AYR Motor Centre
105 Connell Park Rd, Woodstock NB

ENERGY EFFICIENCY STUDY

Energy Management Service Provider:

Tweedie & Associates Consulting Engineers Ltd.

Primary contacts:

Stephen Tweedie – Principal
stweedie@tace.ca

Joshua Bernatchez – Project Engineer
jbernatchez@tace.ca

Telephone: (506) 383-8223

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1.0 Introduction

Tweedie and Associates Consulting Engineers Ltd. (TACE) was retained to perform an energy audit at 105 Connell Park Road, Woodstock, New Brunswick, and to outline energy saving measures. These potential improvements would result in energy consumption and energy cost savings. TACE has made recommendations for new equipment and these recommendations can be found in this report. The energy savings calculations for the proposed energy conservation measures (ECM) can be found in the attached appendixes. These figures were calculated using an hourly analysis software.

This energy study will provide the client with a comprehensive plan that will outline, evaluate, and report on the following:

- The current state of energy usage within the facility;
- Opportunities for "Greenhouse Gas Reductions";
- Measures for improving energy efficiency;
- Measures for reducing the cost of energy;
- The financial impact of implementing the energy efficiency and conservation measures (ECM), including capital cost and projected annual savings;
- Renewable energy opportunities if applicable

2.0 Facility Overview

2.1 General Description

The building complex is located at 105 Connell Park Road, Woodstock, New Brunswick. Controls & Equipment currently manage the mechanical equipment services for this facility. The facility consists of three main sections: Skating Rink (Part A); Swimming Pool (Part B); and Fieldhouse (Part C).

Part A and Part B were built in approximately 1994-1995. It has been open to the public since 1995 with the partnership of the Town of Woodstock and the Woodstock Rotary Club. The original complex offers an ice skating rink and a five-lane swimming pool, along with several multi-purpose rooms and offices.

In 2015, the facility had undergone a major expansion, (Part C). This expansion involved a large gymnasium which consists of a three-court field house and accommodates many sports. The gymnasium also contains a mezzanine walking track. This recent expansion (2015) also contains a fitness room, change rooms, offices and service spaces.

The facility has also undergone changes and modifications during 2015 when an additional VIP section was built on the south side of Part B. The total floor space studied in this energy audit measures 131,175 square feet.

2.2 General Seasonal Use

The facility operates year around, however the skating rink and ice plant are not functional during summer months. Please refer to the following hours of operation for the studied facility.

Arena:	Monday – Friday	5:00 am to 11:00 pm
	Saturday – Sunday	6:00 am to 11:00 pm
Swimming Pool:	Monday – Friday	6:00 am to 9:30 pm
	Saturday – Sunday	8:00 am to 9:30 pm
Field House:	Monday – Friday	5:00 am to 10:00 pm
	Saturday – Sunday	7:00 am to 10:00 pm
Fitness Centre:	Monday – Friday	5:00 am to 10:00 pm
	Saturday – Sunday	7:00 am to 10:00 pm

3.0 Building Profiles

3.1 Building Structure

The facility sits on a sloped landscaped lot. The skating rink is found on the lower level of Part A. The seating area for the skating rink is at the same level as the main entrance. The back and side of the facility (South and East sides) could be considered as walk-out basement with East exterior doors accessing service spaces (Zamboni, ice plant, etc.).

Part B of the facility has a walk-out basement on the south-side of the facility. The swimming pool can be accessed from the main entrance which is at a higher elevation than the walk-out basement. Part B consists of three floor levels (basement, main floor and upper floor). The upper floor contains meeting rooms and mechanical service spaces.

Part C has a partial basement used for storage and service space. The fieldhouse is at same elevation as the main entrance. The main floor also contains change rooms, offices and service space. The second floor contains fitness rooms, washrooms, service rooms and a walking track around the fieldhouse.

The facility is a concrete block structure. The skating rink (Part A) was noted as having metal siding and 50 mm of rigid insulation for a total wall insulation level of R-12.5 (RSI 2.21). The swimming pool (Part B) was noted as having metal siding, 63.5 mm of rigid insulation and batt. insulation (RSI 2.4) for a total wall insulation level of R-20.4 (RSI 3.60). The fieldhouse (Part C) was noted as having

metal siding and was assumed as having wall insulation values of R-20 (RSI 3.54).

The roof of the facility was noted as having a metal deck with varied levels of insulation. The roof is slightly sloped with an asphalt membrane. The roof covering the skating rink (Part A) was noted as having 50 mm of rigid insulation for an overall roof insulation level of R-11.63 (RSI 2.06). The roof over the swimming pool (Part B) was noted as having 89 mm of rigid insulation for an overall roof insulation level of R-19.5 (RSI 3.45). The roof covering the field house (Part C) was assumed at R-30 (RSI 5.30).

The windows and doors for this facility was noted as being in fair condition. The windows were noted as double pane aluminum frame windows. The doors were noted as insulated metal doors and the glass doors were modelled as double pane aluminum frame operable windows.

3.2 Interior Lighting

Interior lighting for the studied spaces is mostly provided by T8 fluorescent light fixtures. The skating rink contains high bay fixtures with higher ballast factors. Some spaces were noted as having Light Emitting Diode (LED) fixtures and High Intensity Discharge (HID) fixtures.

All light fixtures were noted as being controlled by standard light switches. Lighting relays were identified throughout most of the facility. It was noted that this building could take advantage of new lighting controls through the Building Automation System (BAS). TACE has made some recommendations for new light fixtures and new lighting controls. These can be found in Section 7 of this report along with Appendix C. For a complete room-by-room light fixture count, please refer to Appendix C attached to this report.

3.3 Exterior Lighting

The facility contains some exterior light fixtures. Wall packs were noted along the perimeter of the facility. These wall packs were noted as LED fixtures. Parking lot lighting is provided by LED parking lot light fixtures.

Please refer to Appendix C for more details on these light fixtures.

3.4 Interior Heating Systems

The building is heated by a mixture of technologies. The seating area found in the skating rink (Part A) is heated by propane fired infrared tube heaters. The vestibules found throughout the facility were noted as having electric force-flow heaters and the stairwells were noted as having electric unit heaters. Electric

baseboard heaters were noted throughout the facility along with some radiant panels and terminal reheat coils.

3.5 Cooling Systems

Space cooling is provided by packaged air handling units along with two mini-split heat pumps. Please refer to the following table for information on the air source heat pump units. The mini-split heat pumps are of equal capacity and they serve meeting rooms in Part B of the facility.

Table 3.5 – Mini-Split Air Source Heap Pump Schedule

Equipment ID	Heating Capacity	HSPF	Cooling Capacity	SEER	Power Supply	MCA
Mini-Split 1	14,400 Btu/h @ 47°F	10.0	12,000 Btu/h	12.5	Outdoor Unit: 208/60/1; Indoor Unit: 208/60/1	Outdoor Unit: 12; Indoor Unit: N/A
Mini-Split 2	14,400 Btu/h @ 47°F	10.0	12,000 Btu/h	12.5	Outdoor Unit: 208/60/1; Indoor Unit: 208/60/1	Outdoor Unit: 12; Indoor Unit: N/A

A total of seven (7) air handling units were noted as having cooling capability. Two (2) roof-top units were identified, serving Part B (swimming pool and surrounding areas) of the facility. Two roof-top units (AHU-1 and AHU-2) were identified during the energy audit, they serve front entrance and gallery respectively. AHU-3 is split system with the outdoor condenser located on the roof. AHU-4 and AHU-5 serve the fitness room and locker rooms respectively (only AHU-4 has cooling capability, with the outdoor condenser located at ground level). Please refer to the next section for all identified ventilation systems for this facility.

3.6 Ventilation Systems

This facility contains multiple ventilation units. All cooling is provided by DX (Direct Expansion) cooling. Please refer to the following table (located on the following page) for a description of the identified air handling units.

Table 3.6.1 – Ventilation Units Schedule

Equipment ID	Area Served	Fan Capacity	Cooling Capacity	Heating Capacity	Heating Type
SF-1 Trane CTBB22	Fresh Air to AH-1 & AH-2	5 HP	-	80 kW (Staged & SCR)	Heat Wheel Heat Recovery & SCR Heating
RF-2 Trane CRTBB27	AH-1 & AH-2 Return Fan (from Lobby)	3 HP	-	-	-
AH-1 Dectron Dry-O-Tron Model DS-120-53	Swimming Pool	10 HP 11,000 CFM	120,000 Btu/h Pool De-humidi-fication and Heat Recovery (air side reheat + pool water heating)	65 kW (Staged & SCR)	Electric SCR
TE-1 Swimming Pool Exhaust	Exhaust Fan (Swimming Pool)	5 HP	-	-	Heat Wheel Heat Recovery
AH-2 Trane MCCA017	Part B - Offices	7.5 HP 8,400 CFM	-	-	Zone Electric Re-Heat
AH-3 Trane WCD120BW0ADA	Part B – Studio	3 HP 4,000 CFM	120,000 Btu/h	110,00 Btu/h	Heat Pump/ Electric Back-Up
AH-4	Rink Seating Area	No Access N/A 7,000 CFM	-	No Access	Ice Plant Heat Recovery/ Electric
AH-5 Daikin MPS010BYYM	VIP Room (Sam's Room)	SF: 3HP 4,000 CFM	120,000 Btu/h	38.4 kW	Electric 2 Stage
SF-2 & TE-2	Rink Dressing Rooms	SF: 2 HP 800 CFM EF: 2 HP 800 CFM	-	24 kW	Electric SCR
AHU-1 Daikin RPS015DSEY5A	Front Entrance	SF: 5 HP 6,000 CFM RF: 2 HP (RF not shown on graphics)	180,000 Btu/h	39.8 kW	Electric SCR
AHU-2 Daikin DPS010AHHE5DC	Gallery	SF: 4 HP 4,000 CFM RF: 4 HP (RF not shown on	120,000 Btu/h	54 kW	Electric SCR

		graphics)			
AHU-3 Daikin RCS100DYYYYY Outdoor Unit	Fieldhouse	SF: 30 HP 40,000 CFM RF: 25 HP	1,200,000 Btu/h (6 Stage)	N/A	Electric Staged & SCR
AHU-4 Daikin CAH018GDAM Indoor Unit	Fitness Room	SF: 7.5 HP 6,000 CFM RF: 3 HP	180,000 Btu/h (2 Stages)	55 kW	Electric Staged & SCR
AHU-5 Greenheck	Fitness Locker Rooms	SF: 3 HP 4,500 CFM EF: 3 HP 4,500 CFM	-	55 kW	Electric SCR & Heat Wheel Heat Recovery
HRV-1 Lifebreath 700DD Air Exchanger	Storage Under Gallery	SF: 0.5 HP 1,175 CFM EF: 0.5 HP	-	13 kW	Electric SCR Typee
HRV-2 Air Exchanger	Slammer Dressing Room	SF: 0.25 HP 690 CFM EF: 0.25 HP	-	7 kW	Electric SCR Type

The facility also contains multiple exhaust fans. Please refer to the following table for all identified exhaust fans.

Table 3.6.2 – Additional Exhaust Fan Schedule

Equipment ID	Area Served	Fan Capacity
AEF-1	Arena Exhaust	N/A (No Access)
AEF-2	Arena Exhaust	N/A (No Access)
AEF-3	Ice Plant Exhaust	2 HP 2 speed (Ammonia Sensor)
KEF-1	Main Floor Kitchen	1.5 HP 1,750 CFM
KEF-2	Basement Kitchen	1.5 HP 1,600 CFM
EF-1	Fieldhouse Exhaust	0.25 HP N/A

3.7 Dehumidification Units

3.7.1 Swimming Pool Air Conditioning

There are three energy requirements for indoor swimming pools: water heating; humidity control; space heating. The Dectron unit (model DS-120-53) is capable of dehumidifying pool air by cooling the return air and incoming fresh air. Heat is then reclaim from the cooling coil and is utilized for pool water reheat along with supply air reheat. It is said that the evaporation rate of pool water is equal to the amount of het needed to heat the pool water. Supply air is also reheated by an electric heating-coil (65 kW staged with SCR (silicon controller rectifier) used for

supplemental heat. During the energy audit, it was noted that the back-up electric heating elements for the swimming pool were manually turned to "off" position. This indicates that all pool water heating is currently done by the Dectron unit. TACE believes that supplemental heat is only utilized if required (during pool water re-fill, etc.).

3.7.2 Ice Rink Dehumidification

Two Dectron units were noted in the ice rink area. Data could not be retrieved by these units because of limited access since they were mounted quite high at ceiling level. These units run to maintain rink humidity levels low and help to maintain ice surface temperatures at desirable set-point and reduce ice/ water evaporation.

3.8 Domestic Hot water

Hot water for the facility is provided by electric hot water storage tank type heaters located in the service space on the east side of the building, next to the ice plant and Zamboni service space. A domestic hot water preheat tank is also located next to the electric hot water heaters. Domestic water is preheated by a water-side heat recovery system from the condenser side of the chiller plant. A domestic hot water recirculation pump was identified next to the hot water storage tanks. Domestic hot water heating for this facility was noted as sufficient. It is estimated that 15% of the condenser water energy is being re-utilized for domestic hot water heating.

3.9 Ice Plant

The ice plant found at this facility consists of multiple items. There are three main circuits of working medium in ice plants:

Refrigeration circuit: ammonia as working medium which actually produces the cold by changing its phase at different location.

Cooling water circuit: cooling water (from the water cooled cooling tower) as working medium to remove the heat of condenser circuit (ammonia).

Brine circuit: brine solution as working medium which transfers the cold from ammonia to the ice pad (below skating rink surface).

The ice plant consists in two compressors, a water-cooled condenser, a receiver, and an evaporator.

The compressor's function is to increase the temperature and pressure of ammonia vapor coming out from the evaporator.

The condenser liquefies the high pressure and high temperture ammonia to high pressure and high temperature ammonia. Chilled water comes in contact with the high pressure and high temperature ammonia and provides the temperature for condensation.

The receiver is used to collect the liquid ammonia from the condenser.

The evaporator vaporizes the liquid ammonia by extracting heat from the brine circuit and hence brine gets cooled. This brine is then re-circulated through its circuit.

The ice plant found in this facility contains two heat recovery devices from the condenser water (ammonia). Heat is taken from the condenser circuit before it circulates through the cooling tower. A plate and frame, water-to-water heat exchanger was noted. AHU-4 serving the rink seating area has a glycol heating coil which takes heat from this identified heat exchanger. TACE has however noted during the audit that this system is no longer utilized. Heat recovery is however being utilized for non potable hot water heating. This hot water is used for ice resurfacing as zamboni flood water. TACE has noted that the ice plant is currently utilizing approximately 15% of its capable heat recovery.

This ice plant contains two electric hermetic reciprocating chillers with compressors of 60 HP.

The ice plant also consists of two brine pumps in parallel configuration (one pump in standby). These pumps are 30 HP one speed pumps and distribute chilled brine for the skating rink through in-floor reverse-return piping.

The cooling tower water is pumped from a holding tank by a one speed 5 HP pump.

The cooling tower is a Baltimore Air Coil (BAC) unit Model VC1-135 and contains one fan motor of 15 HP.

3.10 Electrical Plug Loads

This facility contains various types of plug load items. Office equipment was identified in various sections of the facility but mainly on the main floor. The fitness centre also contains various exercise machines. Kitchen appliances were noted in the two kitchens (main floor and basement).

3.11 HVAC Control Systems

This facility has a Delta Controls Building Automation System, Version 3.33 (ORCAview) which is provided by Controls & Equipment. The facility is also managed by Controls & Equipment staff personnel. It should however be noted that the swimming pool dehumidification and air conditioning system (Dectron Model DS-120-523) is controlled by its stand-alone built-in controls. The Delta system simply reads equipment status via analog inputs. The ice plant is maintained by Cimco.

4.0 Utility Usage Analysis

4.1 Utility Rates

4.1.1 Electrical Rates

The electrical service provider is NB Power. Billing for the electrical consumption is based on their commercial "General Service 1" rate structure which currently reads as follows on the NB Power web service:

Service Charge:	*$22.70*
First 20 kilowatts of demand:	*No Charge*
Additional kilowatts of demand:	***$10.45/ kW***
First 5000 kilowatt hours:	*$0.1307/ kW*
Balance kilowatt-hours	***$0.0927/ kWh***

Note: Electrical rates fluctuate continuously. For this energy study, the latest energy rates were utilized for more representative financial savings.

4.1.2 Propane Gas Rates

Irving Energy currently supplies propane to 105 Connell Park Road, Woodstock, NB. Propane gas rates fluctuate throughout the course of the year. For the purpose of this energy study, utility rates for propane was taken from the proposed baseline of given data: March 2017 to February 2018. Total propane consumption was measured at 16,224 litres of propane while total cost (before HST) was measured at $6,913.

Average Propane consumption rate: $0.4261/Litre

4.2 Utility Usage Summary

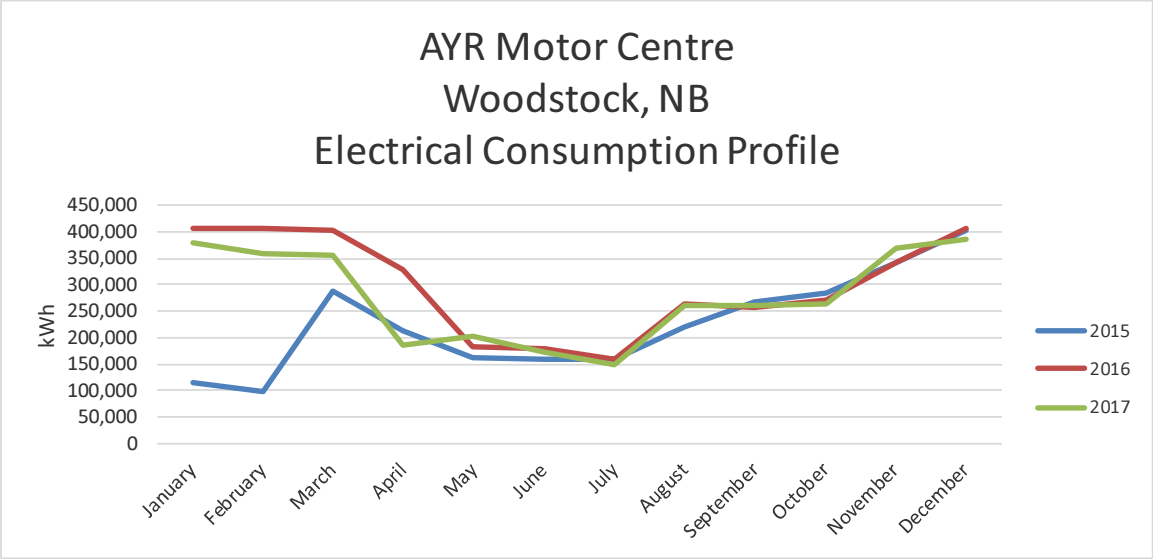
4.2.1 Electrical Consumption

Electrical data was given to TACE from the client upon request. Data was given from January 2015 to December 2017. Electrical consumption continuously fluctuates (with heating energy being a major source of electrical consumption along with ice making during skating season). Please refer to the following tables for all received electrical consumption for the studied facility. For the purpose of this energy study, electrical consumption for the year 2017 was used for the baseline of electrical consumption.

Table 4.2.1 Electrical Consumption Profile – AYR Motor Centre, Woodstock, NB

Account # 1572722-4			
Electrical Consumption (kWh)			
	2015	**2016**	**2017**
January	114,300	407,700	378,900
February	97,200	405,900	358,200
March	286,200	401,400	353,700
April	214,200	326,700	184,500
May	162,900	181,800	201,600
June	157,500	178,200	172,800
July	159,300	158,400	148,500
August	220,500	262,800	261,000
September	265,500	258,300	261,000
October	284,400	270,900	262,800
November	342,900	340,200	367,200
December	404,100	405,000	386,100
TOTAL	**2,709,000**	**3,597,300**	**3,336,300**

Figure 4.2.1 Electrical Consumption Profile – AYR Motor Centre, Woodstock, NB



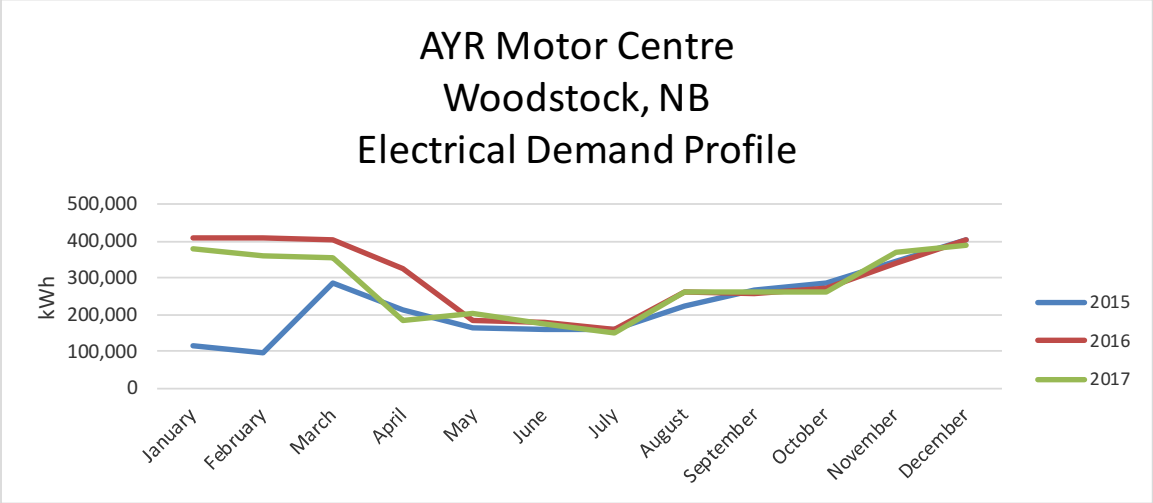
4.2.2 Electrical Demand

The following table describes the electrical demand for the studied facility located at 105 Connell Park Road, Woodstock, NB. The demand meter is typically read every month and reset by NB Power staff. Electrical demand was given from January 2015 to December 2017. For the purpose of this energy study, electrical demand for the year 2017 was used for the baseline of electrical demand.

Table 4.2.2 Electrical Demand Profile – AYR Motor Centre, Woodstock, NB

Account # 1572722-4			
Electrical Demand (kW)			
	2015	**2016**	**2017**
January	443.9	892.6	1,106.5
February	439.0	929.1	1,087.0
March	810.8	815.7	1,077.3
April	534.6	748.4	613.2
May	635.0	683.6	591.3
June	347.5	542.7	560.5
July	443.9	540.3	490.9
August	660.2	689.3	743.6
September	639.9	842.4	740.3
October	841.6	805.1	765.5
November	796.2	787.3	908.8
December	841.6	1,095.9	1,117.0
TOTAL	**7,434.2**	**9,372.4**	**9,801.9**

Figure 4.2.2 Electrical Demand Profile – AYR Motor Centre, Woodstock, NB



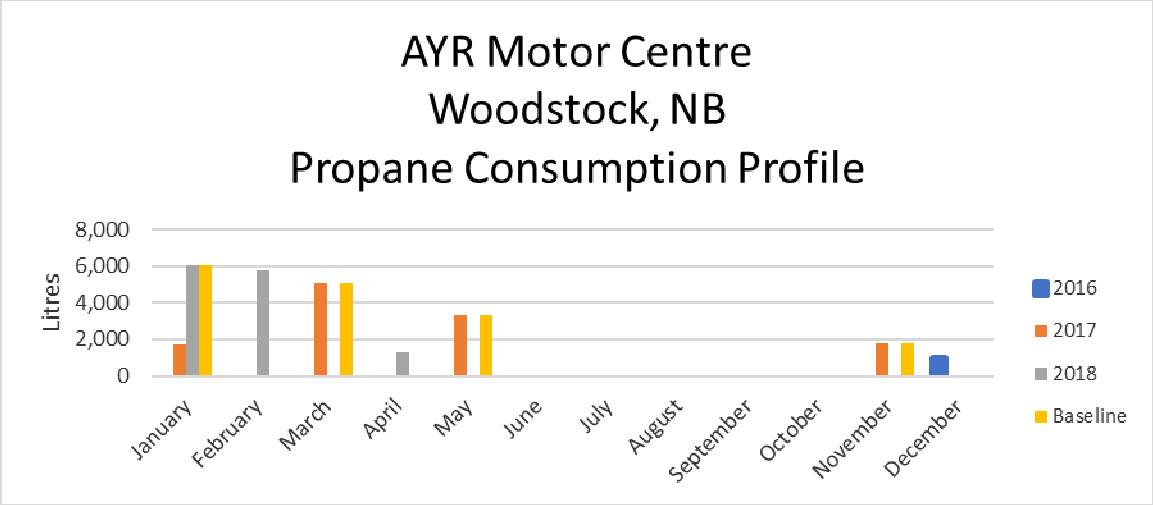
4.2.3 Propane Consumption

Propane consumption data was given by the client upon request. Data was given from January 2017 to April 2018. Propane is solely used for heating which is why there is no propane consumption during summer months. For this section, TACE has included natural gas consumption data taken from January 2017 to April 2018. The baseline was derived from the propane consumption data from February of 2017 to January of 2018. These months were chosen because they are the most recent figures having appropriate charge dates. Since propane consumption is only charged once the tanks are filled, some months are left at zero. An annual baseline was created for this facility and TACE believes that these figures are the most accurate description of the building usage. Please refer to the following table and figure for propane consumption at 105 Connell Park Road, Woodstock, NB.

Table 4.2.3 Propane Consumption Profile – AYR Motor Centre, Woodstock, NB

AYR Motor Centre				
Propane Consumption (Litres)				
	2016	2017	2018	Baseline
January		1,720	6,060	6,060
February			5,777	0
March		5,079		5,079
April			1,298	0
May		3,292		3,292
June				0
July				0
August				0
September				0
October				0
November		1,793		1,793
December	976			0
TOTAL	**976**	**11,883**	**13,135**	**16,224**

Figure 4.2.3 Propane Consumption Profile – AYR Motor Centre, Woodstock, NB



4.2.4 Energy Consumption Summary

Utility data for the last year of given electrical data (year 2017) was utilized to properly decipher all energy loads within the building. Annual electrical consumption for this facility was measured at **3,336,300 kWh/Year**. Annual propane consumption for this facility was measured at **16,224 Litres/ Year**. Total energy consumption was calculated at 12,425 GJ/ Year. The overall annual energy utilization index (EUI) score for the facility is **26.31 eqkWh/ft²).** It was noted that this facility could take advantage of several energy conservation measures (ECMs), which would lower its overall energy consumption, thus improving the EUI score

5.0 Energy Analysis

5.1 Methodology

A detailed energy simulation of the facility was performed using eQuest, an hourly analysis software which allows a complete description of the building using weather data files, building architectural, mechanical and electrical components as noted on site and from various conversations with building personnel. These efforts were also done by means of various engineering principles and calculations. This analysis allows for a complete description of the building shell thermal properties, mechanical and electrical equipment loads, lighting and miscellaneous loads along with all the related schedules and sequence of operations as noted. With this energy model, Tweedie & Associates Consulting Engineers could decipher proper monthly energy loads for all major building components found at this facility.

Energy modeling presents an evaluation of the energy usage profiles for the various loads found in the facility. This analysis provides an existing energy consumption baseline which allows investigation of certain building systems and operations exhibiting energy conservation opportunities.

The energy analysis was based on building equipment data and hours of operation for all related equipment. The information was provided through discussions with building personnel along with site observations.

Figure 5.1.1 eQuest 3D View (1) – AYR Motor Centre, Woodstock, NB

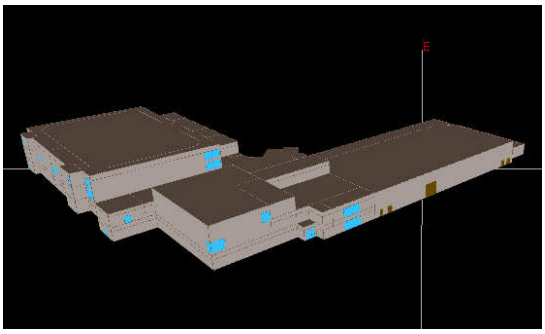
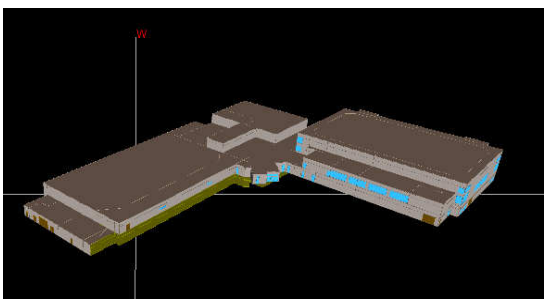


Figure 5.1.2 eQuest 3D View (2) – AYR Motor Centre, Woodstock, NB

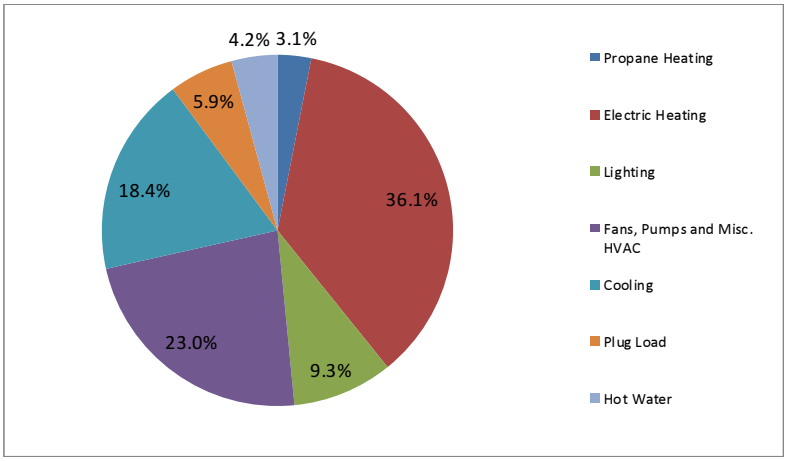


5.2 Energy Consumption

Energy consumption for each building component was calculated and a breakdown of electrical consumption and electrical demand was determined. The modeled energy consumption values were reconciled with the given metered consumption. Once the building model energy profile was reasonably close to the actual energy consumption, the energy profiles for each of the main systems were investigated.

Please refer to the following Energy Consumption Breakdown charts and tables for the studied facility.

Figure 5.2.1 Energy Consumption Breakdown



Existing Annual Energy Consumption Breakdown		
Equipment Description	**Energy Consumption (GJ)**	**%**
Propane Heating	404.9	3.1%
Electric Heating	4,696.6	36.1%
Lighting	1,207.8	9.3%
Fans, Pumps and Misc. HVAC	2,995.6	23.0%
Cooling	2,391.8	18.4%
Plug Load	769.3	5.9%
Hot Water	550.1	4.2%
Total:	**13,016.1**	**100.0%**

“Propane Heating” includes the infrared tube heaters located in the rink seating area. "Electric Heating" includes all electric heating coils found throughout the air handling units and includes all zone heating. "Cooling" includes cooling from every air handling unit but also includes cooling from the ice plant. "Lighting" includes interior and exterior lighting. “Fans, Pumps and Misc. HVAC” includes all fans found throughout the facility (supply fans, return fans, exhaust fans, pumps from domestic hot water re-circulation, brine pumps and cooling tower water feed pump. All other electrical loads such as computers, printers, photocopiers, kitchen equipment, etc. are considered “Plug Load”. “Hot Water” includes hot water heating for all hot water needs including every fixture supplied by hot water and ice resurfacing water.

6.0 Energy Conservation Methodology and Analysis

6.1 Measure Selection Criteria

Once the energy analysis and reconciliation was completed, energy conservation opportunities were developed. These energy conservation opportunities may include replacing or retrofitting inefficient equipment, optimizing sequence of operations, developing improved maintenance and prevention programs, implementing energy recovery devices, along with building envelope thermal resistance improvements, such as added insulation.

Measures proposed for implementation on this project were selected based on the viability of the measure against the following criteria: costs and savings associated with retrofit opportunities; condition of existing equipment; cost to retrofit the existing system compared to the cost to replace the system; overall impact on occupants and interior comfort; equipment approval by facilities personnel.

6.2 Cost Estimation Methodology

Capital cost estimates were determined from construction pricing based on previous projects, price quotes and good engineering practice. Various quotes and conversations with contractors have provided Tweedie and Associates Consulting Engineers with more precision and viability for budget implementation costs. It is our intention to provide accurate pricing; however, the pricing provided should be used as budget costs only and not fixed prices.

6.3 Savings Methodology

The savings for the energy conservation measures were calculated by using parametric runs within the eQuest energy simulation software and by using in-house worksheets and hand calculations. The savings estimates were based on engineering calculations along with good engineering practice.

7.0 Energy Conservation Measures

7.1 Interior Lighting Upgrade

Most interior light fixtures found throughout this facility consist of old lighting technologies. Most of the lighting consists of T8 fluorescent light fixtures. Please refer to Section 3.2 for a description on the light fixtures noted during the energy audit. For more information on all light fixtures and a room-by-room light fixture count, please refer to Appendix C.

TACE recommends replacing all older T8 light fixtures with new LED lamps and existing HID (High Intensity Discharge) lights with new LED light fixtures. For a complete detailed room-by-room lighting count and energy savings calculations, please refer to Appendix C attached to this report. The ballasts found throughout this facility should also be replaced for LED compatibility and ensuring proper life expectancy from the recommended fixtures. This energy conservation measure was calculated with a heating penalty. New efficient lamps disperse less heat and may require additional heat from the heating systems. The heating penalty was generated using the eQuest energy modelling software. Heating penalty was attributed to electrical energy and propane consumption. It should be noted however that there is also a cooling credit attributed to this measure, especially over the rink ice surface area. These figures were calculated with the most accuracy possible from the energy model.

Energy savings for this energy conservation measure were calculated as follows:

Electrical Savings from Lighting Only:	149,898 kWh/ Year 412 kW/ Year
Net Electrical Consumption Savings:	141,586 kWh/ Year
Net Electrical Demand Savings:	352 kW/ Year
Propane Consumption Heating Penalty:	343 Litres
Cost Savings:	$16,657/ Year
Capital cost:	$61,696
Simple Pay-Back Period:	3.7 years
Greenhouse Gas Reduction:	41.2 Tons of CO_2/ Year

7.2 Interior Lighting Controls Upgrade: BAS Upgrade

7.2.1 Interior Lighting Upgrade: Occupancy Sensors

During the energy audit, it was noted that most areas contained light fixtures with regular wall mounted "on/off" light switches. Some key areas were noted as having the possibility of being controlled by occupancy/motion lighting sensors. These locations include a seating area, change rooms, washrooms, storage rooms, offices and conference rooms. Please refer to appendix C for more details on this energy conservation measure. It was estimated that lighting run-times for the fixtures being controlled by occupancy sensors would be reduced by 30%. This energy conservation measure was calculated as follows:

Electrical Consumption Savings:	8,405 kWh/ Year
Cost Savings:	$779/ Year
Capital cost:	$6,900
Simple Pay-Back Period:	8.9 years
Greenhouse Gas Reduction:	2.5 Tons of CO_2/ Year

7.3 Building Automation System Upgrade: Event Scheduling

Controls & Equipment is currently working in collaboration with the building scheduling software. The BAS (Building Automation Software) could function from commands taken from the scheduling software. This will most definitely make it easier and more user friendly for qualified building personnel to control all building mechanical and electrical systems. Interior lighting, space heating/cooling and ventilation could be properly managed from one location (operator workstation). Scheduled events and open/closed hours could automatically enable/disable ventilation, heating/ cooling, lighting. (All interior lighting could be turned "off" when not in use, except for some light fixtures designated as emergency lighting.) Energy savings calculations for this measure were divided into three groups. All energy savings are explained through Sections 7.3, 7.3.2 and 7.3.3. The results for all three groups are described as follows:

Electrical Consumption Savings:	113,571 kWh/ Year
Cost Savings:	$10,528/ Year
Capital cost:	$80,000
Simple Pay-Back Period:	7.6 years
Greenhouse Gas Reduction:	33.5 Tons of CO_2/ Year

7.3.1 BAS Upgrade: Lighting Controls

Interior lighting is currently controlled by manual light switches. It was noted that the facility contains several lighting relays, controlling numerous light fixtures. It would be possible to manage and control all lighting from the existing BAS (Building Automation System) provided by Controls & Equipment. By doing this, the client will reduce lighting run-times.

This energy conservation measure would also include the possibility of manual override, with optional adjustable timer.

For this energy conservation measure, interior lighting energy consumption was estimated to be reduced by 30%, except for all locations found in Section 7.2 of this report along with emergency lighting (vestibules, stairwells, corridors and exit signs).

The results to this energy conservation measure were estimated as follows:

Electrical Consumption Savings:	35,471 kWh/ Year
Cost Savings:	$3,288/ Year
Greenhouse Gas Reduction:	10.5 Tons of CO_2/ Year

7.3.2 BAS Upgrade: Heating/ Cooling Controls

Interior heating and cooling set point schedules could be controlled by the building scheduling software. This would decrease heating and cooling loads for all times where the space in question is unoccupied. Although the existing BAS contains set back temperature capability, it was found that many of the zones were manually being controlled and for most cases, interior temperatures were left as occupied set points. For this energy conservation measure, TACE has readjusted interior temperature set points in the eQuest energy model. The set points were adjusted to enable heating and/or cooling two hours before the current hours of operation from the arena, the pool area and the fieldhouse section. It is possible that the new controls (link between scheduling software and BAS) will provide additional energy savings. Heating and cooling savings calculations should be conservative.

The results to this energy conservation measure were calculated as follows:

Electrical Consumption Savings:	40,300 kWh/ Year
Cost Savings:	$3,782/ Year
Greenhouse Gas Reduction:	12.0 Tons of CO_2/ Year

7.3.3 BAS Upgrade: Ventilation (Fresh Air Ventilation)

Fresh air ventilation for the facility is currently scheduled (user adjustable) and seen from the BAS. However, it is to the conclusion of TACE that fresh air ventilation could be further reduced for most spaces. For this energy conservation measure, energy consumption due to fresh air ventilation for the studio space (AHU-3), Sam's room (AHU-5), the gallery (AH-2) and change rooms (SF-2/TE-2) was reduced by 30%. In reality, SF-2 and TE-2 will be completely shut-off during unoccupied periods, resulting in additional fan savings.

The results to this energy conservation measure were calculated as follows:

Electrical Consumption Savings:	37,800 kWh/ Year
Cost Savings:	$3,504/ Year
Greenhouse Gas Reduction:	11.2 Tons of CO_2/ Year

7.4 Ice Rink Upgrade: Low Emissivity Ceiling

Emissivity describes the ability of a certain material to radiate heat rather than absorb it. A black body would have an emissivity value of 1. Meaning it absorbs all light and has great ability to transfer radiant heat. Low-emissivity ceilings have greater resistance against radiant heat transfer. Typical arena ceiling materials (wood, steel, concrete), such as the AYR Motor Centre Arena, have a high emissivity rating of around .9 radiating about 90% of the heat absorbed back down onto the ice surface. Radiant heat always travels from a warm surface to a cold surface, so we know that the major heat load in an ice arena is coming from the ceiling.

Low-emissivity arena ceilings have been around for about 20 years and yet there is still some misunderstanding of their purpose and why they are beneficial in ice arenas. Some people believe that if they have a white ceiling that is uninsulated, a low-e ceiling will not help them. Others believe that a low-e ceiling will make the arena colder.

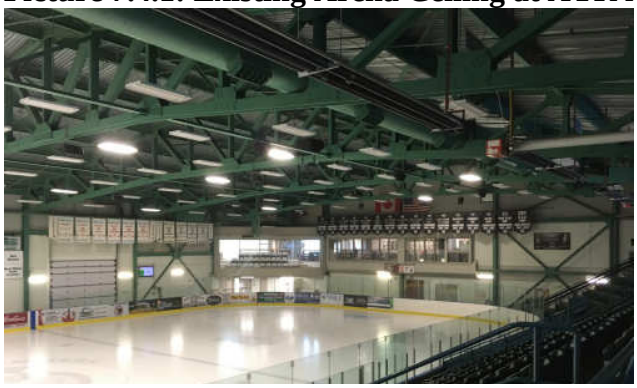
The fact is that a low-e ceiling works because the material it is made of has a very low potential to transfer radiant energy. Most objects and materials, including bright white-faced insulation, have an emissivity factor of .9; this means they are 90 percent efficient in transferring their radiant energy to other objects. Like infrared heaters radiant energy never heats the air, it only heats the objects it strikes - in this case, your ice surface.

Radiant energy will always flow from objects at a higher temperature to objects at a lower temperature. The greater the temperature differential, the faster the rate of heat transfer. Since your arena ceiling is always warmer than your ice surface, there is a constant transfer of radiant energy to the ice. When a low-e ceiling is installed over the ice sheet, it interrupts the flow of radiant energy to the ice. The

low-e ceiling reduces the heat load on the ice sheet by as much as 20 percent. Radiant energy always flows perpendicular to the surface that is emitting it.

An incidental but very beneficial side effect of the low-e ceiling is that it is highly reflective. This substantially increases the perceived light level and may allow you to decrease the number of light fixtures, resulting in even greater energy savings.

Picture 7.4.1: Existing Arena Ceiling at AYR Motor Centre



Picture 7.4.2: Examples of Low-Emissivity Ceilings for Skating Rinks

Low-emissivity ceilings bring many benefits to skating rinks such as: acoustics improvements, condensation reduction, increased R-value, enhanced illumination, visual appeal. These factors would result in reduced energy, operating and maintenance costs. Energy savings were calculated in such that a lighting upgrade was already instated.

TACE has received a verbal quote from a manufacturer located in Ontario on similar project, near four years ago, and it was determined that the price would be somewhere in the vicinity of $30,000 to $35,000. For this energy conservation measure, TACE has estimated the simple pay-back with a capital cost of $40,000.

The energy savings and feasibility analysis are as follows:

Electrical Consumption Savings:	51,200 kWh
Electrical Demand Savings:	80 kW
Cost Savings:	$5,584
Measure Implementation Cost:	$40,000
Simple Pay-Back Period:	7.2 Years
Greenhouse Gas Reduction:	15.1 Tons of CO_2/ Year

7.5 Ice Rink Upgrade: Cold Water Flooding

Cold water flooding is an old idea that requires new technology in order to satisfy all of the various types of skaters. The water is treated by making it flow through a vortex chamber which reduces air bubbles and provides clear water which in turn creates clear and hard ice. There are no moving parts and no chemicals are used in this treatment. This means no operation cost and no maintenance cost. After speaking with various product consumers, TACE has only heard positive feedback. Not only does this energy conservation measure include savings towards heating of hot water, it also reduces cooling load from the ice plant.

This system is said to improve the ice surface by producing fewer and shallower grooves and more visible logos and lines. Furthermore, the lower temperature resurfacing water results in a more consistent ice sheet temperature over the operating day, improving late day and evening conditions.

The energy savings associated with the implementation of this measure were estimated as follows:

Electrical Consumption Savings:	24,400 kWh
Electrical Demand Savings:	80 kW
Cost Savings:	$3,101
Measure Implementation Cost:	$25,000
Simple Pay-Back Period:	8.1 Years
Greenhouse Gas Reduction:	7.2 Tons of CO_2/ Year

The manufacturer which has provided the above-mentioned capital cost has also stated that they are willing to rent the cold water vortex chamber annually. If for some reason the client feels that this system imposes too much risk, the rental alternative may seem like a viable option.

7.6 Swimming Pool Evaporation Prevention During Unoccupied Periods

Swimming pools lose energy in a variety of ways, but evaporation is by far the largest source of energy loss. Evaporating water requires tremendous amounts of energy. It takes 1 Btu to raise 1 pound of water to 1 degree Fahrenheit, but each pound of 80°F water that evaporates takes a whopping 1,048 Btu of heat out of the pool. Pool covers minimize evaporation and as a result reduce pool heating loads. (Outdoor pools have greater energy savings from pool covers due to radiant solar heat gain). Some manufacturers claim that 50%-70% energy savings are possible.

7.6.1 Option 1: Swimming Pool Cover (Bubble Wrap) Installation

Pool covers on indoor pools not only can reduce evaporation but also the need to ventilate indoor air and replace it with unconditioned outdoor air. You can also shut off exhaust fans when an indoor pool is covered, which saves even more energy.

There are several types of pool covers (automatic, semi-automatic, reels, etc.). For the purpose of this energy study TACE has assumed a capital cost of $9,500 for this energy conservation measure.

For these calculations, TACE has changed the energy model from an activity factor of 0.5 during closed hours to an activity factor of 0.05. Please refer to Appendix D for more details on the energy simulations. The results to this energy conservation measure were calculated as follows:

Electrical Consumption Savings:	43,700 kWh/ Year
Cost Savings:	$4,051
Capital cost:	$9,500
Simple Pay-Back Period:	2.3 years
Greenhouse Gas Reduction:	12.9 Tons of CO_2/ Year

7.6.2 Option 2: Liquid Pool Cover

Another valuable option for the client would be the utilization of liquid pool cover through chemical product. A liquid solar cover is a microscopically thin layer of alcohol that sits on top of the water of your pool. This layer reduces water evaporation which is a major cause of water heat loss. It may be to the client's interest to avoid having to open and close pool covers. Given the "L" shape to the pool, a pool cover would present even greater maintenance due to opening and closing (or rolling) pool covers. It was said that the swimming pool would use approximately XXX worth of additional chemical per year.

Given the nature of this technology, it is not quite as effective as using a pool cover. TACE has estimated an effectiveness of 70% when compared to pool

covers (blankets). For these calculations, TACE has changed the energy model from an activity factor of 0.5 during closed hours to an activity factor of 0.175. Please refer to Appendix D for more details on the energy simulations. The results to this energy conservation measure were calculated as follows:

Electrical Consumption Savings:	38,300 kWh/ Year
Cost Savings:	$3,150
Capital cost:	$400 (+ $400/ Year)
Simple Pay-Back Period:	0.1 years
Greenhouse Gas Reduction:	11.3 Tons of CO_2/ Year

7.7 Ice Plant Upgrade: Heat Recovery to Swimming Pool Water Heating

Another alternative to a new Ice Plant, is the fact that supplemental heat could be recovered to heat swimming pool water. This would mean that the heat recovery system from the swimming pool HVAC unit could be utilized for additional re-heat to the supply air. The energy savings and financial figures were estimated as follow:

Electrical Consumption Savings:	238,745 kWh
Electrical Demand Savings:	329 kW
Cost Savings:	$25,572
Measure Implementation Cost:	$170,000
Simple Pay-Back Period:	6.6 Years
Greenhouse Gas Reduction:	70.4 Tons of CO_2/ Year

7.8 Demand Controlled Ventilation: CO_2 Sensing for AHU-1 (Front Entrance)

The front entrance section of the facility is ventilated by AHU-1, installed in 2015. Fresh air ventilation is delivered at the minimum set position during heating and cooling cycles (when free cooling is not possible). The minimum set position was noted as being 25% of the total supply air. It is possible that fresh air ventilation is being delivered to the space even when the space is unoccupied. Delivering fresh air at times when it is not needed, results in additional heating loads during heating season and additional cooling loads during cooling season. TACE recommends installing a carbon dioxide (CO_2) sensor in the return duct. Fresh air modulation could be controlled by CO_2 sensing, to ensure no more than 1,000 ppm of CO_2 (user adjustable) is left indoor for breathing air. Outdoor air damper is currently set to a minimum position of 25%.

Since this air handling units supplies air to multiple zones, it may not be to the client's desire to pursue this energy conservation measure. Since any given zone supplied by AHU-1 could and should modulate the fresh air damper to open when

occupied. Energy savings may not outweigh capital cost and any maintenance cost associated with this measure.

If the client wishes to pursue this measure, TACE recommends installing a new CO_2 sensor for each zone served by AHU-1 (Front Entrance). The sensors should be mounted 4 to 6 feet above finished floor similarly to a wall mounted thermostat. Each individual zone shall monitor CO_2, and the worst case zone shall modulate outdoor air (OA) damper positioning. A general rule of thumb is to have OA damper set to 20% to 30% of design OA rate when CO_2 reading is below threshold (550 ppm to 600 ppm, or 150 ppm to 200 ppm above outside air ppm).

Assumptions

AHU-1 controlled by DCV (replacing fixed OA %)
A total of eleven (11) sensors required

The results to this energy conservation were calculated as follows:

Electrical Consumption Savings:	111,700 kWh/ Year
Cost Savings:	$10,355
Capital cost:	$10,300
Simple Pay-Back Period:	1.0 years
Greenhouse Gas Reduction:	33.0 Tons of CO_2/ Year

7.9 Demand Controlled Ventilation: CO_2 Sensing for AHU-2 (Gallery)

The gallery section of the facility located on level 2 (main floor) of Part C is ventilated by AHU-2, installed in 2015. Fresh air ventilation is delivered at the minimum set position during heating and cooling cycles (when free cooling is not possible). The minimum set position was estimated as being 15%. It is possible that fresh air ventilation is being delivered to the space even when the space is unoccupied (when the schedule has not been properly updated). Delivering fresh air at times when it is not needed, results in additional heating loads during heating season and additional cooling loads during cooling season. TACE recommends installing a carbon dioxide (CO_2) sensor in the return duct. Fresh air modulation could be controlled by CO_2 sensing, to ensure no more than 1,000 ppm of CO_2 (user adjustable) is left indoor for breathing air.

TACE proposes installing a new CO_2 sensor for in the return duct to adjust fresh air damper position with cooling override with free cooling capability.

Assumptions

Outdoor Air Quantities Controlled by DCV (replacing fixed OA %)

The results to this energy conservation were calculated as follows:

Electrical Consumption Savings:	72,200 kWh/ Year
Cost Savings:	$6,693
Capital cost:	$2,300
Simple Pay-Back Period:	0.3 years
Greenhouse Gas Reduction:	21.3 Tons of CO_2/ Year

7.10 Demand Controlled Ventilation: CO_2 Sensing for AHU-4 (Fitness Room)

The fitness room of the facility located on level 3 of Part C is ventilated by AHU-4, installed in 2015. Fresh air ventilation is delivered at the minimum set position during heating and cooling cycles (when free cooling is not possible). The minimum set position was noted as being 25%. It is possible that fresh air ventilation is being delivered to the space even when the space is unoccupied. Delivering fresh air at times when it is not needed, results in additional heating loads during heating season and additional cooling loads during cooling season. TACE recommends installing four wall mounted carbon dioxide (CO_2) sensors in the zone served by AHU-4. The sensors should be mounted 4 to 6 feet above finished floor similarly to a wall mounted thermostat. Each sensor shall monitor CO_2, and the worst case sensor shall modulate outdoor air (OA) damper positioning. A general rule of thumb is to have OA damper set to 20% to 30% of design OA rate when CO_2 reading is below threshold (550 ppm to 600 ppm, or 150 ppm to 200 ppm above outside air ppm). Fresh air modulation would ensure no more than 1,000 ppm of CO_2 (user adjustable) is left indoor for breathing air.

TACE proposes installing four new wall mounted CO_2 sensors located in the space to adjust fresh air damper position with cooling override with free cooling capability.

Assumptions

Outdoor Air Quantities Controlled by DCV (replacing fixed OA %)

The results to this energy conservation were calculated as follows:

Electrical Consumption Savings:	29,900 kWh/ Year
Cost Savings:	$2,772
Capital cost:	$4,700
Simple Pay-Back Period:	1.7 years
Greenhouse Gas Reduction:	8.8 Tons of CO_2/ Year

7.11 Demand Controlled Ventilation: CO_2 Sensing for AH-3 (Studio)

The studio space is ventilated by AH-3, installed in 1995. Fresh air ventilation is delivered at the minimum set position during heating and cooling cycles (when free cooling is not possible). The minimum set position was estimated as being 15%. It is possible that fresh air ventilation is being delivered to the space even when the space is unoccupied. Delivering fresh air at times when it is not needed results in additional heating loads during heating season and additional cooling loads during cooling season. TACE recommends installing carbon dioxide (CO_2) sensors in each zone. Fresh air modulation could be controlled by CO_2 sensing, to ensure no more than 1,000 ppm of CO_2 (user adjustable) is left indoor for breathing air. A general rule of thumb is to have OA damper set to 20% to 30% of design OA rate when CO_2 reading is below threshold (550 ppm to 600 ppm, or 150 ppm to 200 ppm above outside air ppm).

TACE recommends installing a new CO_2 sensor for each zone served by AH-3 (Studio). The sensors should be mounted 4 to 6 feet above finished floor similarly to a wall mounted thermostat. Each individual zone shall monitor CO_2, and the worst case zone shall modulate outdoor air (OA) damper positioning. A general rule of thumb is to have OA damper set to 20% to 30% of design OA rate when CO_2 reading is below threshold (550 ppm to 600 ppm, or 150 ppm to 200 ppm above outside air ppm).

TACE proposes installing new CO_2 sensors for each zone served by AH-3 to control fresh air damper position with cooling override for free cooling capability. This measure would also include new control points for the existing packaged roof-top unit (AH-3).

Assumptions

Outdoor Air Quantities Controlled by DCV (replacing fixed OA %)

The results to this energy conservation were calculated as follows:

Electrical Consumption Savings:	22,100 kWh/ Year
Cost Savings:	$2,049
Capital cost:	$7,100
Simple Pay-Back Period:	3.5 years
Greenhouse Gas Reduction:	6.5 Tons of CO_2/ Year

7.12 Demand Controlled Ventilation: CO_2 Sensing for AH-5 (Sam's Room)

Sam's room (or VIP room) is ventilated by AH-5, installed in 1995. Fresh air ventilation is delivered at the minimum set position during heating and cooling cycles (when free cooling is not possible). The minimum set position was noted as being 17%. It is possible that fresh air ventilation is being delivered to the space even when the space is unoccupied. Delivering fresh air at times when it is not needed results in additional heating loads during heating season and additional cooling loads during cooling season. TACE recommends installing a carbon dioxide (CO_2) sensor in the return duct. Fresh air modulation could be controlled by CO_2 sensing, to ensure no more than 1,000 ppm of CO_2 (user adjustable) is left indoor for breathing air. A general rule of thumb is to have OA damper set to 20% to 30% of design OA rate when CO_2 reading is below threshold (550 ppm to 600 ppm, or 150 ppm to 200 ppm above outside air ppm).

TACE proposes installing a new CO_2 sensor for in the return duct to adjust fresh air damper position with cooling override for free cooling capability.

Assumptions

Outdoor Air Quantities Controlled by DCV (replacing fixed OA %)

The results to this energy conservation were calculated as follows:

Electrical Consumption Savings:	16,100 kWh/ Year
Cost Savings:	$1,492
Capital cost:	$2,300
Simple Pay-Back Period:	1.5 years
Greenhouse Gas Reduction:	4.7 Tons of CO_2/ Year

8.0 Additional Considerations

8.1 New Swimming Pool HVAC Unit

During the site audit for the studied facility, it was noted that the humidity level for the swimming pool area was set to 25% RH (Relative Humidity) with the current reading at 43% RH. For the energy model, TACE assumed that humidity level of the pool area was being maintained at 45% RH. This humidity level was not the intended design for this ventilation unit/ pool heater. Pool humidity levels are generally maintained between 50% and 60% RH. With the current set point being so low, pool chemical treatment, pool water heating and air dehumidifying loads are much higher than they need to be, causing additional maintenance costs to the client. The implementation of a new pool dehumidification/ heating unit will result in energy savings due to increased heat transfer rates (heat transfer efficiency) between the coils and the incoming (fresh air and return air) airflow. Over the years, the cooling coils and heating coils found in air handling units become dirty and/or damaged by liquid and air debris. For the purpose of this study, energy savings were taken by simply changing modelled relative humidity set-points from 45% RH to 60% RH. It is said that swimming pool water evaporation rates equal the same amount of energy required to heat the swimming pool water (swimming pool make-up water from incoming municipal water temperature to swimming pool water temperature set-point).

Please refer to Appendix D for more details on the energy simulations. The results to this energy conservation measure are as follows:

Electrical Consumption Savings:	229,500 kWh/ Year
Electrical Demand Savings:	198 kW/ Year
Cost Savings:	$23,344
Capital cost:	$400,000
Simple Pay-Back Period:	17.1 years
Greenhouse Gas Reduction:	67.7 Tons of CO_2/ Year

The AYR Motor Centre will need to replace its swimming pool HVAC unit in the foreseeable future. For comparison purposes, TACE has prepared a worksheet demonstrating the life-cycle-cost (LCC) of the swimming pool HVAC unit. A comparison was made between the existing baseline with having to replace the unit after seven years Vs replacing the unit today. (Another seven years would bring the HVAC dehumidification unit to 30 years of service life). The LCC analysis demonstrates a lower cost to the client if the unit in question was replaced today. Please refer to Appendix G for more details.

8.2 Ice Plant Upgrade: New Chiller Plant

TACE has included, in this report, the implementation of a new ice plant system for the studied ice rink. The items included in the proposed system can be found throughout Section 8.1 of this report. It should be noted that upgrading the existing ice plant may not present a low pay-back period for energy savings alone, but there may be additional operational savings along with improved ice quality associated with this measure. TACE estimates the following energy savings for this energy conservation measure.

Electrical Consumption Savings:	119,200 kWh
Electrical Demand Savings:	235 kW
Cost Savings:	$13,501
Measure Implementation Cost:	$800,000
Simple Pay-Back Period:	59.3 Years
Greenhouse Gas Reduction:	35.2 Tons of CO_2/ Year

TACE has prepared a life-cycle-cost analysis of the ice plant for this facility. The chiller plant will eventually need to be replaced. For comparison purposes, TACE has prepared two scenarios for the AYR Motor Centre. The baseline case includes replacing the ice plant in seven years and the proposed case demonstrates the analysis with immediate ice plant replacement. (Another seven years from the ice plant would bring the total service life of this system to 30 years). The results to this study can be found in Appendix G.

8.2.1 New Ultraviolet Temperature Sensor

The rink is currently being controlled by brine loop temperature and an underlying floor temperature. Brine temperature is adjusted to a level that hopefully provides the ice hardness required for any particular activity. Considering the number of factors that can affect the ice surface temperature, such as heat load from spectators, lighting, relative humidity and ice thickness, it is easy to understand why most rinks do not operate as efficiently as possible. Today, there are cameras available that are mounted over the ice that are able to sense the exact ice surface temperature by measuring the infra-red energy being emitted from it. Subtle changes in rink conditions can cause changes in the ice surface temperature long before the brine or underlying floor slab temperature changes. By instantly detecting this change, the control system signals the ice plant to react and maintain optimum ice conditions under all conditions.

Advantages include: reduced equipment run times, lower maintenance costs, higher ice quality, easier ice quality maintenance, improved system efficiency and energy conservation.

8.2.2 Variable Speed Pumping

The brine pumps consist in two 30 HP one speed pumps. They operate in lead-lag configuration being in parallel and one pump remaining in stand-by mode while the pump operates. There is continuous flow through the in-floor piping system. TACE recommends installing variable speed pumping capability to the ice plant and to operate the pumps based on demand, read from the ice temperature thermostat.

8.2.3 Variable Speed Condensing Unit

The existing condenser fan consists of a 15 HP, one speed fan motor. TACE recommends installing a new condensing unit with variable speed capability. The fan shall operate on a demand basis.

8.2.4 New High Efficiency Ice Plant Chillers

Although it would be quite difficult to justify installing a state-of-the-art heat recovery system for a new hydronic heating system for this facility, there are ice plant chillers capable of operating at greater efficiencies than the existing ice plant at the Woodstock AYR Motor Centre. TACE has recognized that heat recovery is currently being provided to domestic hot water, more specifically ice resurfacing water. However, it should be noted that different chiller technologies are now commonly available, such as screw compressors, plate-and-frame heat exchangers with microprocessor controls.

8.2.5 Heat Recovery: DHW Heating

The existing system currently has a domestic hot water heat recovery system used

8.3 Renewable Energy: Photovoltaic Power

Photovoltaic solar energy comes from the conversion of sunlight into electricity within semiconductor materials like silicon. These photosensitive materials have the property to release their electrons under the influence of an external energy. This is the photovoltaic effect. Energy is brought by the photons, (components of light) which coincide with the electrons and releases them, inducing an electric current. This direct current (DC) current of micro power can be transformed into alternating current (AC) thanks to an inverter. Electricity is available in the form of direct electricity, can be stored into battery form or can be injected into the electrical grid network.

The performance of photovoltaic power generation depends on the orientation of the solar panels and at which geographical location they are sited. The AYR Motor Centre geographical properties were studied for this analysis. The panels were selected as being on the South-West slope of the ice rink. A simulation was

performed using the RETScreen International Software Tool. RETScreen® International is a clean energy awareness, decision-support and capacity building tool. The core of the tool consists of a standardized and integrated clean energy project analysis software that can be used world-wide to evaluate the energy production, life-cycle costs and greenhouse gas emission reductions for various types of energy efficient and renewable energy.

In this example, TACE has assumed that power could be transmitted to the local power company from this photovoltaic (PV) system. The rate at which electricity would be exported was assumed to be equal to the current electrical utility rate for this building. This would mean an efficiency rating of 100% from the photovoltaic panels. Inverter efficiency was assumed at 98%, which is common practice. TACE has selected an area of 700 m² of photovoltaic panels. Please refer to Appendix G for more details on the RETscreen energy simulation.

Electrical Consumption Savings:	279,100 kWh/ Year
Annual Maintenance Cost:	$5,325
Electrical Cost Savings:	$25,873
Measure Implementation Cost:	$244,950
Simple Pay-Back Period:	11.9 Years
Greenhouse Gas Reduction:	82.3 Tons of CO_2/ Year

Note: RETscreen calculates CO_2 emissions savings from a 100% efficiency power plant, this is not the case of for petroleum-based power generating stations. For this reason, greenhouse gas reductions were taken from NB Power data.

8.4 Plumbing

The plumbing fixtures for this facility were noted as in fair condition, standard and low-flow fixtures. Replacing the plumbing fixtures would result in long pay-back periods.

However, when replacing these units, it is recommended to replace flush tank water closets with low-flow dual flush technology and ensuring that all washroom lavatories have low-flow aerators.

8.5 Building Systems Operations & Management Recommendations

8.5.1 Equipment Set-Point Verification

TACE recommends that each thermostat be inspected and that each set point and time of day schedule be verified and adjusted accordingly, monthly at minimum. This will ensure proper interior comfort along with maximizing energy savings from lowering the interior space temperatures during unoccupied periods. Please refer to Appendix D for all energy conservation measures.

9.0 Financial Incentives

The New Brunswick power commission presently offers an incentive program for the implementation of upgrades for the purposes of reducing electrical consumption. NB Power currently offers incentives in the amount of 10.8 cents per kWh of electrical consumption saved per year. Incentive amounts are similar to annual electrical savings.

10.0 Conclusion

Some organizations do not look to improve their utility costs because they believe that these are part of the fixed overhead costs. However, the smart organization will look at reducing utility bills as a way to improve the bottom line. Not only would implementing energy conservation measures help lower overhead costs, it would add real estate value to the property. Most of today's society is self-aware of how energy has a great environmental impact.

Globally, buildings are responsible for approximately 40% of the total world annual energy consumption. Reducing building HVAC loads is therefore essential for the global environment.

This building could take advantage of new mechanical and electrical equipment which would result in energy and cost savings. Energy usage of the building can be greatly influenced by the people occupying the premises. Items including thermostat settings, set-back temperatures and maintenance of the equipment will influence the energy performance of this building immensely. The following table (found on the next page) describes a list of recommended energy efficiency measures proposed by Tweedie & Associates Consulting Engineers.

Table 10.0 Summary of Energy Conservation Measures

Potential Energy Conservation Measure		Savings per Year						Measure Implemen-tation Cost	Simple Payback Period
ID #	Measure Type	kWh	kW	Propane (Litres)	eq GJ	$/Year	Tons of CO2	$/Year	Years
M 7.1	Interior Lighting Upgrade	141,586	352	-343.10	500.95	$16,657	41.2	$61,696	3.7
M 7.2	Interior Lighting Controls Upgrade	8,405			30.26	$779	2.5	$6,900	8.9
M 7.3	BAS Upgrade: Event Scheduling	113,571			408.86	$10,528	33.5	$80,000	7.6
M 7.4	Ice Rink Upgrade: Low Emissivity Ceiling	51,200	80		184.32	$5,584	15.1	$40,000	7.2
M 7.5	Ice Rink Upgrade: Cold Water Flooding	24,400	80		87.84	$3,101	7.2	$25,000	8.1
M 7.6.1	Swimming Pool Upgrade: Option 1 - Bubble Wrap Cover Installation	43,700			157.32	$4,051	12.9	$9,500	2.3
M 7.6.2	Swimming Pool Upgrade: Option 2 - Liquid Pool Cover	38,300			137.88	$3,150	11.3	$400	0.1
M 7.7	Ice Plant Upgrade: Heat Recovery for Swimming Pool Water Heating	238,745	329		859.48	$25,572	70.4	$170,000	6.6
M 7.8	DCV Upgrade: AHU-1 (Front Entrance)	111,700			402.12	$10,355	33.0	$10,300	1.0
M 7.9	DCV Upgrade: AHU-2 (Gallery)	72,200			259.92	$6,693	21.3	$2,300	0.3
M 7.10	DCV Upgrade: AHU-4 (Fitness Room)	29,900			107.64	$2,772	8.8	$4,700	1.7
M 7.11	DCV Upgrade: AH-3 (Studio)	22,100			79.56	$2,049	6.5	$7,100	3.5
M 7.12	DCV Upgrade: AH-5 (VIP Room)	16,100			57.96	$1,492	4.7	$2,300	1.5
M 8.1	New Swimming Pool HVAC Unit	229,500	198		826.20	$23,344	67.7	$400,000	17.1
M 8.2	Ice Plant Upgrade: New High Efficiency Ice Plant	119,200	235		429.12	$13,501	35.2	$800,000	59.3
M 8.3	Renewable Energy: Photovoltaic Power	279,100			1,004.76	$20,548	82.3	$244,950	11.9
Recommended Measures Total (Excluding 7.6.2; 8.1; 8.2; 8.3):		**873,608**	**842**	**-343.1**	**3,136.23**	**$89,632**	**257.2**	**$419,796**	**4.7**

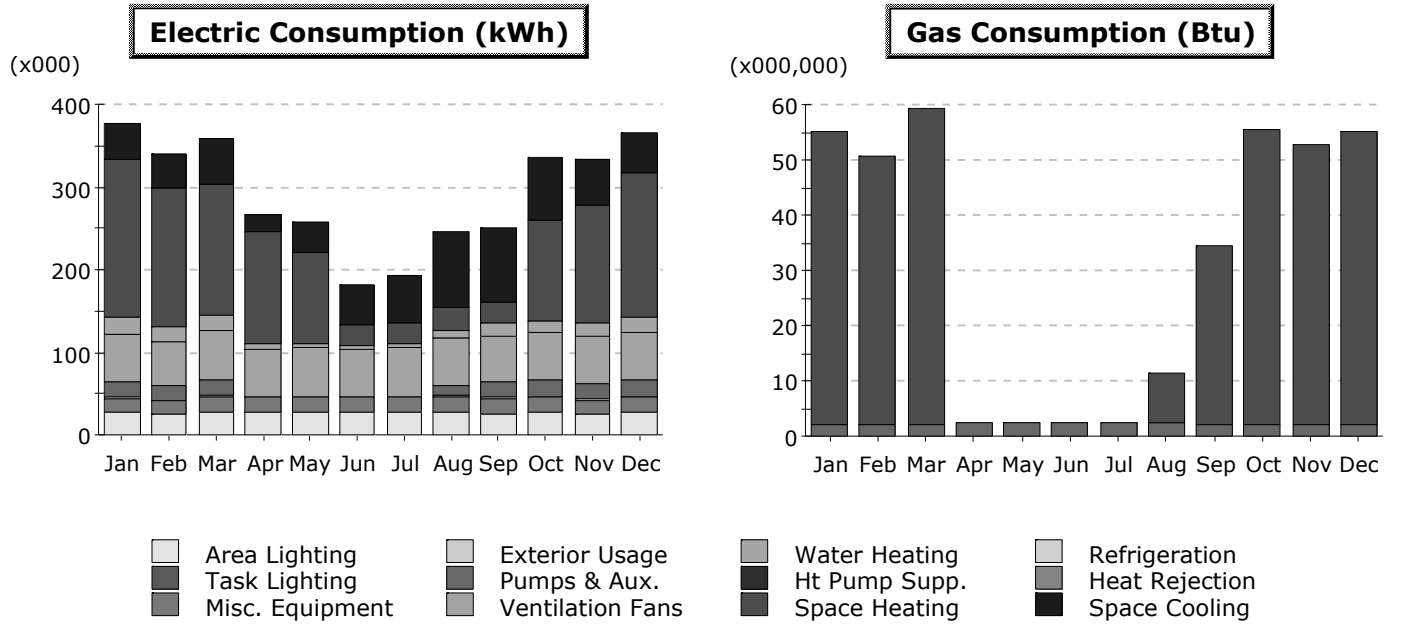
Note: Measure Implementation Cost does not include HST. Please refer to Appendix E for more details on the energy conservation measures.

10.1 System Performance Overview

This facility currently consumes 12,425 gigajoules (GJ) of energy annually. By implementing the identified recommended energy conservation measures, total energy consumption in the building could be reduced by as much as 3,098 gigajoules. With the implementation of the recommended measures, the energy performance of this building would be enhanced; the energy utilization index (EUI) or energy density of this facility would improve from **1.0195 GJ/m^2** to **0.7622 GJ/m^2** (from **26.31 eqkWh** to **19.67 eqkWh**). The implementation of these measures would have an overall greenhouse gas reduction of 257.3 tons of CO_2.

The savings calculations associated with this report are based on anticipated conditions of the building and its occupancy schedules. Increasing building occupancy and equipment schedules from those anticipated in this report would consequently increase the overall building energy load. In other words, it is possible that energy consumption would increase even if the measures outlined in this report were implemented. Nonetheless, the energy savings could be justified, even if future energy consumption is not reduced by the amounts shown by this report, since the additional energy consumption would be due to additional equipment usage and energy loads.

Appendix A
Energy Balance

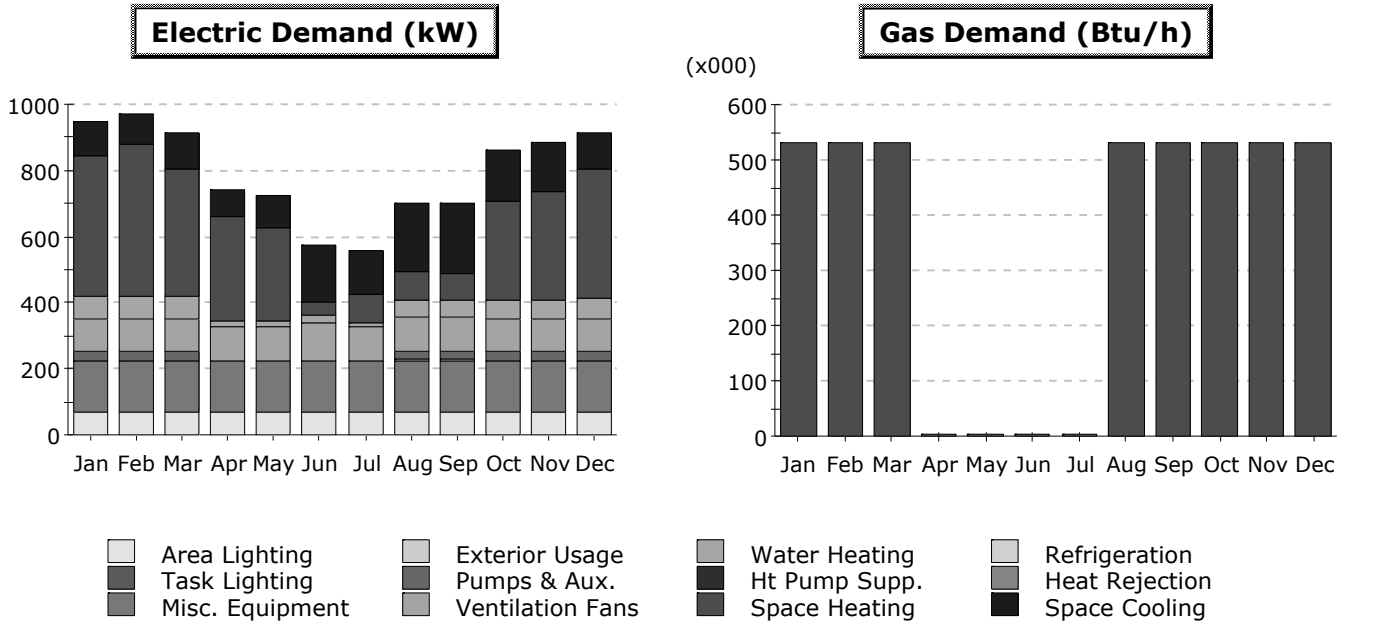


Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	44.1	42.1	53.8	21.1	35.7	48.6	57.8	91.0	91.3	74.3	56.4	48.2	664.4
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	190.6	168.0	158.3	136.1	110.0	24.6	26.2	26.7	25.5	121.5	143.2	173.8	1,304.6
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.7	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.8	17.8	152.8
Vent. Fans	58.0	52.5	58.2	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.8
Pumps & Aux.	19.9	18.0	19.9	0.6	0.5	0.4	0.4	11.6	19.1	19.8	19.2	19.9	149.3
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	26.5	24.6	28.1	27.2	27.4	27.1	27.3	28.2	26.3	27.4	25.6	27.2	322.8
Total	376.4	340.1	357.5	266.6	256.3	181.7	193.8	245.2	251.4	334.7	334.1	364.5	3,502.4

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	52.87	48.64	57.10	-	-	-	-	8.89	32.25	53.40	50.76	52.87	356.81
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.95
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	55.10	50.65	59.31	2.30	2.38	2.30	2.38	11.25	34.46	55.62	52.91	55.10	383.76



Electric Demand (kW)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	101.8	93.5	112.7	80.9	97.9	172.3	128.6	205.3	215.2	155.6	149.5	109.6	1,623.0
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	428.3	455.8	381.6	316.6	280.2	42.9	86.4	86.5	79.4	301.1	327.8	388.4	3,175.0
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	67.1	69.3	69.3	19.3	17.9	25.2	15.4	51.7	51.5	53.7	57.9	62.7	561.0
Vent. Fans	100.1	100.1	100.0	99.8	99.7	110.7	99.5	101.9	101.9	99.7	99.8	100.0	1,213.3
Pumps & Aux.	26.9	26.9	26.9	1.0	0.7	0.7	0.7	26.5	26.5	26.8	26.8	26.9	217.2
Ext. Usage	-	-	-	-	-	-	-	2.7	2.7	-	-	-	5.4
Misc. Equip.	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	1,848.0
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	71.3	71.3	71.3	71.3	71.3	71.3	71.3	71.3	71.3	71.3	71.3	71.3	855.6
Total	949.4	970.9	915.7	743.0	721.7	577.2	555.8	700.0	702.5	862.3	887.2	913.0	9,498.6

Gas Demand (Btu/h x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	528.7	528.7	528.7	-	-	-	-	528.7	528.7	528.7	528.7	528.7	4,230.0
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	1.6	1.6	1.6	3.2	3.2	3.2	3.2	1.6	1.6	1.6	1.6	1.6	25.6
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	530.3	530.3	530.3	3.2	3.2	3.2	3.2	530.3	530.3	530.3	530.3	530.3	4,255.6

Appendix B
Energy Conservation Measures Table

Project: AYR Motor Centre, Woodstock, NB - Energy Study
Project Number: AYR Motor Centre
Date: June 26th 2018
Item: Energy Conservation Measures Table

Building Area: 131,175 square feet

Existing Electrical Consumption: 3,336,300 kWh/Year
Existing Propane Gas Consumption: 16,224 Litres/Year

Electrical Rates: $0.0927 / kWh
$10.4500 / kW

Propane Consumption Rates: $ 0.4261 / GJ

Potential Energy Conservation Measure		Savings per Year						Measure Implementation Cost	Simple Payback Period
ID #	Measure Type	kWh	kW	Propane (Litres)	eq GJ	$/Year	Tons of CO2	$/Year	Years
M 7.1	Interior Lighting Upgrade	141,586	352	-343.10	500.95	$16,657	41.2	$61,696	3.7
M 7.2	Interior Lighting Controls Upgrade	8,405			30.26	$779	2.5	$6,900	8.9
M 7.3	BAS Upgrade: Event Scheduling Scheduling	114,071			410.66	$10,574	33.7	$80,000	7.6
M 7.4	Ice Rink Upgrade: Low Emissivity Ceiling	51,200	80		184.32	$5,584	15.1	$40,000	7.2
M 7.5	Ice Rink Upgrade: Cold Water Flooding	24,400	80		87.84	$3,101	7.2	$25,000	8.1
M 7.6.1	Swimming Pool Upgrade: Option 1 - Bubble Wrap Cover Installation	43,700			157.32	$4,051	12.9	$9,500	2.3
M 7.6.2	Swimming Pool Upgrade: Option 2 - Liquid Pool Cover	38,300			137.88	$3,150	11.3	$400	0.1
M 7.7	Ice Plant Upgrade: Heat Recovery for Swimming Pool Water Heating	238,745	329		859.48	$25,572	70.4	$170,000	6.6
M 7.8	DCV Upgrade: AHU-1 (Front Entrance)	111,700			402.12	$10,355	33.0	$10,300	1.0
M 7.9	DCV Upgrade: AHU-2 (Gallery)	72,200			259.92	$6,693	21.3	$2,300	0.3
M 7.10	DCV Upgrade: AHU-4 (Fitness Room)	29,900			107.64	$2,772	8.8	$4,700	1.7
M 7.11	DCV Upgrade: AH-3 (Studio)	22,100			79.56	$2,049	6.5	$7,100	3.5
M 7.12	DCV Upgrade: AH-5 (VIP Room)	16,100			57.96	$1,492	4.7	$2,300	1.5
M 8.1	New Swimming Pool HVAC Unit	229,500	198		826.20	$23,344	67.7	$400,000	17.1
M 8.2	Ice Plant Upgrade: New High Efficiency Ice Plant	119,200	235		429.12	$13,501	35.2	$800,000	59.3
M 8.3	Renewable Energy: Photovoltaic Power	279,100			1,004.76	$20,548	82.3	$244,950	11.9
Recommended Measures Total (Excluding 7.6.2; 8.1; 8.2; 8.3):		**874,108**	**842**	**-343.1**	**3,138.03**	**$89,679**	**257.3**	**$419,796**	**4.7**

Existing EUI: 1.0195 GJ/ m² = 26.31 eqkWh/sqft
Proposed EUI: 0.7620 GJ/ m² = 19.67 eqkWh/sqft

Appendix C
Lighting Information & Retrofit Measures

Project Name: ***AYR Motor Centre, Woodstock, NB - Energy Study***
Building Name: ***AYR Motor Centre***
TACE Project Number: ***1764***
Item: ***Energy Study Summary***
Date: ***May 30th 2017***

	Cost	
Electrical Consumption:	$0.0927	/kwh
Electrical Demand:	$10.45	/kw

		ECM 7.2.1					ECM 7.3.1				
Location / Zone		Recommended Occupancy Sensor	Net Electrical Savings (kWh)	Cost Savings	Capital Cost	Simple Pay-Back Period (years)	New Savings From BAS Upgrade	Net Electrical Savings (kWh)	Cost Savings	Capital Cost	Simple Pay-Back Period (years)
Room No.	Room Name										
	RINK UPPER LEVEL						X	9,012	$835.45	$2,000.00	
	RINK UPPER LEVEL						X	155	$14.38	$400.00	
	RINK UPPER LEVEL						X	349	$32.37	$400.00	
	RINK UPPER LEVEL										
	RINK ENTRY (OUTSIDE)						X	180	$16.72	$400.00	
	RINK UPPER LEVEL						X	568	$52.62	$400.00	
A123	STAFF (ZAMBONI OPERATOR)						X	57	$5.30	$400.00	
A125	ELECTRICAL						X	19	$1.80	$400.00	
A126	STORAGE	X	35	$3.24	$100.00	30.9				$400.00	
A119	ZAMBONI HALL	X	962	$89.19	$100.00	1.1				$400.00	
A122	STAFF WR	X	6	$0.54	$100.00	185.4				$400.00	
A124	STORAGE	X	6	$0.54	$100.00	185.4				$400.00	
A125	MECHANICAL						X	120	$11.15	$400.00	
A118	OFFICIALS LOCKER	X	57	$5.30	$100.00	18.9				$400.00	
A118	OFFICIALS WR	X	6	$0.54	$100.00	185.4				$400.00	
A120	VESTIBULE										
A121	ICE PLANT						X	70	$6.47	$400.00	
A121A	ICE PLANT MECHANICAL						X	17	$1.62	$400.00	
A115	CHANGE ROOM 6	X	107	$9.89	$100.00	10.1				$400.00	
A116	CHANGE ROOM 6 WR	X	21	$1.98	$100.00	50.6				$400.00	
A117	CHANGE ROOM 6 SHOWERS	X	21	$1.98	$100.00	50.6				$400.00	
A114	CHANGE ROOM 5 SHOWERS	X	21	$1.98	$100.00	50.6				$400.00	
A113	CHANGE ROOM 5 WR	X	43	$3.96	$100.00	25.3				$400.00	
A112	CHANGE ROOM 5	X	128	$11.87	$100.00	8.4				$400.00	
A110	CHANGE ROOM 4	X	149	$13.85	$100.00	7.2				$400.00	
A111	CHANGE ROOM 4 WR	X	21	$1.98	$100.00	50.6				$400.00	
A109	CHANGE ROOM 3 WR	X	21	$1.98	$100.00	50.6				$400.00	
A108	CHANGE ROOM 3	X	149	$13.85	$100.00	7.2				$400.00	
A105	CHANGE ROOM 2	X	128	$11.87	$100.00	8.4				$400.00	
A106	CHANGE ROOM 2 WR	X	43	$3.96	$100.00	25.3				$400.00	
A107	CHANGE ROOM 2 SHOWERS	X	21	$1.98	$100.00	50.6				$400.00	
A103	CHAGE ROOM 1 WR	X	21	$1.98	$100.00	50.6				$400.00	
A104	CHANGE ROOM 1 SHOWERS	X	21	$1.98	$100.00	50.6				$400.00	
A102	CHANGE ROOM 1	X	107	$9.89	$100.00	10.1				$400.00	
	HALL									$400.00	
	HALL									$400.00	
	HALL									$400.00	
	HALL									$400.00	
	A101						X	6,133	$568.56	$400.00	
	A101									$400.00	
A100	RINK							962	$89.19	$400.00	
A100	RINK						X	102	$9.49	$400.00	
A100	RINK										
B301	MEETING ROOM	X	81	$7.55	$100.00	13.2				$400.00	
ST1	POOL SECTION LEVEL 3									$400.00	
ST1	POOL SECTION LEVEL 3										
B300	CORRIDOR									$400.00	
B302	MEETING ROOM	X	41	$3.78	$100.00	26.5				$400.00	
B303	MECHANICAL						X	35	$3.24	$400.00	
POOL	POOL SECTION LEVEL 3									$400.00	
POOL	POOL SECTION LEVEL 3									$400.00	
POOL	POOL SECTION LEVEL 3									$400.00	
POOL	POOL SECTION LEVEL 3										
B305	MECHANICAL						X	58	$5.39	$400.00	
										$400.00	
B215	FEMALE LOCKERS	X	327	$30.34	$100.00	3.3				$400.00	
B215	FEMALE LOCKERS	X	55	$5.06	$100.00	19.8				$400.00	
B217	FEMALE SHOWERS	X	218	$20.23	$100.00	4.9				$400.00	
B218	FAMILLY CHANGE ROOM	X	218	$20.23	$100.00	4.9				$400.00	
B220	MALE LOCKERS	X	55	$5.06	$100.00	19.8				$400.00	
B221	MALE SHOWERS	X	218	$20.23	$100.00	4.9				$400.00	
B222	MALE SHOWERS	X	218	$20.23	$100.00	4.9				$400.00	

Project Name: ***AYR Motor Centre, Woodstock, NB - Energy Study***
Building Name: ***AYR Motor Centre***
TACE Project Number: ***1764***
Item: ***Energy Study Summary***
Date: ***May 30th 2017***

	Cost	
Electrical Consumption:	$0.0927	/kwh
Electrical Demand:	$10.45	/kw

		ECM 7.2.1					ECM 7.3.1				
Location / Zone		Recommended Occupancy Sensor	Net Electrical Savings (kWh)	Cost Savings	Capital Cost	Simple Pay-Back Period (years)	New Savings From BAS Upgrade	Net Electrical Savings (kWh)	Cost Savings	Capital Cost	Simple Pay-Back Period (years)
Room No.	Room Name										
ST2	STAIRWELL									$400.00	
B224	DECK STORAGE	X	19	$1.80	$100.00	55.6				$400.00	
B223	BEACH									$400.00	
	POOL										
B214A	JANITOR	X	14	$1.26	$100.00	79.4				$400.00	
B214	CORRIDOR						X	436	$40.46	$400.00	
B214	CORRIDOR										
B209	FEMALE WR	X	301	$27.87	$100.00	3.6				$400.00	
B210	MALE WR	X	301	$27.87	$100.00	3.6				$400.00	
B223							X	60	$5.57	$400.00	
B102	STUDIO						X	263	$24.36	$400.00	
B102	STUDIO						X	131	$12.18	$400.00	
B102	STUDIO										
B107	WR	X	273	$25.29	$100.00	4.0				$400.00	
B106	WR	X	273	$25.29	$100.00	4.0				$400.00	
ST1	STAIRS									$400.00	
ST1	STAIRS										
	KITCHEN STORAGE	X	20	$1.89	$100.00	53.0				$400.00	
	KITCHEN WR	X	10	$0.94	$100.00	105.9				$400.00	
	KITCHEN	X	367	$33.98	$100.00	2.9				$400.00	
										$400.00	
	AHU3 MECHANICAL ROOM						X	47	$4.32	$400.00	
	BETWEEN GYM/POOL						X	2,648	$245.43	$400.00	
	BETWEEN GYM/POOL										
	GYM (LOWER LEVEL)						X	1,670	$154.82	$400.00	
	GYM (LOWER LEVEL)									$400.00	
	GYM STORAGE	X	258	$23.91	$100.00	4.2				$400.00	
	GYM STORAGE	X	1	$0.05	$100.00	1,894.5					
	ENTRY									$400.00	
	ENTRY										
	STAIR ENTRY									$400.00	
	STAIR ENTRY										
	STAIR ENTRY 2									$400.00	
	STAIR ENTRY 2										
	STAIR ENTRY									$400.00	
	STAIR ENTRY 2									$400.00	
	GYM (UPPER LEVEL)						X	5,487	$508.69	$400.00	
	GYM (UPPER LEVEL)										
C302	MECHANICAL ROOM									$400.00	
	STAIRS									$400.00	
	STAIRS									$400.00	
	FITNESS ROOM						X	2,386	$221.17	$400.00	
	FITNESS ROOM										
	MENS WR	X	239	$22.12	$100.00	4.5				$400.00	
	WOMENS WR	X	239	$22.12	$100.00	4.5				$400.00	
	JANITORS ROOM	X	14	$1.26	$100.00	79.4				$400.00	
	STAIR									$400.00	
	HALL MAIN FLOOR						X	1,343	$124.49	$400.00	
	HALL MAIN FLOOR										
	OFFICE	X	94	$8.73	$100.00	11.5				$400.00	
	OFFICE	X	47	$4.36	$100.00	22.9				$400.00	
	CUSTODIAN ROOM	X	17	$1.57	$100.00	63.6				$400.00	
	OFFICIALS ROOM	X	47	$4.36	$100.00	22.9				$400.00	
	HALL									$400.00	
	ELEVATOR ROOM									$400.00	
	MENS LOCKERS ROOM	X	358	$33.18	$100.00	3.0				$400.00	
	MENS LOCKERS ROOM	X	63	$5.89	$100.00	17.0				$400.00	
	WOMENS LOCKER ROOM	X	358	$33.18	$100.00	3.0				$400.00	
	WOMENS LOCKER ROOM	X	63	$5.89	$100.00	17.0				$400.00	

Project Name: ***AYR Motor Centre, Woodstock, NB - Energy Study***
Building Name: ***AYR Motor Centre***
TACE Project Number: ***1764***
Item: ***Energy Study Summary***
Date: ***May 30th 2017***

	Cost	
Electrical Consumption:	$0.0927	/kwh
Electrical Demand:	$10.45	/kw

		ECM 7.2.1					ECM 7.3.1				
Location / Zone		Recommended Occupancy Sensor	Net Electrical Savings (kWh)	Cost Savings	Capital Cost	Simple Pay-Back Period (years)	New Savings From BAS Upgrade	Net Electrical Savings (kWh)	Cost Savings	Capital Cost	Simple Pay-Back Period (years)
Room No.	Room Name										
	Basement GYM HALL						X	537	$49.76	$400.00	
	Basement GYM HALL										
	GYM ELECTRICAL ROOM						X	23	$2.16	$400.00	
	STORAGE (AHU 6)	X	17	$1.62	$100.00	61.8				$400.00	
	STORAGE / BOXING PRACTICE	X	122	$11.33	$100.00	8.8				$400.00	
	Jr A Slammers	X	34	$3.15	$100.00	31.8				$400.00	
	LAUNDRY	X	27	$2.52	$100.00	39.7				$400.00	
	L ROOM	X	14	$1.26	$100.00	79.4				$400.00	
B108	STORAGE	X	17	$1.62	$100.00	61.8				$400.00	
B108	STORAGE	X	6	$0.54	$100.00	185.4				$400.00	
B115	POOL FILTRATION						X	163	$15.10	$400.00	
B115	POOL FILTRATION						X	95	$8.81	$400.00	
	LOBBY						X	409	$37.90	$400.00	
	FRONT ENTRY						X	116	$10.72	$400.00	
	LOBBY						X	537	$49.77	$400.00	
	HALL						X	89	$8.23	$400.00	
	ADMIN OFFICE	X	89	$8.23	$100.00	12.1				$400.00	
	TOURISM OFFICE	X	86	$7.98	$100.00	12.5				$400.00	
B202	TICKET OFFICE	X	57	$5.24	$100.00	19.1				$400.00	
	LOBBY										
	HALL BY CAFETERIA						X	537	$49.77	$400.00	
	HALL BY CAFETERIA						X	178	$16.46	$400.00	
	HALL BY CAFETERIA									$400.00	
	HALL TO POOL LOBBY						X	355	$32.92	$400.00	
	SAMS ROOM	X	229	$21.21	$100.00	4.7				$400.00	
	SAMS ROOM	X	230	$21.32	$100.00	4.7				$400.00	
	SAMS ROOM	X	33	$3.05	$100.00	32.8				$400.00	
	SAMS ROOM	X	105	$9.74	$100.00	10.3				$400.00	
B206/207	KITCHEN	X	183	$16.99	$100.00	5.9				$400.00	
B205	CAFETERIA						X	122	$11.33	$400.00	
B225	POOL OFFICE	X	255	$23.60	$100.00	4.2				$400.00	
	BASEMENT HALL BY POOL									$400.00	
	BASEMENT HALL BY POOL									$400.00	
	BASEMENT HALL BY POOL									$400.00	
Interior Totals ECM 8.2			**8,405**	**$779**	**$6,900**	**8.9**		**35,471**	**$3,288**	**$56,000**	**17.0**

Appendix D
Energy Conservation Measures

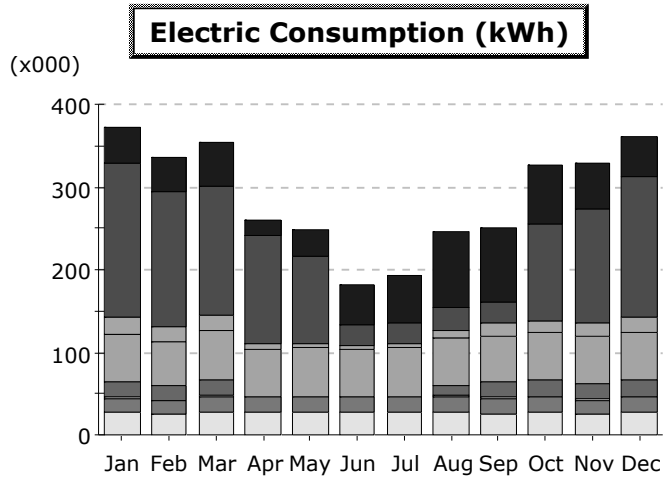
Energy Conservation Measure 7.1

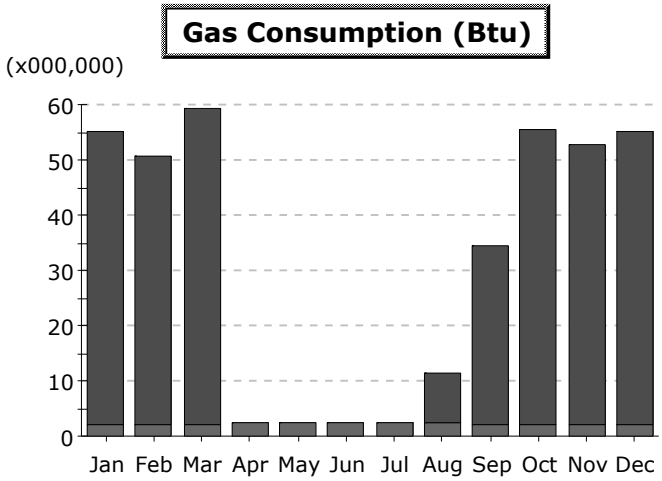
Interior Lighting Upgrade (Heating Penalty)

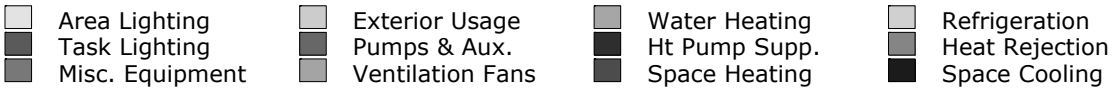
7.1: Interior Lighting Upgrade

Please refer to eQuest files (“baseline” & “- 1”) & Appendix C for applied heating penalty.

Please refer to Appendix C for Energy Conservation Measure 7.1





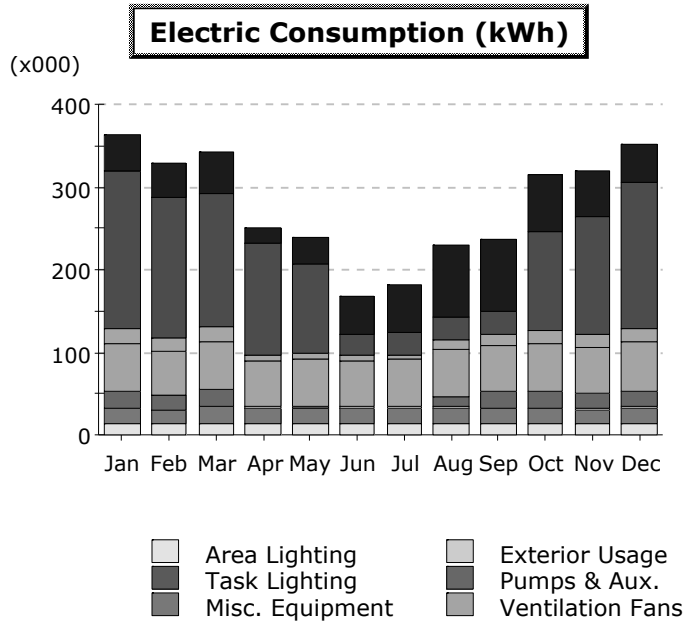


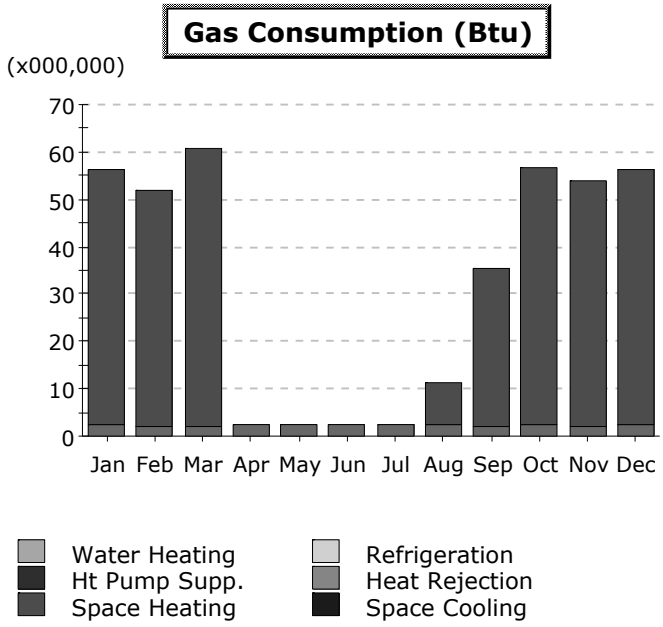
Electric Consumption (kWh x000)

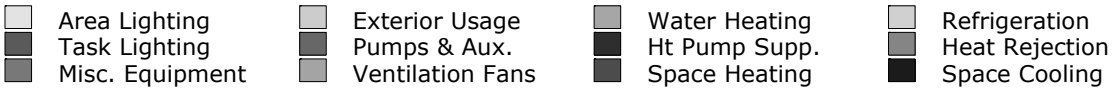
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	44.0	41.9	53.1	19.9	33.6	48.5	57.8	91.0	91.3	72.0	55.2	47.9	656.1
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	186.5	164.7	154.8	131.5	104.9	24.6	26.2	26.7	25.5	116.0	138.7	170.8	1,270.9
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	152.9
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.6
Pumps & Aux.	19.9	18.0	19.9	0.6	0.5	0.4	0.4	11.6	19.1	19.8	19.2	19.9	149.3
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	26.5	24.6	28.1	27.2	27.4	27.1	27.3	28.2	26.3	27.4	25.6	27.2	322.8
Total	372.1	336.5	353.3	260.8	249.1	181.6	193.8	245.2	251.3	326.9	328.4	361.2	3,460.4

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	52.87	48.64	57.10	-	-	-	-	8.89	32.25	53.40	50.76	52.87	356.81
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.95
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	55.10	50.65	59.31	2.30	2.38	2.30	2.38	11.25	34.46	55.62	52.91	55.10	383.76







Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	42.0	40.1	50.7	18.9	32.1	47.7	56.8	88.8	88.6	68.1	52.9	45.8	632.5
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	191.4	169.2	159.5	135.5	108.1	25.3	26.9	27.4	26.3	120.2	143.0	175.7	1,308.8
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	19.9	17.9	19.8	0.6	0.5	0.4	0.4	11.6	19.0	19.8	19.2	19.9	149.0
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	362.6	327.7	342.4	251.0	238.0	168.8	180.7	230.3	237.1	314.4	318.4	351.2	3,322.5

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	9.10	33.00	54.65	51.94	54.10	365.11
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.95
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	11.46	35.21	56.87	54.09	56.33	392.06

Energy Conservation Measure 7.2

Interior Lighting Controls Upgrade

7.2.1: Interior Lighting Upgrade: Occupancy Sensors

Please refer to Appendix C

Project Name: ***AYR Motor Centre, Woodstock, NB - Energy Study***
Building Name: ***AYR Motor Centre***
TACE Project Number: ***1764***
Item: ***Energy Study Summary***
Date: ***May 30th 2017***

	Cost	
Electrical Consumption:	$0.0927	/kwh
Electrical Demand:	$10.45	/kw

		ECM 7.2.1					ECM 7.3.1				
Location / Zone		Recommended Occupancy Sensor	Net Electrical Savings (kWh)	Cost Savings	Capital Cost	Simple Pay-Back Period (years)	New Savings From BAS Upgrade	Net Electrical Savings (kWh)	Cost Savings	Capital Cost	Simple Pay-Back Period (years)
Room No.	Room Name										
	RINK UPPER LEVEL						X	9,012	$835.45	$2,000.00	
	RINK UPPER LEVEL						X	155	$14.38	$400.00	
	RINK UPPER LEVEL						X	349	$32.37	$400.00	
	RINK UPPER LEVEL										
	RINK ENTRY (OUTSIDE)						X	180	$16.72	$400.00	
	RINK UPPER LEVEL						X	568	$52.62	$400.00	
A123	STAFF (ZAMBONI OPERATOR)						X	57	$5.30	$400.00	
A125	ELECTRICAL						X	19	$1.80	$400.00	
A126	STORAGE	X	35	$3.24	$100.00	30.9				$400.00	
A119	ZAMBONI HALL	X	962	$89.19	$100.00	1.1				$400.00	
A122	STAFF WR	X	6	$0.54	$100.00	185.4				$400.00	
A124	STORAGE	X	6	$0.54	$100.00	185.4				$400.00	
A125	MECHANICAL						X	120	$11.15	$400.00	
A118	OFFICIALS LOCKER	X	57	$5.30	$100.00	18.9				$400.00	
A118	OFFICIALS WR	X	6	$0.54	$100.00	185.4				$400.00	
A120	VESTIBULE										
A121	ICE PLANT						X	70	$6.47	$400.00	
A121A	ICE PLANT MECHANICAL						X	17	$1.62	$400.00	
A115	CHANGE ROOM 6	X	107	$9.89	$100.00	10.1				$400.00	
A116	CHANGE ROOM 6 WR	X	21	$1.98	$100.00	50.6				$400.00	
A117	CHANGE ROOM 6 SHOWERS	X	21	$1.98	$100.00	50.6				$400.00	
A114	CHANGE ROOM 5 SHOWERS	X	21	$1.98	$100.00	50.6				$400.00	
A113	CHANGE ROOM 5 WR	X	43	$3.96	$100.00	25.3				$400.00	
A112	CHANGE ROOM 5	X	128	$11.87	$100.00	8.4				$400.00	
A110	CHANGE ROOM 4	X	149	$13.85	$100.00	7.2				$400.00	
A111	CHANGE ROOM 4 WR	X	21	$1.98	$100.00	50.6				$400.00	
A109	CHANGE ROOM 3 WR	X	21	$1.98	$100.00	50.6				$400.00	
A108	CHANGE ROOM 3	X	149	$13.85	$100.00	7.2				$400.00	
A105	CHANGE ROOM 2	X	128	$11.87	$100.00	8.4				$400.00	
A106	CHANGE ROOM 2 WR	X	43	$3.96	$100.00	25.3				$400.00	
A107	CHANGE ROOM 2 SHOWERS	X	21	$1.98	$100.00	50.6				$400.00	
A103	CHAGE ROOM 1 WR	X	21	$1.98	$100.00	50.6				$400.00	
A104	CHANGE ROOM 1 SHOWERS	X	21	$1.98	$100.00	50.6				$400.00	
A102	CHANGE ROOM 1	X	107	$9.89	$100.00	10.1				$400.00	
	HALL									$400.00	
	HALL									$400.00	
	HALL									$400.00	
	HALL									$400.00	
	A101						X	6,133	$568.56	$400.00	
	A101									$400.00	
A100	RINK							962	$89.19	$400.00	
A100	RINK						X	102	$9.49	$400.00	
A100	RINK										
B301	MEETING ROOM	X	81	$7.55	$100.00	13.2				$400.00	
ST1	POOL SECTION LEVEL 3									$400.00	
ST1	POOL SECTION LEVEL 3										
B300	CORRIDOR									$400.00	
B302	MEETING ROOM	X	41	$3.78	$100.00	26.5				$400.00	
B303	MECHANICAL						X	35	$3.24	$400.00	
POOL	POOL SECTION LEVEL 3									$400.00	
POOL	POOL SECTION LEVEL 3									$400.00	
POOL	POOL SECTION LEVEL 3									$400.00	
POOL	POOL SECTION LEVEL 3										
B305	MECHANICAL						X	58	$5.39	$400.00	
										$400.00	
B215	FEMALE LOCKERS	X	327	$30.34	$100.00	3.3				$400.00	
B215	FEMALE LOCKERS	X	55	$5.06	$100.00	19.8				$400.00	
B217	FEMALE SHOWERS	X	218	$20.23	$100.00	4.9				$400.00	
B218	FAMILLY CHANGE ROOM	X	218	$20.23	$100.00	4.9				$400.00	
B220	MALE LOCKERS	X	55	$5.06	$100.00	19.8				$400.00	
B221	MALE SHOWERS	X	218	$20.23	$100.00	4.9				$400.00	
B222	MALE SHOWERS	X	218	$20.23	$100.00	4.9				$400.00	

Project Name: ***AYR Motor Centre, Woodstock, NB - Energy Study***
Building Name: ***AYR Motor Centre***
TACE Project Number: ***1764***
Item: ***Energy Study Summary***
Date: ***May 30th 2017***

	Cost	
Electrical Consumption:	$0.0927	/kwh
Electrical Demand:	$10.45	/kw

		ECM 7.2.1					ECM 7.3.1				
Location / Zone		Recommended Occupancy Sensor	Net Electrical Savings (kWh)	Cost Savings	Capital Cost	Simple Pay-Back Period (years)	New Savings From BAS Upgrade	Net Electrical Savings (kWh)	Cost Savings	Capital Cost	Simple Pay-Back Period (years)
Room No.	Room Name										
ST2	STAIRWELL									$400.00	
B224	DECK STORAGE	X	19	$1.80	$100.00	55.6				$400.00	
B223	BEACH									$400.00	
	POOL										
B214A	JANITOR	X	14	$1.26	$100.00	79.4				$400.00	
B214	CORRIDOR						X	436	$40.46	$400.00	
B214	CORRIDOR										
B209	FEMALE WR	X	301	$27.87	$100.00	3.6				$400.00	
B210	MALE WR	X	301	$27.87	$100.00	3.6				$400.00	
B223							X	60	$5.57	$400.00	
B102	STUDIO						X	263	$24.36	$400.00	
B102	STUDIO						X	131	$12.18	$400.00	
B102	STUDIO										
B107	WR	X	273	$25.29	$100.00	4.0				$400.00	
B106	WR	X	273	$25.29	$100.00	4.0				$400.00	
ST1	STAIRS									$400.00	
ST1	STAIRS										
	KITCHEN STORAGE	X	20	$1.89	$100.00	53.0				$400.00	
	KITCHEN WR	X	10	$0.94	$100.00	105.9				$400.00	
	KITCHEN	X	367	$33.98	$100.00	2.9				$400.00	
										$400.00	
	AHU3 MECHANICAL ROOM						X	47	$4.32	$400.00	
	BETWEEN GYM/POOL						X	2,648	$245.43	$400.00	
	BETWEEN GYM/POOL										
	GYM (LOWER LEVEL)						X	1,670	$154.82	$400.00	
	GYM (LOWER LEVEL)									$400.00	
	GYM STORAGE	X	258	$23.91	$100.00	4.2				$400.00	
	GYM STORAGE	X	1	$0.05	$100.00	1,894.5					
	ENTRY									$400.00	
	ENTRY										
	STAIR ENTRY									$400.00	
	STAIR ENTRY										
	STAIR ENTRY 2									$400.00	
	STAIR ENTRY 2										
	STAIR ENTRY									$400.00	
	STAIR ENTRY 2									$400.00	
	GYM (UPPER LEVEL)						X	5,487	$508.69	$400.00	
	GYM (UPPER LEVEL)										
C302	MECHANICAL ROOM									$400.00	
	STAIRS									$400.00	
	STAIRS									$400.00	
	FITNESS ROOM						X	2,386	$221.17	$400.00	
	FITNESS ROOM										
	MENS WR	X	239	$22.12	$100.00	4.5				$400.00	
	WOMENS WR	X	239	$22.12	$100.00	4.5				$400.00	
	JANITORS ROOM	X	14	$1.26	$100.00	79.4				$400.00	
	STAIR									$400.00	
	HALL MAIN FLOOR						X	1,343	$124.49	$400.00	
	HALL MAIN FLOOR										
	OFFICE	X	94	$8.73	$100.00	11.5				$400.00	
	OFFICE	X	47	$4.36	$100.00	22.9				$400.00	
	CUSTODIAN ROOM	X	17	$1.57	$100.00	63.6				$400.00	
	OFFICIALS ROOM	X	47	$4.36	$100.00	22.9				$400.00	
	HALL									$400.00	
	ELEVATOR ROOM									$400.00	
	MENS LOCKERS ROOM	X	358	$33.18	$100.00	3.0				$400.00	
	MENS LOCKERS ROOM	X	63	$5.89	$100.00	17.0				$400.00	
	WOMENS LOCKER ROOM	X	358	$33.18	$100.00	3.0				$400.00	
	WOMENS LOCKER ROOM	X	63	$5.89	$100.00	17.0				$400.00	

Project Name: ***AYR Motor Centre, Woodstock, NB - Energy Study***
Building Name: ***AYR Motor Centre***
TACE Project Number: ***1764***
Item: ***Energy Study Summary***
Date: ***May 30th 2017***

	Cost	
Electrical Consumption:	$0.0927	/kwh
Electrical Demand:	$10.45	/kw

		ECM 7.2.1					ECM 7.3.1				
Location / Zone		Recommended Occupancy Sensor	Net Electrical Savings (kWh)	Cost Savings	Capital Cost	Simple Pay-Back Period (years)	New Savings From BAS Upgrade	Net Electrical Savings (kWh)	Cost Savings	Capital Cost	Simple Pay-Back Period (years)
Room No.	Room Name										
	Basement GYM HALL						X	537	$49.76	$400.00	
	Basement GYM HALL										
	GYM ELECTRICAL ROOM						X	23	$2.16	$400.00	
	STORAGE (AHU 6)	X	17	$1.62	$100.00	61.8				$400.00	
	STORAGE / BOXING PRACTICE	X	122	$11.33	$100.00	8.8				$400.00	
	Jr A Slammers	X	34	$3.15	$100.00	31.8				$400.00	
	LAUNDRY	X	27	$2.52	$100.00	39.7				$400.00	
	L ROOM	X	14	$1.26	$100.00	79.4				$400.00	
B108	STORAGE	X	17	$1.62	$100.00	61.8				$400.00	
B108	STORAGE	X	6	$0.54	$100.00	185.4				$400.00	
B115	POOL FILTRATION						X	163	$15.10	$400.00	
B115	POOL FILTRATION						X	95	$8.81	$400.00	
	LOBBY						X	409	$37.90	$400.00	
	FRONT ENTRY						X	116	$10.72	$400.00	
	LOBBY						X	537	$49.77	$400.00	
	HALL						X	89	$8.23	$400.00	
	ADMIN OFFICE	X	89	$8.23	$100.00	12.1				$400.00	
	TOURISM OFFICE	X	86	$7.98	$100.00	12.5				$400.00	
B202	TICKET OFFICE	X	57	$5.24	$100.00	19.1				$400.00	
	LOBBY										
	HALL BY CAFETERIA						X	537	$49.77	$400.00	
	HALL BY CAFETERIA						X	178	$16.46	$400.00	
	HALL BY CAFETERIA									$400.00	
	HALL TO POOL LOBBY						X	355	$32.92	$400.00	
	SAMS ROOM	X	229	$21.21	$100.00	4.7				$400.00	
	SAMS ROOM	X	230	$21.32	$100.00	4.7				$400.00	
	SAMS ROOM	X	33	$3.05	$100.00	32.8				$400.00	
	SAMS ROOM	X	105	$9.74	$100.00	10.3				$400.00	
B206/207	KITCHEN	X	183	$16.99	$100.00	5.9				$400.00	
B205	CAFETERIA						X	122	$11.33	$400.00	
B225	POOL OFFICE	X	255	$23.60	$100.00	4.2				$400.00	
	BASEMENT HALL BY POOL									$400.00	
	BASEMENT HALL BY POOL									$400.00	
	BASEMENT HALL BY POOL									$400.00	
Interior Totals ECM 8.2			**8,405**	**$779**	**$6,900**	**8.9**		**35,471**	**$3,288**	**$56,000**	**17.0**

Energy Conservation Measure 7.3

Building Automation Upgrade: Event Scheduling

7.3.1: BAS Upgrade: Lighting Controls:

Please refer to Appendix C

7.3.2: BAS Upgrade: Heating/ Cooling Controls

Please refer to eQuest file *AYR Motor Centre – 7.3.2_New Heating & Cooling Schedule*

Please refer to eQuest file *AYR Motor Centre – June 26*

Subtract electrical consumption from files noted as "- 1" (These figures were taken after lighting upgrade measures:

3,362,800 – 3,322,500 = 40,300 kWh

7.3.3: BAS Upgrade: Ventilation (Fresh Air Ventilation)

Please refer to eQuest file *AYR Motor Centre – 7.3.3_No FA Ventilation*

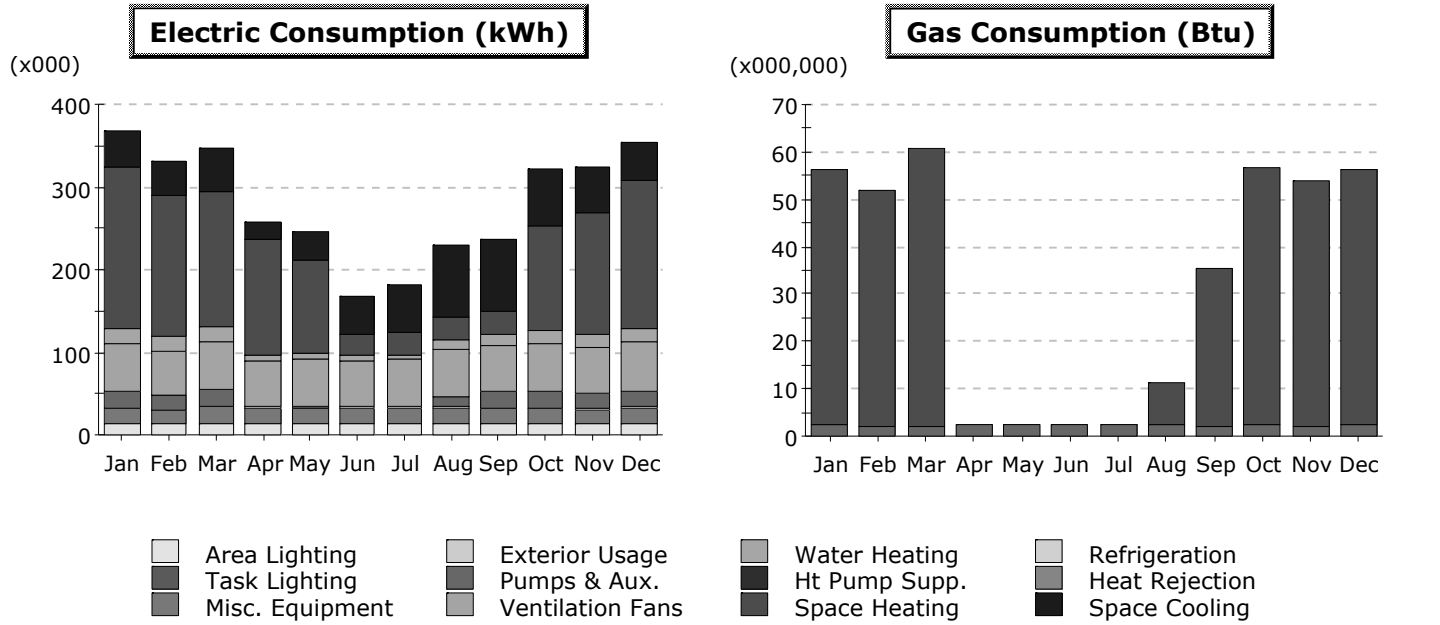
Please refer to eQuest file *AYR Motor Centre – June 26*

Subtract electrical consumption from files noted as "- 1" (These figures were taken after lighting upgrade measures

Take 30% energy savings:

(3,322,500 – 3,196,500)*0.3 = 37,800 kWh

Another method would be to open eQuest file & manually enter 0 for outdoor air ventilation for selected air handling units and taking 0% of the calculated energy savings.

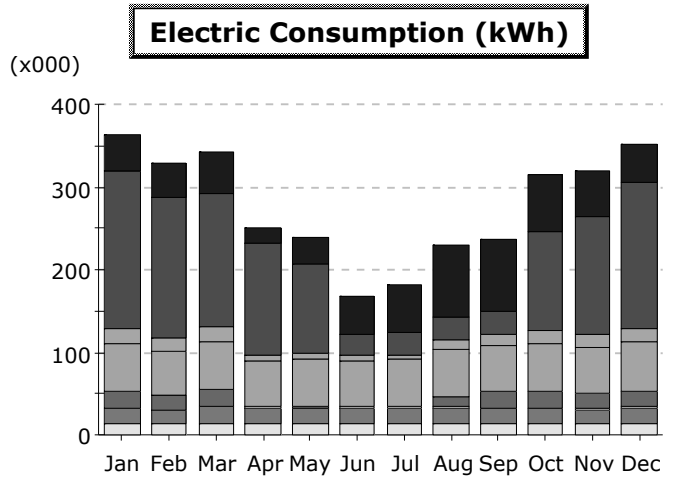


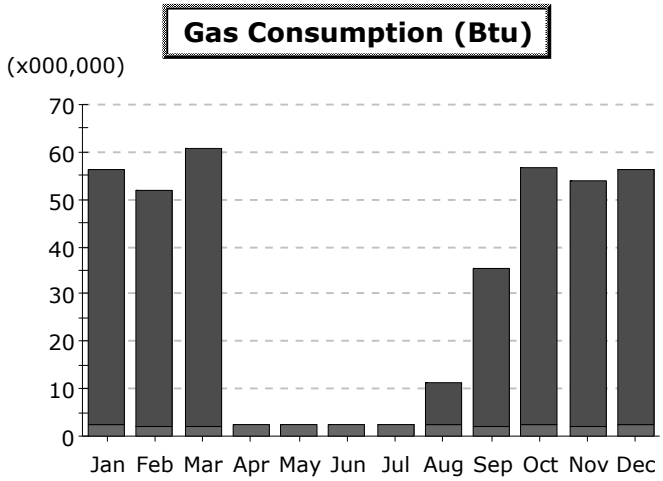
Electric Consumption (kWh x000)

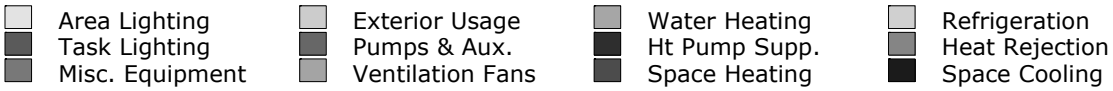
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	42.2	40.3	51.2	20.1	34.0	47.9	56.8	88.8	88.6	70.0	53.7	45.9	639.5
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	195.9	172.4	162.8	140.0	113.3	25.3	26.9	27.4	26.3	125.8	147.3	178.6	1,342.0
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.7	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.8	17.8	152.8
Vent. Fans	58.0	52.5	58.2	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.9
Pumps & Aux.	19.9	17.9	19.8	0.6	0.5	0.4	0.4	11.6	19.0	19.8	19.2	19.9	149.1
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	367.3	331.0	346.1	256.6	245.1	168.9	180.7	230.3	237.1	321.9	323.5	354.2	3,362.8

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	9.10	33.00	54.65	51.94	54.10	365.11
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.95
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	11.46	35.21	56.87	54.09	56.33	392.06





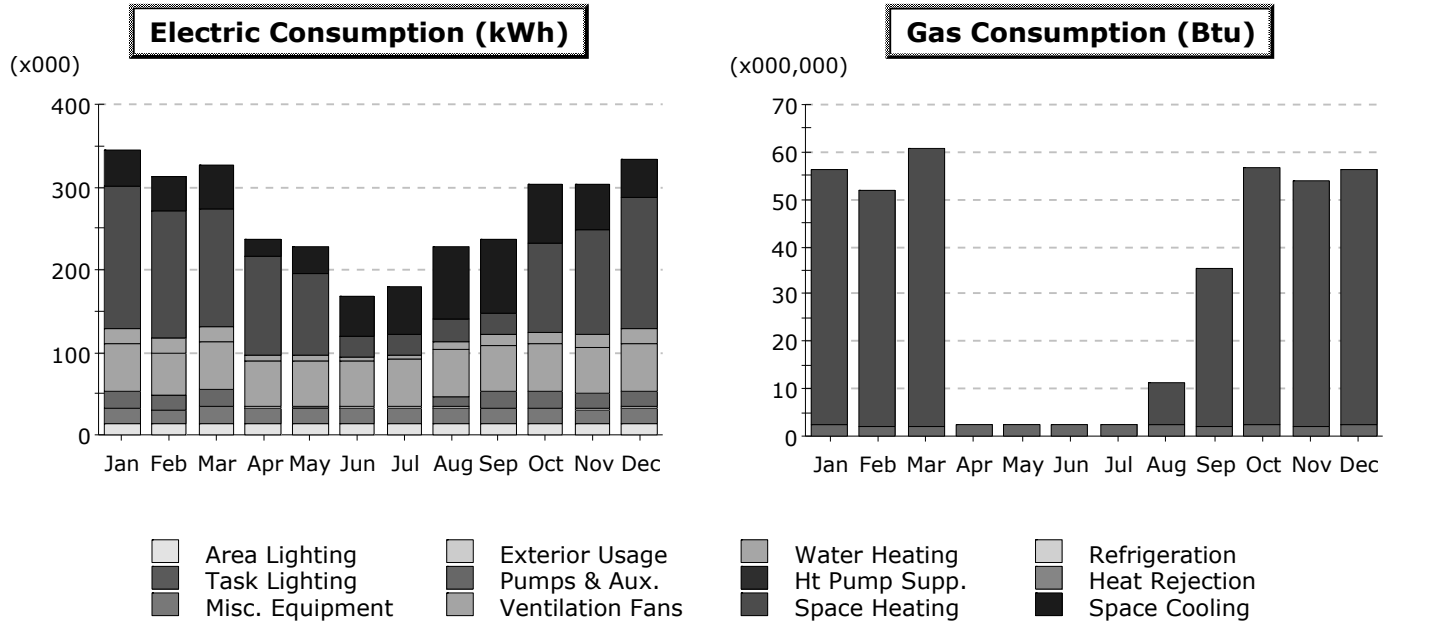


Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	42.0	40.1	50.7	18.9	32.1	47.7	56.8	88.8	88.6	68.1	52.9	45.8	632.5
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	191.4	169.2	159.5	135.5	108.1	25.3	26.9	27.4	26.3	120.2	143.0	175.7	1,308.8
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	19.9	17.9	19.8	0.6	0.5	0.4	0.4	11.6	19.0	19.8	19.2	19.9	149.0
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	362.6	327.7	342.4	251.0	238.0	168.8	180.7	230.3	237.1	314.4	318.4	351.2	3,322.5

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	9.10	33.00	54.65	51.94	54.10	365.11
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.95
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	11.46	35.21	56.87	54.09	56.33	392.06



Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	43.4	41.4	52.3	20.5	33.2	46.9	55.4	87.3	88.1	69.6	54.5	47.3	640.2
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	173.0	152.8	142.3	120.9	98.2	25.3	26.9	27.4	26.3	107.7	127.8	158.4	1,187.0
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	57.0	51.6	57.2	55.2	56.9	55.2	56.9	56.9	55.2	56.9	55.1	57.1	671.2
Pumps & Aux.	19.8	17.9	19.8	0.6	0.5	0.4	0.4	11.6	19.0	19.7	19.2	19.8	148.6
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	344.5	311.7	325.7	237.0	228.2	167.0	178.3	227.9	235.7	302.4	303.8	334.3	3,196.5

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	9.10	33.00	54.65	51.94	54.10	365.11
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.95
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	11.46	35.21	56.87	54.09	56.33	392.06

Energy Conservation Measure 7.4

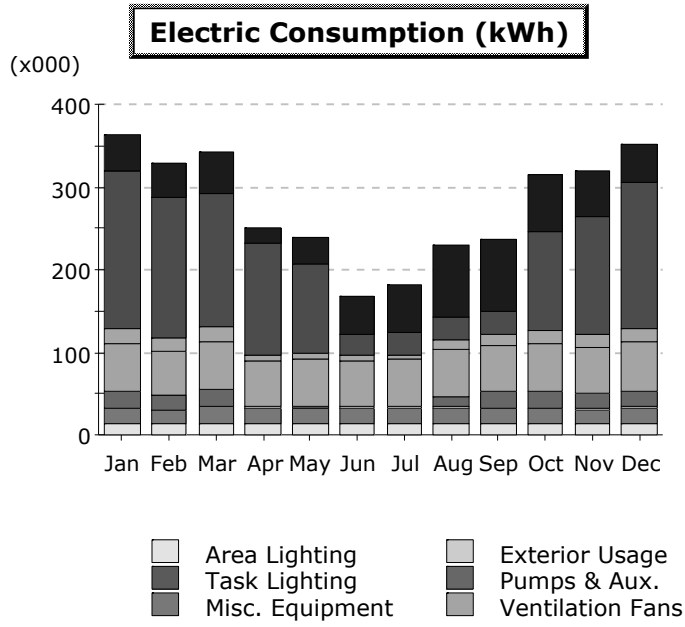
Ice Rink Upgrade: Low Emissivity Ceiling

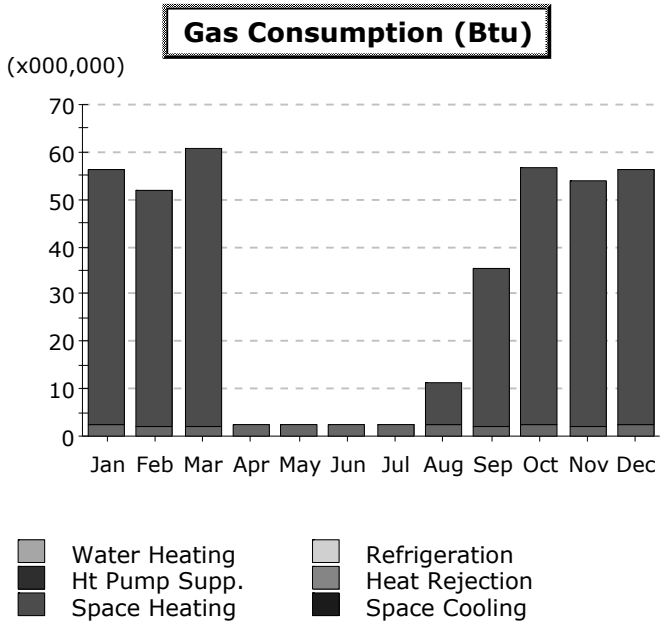
7.3.6: BAS Upgrade: Ventilation (Fresh Air Ventilation)

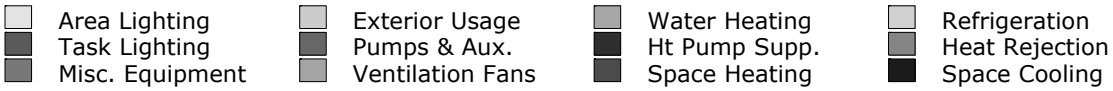
Please refer to eQuest files *AYR Motor Centre – June 26*

Subtract electrical consumption from files “- 1” & “- 2”

Subtract electrical demand from files “- 1” & “- 2”





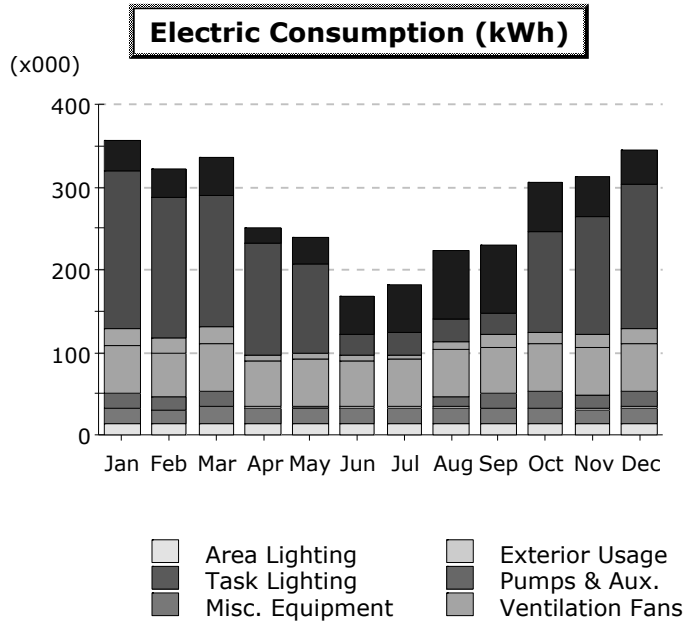


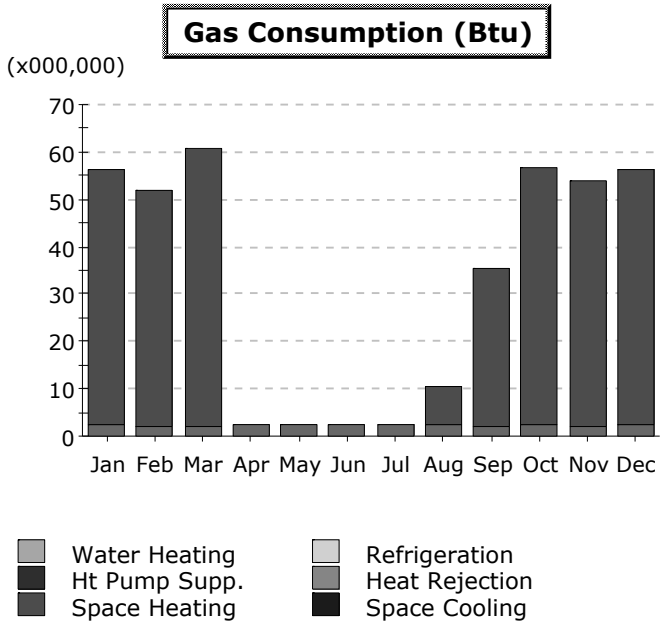
Electric Consumption (kWh x000)

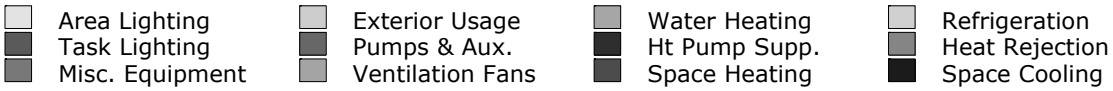
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	42.0	40.1	50.7	18.9	32.1	47.7	56.8	88.8	88.6	68.1	52.9	45.8	632.5
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	191.4	169.2	159.5	135.5	108.1	25.3	26.9	27.4	26.3	120.2	143.0	175.7	1,308.8
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	19.9	17.9	19.8	0.6	0.5	0.4	0.4	11.6	19.0	19.8	19.2	19.9	149.0
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	362.6	327.7	342.4	251.0	238.0	168.8	180.7	230.3	237.1	314.4	318.4	351.2	3,322.5

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	9.10	33.00	54.65	51.94	54.10	365.11
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.95
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	11.46	35.21	56.87	54.09	56.33	392.06





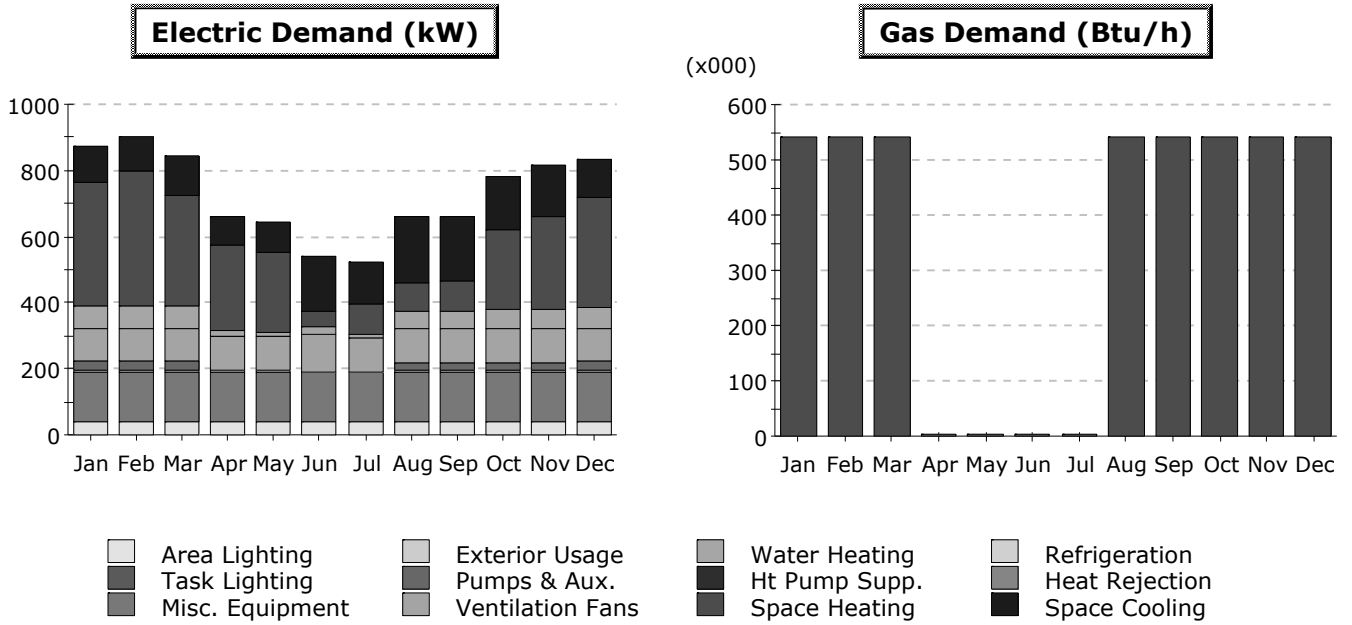


Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	38.1	36.2	45.6	18.9	32.1	47.7	56.8	82.8	81.7	61.7	47.7	41.4	590.6
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	191.4	169.2	159.5	135.5	108.1	25.3	26.9	27.4	26.3	120.2	143.0	175.7	1,308.8
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.6	16.8	18.6	0.6	0.5	0.4	0.4	10.8	17.8	18.5	18.0	18.6	139.7
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	357.5	322.6	336.0	251.0	238.0	168.8	180.7	223.6	229.0	306.7	311.9	345.5	3,271.3

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.20

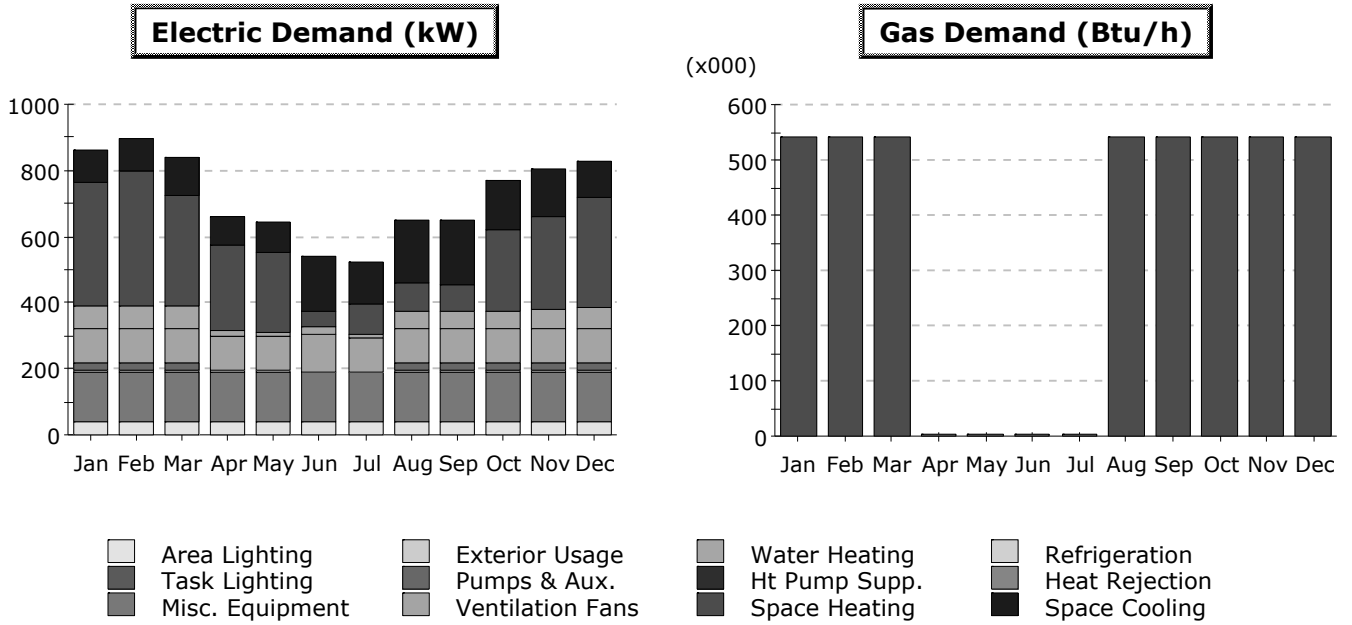


Electric Demand (kW)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	104.1	100.6	120.7	85.3	95.6	168.9	126.8	198.9	197.7	164.5	154.2	113.4	1,630.8
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	376.0	407.7	333.4	263.4	237.7	44.1	87.6	87.5	91.8	243.0	279.1	334.1	2,785.4
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	67.1	69.3	69.3	16.7	15.5	25.2	15.4	51.7	51.5	53.7	57.9	62.7	556.1
Vent. Fans	102.2	102.3	102.1	102.0	102.0	110.7	99.5	101.9	101.9	102.0	102.0	102.1	1,230.7
Pumps & Aux.	26.8	26.8	26.8	0.9	0.9	0.7	0.7	26.4	26.4	26.8	26.8	26.8	217.0
Ext. Usage	2.7	2.7	2.7	2.7	2.7	-	-	2.7	2.7	2.7	2.7	2.7	27.2
Misc. Equip.	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	1,848.0
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	453.0
Total	870.8	901.3	846.9	662.8	646.2	541.4	521.7	661.0	663.8	784.4	814.4	833.6	8,748.2

Gas Demand (Btu/h x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	541.0	541.0	541.0	-	-	-	-	541.0	541.0	541.0	541.0	541.0	4,328.4
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	1.6	1.6	1.6	3.2	3.2	3.2	3.2	1.6	1.6	1.6	1.6	1.6	25.6
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	542.6	542.6	542.6	3.2	3.2	3.2	3.2	542.6	542.6	542.6	542.6	542.6	4,354.0



Electric Demand (kW)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	98.8	95.9	113.4	85.3	95.6	168.9	126.8	187.2	197.5	154.1	145.1	106.6	1,575.3
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	376.0	407.7	333.4	263.4	237.7	44.1	87.6	87.5	80.5	243.0	279.1	334.1	2,774.2
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	67.1	69.3	69.3	16.7	15.5	25.2	15.4	51.7	51.5	53.7	57.9	62.7	556.1
Vent. Fans	102.2	102.3	102.1	102.0	102.0	110.7	99.5	101.9	101.9	102.0	102.0	102.1	1,230.7
Pumps & Aux.	25.1	25.2	25.1	0.9	0.9	0.7	0.7	24.8	24.8	25.1	25.1	25.1	203.5
Ext. Usage	2.7	2.7	2.7	2.7	2.7	-	-	2.7	2.7	2.7	2.7	2.7	27.2
Misc. Equip.	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	1,848.0
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	453.0
Total	863.8	894.9	837.8	662.8	646.2	541.4	521.7	647.6	650.7	772.3	803.6	825.2	8,668.0

Gas Demand (Btu/h x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	541.0	541.0	541.0	-	-	-	-	541.0	541.0	541.0	541.0	541.0	4,328.4
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	1.6	1.6	1.6	3.2	3.2	3.2	3.2	1.6	1.6	1.6	1.6	1.6	25.6
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	542.6	542.6	542.6	3.2	3.2	3.2	3.2	542.6	542.6	542.6	542.6	542.6	4,354.0

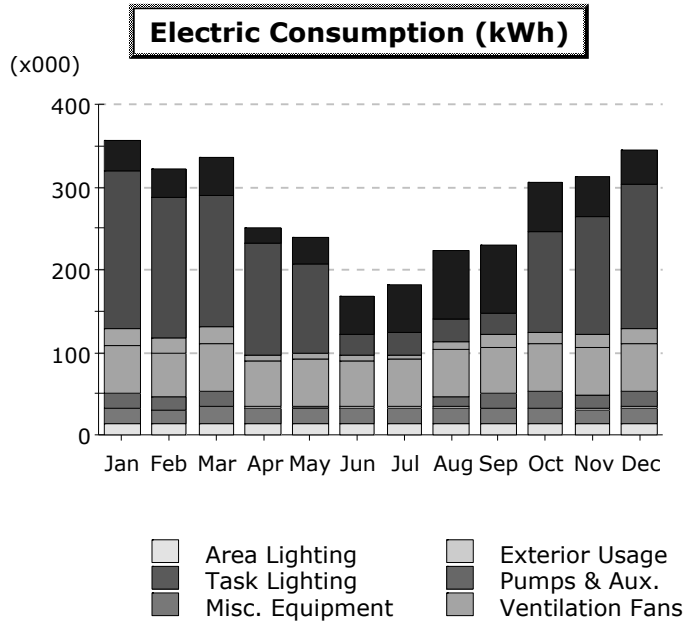
Energy Conservation Measure 7.5

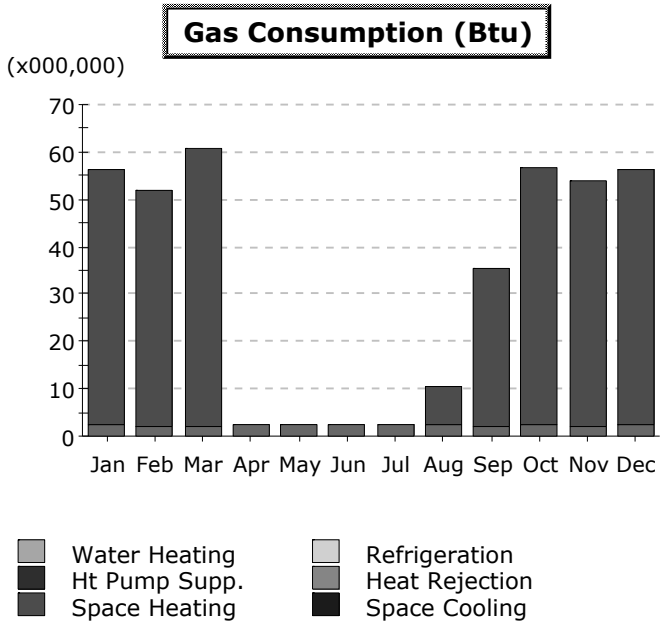
Ice Rink Upgrade: Cold Water Flooding

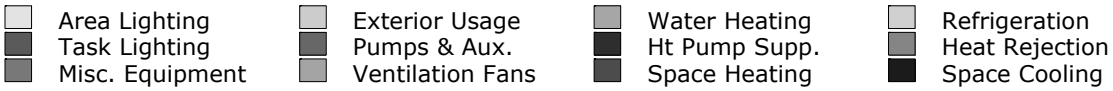
Please refer to eQuest files *AYR Motor Centre – June 26*

Subtract electrical consumption from files “- 2” & “- 3”

Subtract electrical demand from files “- 2” & “- 3”





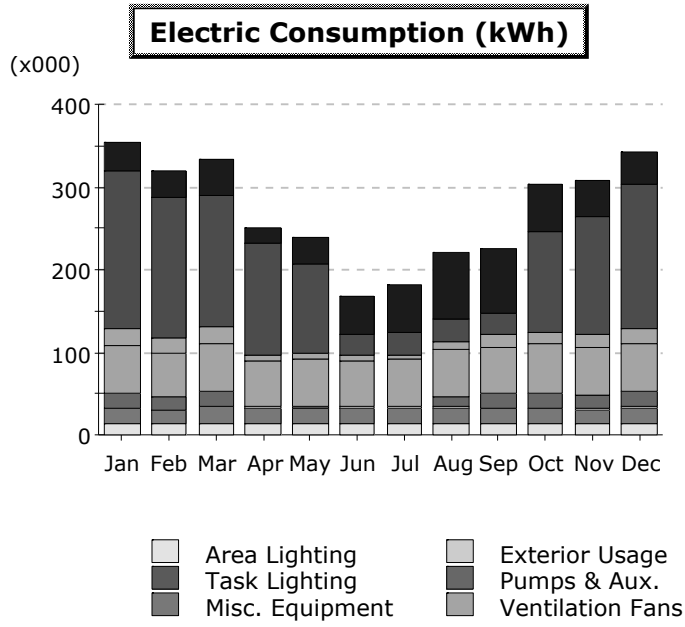


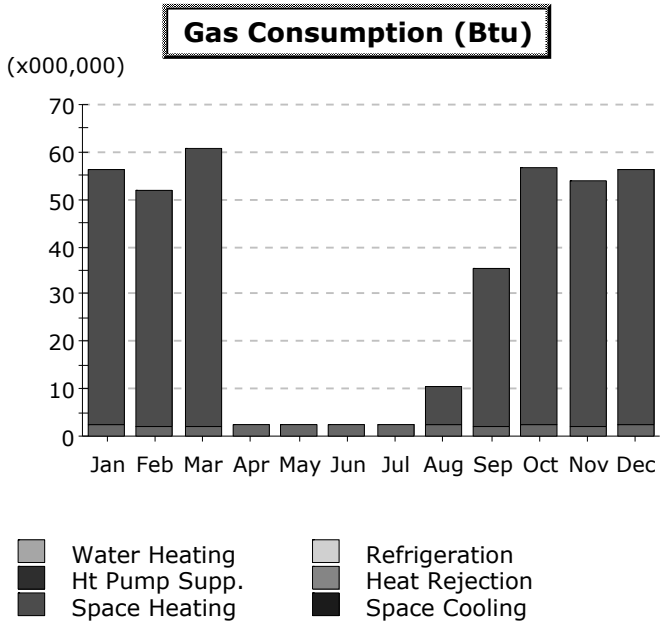
Electric Consumption (kWh x000)

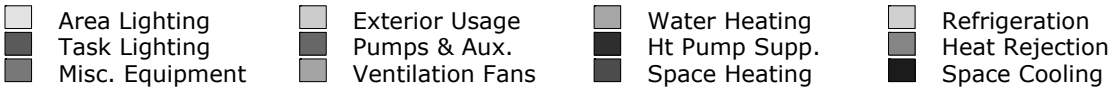
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	38.1	36.2	45.6	18.9	32.1	47.7	56.8	82.8	81.7	61.7	47.7	41.4	590.6
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	191.4	169.2	159.5	135.5	108.1	25.3	26.9	27.4	26.3	120.2	143.0	175.7	1,308.8
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.6	16.8	18.6	0.6	0.5	0.4	0.4	10.8	17.8	18.5	18.0	18.6	139.7
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	357.5	322.6	336.0	251.0	238.0	168.8	180.7	223.6	229.0	306.7	311.9	345.5	3,271.3

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.20





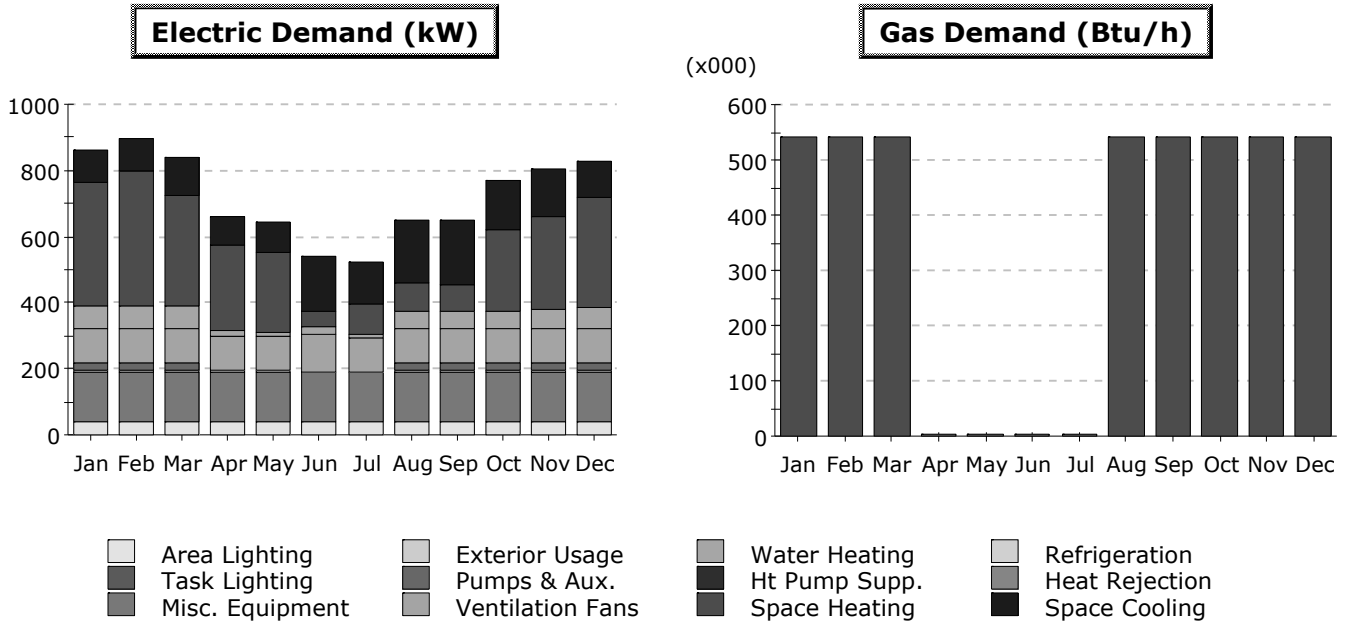


Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	35.0	33.4	42.5	18.9	32.1	47.7	56.8	80.9	78.6	58.5	44.6	38.3	567.4
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	191.4	169.2	159.5	135.5	108.1	25.3	26.9	27.4	26.3	120.2	143.0	175.7	1,308.8
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.5	16.7	18.4	0.6	0.5	0.4	0.4	10.8	17.7	18.4	17.8	18.5	138.6
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	354.2	319.7	332.7	251.0	238.0	168.8	180.7	221.6	225.8	303.4	308.8	342.3	3,246.9

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21

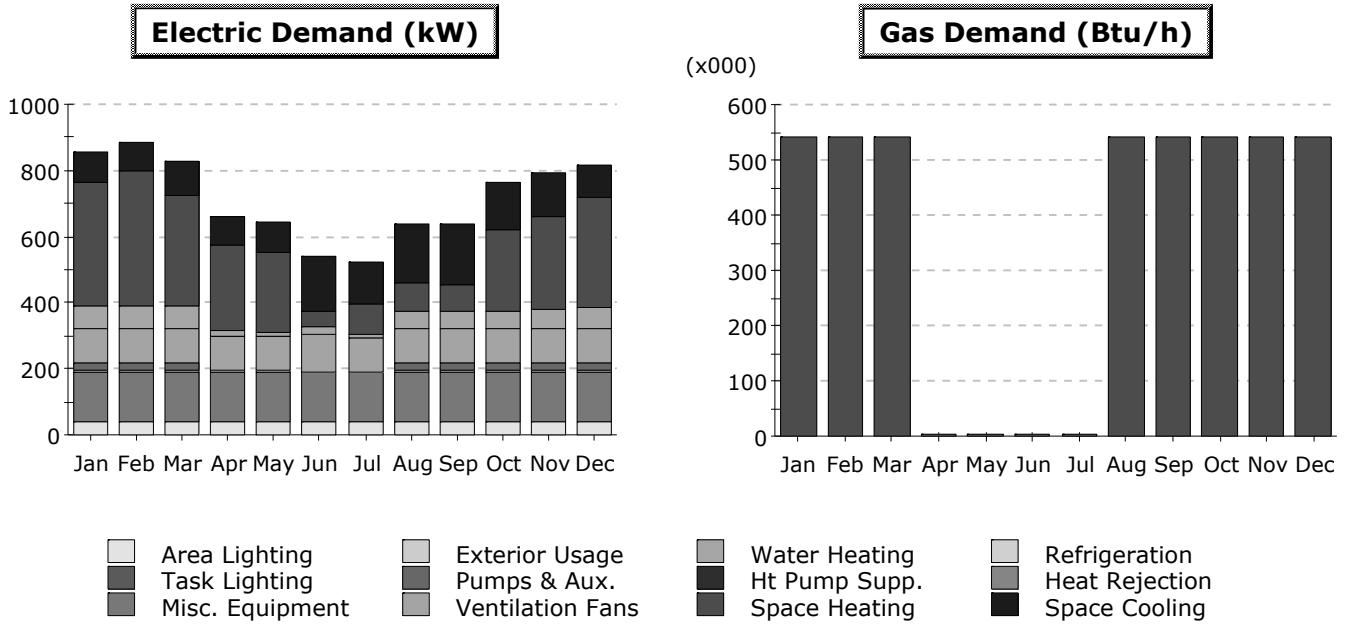


Electric Demand (kW)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	98.8	95.9	113.4	85.3	95.6	168.9	126.8	187.2	197.5	154.1	145.1	106.6	1,575.3
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	376.0	407.7	333.4	263.4	237.7	44.1	87.6	87.5	80.5	243.0	279.1	334.1	2,774.2
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	67.1	69.3	69.3	16.7	15.5	25.2	15.4	51.7	51.5	53.7	57.9	62.7	556.1
Vent. Fans	102.2	102.3	102.1	102.0	102.0	110.7	99.5	101.9	101.9	102.0	102.0	102.1	1,230.7
Pumps & Aux.	25.1	25.2	25.1	0.9	0.9	0.7	0.7	24.8	24.8	25.1	25.1	25.1	203.5
Ext. Usage	2.7	2.7	2.7	2.7	2.7	-	-	2.7	2.7	2.7	2.7	2.7	27.2
Misc. Equip.	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	1,848.0
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	453.0
Total	863.8	894.9	837.8	662.8	646.2	541.4	521.7	647.6	650.7	772.3	803.6	825.2	8,668.0

Gas Demand (Btu/h x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	541.0	541.0	541.0	-	-	-	-	541.0	541.0	541.0	541.0	541.0	4,328.4
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	1.6	1.6	1.6	3.2	3.2	3.2	3.2	1.6	1.6	1.6	1.6	1.6	25.6
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	542.6	542.6	542.6	3.2	3.2	3.2	3.2	542.6	542.6	542.6	542.6	542.6	4,354.0



Electric Demand (kW)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	89.0	86.1	103.6	85.3	95.6	168.9	126.8	177.4	187.3	144.3	135.3	96.8	1,496.6
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	376.0	407.7	333.4	263.4	237.7	44.1	87.6	87.5	80.5	243.0	279.1	334.1	2,774.2
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	67.1	69.3	69.3	16.7	15.5	25.2	15.4	51.7	51.5	53.7	57.9	62.7	556.1
Vent. Fans	102.2	102.3	102.1	102.0	102.0	110.7	99.5	101.9	101.9	102.0	102.0	102.1	1,230.7
Pumps & Aux.	24.9	24.9	24.9	0.9	0.9	0.7	0.7	24.6	24.6	24.9	24.9	24.9	201.8
Ext. Usage	2.7	2.7	2.7	2.7	2.7	-	-	2.7	2.7	2.7	2.7	2.7	27.2
Misc. Equip.	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	1,848.0
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	453.0
Total	853.8	884.9	827.8	662.8	646.2	541.4	521.7	637.6	640.3	762.3	793.6	815.2	8,587.7

Gas Demand (Btu/h x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	541.0	541.0	541.0	-	-	-	-	541.0	541.0	541.0	541.0	541.0	4,328.4
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	1.6	1.6	1.6	3.2	3.2	3.2	3.2	1.6	1.6	1.6	1.6	1.6	25.6
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	542.6	542.6	542.6	3.2	3.2	3.2	3.2	542.6	542.6	542.6	542.6	542.6	4,354.0

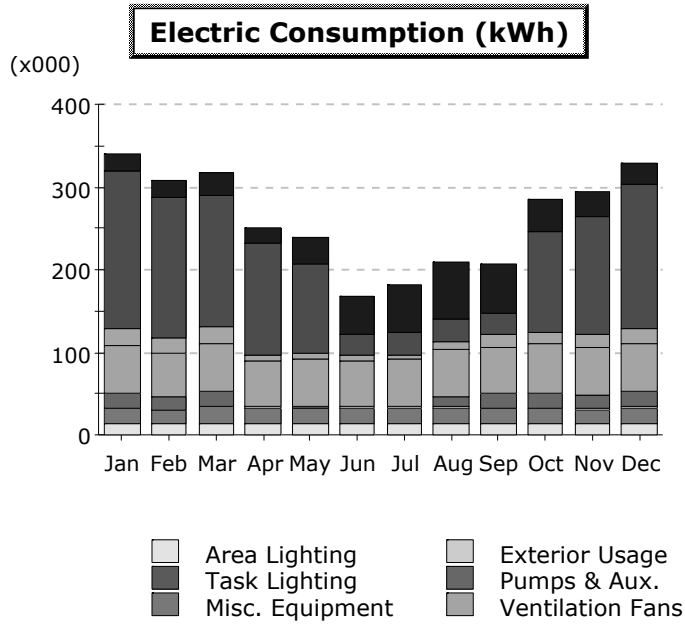
Energy Conservation Measure 7.6

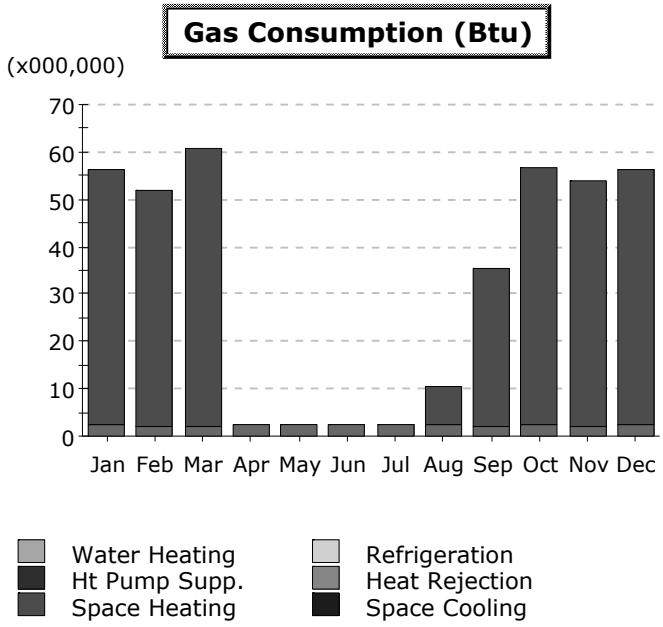
Swimming Pool Evaporation Prevention

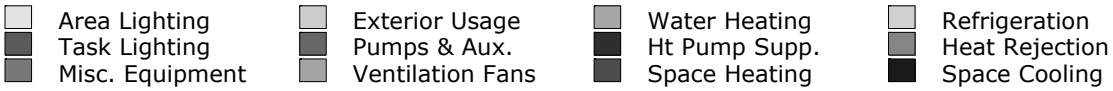
7.6.1: Option 1: Swimming Pool Cover (Bubble Wrap) Installation

Please refer to eQuest files *AYR Motor Centre – June 26*

Subtract electrical consumption from files “- 4” & “- 5.1”





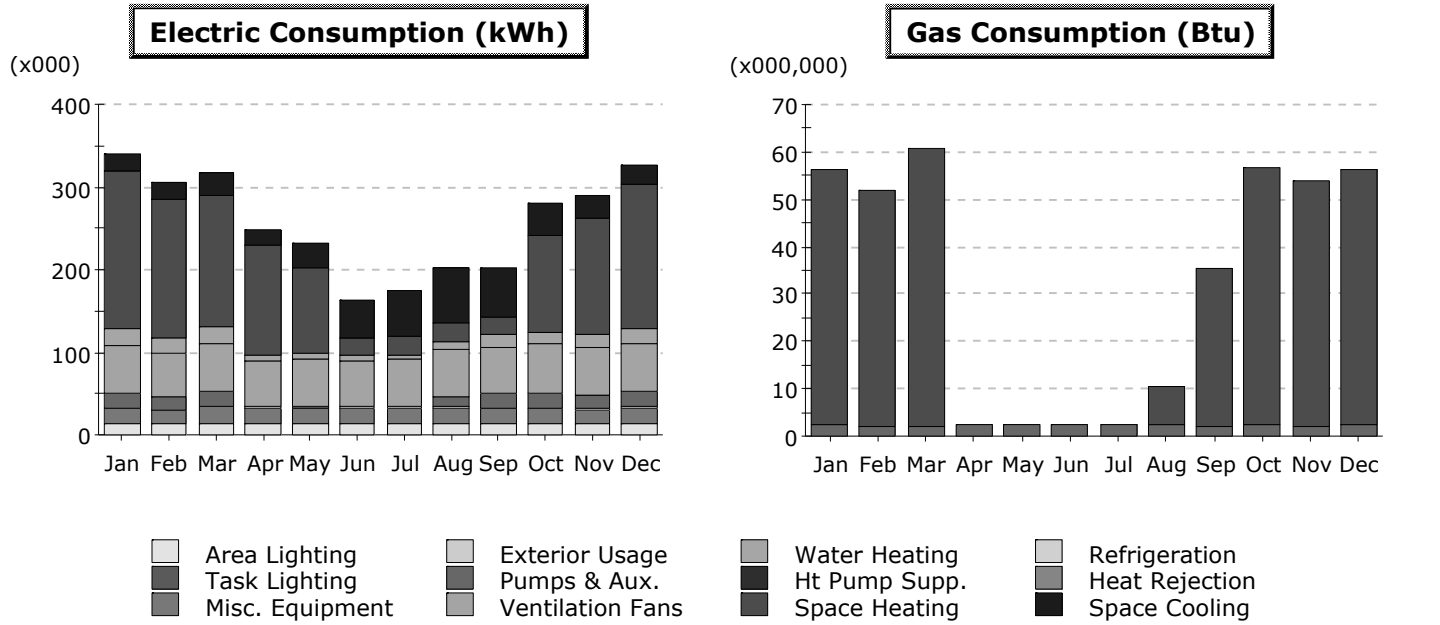


Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	22.2	21.3	27.3	18.9	32.1	47.7	56.8	67.8	59.7	40.6	29.2	24.4	448.1
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	191.4	169.2	159.5	135.5	108.1	25.3	26.9	27.4	26.3	120.2	143.0	175.7	1,308.8
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.5	16.7	18.4	0.6	0.5	0.4	0.4	10.8	17.7	18.4	17.8	18.5	138.6
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	341.4	307.6	317.5	251.0	238.0	168.8	180.7	208.5	206.9	285.5	293.4	328.4	3,127.7

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21



Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	22.0	21.1	27.0	18.3	30.8	46.2	55.2	66.2	58.4	39.6	28.4	24.1	437.3
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	190.9	168.4	158.7	133.3	104.2	20.7	22.3	22.7	22.3	117.0	140.5	174.8	1,275.9
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.5	16.7	18.4	0.6	0.5	0.4	0.4	10.8	17.7	18.4	17.8	18.5	138.6
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	340.7	306.7	316.5	248.2	232.7	162.7	174.4	202.3	201.5	281.2	290.0	327.2	3,084.0

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21

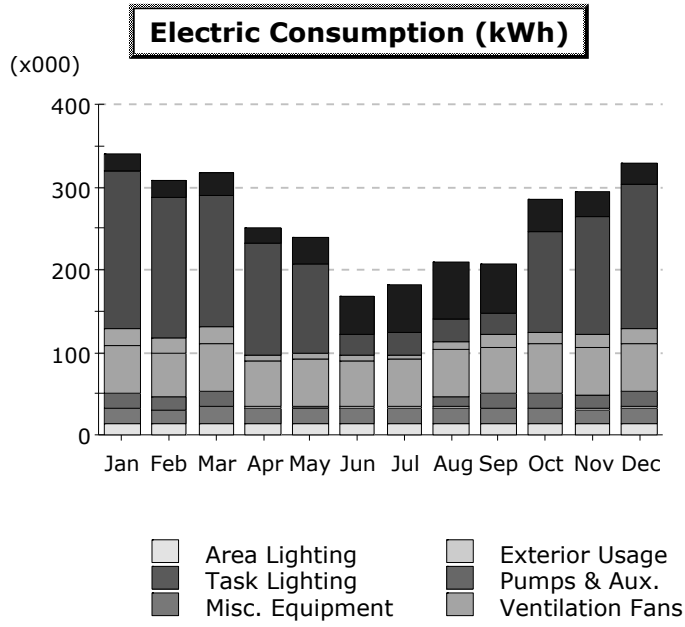
Energy Conservation Measure 7.6

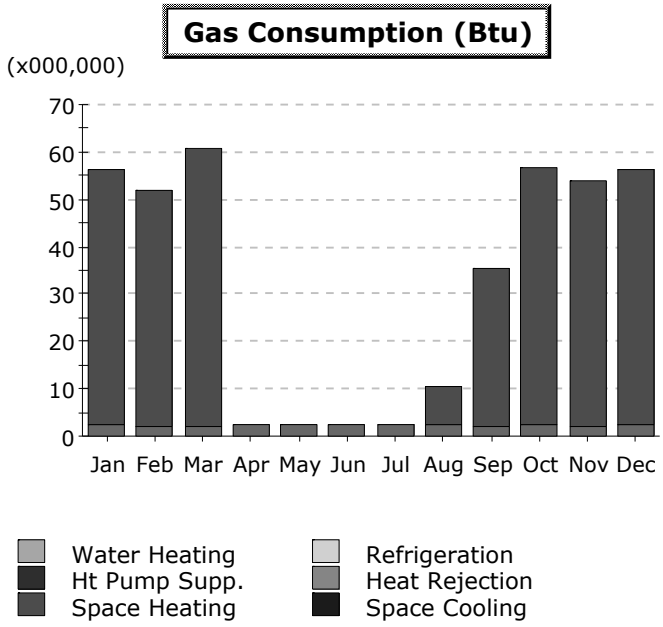
Swimming Pool Evaporation Prevention

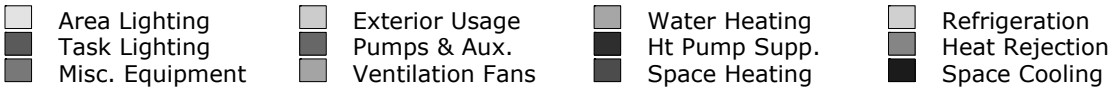
7.6.2: Option 2: Liquid Pool Cover

Please refer to eQuest files *AYR Motor Centre – June 26*

Subtract electrical consumption from files “- 4” & “- 5.2”





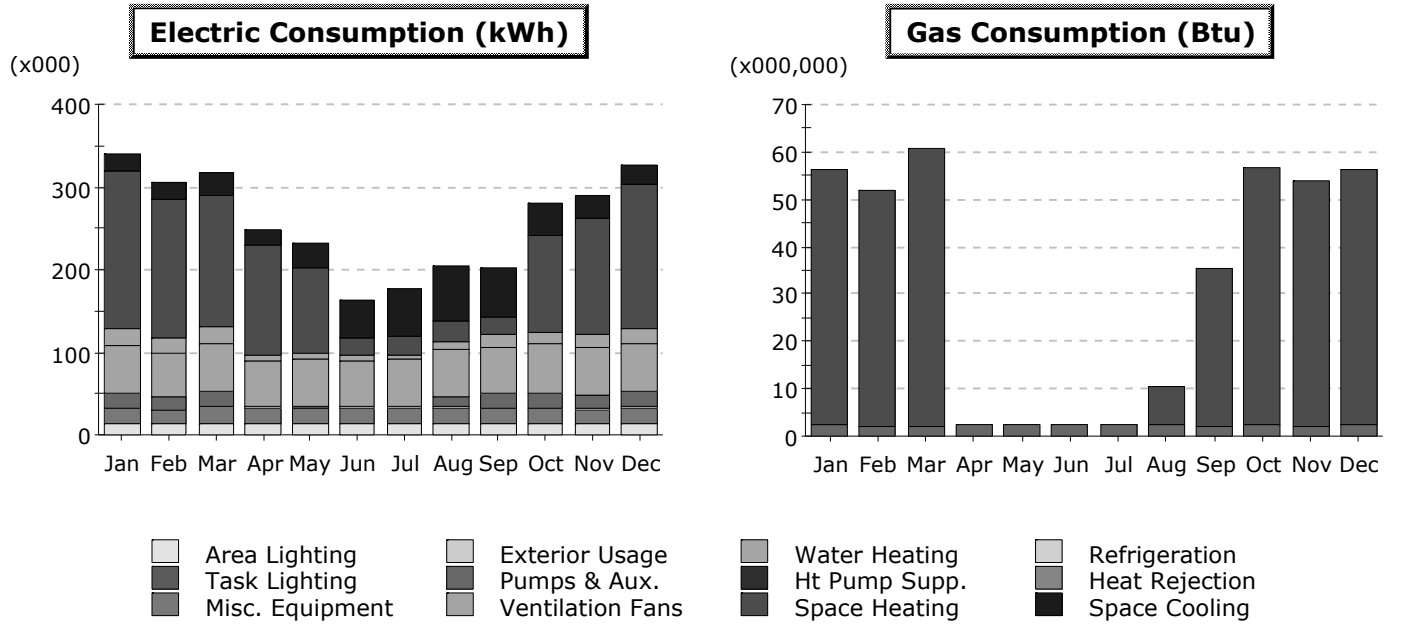


Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	22.2	21.3	27.3	18.9	32.1	47.7	56.8	67.8	59.7	40.6	29.2	24.4	448.1
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	191.4	169.2	159.5	135.5	108.1	25.3	26.9	27.4	26.3	120.2	143.0	175.7	1,308.8
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.5	16.7	18.4	0.6	0.5	0.4	0.4	10.8	17.7	18.4	17.8	18.5	138.6
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	341.4	307.6	317.5	251.0	238.0	168.8	180.7	208.5	206.9	285.5	293.4	328.4	3,127.7

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21



Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	22.0	21.1	27.0	18.3	30.8	46.4	55.6	66.6	58.5	39.6	28.4	24.1	438.5
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	190.9	168.4	158.8	133.3	104.3	21.4	23.4	24.2	22.8	117.2	140.5	174.8	1,280.1
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.5	16.7	18.4	0.6	0.5	0.4	0.4	10.8	17.7	18.4	17.8	18.5	138.6
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	340.7	306.7	316.5	248.2	232.9	163.6	175.9	204.1	202.1	281.5	290.1	327.2	3,089.4

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21

Energy Conservation Measure 7.7

Ice Plant Upgrade: Heat Recovery to Swimming Pool Water Heating

Please refer to the following pages for calculations and provided data from existing Swimming Pool HVAC Unit (Dectron model DS-120-53)

INDOTEC AGENCIES ATLANTIC INC.

Z-Duct units wrong configuration See Dwg HV-1

THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS ON SITE
EASTCAN CONSULTANTS LTD.
JUL 11 1994
☑ REVIEWED ☐ REVISE AND RESUBMIT
☐ REVIEWED AS MODIFIED ☐ NOT REVIEWED
SIGNED MG

PROJECT: CARLETON CIVIC CENTRE

CONSULTANT: EASTCAN CONSULTANTS LTD.

CONTRACTOR: BEAULIEU PLUMBING & HTG.

EQUIPMENT : DEHUMIDIFICATION EQUIPMENT (ICE RINK & POOL)

MANUFACTURER: DECTRON INC./Z-AIR INC.

Reviewed Re-submit

SALES AGENT: INDOTEC AGENCIES ATLANTIC INC.

DATE: JULY 5, 1994

RECEIVED
JUL 8 1994
EASTCAN CONSULTANTS LTD.

BEAULIEU PLUMBING & MECHANICAL INC.
R. R. 1 - Caron Brook, N.-B.
E0L 1A0

PTD-088

DECTRON INC.

Date: June 30 - 1994

DRY-O-TRON PERFORMANCE AND TECHNICAL SPECIFICATIONS

DRY-O-TRON MODEL: ***DS - 120 - 53*** SERIAL NO: 9530-3

PROJECT: ***CARLETON CIVIC CENTRE*** QUOTATION NO.: ---------

1. AIR HANDLING CHARACTERISTICS

Supply air flow: 11000 CFM Outdoor air flow: 1650 CFM

External static pressure: 2.0 Inch W.C.

Total static pressure: 3.0 Inch W.C.

Moisture removal capacity: 112.0 Lb/h @ 80 F, 50 % R.H. room condition.

Moisture removal efficiency (kWh/Lb of evaporation) 0.220 *

Air entering: 80 F D.B., 66.8 F W.B.

Air leaving at:

Max. water heating mode: 85.5 F D.B., 64.8 F W.B.

Min. water heating mode: 94.7 F D.B., 67.8 F W.B.

Air conditioning mode: 67.8 F D.B., 58.6 F W.B.

Sensible cooling capacity during air conditioning mode: 205000 BTU/h
(not including unit heat gain from blower HP and hot gas pipes).

Blower motor: 1750 RPM Blower: 805 RPM

Belt: TYPE *BX*

2. ELECTRICAL DATA

Power supply: 575 V, 60 Hertz, 3 Phase

Control voltage for all remote connections: 24 V

Control voltage for control panel: 120/24 V

Compressor LRA: 200.0 A, FLA: 43.0 A

Compressor power consumption at standard condition: 24.6 kW.

* Compressor power consumption at standard condition.
Moisture removal capacity at standard condition.

Initials A.M.

Blower motor: 10.0 HP, Blower FLA.: 11.0 A.

Maximum main fuse: 100 A Time delay type fuse.

Minimum ampacity: 65 A. Denotes electrical conductor size required for connection. Check with local electrical code.

3. WATER COOLED CONDENSER (POOL HEATER)

Maximum water flow: 20 USgpm

Maximum entering water temperature: 80 F

Nominal water temp. rise max. heating: 14.5 F

Nominal water temp. rise min. heating: 3.5 F

Pressure drop: 6.0 PSI Fouling factor: 0.00025

Water connection I.D.: 1 1/4" Union sweat.

a) OPTIONAL WATER COOLED CONDENSER (WHIRLPOOL HEATER)

Maximum water flow: ---- USgpm

Maximum entering water temperature: -- -- F

Nominal water temp. rise max. heating: ----- F

Nominal water temp. rise min. heating: ----- F

Pressure drop: --- PSI Fouling factor: ----------

Water connection I.D.: ------ Union sweat

b) OPTIONAL WATER COOLED CONDENSER (HEAT REJECTION TO WATER)

Maximum water flow: ---- USgpm
Maximum entering water temperature: - ---- F

Nominal water temperature rise : ----- F

Pressure drop: --- PSI Fouling factor: ----------

Water connection I.D.: ------ Union sweat

4. COILS

Evaporator coil:

Type of coil: Copper tubing, aluminum fins.

Max. air pressure drop: 0.455 Inch W.C.

Total air flow through coil: 6300 CFM

Condenser coil:

Type of coil: Copper tubing, aluminum fins.

Max. air pressure drop: 0.275 Inch W.C.

Total air flow through coil: 11000 CFM

5. OPTIONAL REFRIGERANT CONNECTIONS FOR AIR CONDITIONING WITH REMOTE AIR COOLED CONDENSER.

Hot gas line O.D.: 1-3/8 "

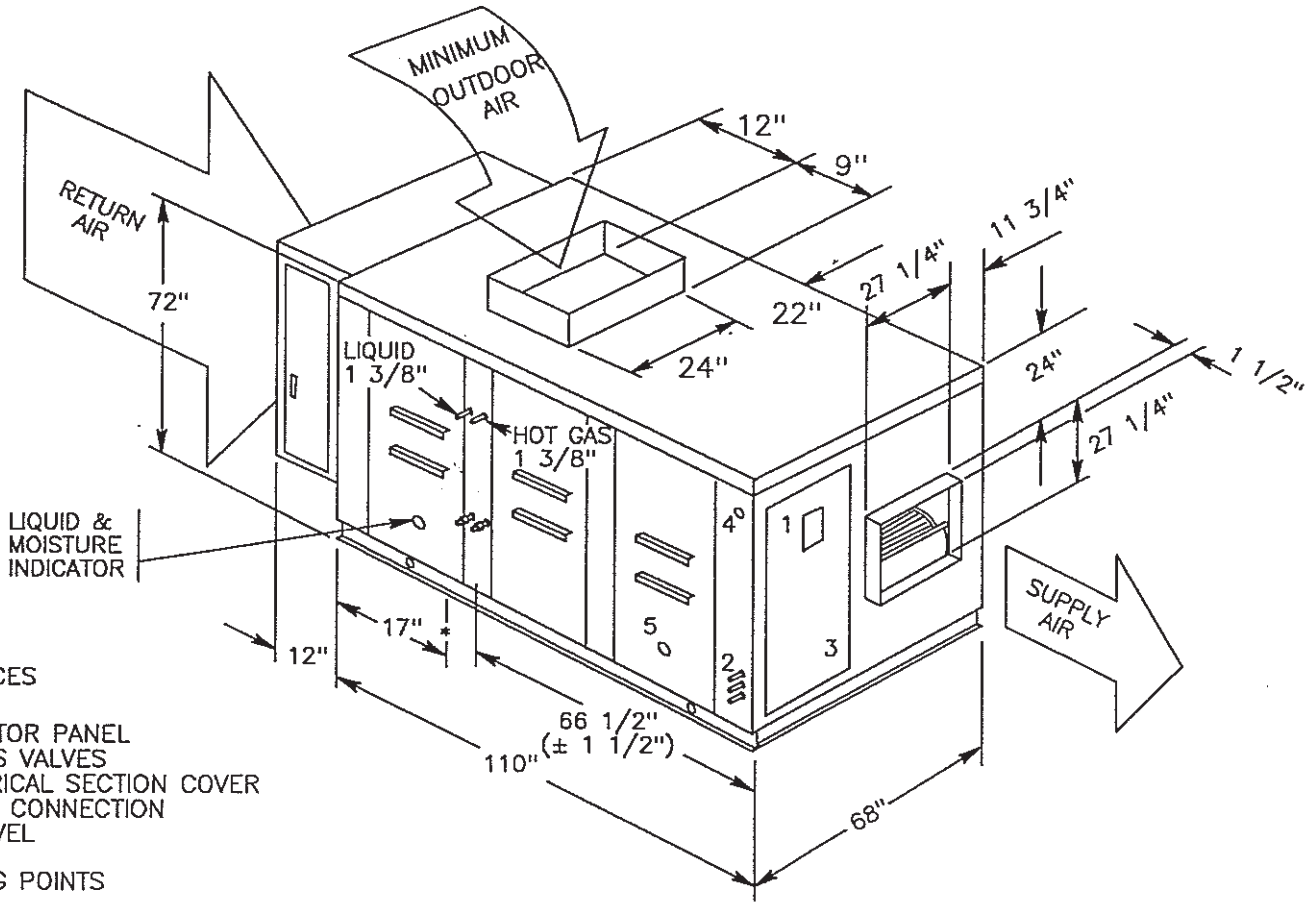
Liquid return line O.D.: 1-3/8 "
(Recommended refrigerant line sizes based on 50 ft MAXIMUM line length to remote condenser)

Condenser (CCB-026) heat rejection capacity: 397800 Btu/h
(Based on 120 F condensing temperature and 90 F ambient)

Receiver pump down capacity: 162 Lb.
(Based on information received with P.O.)

Location of outdoor condenser: above DRY-O-TRON unit.

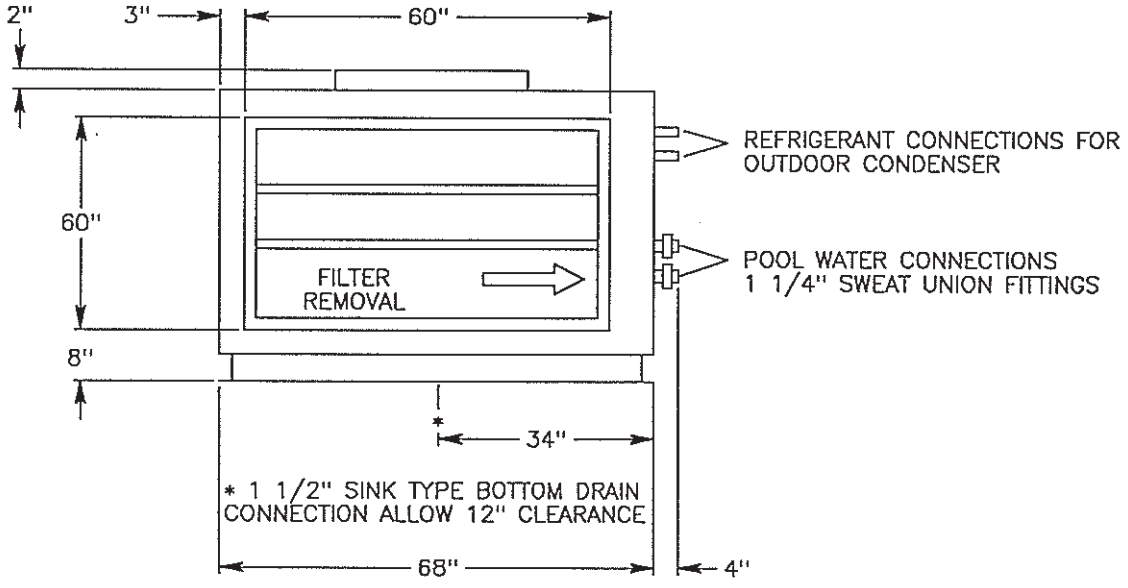
APPROXIMATE WEIGHT: 4500 Lbs.



REFERENCES

1 OPERATOR PANEL
2 ACCESS VALVES
3 ELECTRICAL SECTION COVER
4 POWER CONNECTION
5 OIL LEVEL

○ LIFTING POINTS



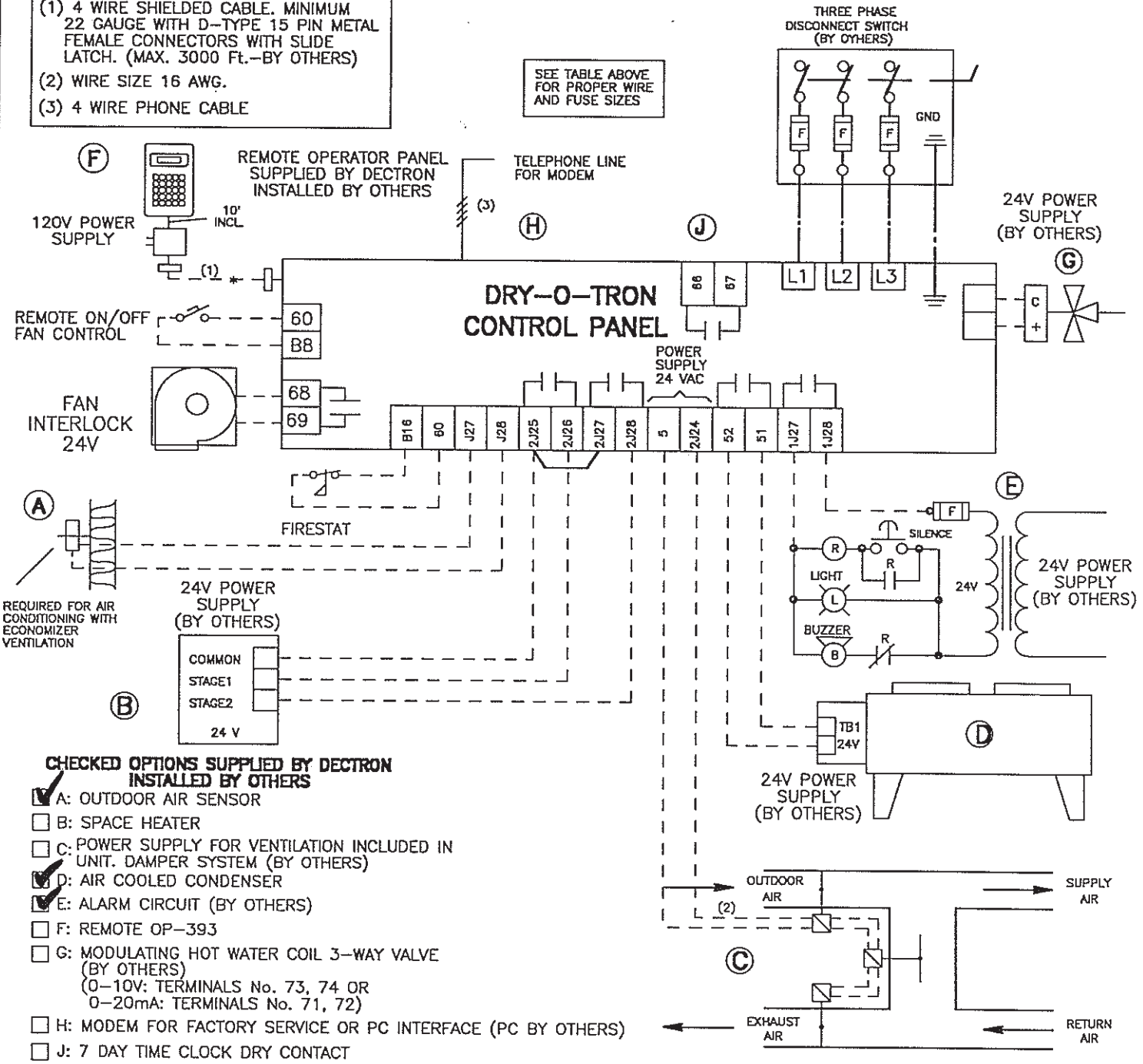
NOTE: OUTDOOR AIR MUST BE FILTERED BEFORE ENTERING DRY-O-TRON UNIT

–	–	–	–		DRAWN C.D.	Dectron
–	–	–	–		DATE 93/05/03	
–	–	–	–		CHK. H.L	MODEL DS-120 C/W AIR COOLED A/C
7	ENCLOSURE DIMENSIONS CHANGED	G.G.	94/02/28	H.L		
NO.	REVISIONS	BY	DATE	CHK.	TB2	DS-M-120-009 AE REV. 7

MODEL	DS–100	DS–120	DS–150	DS–182	DS–242	DS–282
MINIMUM AMPACITY						
208/230V–3PH	131	152	196	227	297	371
460V–3PH	65	75	97	113	148	183
575V–3PH	54	65	84	92	126	156
MAXIMUM MAIN FUSE						
208/230V–3PH	200	250	300	300	400	500
460V–3PH	100	125	150	150	200	250
575V–3PH	80	100	125	125	175	200

CONTROL WIRE SIZE MIN. 20 AWG. EXCEPT:
(1) 4 WIRE SHIELDED CABLE. MINIMUM 22 GAUGE WITH D–TYPE 15 PIN METAL FEMALE CONNECTORS WITH SLIDE LATCH. (MAX. 3000 Ft.–BY OTHERS)
(2) WIRE SIZE 16 AWG.
(3) 4 WIRE PHONE CABLE

SEE TABLE ABOVE FOR PROPER WIRE AND FUSE SIZES



CHECKED OPTIONS SUPPLIED BY DECTRON INSTALLED BY OTHERS

- ☑ A: OUTDOOR AIR SENSOR
- ☐ B: SPACE HEATER
- ☐ C: POWER SUPPLY FOR VENTILATION INCLUDED IN UNIT. DAMPER SYSTEM (BY OTHERS)
- ☑ D: AIR COOLED CONDENSER
- ☑ E: ALARM CIRCUIT (BY OTHERS)
- ☐ F: REMOTE OP–393
- ☐ G: MODULATING HOT WATER COIL 3–WAY VALVE (BY OTHERS)
  (0–10V: TERMINALS No. 73, 74 OR
  0–20mA: TERMINALS No. 71, 72)
- ☐ H: MODEM FOR FACTORY SERVICE OR PC INTERFACE (PC BY OTHERS)
- ☐ J: 7 DAY TIME CLOCK DRY CONTACT

NO.	REVISIONS	BY	DATE	CHK.
4	DWG REVISED	G.G.	93/05/26	M.L
3	OPTIONS ADDED	G.G.	93/02/26	M.L
2	REVISED OPTIONS	P.B.	92/07/31	M.L
1	WATER COOLED A/C OPTION ADDED	TM	92/07/22	M.L

DRAWN P.B. | CHK. M.L | DATE 92/07/07 | TB1

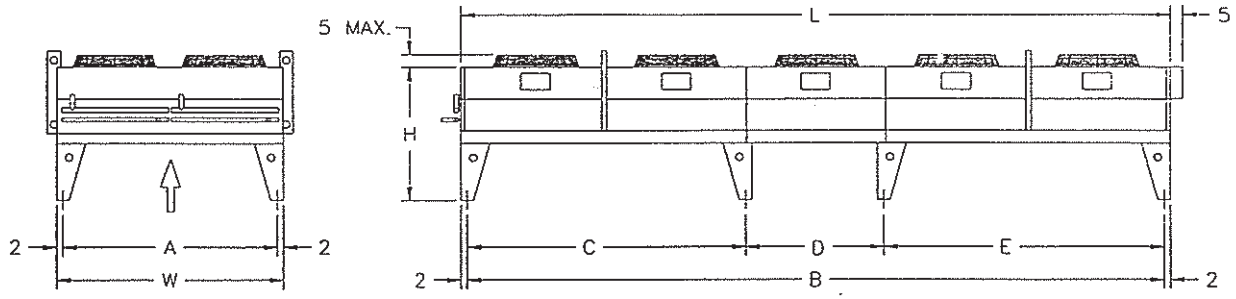
FIELD WIRING (DOTICS–9)

FS–W–000–030 AE | REV. 4

DEC TRON DRY–O–TRON®

OUTDOOR AIR COOLED CONDENSER

MODEL **CCB - 026**



FAN		UNIT SIZE (Inches)								SHIPPING WEIGHT (lbs)
DIA	QTY	L	W	H	A	B	C	D	E	
30	1 x 2	117	48	48	44	113	-----	-----	-----	1082

Qty of Fan	600V 3ph/60Hz	
	AMP.	FUSE SIZE Type"D"
2	4.2	15

Pool location: Montreal January 11, 1994

Design Conditions

Air dry bulb temperature:	80.0	°F
Relative humidity range:	50.0 - 55.0	% RH
Active hours per day:	14.0	
Type of pool:	PUBLIC	

	#1 POOL	#2	#3	#4
Pool area in ft²	4 090			
Water temp. in °F	80.0			
Activity factor	2.0			

(1)Outside air, air volume:	2 045	CFM
(2)Annual average outside air temperature D.B.:	43.7	°F
Annual average outside air temperature W.B.:	39.6	°F
Pool enclosure volume in cubic feet:	121 500	

TOTAL EVAPORATION AND OTHER LATENT HEAT LOAD

ACTIVE PERIOD 14.0 hours/day 55.0% RH

#1 POOL	#2	#3	#4
188.0			

Pool(s) evaporation load:	2 631.4	lb/day
Outside air latent heat credit:	-1 017.4	lb/day

NON-ACTIVE PERIOD 10.0 hours/day 50.0% RH

#1 POOL	#2	#3	#4
104.5			

Pool(s) evaporation load:	1 044.6	lb/day

TOTAL AVERAGE EVAPORATION LOAD:	153.2	lb/h

DRY-O-TRON MODEL SELECTED = ONE DS-120

COMBINED DRY-O-TRON SYSTEM AVERAGE MOISTURE REMOVAL:	160.2	lb/h
UNIT RUN TIME:	95.6	%

STANDARD UNIT MAY NOT BE ABLE TO HEAT POOL WATER - CONTACT FACTORY

(1)Based on ASHRAE standard 62-189 Table 2. (2)Based on AS

ENERGY REQUIREMENT OF VARIABLE VOLUME OUTSIDE AIR MAKE-UP SYSTEM

Heating Season: (Below 70 °F ambient temperature)

WATER HEATING AND HUMIDITY CONTROL

NOTE: The following energy required for 1 Lb of moisture removal in Btu's/Lb is based on the most energy efficient variable volume outside air make-up system.

Based on design conditions an average of 2,435 Btu per pound of pool water evaporation is required to maintain the pool water temperature and a 50% relative humidity level in the pool enclosure. With 1,000 Btu of evaporation losses plus an average of 1,435 Btu to heat the make-up air, the heating season energy requirement for 1 Lb of evaporation equals:

2 435 Btu/lb or 2 435 ÷ 3 413 = 0.713 kWh/lb

	Heating season energy requirement		0.713 kWh/lb
times	Total average evaporation and latent heat load	(C)	153.17 lb/h
times	Heating season hours		7 690 h
equals	Heating season energy consumed	(E)	839 828 kWh

Summer Season: (Above 70 °F ambient temperature)

WATER HEATING ONLY

1 lb of evaporation = 1 000 BTU or 1 000 ÷ 3 413 = 0.293 kWh/lb

	Evaporation energy		0.293 kWh/lb
times	Pool(s) average evaporation load	(B)	153.17 lb/h
times	Summer season hours		1 070 h
equals	Summer season energy consumed	(F)	48 020 kWh

	Heating season energy consumed	(E)	839 828 kWh
plus	Summer season energy consumed	(F)	48 020 kWh
equals	OUTSIDE AIR MAKE-UP SYSTEM TOTAL ANNUAL ENERGY CONSUMED	(G)	887 848 kWh

ENERGY REQUIREMENT FOR DRY-O-TRON

Heating Season: (Below 70 °F ambient temperature)

WATER HEATING AND HUMIDITY CONTROL

The average pool evaporation equals the heat loss of the pool water. In capturing evaporation and other latent load the DRY-O-TRON dehumidifies the air, absorbs the latent heat and returns it to the pool water and enclosure.

1 lb of evaporation = 1 000 Btu or 1 000 ÷ 3 413 = 0.293 kWh/lb

	Pool(s) average evaporation load	(B)	153.17 lb/h
times	Evaporation energy		0.293 kWh/lb
equals	Water heating power consumed	(H)	44.88 kW

ADDITIONAL HEAT CONTRIBUTION TO POOL ENCLOSURE

The electric energy required to run the compressor is contributed to the pool enclosure heating.

	Energy contributed by ONE DS-120 (Power input for ONE DS-120) 24.6kW ÷ (D)160.21b/h		0.154 kWh/lb
times	Total average evaporation and latent heat load	(C)	153.17 lb/h
times	Heating season hours		7 690 h
equals	Heating season energy consumed (Heat contributed by DRY-O-TRON to enclosure)	(I)	180 843 kWh

Summer Season: (Above 70 °F ambient temperature)		
WATER HEATING ONLY 1 lb of evaporation = 1 000 Btu or 1 000 ÷ 3 413 = 0.293 kWh/lb		
	Evaporation energy	0.293 kWh/lb
times	Pool(s) average evaporation load (B)	153.17 lb/h
times	Summer season hours	1 070 h
equals	Summer season water heating energy consumed or DRY-O-TRON maximum water heating capacity	48 020 kWh

	Water heating power consumed (H)	44.88 kW
plus	Power input for ONE DS-120	24.6 kW
equals	Total water heating capacity	69.48 kW
divided by	Power input for ONE DS-120	24.6 kW
equals	Ratio (heating pool or domestic hot water)	2.82

	Summer season water heating energy consumed	48 020 kWh
divided by	Ratio	2.82
equals	Summer season energy consumed (J)	17 002 kWh

MINIMUM OUTSIDE AIR HEATING		
	Minimum outside air, air volume (A)	2 045 cfm
times	Average temperature difference (80.0°F - 43.7°F)	36.3 °F
times	Sensible heat factor (Btu·min/cu.ft·°F·h)	1.08
equals		80 172.18 Btu/h
divided by	Conversion factor	3413 Btu/kWh
times	Active period	14.0 h
equals	Min. outside air heating energy consumed per day	328.86 kWh
times	Days per year	365
equals	Annual min. outside air heating energy consumed (K)	120 035 kWh

	Heating season energy consumed (Heat contributed by DRY-O-TRON to enclosure) (I)	180 843 kWh
plus	Summer season energy consumed (J)	17 002 kWh
equals	DRY-O-TRON total annual energy consumed (L)	197 846 kWh

ENERGY COST SAVINGS WITH THE DRY-O-TRON SYSTEM

Cost reduction if electricity is used for dehumidification and pool water heating:		
	Outside air make-up system total energy consumed (G)	887 848 kWh
times	Cost of electricity in kWh Efficiency	$0.080/kWh
equals	Outside air make-up system total energy cost	$71 028
	DRY-O-TRON total annual energy consumed (L)	197 846 kWh
times	Cost of electricity	$0.080/kWh
equals	DRY-O-TRON total annual energy cost	-$15 828
	ANNUAL ENERGY COST SAVINGS IN ELECTRICITY IF DRY-O-TRON IS USED FOR DEHUMIDIFICATION AND POOL WATER HEATING: (M)	$55 200
Cost reduction if electricity is used for space heating:		
	Total heat contributed by DRY-O-TRON to enclosure (I)	180 843 kWh
minus	Annual min. outside air heating energy consumed (K)	120 035 kWh
equals	Net heat contributed by DRY-O-TRON to enclosure	60 808 kWh
times	Cost of electricity	$0.080/kWh
equals	ANNUAL ENERGY COST SAVINGS IF ELECTRICITY IS USED FOR SPACE HEATING DUE TO INSTALLING DRY-O-TRON: (N)	$4 865
	ANNUAL ENERGY COST SAVINGS IN ELECTRICITY IF DRY-O-TRON IS USED FOR DEHUMIDIFICATION AND POOL WATER HEATING: (M)	$55 200
plus	ANNUAL ENERGY COST SAVINGS IF ELECTRICITY IS USED FOR SPACE HEATING DUE TO INSTALLING DRY-O-TRON: (N)	$4 865
equals	TOTAL ENERGY COST SAVINGS PER YEAR DUE TO INSTALLING DRY-O-TRON:	$60 065

ONCLUSION:
bove are minimum savings only. Savings are much greater if compared to a non-ariable volume outside air make-up system. There are additional structural, abor, water and chemical cost savings as well as the increased health and omfort benefits which accompany a DRY-O-TRON installation that are as important s the above energy savings. (See cover sheet of this DRY-O-TRON survey.) For uilding design considerations and a psychrometric comparison of an outside air ake-up system vs outside air make-up system with heat recovery vs a DRY-O-TRON ystem, see DRY-O-TRON's "Design Guidelines for Pool Enclosures and Mechanical ir Handling Systems".

January 11, 1994

ANNUAL ENERGY CONSUMPTION ANALYSIS

DRY-O-TRON
vs
VARIABLE VOLUME OUTSIDE AIR MAKE-UP SYSTEM

We have surveyed your pool space dehumidification and pool water heating needs and recommend ONE Dry-O-Tron Model DS-120. Please consider the following:

1. NO additional energy or equipment is required to heat and maintain the pool water temperature.

2. NO additional energy or equipment is required to dehumidify the pool space.

3. You now have less equipment to maintain and less usable floor space is taken up. (Pool water heating and space dehumidification are combined in the same unit.)

4. Pool space temperature and humidity will now be economically kept at comfortable room conditions.

5. The Dry-O-Tron should also be piped to return the condensate (water evaporated from the pool surface) back to the pool, saving 608627 liters (160799 gallons) per year in make-up water.

6. The installation of a Dry-O-Tron normally negates the need for a pool cover thus saving additional labor cost. A pool cover is an asset only if space temperature is to be setback during multiple days of nonuse, when the pool is left without supervision for prolonged periods of time or during lengthy power failures. The pool blanket is therefore necessary for emergency use.

7. In a properly designed enclosure, with a correct air distribution system, DRY-O-TRON eliminates condensation and building deterioration due to high humidity. (Consult your engineer and your architect and see DRY-O-TRON's "Design Guidelines".

See the attached calculation sheets for an explanation of your energy savings.

Blower motor power consumption is not included in this comparison
It is assumed that a make-up air system has an equal or higher air volume.

ENERGY REQUIREMENT OF VARIABLE VOLUME OUTSIDE AIR MAKE-UP SYSTEM

Heating Season: (Below 70 °F ambient temperature)

WATER HEATING AND HUMIDITY CONTROL

NOTE: The following energy required for 1 Lb of moisture removal in Btu's/Lb is based on the most energy efficient variable volume outside air make-up system.

Based on design conditions an average of 2,435 Btu per pound of pool water evaporation is required to maintain the pool water temperature and a 50% relative humidity level in the pool enclosure. With 1,000 Btu of evaporation losses plus an average of 1,435 Btu to heat the make-up air, the heating season energy requirement for 1 Lb of evaporation equals:

2 435 Btu/lb or 2 435 ÷ 3 413 = 0.713 kWh/lb

	Heating season energy requirement		0.713 kWh/lb
times	Total average evaporation and latent heat load	(C)	153.17 lb/h
times	Heating season hours		7 690 h
equals	Heating season energy consumed	(E)	839 828 kWh

Summer Season: (Above 70 °F ambient temperature)

WATER HEATING ONLY

1 lb of evaporation = 1 000 BTU or 1 000 ÷ 3 413 = 0.293 kWh/lb

	Evaporation energy		0.293 kWh/lb
times	Pool(s) average evaporation load	(B)	153.17 lb/h
times	Summer season hours		1 070 h
equals	Summer season energy consumed	(F)	48 020 kWh

	Heating season energy consumed	(E)	839 828 kWh
plus	Summer season energy consumed	(F)	48 020 kWh
equals	OUTSIDE AIR MAKE-UP SYSTEM TOTAL ANNUAL ENERGY CONSUMED	(G)	887 848 kWh

ENERGY REQUIREMENT FOR DRY-O-TRON

Heating Season: (Below 70 °F ambient temperature)

WATER HEATING AND HUMIDITY CONTROL

The average pool evaporation equals the heat loss of the pool water. In capturing evaporation and other latent load the DRY-O-TRON dehumidifies the air, absorbs the latent heat and returns it to the pool water and enclosure.

1 lb of evaporation = 1 000 Btu or 1 000 ÷ 3 413 = 0.293 kWh/lb

	Pool(s) average evaporation load	(B)	153.17 lb/h
times	Evaporation energy		0.293 kWh/lb
equals	Water heating power consumed	(H)	44.88 kW

ADDITIONAL HEAT CONTRIBUTION TO POOL ENCLOSURE

The electric energy required to run the compressor is contributed to the pool enclosure heating.

	Energy contributed by ONE DS-120 (Power input for ONE DS-120) 24.6kW ÷ (D)160.2lb/h		0.154 kWh/lb
times	Total average evaporation and latent heat load	(C)	153.17 lb/h
times	Heating season hours		7 690 h
equals	Heating season energy consumed (Heat contributed by DRY-O-TRON to enclosure)	(I)	180 843 kWh

Summer Season: (Above 70 °F ambient temperature)		
WATER HEATING ONLY 1 lb of evaporation = 1 000 Btu or 1 000 ÷ 3 413 = 0.293 kWh/lb		
	Evaporation energy	0.293 kWh/lb
times	Pool(s) average evaporation load (B)	153.17 lb/h
times	Summer season hours	1 070 h
equals	Summer season water heating energy consumed or DRY-O-TRON maximum water heating capacity	48 020 kWh

	Water heating power consumed (H)	44.88 kW
plus	Power input for ONE DS-120	24.6 kW
equals	Total water heating capacity	69.48 kW
divided by	Power input for ONE DS-120	24.6 kW
equals	Ratio (heating pool or domestic hot water)	2.82

	Summer season water heating energy consumed	48 020 kWh
divided by	Ratio	2.82
equals	Summer season energy consumed (J)	17 002 kWh

MINIMUM OUTSIDE AIR HEATING		
	Minimum outside air, air volume (A)	2 045 cfm
times	Average temperature difference (80.0°F - 43.7°F)	36.3 °F
times	Sensible heat factor (Btu·min/cu.ft·°F·h)	1.08
equals		80 172.18 Btu/h
divided by	Conversion factor	3413 Btu/kWh
times	Active period	14.0 h
equals	Min. outside air heating energy consumed per day	328.86 kWh
times	Days per year	365
equals	Annual min. outside air heating energy consumed (K)	120 035 kWh

	Heating season energy consumed (Heat contributed by DRY-O-TRON to enclosure) (I)	180 843 kWh
plus	Summer season energy consumed (J)	17 002 kWh
equals	DRY-O-TRON total annual energy consumed (L)	197 846 kWh

ENERGY COST SAVINGS WITH THE DRY-O-TRON SYSTEM

Cost reduction if oil is used for dehumidification and pool water heating:		
	Outside air make-up system total energy consumed (G)	887 848 kWh
times	Cost of oil in kWh $1.250/Gal x 0.724Gal/kW x 0.03413 ÷ 0.80 Efficiency	$0.039/kWh
equals	Outside air make-up system total energy cost	$34 626

	DRY-O-TRON total annual energy consumed (L)	197 846 kWh
times	Cost of electricity	$0.080/kWh
equals	DRY-O-TRON total annual energy cost	-$15 828

ANNUAL ENERGY COST SAVINGS IN OIL IF DRY-O-TRON IS USED FOR DEHUMIDIFICATION AND POOL WATER HEATING: (M)	$18 798

Cost reduction if oil is used for space heating:		
	Total heat contributed by DRY-O-TRON to enclosure (I)	180 843 kWh
minus	Annual min. outside air heating energy consumed (K)	120 035 kWh
equals	Net heat contributed by DRY-O-TRON to enclosure	60 808 kWh
times	Cost of oil	$0.039/kWh
equals	ANNUAL ENERGY COST SAVINGS IF OIL IS USED FOR SPACE HEATING DUE TO INSTALLING DRY-O-TRON: (N)	$2 372

	ANNUAL ENERGY COST SAVINGS IN OIL IF DRY-O-TRON IS USED FOR DEHUMIDIFICATION AND POOL WATER HEATING: (M)	$18 798
plus	ANNUAL ENERGY COST SAVINGS IF OIL IS USED FOR SPACE HEATING DUE TO INSTALLING DRY-O-TRON: (N)	$2 372
equals	TOTAL ENERGY COST SAVINGS PER YEAR DUE TO INSTALLING DRY-O-TRON:	$21 170

CONCLUSION:

Above are minimum savings only. Savings are much greater if compared to a non-variable volume outside air make-up system. There are additional structural, labor, water and chemical cost savings as well as the increased health and comfort benefits which accompany a DRY-O-TRON installation that are as important as the above energy savings. (See cover sheet of this DRY-O-TRON survey.) For building design considerations and a psychrometric comparison of an outside air make-up system vs outside air make-up system with heat recovery vs a DRY-O-TRON system, see DRY-O-TRON's "Design Guidelines for Pool Enclosures and Mechanical Air Handling Systems".

Project Name: ***AYR Motor Centre, Woodstock, NB - Energy Study***
Building Name: ***AYR Motor Centre***
TACE Project Number: ***1817***
Item: ***Energy Conservation Measure 7.7 - Ice Plant Heat Recovery to Pool Unit & Pool Water Heating***
Date: ***May 30th 2017***

Supply Air Heating (Reference Only)

Data Taken from eQuest

	Heating (MBTU)	Heat Recovered (MBTU)
January	44.403	44.403
February	37.747	37.747
March	27.242	27.242
April	19.419	0
May	15.667	0
June	15.59	0
July	17.202	0
August	18.828	9.414
September	19.45	19.45
October	18.795	18.795
November	27.508	27.508
December	41.133	41.133

Savings: 225.692 MBTU — 66,147 kWh; 520 kW (Max)

Swimming Pool Water Heating

Data Taken from Dectron

1,070	*hours*	*48,020*	*kWh*
5,631	hours	252,730	kWh — Open Hours (High Activity Factor)
3,129	hours	7,020	kWh — Closed Hours (Activity Factor of 0.05)
		359	kW — @ 0.293kW/lb

Additional Pumping Power: 5 HP

5,631	hours	
	21,005	kWh
	30	kW

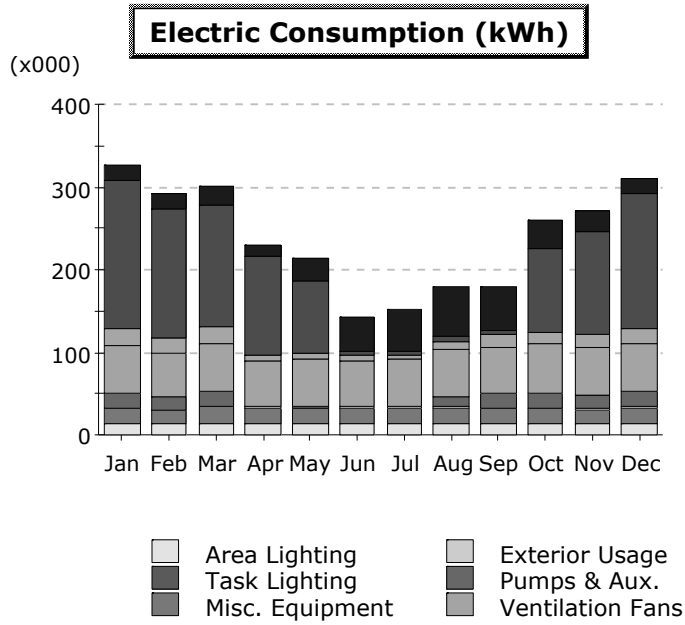
238,745 kWh
329 kW

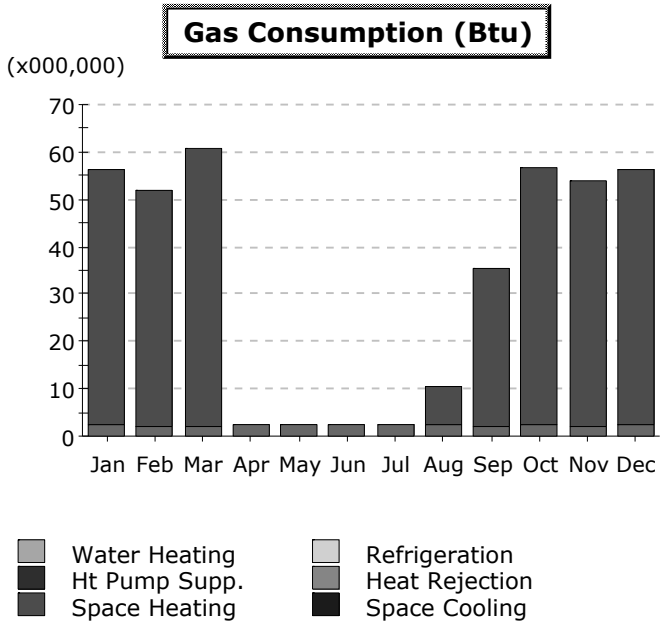
Energy Conservation Measure 7.8

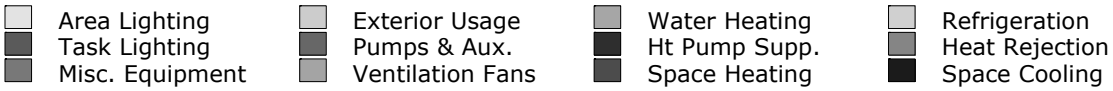
Demand Controlled Ventilation: CO2 Sensing for AHU-1

Please refer to eQuest files *AYR Motor Centre – June 26*

Subtract electrical consumption from files “- 7” & “- 6”





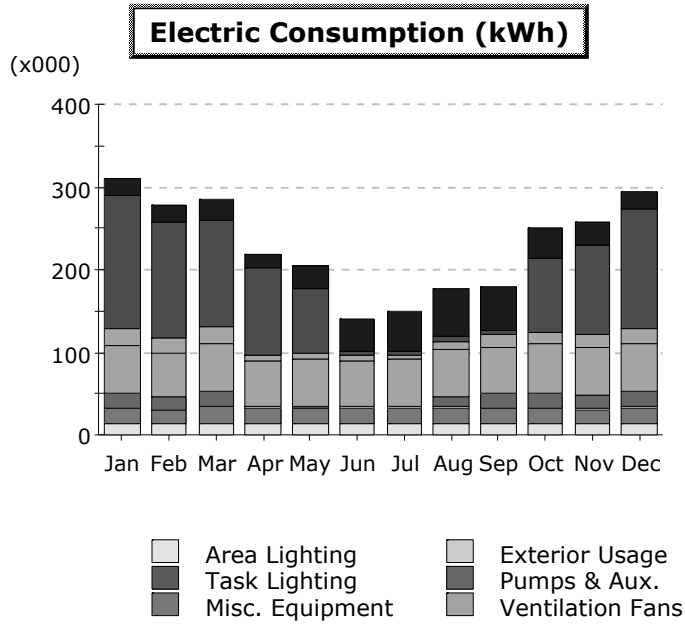


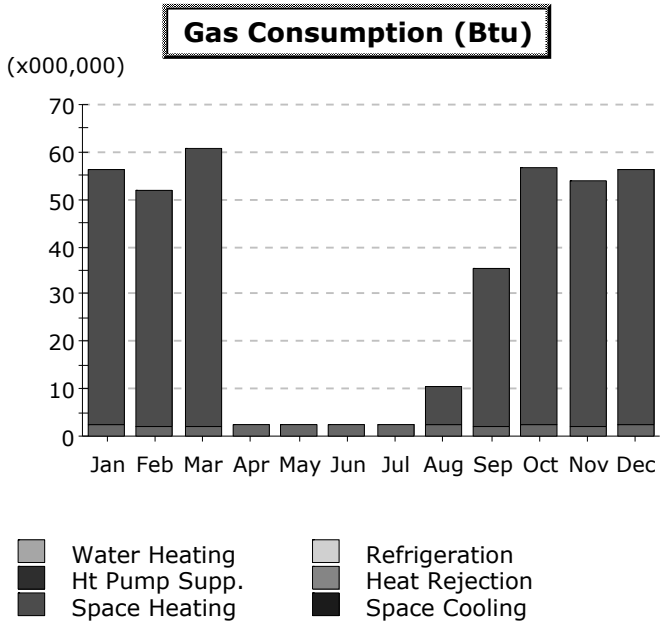
Electric Consumption (kWh x000)

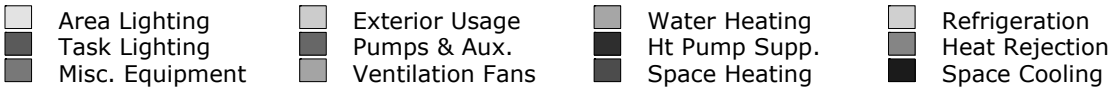
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	18.5	17.6	23.1	13.9	26.0	41.1	49.5	60.4	53.0	34.5	23.6	20.3	381.5
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	180.0	157.6	146.4	119.8	89.1	4.6	5.0	5.5	5.9	101.5	125.7	162.8	1,103.9
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.5	16.7	18.4	0.6	0.5	0.4	0.4	10.8	17.7	18.4	17.9	18.5	138.7
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	326.3	292.3	300.2	230.3	212.8	141.4	151.5	179.3	179.8	260.6	270.5	311.3	2,856.3

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21







Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	20.3	19.3	25.4	16.2	27.8	40.3	47.9	58.8	52.8	36.8	26.0	22.3	393.9
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	161.3	140.9	129.4	105.2	79.0	4.6	5.0	5.5	5.9	88.5	109.8	144.7	979.9
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.4	16.7	18.4	0.6	0.5	0.4	0.4	10.8	17.7	18.3	17.8	18.4	138.5
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	309.3	277.3	285.5	218.0	204.6	140.7	149.9	177.7	179.5	249.9	256.9	295.2	2,744.5

Gas Consumption (Btu x000,000)

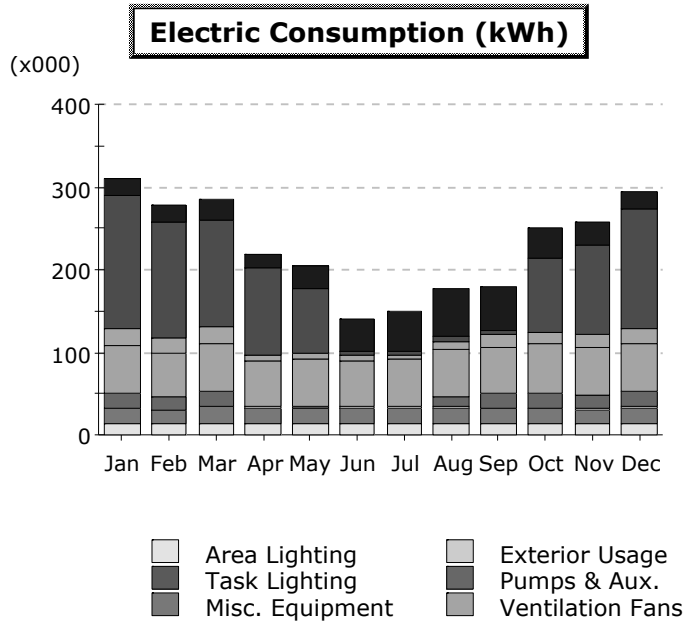
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21

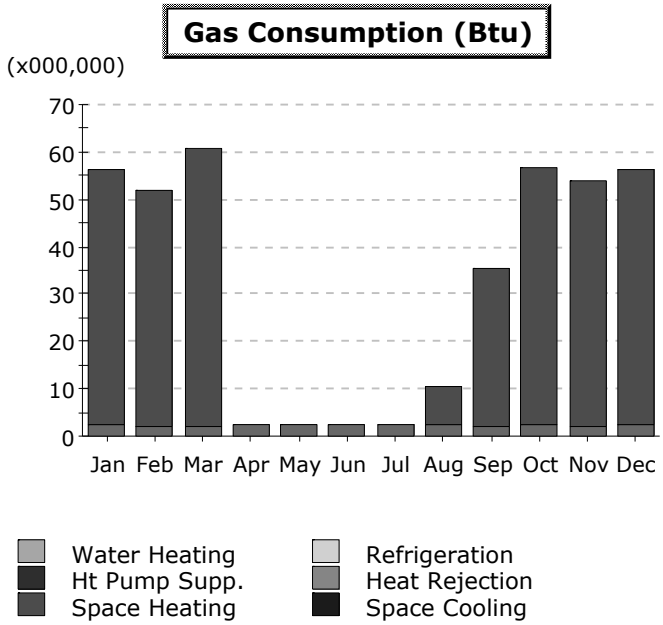
Energy Conservation Measure 7.9

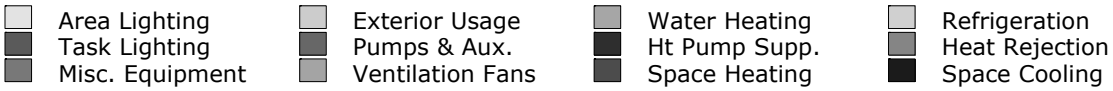
Demand Controlled Ventilation: CO2 Sensing for AHU-2

Please refer to eQuest files *AYR Motor Centre – June 26*

Subtract electrical consumption from files “- 8” & “- 7”





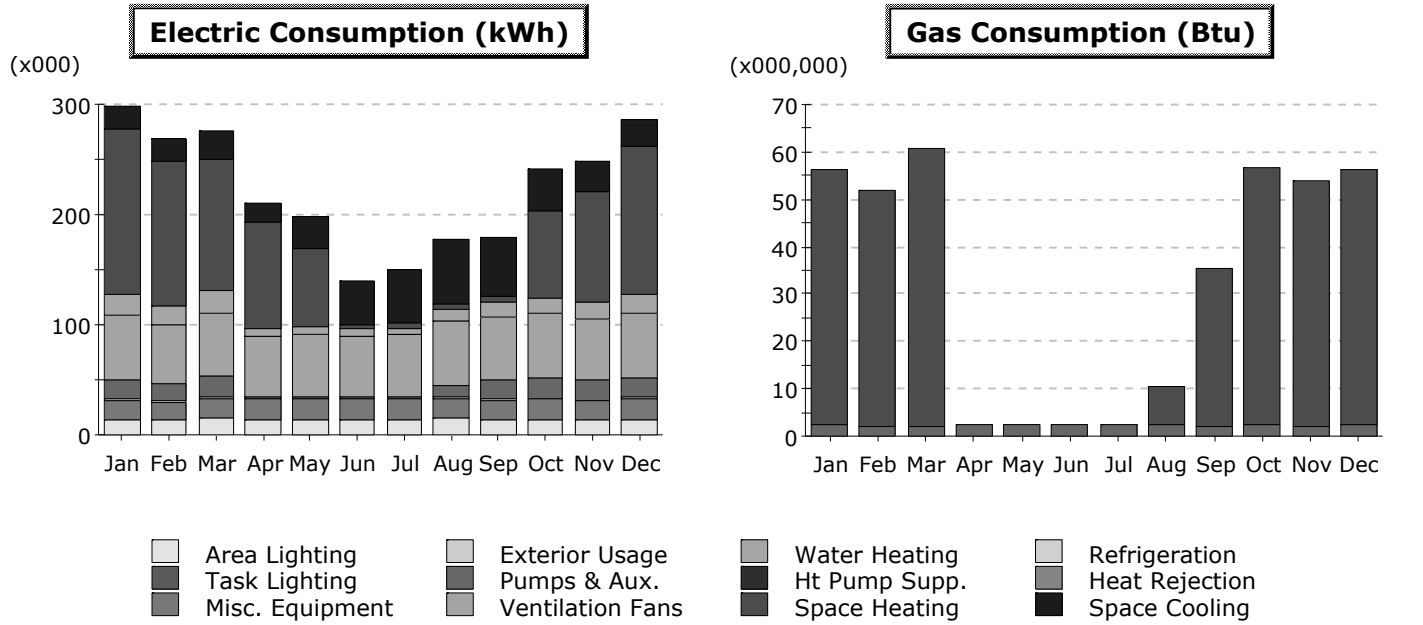


Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	20.3	19.3	25.4	16.2	27.8	40.3	47.9	58.8	52.8	36.8	26.0	22.3	393.9
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	161.3	140.9	129.4	105.2	79.0	4.6	5.0	5.5	5.9	88.5	109.8	144.7	979.9
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.4	16.7	18.4	0.6	0.5	0.4	0.4	10.8	17.7	18.3	17.8	18.4	138.5
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	309.3	277.3	285.5	218.0	204.6	140.7	149.9	177.7	179.5	249.9	256.9	295.2	2,744.5

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21



Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	20.8	19.9	26.3	17.2	28.5	40.0	47.3	58.1	52.6	37.8	27.0	23.1	398.7
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	150.5	131.1	118.8	95.8	72.0	4.6	5.0	5.5	5.9	79.6	100.0	134.2	903.1
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.4	16.6	18.4	0.6	0.5	0.4	0.4	10.8	17.7	18.3	17.8	18.4	138.3
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	299.1	268.1	275.9	209.6	198.3	140.3	149.3	177.0	179.3	242.0	248.0	285.5	2,672.4

Gas Consumption (Btu x000,000)

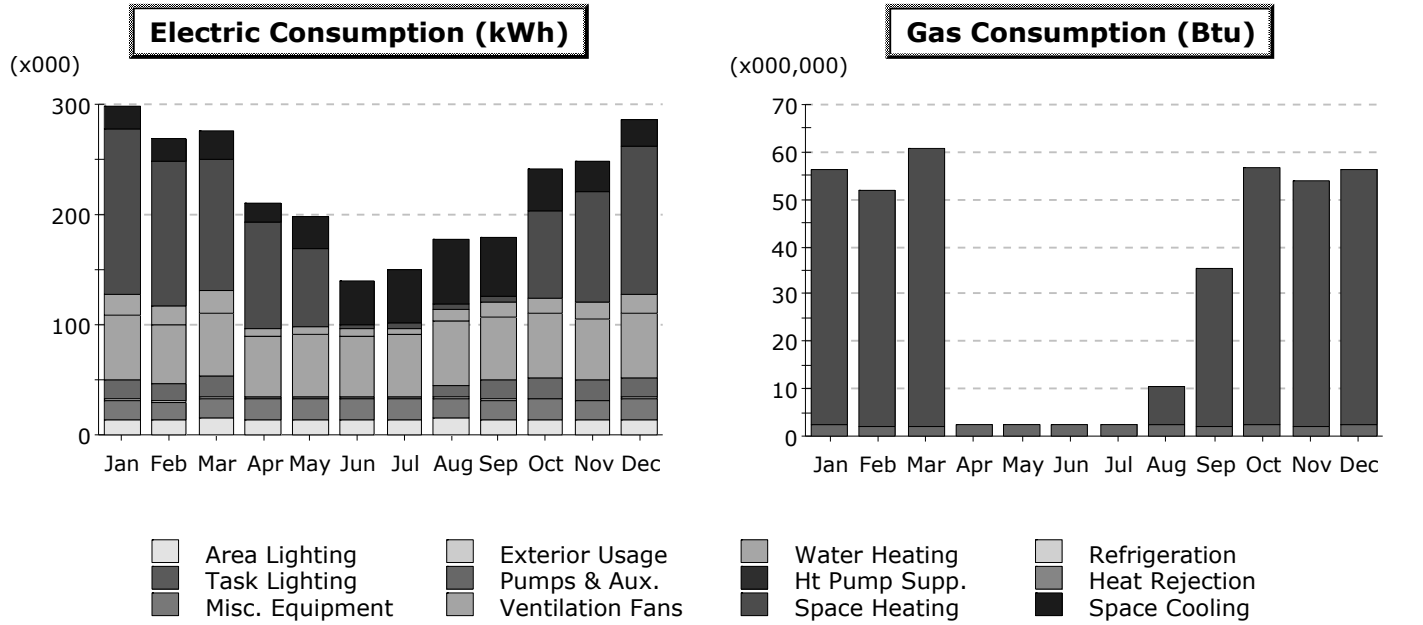
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21

Energy Conservation Measure 7.10

Demand Controlled Ventilation: CO2 Sensing for AHU-4

Please refer to eQuest files *AYR Motor Centre – June 26*

Subtract electrical consumption from files “- 9” & “- 8”

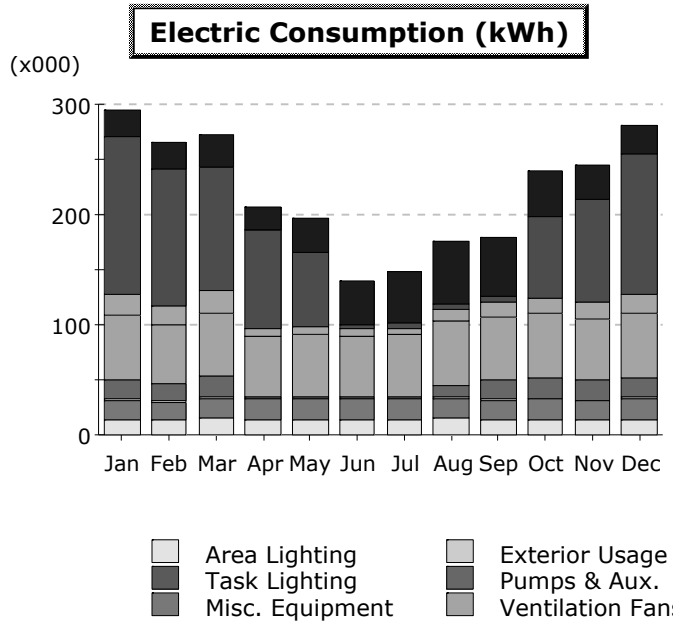


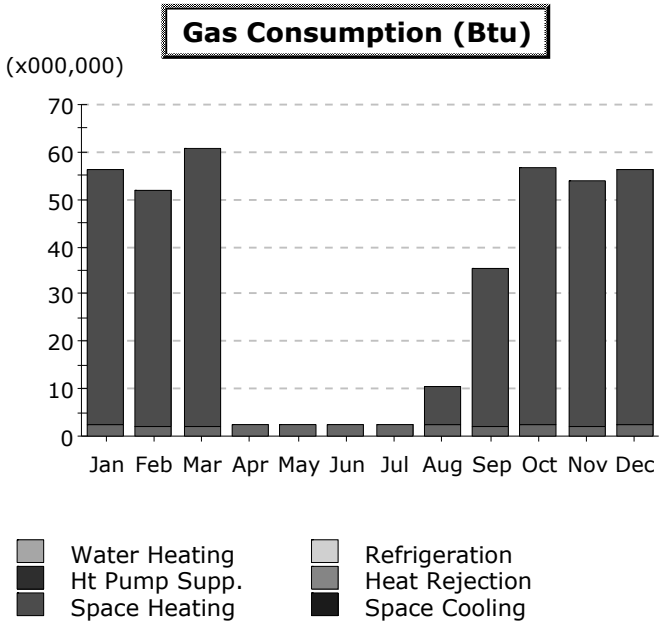
Electric Consumption (kWh x000)

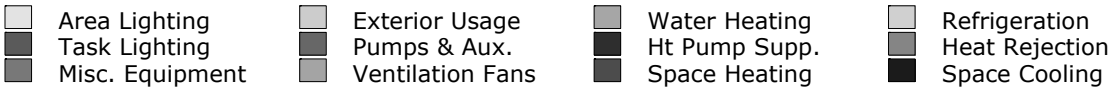
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	20.8	19.9	26.3	17.2	28.5	40.0	47.3	58.1	52.6	37.8	27.0	23.1	398.7
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	150.5	131.1	118.8	95.8	72.0	4.6	5.0	5.5	5.9	79.6	100.0	134.2	903.1
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.4	16.6	18.4	0.6	0.5	0.4	0.4	10.8	17.7	18.3	17.8	18.4	138.3
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	299.1	268.1	275.9	209.6	198.3	140.3	149.3	177.0	179.3	242.0	248.0	285.5	2,672.4

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21







Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	24.1	22.9	29.7	20.3	30.5	39.0	45.5	56.3	52.2	40.4	30.2	26.4	417.5
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	143.6	124.9	111.9	89.7	68.3	4.6	5.0	5.5	5.9	74.5	93.4	127.3	854.5
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.4	16.6	18.4	0.6	0.5	0.4	0.4	10.8	17.6	18.3	17.8	18.4	138.2
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	295.4	264.8	272.3	206.5	196.6	139.4	147.5	175.1	178.9	239.5	244.6	281.9	2,642.4

Gas Consumption (Btu x000,000)

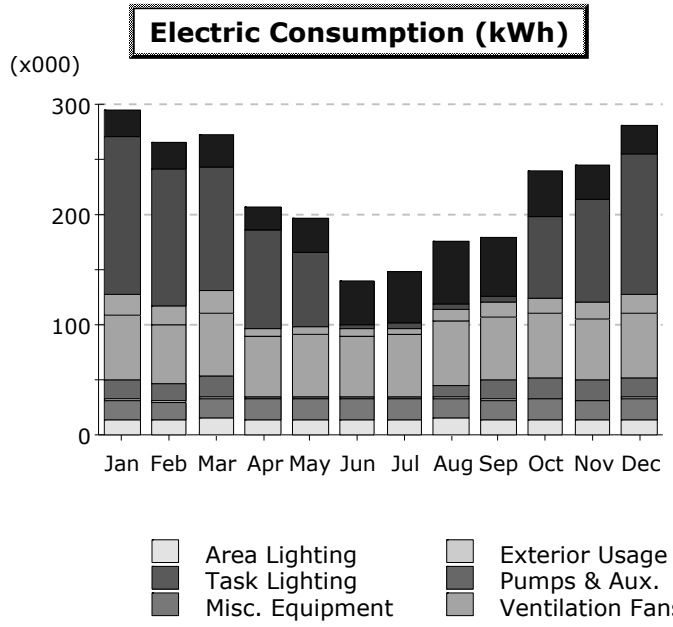
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21

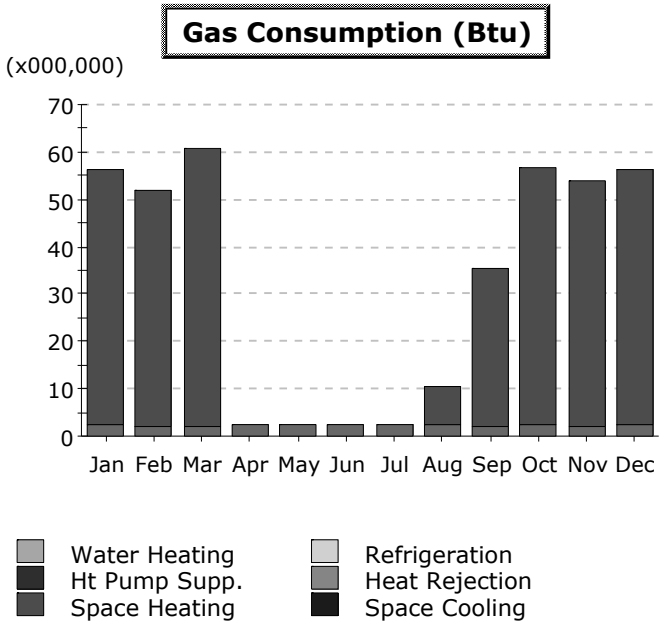
Energy Conservation Measure 7.11

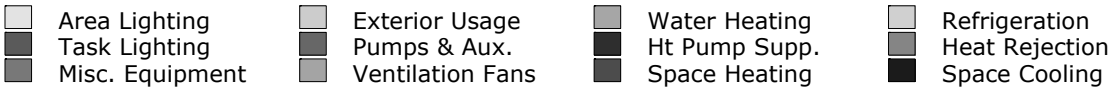
Demand Controlled Ventilation: CO2 Sensing for AH-3

Please refer to eQuest files *AYR Motor Centre – June 26*

Subtract electrical consumption from files “- 10” & “- 9”





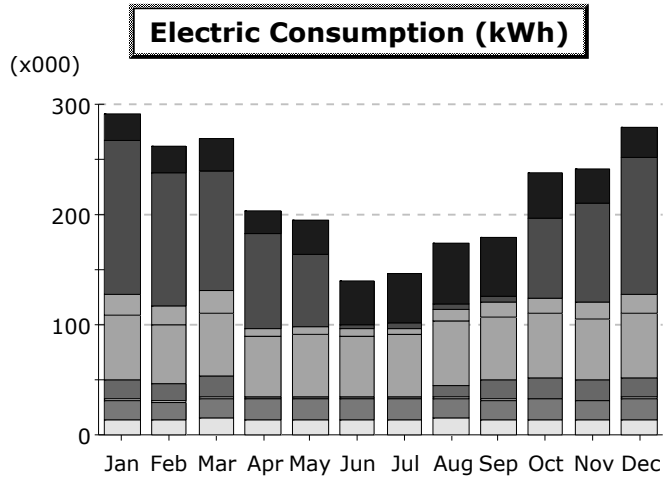


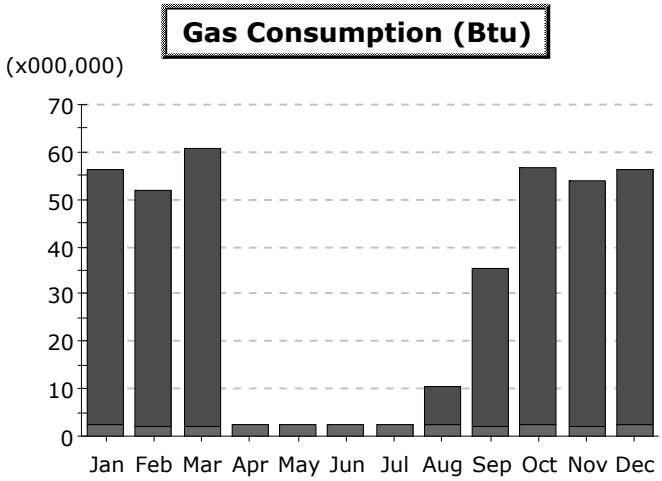
Electric Consumption (kWh x000)

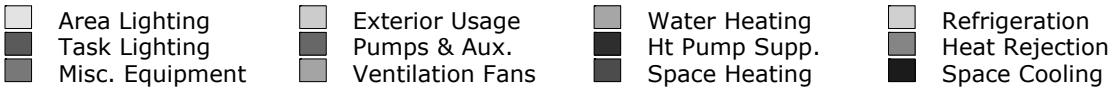
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	24.1	22.9	29.7	20.3	30.5	39.0	45.5	56.3	52.2	40.4	30.2	26.4	417.5
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	143.6	124.9	111.9	89.7	68.3	4.6	5.0	5.5	5.9	74.5	93.4	127.3	854.5
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.4	16.6	18.4	0.6	0.5	0.4	0.4	10.8	17.6	18.3	17.8	18.4	138.2
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	295.4	264.8	272.3	206.5	196.6	139.4	147.5	175.1	178.9	239.5	244.6	281.9	2,642.4

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21







Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	24.7	23.4	30.3	20.8	30.9	38.9	45.2	56.0	52.2	41.0	30.8	27.0	421.2
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	139.7	121.5	108.4	86.6	66.2	4.6	5.0	5.5	5.9	71.7	89.9	123.8	828.9
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.4	16.6	18.4	0.6	0.5	0.4	0.4	10.8	17.6	18.3	17.8	18.4	138.1
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	292.2	262.0	269.4	203.9	194.9	139.2	147.2	174.9	178.9	237.2	241.8	278.9	2,620.4

Gas Consumption (Btu x000,000)

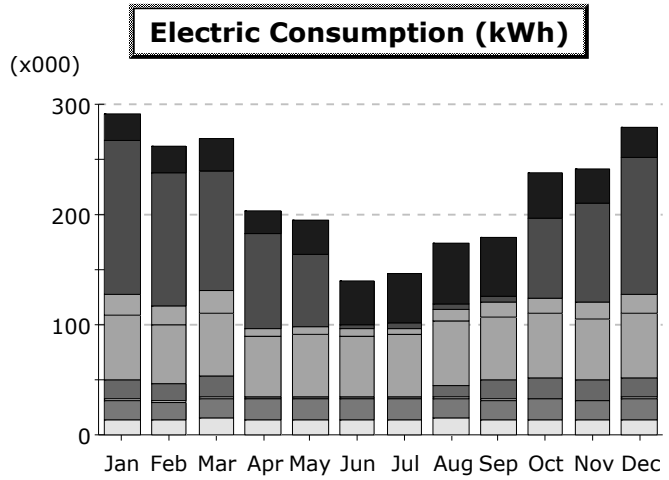
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21

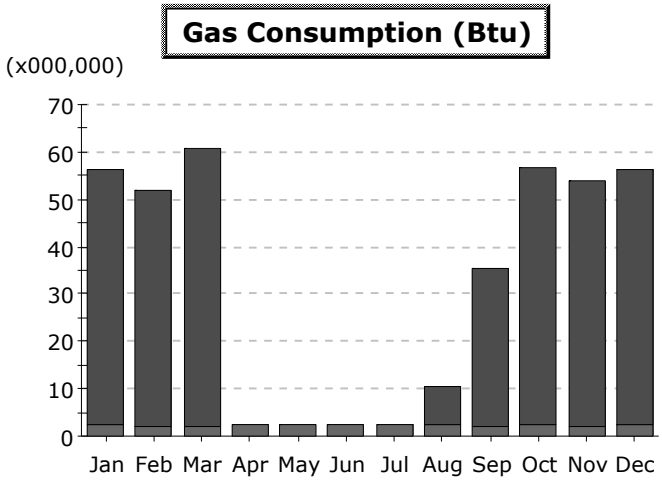
Energy Conservation Measure 7.12

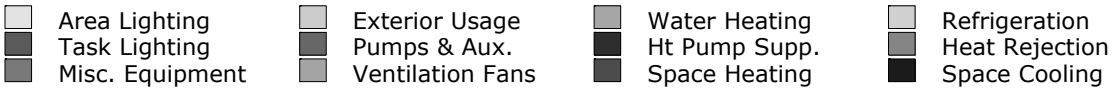
Demand Controlled Ventilation: CO2 Sensing for AH-5

Please refer to eQuest files *AYR Motor Centre – June 26*

Subtract electrical consumption from files “- 11” & “- 10”





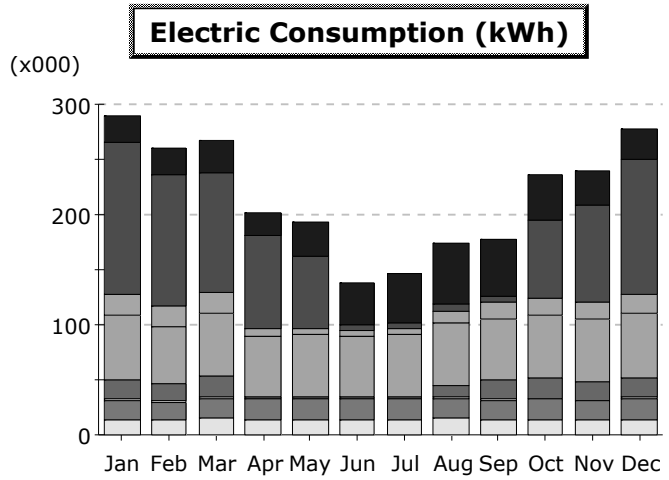


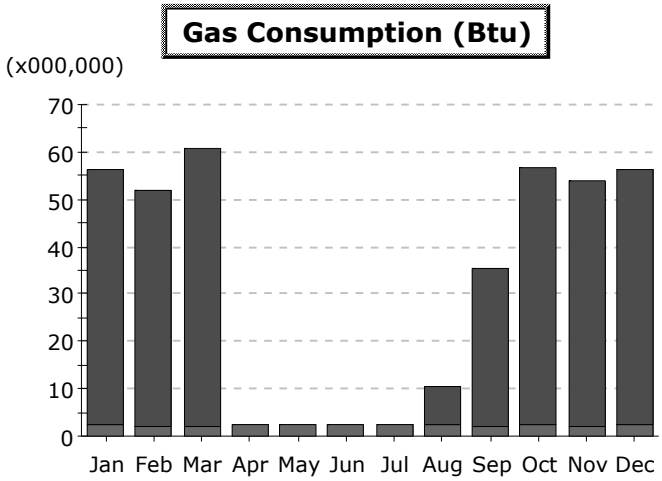
Electric Consumption (kWh x000)

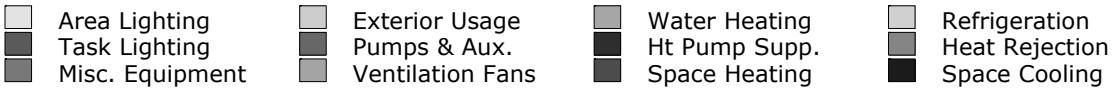
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	24.7	23.4	30.3	20.8	30.9	38.9	45.2	56.0	52.2	41.0	30.8	27.0	421.2
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	139.7	121.5	108.4	86.6	66.2	4.6	5.0	5.5	5.9	71.7	89.9	123.8	828.9
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.4	16.6	18.4	0.6	0.5	0.4	0.4	10.8	17.6	18.3	17.8	18.4	138.1
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	292.2	262.0	269.4	203.9	194.9	139.2	147.2	174.9	178.9	237.2	241.8	278.9	2,620.4

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21







Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	24.8	23.5	30.4	20.9	31.0	38.7	44.9	55.7	52.0	41.1	30.9	27.1	421.0
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	138.5	120.4	107.3	85.7	65.7	4.6	5.0	5.5	5.9	70.9	88.9	122.5	820.9
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	57.3	51.9	57.5	55.5	57.2	55.5	57.2	57.3	55.5	57.2	55.4	57.4	674.9
Pumps & Aux.	18.4	16.6	18.3	0.5	0.5	0.4	0.4	10.7	17.6	18.3	17.8	18.4	137.9
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	290.3	260.3	267.7	202.5	193.7	138.4	146.2	173.9	178.1	235.9	240.2	277.1	2,604.2

Gas Consumption (Btu x000,000)

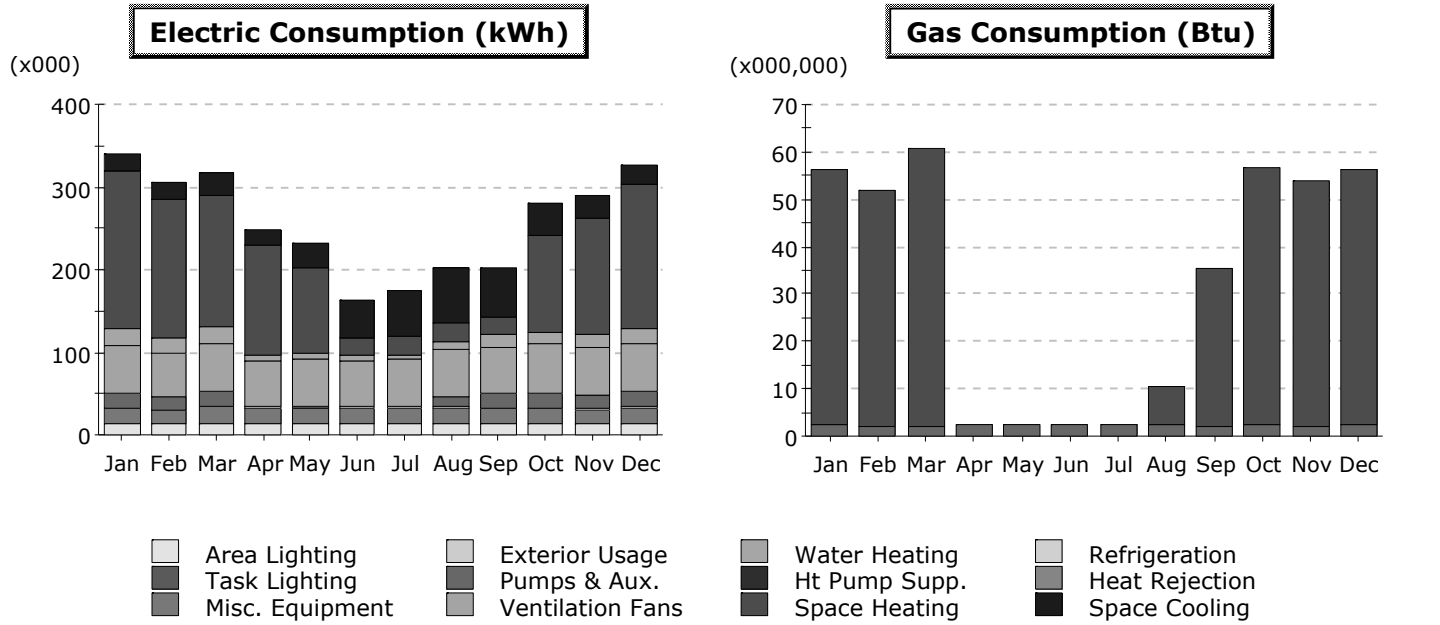
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21

Energy Conservation Measure 8.1

New Swimming Pool HVAC Unit

Please refer to eQuest files *AYR Motor Centre – June 26*

Subtract electrical consumption from files “- 6” & “- 5.1”

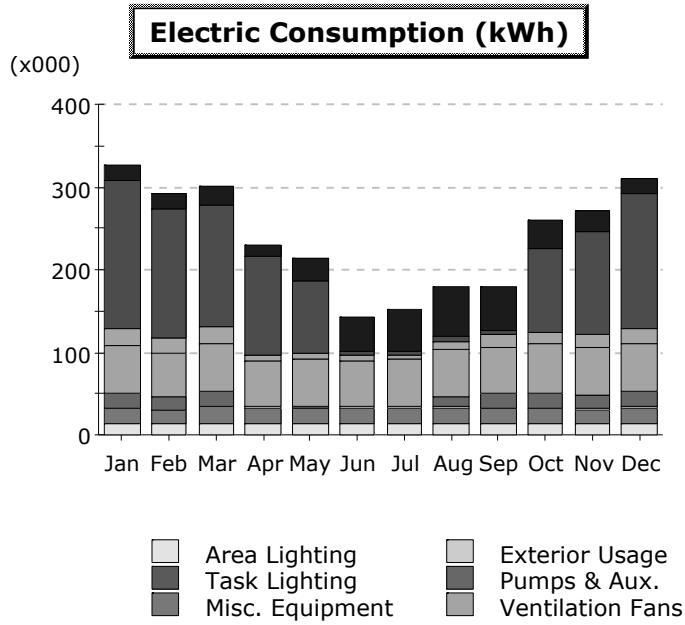


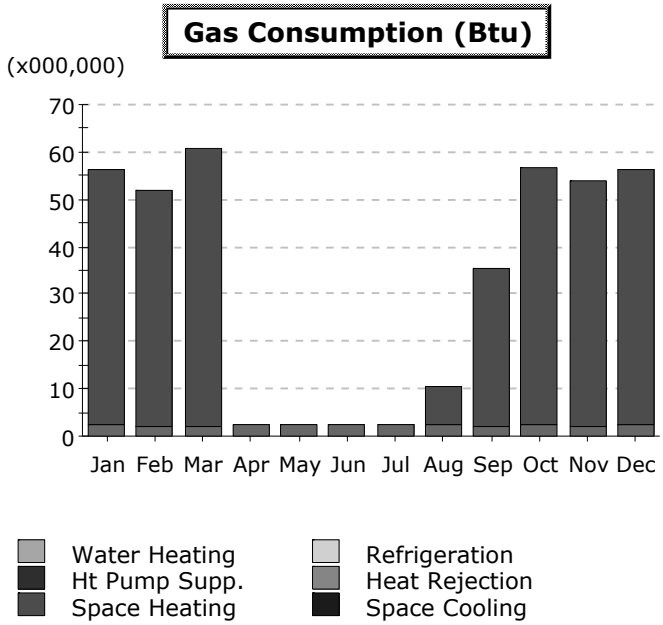
Electric Consumption (kWh x000)

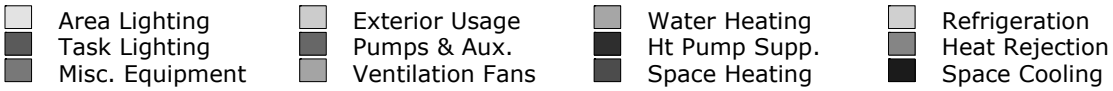
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	22.0	21.1	27.0	18.3	30.8	46.2	55.2	66.2	58.4	39.6	28.4	24.1	437.3
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	190.9	168.4	158.7	133.3	104.2	20.7	22.3	22.7	22.3	117.0	140.5	174.8	1,275.9
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.5	16.7	18.4	0.6	0.5	0.4	0.4	10.8	17.7	18.4	17.8	18.5	138.6
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	340.7	306.7	316.5	248.2	232.7	162.7	174.4	202.3	201.5	281.2	290.0	327.2	3,084.0

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21





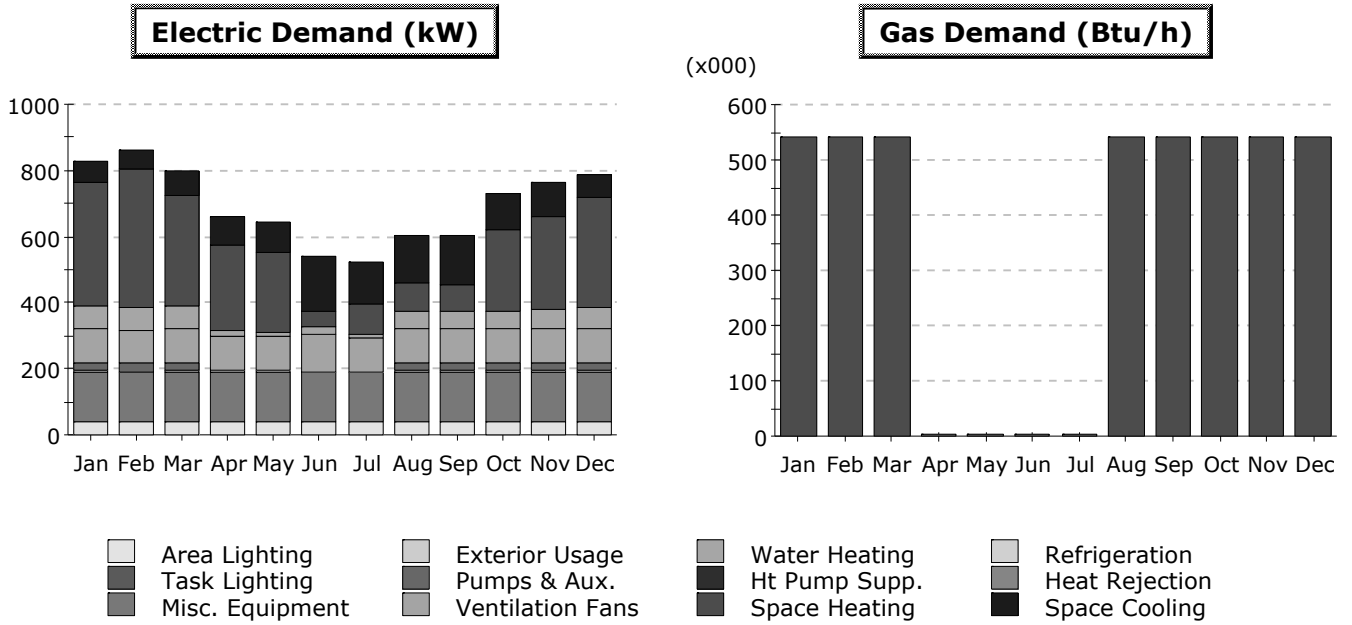


Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	18.5	17.6	23.1	13.9	26.0	41.1	49.5	60.4	53.0	34.5	23.6	20.3	381.5
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	180.0	157.6	146.4	119.8	89.1	4.6	5.0	5.5	5.9	101.5	125.7	162.8	1,103.9
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.5	16.7	18.4	0.6	0.5	0.4	0.4	10.8	17.7	18.4	17.9	18.5	138.7
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	326.3	292.3	300.2	230.3	212.8	141.4	151.5	179.3	179.8	260.6	270.5	311.3	2,856.3

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21

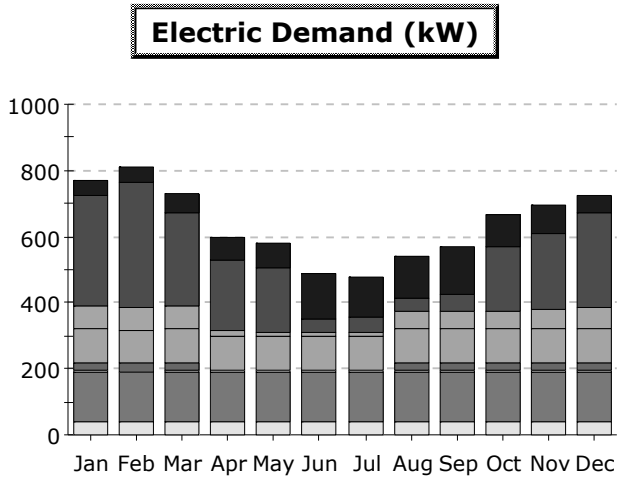


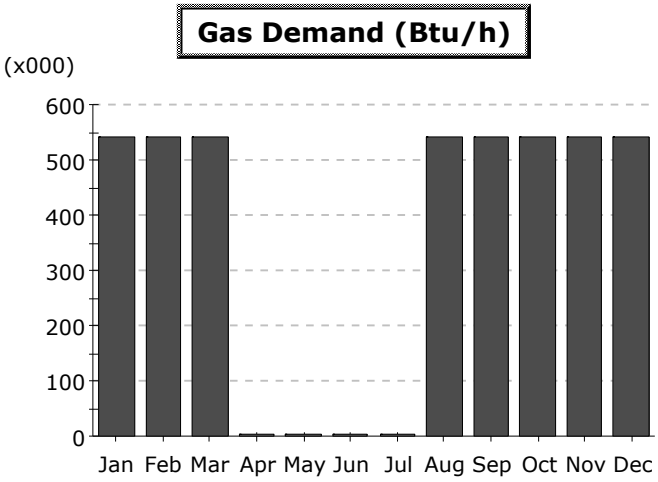
Electric Demand (kW)

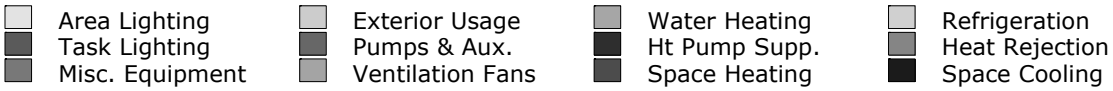
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	64.3	59.3	75.7	85.3	95.6	168.9	126.8	141.5	153.3	111.8	104.9	70.2	1,257.8
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	376.0	417.3	333.4	263.4	237.7	44.1	87.6	87.5	80.5	243.0	279.1	334.1	2,783.7
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	67.1	69.3	69.3	16.7	15.5	25.2	15.4	51.7	51.5	53.7	57.9	62.7	556.1
Vent. Fans	102.2	99.9	102.1	102.0	102.0	110.7	99.5	101.9	101.9	102.0	102.0	102.1	1,228.3
Pumps & Aux.	24.9	24.9	24.9	0.9	0.9	0.7	0.7	24.6	24.6	24.9	24.9	24.9	201.8
Ext. Usage	2.7	-	2.7	2.7	2.7	-	-	2.7	2.7	2.7	2.7	2.7	24.5
Misc. Equip.	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	1,848.0
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	453.0
Total	829.1	862.5	800.0	662.8	646.2	541.4	521.7	601.7	606.3	729.8	763.2	788.5	8,353.2

Gas Demand (Btu/h x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	541.0	541.0	541.0	-	-	-	-	541.0	541.0	541.0	541.0	541.0	4,328.4
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	1.6	1.6	1.6	3.2	3.2	3.2	3.2	1.6	1.6	1.6	1.6	1.6	25.6
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	542.6	542.6	542.6	3.2	3.2	3.2	3.2	542.6	542.6	542.6	542.6	542.6	4,354.0







Electric Demand (kW)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	49.7	46.0	58.4	69.0	79.5	138.6	121.0	126.3	144.8	97.4	88.4	54.5	1,073.8
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	333.4	378.3	281.5	215.3	190.1	38.0	47.4	43.1	53.4	196.8	229.7	286.4	2,293.4
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	67.1	69.3	69.3	16.7	15.5	14.3	13.3	51.7	51.5	53.7	57.9	62.7	543.1
Vent. Fans	102.2	99.9	102.1	102.0	102.0	101.9	101.9	101.9	101.9	102.0	102.0	102.1	1,222.0
Pumps & Aux.	24.9	24.9	24.9	0.9	0.9	0.7	0.7	24.6	24.6	24.9	24.9	24.9	201.8
Ext. Usage	2.7	-	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	29.9
Misc. Equip.	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	1,848.0
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	453.0
Total	771.9	810.2	730.8	598.4	582.5	488.0	478.8	542.0	570.7	669.3	697.3	725.2	7,664.9

Gas Demand (Btu/h x000)

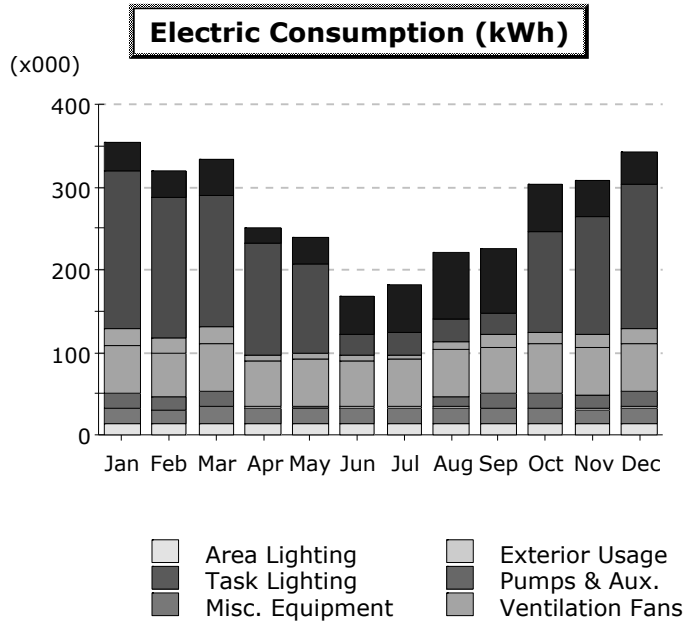
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	541.0	541.0	541.0	-	-	-	-	541.0	541.0	541.0	541.0	541.0	4,328.4
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	1.6	1.6	1.6	3.2	3.2	3.2	3.2	1.6	1.6	1.6	1.6	1.6	25.6
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	542.6	542.6	542.6	3.2	3.2	3.2	3.2	542.6	542.6	542.6	542.6	542.6	4,354.0

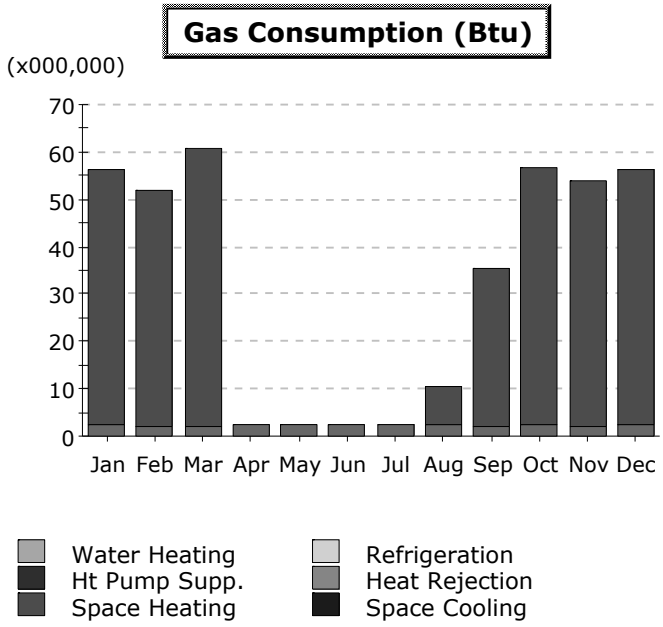
Energy Conservation Measure 8.2

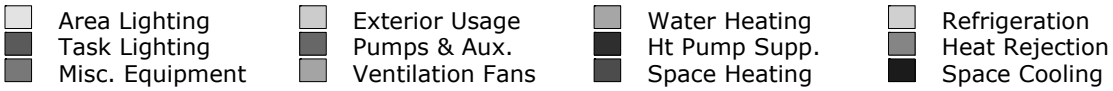
Ice Plant Upgrade: New Chiller Plant

Please refer to eQuest files *AYR Motor Centre – June 26*

Subtract electrical consumption from files “- 4” & “- 3”





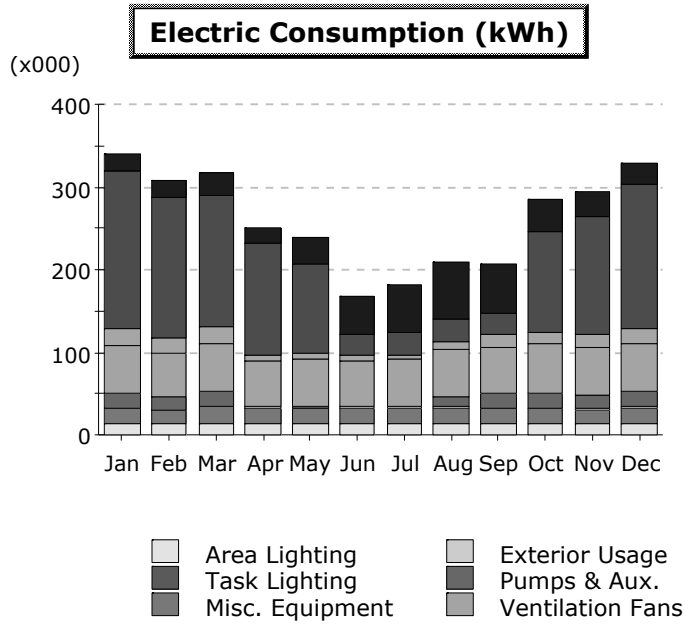


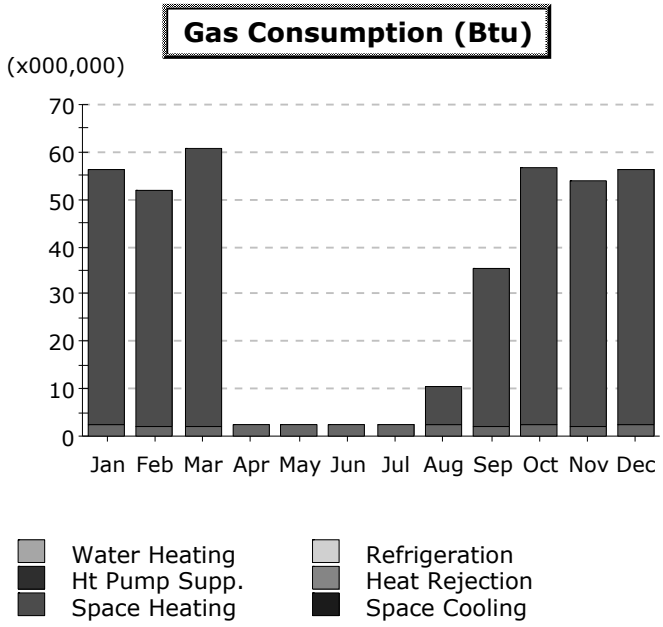
Electric Consumption (kWh x000)

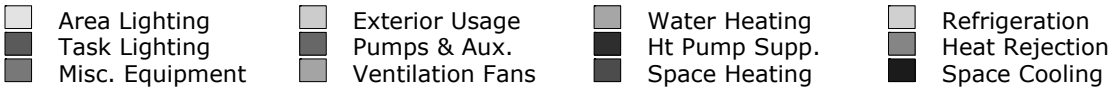
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	35.0	33.4	42.5	18.9	32.1	47.7	56.8	80.9	78.6	58.5	44.6	38.3	567.4
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	191.4	169.2	159.5	135.5	108.1	25.3	26.9	27.4	26.3	120.2	143.0	175.7	1,308.8
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.5	16.7	18.4	0.6	0.5	0.4	0.4	10.8	17.7	18.4	17.8	18.5	138.6
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	354.2	319.7	332.7	251.0	238.0	168.8	180.7	221.6	225.8	303.4	308.8	342.3	3,246.9

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21





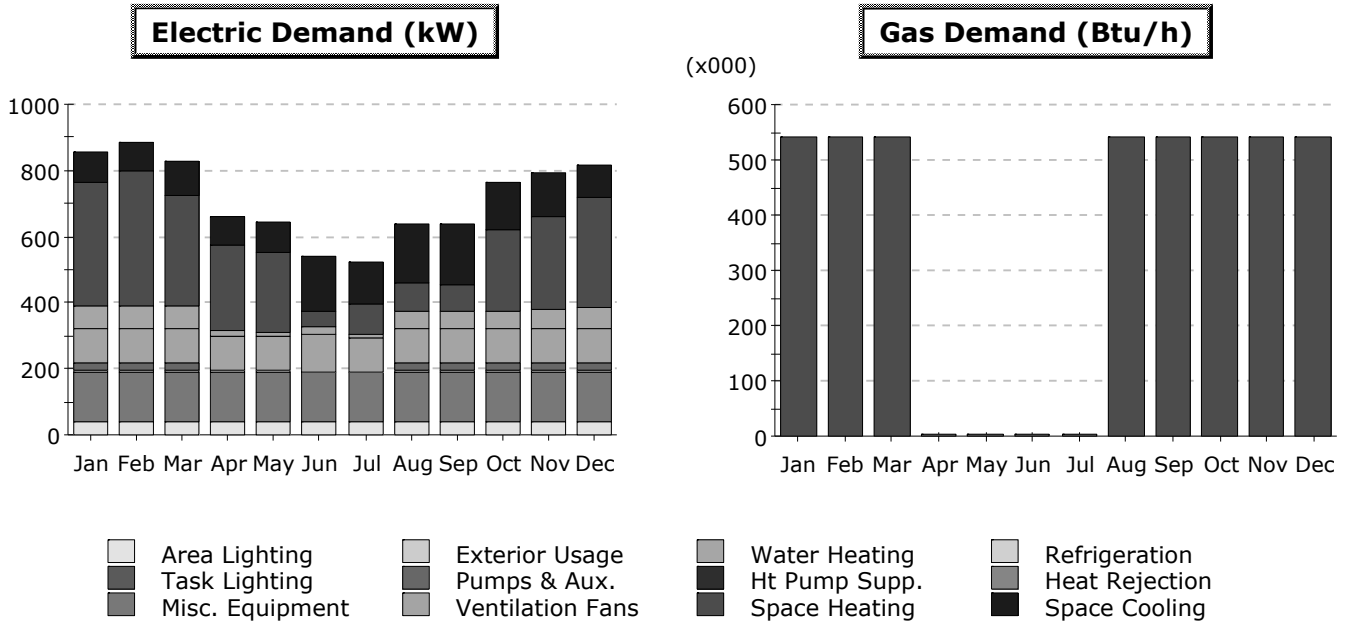


Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	22.2	21.3	27.3	18.9	32.1	47.7	56.8	67.8	59.7	40.6	29.2	24.4	448.1
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	191.4	169.2	159.5	135.5	108.1	25.3	26.9	27.4	26.3	120.2	143.0	175.7	1,308.8
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	18.9	17.8	19.6	6.4	6.0	5.6	5.1	10.5	14.2	15.1	15.9	17.8	153.0
Vent. Fans	58.0	52.5	58.1	56.2	57.9	56.2	57.9	57.9	56.1	57.9	56.0	58.1	682.7
Pumps & Aux.	18.5	16.7	18.4	0.6	0.5	0.4	0.4	10.8	17.7	18.4	17.8	18.5	138.6
Ext. Usage	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.9
Misc. Equip.	17.4	16.3	18.7	18.0	17.8	18.2	18.1	18.3	18.0	17.8	16.8	18.5	213.7
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	14.0	13.0	14.9	14.4	14.5	14.4	14.5	14.9	13.9	14.5	13.5	14.4	170.9
Total	341.4	307.6	317.5	251.0	238.0	168.8	180.7	208.5	206.9	285.5	293.4	328.4	3,127.7

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	54.10	49.78	58.43	-	-	-	-	8.24	33.00	54.65	51.94	54.10	364.25
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	2.22	2.00	2.21	2.30	2.38	2.30	2.38	2.36	2.21	2.22	2.15	2.22	26.96
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	56.33	51.78	60.64	2.30	2.38	2.30	2.38	10.60	35.21	56.87	54.09	56.33	391.21

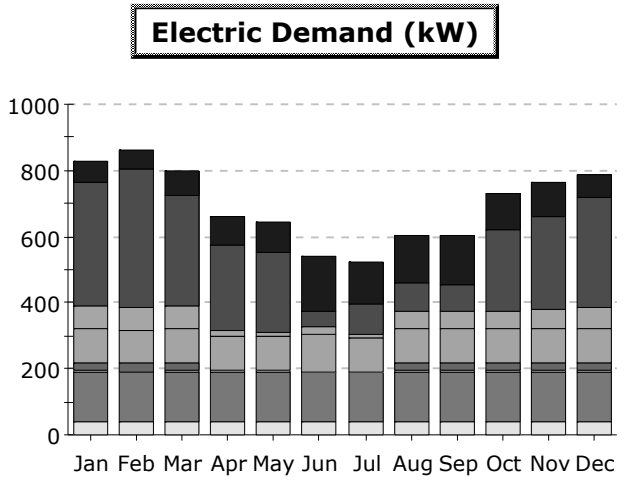


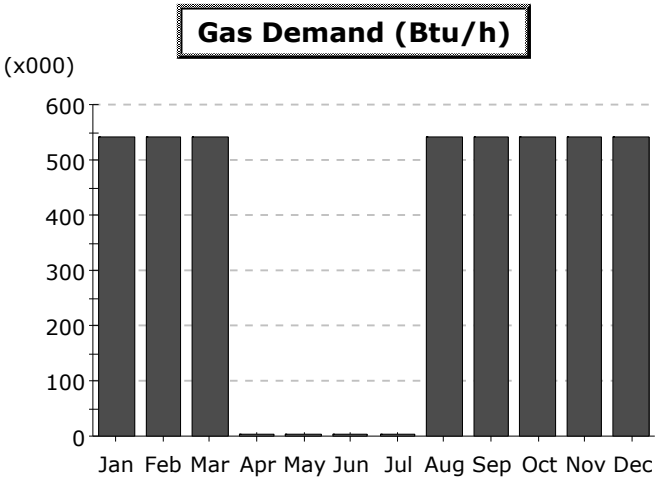
Electric Demand (kW)

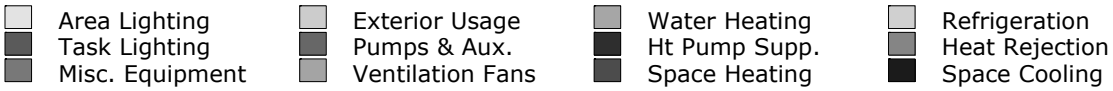
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	89.0	86.1	103.6	85.3	95.6	168.9	126.8	177.4	187.3	144.3	135.3	96.8	1,496.6
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	376.0	407.7	333.4	263.4	237.7	44.1	87.6	87.5	80.5	243.0	279.1	334.1	2,774.2
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	67.1	69.3	69.3	16.7	15.5	25.2	15.4	51.7	51.5	53.7	57.9	62.7	556.1
Vent. Fans	102.2	102.3	102.1	102.0	102.0	110.7	99.5	101.9	101.9	102.0	102.0	102.1	1,230.7
Pumps & Aux.	24.9	24.9	24.9	0.9	0.9	0.7	0.7	24.6	24.6	24.9	24.9	24.9	201.8
Ext. Usage	2.7	2.7	2.7	2.7	2.7	-	-	2.7	2.7	2.7	2.7	2.7	27.2
Misc. Equip.	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	1,848.0
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	453.0
Total	853.8	884.9	827.8	662.8	646.2	541.4	521.7	637.6	640.3	762.3	793.6	815.2	8,587.7

Gas Demand (Btu/h x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	541.0	541.0	541.0	-	-	-	-	541.0	541.0	541.0	541.0	541.0	4,328.4
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	1.6	1.6	1.6	3.2	3.2	3.2	3.2	1.6	1.6	1.6	1.6	1.6	25.6
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	542.6	542.6	542.6	3.2	3.2	3.2	3.2	542.6	542.6	542.6	542.6	542.6	4,354.0







Electric Demand (kW)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	64.3	59.3	75.7	85.3	95.6	168.9	126.8	141.5	153.3	111.8	104.9	70.2	1,257.8
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	376.0	417.3	333.4	263.4	237.7	44.1	87.6	87.5	80.5	243.0	279.1	334.1	2,783.7
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	67.1	69.3	69.3	16.7	15.5	25.2	15.4	51.7	51.5	53.7	57.9	62.7	556.1
Vent. Fans	102.2	99.9	102.1	102.0	102.0	110.7	99.5	101.9	101.9	102.0	102.0	102.1	1,228.3
Pumps & Aux.	24.9	24.9	24.9	0.9	0.9	0.7	0.7	24.6	24.6	24.9	24.9	24.9	201.8
Ext. Usage	2.7	-	2.7	2.7	2.7	-	-	2.7	2.7	2.7	2.7	2.7	24.5
Misc. Equip.	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	154.0	1,848.0
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	453.0
Total	829.1	862.5	800.0	662.8	646.2	541.4	521.7	601.7	606.3	729.8	763.2	788.5	8,353.1

Gas Demand (Btu/h x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	541.0	541.0	541.0	-	-	-	-	541.0	541.0	541.0	541.0	541.0	4,328.4
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	1.6	1.6	1.6	3.2	3.2	3.2	3.2	1.6	1.6	1.6	1.6	1.6	25.6
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	542.6	542.6	542.6	3.2	3.2	3.2	3.2	542.6	542.6	542.6	542.6	542.6	4,354.0

Energy Conservation Measure 8.3

Renewable Energy: Photovoltaic Power

Please refer to RETScreen Model in Appendix F

Appendix E
Woodstock Weather Data

Station Name MONCTON INTL A
Province NEW BRUNSWICK
Latitude 46.11
Longitude -64.68
Elevation 70.7
Climate Identif 8103201
Station Name WOODSTOCK
Province NEW BRUNSWICK
Latitude 46.17
Longitude -67.55
Elevation 153
Climate Identif 8105600
WMO Identifier
TC Identifier

Legend

A	Accumulated
C	Precipitation occurred, amount uncertain
E	Estimated
F	Accumulated and estimated
L	Precipitation may or may not have occurred
M	Missing
N	Temperature missing but known to be > 0
S	More than one occurrence
T	Trace
Y	Temperature missing but known to be < 0

5/31/2017	2017	5	31 †	14.5	8.5	11.5	6.5	0	0.6	0	0.6	0	1	11.5
6/1/2017	2017	6	1 †	23.5	12	17.8	0.2	0	0.6	0	0.6	0	0	FALSE
6/2/2017	2017	6	2 †	17.5	8.5	13	5	0	0.2	0	0.2	0	1	13
6/3/2017	2017	6	3 †	17.5	6.5	12	6	0	9.8	0	9.8	0	1	12
6/4/2017	2017	6	4 †	17.5	5.5	11.5	6.5	0	0	0	0	0	1	11.5
6/5/2017	2017	6	5 †	16.5	6.5	11.5	6.5	0	0	0	0	0	1	11.5
6/6/2017	2017	6	6 †	19.5	1.5	10.5	7.5	0	0	0	0	0	1	10.5
6/7/2017	2017	6	7 †	26	1.5	13.8	4.2	0	0	0	0	0	1	13.8
6/8/2017	2017	6	8 †	29.5	10	19.8	0	1.8	0	0	0	0	0	FALSE
6/9/2017	2017	6	9 †	15.5	12	13.8	4.2	0	3	0	3	0	1	13.8
6/10/2017	2017	6	10 †	23	7	15	3	0	0	0	0	0	0	FALSE
6/11/2017	2017	6	11 †	32	14.5	23.3	0	5.3	0	0	0	0	0	FALSE
6/12/2017	2017	6	12 †	28.5	13	20.8	0	2.8	5.6	0	5.6	0	0	FALSE
6/13/2017	2017	6	13 †	25	18	21.5	0	3.5	0	0	0	0	0	FALSE
6/14/2017	2017	6	14 †	18	8.5	13.3	4.7	0	0	0	0	0	1	13.3
6/15/2017	2017	6	15 †	19.5	5	12.3	5.7	0	0	0	0	0	1	12.3
6/16/2017	2017	6	16 †	16	7	11.5	6.5	0	6.6	0	6.6	0	1	11.5
6/17/2017	2017	6	17 †	19	10.5	14.8	3.2	0	1.2	0	1.2	0	1	14.8
6/18/2017	2017	6	18 †	25	15	20	0	2	0	0	0	0	0	FALSE
6/19/2017	2017	6	19 †	30	19	24.5	0	6.5	1.2	0	1.2	0	0	FALSE
6/20/2017	2017	6	20 †	25	17	21	0	3	1.4	0	1.4	0	0	FALSE
6/21/2017	2017	6	21 †	22.5	11.5	17	1	0	7.8	0	7.8	0	0	FALSE
6/22/2017	2017	6	22 †	24	10.5	17.3	0.7	0	0	0	0	0	0	FALSE
6/23/2017	2017	6	23 †	20	9	14.5	3.5	0	4	0	4	0	1	14.5
6/24/2017	2017	6	24 †	24	14	19	0	1	18	0	18	0	0	FALSE
6/25/2017	2017	6	25 †	24.5	12	18.3	0	0.3	0	0	0	0	0	FALSE
6/26/2017	2017	6	26 †	21	10.5	15.8	2.2	0	0	0	0	0	0	FALSE
6/27/2017	2017	6	27 †	23.5	7.5	15.5	2.5	0	5.4	0	5.4	0	0	FALSE
6/28/2017	2017	6	28 †	20.5	11.5	16	2	0	2.8	0	2.8	0	0	FALSE
6/29/2017	2017	6	29 †	23	7.5	15.3	2.7	0	0.8	0	0.8	0	0	FALSE
6/30/2017	2017	6	30 †	24	13.5	18.8	0	0.8	0.4	0	0.4	0	0	FALSE
7/1/2017	2017	7	1 †	18.5	16.5	17.5	0.5	0	4.6	0	4.6	0	0	FALSE
7/2/2017	2017	7	2 †	27	15.5	21.3	0	3.3	0	0	0	0	0	FALSE
7/3/2017	2017	7	3 †	24.5	15	19.8	0	1.8	0	0	0	0	0	FALSE
7/4/2017	2017	7	4 †	23	12.5	17.8	0.2	0	0	0	0	0	0	FALSE
7/5/2017	2017	7	5 †	26	9.5	17.8	0.2	0	0	0	0	0	0	FALSE
7/6/2017	2017	7	6 †	27	14.5	20.8	0	2.8	0	0	0	0	0	FALSE
7/7/2017	2017	7	7 †	26.5	15	20.8	0	2.8	0	0	0	0	0	FALSE
7/8/2017	2017	7	8 †	25.5	13.5	19.5	0	1.5	21.6	0	21.6	0	0	FALSE
7/9/2017	2017	7	9 †	25.5	14	19.8	0	1.8	0.6	0	0.6	0	0	FALSE
7/10/2017	2017	7	10 †	24	11.5	17.8	0.2	0	0.4	0	0.4	0	0	FALSE
7/11/2017	2017	7	11 †	28	16	22	0	4	0	0	0	0	0	FALSE
7/12/2017	2017	7	12 †	21.5	17	19.3	0	1.3	1.2	0	1.2	0	0	FALSE
7/13/2017	2017	7	13 †	23	10.5	16.8	1.2	0	0	0	0	0	0	FALSE
7/14/2017	2017	7	14 †	26	8.5	17.3	0.7	0	0	0	0	0	0	FALSE
7/15/2017	2017	7	15 †	20.5	13	16.8	1.2	0	0	0	0	0	0	FALSE
7/16/2017	2017	7	16 †	27.5	14	20.8	0	2.8	0.6	0	0.6	0	0	FALSE
7/17/2017	2017	7	17 †	28.5	14.5	21.5	0	3.5	0	0	0	0	0	FALSE
7/18/2017	2017	7	18 †	25.5	15	20.3	0	2.3	0	0	0	0	0	FALSE
7/19/2017	2017	7	19 †	29.5	18.5	24	0	6	0	0	0	0	0	FALSE
7/20/2017	2017	7	20 †	28.5	17.5	23	0	5	1.4	0	1.4	0	0	FALSE
7/21/2017	2017	7	21 †	27.5	14.5	21	0	3	0.8	0	0.8	0	0	FALSE

Station Name MONCTON INTL A
Province NEW BRUNSWICK
Latitude 46.11
Longitude -64.68
Elevation 70.7
Climate Identif 8103201
Station Name WOODSTOCK
Province NEW BRUNSWICK
Latitude 46.17
Longitude -67.55
Elevation 153
Climate Identif 8105600
WMO Identifier
TC Identifier

Legend

A	Accumulated
C	Precipitation occurred, amount uncertain
E	Estimated
F	Accumulated and estimated
L	Precipitation may or may not have occurred
M	Missing
N	Temperature missing but known to be > 0
S	More than one occurrence
T	Trace
Y	Temperature missing but known to be < 0

7/22/2017	2017	7	22 †	21.5	11.5	16.5	1.5	0	0	0	0	0	0	FALSE
7/23/2017	2017	7	23 †	22	3.5	12.8	5.2	0	0	0	0	0	1	12.8
7/24/2017	2017	7	24 †	21.5	5	13.3	4.7	0	0	0	0	0	1	13.3
7/25/2017	2017	7	25 †	25.5	12	18.8	0	0.8	0	0	0	0	0	FALSE
7/26/2017	2017	7	26 †	27.5	7.5	17.5	0.5	0	0	0	0	0	0	FALSE
7/27/2017	2017	7	27 †	22	14.5	18.3	0	0.3	0.8	0	0.8	0	0	FALSE
7/28/2017	2017	7	28 †	23.5	16.5	20	0	2	0	0	0	0	0	FALSE
7/29/2017	2017	7	29 †	22.5	5.5	14	4	0	0	0	0	0	1	14
7/30/2017	2017	7	30 †	24.5	6	15.3	2.7	0	0	0	0	0	0	FALSE
7/31/2017	2017	7	31 †	29	8.5	18.8	0	0.8	5.8	0	5.8	0	0	FALSE
8/1/2017	2017	8	1 †	26	13.5	19.8	0	1.8	0	0	0	0	0	FALSE
8/2/2017	2017	8	2 †	30.5	9.5	20	0	2	0	0	0	0	0	FALSE
8/3/2017	2017	8	3 †	28	15.5	21.8	0	3.8	12.8	0	12.8	0	0	FALSE
8/4/2017	2017	8	4 †	29	16	22.5	0	4.5	0	0	0	0	0	FALSE
8/5/2017	2017	8	5 †	26.5	16.5	21.5	0	3.5	8.6	0	8.6	0	0	FALSE
8/6/2017	2017	8	6 †	21	17	19	0	1	0	0	0	0	0	FALSE
8/7/2017	2017	8	7 †	22	10	16	2	0	0	0	0	0	0	FALSE
8/8/2017	2017	8	8 †	22	10	16	2	0	0.2	0	0.2	0	0	FALSE
8/9/2017	2017	8	9 †	24.5	5	14.8	3.2	0	0	0	0	0	1	14.8
8/10/2017	2017	8	10 †	24.5	9.5	17	1	0	0	0	0	0	0	FALSE
8/11/2017	2017	8	11 †	25	11.5	18.3	0	0.3	5.6	0	5.6	0	0	FALSE
8/12/2017	2017	8	12 †	23.5	14	18.8	0	0.8	0	0	0	0	0	FALSE
8/13/2017	2017	8	13 †	24	16	20	0	2	5.2	0	5.2	0	0	FALSE
8/14/2017	2017	8	14 †	26	10	18	0	0	2.6	0	2.6	0	0	FALSE
8/15/2017	2017	8	15 †	27.5	12.5	20	0	2	0	0	0	0	0	FALSE
8/16/2017	2017	8	16 †	22	15	18.5	0	0.5	0	0	0	0	0	FALSE
8/17/2017	2017	8	17 †	21.5	10.5	16	2	0	0	0	0	0	0	FALSE
8/18/2017	2017	8	18 †	22.5	8.5	15.5	2.5	0	1.2	0	1.2	0	0	FALSE
8/19/2017	2017	8	19 †	19	13.5	16.3	1.7	0	0.8	0	0.8	0	0	FALSE
8/20/2017	2017	8	20 †	25.5	17	21.3	0	3.3	0	0	0	0	0	FALSE
8/21/2017	2017	8	21 †	27	13	20	0	2	0	0	0	0	0	FALSE
8/22/2017	2017	8	22 †	30	16	23	0	5	0.4	0	0.4	0	0	FALSE
8/23/2017	2017	8	23 †	26	19	22.5	0	4.5	0	0	0	0	0	FALSE
8/24/2017	2017	8	24 †	23.5	9.5	16.5	1.5	0	0	0	0	0	0	FALSE
8/25/2017	2017	8	25 †	19.5	6	12.8	5.2	0	0	0	0	0	1	12.8
8/26/2017	2017	8	26 †	19.5	8.5	14	4	0	0	0	0	0	1	14
8/27/2017	2017	8	27 †	22.5	5.5	14	4	0	0	0	0	0	1	14
8/28/2017	2017	8	28 †	25	3	14	4	0	0	0	0	0	1	14
8/29/2017	2017	8	29 †	27	4.5	15.8	2.2	0	0	0	0	0	0	FALSE
8/30/2017	2017	8	30 †	20	9	14.5	3.5	0	0	0	0	0	1	14.5
8/31/2017	2017	8	31 †	20	6.5	13.3	4.7	0	0.6	0	0.6	0	1	13.3
9/1/2017	2017	9	1 †	12.5	7.5	10	8	0	0.2	0	0.2	0	1	10
9/2/2017	2017	9	2 †	20.5	7.5	14	4	0	0	0	0	0	1	14
9/3/2017	2017	9	3 †	22	4.5	13.3	4.7	0	7.6	0	7.6	0	1	13.3
9/4/2017	2017	9	4 †	20.5	11	15.8	2.2	0	0	0	0	0	0	FALSE
9/5/2017	2017	9	5 †	22	15.5	18.8	0	0.8	4.8	0	4.8	0	0	FALSE
9/6/2017	2017	9	6 †	18.5	14.5	16.5	1.5	0	9.2	0	9.2	0	0	FALSE
9/7/2017	2017	9	7 †	21.5	14.5	18	0	0	3.6	0	3.6	0	0	FALSE
9/8/2017	2017	9	8 †	20.5	9.5	15	3	0	1.6	0	1.6	0	0	FALSE
9/9/2017	2017	9	9 †	19	9.5	14.3	3.7	0	0.2	0	0.2	0	1	14.3
9/10/2017	2017	9	10 †	18.5	7	12.8	5.2	0	0	0	0	0	1	12.8
9/11/2017	2017	9	11 †	23.5	6.5	15	3	0	0	0	0	0	0	FALSE

Station Name MONCTON INTL A
Province NEW BRUNSWICK
Latitude 46.11
Longitude -64.68
Elevation 70.7
Climate Identif 8103201
Station Name WOODSTOCK
Province NEW BRUNSWICK
Latitude 46.17
Longitude -67.55
Elevation 153
Climate Identif 8105600
WMO Identifier
TC Identifier

Legend

A	Accumulated
C	Precipitation occurred, amount uncertain
E	Estimated
F	Accumulated and estimated
L	Precipitation may or may not have occurred
M	Missing
N	Temperature missing but known to be > 0
S	More than one occurrence
T	Trace
Y	Temperature missing but known to be < 0

9/12/2017	2017	9	12 †	25	5.5	15.3	2.7	0	0	0	0	0	0	FALSE
9/13/2017	2017	9	13 †	26.5	8.5	17.5	0.5	0	0	0	0	0	0	FALSE
9/14/2017	2017	9	14 †	27.5	10.5	19	0	1	0	0	0	0	0	FALSE
9/15/2017	2017	9	15 †	24.5	8	16.3	1.7	0	0	0	0	0	0	FALSE
9/16/2017	2017	9	16 †	28	12	20	0	2	0	0	0	0	0	FALSE
9/17/2017	2017	9	17 †	27.5	12.5	20	0	2	0	0	0	0	0	FALSE
9/18/2017	2017	9	18 †	24	16	20	0	2	0	0	0	0	0	FALSE
9/19/2017	2017	9	19 †	22.5	15	18.8	0	0.8	0.2	0	0.2	0	0	FALSE
9/20/2017	2017	9	20 †	25	17	21	0	3	0	0	0	0	0	FALSE
9/21/2017	2017	9	21 †	23	8	15.5	2.5	0	0	0	0	0	0	FALSE
9/22/2017	2017	9	22 †	23.5	3.5	13.5	4.5	0	0	0	0	0	1	13.5
9/23/2017	2017	9	23 †	29	4.5	16.8	1.2	0	0	0	0	0	0	FALSE
9/24/2017	2017	9	24 †	29.5	10.5	20	0	2	3.4	0	3.4	0	0	FALSE
9/25/2017	2017	9	25 †	31	15.5	23.3	0	5.3	0	0	0	0	0	FALSE
9/26/2017	2017	9	26 †	32	20	26	0	8	0	0	0	0	0	FALSE
9/27/2017	2017	9	27 †	24.5	12	18.3	0	0.3	26.4	0	26.4	0	0	FALSE
9/28/2017	2017	9	28 †	18	13	15.5	2.5	0	0	0	0	0	0	FALSE
9/29/2017	2017	9	29 †	11.5	3	7.3	10.7	0	0	0	0	0	1	7.3
9/30/2017	2017	9	30 †	12	-0.5	5.8	12.2	0	0	0	0	0	1	5.8
10/1/2017	2017	10	1 †	18	-0.5	8.8	9.2	0	0	0	0	0	1	8.8
10/2/2017	2017	10	2 †	14.5	4.5	9.5	8.5	0	0	0	0	0	1	9.5
10/3/2017	2017	10	3 †	18	-3	7.5	10.5	0	0	0	0	0	1	7.5
10/4/2017	2017	10	4 †	25	8	16.5	1.5	0	0.8	0	0.8	0	0	FALSE
10/5/2017	2017	10	5 †	19	12	15.5	2.5	0	0	0	0	0	0	FALSE
10/6/2017	2017	10	6 †	16.5	6	11.3	6.7	0	0	0	0	0	1	11.3
10/7/2017	2017	10	7 †	18	1.5	9.8	8.2	0	0.4	0	0.4	0	1	9.8
10/8/2017	2017	10	8 †	20.5	14.5	17.5	0.5	0	8.6	0	8.6	0	0	FALSE
10/9/2017	2017	10	9 †	19.5	13.5	16.5	1.5	0	25	0	25	0	0	FALSE
10/10/2017	2017	10	10 †	22.5	17	19.8	0	1.8	0	0	0	0	0	FALSE
10/11/2017	2017	10	11 †	12	5	8.5	9.5	0	0	0	0	0	1	8.5
10/12/2017	2017	10	12 †	12.5	-2	5.3	12.7	0	0	0	0	0	1	5.3
10/13/2017	2017	10	13 †	16	-2.5	6.8	11.2	0	0	0	0	0	1	6.8
10/14/2017	2017	10	14 †	17	8	12.5	5.5	0	0	0	0	0	1	12.5
10/15/2017	2017	10	15 †	19	10.5	14.8	3.2	0	0.8	0	0.8	0	1	14.8
10/16/2017	2017	10	16 †	9.5	6	7.8	10.2	0	0	0	0	0	1	7.8
10/17/2017	2017	10	17 †	10	-3	3.5	14.5	0	0	0	0	0	1	3.5
10/18/2017	2017	10	18 †	16	5.5	10.8	7.2	0	0	0	0	0	1	10.8
10/19/2017	2017	10	19 †	22	-1.5	10.3	7.7	0	0	0	0	0	1	10.3
10/20/2017	2017	10	20 †	16.5	10.5	13.5	4.5	0	0	0	0	0	1	13.5
10/21/2017	2017	10	21 †	14	2	8	10	0	0	0	0	0	1	8
10/22/2017	2017	10	22 †	14	-1	6.5	11.5	0	0	0	0	0	1	6.5
10/23/2017	2017	10	23 †	19.5	2	10.8	7.2	0	0	0	0	0	1	10.8
10/24/2017	2017	10	24 †	21.5	12	16.8	1.2	0	0	0	0	0	0	FALSE
10/25/2017	2017	10	25 †	19.5	17.5	18.5	0	0.5	48.2	0	48.2	0	0	FALSE
10/26/2017	2017	10	26 †	20	17	18.5	0	0.5	25	0	25	0	0	FALSE
10/27/2017	2017	10	27 †	11.5	8.5	10	8	0	0	0	0	0	1	10
10/28/2017	2017	10	28 †	15	0	7.5	10.5	0	0	0	0	0	1	7.5
10/29/2017	2017	10	29 †	16	7	11.5	6.5	0	0	0	0	0	1	11.5
10/30/2017	2017	10	30 †	18	10.5	14.3	3.7	0	27.2	0	27.2	0	1	14.3
10/31/2017	2017	10	31 †	12	5.5	8.8	9.2	0	0	0	0	0	1	8.8
11/1/2017	2017	11	1 †	7.5	0	3.8	14.2	0	0 T	0	0 T	0	1	3.8
11/2/2017	2017	11	2 †	15.5	2.5	9	9	0	10.2	0	10.2	0	1	9

Appendix F
RETScreen Model

RETScreen® International

www.retscreen.net

Clean Energy Project Analysis Software

Project information

See project database

Project name	AYR Motor Centre
Project location	Woodstock, NB
Prepared for	Controls & Equipment
Prepared by	TACE
Project type	Power
Technology	Photovoltaic
Grid type	Central-grid & internal load
Analysis type	Method 2
Heating value reference	Higher heating value (HHV)
Show settings	☑
Language - Langue	English - Anglais
User manual	English - Anglais
Currency	$
Units	Imperial units

Site reference conditions

Select climate data location

Climate data location	Fredericton Airport
Show data	☐

Complete Load & Network sheet

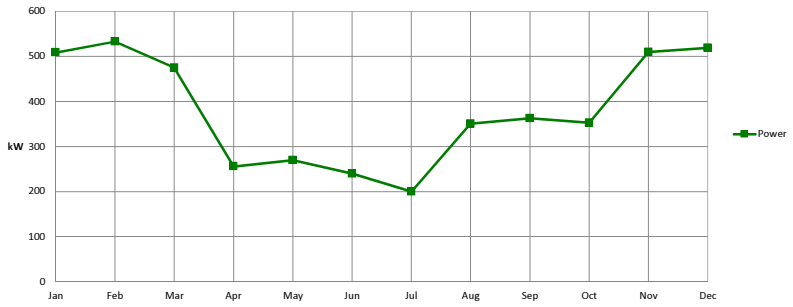
Power project	Unit	
Base case power system		
Grid type		Central-grid & internal load

Base case load characteristics

Month	Power gross average load kW
January	509
February	533
March	475
April	256
May	270
June	240
July	200
August	351
September	363
October	353
November	510
December	519

System peak electricity load over max monthly average		110.0%
Peak load - annual		1,119
Electricity	MWh	3,441
Electricity rate - base case	$/kWh	0.093
Total electricity cost	$	318,998

Base case system load characteristics graph

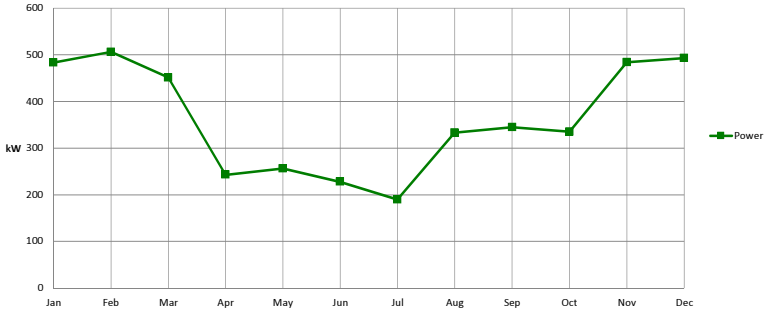


Proposed case load characteristics

Month	Power net average load kW
January	484
February	506
March	451
April	243
May	257
June	228
July	190
August	333
September	345
October	335
November	485
December	493

Peak load - annual	1,063

Proposed case system load characteristics graph



Proposed case energy efficiency measures

End-use energy efficiency measures	%	5%
Net peak electricity load	kW	1,063
Net electricity	MWh	3,269

Proposed case load and energy

		Power
System peak load	kW	1,063
System energy	MWh	3,269

Proposed case power system

Analysis type: ○ Method 1 ◉ Method 2

Resource assessment

Solar tracking mode		Fixed
Slope	°	10.0
Azimuth	°	45.0

☑ Show data

Month	Daily solar radiation - horizontal kWh/m²/d	Daily solar radiation - tilted kWh/m²/d	Electricity export rate $/MWh	Electricity exported to grid MWh
January	1.52	1.81	92.7	0.000
February	2.39	2.71	92.7	0.000
March	3.41	3.67	92.7	0.000
April	4.24	4.38	92.7	0.000
May	5.01	5.06	92.7	0.000
June	5.53	5.54	92.7	0.000
July	5.55	5.59	92.7	0.000
August	4.86	4.98	92.7	0.000
September	3.60	3.78	92.7	0.000
October	2.39	2.63	92.7	0.000
November	1.41	1.62	92.7	0.000
December	1.16	1.38	92.7	0.000
Annual	**3.43**	**3.60**	**0.00**	**0.000**

Annual solar radiation - horizontal	MWh/m²	1.25
Annual solar radiation - tilted	MWh/m²	1.31

Photovoltaic

Type		poly-Si	
Power capacity	kW	97.98	*See product database*
Manufacturer		Aleo Solar	
Model		poly-Si - aleo S_18 | 230	426 unit(s)
Efficiency	%	14.0%	
Nominal operating cell temperature	℃	45	
Temperature coefficient	% / ℃	0.40%	
Solar collector area	m²	700	
Miscellaneous losses	%	15.0%	

Inverter

Efficiency	%	98.0%
Capacity	kW	94.0
Miscellaneous losses	%	0.0%

Summary

Capacity factor	%	12.5%
Electricity delivered to load	MWh	107.048
Electricity exported to grid	MWh	0.000

Operating strategy - base load power system

Electricity rate - base case	$/MWh	92.70
Fuel rate - proposed case power system	$/MWh	0.00
Electricity rate - proposed case	$/MWh	92.70

Operating strategy	Electricity delivered to load MWh	Electricity exported to grid MWh	Remaining electricity required MWh	Power system fuel million Btu	Operating profit (loss) $	Efficiency %
Full power capacity output	**107**	**0**	**3,162**	**0**	**9,923**	-
Power load following	107	0	3,162	0	9,923	-

Select operating strategy: Full power capacity output

RETScreen Cost Analysis - Power project

Settings			
(•) Method 1	(•) Notes/Range	Notes/Range	
( ) Method 2	( ) Second currency	None	
	( ) Cost allocation		

Initial costs (credits)	Unit	Quantity	Unit cost	Amount	Relative costs
Feasibility study					
Feasibility study	cost	0		$ -	
Subtotal:				**$ -**	0.0%
Development					
Development	cost	0		$ -	
Subtotal:				**$ -**	0.0%
Engineering					
Engineering	cost	0		$ -	
Subtotal:				**$ -**	0.0%
Power system					
Base load - Photovoltaic	kW	97.98	$ 2,500	$ 244,950	
Peak load - Grid electricity	kW	1,063.34		$ -	
Road construction	km			$ -	
Transmission line	km			$ -	
Substation	project			$ -	
Energy efficiency measures	project			$ -	
User-defined	cost			$ -	
				$ -	
Subtotal:				**$ 244,950**	100.0%
Balance of system & miscellaneous					
Spare parts	%			$ -	
Transportation	project			$ -	
Training & commissioning	p-d			$ -	
User-defined	cost			$ -	
Contingencies	%		$ 244,950	$ -	
Interest during construction			$ 244,950	$ -	
Subtotal:		Enter number of months		**$ -**	0.0%
Total initial costs				**$ 244,950**	100.0%

Annual costs (credits)	Unit	Quantity	Unit cost	Amount
O&M				
Parts & labour	project	426	$ 10	$ 4,260
User-defined	cost			$ -
Contingencies	%	25.0%	$ 4,260	$ 1,065
Subtotal:				**$ 5,325**
Fuel cost - proposed case				
Electricity	MWh	3,162	$ 92.700	$ 293,125
Subtotal:				**$ 293,125**

Annual savings	Unit	Quantity	Unit cost	Amount
Fuel cost - base case				
Electricity	MWh	3,441	$ 92.700	$ 318,998
Subtotal:				**$ 318,998**

Periodic costs (credits)	Unit	Year	Unit cost	Amount
User-defined	cost			$ -
				$ -
End of project life	cost			$ -

RETScreen Emission Reduction Analysis - Power project

☑ Emission Analysis

- ⊙ Method 1
- ○ Method 2
- ○ Method 3

Base case electricity system (Baseline)

Country - region	Fuel type	GHG emission factor (excl. T&D) tCO2/MWh	T&D losses %	GHG emission factor tCO2/MWh
Canada	All types	0.196		0.196

☐ Baseline changes during project life

Base case system GHG summary (Baseline)

Fuel type	Fuel mix %	Fuel consumption MWh	GHG emission factor tCO2/MWh	GHG emission tCO2
Electricity	100.0%	3,441	0.196	675.5
Total	100.0%	3,441	0.196	675.5

Proposed case system GHG summary (Power project)

Fuel type	Fuel mix %	Fuel consumption MWh	GHG emission factor tCO2/MWh	GHG emission tCO2
Solar	3.3%	107	0.000	0.0
Electricity	96.7%	3,162	0.196	620.7
Total	100.0%	3,269	0.190	620.7

GHG emission reduction summary

	Base case GHG emission tCO2	Proposed case GHG emission tCO2	Gross annual GHG emission reduction tCO2	GHG credits transaction fee %	Net annual GHG emission reduction tCO2
Power project	675.5	620.7	54.8		54.8

Net annual GHG emission reduction	54.8	tCO2	is equivalent to	10.0	Cars & light trucks not used

RETScreen Financial Analysis - Power project

Financial parameters

General

Fuel cost escalation rate	%	3.0%
Inflation rate	%	3.0%
Discount rate	%	5.0%
Project life	yr	25

Finance

Incentives and grants	$	
Debt ratio	%	

Income tax analysis ☐

Annual income

Electricity export income

GHG reduction income ☐

Net GHG reduction	tCO2/yr	55
Net GHG reduction - 25 yrs	tCO2	1,370

Customer premium income (rebate) ☐

Other income (cost) ☐

Clean Energy (CE) production income ☐

Project costs and savings/income summary

Initial costs

Power system	100.0%	$	244,950
Balance of system & misc.	0.0%	$	0
Total initial costs	**100.0%**	**$**	**244,950**

Annual costs and debt payments

O&M	$	5,325
Fuel cost - proposed case	$	293,125
Total annual costs	**$**	**298,450**

Periodic costs (credits)

Annual savings and income

Fuel cost - base case	$	318,998
Total annual savings and income	**$**	**318,998**

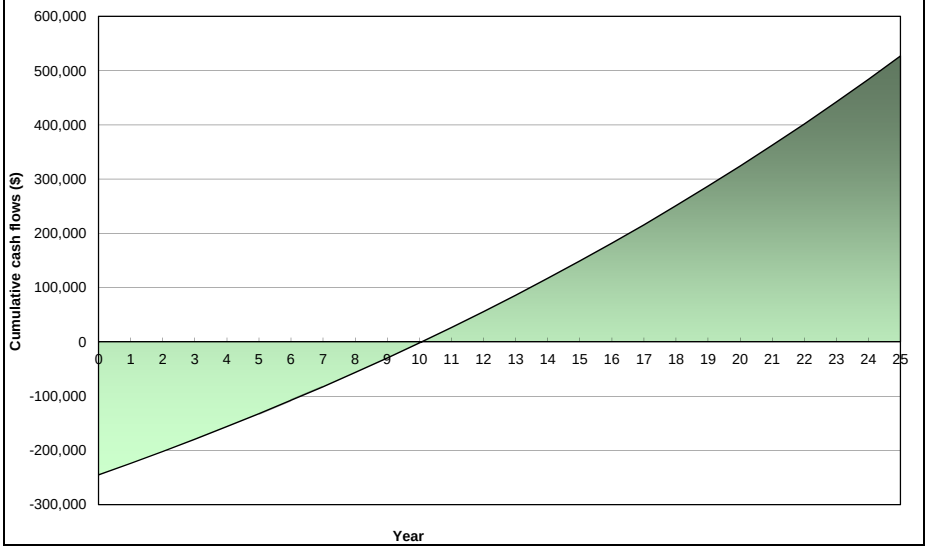
Financial viability

Pre-tax IRR - equity	%	10.0%
Pre-tax IRR - assets	%	10.0%
After-tax IRR - equity	%	10.0%
After-tax IRR - assets	%	10.0%
Simple payback	yr	11.9
Equity payback	yr	10.1
Net Present Value (NPV)	$	158,981
Annual life cycle savings	$/yr	11,280
Benefit-Cost (B-C) ratio		1.65
GHG reduction cost	$/tCO2	(206)

Yearly cash flows

Year	Pre-tax	After-tax	Cumulative
#	$	$	$
0	-244,950	-244,950	-244,950
1	21,165	21,165	-223,785
2	21,800	21,800	-201,986
3	22,454	22,454	-179,532
4	23,127	23,127	-156,405
5	23,821	23,821	-132,583
6	24,536	24,536	-108,048
7	25,272	25,272	-82,776
8	26,030	26,030	-56,746
9	26,811	26,811	-29,935
10	27,615	27,615	-2,320
11	28,444	28,444	26,124
12	29,297	29,297	55,421
13	30,176	30,176	85,597
14	31,081	31,081	116,678
15	32,014	32,014	148,691
16	32,974	32,974	181,665
17	33,963	33,963	215,629
18	34,982	34,982	250,611
19	36,032	36,032	286,642
20	37,113	37,113	323,755
21	38,226	38,226	361,981
22	39,373	39,373	401,353
23	40,554	40,554	441,907
24	41,770	41,770	483,678
25	43,024	43,024	526,701

Cumulative cash flows graph



Appendix G
Life-Cycle-Cost Analysis

Project: AYR Motor Centre, Woodstock, NB - Energy Study
Project Number: AYR Motor Centre
Date: June 26th 2018
Item: Life-Cycle-Cost Analysis - ECM8.1: New Swimming Pool HVAC Unit

Energy Calculation - Factors

Energy	Conversion factor to GJ (GJ / [Unit])	Conversion factor to GHG (g of CO2 eq/ [Unit])	Energy cost ($ / [Unit])	Energy Demand Cost ($ / [Unit])
Electricity (kwh)	0.0036	420.0	$0.09	$10.45
Natural Gas (m3)	0.0383	1903.0		-
Fuel Oil (L)	0.0388	2735.0		-
Diesel (L)	0.0383	2790.0		-
Propane (L)	0.0253	1544.0		-

Energy Details

Energy	Baseline - Consumption and Demand				Energy Efficiency Measure - Consumption and Demand				Savings			
	Energy	Demand	GHG (Tons of CO2 eq)	Cost	Energy	Demand	GHG (Tons of CO2 eq)	Cost	Energy	Demand	GHG (Tons of CO2 eq)	Cost
Electricity (kwh)	474 830 kWh	985 kW	199.4 Tons	$54,307	245 330 kWh	787 kW	103.0 Tons	$30,963	229 500 kWh	198 kW	96.4 Tons	$23,343.8
Natural Gas (m3)	0 m³	-	0.0 Tons	$0	0 m³	-	0.0 Tons	$0	0 m³	-	0.0 Tons	$0.0
Fuel Oil (L)	0 L	-	0.0 Tons	$0	0 L	-	0.0 Tons	$0	0 L	-	0.0 Tons	$0.0
Diesel (L)	0 L	-	0.0 Tons	$0	0 L	-	0.0 Tons	$0	0 L	-	0.0 Tons	$0.0
Propane (L)	0 L	-	0.0 Tons	$0	0 L	-	0.0 Tons	$0	0 L	-	0.0 Tons	$0.0
TOTAL	**1 709 GJ**	**-**	**199.4 Tons**	**$54,307**	**883 GJ**	**-**	**103.0 Tons**	**$30,963**	**826 GJ**	**-**	**96.4 Tons**	**$23,343.8**

Life Cycle Cost Analysis

Discount Rate / Borrowing Cost	3.0%
General Inflation Rate	3.0%
Energy Escalation Rate	3.0%
Life of Project	30
Energy Efficiency Measure Cost	$400,000
Utility Incentive	$24,786

NPV of Energy Efficiency Measure
$280,567.25

IRR of Energy Efficiency Measure
11%

Simple Payback (energy savings only & Applied Incentives)
16.1

			LCC - Baseline					LCC - Energy Efficiency Measure		
	Baseline - do nothing option		$1,624,982		Energy Efficiency Measure			$1,344,415		
Year (t)	Energy Costs	Other Costs (Present $)	Maintenance Costs (Present $)	Total Costs (Inflated $)	Initial Investment	Energy Costs	Other Costs (Present $)	Maintenance Costs (Present $)	Total Costs (Inflated $)	Net Cash Flow
0	**$1,185,682**	**$0**		**$439,300**	**$375,214**	**$928,901**	**$0**		**$40,300**	($375,214)
1	$55,936	$0	**$2,500**	$2,575		$31,892	$0	**$0**	$0	$26,619
2	$57,614	$0	**$2,600**	$2,758		$32,849	$0	**$0**	$0	$27,524
3	$59,343	$0	**$2,700**	$2,950		$33,834	$0	**$0**	$0	$28,459
4	$61,123	$0	**$2,800**	$3,151		$34,850	$0	**$0**	$0	$29,425
5	$62,957	$0	**$2,900**	$3,362		$35,895	$0	**$300**	$348	$30,076
6	$64,846	$0	**$3,000**	$3,582		$36,972	$0	**$400**	$478	$30,978
7	$38,081	$0	**$400,000**	$491,950		$38,081	$0	**$500**	$615	$491,335
8	$39,223	$0	**$0**	$0		$39,223	$0	**$600**	$760	($760)
9	$40,400	$0	**$0**	$0		$40,400	$0	**$700**	$913	($913)
10	$41,612	$0	**$0**	$0		$41,612	$0	**$800**	$1,075	($1,075)
11	$42,861	$0	**$0**	$0		$42,861	$0	**$900**	$1,246	($1,246)
12	$44,146	$0	**$300**	$428		$44,146	$0	**$1,000**	$1,426	($998)
13	$45,471	$0	**$400**	$587		$45,471	$0	**$1,100**	$1,615	($1,028)
14	$46,835	$0	**$500**	$756		$46,835	$0	**$1,200**	$1,815	($1,059)
15	$48,240	$0	**$600**	$935		$48,240	$0	**$1,300**	$2,025	($1,091)
16	$49,687	$0	**$700**	$1,123		$49,687	$0	**$1,400**	$2,247	($1,123)
17	$51,178	$0	**$800**	$1,322		$51,178	$0	**$1,500**	$2,479	($1,157)
18	$52,713	$0	**$900**	$1,532		$52,713	$0	**$1,600**	$2,724	($1,192)
19	$54,294	$0	**$1,000**	$1,754		$54,294	$0	**$1,700**	$2,981	($1,227)
20	$55,923	$0	**$1,100**	$1,987		$55,923	$0	**$1,800**	$3,251	($1,264)
21	$57,601	$0	**$1,200**	$2,232		$57,601	$0	**$1,900**	$3,535	($1,302)
22	$59,329	$0	**$1,300**	$2,491		$59,329	$0	**$2,000**	$3,832	($1,341)
23	$61,109	$0	**$1,400**	$2,763		$61,109	$0	**$2,100**	$4,145	($1,382)
24	$62,942	$0	**$1,500**	$3,049		$62,942	$0	**$2,200**	$4,472	($1,423)
25	$64,830	$0	**$1,600**	$3,350		$64,830	$0	**$2,300**	$4,816	($1,466)
26	$117,118	$0	**$1,700**	$3,666		$66,775	$0	**$2,400**	$5,176	$48,833
27	$120,632	$0	**$1,800**	$3,998		$68,779	$0	**$2,500**	$5,553	$50,298
28	$124,251	$0	**$1,900**	$4,347		$70,842	$0	**$2,600**	$5,949	$51,807
29	$127,978	$0	**$2,000**	$4,713		$72,967	$0	**$2,700**	$6,363	$53,361
30	$131,818	$0	**$2,100**	$5,097		$75,156	$0	**$2,800**	$6,796	$54,962

Project: AYR Motor Centre, Woodstock, NB - Energy Study
Project Number: AYR Motor Centre
Date: June 26th 2018
Item: Life-Cycle-Cost Analysis - ECM8.2: Ice Plant Upgrade

Energy Calculation - Factors

Energy	Conversion factor to GJ (GJ / [Unit])	Conversion factor to GHG (g of CO2 eq/ [Unit])	Energy cost ($ / [Unit])	Energy Demand Cost ($ / [Unit])
Electricity (kwh)	0.0036	420.0	$0.09	$10.45
Natural Gas (m3)	0.0383	1903.0		-
Fuel Oil (L)	0.0388	2735.0		-
Diesel (L)	0.0383	2790.0		-
Propane (L)	0.0253	1544.0		-

Energy Details

Energy	Baseline - Consumption and Demand				Energy Efficiency Measure - Consumption and Demand				Savings			
	Energy	Demand	GHG (Tons of CO2 eq)	Cost	Energy	Demand	GHG (Tons of CO2 eq)	Cost	Energy	Demand	GHG (Tons of CO2 eq)	Cost
Electricity (kwh)	849 196 kWh	1 298 kW	356.7 Tons	$92,280	729 996 kWh	1 063 kW	306.6 Tons	$78,779	119 200 kWh	235 kW	50.1 Tons	$13,501.4
Natural Gas (m3)	0 m³	-	0.0 Tons	$0	0 m³	-	0.0 Tons	$0	0 m³	-	0.0 Tons	$0.0
Fuel Oil (L)	0 L	-	0.0 Tons	$0	0 L	-	0.0 Tons	$0	0 L	-	0.0 Tons	$0.0
Diesel (L)	0 L	-	0.0 Tons	$0	0 L	-	0.0 Tons	$0	0 L	-	0.0 Tons	$0.0
Propane (L)	0 L	-	0.0 Tons	$0	0 L	-	0.0 Tons	$0	0 L	-	0.0 Tons	$0.0
TOTAL	**3 057 GJ**	**-**	**356.7 Tons**	**$92,280**	**2 628 GJ**	**-**	**306.6 Tons**	**$78,779**	**429 GJ**	**-**	**50.1 Tons**	**$13,501.4**

Life Cycle Cost Analysis

Discount Rate / Borrowing Cost	3.0%
General Inflation Rate	3.0%
Energy Escalation Rate	3.0%
Life of Project	30
Energy Efficiency Measure Cost	$800,000
Utility Incentive	$12,874

NPV of Energy Efficiency Measure
$159,189.11

IRR of Energy Efficiency Measure
6%

Simple Payback (energy savings only & Applied Incentives)
58.3

			LCC - Baseline					LCC - Energy Efficiency Measure		
	Baseline - do nothing option		$3,349,284		Energy Efficiency Measure			$3,190,095		
Year (t)	Energy Costs	Other Costs (Present $)	Maintenance Costs (Present $)	Total Costs (Inflated $)	Initial Investment	Energy Costs	Other Costs (Present $)	Maintenance Costs (Present $)	Total Costs (Inflated $)	Net Cash Flow
0	**$2,511,884**	**$0**		**$837,400**	**$787,126**	**$2,363,369**	**$0**		**$39,600**	($787,126)
1	$95,049	$0	**$2,300**	$2,369		$81,142	$0	**$0**	$0	$16,275
2	$97,900	$0	**$2,400**	$2,546		$83,577	$0	**$0**	$0	$16,870
3	$100,837	$0	**$2,500**	$2,732		$86,084	$0	**$0**	$0	$17,485
4	$103,862	$0	**$2,600**	$2,926		$88,666	$0	**$0**	$0	$18,122
5	$106,978	$0	**$2,700**	$3,130		$91,326	$0	**$0**	$0	$18,782
6	$110,188	$0	**$2,800**	$3,343		$94,066	$0	**$0**	$0	$19,465
7	$96,888	$0	**$800,000**	$983,899		$96,888	$0	**$500**	$615	$983,284
8	$99,795	$0	**$0**	$0		$99,795	$0	**$600**	$760	($760)
9	$102,789	$0	**$0**	$0		$102,789	$0	**$700**	$913	($913)
10	$105,872	$0	**$0**	$0		$105,872	$0	**$800**	$1,075	($1,075)
11	$109,049	$0	**$0**	$0		$109,049	$0	**$900**	$1,246	($1,246)
12	$112,320	$0	**$0**	$0		$112,320	$0	**$1,000**	$1,426	($1,426)
13	$115,690	$0	**$0**	$0		$115,690	$0	**$1,100**	$1,615	($1,615)
14	$119,160	$0	**$500**	$756		$119,160	$0	**$1,200**	$1,815	($1,059)
15	$122,735	$0	**$600**	$935		$122,735	$0	**$1,300**	$2,025	($1,091)
16	$126,417	$0	**$700**	$1,123		$126,417	$0	**$1,400**	$2,247	($1,123)
17	$130,210	$0	**$800**	$1,322		$130,210	$0	**$1,500**	$2,479	($1,157)
18	$134,116	$0	**$900**	$1,532		$134,116	$0	**$1,600**	$2,724	($1,192)
19	$138,139	$0	**$1,000**	$1,754		$138,139	$0	**$1,700**	$2,981	($1,227)
20	$142,284	$0	**$1,100**	$1,987		$142,284	$0	**$1,800**	$3,251	($1,264)
21	$146,552	$0	**$1,200**	$2,232		$146,552	$0	**$1,900**	$3,535	($1,302)
22	$150,949	$0	**$1,300**	$2,491		$150,949	$0	**$2,000**	$3,832	($1,341)
23	$155,477	$0	**$1,400**	$2,763		$155,477	$0	**$2,100**	$4,145	($1,382)
24	$160,141	$0	**$1,500**	$3,049		$160,141	$0	**$2,200**	$4,472	($1,423)
25	$164,946	$0	**$1,600**	$3,350		$164,946	$0	**$2,300**	$4,816	($1,466)
26	$199,011	$0	**$1,700**	$3,666		$169,894	$0	**$2,400**	$5,176	$27,607
27	$204,981	$0	**$1,800**	$3,998		$174,991	$0	**$2,500**	$5,553	$28,436
28	$211,131	$0	**$1,900**	$4,347		$180,241	$0	**$2,600**	$5,949	$29,289
29	$217,465	$0	**$2,000**	$4,713		$185,648	$0	**$2,700**	$6,363	$30,167
30	$223,989	$0	**$2,100**	$5,097		$191,217	$0	**$2,800**	$6,796	$31,072