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ENERGY AUDIT REPORT

for 6 Milvan Drive, North York, Ontario

Presented To:

1276042 ONTARIO INC.
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North York, Ontario,
Tel: (416) 742-1315
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2011

Prepared by:

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ABS File No. G-EA-10.02

Date: January 10th, 2011

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1.0 Executive Summary

Based on the site reviews, review of facility operating data, equipment schedules, existing documents to prepare inventory of the existing building elements, interviews with Client, Operating Personnel, RETScreen analysis of recommended energy measures suggest both energy and cost savings when compare with actual building.

2010 utility rates extracted form utility bills of $0.139/Kwh for electricity and $0.539 /m3 (Includes overall utility charges) for natural gas were used throughout the entire analysis.

Based on electricity and natural gas billing analysis of actual building, the electricity energy consumption and cost are approximately 199GJ (Gigajoules) ($7706) & natural gas is 398GJ ($5610).

Based on RETScreen analysis the proposed building fuel and cost consumptions are approximately for electricity is 131.4GJ ($5077) and natural gas is 201GJ ($2865).

After implementing all following recommended energy savings options (A) the total cost savings shall be approximately $6,667 (44.9%). (B) The total fuel (electric & natural gas) savings shall be 270GJ.

Simply payback analysis including education and engineering fee will be 7.31 years.

1.1 ENERGY EFFICIENCY MEASURES - SUMMARY TABLE

Description	Increme--ntal . Cost $	Annual Savings				Simple Payback Years
		Annual Cost Savings $	Heating GJ	Cooling GJ	Electricity GJ	
4.1.1 Windows Replacement	$5,000	1,211	51	13	-	4.1
4.1.2 Door Upgrade, Insulation	$1,500	152	10	1	-	9.9
4.1.3 (a) Ceiling Wall Insulation	$3,000	524	34	-	-	5.7
4.1.3 (b) West Overhang Insulation	$2,000	214	14	-	-	9.3
4.2.1 Rooftop Unit Replacement	$10,566	1,290	-	8	-	8.2
4.2.2 (a) Ventilation Upgrade	$7,000	347	24	-	-	20.2
4.2.2 (b) Shipping Area Ventilation	$3000	611	44	-	-	4.9
4.2.2 (c) Washrooms Ventilation	$3,700	279	20	-	-	13.2
4.2.3 Hot Water Upgrade	$1,500	202	4	-	-	8.8
4.3.1 (a) Office Lighting Upgrade	$2,000	772	-	-	20	2.6
4.3.1 (b) Outdoor Lighting Upgrade	$50	365	-	-	10	0.1
4.3.1 (c) Stairwell Lighting Upgrade	$250	158	-	-	4	1.6
4.3.1 (d) Exit Lighting Upgrade	$500	341	-	-	9	1.5
4.3.1 (e) Corridor Lighting Upgrade	$200	201	-	-	5	1
4.5 Education	$1,000					
4.6 Engineering Fees	$7,500					
Total	**48,766**	**6,667**	**201**	**22**	**48**	**7.31**

1.2 INTRODUCTION

Client Information: 1276042 Ontario Inc.
6 Milvan Drive, North York, Ontario

Contact Information: Mr. Tameshwar Lilmohan
Property Owner
Tel: 416.742.1315
Fax: 416.742.3401
E-mail: tnassosm@on.aibn.com

Energy Auditor:

ABS GREEN INC. was retained by client Mr. Tameshwar Lilmohan of 1276042 Ontario Inc. and authorization to proceed with the work was awarded on December 18, 2010 to conduct an Energy Audit of the Office Building located at 6 Milvan Drive, North York, Ontario & to prepare Energy Audit report. The intent of this report is to present the findings of the building energy performance analysis, propose recommendations for the reduction in building energy consumption and cost estimates.

Imran Majeed, P.Eng, of ABS Green Inc. visited the above stated site on December 18, December 23, 2010 and January 5th, 2011 to evaluate the building and meet with client to summarize the outcome of the findings and discuss possible energy saving measures. The following work, briefly described below, were carried out:

1. Review of facility operating data, equipment schedules, existing documents to prepare inventory of the existing building elements potentially presenting energy management opportunities.
2. Meeting on site with Client and maintenance personal Mr. Archi to understand the past and current building conditions including mechanical and electrical systems and discuss possible energy saving measures.
3. A comprehensive visual review of the building systems to identify the energy saving areas.
4. Gather data such as major existing equipment including lighting, all sources of heating and cooling, fuel type as well as manufacturer, model number, physical condition and year of service.
5. Pictures of existing building component were taken to show building and its component existing physical condition.

The survey was limited to visual inspection on a sampling basis only during three (3) site visits. No item of equipment was tested to determine capacity or operating efficiency. As indicated by Client, no construction documents of such as architectural, structural, mechanical and electrical system drawings and specification were in Client possession that can help us to precisely determine the physical characteristics of the building, its current condition, construction type, structural, mechanical and

electrical systems. Client expressly agreed, for the purpose of conducting this energy analysis, to make legitimate assumptions wherever information is simple not available or missing. Where equipment nameplates were obscured or missing, the information reflect in this report is based on our own professional judgement.

Following documents have been provided by the Client for our review.

1) Preliminary Building Inspection Report, prepared by Carson Dunlop Weldon & Associates Ltd, dated January 22, 1998.
2) Toronto Hydro Electricity Bills – Meter Number 424089 from December 2009 to October 2010.
3) Toronto Hydro Electricity Bills – Meter Number 30004437 from December 2009 to November 2010.
4) Toronto Hydro Electricity Bills - Screenshot of Billing History from March 2002 to August 2010.
5) Enbridge Natural Gas Bills – From December 2009 to November 2010.
6) Environmental Report, prepared by Environmental Auditors (Canada) Ltd, dated June 26, 1998.
7) Roof Replacement quotation, prepared by Andy Carneiro (416-997-0717).
8) Two page surveyor plan prepared by Speight And Van Nostrand Limited, dated March 28, 1980.
9) Fax received, dated Dec 30 and Dec 31, 2010, from Client Office includes; appliances quantities and general lighting watts with quantities.

1.3 DISCLAIMER & LIMITATIONS

(Refer to Appendix "A").

1.4 PROPERTY AND BUILDING INFORMATION

The property is located at 6 Milvan Drive, North York, Ontario. The property is rectangular in shape and comprises an area of approximately 0.085 ha (0.21 ac). The open portion of the property is asphalted except for a small landscaped area fronting Milvan Drive. The property is bounded to the North and West by a commercial establishment and to the South by a fence with open area. Retail establishments are located to the East separated by Milvan Drive.

The visual evidence suggested that the constructed circa of the building was 1971. Buildings with its north face directed counter-clockwise approximately 107 degrees west. The Office Building is rectangular in shape and comprises of a three (3) stories brick building structure and has a floor space of approximately 8287 sq. ft. with very limited outdoor parking allowed on North and West side of the building. The building is of slab-on-grade construction and has no basement. First floor is approximately 2287 sq. ft. in area and consist of one large office suite with shipping and receiving area located on West of the building. The second and third floors are approximately 3000 sq. ft. per floor in an area and consist of Office suites, Washrooms, Corridors, Stairwells and Service Closets. Second and Third floors are extended above the First floor Shipping and West parking areas. Building have two stairs one is located at the East entrance and other is located on South side of the building.

Since 1998, the building is used as Office Building and currently occupied. As indicated by client some of the third floor office suites are vacant since early 2010. The property itself is flat, no vegetation, plant or trees were observed during inspection, which helps to provide shading, reduce infiltration and building energy consumption. *(Refer to Photo 1 in Appendix "B")*.

1.5 BUILDING CURRENT CONDITION

Building structure consist of concrete block foundations to support concrete block and brick veneer exterior walls. The steel roof deck and concrete floors are supported by open web steel joists which are supported by masonry bearing walls and exterior walls. Roof has been upgraded in late 2009. *(Refer to Photo 2 in Appendix "B")*.

Exterior building envelope consist of approximately 82.6% wall area (clad with brick veneer) with expanded polystyrene foam insulation (R-6) and approximately 17.4% glazing area which are aluminum framed, double glazed unit without any external shading devises. Out of 97 windows, 25 of them are operable type with horizontal sliders. Front entrance doors are aluminum framed, single glazed units and the west overhead door is a plywood sectional unit without any vestibules. The other doors on main floor are steel units. Access was not gained to the floor area above the west overhang. However, what appears in previous report to be a mineral wool or fibreglass batt insulation. In general, as a result of poor Wall/Roof insulation, air leaking doors and windows makes the building vulnerable to energy losses. *(Refer to Photo 3 in Appendix "B" and List in Appendix "C")*.

Building Interior consist of office suites with suspended T-Bar ceiling, drywall and carpeting. Washrooms and Corridor consist of ceramic or resilient tiles. *(Refer to Photo 4 in Appendix "B")*.

Building Electrical system consists of two separate hydro meters, one is for 200-amps, 120/240-volt, single-phase service and second is for 200-amps, 600-volt, three-phase electrical service. In general, building has Fluorescent T12 lighting with 4 lamps each of 34 watts and 2 ballasts each of 40 watts in entire office suites, Fluorescent T12 with 2 lamps each of 34 watts & 1ballast of 40 watts in Corridors & stairwells. Chandelier was found in 3rd floor East stairwell with five (5) Incandescent bulbs. Shipping area lighting consist of 4 Fluorescent T12 lighting fixture with 8 feet long 2 lamps each of 96 watts and 1 ballasts of 150 watts & adjacent office consist of one Fluorescent T12 with 2 lamps each of 34 watts and 1ballast of 40 watts. The building is provided with exit lighting system consisting of EXIT signs with incandescent 50W bulbs. Exterior & Washroom lightings are surface mounted fixtures with one (1) Incandescent bulb. Front exterior light were on during site visit. *(Refer to Photo 5 in Appendix "B" and List in Appendix "C")*.

Building Heating and Cooling systems consist of three natural gas fired with air cooled DX electrical cooling rooftop units for second and third floors and for first floor there is one floor mounted natural gas fired furnace with duct mounted DX cooling coils with outdoor condensing unit. One condenser unit was found at roof. *(Refer to Photo 6 in Appendix "B")*.

Five thermostats were found in entire building to control air temperature, two are located at third floor office suites one for each five ton rooftop unit but do not have the programming capability for night setback, one programmable thermostat is located in second floor corridor for ten ton rooftop unit, one programmable thermostat is located in first floor office suite for three ton furnace and one abandoned thermostat is located in main floor electrical room. Gas meter is located on South West end of the Shipping area near door. *(Refer to Photo 7 in Appendix "B")*.

Building ventilation is achieved with operable windows. Three Rooftop units and one furnace have no fresh air system or simply missing economiser and fresh air kit. The washrooms at second and third floors are ventilated by operable windows. First floor washroom is provided with exhaust fan. All washrooms are provided with supply air grilles Shipping area ventilation is achieved with one wall exhaust fan located in North wall. No humidity control was found in the building. *(Refer to Photo 8 in Appendix "B")*.

Building water meter is located under lavatory counter where the water main service enters. All water piping is copper. Domestic hot water heating system consist of 50 gallons, natural gas fired water heater with Power vent located adjacent to the first floor furnace in Shipping Office area.

<u>Building General Information at Glance:</u>

Audit Location:	6 Milvan Drive, North York, Ontario.
Built:	early 1970's
Building True North:	Directed Counter-Clockwise 107 degrees west
Type of Operation:	Office
Number of Floors:	3
Gross Floor Area:	8287 Sq. ft.

Net Air-Conditioned Area:	8287 Sq. ft.
Construction Type:	Reinforced Concrete, Brick Veneer, Steel Frame
Roof Type:	Flat
Glazing:	Double Glass with Aluminum Frame (AIRLITE CMHC 5537)
Exterior Glass Shading:	None
Interior Glass Shading:	Shades, Blinds, Drapes (open mesh), Film
Building Occupancy:	Weekdays – 9:00 am – 5:00 pm
Hours of Air-Conditioned:	Weekdays – 9:00 am – 5:00 pm
Shipping Area:	Weekdays – 9:00 am – 7:00 pm
Unoccupied Hours:	Weekdays – 5:00 pm – 9:00 am Saturday – Partially Occupied Sunday - Closed
Number of People	22 Actual and 56 (Calculated as per ASHRAE, less shipping area)

HVAC Systems at Glance:

Principle Systems:	Rooftop units for 2nd and 3rd floors & Furnace for 1st floor
Principle of Operation:	Constant Volume Heating or Cooling
Principal Heating:	Natural Gas
Principal Cooling:	Electricity
Perimeter Systems:	Not Available
Cooling Plant:	Not Available
Boiler Plant:	Not Available
DHW:	Natural Gas
Cooling to Heating	Subjected to Weather Conditions
Indoor Temperature	74 °F Year Round
Control	Via Thermostat
Air Infiltration (Window)	500 CFM (Assumed)
Air Infiltration (Doors)	250 CFM (Assumed)

Lighting at Glance:

Principal Systems:	T12 with electronic ballast
Principle of Operation:	On during Occupied hours
Control	Via light switch in each office and corridor. Trend to shut down the Corridor lighting on leaving basis.

Current Normalized Annual Utility Costs and Consumption:

Fuel Usage	Consumption	Intensity (Unit/ft2)	Costs
Electricity	199 GJ	6.28	$7706
Natural Gas	398 GJ	1.18	$5,610
Building Total	**597 GJ**	**7.46**	**13,316**

RETScreen Base Case Normalized Annual Energy Usage and Energy Index:

Energy Usage	Heating	Cooling	Electricity	Total
Base Case	323 GJ	159 GJ	157 GJ	639 GJ
Intensity	0.0390 GJ/ft2	0.0192 GJ/ft2	0.0189 GJ/ft2	0.0771 GJ/ft2

The Overall energy intensity of the building in 2010 was 0.0771 GJ/ft2.

1.6 OVERVIEW OF ENERGY EFFICIENCY MEASURES

To maximize the potential savings and incentive, our recommendation is to have multiple energy efficiency measures in the building.

Building Envelope: The main opportunities for energy conservation involve the upgrading of the aging glazing, single pan doors at each entrance, wall insulation within ceiling plenum spaces, west overhang area along with west wooden door to be insulated to minimize the energy losses and reduce the building thermal loads. In addition provide weather proof strips and seals at each entrance doors and west wooden door to minimize air infiltration.

Heating, Ventilation and Air-Conditioning (HVAC): The main opportunities for energy conservation involve the replacement of original and aging three (3) constant volume rooftop units installed in 1998, with more efficient and more appropriately sized constant volume rooftop units with high efficiency motors, economizer and energy recovery system for fresh air.

The original air distribution system consist of sheet metal duct work shall be provided either new VAV boxes with controls or Variable air flow thermal diffusers with built-in controls. Missing and/or damaged insulation shall be replaced. Rebalance the entire HVAC System.

Provide Heat Recovery Ventilators for building fresh air, washrooms and Shipping area ventilation.

Domestic Hot Water Heating: Reduce the usage of hot water by introducing the aerators with sensor faucets in each washroom faucets & replace the existing domestic hot water heater with high efficient Insta heater.

Interior and Exterior Building Lighting: We recommend a number of lighting measures to replace the remaining aging and less efficient florescent T12 lighting lamps with T-5, reduce lighting levels in some areas as permitted by code and reduce run hours as much as possible. Replace existing incandescent exit signs with LED signs.

Energy Conservation Awareness And Education: Finally, we recommend a communications strategy to encourage tenant to promote conservation and to highlight organizational environmental values.

1.7 OVERVIEW OF RETScreen SOFTWARE

In accordance with ecoENERGY retrofit incentive program, each energy measures shall be evaluated by using RETScreen software to simulate the actual energy consumption of the building rather than use a theoretical reference building.

RETScreen Clean Energy Project Analysis Software: As instructed by NRCan ecoENERGY program, the energy auditor performing the energy audit consult a software application such as NRCan's RETScreen V-4. The RETScreen Clean Energy Project Analysis Software is a unique decision support tool developed with the contribution of numerous experts from government, industry, and academia. The software, provided free-of-charge, can be used worldwide to evaluate the energy production and savings, costs, emission reductions, financial viability and risk for various types of Renewable-energy and Energy-efficient Technologies (RETs). It should be noted that the purpose of RETScreen Version 4 analysis and simulations is to predict the expected energy use of the building and to provide a uniform and consistent means and basis for completing the actual pre-project energy audit report.

2.0 Detailed Current Building Systems Overview

2.1 MECHANICAL

The building mechanical systems consist of heating, natural ventilation and air conditioning (HVAC), plumbing and drainage systems includes domestic water, sanitary and storm drainage and associated plumbing fixtures with piping.

2.1.1 Heating, Natural ventilation and Air Conditioning (HVAC): Building Heating and Cooling systems consist of three natural gas fired with air cooled DX-R22 based electrical cooling, rooftop units of capacities 5 tons each for third floor offices suites and one 10 ton unit for second floor offices suites. For entire first floor there is one a floor mounted natural gas fired furnace with duct mounted DX cooling coils of 3 tons in capacity with outdoor condensing unit serving front office and west shipping area. One condenser unit was found at roof. East stairwell is provided with air system.

Access was not gained to the floor area above the west overhang. It was not evident that the space is provided with any heating system.

2.1.2 Ventilation: Building ventilation is achieved with operable windows to provide natural ventilation. Three Rooftop units and one furnace have no fresh air system or simply missing economiser and fresh air kit. The washrooms at second and third floors are ventilated by operable windows. First floor washroom is provided with exhaust fan. All washrooms are provided with supply air grilles. Shipping area ventilation is achieved with one wall exhaust fan located on North wall.

2.1.3 Air Distribution: The supply and return air distribution system uses rectangular shape sheet metal duct work with round branch ducts complete with air diffusers and supply grilles located above windows with return air grilles distributed throughout the building. Each ceiling space in every floor act as return air plenum.

2.1.4 Controls: There is no DDC system in a building. Five thermostats were found in entire building to provide temperature control, two are located at third floor office suites one for each five ton rooftop unit but do not have the programming capability for night setback, one programmable thermostat is located in second floor corridor for ten ton rooftop unit, one programmable thermostat is located in first floor office suite for three ton furnace and one abandoned thermostat is located in main floor electrical room. No humidity control was found in the building.

2.1.5 Others: Gas meter is located on South West end of the Shipping area near door.

2.1.6 Plumbing: Domestic hot water heating system consists of RHEEM PVS50 - 50 gallons, natural gas fired water heater located adjacent to the main electrical service entrance. All water piping is copper, it is not determined as to grade, considering that it appeared to be original & assumed to be type L or K.

Public washrooms are provided with white vitreous china floor mounted tank type water closets. Lavatories are with stand and separate cold and hot water sensor less faucets without or simply missing aerators.

2.1.7 Current Major Equipment & Window List: All current major equipment and windows are listed in *Appendix "C"* indicating all sources of heating and cooling, energy consumption, fuel type, manufacturer, model number, physical condition and years of service.

2.2 ELECTRICAL

The building electrical systems consist of site services, power distribution, exit, interior and exterior lighting.

2.2.1 Site Services: The building is serviced overhead from Toronto Hydro overhead pole located on Milvan Drive.

2.2.2 Power Distribution: Building Electrical system consists of two separate hydro meters, one is for 200-amps, 120/240-volt, single-phase service and second is for 200-amps, 600-volt, three-phase electrical service.

2.2.3 Exit Lighting System: The building is provided with exit lighting system consisting of EXIT signs with anticipated incandescent 50W bulbs.

2.2.4 Interior & Exterior Lighting: In general, building has Fluorescent T12 lighting with 4 lamps each of 34 watts and 2 ballasts each of 40 watts in entire office suites, Fluorescent T12 with 2 lamps each of 34 watts & 1ballast of 40 watts in Corridors & stairwells. Chandelier was found in 3rd floor East stairwell with five (5) Incandescent bulbs.

Shipping area lighting consist of 4 Fluorescent T12 lighting fixture with 8 feet long 2 lamps each of 96 watts and 1 ballasts of 150 watts & adjacent office consist of one Fluorescent T12 with 2 lamps each of 34 watts and 1ballast of 40 watts.

The building is provided with exit lighting system consisting of EXIT signs with incandescent 50W bulbs.

Exterior & Washroom lightings are surface mounted fixtures with one (1) Incandescent bulb. *F*ront exterior light were on during site visit.

Typically, lighting is controlled by local switches.

2.2.5 Communication & Security Systems: Both Communication and Security services are not provided in a building.

3.0 Detailed Energy Analysis

3.1 BUILDING DEGREE DAYS

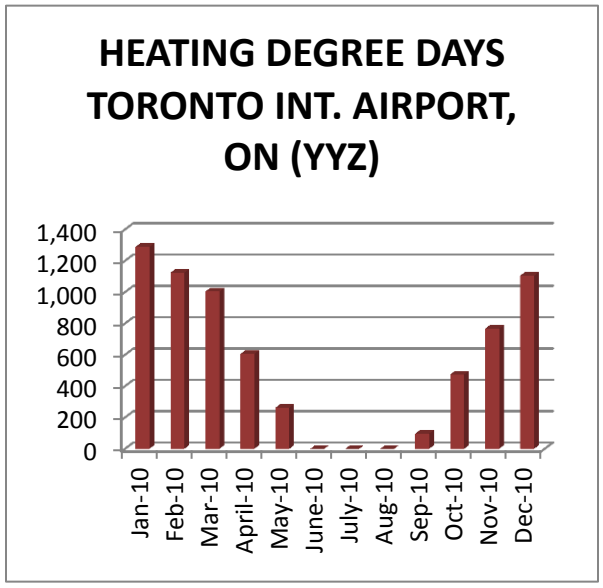
Based on Current Bills - December 2009 to November 2010

Degree Days is a unit used in estimating energy requirements for building heating and cooling. The monthly degree-days as indicated in Chart-1 and Chart-2 are the days below 18ºC (65ºF) and above 10ºC (50°F) respectively. The monthly degree-days are the sum of the degree-days for each day of the month.

Heating degree-days for a given day represent the number of Celsius or Fahrenheit degrees that the mean temperature is below 18ºC (65ºF).

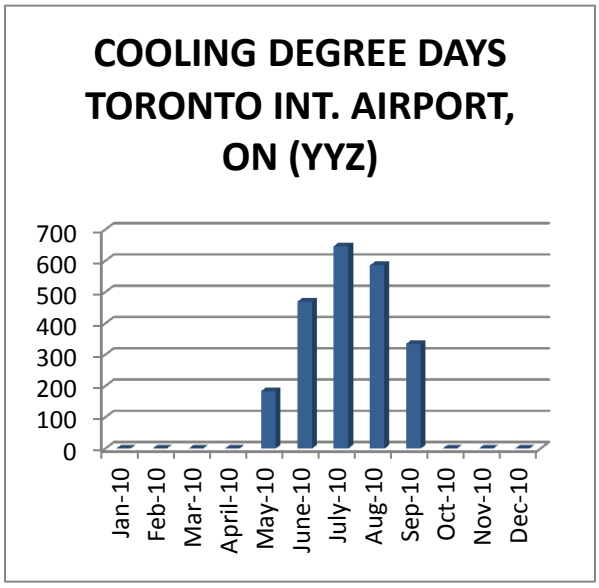
Cooling degree-days for a given day represent the number of Celsius or Fahrenheit degrees that the mean temperature is above 10ºC (50°F). RETScreen model calculates the heating degree-days for the entire year.

CHART-1



Total Heating Degree Days – 6728, (75%)

CHART-2



Total Cooling Degree Days – 2222, (25%)

3.2 CURRENT BILLING ANALYSIS

3.2.1 Electricity Bills: December 2009 to October 2010

Includes 11 months history of all electrical energy type used in the building, to analyze the building's energy profile, to develop energy-efficient measures and to understand the patterns of energy consumptions.

CHART-3: Represent electrical consumption of 200-amps, 120/240-volt, Single-phase service.

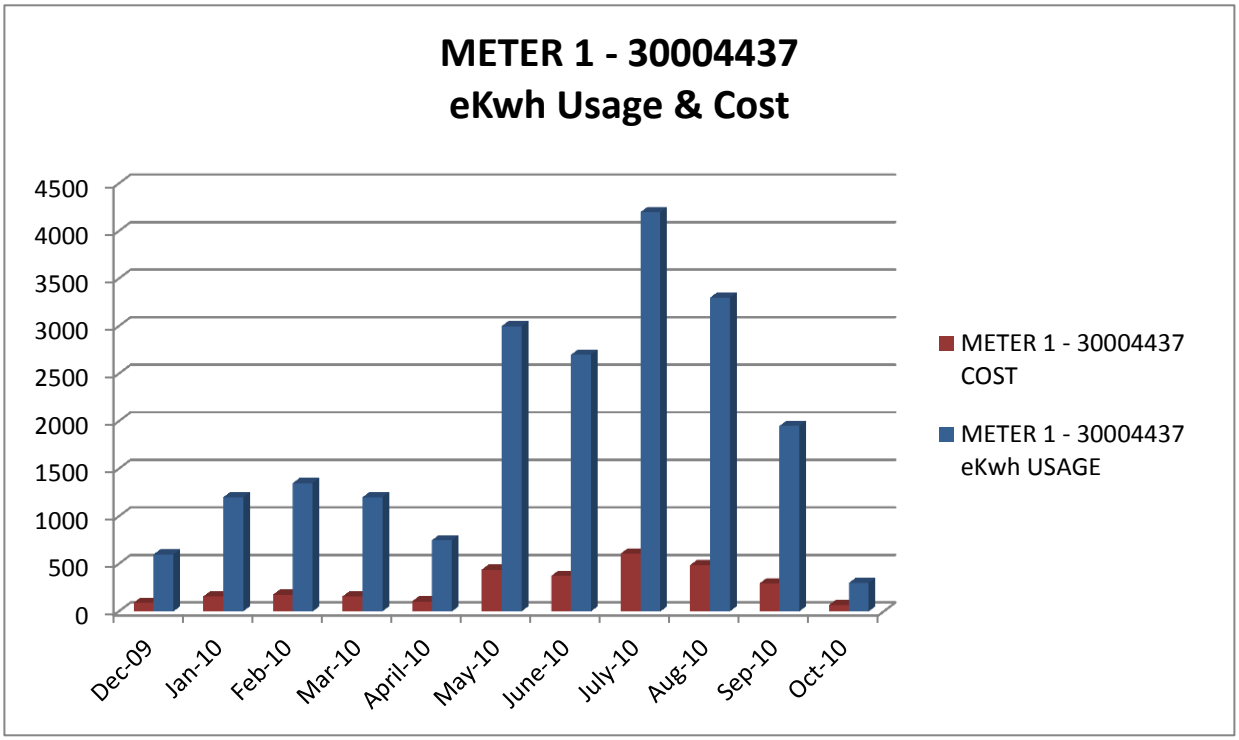


CHART-4: Represent electrical consumption of 200-amps, 600-volt, Three-phase electrical service.

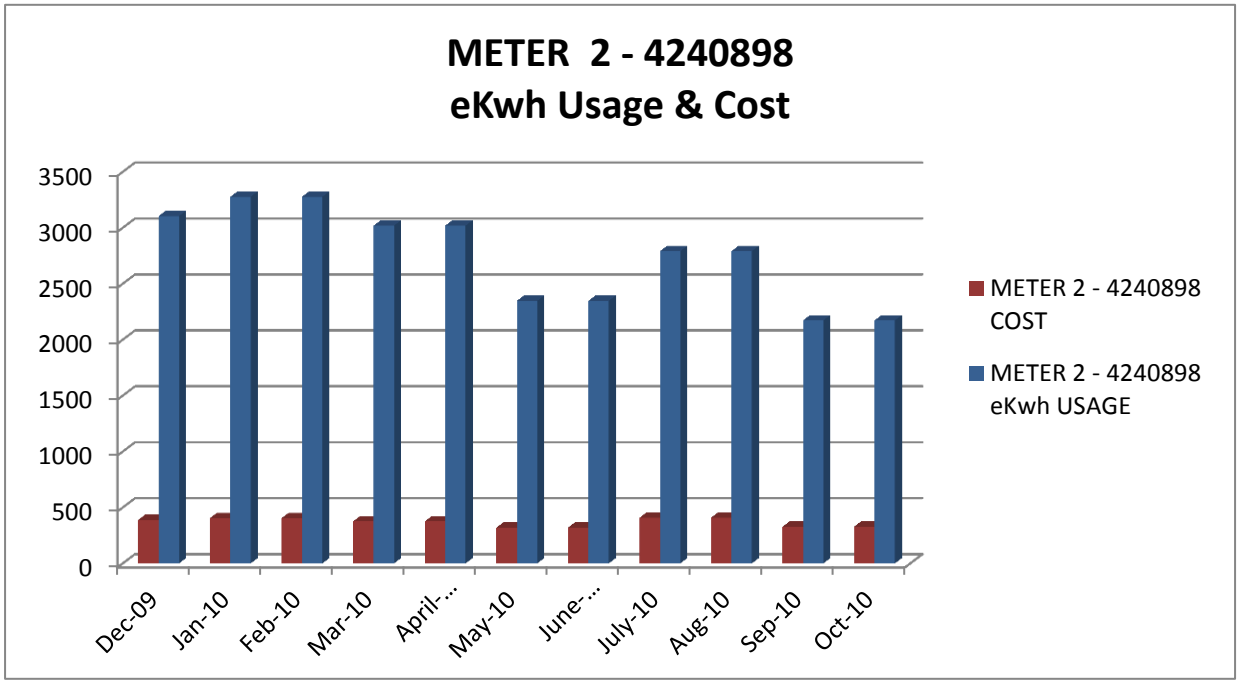
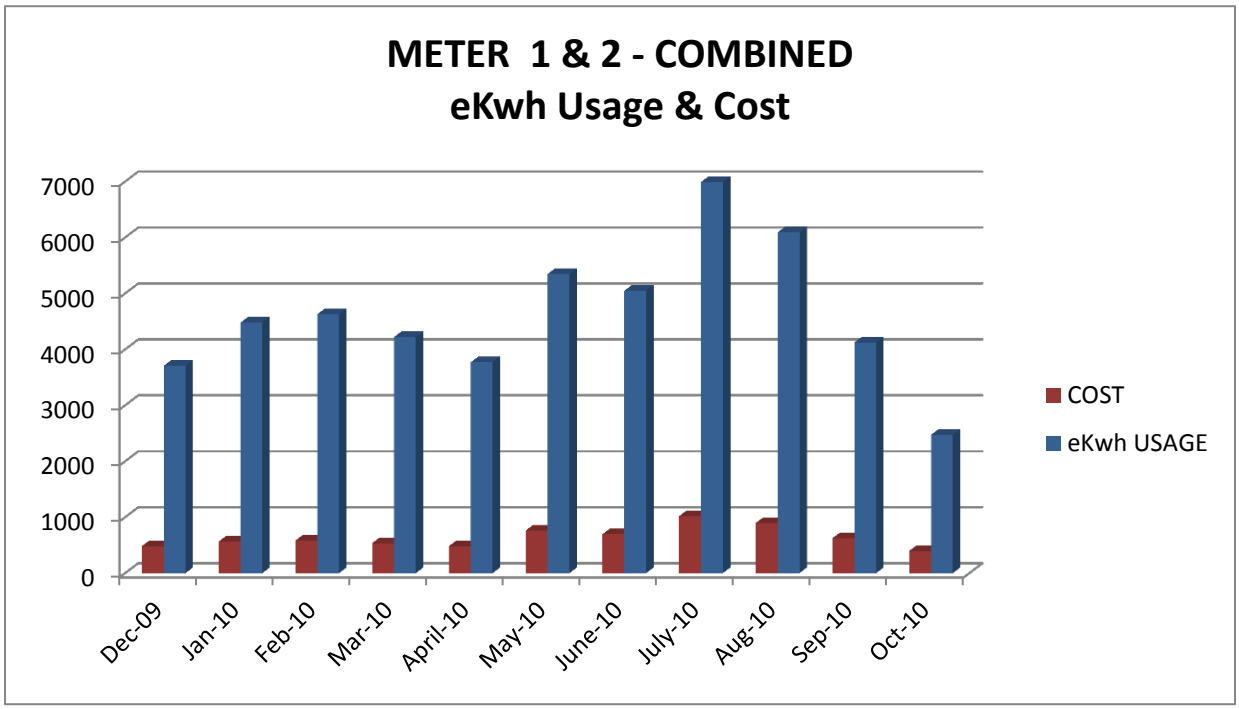


CHART-5: Represent electrical consumption of combine building electrical services: 200-amps, 120/240-volt, single-phase service and 200-amps, 600-volt, three-phase electrical service.



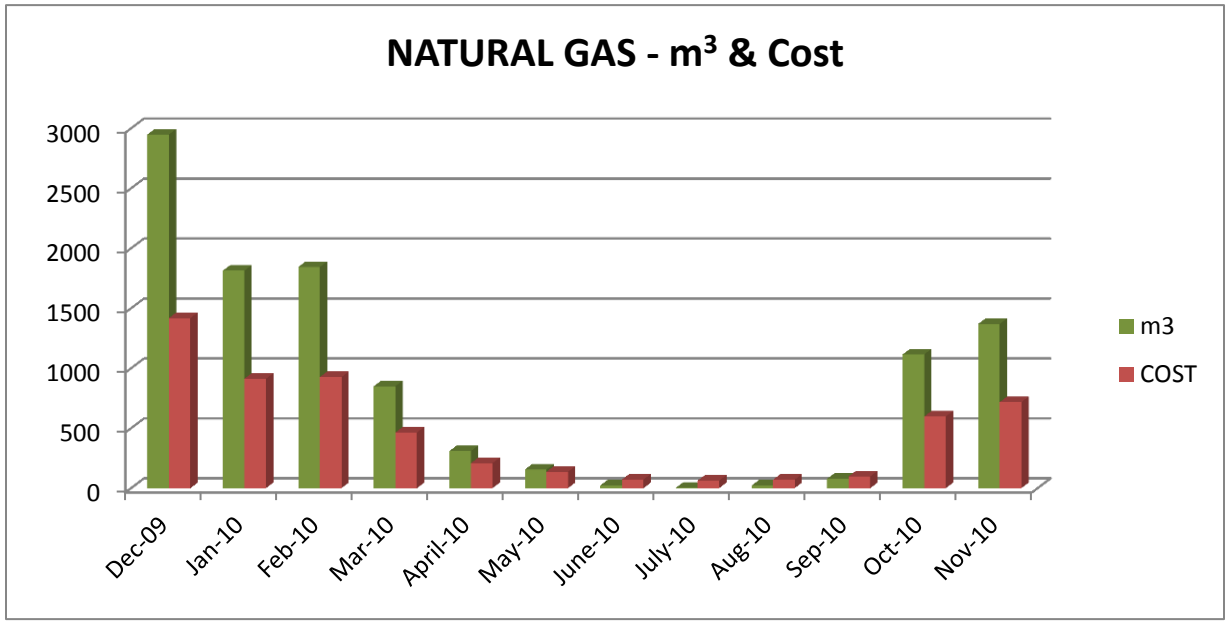
The electrical consumption profile in Chart-5 above, reflect a non-consistent use of electrical energy in the building. The consumption stays near peak levels in the months of May, June, July and August which represent the cooling months. October consumption in particular seems to be low. Through autumn and most of the winter there is no significant drop in consumption that would normally be expected from reduced cooling loads. However, due to energy losses and based on this analysis the building energy consumptions can be reduce by implementing the measures as recommend in this report.

3.2.2 Gas Bills: December 2009 to November 2010

Includes 12 months history of Natural Gas energy type used in the building, to analyze the building's energy profile, to develop energy-efficient measures and to understand the patterns of energy consumptions.

Natural gas consumption of the building as indicated in Chart-6 reflects that the gas consumption reduces significantly during the summer months. The only gas used in the summer month is to heat the domestic hot water. The usage trend seems obvious but surprisingly high in the December due to high infiltration and energy losses from windows, doors etc, throughout the building. Our investigation reveals that as a result of poor Wall/Roof insulation (R-6), air leaking doors and windows makes the building vulnerable to energy losses.

CHART-6



3.2.3 Overall Building Energy Consumption & Cost Analysis - Based on Current Bills

December 2009 to November 2010

Chart-7 and Chart-8 represents total natural gas and electricity consumptions in similar eKwh units and total cost in Dollars. Surprisingly the total natural gas usage in eKwh units is extremely higher than electricity consumption within the building. Chart-7 reveals that the natural gas usage is approximately 111889 eKwh (350GJ) which is 68% and electricity usage is approximately 53334 eKwh (192GJ) which is 32% of the entire energy consumption. This results due to heating degree days and high infiltration and energy losses from windows, doors etc, throughout the building. Our investigation reveals that as a result of poor Wall/Roof insulation (R-6), air leaking doors and windows makes the building vulnerable to energy losses.

CHART-7

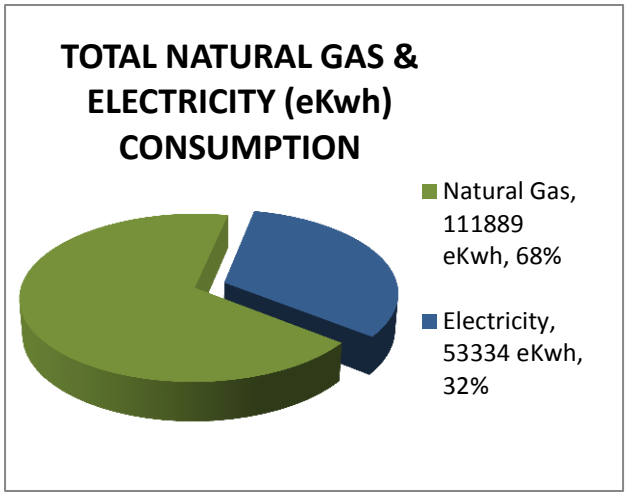
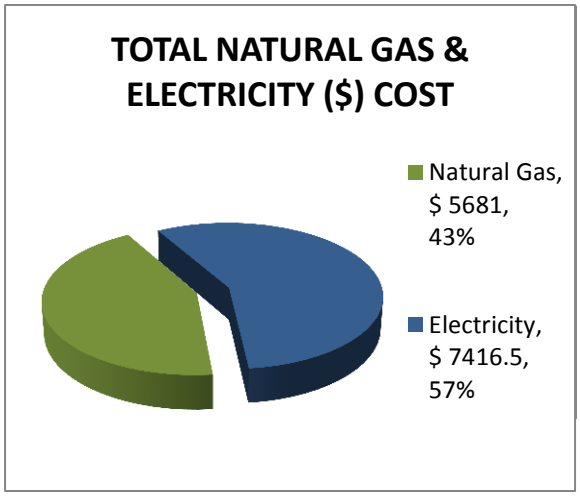


CHART-8



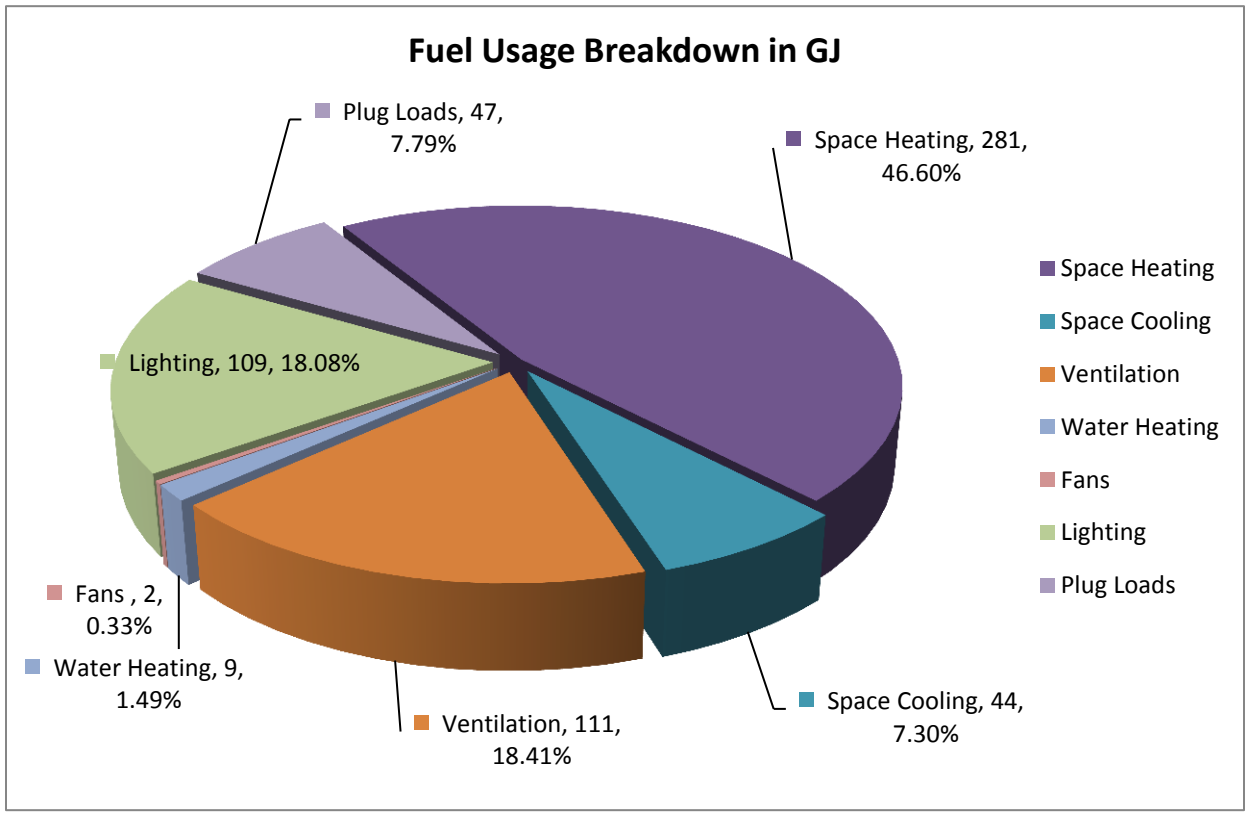
Although total consumption of natural gas energy is higher to electrical energy on annual basis, the electricity unit cost is much higher than natural gas in equivalent (ekWh) unit for the entire baseline period. Chart-8 reflects that the overall natural gas usage cost is $5681 which is 43% and electricity usage cost is $7416.5 which is 57% for the base case.

3.2.4 Breakdown of 2010 Base Building Fuel and Energy Consumption By RETScreen:

Fuel Usage Breakdown by RETScreen:

Description	Overall Consumption in GJ	Overall %	Electricity in GJ	Electricity %	Natural Gas in GJ	Natural Gas %
Space Heating	281	46.60%	-	-	281	70.19%
Space Cooling	44	7.30%	44	21.78%	-	-
Ventilation	111	18.41%	-	-	111	27.67%
Water Heating	9	1.5%	-	-	9	2.24%
Fans	2	0.33%	2	1%	-	-
Lighting	109	18.07%	109	53.96%	-	-
Plug Loads	47	7.79%	47	23.26%	-	-
Building Total	**603**	**100%**	**202**	**100%**	**401**	**100%**

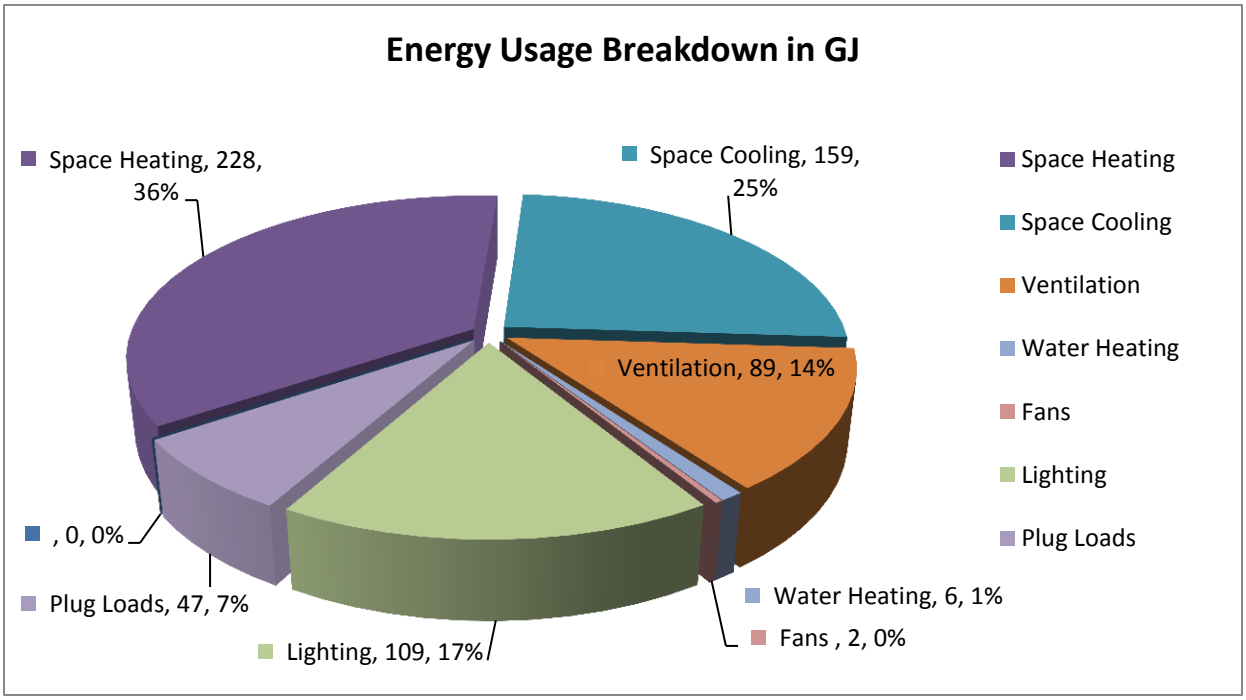
CHART-9



Energy Usage Breakdown by RETScreen:

Description	Overall Consumption in GJ	Overall %
Space Heating	228	35.68%
Space Cooling	159	24.88%
Ventilation	89	13.93%
Water Heating	6	0.94%
Fans	2	0.31%
Lighting	109	17.06%
Plug Loads	47	7.36%
Building Total	**639**	**100%**

CHART-10



3.3 DETAIL RETSCREEN ANALYSIS OF RECOMMENDED ENERGY SAVING MEASURES

3.3.1 Detailed RETScreen Analysis of Recommended Energy Saving Measures

Refer to Appendix "D" for each energy saving measures and their resulting net effect.

4.0 Recommended Energy Saving Measures Details

4.1 BUILDING ENVELOPE UPGRADES

4.1.1 Windows

Exterior building envelope consist of two-thirds walls (clad with brick veneer) with expanded polystyrene foam insulation (R-6) and one-third glazing unit which are aluminum framed, double glazed unit without any external shading devises. Some of the windows are operable type with horizontal sliders and these windows are leaking provide a greater means of air infiltration.

We recommend to replace the entire building windows with more efficient and air tight windows with improved thermal characteristics such overall heat transfer coefficient shall be 0.3 (Btu/h/ft2/F) and shading coefficient of 0.3.

4.1.2 Doors

Front entrance doors are aluminum framed, single glazed units and the west overhead door is a plywood sectional unit without any vestibules. The other doors on main floor are steel units. All main floor doors are leaking provide a greater means of air infiltration.

We recommend to replace main entrance single pan glass doors with double pan glass doors which are more efficient with improved thermal characteristics such overall heat transfer coefficient shall be 0.5 (Btu/h/ft2/F) and shading coefficient of 0.5. Also provide weather strip around the door opening to minimize air infiltration.

In addition, we also recommend providing weather proof fibre glass insulation of R-20 on a west shipping Wooden door to minimize the energy losses.

4.1.3 Insulation

Access was not gained to the floor area above the west overhang. However, what appears in previous report to be a mineral wool or fibreglass batt insulation.

a) We recommend only those walls located in return air ceiling plenum shall be provided with R-20 insulation to minimize the energy losses.

b) In addition the insulation shall be provided of R-20 in west overhang area to minimize the energy losses.

4.1.4 Building Envelope Energy Saving Measure Summary

Description	Incremental Cost $	Annual Savings			Simple Payback Years
		Cost Savings $	Natural Gas-GJ	Electricity GJ	
4.1.1 Windows Replacement	$5,000	1,211	51	13	4.1
4.1.2 Door Upgrade, Insulation	$1,500	152	10	1	9.9
4.1.3 (a) Ceiling Wall Insulation	$4,000	524	34	-	5.7
4.1.3 (b) West Overhang Insulation	$3,000	214	14	-	9.3
Total	**13,500**	**2,101**	**109**	**14**	**6.4**

4.2 MECHANICAL

The main purpose of this energy audit and study was to identify energy conservation opportunities and to support and complete the documentation requirement for ecoENERGY Retrofit Building incentive program. The results of energy analysis suggest alternate options that would increase the energy performance of the building and result in reduced annual energy cost. The analysis of most of the proposed measures were analyse by using RETScreen tool.

4.2.1 Replacement of all existing Rooftop Units

Building Heating and Cooling systems consist of three natural gas fired with air cooled DX electrical cooling constant volume rooftop units for second and third floors and for first floor there is one floor mounted natural gas fired constant volume furnace with duct mounted DX cooling coils with outdoor condensing unit. Existing rooftop unit were bought used and installed in 1998. The make of these units are RHEEM and year of manufacturer 1995. These original units don't have free cooling, economizer and fresh air power vent kit. The cooling is achieved with R22 refrigerant.

We are recommending to replace these units with more energy efficient constant volume unit with gas fired two stage 80% efficient heating burner, Cooling seasonal COP of 5.0, R410A refrigerant, Free cooling, economizer, 75% effectiveness Energy Recovery system for Fresh Air, 2" internal insulation and programmable thermostats. We recommend to insulation and provide Variable air boxes or VAV diffusers in an existing ductwork system to achieve the seasonal performance of 5.0 and better temperature control of the building. Rebalance the entire HVAC System.

4.2.2 Ventilation

There is no forced ventilation system within the building except shipping and first floor washroom areas. Ventilation is achieved by opening the windows which brings untreated air in the building, as a result the existing inefficient heating and cooling system works longer hours.

a) As described in item 4.2.1 above, we are recommending to provide 75% effectives energy recovery system on roof which shall be connected to new rooftop units in order to recovery energy from general exhaust stream and provide more controlled air in the building.
b) For 1st, 2nd and 3rd floor washrooms we recommend to provide a 75% effectiveness horizontal heat recovery ventilator to recover energy from exhaust stream. This unit will supply and exhaust the design air capacities as recommend by Ontario Building Code and shall be connected to occupancy sensor.
c) For shipping area we are recommending to delete the wall mounted exhaust fan and replace it with 75% effectiveness horizontal heat recovery ventilator to recover energy from exhaust stream, which unable via switch to supply and exhaust the design air capacities as recommend by Ontario Building Code. Blank of the portion of the wall opening to match existing construction and provide R-20 insulation to minimize energy gain or loss.

4.2.3 Hot Water

Washroom lavatories faucets were equipped with less efficient aerators and simply non sensor faucets. We strongly recommend providing aerator and sensor faucet to reduce the hot water demand by at least 15 to 20% which eventually reduce the water heating requirement.

Replace the existing hot water boiler with 90% energy efficient Insta heater.
In addition, for Shipping area we recommend a separate meter to maintain the water usage log for this area.

4.2.4 Building Mechanical Energy Saving Measure Summary

Description	Incremental Cost $	Annual Savings			Simple Payback Years
		Cost Savings $	Natural Gas-GJ	Electricity GJ	
4.2.1 Rooftop Unit Replacement	$10,566	1,290	-	8	8.2
4.2.2 (a) Ventilation Upgrade	$7,000	347	24	-	20.2
4.2.2 (b) Shipping Area Ventilation	$3000	611	44	-	4.9
4.2.2 (c) Washrooms Ventilation	$3,700	279	20	-	13.2
4.2.3 Hot Water Upgrade	$1,500	202	4	-	8.8
Total	**30,200**	**2,698**	**92**	**8**	**11.2**

4.3 LIGHTING

The existing lighting technology is a mix of different lighting fixtures, in general, fluorescent T-12 of 34 watts with magnetic ballast. With new lighting technology give options to reduce building lighting levels to meet local lighting codes and standards.

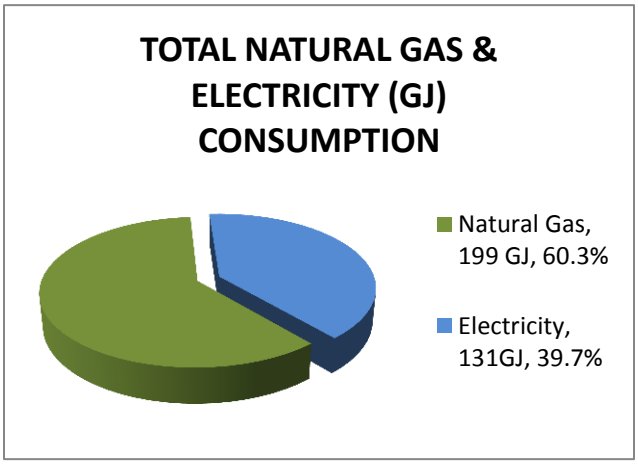
4.3.1 Lighting Retrofits

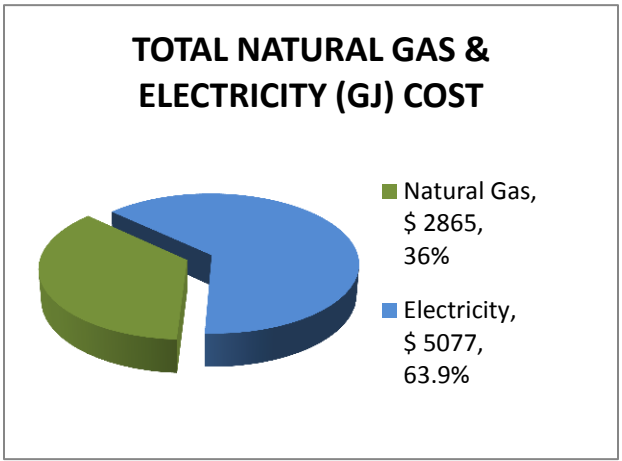
a) Upgrading older lighting technology represents the greatest energy savings opportunity in lighting. We recommend replacing the Offices lighting with fluorescent T-5 of 21 watts with electronic ballast.
b) Outdoor lighting consists of 8 fixtures and we assume it is Incandescent bulb to be replaced with compact fluorescent type lighting.
c) Replace the building Stairwells lighting with fluorescent T-5 of 21 watts with electronic ballast.
d) Replace existing incandescent exit signs of 50watts with LED signs of 15 watts.
e) Replace the building Stairwells lighting with fluorescent T-5 of 21 watts with electronic ballast.

4.3.2 Building Lighting Energy Saving Measure Summary

Description	Incremental Cost $	Annual Savings			Simple Payback Years
		Cost Savings $	Natural Gas-GJ	Electricity GJ	
4.3.1 (a) Office Lighting Upgrade	$2,000	772	-	20	2.6
4.3.1 (b) Outdoor Lighting Upgrade	$50	365	-	10	0.1
4.3.1 (c) Stairwell Lighting Upgrade	$250	158	-	4	1.6
4.3.1 (d) Exit Lighting Upgrade	$500	341	-	9	1.5
4.3.1 (e) Corridor Lighting Upgrade	$200	201	-	5	1
Total	**$3,000**	**1,837**	**-**	**48**	**1.63**

4.4 BUILDING ENERGY & COST - AFTER IMPLEMENTING ENERGY MEASURES





Fuel Usage Breakdown by RETScreen:

Description	Overall Consumption in GJ	Overall %	Electricity in GJ	Electricity %	Natural Gas in GJ	Natural Gas %
Space Heating	172	52.12%	-	-	172	86.43%
Space Cooling	22	6.67%	22	16.79%	-	-
Ventilation	22	6.67%	-	-	22	11.06%
Water Heating	5	1.52%	-	-	5	2.51%
Fans	2	0.61%	2	1.53%	-	-
Lighting	60	18.18%	60	45.80%	-	-
Plug Loads	47	14.24%	47	35.88%	-	-
Building Total	**330**	**100%**	**131**	**100%**	**199**	**100%**

Energy Usage Breakdown by RETScreen:

Description	Overall Consumption in GJ	Overall %
Space Heating	140	37.63%
Space Cooling	100	26.88%
Ventilation	19	5.11%
Water Heating	4	1.08%
Fans	2	0.54%
Lighting	60	16.13%
Plug Loads	47	12.63%
Building Total	**372**	**100%**

4.5 ENERGY CONSERVATION AWARENESS AND EDUCATION

Without changing the attitude and behaviour of the end users, improvements in efficiency through investments in improved technologies alone will not be successful. Less consumption of energy by improving efficiency, avoiding wastages without sacrificing comfort or standard of living is in the interest of everybody - individuals, business and industry and as a nation. This can be achieved with good habits, attitude and behaviour of every individual.

Some of the simple good habits of energy saving are:

- Use of energy saving lighting at home, commercial building and public places.
- Switching off lights, fans, air-conditioners etc. in unoccupied areas.
- Use of energy efficient cars and other vehicles.
- Good driving habits like driving at optimum speed to obtain the best fuel efficiency, avoiding use of braking too often by speed control.
- Switching off electronic equipment like TV, computers, DVD/VCD players, music system when not in use without keeping them on standby mode.
- Use of public transport and walking to the maximum extent possible

Involvement of everybody in work place - is essential in energy conservation and this is possible by educating them appropriately and modifying their behaviour. Educational initiatives to raise awareness about energy conservation and saving issue will have more impact on people. What are needed are specific energy education programs, which will help in developing sustained changes in the behaviour and attitude of current and future energy consumers.

We estimate that this awareness program strategy will cost a **maximum of $1,000**.

4.6 ENERGY CONSULTING AND PROJECT MANAGEMENT

We estimate that **approximately $7,500** will be the consulting fee to provide Consulting Engineering services on this project. These estimated costs are without the initial cost of the energy audit, and other cost associated to this project.

5.0 Financial Incentive Possibilities

5.1 FEDERAL GOVERNMENT:

Natural Resources Canada's Office of Energy Efficiency (OEE) offers the *ecoENERGY Retrofit Incentive for Buildings*, the commercial/institutional component of the ecoENERGY Retrofit financial incentives for existing small and medium facilities of 20,000 m^2 or less. The client could receive after implementing the energy measures in a building up to $10 per gigajoule of estimated energy savings, 25 percent of eligible project costs or $50,000 per project or $250,000 per organization. This document shall act as a pre-project energy audit which is required as part of the application form. It is important that Client does not start the work or incur eligible costs prior to written approval from NRCan.

http://ecoaction.gc.ca/retrofit

5.2 OTHER INCENTIVES PROGRAM:

5.2.1 Utilities

There may also be other incentives, grants or rebates available from local energy utilities such as Enbridge or Union Gas which could help in reducing the costs of the recommended measures.

http://oee.nrcan.gc.ca/programs-directory

Enbridge Gas is offering a "Retrofit Incentive" program where Client may receive after implementing the natural gas saving measures in a building up to $0.10 per m3 of gas saving to maximum of $100,000 per facility, building or project. There are Energy Audit incentives are also available for Enbridge to help Client to cut the cost, client need to contact Enbridge for pre-approval before the audit. Each facility must consume a **minimum of 150,000 m³ of natural gas per year** to qualify for an audit incentive (unless otherwise approved).

5.2.2 Others

1. BOMA CDM Programs - http://www.bomacdm.com/cdmProgram.aspx
2. BOMA ECAP Program - http://www.bomacdm.com/ecapProgram.aspx
3. Toronto Better Building Partnership - http://bbptoronto.ca/get-started-2/

Report Certified By:

Imran Majeed, P.Eng
January 10th, 2011

APPENDIX "A"

DISCLAIMER & LIMITATIONS

Disclaimer & Limitations

We thank you for engaging ABS GREEN INC. (Consulting Engineers) to conduct an energy audit on your facility. Please note that our audit report is made expressly subject to the following assumptions and limiting conditions:

1. The client expressly agrees that it has entered into agreement with ABS GREEN INC. for this commission, both on its own and as an agent on behalf of its employees and principals.

2. Our audit report is prepared at your request for the purpose of reviewing the energy consumption and providing energy saving recommendations for the building municipally known as 6 Milvan Drive, North York, Ontario (Office Building) in accordance with the guidelines set out by Natural Resources of Canada.

3. Our audit report is given only to your facility management team and is exclusively for the use and benefit of the Client identified on this report and is not for the use and benefit of, nor may it be relied upon by, any other person or entity. The contents of this report may not be quoted in whole or in part or distributed to any person or entity other than the Client. Also, all liabilities to all such other persons are denied. Our report is prepared for your exclusive and confidential use and for the specific purpose and functions as stated above.

4. Our calculations are solely based on the data from the manufacturers' specifications, energy engineering handbooks, industry published paper, and government documents.

5. We have assumed the accuracy and truthfulness of all of the above stated documents and information. We have not been instructed to and have not engaged in any independent inquiry or investigation of the above stated documents and information, and our report is solely based on the above stated documents and information.

6. Sketches, drawings, diagrams etc. included in our report are for the sole purpose of illustration, & no responsibility is assumed concerning the accuracy or sufficiency of these matters.

7. In no event shall our liability for damages exceed the amount you pay for our services in rendering our audit and report, and in no event shall we be liable for any special, indirect or consequential damages, even if we have been advised of the possibility of any of these damages. This shall apply irrespective of the nature of the cause of action underlying a claim, demand or action by you, including but not limited to breach of contract and tort including negligence.

8. The cost estimates indicated herein are intended for general budgeting only and are subject to confirmation and adjustments when tenders from suitable qualified contractors are obtained.

9. There is a possibility for additional deficiencies being present in the building, which have not been identified during our visit, given the limited nature of this review.

10. ABS GREEN INC. accepts no responsibility for damages that may be suffered by any third party as the result of decisions made, or action taken, based on this report.

11. Nothing in our audit report shall be construed as or taken to be a guarantee of the actual energy and cost savings from the calculations on behalf of ABS GREEN INC. as a corporation or any personnel. No indemnity whatsoever is provided. The client expressly agrees that ABS GREEN INC.s employees and principals shall have no personal liability to the client in respect to claim, whether in contract, tort and/or any other cause of action in law. Accordingly, the client expressly agrees that it will bring no proceedings and take no action in any court of law against any of ABS GREEN INC.'s employees or principals in their personal capacity.

APPENDIX "B"

PHOTOGRAPHS

Photo #1: Site Location Map

Photo #2: Building Roof

Photo #3: Building Envelop

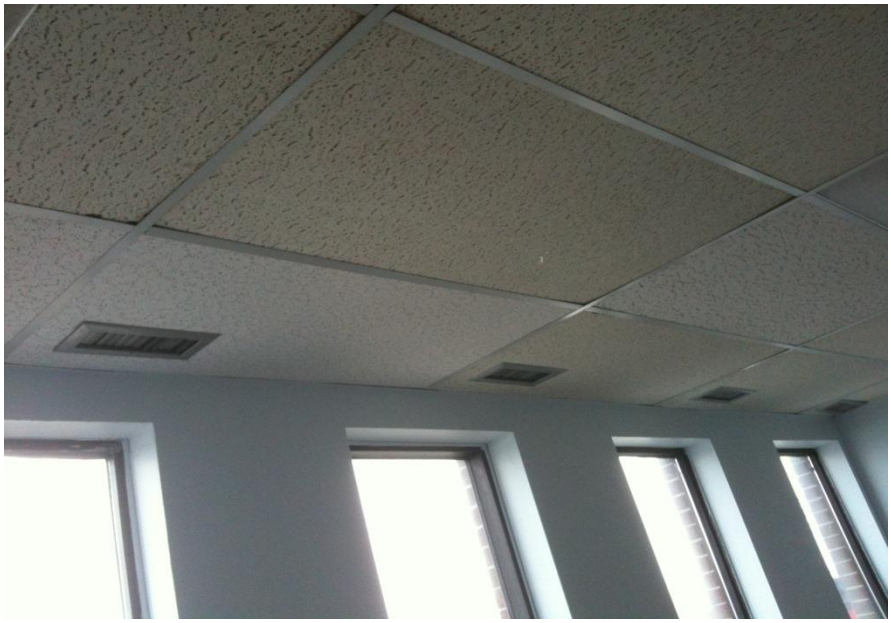


Photo #4: Building Interior Ceiling

Photo #5: Building Interior Lighting Fixtures

Photo #6: 3 Building Heating & Cooling Units at Roof

Photo #7: Building Thermostats & Gas Meter.

Photo #8: First Floor Washroom & Shipping Area Fans.

APPENDIX "C"

CURRENT MAJOR EQUIPMENT LIST

LIGHTING								
Description	**Type**	**Ballast Watts**	**Lamps Watts**	**Total Lamps (Ballast)**	**Total Watts Per Fixture**	**Total # of Fixtures (Size)**		**Hours Per Day**
OFFICES	T12	40	34	4 (2)	136	39 (4'x2')	1st = 7 2nd = 20 3rd = 12	8
CORRIDORS	T12	40	34	2 (1)	68	8 (4'x1')	- 2nd =4 3rd =4	10
STARIWELLS	T12 Chandelier Incandescent	40 - -	34 60 60	2(1) 5(-) 5(-)	68 300 300	6 (4'x8") 1 1	1st =2 2nd =2 3rd =2 1 1	24
SHIPPING	T12	40 40	96 34	2(1) 2(1)	192 68	5 (8'x8") 1 (4'x8")		8
WASHROOMS SERVICE	Incandescent bulb	- -	60 60	6 (-) 1 (-)	360 60	6 (-) 1 (-)		10
EXIT SIGNS	Incandescent bulb	-	50	9 (-)	450 (-)	9 (-)		24
OUTDOOR	Incandescent bulb	-	60	8 (-)	480	8 (-)		14

MAIN DOORS				
Floors	**North**	**East**	**West**	**South**
First	1 Steel Solid door in Shipping Area.	2 Entrance Glass Doors: Each of Single Pan, Aluminum Frame with weather strip, Size: 84"H" x 37"W	1 Plywood Sectional Door with Rubber strips. Total Area: 220 Sq.ft.	1 Steel Solid door in Stairwell.

WINDOWS				
Floors	**North**	**East**	**West**	**South**
First	2 Small, Operable, Size: 36”H x 21”L	2 big, Size: 60”H x 60”W	-	2 Small, Operable, Size: 36”H x 21”W
Second	18 Medium, 7 of them operable	7 Medium, 3 of them operable, 2 in Stairwell	7 Medium	19 Medium, 4 of them operable, 1 in Stairwell
Third	18 Medium, 7 of them operable	7 Medium, 1 of them operable, 2 in Stairwell	7 Medium	10 Medium, 1 of them operable, 1 in Stairwell
Note: General Windows – AIRLITE CMHC 5537 70- with Glass Size: 66”H x 26”W				

MAJOR UNITS								
Equipment	**Make**	**Model**	**Location**	**Installed Year**	**Physical Condition**	**Life Expect**	**Heating Gas**	**Cooling Electric**
Rooftop Unit	RHEEM	RKKA-A06YL13E	Roof	1998	Satisfactory	5 Years	150MBH	5 Tons
Rooftop Unit	RHEEM	RKKA-A06YL13E	Roof	1998	Satisfactory	5 Years	150MBH	5 Tons
Rooftop Unit	RHEEM	RRGF-200100YLA	Roof	1998	Satisfactory	5 Years	150MBH	10 Tons
Outdoor Condensing Unit	Comfort Air	000-88-A	Roof	Old Unknown	-	1 Years	-	2 Tons
Furnace	GOOD MAN	-	First Floor	1998	Good	7 Years	100MBH	3 Tons
Outdoor Condensing Unit	-	CK49-18	First Floor West	1998	Good	7 Years	-	3 Tons
DHW Heater	RUDD	-	First Floor	1998	Good	5 Years	50 Gallons	-

APPENDIX "D"

1. DETAILED RETScreen ANALYSIS OF RECOMMENDED ENERGY SAVING MEASURES

Fuels & Schedule:

RETScreen Energy Model - Energy efficiency measures project

Fuels & schedules ☑ Show data

Fuel			Fuel type 1	Fuel type 2
Fuel type			Electricity	Natural gas - m³
Fuel consumption - unit			MWh	m³
Fuel rate - unit			$/kWh	$/m³
Fuel rate			0.139	0.539

Schedule	Unit		Schedule 1	Schedule 2
Description			24/7	24/7
				Occupied
Temperature - space heating	°F		74.0	74.0
Temperature - space cooling	°F		74.0	74.0
				Unoccupied
Temperature - unoccupied	+/-°F			3.0
				Occupied
Occupancy rate - daily			h/d	h/d
Monday			24	8.0
Tuesday			24	8.0
Wednesday			24	8.0
Thursday			24	8.0
Friday			24	8.0
Saturday			24	8.0
Sunday			24	8.0
Occupancy rate - annual	h/yr		8,760	2,920
	%		100%	33%
Heating/cooling changeover temperature	°F	61.0		
Length of heating season	d	228		
Length of cooling season	d	137		

Fuel Consumption – Base Case

Facility characteristics ☑ Show data

Show:	Heating	Cooling	Electricity
Fuel consumption - base case	GJ	GJ	GJ
Heating system			
NATURAL GAS - SAME EFFICIENCY ROOF UNITS	0	-	-
DHW INSTA HEATER	0	-	-
Cooling system			
ELECTRIC WITH 5 COP	-	0	-
Building envelope			
BUILDING LESS PLENUM WALL - WINDOW UPGR/	180	40	-
ADD INSULATION ONLY CEILING PLENUM WALL	47	2	-
DOOR UPGRADE & ADD INSULATION	35	1	-
ADD INSULATION ON WEST HANGING FLOOR	19	1	-
Ventilation			
VENTILATION WITH 75% HRV	28	0	-
SHIPPING AREA WITH 75% HRV	57	0	-
FIRST FLOOR WASHROON VENTILATION	9	0	-
2 & 3 FLOOR WASHROOM VENTILATION	17	0	-
Lights			
OFFICES WITH T5 LAMP UPGRADE	-	-	52
OUTDOOR WITH COMPACT FLOURESCENT	-	-	19
STAIRWELLS WITH T5 LAMP UPGRADE	-	-	11
EXIT SIGN WITH LED	-	-	13
CORRIDOR WITH T5 LAMP UPGRADE	-	-	14
Electrical equipment			
EQUIPMENT	-	-	47
Hot water			
HOTWATER USED BY OFFICE	6	-	-
HOTWATER USED BY CARWASH	3	-	-
Pumps			
Fans			
SHIPPING FAN FOR BASE CASE	-	-	2
FIRST FLOOR WASHROOM FAN FOR BASE CASE	-	-	0
Motors			
Process steam			
Heat recovery			
Compressed air			
Refrigeration			
Other			
Total	400	44	157

Fuel Consumption – Proposed Case

Facility characteristics ☑ Show data

Show:	Heating	Cooling	Electricity
Fuel consumption - proposed case	GJ	GJ	GJ
Heating system			
NATURAL GAS - SAME EFFICIENCY ROOF UNITS	0	-	-
DHW INSTA HEATER	0	-	-
Cooling system			
ELECTRIC WITH 5 COP	-	0	-
Building envelope			
BUILDING LESS PLENUM WALL - WINDOW UPGR/	129	20	-
ADD INSULATION ONLY CEILING PLENUM WALL	13	0	-
DOOR UPGRADE & ADD INSULATION	25	1	-
ADD INSULATION ON WEST HANGING FLOOR	5	0	-
Ventilation			
VENTILATION WITH 75% HRV	3	0	-
SHIPPING AREA WITH 75% HRV	13	0	-
FIRST FLOOR WASHROON VENTILATION	2	0	-
2 & 3 FLOOR WASHROOM VENTILATION	4	0	-
Lights			
OFFICES WITH T5 LAMP UPGRADE	-	-	32
OUTDOOR WITH COMPACT FLOURESCENT	-	-	9
STAIRWELLS WITH T5 LAMP UPGRADE	-	-	7
EXIT SIGN WITH LED	-	-	4
CORRIDOR WITH T5 LAMP UPGRADE	-	-	8
Electrical equipment			
EQUIPMENT	-	-	47
Hot water			
HOTWATER USED BY OFFICE	3	-	-
HOTWATER USED BY CARWASH	2	-	-
Pumps			
Fans			
SHIPPING FAN FOR BASE CASE	-	-	2
FIRST FLOOR WASHROOM FAN FOR BASE CASE	-	-	0
Motors			
Process steam			
Heat recovery			
Compressed air			
Refrigeration			
Other			
Total	199	22	109

Fuel Saved

Facility characteristics ☑ Show data

Show:	Heating	Cooling	Electricity
Fuel saved	GJ	GJ	GJ
Heating system			
NATURAL GAS - SAME EFFICIENCY ROOF UNITS	0	-	-
DHW INSTA HEATER	2	-	-
Cooling system			
ELECTRIC WITH 5 COP	-	8	-
Building envelope			
BUILDING LESS PLENUM WALL - WINDOW UPGR/	51	13	-
ADD INSULATION ONLY CEILING PLENUM WALL	34	1	-
DOOR UPGRADE & ADD INSULATION	10	0	-
ADD INSULATION ON WEST HANGING FLOOR	14	0	-
Ventilation			
VENTILATION WITH 75% HRV	24	0	-
SHIPPING AREA WITH 75% HRV	44	0	-
FIRST FLOOR WASHROON VENTILATION	7	0	-
2 & 3 FLOOR WASHROOM VENTILATION	13	0	-
Lights			
OFFICES WITH T5 LAMP UPGRADE	-	-	20
OUTDOOR WITH COMPACT FLOURESCENT	-	-	9
STAIRWELLS WITH T5 LAMP UPGRADE	-	-	4
EXIT SIGN WITH LED	-	-	9
CORRIDOR WITH T5 LAMP UPGRADE	-	-	5
Electrical equipment			
EQUIPMENT	-	-	0
Hot water			
HOTWATER USED BY OFFICE	1	-	-
HOTWATER USED BY CARWASH	0	-	-
Pumps			
Fans			
SHIPPING FAN FOR BASE CASE	-	-	0
FIRST FLOOR WASHROOM FAN FOR BASE CASE	-	-	0
Motors			
Process steam			
Heat recovery			
Compressed air			
Refrigeration			
Other			
Total	201	21	48

Energy Consumption – Base Case

Facility characteristics ☑ Show data

Show:	Heating	Cooling	Electricity
Energy - base case	GJ	GJ	GJ
Heating system			
NATURAL GAS - SAME EFFICIENCY ROOF UNITS	0	-	-
DHW INSTA HEATER	0	-	-
Cooling system			
ELECTRIC WITH 5 COP	-	0	-
Building envelope			
BUILDING LESS PLENUM WALL - WINDOW UPGR/	146	146	-
ADD INSULATION ONLY CEILING PLENUM WALL	38	6	-
DOOR UPGRADE & ADD INSULATION	28	4	-
ADD INSULATION ON WEST HANGING FLOOR	16	2	-
Ventilation			
VENTILATION WITH 75% HRV	22	0	-
SHIPPING AREA WITH 75% HRV	46	0	-
FIRST FLOOR WASHROON VENTILATION	7	0	-
2 & 3 FLOOR WASHROOM VENTILATION	14	0	-
Lights			
OFFICES WITH T5 LAMP UPGRADE	-	-	52
OUTDOOR WITH COMPACT FLOURESCENT	-	-	19
STAIRWELLS WITH T5 LAMP UPGRADE	-	-	11
EXIT SIGN WITH LED	-	-	13
CORRIDOR WITH T5 LAMP UPGRADE	-	-	14
Electrical equipment			
EQUIPMENT	-	-	47
Hot water			
HOTWATER USED BY OFFICE	4	-	-
HOTWATER USED BY CARWASH	2	-	-
Pumps			
Fans			
SHIPPING FAN FOR BASE CASE	-	-	2
FIRST FLOOR WASHROOM FAN FOR BASE CASE	-	-	0
Motors			
Process steam			
Heat recovery			
Compressed air			
Refrigeration			
Other			
Total	323	159	157

Energy Consumption – Proposed Case

Facility characteristics ☑ Show data

Show:	Heating	Cooling	Electricity
Energy - proposed case	GJ	GJ	GJ
Heating system			
NATURAL GAS - SAME EFFICIENCY ROOF UNITS	0	-	-
DHW INSTA HEATER	0	-	-
Cooling system			
ELECTRIC WITH 5 COP	-	0	-
Building envelope			
BUILDING LESS PLENUM WALL - WINDOW UPGR/	105	90	-
ADD INSULATION ONLY CEILING PLENUM WALL	11	2	-
DOOR UPGRADE & ADD INSULATION	20	4	-
ADD INSULATION ON WEST HANGING FLOOR	4	1	-
Ventilation			
VENTILATION WITH 75% HRV	3	0	-
SHIPPING AREA WITH 75% HRV	11	2	-
FIRST FLOOR WASHROON VENTILATION	2	0	-
2 & 3 FLOOR WASHROOM VENTILATION	3	1	-
Lights			
OFFICES WITH T5 LAMP UPGRADE	-	-	32
OUTDOOR WITH COMPACT FLOURESCENT	-	-	9
STAIRWELLS WITH T5 LAMP UPGRADE	-	-	7
EXIT SIGN WITH LED	-	-	4
CORRIDOR WITH T5 LAMP UPGRADE	-	-	8
Electrical equipment			
EQUIPMENT	-	-	47
Hot water			
HOTWATER USED BY OFFICE	3	-	-
HOTWATER USED BY CARWASH	1	-	-
Pumps			
Fans			
SHIPPING FAN FOR BASE CASE	-	-	2
FIRST FLOOR WASHROOM FAN FOR BASE CASE	-	-	0
Motors			
Process steam			
Heat recovery			
Compressed air			
Refrigeration			
Other			
Total	162	100	109

Energy - Saved

Facility characteristics ☑ Show data

Show:	Heating	Cooling	Electricity
Energy saved	GJ	GJ	GJ
Heating system			
NATURAL GAS - SAME EFFICIENCY ROOF UNITS	0	-	-
DHW INSTA HEATER	0	-	-
Cooling system			
ELECTRIC WITH 5 COP	-	0	-
Building envelope			
BUILDING LESS PLENUM WALL - WINDOW UPGR/	41	56	-
ADD INSULATION ONLY CEILING PLENUM WALL	28	4	-
DOOR UPGRADE & ADD INSULATION	8	1	-
ADD INSULATION ON WEST HANGING FLOOR	11	2	-
Ventilation			
VENTILATION WITH 75% HRV	20	0	-
SHIPPING AREA WITH 75% HRV	35	-2	-
FIRST FLOOR WASHROON VENTILATION	5	0	-
2 & 3 FLOOR WASHROOM VENTILATION	11	-1	-
Lights			
OFFICES WITH T5 LAMP UPGRADE	-	-	20
OUTDOOR WITH COMPACT FLOURESCENT	-	-	9
STAIRWELLS WITH T5 LAMP UPGRADE	-	-	4
EXIT SIGN WITH LED	-	-	9
CORRIDOR WITH T5 LAMP UPGRADE	-	-	5
Electrical equipment			
EQUIPMENT	-	-	0
Hot water			
HOTWATER USED BY OFFICE	1	-	-
HOTWATER USED BY CARWASH	0	-	-
Pumps			
Fans			
SHIPPING FAN FOR BASE CASE	-	-	0
FIRST FLOOR WASHROOM FAN FOR BASE CASE	-	-	0
Motors			
Process steam			
Heat recovery			
Compressed air			
Refrigeration			
Other			
Total	161	59	48

Payback Analysis

Facility characteristics

Show: Energy saved	Incremental initial costs $	Fuel cost savings $	Incremental O&M savings $	Simple payback yr	Include measure? ☐
Heating system					
NATURAL GAS - SAME EFFICIENCY ROOF UNITS	0	0	0	-	☑
DHW INSTA HEATER	0	31	0	0.0	☑
Cooling system					
ELECTRIC WITH 5 COP	10,566	318	972	8.2	☑
Building envelope					
BUILDING LESS PLENUM WALL - WINDOW UPGR/	5,000	1,211	0	4.1	☑
ADD INSULATION ONLY CEILING PLENUM WALL	3,000	524	0	5.7	☑
DOOR UPGRADE & ADD INSULATION	1,500	152	0	9.9	☑
ADD INSULATION ON WEST HANGING FLOOR	2,000	214	0	9.3	☑
Ventilation					
VENTILATION WITH 75% HRV	7,000	347	0	20.2	☑
SHIPPING AREA WITH 75% HRV	3,000	611	0	4.9	☑
FIRST FLOOR WASHROON VENTILATION	1,200	93	0	12.9	☑
2 & 3 FLOOR WASHROOM VENTILATION	2,500	186	0	13.5	☑
Lights					
OFFICES WITH T5 LAMP UPGRADE	2,000	772	0	2.6	☑
OUTDOOR WITH COMPACT FLOURESCENT	50	365	0	0.1	☑
STAIRWELLS WITH T5 LAMP UPGRADE	250	158	0	1.6	☑
EXIT SIGN WITH LED	500	341	0	1.5	☑
CORRIDOR WITH T5 LAMP UPGRADE	200	201	0	1.0	☑
Electrical equipment					
EQUIPMENT	0	0	0	-	☑
Hot water					
HOTWATER USED BY OFFICE	1,500	21	150	8.8	☑
HOTWATER USED BY CARWASH	0	5	0	0.0	☑
Pumps					
Fans					
SHIPPING FAN FOR BASE CASE	0	0	0	-	☐
FIRST FLOOR WASHROOM FAN FOR BASE CASI	0	0	0	-	☐
Motors					
Process steam					
Heat recovery					
Compressed air					
Refrigeration					
Other					
Total	40,266	5,549	1,122	6.04	

Summary

Summary ☑ Show data

	Fuel			Base case		
Fuel type	Fuel consumption - unit		Fuel rate	Fuel consumption		Fuel cost
Electricity	MWh	$	139.000	55.7	$	7,740
Natural gas	m³	$	0.539	10,669.3	$	5,751
Total					$	13,491

	Proposed case			Fuel cost savings		
Fuel type	Fuel consumption		Fuel cost	Fuel saved		Fuel cost savings
Electricity	36.5	$	5,077	19.2	$	2,663
Natural gas	5,315.2	$	2,865	5,354.1	$	2,886
Total		$	7,942		$	5,549

Project verification Fuel type	Fuel consumption - unit	Fuel consumption - historical	Fuel consumption Base case	Fuel consumption - variance
Electricity	MWh	53.3	55.7	4%
Natural gas	m³	10,528.0	10,669.3	1%

Energy	Heating GJ	Cooling GJ	Electricity GJ	Total GJ
Energy - base case	323	159	157	639
Energy - proposed case	162	100	109	371
Energy saved	161	59	48	268
Energy saved - %	49.9%	37.3%	30.3%	41.9%

Benchmark		
Energy unit	GJ	
Reference unit	ft²	8,287

Benchmark Energy	Heating GJ/ft²	Cooling GJ/ft²	Electricity GJ/ft²	Total GJ/ft²
Energy - base case	0.0390	0.0192	0.0189	0.0771
Energy - proposed case	0.0195	0.0120	0.0132	0.0448
Energy saved	0.0194	0.0072	0.0057	0.0323

Emission Analysis

Emission Analysis

Base case electricity system (Baseline) Country - region	Fuel type	GHG emission factor (excl. T&D) tCO2/MWh
Canada - Ontario	All types	0.201

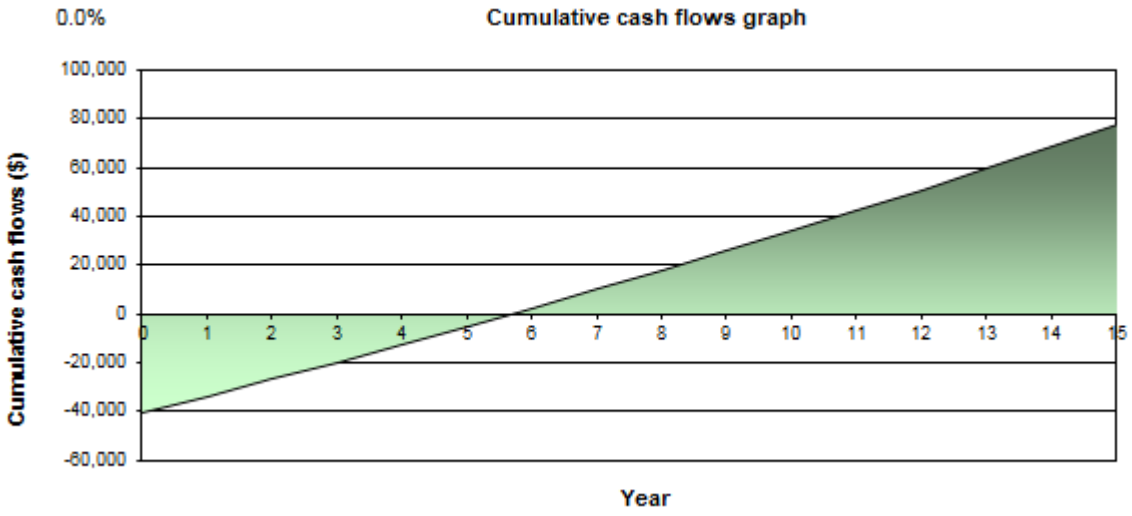
GHG emission		
Base case	tCO2	31.5
Proposed case	tCO2	18.0
Gross annual GHG emission reduction	tCO2	13.5
GHG credits transaction fee	%	0.0%
Net annual GHG emission reduction	tCO2	13.5

13.5tCO2 Is Equivalent to 2.5 Cars and light trucks not used.

Financial Analysis

Financial Analysis

Financial parameters		
Inflation rate	%	2.0%
Project life	yr	15
Debt ratio	%	0%
Initial costs		
Energy efficiency measures	$	40,266
Other	$	
Total initial costs	$	40,266
Incentives and grants	$	
Annual costs and debt payments		
O&M (savings) costs	$	-1,122
Fuel cost - proposed case	$	7,942
Other	$	
Total annual costs	$	6,820
Annual savings and income		
Fuel cost - base case	$	13,491
Other	$	
Total annual savings and income	$	13,491
Financial viability		
Pre-tax IRR - assets	%	16.6%
Simple payback	yr	6.0
Equity payback	yr	5.6



Incremental Cost Payback is 6 years (Excluding Education & Engineering Fees).

END OF REPORT