$106,526
May	1,938	773,430	2.5	162.4	$80,647	133,764	4.5	254.6	$26,110	2,156,550	7.0	417.0	$106,757
Jun	2,301	905,776	2.9	190.2	$94,350	110,932	3.7	211.1	$21,654	2,052,813	6.6	401.3	$116,004
Jul	2,098	998,956	3.2	209.8	$110,467	106,371	3.5	202.4	$20,763	2,098,832	6.8	412.2	$131,230
Aug	2,070	922,333	3.0	193.7	$86,494	111,867	3.7	212.9	$21,836	2,079,038	6.7	406.6	$108,330
Sep	1,974	740,033	2.4	155.4	$70,006	126,597	4.2	240.9	$24,711	2,049,046	6.6	396.3	$94,717
Oct	1,458	669,274	2.2	140.5	$68,800	153,055	5.1	291.3	$29,876	2,251,863	7.3	431.8	$98,676
Nov	1,142	642,186	2.1	134.9	$63,445	196,142	6.5	373.3	$38,287	2,670,294	8.6	508.1	$101,732
Dec	1,131	668,474	2.2	140.4	$65,903	242,968	8.1	462.4	$47,427	3,180,763	10.3	602.7	$113,330
Total	**2,301**	**8,917,504**	**28.8**	**1,872.7**	**$892,458**	**2,020,625**	**67.4**	**3,845.2**	**$394,422**	**29,810,767**	**96.2**	**5,717.9**	**$1,286,880**

1. Natural gas cost data was not available. Costs are estimated from the marginal rate.

Exhibit 2 shows the monthly electricity use profile. The majority of the electricity consumption is baseload, with a summer peak due to cooling, and a smaller winter extra that is the result of increased pumping energy associated with the heating system.

Exhibit 2 Baseline Electricity Use Profile

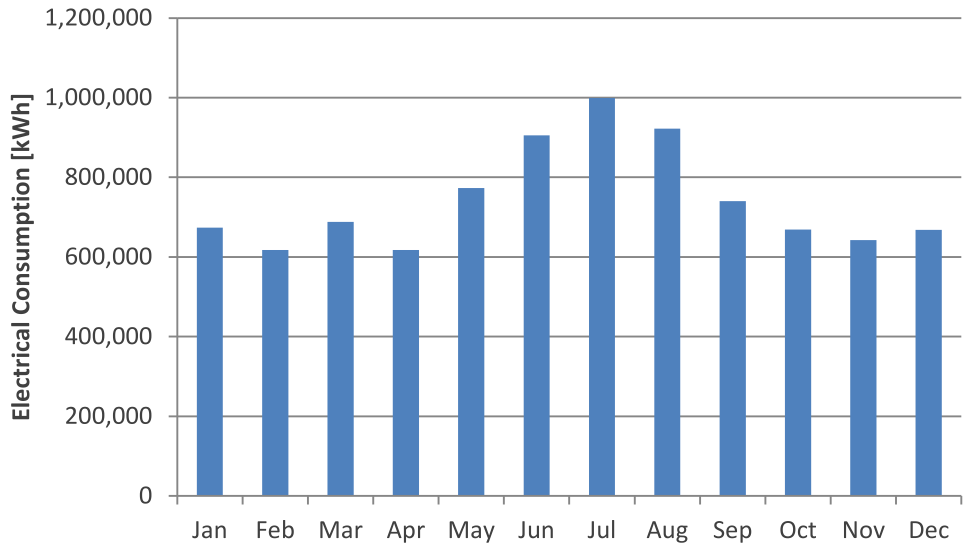


Exhibit 3 shows the daily maximum and minimum electricity demand profile for 2012. The building has a daytime baseload of approximately 1,150 kW and a nighttime baseload of approximately 700 kW. The cooling equipment adds up to 1,250 kW of additional load in the summer.

Exhibit 3 Baseline Electricity Demand Profile

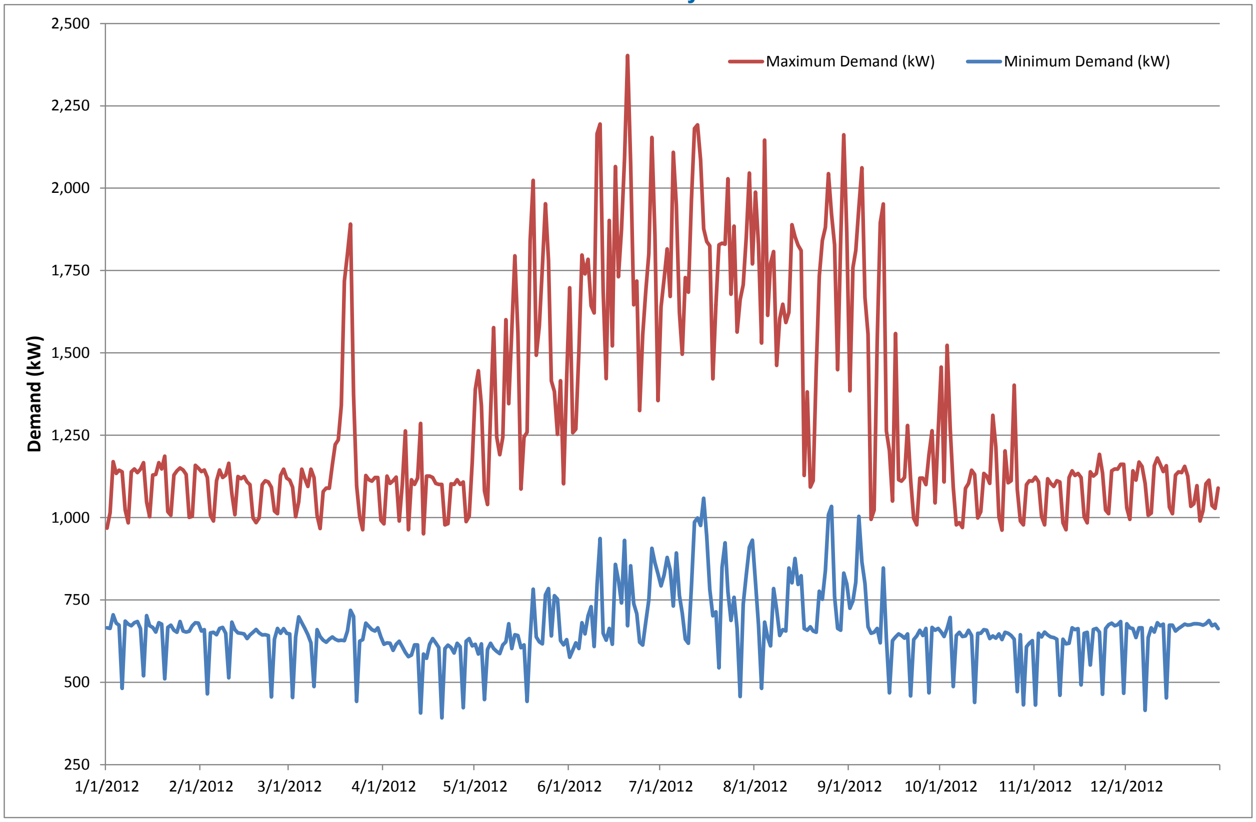
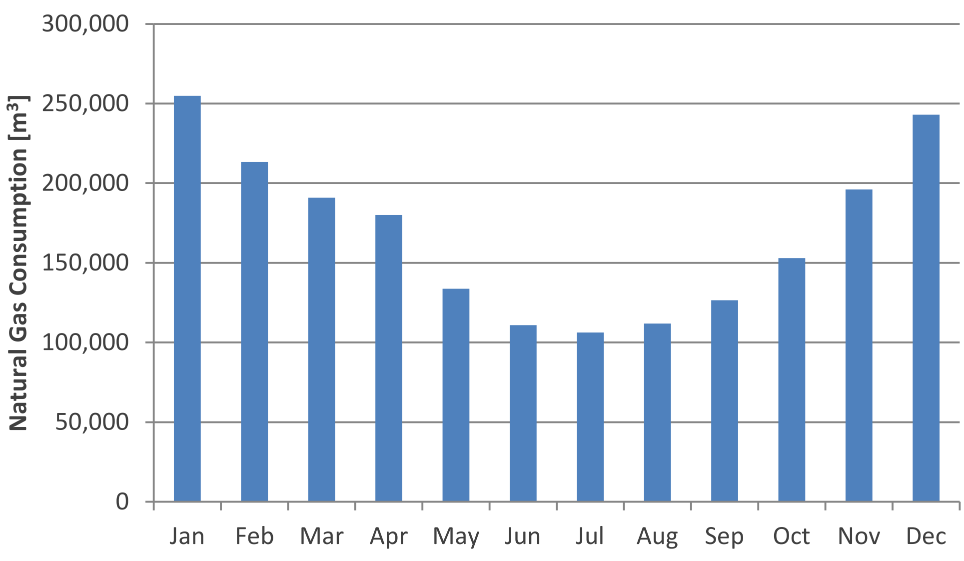


Exhibit 4 shows the monthly natural gas use profile. Approximately two thirds of the gas is being used for the baseload, and there is a predictable winter increase that corresponds well with the heating demand.

Exhibit 4 Baseline Natural Gas Use Profile



3.2 Utility Rates

This sub section presents an overview of utility services and rates for electricity, natural gas, and water consumption. The utility costs were used in this study for the purposes of calculating marginal costs to accurately assess savings. Avoided costs are based on the current marginal rates sourced from the utility's billing structure.

3.2.1 Electricity

Electricity is provided to the Timmins and District Hospital by Hydro One at the following rate structure:

- Consumption Charges
  - Hourly Ontario Electricity Price[2]: 8.41 cents/kWh
  - Wholesale Market Service Rate: 0.63 cents/kWh
  - Debt Retirement Charge: 0.70 cents/kWh

- Demand Charges
  - Distribution Volume Charge: $0.668/kW
  - Retail Transmission Network Charge: $2.65/kW
  - Retail Transmission Connection Charge: $2.14/kW

Using this rate structure, the marginal electrical rates used for this study are **9.74 cents per kWh** and **$5.46 per kW.**

3.2.2 Natural Gas

Natural gas is provided to the Timmins and District Hospital by Union Gas under Rate 10, which is structured as follows:

- Storage 2.2760 cents/m^3
- Storage Price Adjustment 0.1201 cents/m^3
- Commodity and Fuel: 12.4183 cents/m^3
- Commodity and Fuel Price Adjustment 0.5205 cents/m^3
- Transportation Charge: 5.0941 cents/m^3
- Transportation Price Adjustment: (0.9092) cents/m^3

The marginal natural gas rate used for this study is **19.52 cents per m^3**.

3.2.3 Water

Water is sourced from the City of Timmins, which bills all industrial and commercial users as follows:

- Water Charge: $1.33/$m^3$
- Wastewater Surcharge: 85.67% of total water charge

[2] 2013 YTD Price as of August 2013. Retrieved from http://www.ieso.ca/imoweb/pubs/marketReports/monthly/2013aug.pdf

The marginal water rate used for this study is **$2.47 per m^3**.

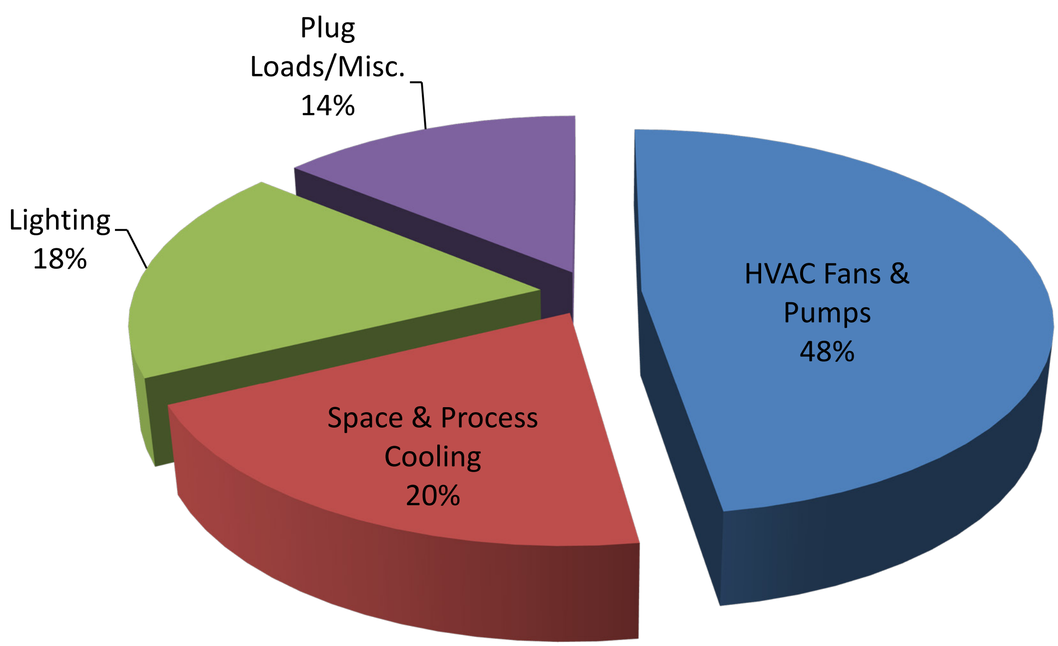
3.3 Energy End Use Breakdown

Energy end-use estimates were calculated using spreadsheet-based tools in conjunction with a review of utility profiles. Specific energy uses that may overlap several categories are explained in their respective sections.

3.3.1 Electricity

Exhibit 5 illustrates the electrical energy end-use distribution. The following end uses shown below were identified to have an electrical impact.

Exhibit 5 Electricity End-Use Breakdown



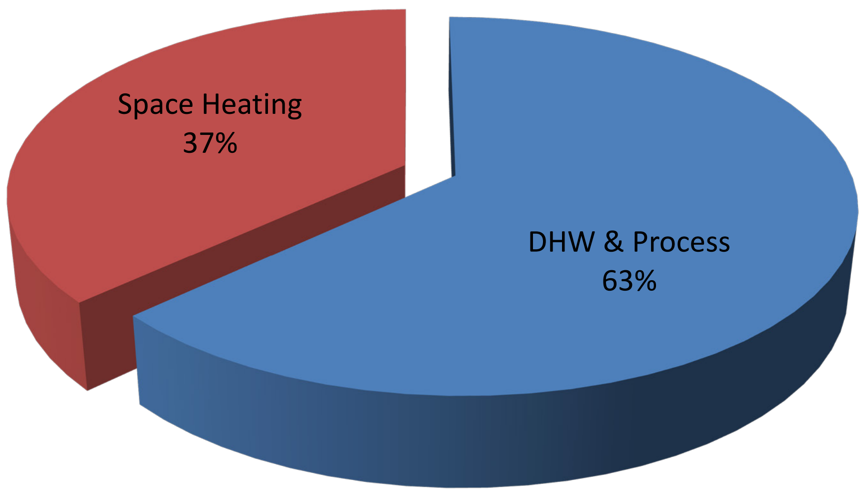
Observations on Electrical End-Use Breakdown:

- HVAC Fans & Pumps: 48%
  - The energy consumption for HVAC equipment is higher than expected, but still reasonable given the high ventilation rates.
- Space & Process Cooling: 20%
  - The cooling energy consumption is within the expected range. High internal heat gains mean that certain areas require space cooling year round. Process cooling loads include medical and IT equipment.
- Lighting: 18%
  - The energy consumption is within the expected range.
- Plug Loads/Miscellaneous: 14%
  - Plug loads include medical and IT equipment. The energy consumption is within the expected range.

3.3.2 Natural Gas

Exhibit 6 illustrates the natural gas energy end-use distribution. The following end uses shown below were identified to impact natural gas use.

Exhibit 6 Natural Gas End-Use Breakdown



Observations on Natural Gas End-Use Breakdown:

- Domestic Hot Water & Process: 63%
  - Process loads include steam consumption for humidification, sterilization, laundry, and cooking. The amount of energy used for the baseload DHW and steam supply is much higher than expected. Outside of the heating season, the overall efficiency of the boiler plant is likely very low.
- Space Heating: 37%
  - The energy consumption for space heating is within the expected range.

3.3.3 Water

A detailed water audit was not conducted, so it is not possible to prepare a water end use breakdown.

4 Energy Conservation Strategies

This section summarizes the potential energy efficiency measures. It includes a discussion of each measure, a description of the existing system, and the results of the financial analysis. Further information, including internal rate of return (IRR), net present value (NPV), and a list of assumptions made for each measure can be found in **Appendix A**.

4.1 Chiller Plant Retrofit

Description of Existing System

The central chiller plant consists of (4) 240 ton Trane Helirotor air cooled reciprocating compressors that are approaching end of life. There are no VFDs on the chilled water pumps.

Proposed Energy Efficiency Measure

Install a 1,000 ton centrifugal chiller and evaporative cooling tower. Install VFDs on the chilled water pumps.

Exhibit 7 below presents a summary of the economic justification for the measure including total project cost, energy cost savings, simple payback period, and GHG emissions reduction. Refer to ***Appendix A*** for details of costs and savings.

Exhibit 7 Chiller Plant Retrofit Measure Summary

Energy Reduction Measure	Electricity			Water		Total Savings	Estimated Cost	Simple Payback	GHG Reduction
	[kW]	[kWh]	[$]	[m^3]	[$]	[$]	[$]	[Years]	[teCO_2]
Chiller Plant	238.4	265,540	$33,671	-1,719	-$4,245	$29,425	$362,970	12.3	55.8

Project costs have been based on the incremental costs of the new centrifugal chiller plant compared to replacing the existing reciprocating chillers.

Impact on Operations and Maintenance

The cooling tower and VFDs will require some additional maintenance.

Estimated Service Life

Centrifugal Chiller: 25 years

Implementation Guidelines

A structural assessment of the roof should be carried out prior to project implementation to ensure that it can support the weight of the new equipment.

Available Incentives

The Ontario Power Authority offers incentives for energy savings projects through the saveONenergy program. It is estimated that this retrofit may qualify for $232,718 of incentive financing, which would have the effect of reducing the project's simple payback time from 12.3 years to 4.4 years. Please note that the project costs shown in Exhibit 7 do not include the potential incentive payments. Hydro One should be consulted for details of the requirements and payments for incentive programs. The website for this program can be found at https://www.saveonenergy.ca, and provides details on the types of incentives available. There are three ways to apply to the program: prescriptive, engineered, or custom.

The prescriptive application provides a set amount for each qualifying item replaced, regardless of application or schedule. The program provides a spreadsheet with a list of equipment sizes to choose from, and the corresponding incentive amount that may be available. To be eligible for financing, equipment must meet certain performance criteria which are also available from the website.

Similar to the prescriptive process is the engineered approach, which again uses a spreadsheet but requires operating schedules and further details about the facility. There is also a custom application process, which is more sophisticated, requiring engineering calculations to work out the exact kW and kWh savings for a retrofit situation. The incentives for the custom applications are on a per-kW or per-kWh basis, whichever is higher. Current incentives are $800 per kW or $0.10 per kWh.

4.2 Combined Heat and Power Generation

Description of Existing System

There is currently no non-emergency electricity generation capacity on site.

Proposed Energy Efficiency Measure

A pre-feasibility study was carried out on a combined heat and power generating (cogeneration) system. The results of the study indicate that a 1,060 kW natural gas reciprocating engine to provide electricity, domestic hot water, and steam is the best option. The system has been sized to meet the baseload DHW and steam consumption for the facility.

Exhibit 8 presents a summary of the economic justification for the measure including total project cost, energy cost savings, simple payback period, and GHG emissions reduction. Refer to ***Appendix A*** for details of costs and savings.

Exhibit 8 Combined Heat and Power Generation Measure Summary

Energy Reduction Measure	Electricity			Natural Gas		Total Savings	Estimated Cost	Simple Payback	GHG Reduction
	[kW]	[kWh]	[$]	[m^3]	[$]	[$]	[$]	[Years]	[$teCO_2$]
CHP	1,060	7,621,989	$694,568	-737,136	-$143,888	$550,681	$3,534,375	6.4	197.8

Impact on Operations and Maintenance

- The cogeneration plant will require continuous maintenance. A cost of $0.015/kWh was included in the project costs to account for O&M expenses.
- A capacity factor of 95% was assumed for the plant.
- A major overhaul of the plant will be required after 60,000 hours of operation.
- The cogeneration plant will be sized to meet the baseload steam and DHW demand of the facility, which will allow the steam plant to be shut down during the summer months.
- The cogeneration system can be incorporated into the emergency power circuit for the building, allowing for additional equipment to be operated during a grid blackout, or allowing for the diesel generators to stay offline while the cogeneration plant provides emergency power.

Estimated Service Life

Cogeneration Plant: 20 years

Implementation Guidelines

It is recommended that a detailed engineering study be carried out before project implementation.

Available Incentives

The Ontario Power Authority offers incentives for cogeneration projects through the Process and Systems Upgrade Initiative of the saveONenergy program. It is estimated that this retrofit may qualify for $1,413,750 of incentive financing, which would have the effect of reducing the project's simple payback time from 6.4 years to 3.9 years. Please note that the project costs shown in Exhibit 8 do not include the potential incentive payments. Hydro One should be consulted for details of the requirements and payments for incentive programs.

The PSUI program provides incentives of $200/MWh up to a maximum of 40% of total project costs.

4.3 Measures Considered and Not Recommended

The following measures were considered and rejected:

- Alternative capacities for the combined heat and power plant
  Prior proposals to the Timmins and District Hospital have recommended the installation of CHP plants of various capacities. Consequently, four different capacities for the CHP plant were considered in detail before settling on the 1,060 kW plant. It can be seen from the table below that the 1,060 kW system has the best financial outcome in addition to being the most adequately sized for the hospital's needs.

System Size (kW)	Cost	Ann. Savings	PSUI Incentive	SPP	ISPP	NPV	ROI
852	$3,187,500	$461,566	$1,275,000	6.91	4.14	$1,373,297	11%
1,060	$3,534,375	$550,681	$1,413,750	6.42	3.85	$1,958,558	13%
1,132	$3,656,250	$556,406	$1,462,500	6.57	3.94	$1,859,018	12%
1,425	$4,408,125	$610,328	$1,641,191	7.22	4.53	$1,524,961	10%

Appendix A Measure Worksheets

Measure Cost and Savings Work-Up Sheet

Facility: **Timmins**

Measure: **Chiller Plant**

Existing:

The central chiller plant consists of (4) 240 ton Trane Helirotor air cooled reciprocating compressors that are approaching end of life. There are no VFDs on the chilled water pumps.

Proposed:

Install a 1,000 ton centrifugal chiller and evaporative cooling tower. Install VFDs on the chilled water pumps.

Cost:

Material:	$237,100
Labour:	$53,276
Sub-Total:	$290,376
(15%) Eng. & Proj. Man.:	$43,556
(10%) Contingency:	$29,038
Total Cost:	$362,970
Annual Savings:	$29,425
Service Life (Years):	25
Simple Payback:	12.34
Net Present Value:	$13,184
ROI:	6%

Assumptions:

- Project costs are based on the incremental cost of the proposed retrofit compared to replacing the existing system.

- Material Costs
- 240 ton reciprocating chiller: $148,500 each
- 1,000 ton centrifugal chiller: $503,000
- 1,150 ton evaporative cooling tower: $190,000
- 20 HP Pump: $15,000/pump
- 25 HP Pump: $16,500/pump
- 20 HP Motor: $1,325/motor
- 25 HP Motor: $1,525/motor
- 20 HP VFD: $3,450/VFD

-Labour Costs
- Labour Rate: $70/hour
- Reciprocating chiller installation requires 151 hours
- Centrifugal chiller installation requires 426 hours
- Cooling tower installation requires 322 hours
- Installation requires 17 hours/pump
- Installation requires 3 hours/motor
- Installation requires 18 hours/VFD

- Incentives

- saveONenergy ERII Prescriptive Track
  - 20 HP Motor: $41/motor
  - 25 HP Motor: $31/motor
  - 20 HP VFD: $1,070/VFD
- saveONenergy ERII Custom Track
  - greater of $800/kW and $0.10/kWh, capped at 50% of project costs

Savings:

Energy Reduction Measure	Electricity [kW]	Electricity [kWh]	Electricity [$]	Water [m^3]	Water [$]	Total Savings [$]	Estimated Cost [$]	Simple Payback [Years]	GHG Reduction [$teCO_2$]
Chiller Plant	238.4	265,540	$33,671	-1,719	-$4,245	$29,425	$362,970	12.3	55.8

Notes:

Approximately $232,718 may be available in incentive funding from the Ontario Power Authority's saveONenergy Retrofit program. See http://saveONenergy.ca for details.

Measure Cost and Savings Work-Up Sheet

Facility: **Timmins**

Measure: **Combined Heat & Power**

Existing:

No non-emergency electricity generation capacity exists on site.

Proposed:

Install a 1,060 kW cogeneration system to provide electricity, DHW, and steam.

Cost:

Material:	$1,852,500
Labour:	$975,000
Sub-Total:	$2,827,500
(15%) Eng. & Proj. Man.:	$424,125
(10%) Contingency:	$282,750
Total Cost:	$3,534,375
Annual Savings:	$550,681
Service Life (Years):	20
Simple Payback:	6.42
Net Present Value:	$1,958,558
ROI:	13%

Assumptions:

- Electricity, hot water, and steam generation estimates based on a 1,060 kW natural gas reciprocating engine utilising a load following strategy.
- The plant has an estimated capacity factor of 95%.
- Natural gas consumption is the net of the gas required for power generation and the gas saved on DHW and steam generation.
- O&M costs of $0.025/kWh included in the annual savings estimate.
- A major overhaul estimated at $412,000 in today's prices will be required after 60,000 hours of operation. The cost of the overhauls has been included in the financial analysis above.
- Incentives estimated from the saveONenergy Process and Systems Upgrade Initiative track.
  - $200/MWh of generated electricity, capped at 40% of project costs.

Savings:

Energy Reduction Measure	Electricity			Natural Gas		Total Savings	Estimated Cost	Simple Payback	GHG Reduction
	[kW]	[kWh]	[$]	[m^3]	[$]	[$]	[$]	[Years]	[$teCO_2$]
CHP	1,060	7,621,989	$694,568	-737,136	-$143,888	$550,681	$3,534,375	6.4	197.8

Notes:

- Electricity cost savings include operation and maintenance costs of 1.5 c/kWh .
- Approximately $1,413,750 may be available in incentive funding from the Ontario Power Authority's saveONenergy PSUI program. See http://saveONenergy.ca for details.