

Energy Study
for the
Jericho Sailing Centre

1300 Discovery St

Vancouver, BC



Prepared by

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Jericho Sailing Centre – 1300 Discovery St, Vancouver

- Energy Study -

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1. Executive Summary

1.1 Background of the Project

Sinclair Environmental Solutions was asked to provide an Energy Study to analyse the present operation of the Jericho Sailing Centre located at 1300 Discovery Street. The 2 storey building with 1,856 m² of floor space including offices, a restaurant, meeting rooms, and storage areas. The lighting is mostly a mixture of T12 fluorescent, incandescent, and halogen. Heating and domestic hot water in the building is provided by a boiler, four domestic hot water heaters, and electric baseboard heaters. Additional major equipment includes a walk-in refrigerator, walk-in freezer, and a fully equipped commercial kitchen. The facility currently produces 63.2 Tonnes of Annual CO₂ Emissions based on the following energy consumption data.

Normalized **Annual Utility Costs and Consumption** for the Jericho Sailing Centre are:

Annual Usage	2004 Costs	2006 Costs	2004 Consumption	2006 Consumption	Ave. Cost per GJ	2004 BEPI* (MJ/m ²)	2006 BEPI* (MJ/m ²)
Natural Gas	\$10,042	\$14,680	960 GJ	1,129 GJ	\$12.45	517	608
Electricity	\$15,363	\$15,514	741 GJ	792 GJ	\$19.58	399	427
Totals	\$25,405	\$30,194	1,701 GJ	1,921 GJ	\$16.01	916	1,035

The aim of the study was to analyse the existing operation of the building to try to seek out opportunities to reduce energy consumption, and to analyse the costs associated with these potential projects. As complete billing information for recent years was not available some energy costs have been estimated to create an annual profile of the facility. For energy savings estimates we have used the 2006 consumption as a baseline.

1.2 Précis of Project

Lighting opportunities and automated controls hold the greatest potential for energy conservation in this building. All of the T12 fluorescent lights in the heated portion of the building can be retrofit with very efficient T8 lamps and ballasts. There are also many opportunities to replace incandescent lights with compact fluorescents and LED exit signs. We also recommend some motion sensor controls for washroom lighting which can yield substantial savings. Next we recommended adding programmable thermostats and timer controls to heaters, pumps and some fans to minimize the energy consumption from these devices. Finally we looked at a number of renewable energy projects at a really high level that could be considered by the Centre, but as these projects are so expensive, we have not included recommendations for immediate implementation, rather we recommend discussion and further review of these ideas with your Board. We have also included a brief discussion on Green Financing to help make these projects possible. The costs associated with each of the projects we recommend immediately are summarized below.

1.3 Summary Report Table

Recommended Energy Conservation Measures (ECM)	Initial Capital Cost	Annual Energy Savings			Simple Payback (years)	GHG Savings (Tonnes)
		Savings	Electricity	Gas		
4.1 Mechanical	\$4,500	\$1,602	12,569 kWh	55 GJ	2.8	3.1
4.2 Lighting	\$10,870	\$2,264	27,884 kWh		4.8	1.0
4.3 Education	\$500	\$150	2,200 kWh		8.1	0.1
4.4 Energy Consulting	\$5,000					
ECM Totals	\$20,870	\$4,016	42,653 kWh	55 GJ	5.2	4.2

1.4 Allocation of Funds

These projects have the potential to reduce the **energy footprint** of the building by **10.9%**. We recommend that **\$20,870** be budgeted for the implementation of capital projects to achieve an annual savings of **57 GJ** of gas consumption and **42,653 kWh** of electricity consumption. When the Jericho Sailing Centre makes these changes, they will be eliminating **4.2 Tonnes** of annual GHG emissions (6.4% reduction) while saving **\$4,016** per year.

2. Customer Information

Name and Address: Jericho Sailing Centre
1300 Discovery St
Vancouver, BC
V6R 4L9

Contact Information: Mike Cotter
General Manager
Phone: (604) 224 - 4177

3. Background Description of Facility, Hardware and Systems

3.1 Overview

The Jericho Sailing Centre is a 70 year old, 2-storey facility that is open to members 365 days a year. It is staffed 14 hours a day from May 1st through the first week in September. Hours are much shorter during the rest of the year. A restaurant, meeting rooms, restrooms, showers and lounges are found on the second floor. The restaurant also varies its hours seasonally. The first floor houses offices, a large locker room, and storage areas. Shower rooms, meeting rooms, and member lounges are also located on the second floor. Part of the building known as “the hanger” is open to the second floor and used for storage of larger vessels and equipment, in addition to housing the restaurant coolers. A small sun deck is located on the roof of the building.

BC Hydro Account Number	118 – 0930 - 021
Terasen Gas Account Number	640897
Facility type	Office Building
Facility age	Constructed in the 1930s
Total floor area and number of floors	1,856 m²/ 2 storey

3.2 Mechanical Systems

A small portion of building heating is provided by a 168,000 BTU gas fired boiler with the majority of heat coming from electric baseboard heaters. Heating throughout the building is controlled by conventional, non-programmable, local thermostats. About 45% of the building is not directly heated. Ventilation for the restaurant kitchen is provided by a 2 HP exhaust fan and a 3 HP fresh air supply fan that does not have heating capability. These fans are controlled by manual switches. There are six additional small exhaust fans, two of which service the shower rooms and are controlled by a humidistat.

Domestic hot water for the washrooms and shower rooms is provided by three tank style hot water heaters (two electric and one gas). A fourth electric domestic water heater serves the kitchen area.

All major HVAC equipment is listed on pages A1-A2 of the Appendix indicating their annual energy consumption, operating schedule and area served. A rough simulation of the gas used by the boiler and hot water heater is also included in the Mechanical Inventory (Appendix page A2).

3.3 Electrical System – Account 118 – 0930 - 021

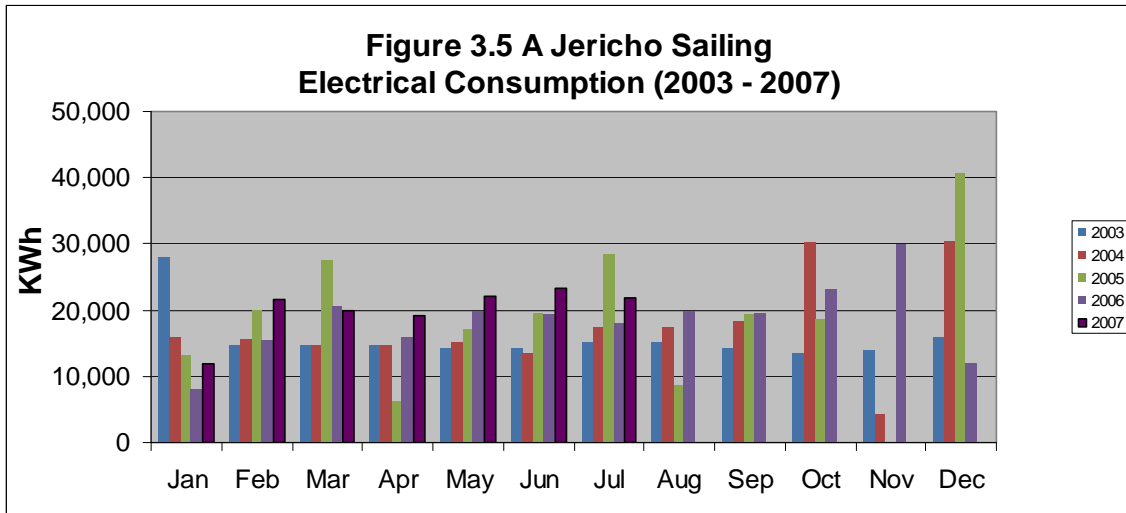
The building has 240 / 600 V distribution with a 200 amp service. Monthly consumption profiles can be found in Section 3.5 of the study.

3.4 Lighting System

The lighting systems throughout the building are a diverse mix of 1 and 2-lamp 34 Watt T12 linear fluorescent, circular fluorescent, halogen, incandescent, and some exterior Metal Halide / Mercury Vapor. A portion of exterior lights are controlled by a timer and photocell. A few efficient lighting upgrades have been made, but there are significant opportunities for improvement given the present lighting density of 1.1 W/ft². A detailed room-by-room inventory of the lighting systems is included in Appendix B. Lighting levels will be discussed in Section 4.2.

3.5 Energy Analysis

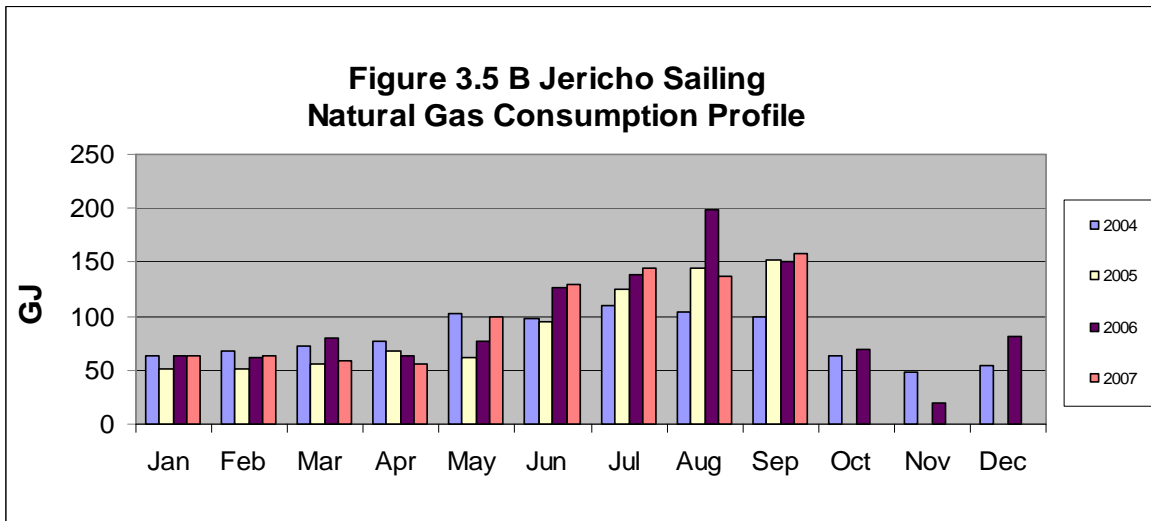
The main purpose of our study was to identify potential areas for conservation, and to analyze the feasibility of these projects. To understand the patterns of energy consumption, we have analyzed the electrical consumption profile as well as the gas consumption profile for the building. The following graphs highlight trends in energy consumption that help us identify areas for potential conservation.



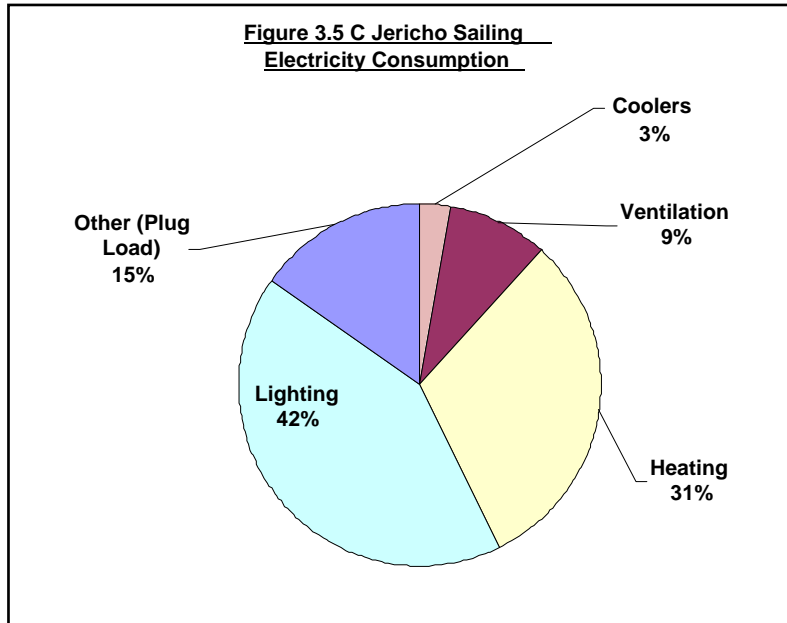
In Figure 3.5A we notice that most years, electrical consumption remains relatively constant over the seasons. It appears that the heating load in winter months is offset by the lower usage of the facility at that time of year. There are significant month to month swings in electrical usage, but this may be the result of an irregular meter reading schedule. There were many irregular readings noted in the 2005 data due to extra days added to the billing for a particular month.

Electrical usage does show unusual spikes during the winter months. In particular, the spikes in December may be partly explained by the fact the facility is used to host holiday parties. Large space heaters have been used to heat the drafty building for these parties. However, it is also possible that these spikes have been caused by equipment and heating being left on when the building is sparsely used. Adding controls will reduce human error when it comes to turning equipment down or off. There does seem to be a general upward trend in electrical consumption over the last few years, indicating an opportunity for behavior change.

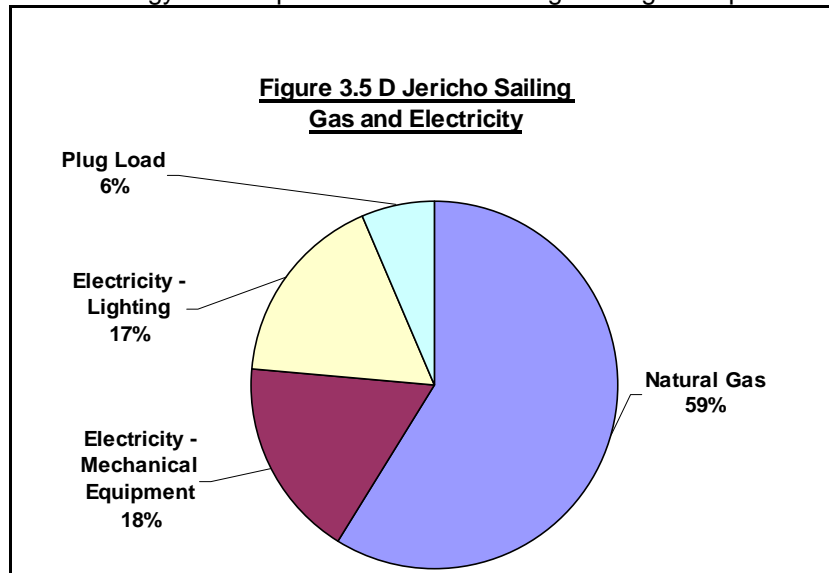
In the profile shown below, we see that gas consumption rises significantly during the summer months due to increased usage of the restaurant kitchen and higher domestic hot water consumption, particularly from the shower room. Only a small portion of natural gas consumption is used for space heating. Although gas consumption is significantly lower in the winter, we again see the occasional spike which indicates that improved controls may help to reduce usage.



Finally we analyzed the breakdown of energy consumption by building systems to estimate what percentage of the load each system was representing. In Figure 3.5 C, the electricity consumption profile shows us that the Heating, Lighting, and Ventilation are the major electricity consumers in the building.



In Figure 3.5 D, the overall energy consumption chart shows how gas usage compares with electrical use.



4. Energy Conservation Opportunities

4.1 Mechanical/HVAC Opportunities

The primary purpose of this study was to identify energy conservation opportunities at the Jericho Sailing Centre. We have identified and analyzed several potential opportunities to save energy and money by modifying and upgrading mechanical systems at this facility, and we will explain these ideas in detail in this section. Note for financial savings estimates, we have used a rate of \$13.00/GJ for natural gas and BC Hydro’s current electricity rate of \$0.0691 / kWh for consumption plus an additional 2.4% in rate riders. While we believe that these prices are likely to increase in the future, we have not factored this into our analysis. For Greenhouse Gas estimates, we have assumed emissions factors of 0.031 kg CO₂e / kWh of electricity in BC and 49.9 kg CO₂e / GJ for natural gas (source: 2004 data from Statistics Canada and Environment Canada).

4.1.1 Mechanical System Changes

Below are a number of changes to mechanical systems that we recommend to significantly reduce energy consumption at the Jericho Sailing Centre. In addition to these proposed changes, we also recommend shutting down the existing gas fired heating boiler during the summer, as this device should not be required for a good portion of the year. As this boiler previously served the hanger, it is now oversized to provide heat to a few small heaters, and a good way to save energy is simply turn off the boiler when the season permits. We did look at replacing this boiler with a high efficiency condensing boiler, though this was recommended as the project had a 40 year energy payback. One final comment that the restaurant Kitchen Equipment represents approximately 40% of the gas consumption for the facility, and that we did not recommend any specific measures regarding the use of this equipment. We specifically recommend that management have a conversation with all Kitchen staff to ensure that cooking equipment is not left on any longer than necessary, as this may yield significant energy savings. The following mechanical measures are recommended:

4.1.1.1 Timer Control for DHW Pump

A pump is used to circulate the hot water from the domestic hot water heaters throughout the building. Normally this pump continues to operate throughout the night, causing heat to be lost through piping in a very cool building. By adding a timer control, we can save energy by turning the pump off overnight when not needed. Because the hot water is not circulating through the building all night, this measure saves a significant amount energy from the water heaters. We estimate that this measure will save approximately 50% of the energy currently used by the pump and at least 5% of the electricity and gas used by the domestic hot water heaters, saving a total of 900 kWh of electricity and 18 GJ of gas. We estimate these controls will cost \$500 to install and will save an estimated \$297 a year, which represents a simple payback of 1.7 years.

4.1.1.2 Timer Control for Restaurant Ventilation

The restaurant and kitchen are serviced by two large fan units. These both operate by a manual switch that requires someone to remember to shut them off. We observed that one of these units was operating on a day that the restaurant was closed. Adding a timer control to turn off these units after hours (with manual override to allow afterhours use) will reduce human error. We estimate that this would reduce operation of these fans by 20% and save 3,707 kWh or \$261 per year. The cost for this measure will be approximately \$1,000 representing a payback of 3.8 years.

4.1.1.3 Programmable Thermostats

Many heated areas of the building are sparsely occupied during the winter months. Although efforts are made to turn down thermostats during off-hours, relatively inexpensive programmable digital thermostats will ensure that these heaters are turned down during unoccupied times. For example we found that the thermostat in one of the restrooms had been set for over 20 degrees Celsius even though the building was not being used.

We estimate that installing programmable thermostats throughout the building will reduce energy consumption from heating by at least 15%. The savings for this measure would be 7,967 kWh for the electric heaters and 37 GJ from the gas boiler, or \$1,044 per year. The cost for this measure will be approximately \$3,000 representing a payback of 2.9 years.

4.1.2 Mechanical Opportunity Summary

We have summarized the mechanical energy conservation measures below.

Recommended ECM	Initial Cost	Annual Savings			Simple Payback	GHG Savings (tonnes)
4.1.1.1 DHW Timer Control	\$500	\$297	18 GJ	895 kWh	1.7 years	0.9
4.1.1.2 Ventilation Timer Control	\$1,000	\$261		3,707 kWh	3.8 years	0.1
4.1.2.3 Programmable Thermostats	\$3,000	\$1,044	37 GJ	7,967 kWh	2.9 years	2.1
Total Mechanical Bundle	\$4,500	\$1,602	55 GJ	12,569 kWh	2.8 years	3.1 tonnes

4.1.3 Building Envelope Issues

The building has many poorly sealed doors and windows, in addition to minimal insulation. Although some windows have been updated to double pane, many are still many single paned. In addition, several outside doors have noticeable air gaps. The addition of inexpensive weatherstripping to plug air gaps would considerably improve winter comfort and would result in a significant reduction in heating costs. Upgrading the remaining windows as well as upgrading building insulation will not be economically justifiable based purely on energy savings due to the high expense of this project, though this would appreciably lower heating costs.

4.1.4 Refrigeration Issues

The doors for both the walk-in refrigerator and walk-in freezer do not seem to sealing properly. We measured a temperature of 1.8° C on the outside of the freezer door near the bottom of the door. The room temperature at the time was 16° C and the temperature on the outside of the insulated freezer walls was 15° C, indicating that there was significant leakage through the door.

Replacing the gasket and fixing the refrigerator doors is a relatively simple project that should result in good energy savings, and we highly recommend this as a maintenance project.

4.1.5 Energy Efficiency Incentives

The federal government is offering incentives (through the Eco-Energy Initiative) for energy efficiency upgrades on commercial buildings that are less than 10,000 m² in floor area. We believe that this facility will qualify to apply for this program, and could receive \$10 per GJ to be applied towards the upgrades we have described in this study, though with lighting and mechanical measures alone, this will only result in \$2,000 of incentive, and the application process is time consuming, so it may not make sense to apply to this program.

4.2 Lighting Opportunities

The lighting systems throughout the building are a diverse mix of 1 and 2-lamp T12 linear fluorescent, circular halogen, incandescent, and some exterior Metal Halide / Mercury Vapor. Exterior lighting is partially controlled by a timer and photocell. We have recommended a number of projects that involve lighting retrofits and occupancy sensor control. These projects will be discussed in detail in this section.

4.2.1.1 2 Lamp 25W T8 Retrofit

There are a total of 126 - 2 lamp 34W T12 florescent fixtures throughout the heated portion of the building that we recommend be retrofit with new 25 Watt T8 lamps at an estimated cost of \$7,600. This would result in annual savings of about \$569 or 7,685 kWh. Additional cost savings of approximately \$200 per year could be expected from reduced maintenance requirements for the new lamps and ballasts over the first several years. This represents a simple payback of 9.9 years.

4.2.1.2 1 Lamp 25W T8 Retrofit

There are a total of 6 - 1 lamp 34W T12 florescent fixtures that we recommend be retrofit with new 25 Watt T8 lamps for a cost of \$300. The annual savings for this would be \$20 or 267 kWh. This represents a payback of 15.2 years.

4.2.1.3 Exit Sign Retrofit

There are a total of 16 exit signs that currently use incandescent bulbs. Replacing these with LED bulbs would cost \$400. The expected savings for this would be \$239 or 3,227 kWh. This represents a payback of 1.7 years. Additional savings could be expected from the reduced maintenance costs of the longer life lamps.

4.2.1.4 Flood Light Bulb Retrofit

There are a total of 23 fixtures that contain incandescent reflector flood lamps. These could be replaced with new 15 Watt CFL lamps for a cost of \$300. The savings for this would be \$195 or 2,635 kWh. This represents a payback of 1.5 years. Additional savings could be expected from the reduced maintenance costs of the longer life lamps.

4.2.1.5 100W Incandescent Retrofit

There are a total of 4 fixtures that contain 100W incandescent lamps. These could be replaced with new 20 Watt CFL lamps for a cost of \$40. The savings for this would be \$9 or 122 kWh. This represents a payback of 4.4 years. Additional savings could be expected from the reduced maintenance costs of the longer life lamps.

4.2.1.6 60W Incandescent Retrofit

There are a total of 23 fixtures that contain incandescent 60W lamps. These could be replaced with new 15 Watt CFL lamps for a cost of \$200. The savings for this would be \$123 or 1,667 kWh. This represents a payback of 1.6 years. Additional savings could be expected from the reduced maintenance costs of the longer life lamps.

4.2.1.7 60W Incandescent Pot Light Retrofit

There are a total of 23 fixtures that contain 60W incandescent bulbs in pot lights. These could be replaced with new 15 Watt CFL lamps for a cost of \$200. The savings for this would be \$178 or 2,405 kWh. This represents a payback of 1.1 years. Additional savings could be expected from the reduced maintenance costs of the longer life lamps.

4.2.1.8 Incandescent Globe Light Retrofit

There are a total of 3 fixtures that contain incandescent globe lamps. These could be replaced with new 15 Watt CFL globe lamps for a cost of \$30. The savings for this would be \$22 or 296 kWh. This represents a payback of 1.4 years. Additional savings could be expected from the reduced maintenance costs of the longer life lamps.

4.2.1.9 Washroom Motion Sensors

We recommend adding motion sensors in the restrooms and shower area to automatically switch the lights off after a set period of time when no motion has been detected. Two motion sensors would be installed in each restroom, controlling the lights in the washroom area and shower area respectively. This project would cost an estimated \$800 and save \$365 or 4,938 kWh annually. The payback would be 2.2 years.

4.2.1.10 Locker Room Motion Sensors

We also recommend motion sensors to control the lights in the locker room area on the first floor. Although these lights are sometimes turned off, we noticed that were left on for hours when there was little traffic in this area. Three motion sensors in total would be required to cover all of the entrances into this area. This project would cost an estimated \$600 and save \$144 or 1,948 kWh annually. The payback would be 4.2 years.

4.2.1.11 Vending Machine

There are two vending machines located in the second floor hallway. Refrigerated vending machines use approximately \$300 per year in electricity. We suggest you consider installing a vending machine energy miser. This device will reduce the run hours on the machine using an energy saving mode when the space is unoccupied. We estimate that the installed cost of three vending machine energy misers will be \$400, and will save approximately \$200 and 2,700 kWh per year in electricity. This represents a payback of 2.0 years.

4.2.2 Lighting Retrofit Summary

The following table summarizes the various potential retrofits that are recommended at the Jericho Sailing Centre, descriptions of each retrofit follow:

Qty	Recommended ECM	Project	Initial Cost	Annual Savings			Simple Payback	GHG Savings
				Cost	kW	kWh		
126	4.2.1.1 to 2-F25W and new ballast	Retrofit	\$7,600	\$769	3.15	7,685	9.9	0.2
6	4.2.1.2 to 1-F25W and new ballast	Retrofit	\$300	\$20	0.00	267	15.0	0.0
16	4.2.1.3 to LED lamp for exit signs	Retrofit	\$400	\$239	0.00	3,227	1.7	0.1
23	4.2.1.4 to 15W CFL reflector	Retrofit	\$300	\$195	0.07	2,635	1.5	0.1
4	4.2.1.5 to 20W CFL	Retrofit	\$40	\$9	0.00	122	4.4	0.0
23	4.2.1.6 to 15W CFL	Retrofit	\$200	\$123	0.00	1,667	1.6	0.1
23	4.2.1.7 to 15W CFL	Retrofit	\$200	\$178	0.37	2,405	1.1	0.1
3	4.2.1.8 to 15W CFL Globe	Retrofit	\$30	\$22	0.00	296	1.4	0.0
37	4.2.1.9 WRMS(2)	Motion Sensor	\$800	\$365	0.00	4,938	2.2	0.2
31	4.2.1.10 Locker room(1)	Motion Sensor	\$600	\$144	1.15	1,948	4.2	0.1
2	4.2.1.11 Vending Machine Energy Misers	Motion Sensor	\$400	\$200	0.00	2,694	2.9	0.1
Total Lighting Bundle			\$10,870	\$2,264	4.74	27,884	4.8	1.0 t

4.2.3 BC Hydro Product Incentives

BC Hydro offers product incentives for certain kinds of lighting upgrades including T12 to T8 retrofits, LED exit lights, and compact fluorescent lamps. As we many of these types of product retrofits, this study will qualify for over \$2,000 in lighting product incentives, which are relatively easy to obtain so we highly recommend making an application to this program.

4.3 Renewable Energy Projects

We evaluated this site for a few types of renewable energy projects. These projects have relatively long payback periods, but would be interesting projects demonstrating leadership in sustainable energy. Funding for these projects could be available from external sources such as Vancity's sustainable energy grant program for non-profit organizations which will provide up to \$50,000 towards renewable energy and energy efficiency upgrades in a building. While some of these projects do not have short payback periods, the vision of having Solar and Wind Power at the Jericho Sailing Centre is highly aligned with the identity of the organization and may be worth pursuing for symbolic reasons alone.

4.3.1 Solar Photovoltaic

A basic 1.8 kW solar photovoltaic system would cost \$19,150 and produce 1,960 kWh per year, while the Jericho Sailing Centre is currently using about 220,000 kWh of electricity per year. The building's roof does have space to accommodate larger systems up to 22.8 kW. The largest system would produce 24,700 kWh per year. This would offset 10% of the buildings electrical consumption and save 766 kg of Annual CO₂ Emissions.

4.3.2 Wind Turbine

We also evaluated installing a small 1.9 kW wind turbine at the site. The estimated annual production for this turbine would be approximately 1,570 kWh and it would save 49 kg of Annual CO₂ Emissions. A tower of 33m in height would be required for the wind turbine. It would cost approximately \$15,000 for a guyed tower system. The guyed wires would require a radius of 16.5 m. A stand-alone tower that doesn't require guy wires would add approximately \$9,000 to the cost. To evaluate these options in more detail, would require further investigation, and more detailed analysis.

Note: The estimated production is based on wind data from monitoring stations farther inland. A more accurate estimate could be done with detailed data collected on site.

4.3.3 Solar Hot Water

A solar hot water system represents the most cost effective form of renewable energy for the Jericho Sailing Centre and this could be used to preheat the water for the domestic hot water heaters. This system could reduce heating costs by approximately \$3,000 per year, saving an estimated 202 GJ of natural gas and 8,654 kWh of electricity. The cost for this system would be about \$80,000. Grants available under the federal EcoEnergy program could reduce the cost to approximately \$60,000. With grants, the estimated simple payback of this project is 18.6 years. Please note that Solar Water Heating Systems are very scalable, so if this cost of \$80,000 seems too high for the Centre to consider, it may be possible to consider a \$20,000 installation which could save \$1,000 per year in domestic water heating costs, while still demonstrating leadership in renewable energy.

4.4 Conservation Education and Communication

So far we have addressed energy conservation using technology to reduce consumption, but one of the best ways to reduce energy consumption is through education of staff. Many people leave computers and lighting on when they leave their office for a few hours or even overnight. Crafting a simple memo to all employees to indicate that the organization is striving to become more sustainable and reduce energy consumption can have a big effect. In this memo, staff can be asked to do their part to reduce our combined impact on the environment, by turning off their computers, and lighting immediately after they leave a room, both at work and at home. By explaining that the Jericho Sailing Centre cares about Climate Change, and is doing their part to reduce Greenhouse Gas consumption, management can ask each individual employee to do their part. We would recommend the creation of a small 'sustainability' communications strategy to send the message to staff that this program is in place, and ongoing, with follow up memos (with educational energy saving ideas), and later messages that celebrate success. We estimate that this communication and education strategy will cost a maximum of \$500 with potential to save at least 1% of the electricity through behavior change, representing \$150 per year of cost savings.

4.5 Energy Consulting and Project Management

So that Jericho Sailing management staff can accurately analyze the overall costs for this project, we estimate that approximately \$5,000 of budget will be required for consulting on this project. These estimated costs include the initial energy audit, as well as some time to help direct the implementation of the projects described.

4.6 Green Financing

As a final note, we would like to reflect that these projects do not have to be paid out of a capital budget. It will be possible to finance these initiatives over a 15 or 20 year life cycle, such that the energy savings from these measures will actually save more money than the loan payments. In this way, these ideas can actually be better than cost neutral. Vancity and Coast Capital Savings both offer green financing for energy upgrades to facilities.

Project Summary

Jericho Sailing

Area
1,856 m²

Overall Energy Consumption	GJ	kWh
Natural Gas	1,129	313,667
Electricity - Mechanical Equipment	339	94,044
Electricity - Lighting	332	92,315
Plug Load	122	33,755
Total	1,922	220,114

Total	BEPI	2006	BEPI	2004	Cost		
					2004	2005	2006
Gas	608 MJ / m ²		517	MJ / m ²	\$11,284	\$ 10,042	\$ 14,680
Electricity	427 MJ / m ²		399	MJ / m ²	\$14,514	\$ 15,363	\$ 15,514
Total	1,035 MJ / m²		917	MJ / m²	\$25,797	\$25,406	\$30,194

Actual Electrical Inventory Breakdown

	kWh	kW	Ave. Hours
Pumps & Chiller	5,973	7.7	771
Ventilation	19,503	4.0	4,841
Heating	68,569	51.5	1,331
Lighting	92,315	31.0	2,982
Other (Plug Load)	33,755	3.9	8,760
Total	220,114	98.1	

Existing Systems

	W/ sq m	W/ sq ft
Lighting	12.3	1.1
Mechanical:	34.1	3.2
Plug Load	2.1	0.2

Energy Study Project Savings

Project Savings Summary	10.9% kWh	BEPI Reduction GJ	BEPI Reduction MJ / m ²	GHG Savings (Tonnes)
Mechanical Savings (Electrical)	12,569	45	24.4	0.4
Mechanical Savings (Natural Gas)		55	29.7	2.8
Lighting Savings (Electrical)	27,881	100	54.1	0.9
Education Savings	2,201	8	4.3	0.1
Total Savings	42,651	209	112.4	4.1
Projected Future Usage			923	59.1

Savings
\$
\$ 886
\$ 717
\$ 2,063
\$ 155
\$ 3,821

	Electricity	Gas	Total	GHG Savings
Current Total GHG Produced (Tonnes of CO2)*	6.8	56.3	63.2	
Project GHG Savings (Tonnes of CO2)*	1.3	2.8	4.1	6.4%

* Note: Emission factors of 0.031 kg CO₂ / kWh for electricity in BC, and 49.9 kg CO₂ / GJ natural gas.
Source Canada Canadian Standards Association

Appendix A - Mechanical and Motor Inventory

Mechanical Systems

ENERGY INVENTORY FORM - Mechanical Equipment

BUILDING NAME: Jericho Sailing

Ventilation							Check Month Op. Hours Apply																	
System Name	Equipment Number	Service Areas	Load hp	Load kW	% LF	J	F	M	A	M	J	J	A	S	O	N	D	Annual Hrs	Annual kWh	% of Total	Operating Schedule			
Fresh air supply unit		Restaurant	3.0	2.2	100	239	216	239	330	682	660	682	682	495	341	165	239	4969	11,120	57.0	Demand			
Kitchen exhaust unit		Kitchen	2.0	1.5	100	239	216	239	330	682	660	682	682	495	341	165	239	4969	7,413	38.0	Demand			
Exhaust Fan (Greenheck G-09-D)	EF-1	Showers	0.0667	0.05	100	37.2	134	223	360	595	720	893	744	576	298	144	149	4873	242	1.2	Demand			
Exhaust Fan	EF-2	Showers	0.0667	0.05	100	37.2	134	223	360	595	720	893	744	576	298	144	149	4873	242	1.2	Demand			
Exhaust Fan	EF-3		0.0667	0.05	100	37.2	134	223	360	595	720	893	744	576	298	144	149	4873	242	1.2	Demand			
Exhaust Fan	EF-4		0.0667	0.05	100	37.2	134	223	360	595	720	893	744	576	298	144	149	4873	242	1.2	Demand			
Exhaust Fan	EF-5		0.0667	0.05	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	Demand			
Exhaust Fan	EF-6		0.0667	0.05	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	Demand			
Totals				4.0															19,503	100.0				

Heating							Check Month Op. Hours Apply																	
System Name	Equipment Number	Service Areas	Load hp	Load kW	% LF	J	F	M	A	M	J	J	A	S	O	N	D	Annual Hrs	Annual kWh	% of Total	Operating Schedule			
3 ft Baseboard Heaters*		(total 6)		4.5	40	521	403	372	216	0	0	0	0	216	446	576	744	3494	6,290	9.2	Demand			
4 ft Baseboard Heaters*		(total 14)		14.0	40	521	403	372	216	0	0	0	0	216	446	576	744	3494	19,569	28.5	Demand			
6 ft Baseboard Heaters*		(total 2)		3.0	40	521	403	372	216	0	0	0	0	216	446	576	744	3494	4,193	6.1	Demand			
8 ft Baseboard Heaters*		(total 6)		12.0	40	521	403	372	216	0	0	0	0	216	446	576	744	3494	16,773	24.5	Demand			
Quellet OVS Wall Heater		Meeting Rooms		1.5	40	521	403	372	216	0	0	0	0	216	446	576	744	3494	2,097	3.1	Demand			
Quellet OVS Wall Heater		Meeting Rooms		1.5	40	521	403	372	216	0	0	0	0	216	446	576	744	3494	2,097	3.1	Demand			
Quellet OVS Wall Heater		Meeting Rooms		1.5	40	521	403	372	216	0	0	0	0	216	446	576	744	3494	2,097	3.1	Demand			
DHW Heater 284L		Kitchen		4.5	40	55.8	101	112	135	558	540	558	558	108	112	81	83.7	3002	5,403	7.9	Demand			
DHW Heater 270L		Mech Room		4.5	50	17.1	61.6	102	165	273	330	409	341	264	136	66	68.2	2234	5,025	7.3	Demand			
DHW Heater 270L		Mech Room		4.5	50	17.1	61.6	102	165	273	330	409	341	264	136	66	68.2	2234	5,025	7.3	Demand			
Totals				51.5		0	0	0	0	0	0	0	0	0	0	0	0	0	68,569	100.0				

Pumps & Chiller							Check Month Op. Hours Apply																	
System Name	Equipment Number	Service Areas	Load hp	Load kW	% LF	J	F	M	A	M	J	J	A	S	O	N	D	Annual Hrs	Annual kWh	% of Total	Comments			
Compressor (Tecumseh AKA946)	COMP-1	Walk in fridge	0.75	0.56	30	744	672	744	720	744	720	744	744	720	744	720	744	8760	1,470	24.6	demand			
Compressor (Tecumseh AWA244)	COMP-2	Walk in freezer	1.00	0.75	30	744	672	744	720	744	720	744	744	720	744	720	744	8760	1,960	32.8	demand			
Motor		Walk in fridge	0.05	0.04	90	264	238	264	255	264	255	264	264	255	264	255	264	3103	104	1.7	demand			
Motor		Walk in freezer	0.05	0.04	90	264	238	264	255	264	255	264	264	255	264	255	264	3103	104	1.7	demand			
Pump		DHW	0.20	0.15	60	744	672	744	720	744	720	744	744	720	744	720	744	8760	784	13.1	demand			
Pump		Boiler Room	0.33	0.25	60	744	672	744	720	744	720	744	744	720	744	720	744	8760	1,307	21.9	demand			
Totals					100	0	0	0	0	0	0	0	0	0	0	0	0	0	41	242	4.1	Demand		
Elevator Motor		Elevator	8.0	6.0	100	0.31	1.12	1.86	3	4.96	6	7.44	6.2	4.8	2.48	1.2	1.24							
Totals				7.7															5,973	100.0				

Appendix A - Mechanical and Motor Inventory

Natural Gas Equipment

ENERGY INVENTORY FORM - Mechanical Equipment
 BUILDING NAME: Jericho Sailing

Jericho Sailing					Check Month Op. Hours Apply															
System	Equipment		BTU/h	%													Annual	Annual	% of	Comments
Name	Number			LF	J	F	M	A	M	J	J	A	S	O	N	D	Hrs	GJ	Total	
Boiler	B-1	Hydotherm 80% eff	168,000	30	744	605	595	468	223	112	0	0	216	446	504	744	4,657	248	23.4	on demand
					40	32	32	25	12	6	0	0	11	24	27	40	248			
Domestic Water Heater	DHW	65 US gal	365,000	40	31	28	93	150	310	403	403	403	300	155	30	31	2,337	360	34.0	on demand
					5	4	14	23	48	62	62	62	46	24	5	5	360			
Kitchen (grills, etc.)			1,000,000	24	42	38	70	68	167	251	335	363	297	70	41	42	1,782	451	42.6	seasonal
					11	10	18	17	42	64	85	92	75	18	10	11	451			
Totals					55	46	64	65	102	132	147	154	133	65	42	55	1059	1,059	100	

	Average	60.2	60.9	66.8	66.1	85.2	112.1	129.5	145.9	140.1	80.8	33.9	67.4	966
Actual Gas Consumption	2003													0
	2004	63.5	68.5	72.7	77.4	102.3	97.8	109.7	103.6	99.4	63.3	48.2	53.9	960
	2005	50.5	50.5	55.2	67.8	62.4	94.9	125.6	143.9	152.5				803
	2006	63.7	61.4	80.4	63.2	76.5	126.1	138.0	199.2	151.0	69.4	19.5	80.8	1,129
	2007	63.1	63.1	59.0	56.1	99.5	129.5	144.6	136.9	157.4	109.8			1,019

Energy Inventory Form - Lighting Inventory

Date: 12/12
Inventory by: Rob Baxter

Building Name: Jericho Sailing

Type	Descrip	Floor	Area	Qty	Operating Hours								Existing			After Retrofit Projects			
					S	M	T	W	T	F	S	Unit Watts	Total Watts	kWh	Year Hours	Total Hours	Unit Watts	Total Watts	kWh
A	2F34T12	First	Lobby	2	10	10	10	10	10	10	10	68	136	503	3701	7401.2112	43	86	318
B	1F34T12	First	Lobby	5	10	10	10	10	10	10	10	34	170	629	3701	18503.028	22	110	407
C	25T6-12	First	Lobby	3	24	24	24	24	24	24	24	25	75	657	8766	26298.72	2	6	53
D	65R30FL	First	Lobby	2	10	10	10	10	10	10	10	65	130	481	3701	7401.2112	15	30	111
R	60W Incan Potlight	First	JSCA Office	9	0	7	7.4	7	7.4	7.4	0	60	540	1,036	1918	17258.535	15	135	259
A	2F34T12	First	JSCA Office	5	0	7	7.4	7	7.4	7.4	0	68	340	652	1918	9588.075	43	215	412
K	Q50MR16	First	JSCA Office	6	0	7	7.4	7	7.4	7.4	0	50	300	575	1918	11505.69	50	300	575
A	2F34T12	First	Windsure School Office	6	0	6	6	6	6	6	0	68	408	639	1565	9392.4	43	258	404
A	2F34T12	First	Rescue & First Aid	6	0	2	2	2	2	2	0	68	408	213	522	3130.8	43	258	135
A	2F34T12	First	DSA Sailing	3	5	5	5	5	5	5	5	68	204	373	1826	5478.9	43	129	236
D	65R30FL	First	DSA Sailing	2	5	5	5	5	5	5	5	65	130	237	1826	3652.6	15	30	55
H	60 W Incan	First	DSA Sailing	2	5	5	5	5	5	5	5	60	120	219	1826	3652.6	15	30	55
U	Q50MR16	First	Elevator	5	24	24	24	24	24	24	24	50	250	2,192	8766	43831.2	50	250	2,192
A	2F34T12	First	Elevator Mech Room	1	0	0	0	0	0	0	0	68	68	2	31	31.308	43	43	1
F	CFL	First	JSCA Workroom (storage)	1	0	0	0	0	0	0	0	13	13	0	31	31.308	13	13	0
A	2F34T12	First	Mac Sailing School	3	5	5	5	5	5	5	5	68	204	373	1826	5478.9	43	129	236
A	2F34T12	First	Mac Sailing School Storage	4	1	1	1	1	1	1	1	68	272	99	365	1461.04	43	172	63
A	2F34T12	First	DSA Sailing (Storage)	1	1	1	1	1	1	1	1	68	68	25	365	365.26	43	43	16
A	2F34T12	First	Lockers Behind Stairs	1	8	8	8	8	8	8	8	68	68	199	2922	2922.08	43	43	126
A	2F34T12	First	Discovery Sailing	2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	68	136	109	804	1607.144	43	86	69
A	2F34T12	First	Locker Room	31	8	8	8	8	8	8	8	68	2,108	6,160	2922	90584.48	43	1,333	3,895
A	2F34T12	First	Locker Room	7	24	24	24	24	24	24	24	68	476	4,173	8766	61363.68	43	301	2,639
C	25T6-12	First	Locker Room	4	24	24	24	24	24	24	24	25	100	877	8766	35064.96	2	8	70
		First	Corsairs	0	2.2	2.2	2.2	2.2	2.2	2.2	2.2	68	408	328	804	4821.432	43	258	207
A	2F34T12	First	UBC Club	6	2.2	2.2	2.2	2.2	2.2	2.2	2.2	68	476	383	804	5625.004	43	301	242
A	2F34T12	First	Locarno	7	2.2	2.2	2.2	2.2	2.2	2.2	2.2	68	476	383	804	5625.004	43	301	242
A	2F34T12	First	Companion Way	2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	68	136	109	804	1607.144	43	86	69
A	2F34T12	First	Sea Scouts	4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	68	272	219	804	3214.288	43	172	138
A	2F34T12	First	Vikings	4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	68	272	219	804	3214.288	43	172	138
H	60 W Incan	First	Vikings	6	2.2	2.2	2.2	2.2	2.2	2.2	2.2	60	360	289	804	4821.432	15	90	72
G	100 W Incan	First	Electrical Room	2	0.1	0	0.1	0	0.1	0.1	0.1	100	200	5	26	52.18	20	40	1
H	60 W Incan	First	Mech Room	2	0.1	0	0.1	0	0.1	0.1	0.1	60	120	3	26	52.18	15	30	1
J	2 F96T12	First	Hanger	16	10	10	10	10	10	10	10	120	1,920	7,013	3653	58441.6	120	1,920	7,013
C	25T6-12	First	Hanger	2	24	24	24	24	24	24	24	25	50	438	8766	17532.48	2	4	35
G	100 W Incan	First	Workshop (Bailitt)	2	2	2	2	2	2	2	2	100	200	146	731	1461.04	20	40	29
		First	Ecomarine Storage	0.2	0	0	0.2	0	0.2	0.2	0.2	0	0	73	0	0	0	0	
		First	UBC Storage	0.2	0	0	0.2	0	0.2	0.2	0.2	0	0	73	0	0	0	0	
		First	Storage	0.2	0	0	0.2	0	0.2	0.2	0.2	0	0	73	0	0	0	0	
		First	Locarno Storage	0.2	0	0	0.2	0	0.2	0.2	0.2	0	0	73	0	0	0	0	
		First	Sea Scouts Storage	0.2	0	0	0.2	0	0.2	0.2	0.2	0	0	73	0	0	0	0	
		First	Mac Storage	0.2	0	0	0.2	0	0.2	0.2	0.2	0	0	73	0	0	0	0	
A	2F34T12	Second	Hanger Stairway	1	24	24	24	24	24	24	24	68	68	596	8766	8766.24	43	43	377
A	2F34T12	Second	Storage Galley	1	3	3	3	3	3	3	3	68	68	75	1096	1095.78	43	43	47
F	CFL	Second	SW Meeting	2	6	6	6	6	6	6	6	13	26	57	2192	4383.12	13	26	57
K	Q50MR16	Second	SW Meeting	2	6	6	6	6	6	6	6	50	100	219	2192	4383.12	50	100	219
F	CFL	Second	SE Meeting	4	6	6	6	6	6	6	6	13	52	114	2192	8766.24	13	52	114
K	Q50MR16	Second	SE Meeting	4	6	6	6	6	6	6	6	50	200	438	2192	8766.24	50	200	438
L	100 W Incan on dimmer	Second	NW Meeting	5	5	5	5	5	5	5	5	100	500	913	1826	9131.5	100	500	913
U	LED Exit	Second	NW Meeting	1	5	5	5	5	5	5	5	2	2	4	1826	1826.3	2	2	4
M	Q50MR16	Second	NW Meeting	4	5	5	5	5	5	5	5	50	200	365	1826	7305.2	50	200	365
N	60 W Incan on dimmer	Second	NE Meeting	4	5	5	5	5	5	5	5	60	240	438	1826	7305.2	60	240	438
P	60 W Incan on dimmer	Second	NE Meeting	5	5	5	5	5	5	5	5	60	300	548	1826	9131.5	60	300	548
U	Q50MR16	Second	NE Meeting	11	5	5	5	5	5	5	5	50	550	1,004	1826	20089.3	50	550	1,004
C	25T6-12	Second	NE Meeting	1	24	24	24	24	24	24	24	25	25	219	8766	8766.24	2	2	18
A	2F34T12	Second	Rescue Area (Exit)	2	10	10	10	10	10	10	10	68	136	502	3689	7378.252	43	86	317
Q	FC8T9/FC12T9	Second	Men's Restroom	8	10	10	10	10	10	10	10	84	672	2,479	3689	29513.008	84	672	2,479
Q	FC8T9/FC12T9	Second	Men's Shower	6	10	10	10	10	10	10	10	84	504	1,859	3689	22134.756	84	504	1,859
A	2F34T12	Second	Men's Shower	5	10	10	10	10	10	10	10	68	340	1,254	3689	18445.63	43	215	793
Q	FC8T9/FC12T9	Second	Women's Restroom	7	10	10	10	10	10	10	10	84	588	2,169	3689	25823.882	84	588	2,169
Q	FC8T9/FC12T9	Second	Women's Shower	6	10	10	10	10	10	10	10	84	504	1,859	3689	22134.756	84	504	1,859
B	1F34T12	Second	Women's Shower	1	10	10	10	10	10	10	10	34	34	125	3689	3689.126	22	22	81
A	2F34T12	Second	Women's Shower	4	10	10	10	10	10	10	10	68	272	1,003	3689	14756.504	43	172	635
F	CFL	Second	Restroom	1	2	2	2	2	2	2	2	13	13	9	731	730.52	13	13	9
A	2F34T12	Second	Kitchen	9	0	1	1	1	1	1	1	68	612	160	261	2348.1	43	387	101
K	Q50MR16	Second	Kitchen	3	11	11	11	11	11	11	11	50	150	603	4018	12053.58	50	150	603
R	60W Incan Potlight	Second	Kitchen	3	11	11	11	11	11	11	11	60	180	723	4018	12053.58	15	45	181
H	60 W Incan	Second	Cafetria Galley	9	6	6	6	6	6	6	6	60	540	1,183	2192	19724.04	15	135	296
D	65R30FL	Second	Cafetria Galley	3	6	6	6	6	6	6	6	65	195	427	2192	6574.68	15	45	99
R	60W Incan Potlight	Second	Member's Lounge	6	6	6	6	6	6	6	6	60	360	789	2192	13149.36	15	90	197
A	2F34T12	Second	Member's Lounge	2	6	6	6	6	6	6	6	68	136	298	2192	4383.12	43	86	188
U	Q50MR16	Second	Member's Lounge	3	6	6	6	6	6	6	6	50	150	329	2192	6574.68	50	150	329
C	25T6-12	Second	Member's Lounge	2	24	24	24	24	24	24	24	25	50	438	8766	17532.48	2	4	35
R	60W Incan Potlight	Second	Member's Lounge	5	6	6	6	6	6	6	6	60	300	657	2192	10957.8	15	75	164
U	Q50MR16	Second	Member's Lounge	3	6	6	6	6	6	6	6	50	150	329	2192	6574.68	50	150	329
S	60WG30	Second	Member's Lounge	3	6	6	6	6	6	6	6	60	180	394	2192	6574.68	15	45	99

Type	Descrip	Floor	Area	Qty	Operating Hours							Existing			After Retrofit Projects				
					S	M	T	W	T	F	S	Unit Watts	Total Watts	kWh	Year Hours	Total Hours	Unit Watts	Total Watts	kWh
D	65R30FL	Second	Member's Lounge	11	6	6	6	6	6	6	6	65	715	1,567	2192	24107.16	15	165	362
U	Q50MR16	Second	Member's Lounge	8	6	6	6	6	6	6	50	400	877	2192	17532.48	50	400	877	
C	25T6-12	Second	Surf and Turf	1	24	24	24	24	24	24	25	25	219	8766	8766.24	2	2	18	
D	65R30FL	Second	Surf and Turf	5	6	6	6	6	6	6	65	325	712	2192	10957.8	15	75	164	
U	Q50MR16	Second	Surf and Turf	5	6	6	6	6	6	6	50	250	548	2192	10957.8	50	250	548	
V	30R20	Second	Surf and Turf	2	6	6	6	6	6	6	30	60	131	2192	4383.12	30	60	131	
H	60 W Incan	Second	Surf and Turf	4	6	6	6	6	6	6	60	240	526	2192	8766.24	15	60	131	
Q	FC8T9/FC12T9	Second	Janitor	1	0.5	1	0.5	1	0.5	0.5	84	84	15	183	182.63	84	84	15	
		Second	Rescue Area 2		0.1	0	0.1	0	0.1	0.1		0	0	37	0		0	0	
		Second	Storage		0.1	0	0.1	0	0.1	0.1		0	0	37	0		0	0	
F	CFL	Second	Hallway	3	11	11	11	11	11	11	13	39	157	4018	12053.58	13	39	157	
C	25T6-12	Second	Hallway	2	24	24	24	24	24	24	25	50	438	8766	17532.48	2	4	35	
M	LED Exit	Second	Hallway	1	11	11	11	11	11	11	2	2	8	4018	4017.86	2	2	8	
A	2F34T12	Second	Hallway	6	11	11	11	11	11	11	68	408	1,639	4018	24107.16	43	258	1,037	
A	2F34T12	Second	Hallway	1	24	24	24	24	24	24	68	68	596	8766	8766.24	43	43	377	
Q	FC8T9/FC12T9	Second	Stairway	6	11	11	11	11	11	11	84	504	2,025	4018	24107.16	84	504	2,025	
Q	FC8T9/FC12T9	Second	Stairway	1	24	24	24	24	24	24	84	84	736	8766	8766.24	84	84	736	
C	25T6-12	Second	Stairway	1	24	24	24	24	24	24	25	25	219	8766	8766.24	2	2	18	
F	CFL	Second	Exterior	11	10	10	10	10	10	10	13	143	522	3653	40178.6	13	143	522	
T	MV1000	Second	Exterior	5	10	10	10	10	10	10	1000	5,000	18,263	3653	18263	1000	5,000	18,263	
W	MH1000	Yard	Post	3	10	10	10	10	10	10	1000	3,000	10,958	3653	10957.8	1000	3,000	10,958	
Totals				377								30,957	92,315	275,474	1,092,841	23,692	74,018		

Luminaire Schedule		
Type	Description	Watts
A	2F34T12	68
B	1F34T12	34
C	25T6-12	25
D	65R30FL	65
E	100 W Flood	100
F	CFL	13
G	100 W Incan	100
H	60 W Incan	60
J	2 F96T12	120
K	Q50MR16	50
L	100 W Incan on dimmer	100
M	LED Exit	2
N	60 W Incan on dimmer	60
P	60 W Incan on dimmer	60
Q	FC8T9/FC12T9	84
R	60W Incan Potlight	60
S	60WG30	60
T	MV1000	1000
U	Q50MR16	50
V	30R20	30
W	MH1000	1000
X		
Y	2-F25W	43
AA	1-F25W	22
BB		
CC		
DD		

Replacement Unit Costs	\$	W
Retrofit to 2-F25W and ne	60	43
Retrofit to 1-F25W and ne	43	22
Retrofit to LED lamp for ex	25	2
Retrofit to 15W CFL reflect	12	15
		100
		13
Retrofit to 20W CFL	10	20
Retrofit to 15W CFL	8	15
		120
		50
		100
		60
		60
		84
Retrofit to 15W CFL	8	15
Retrofit to 15W CFL Globe	10	15
		1000
		50
		30
		1000
		43
		22

Appendix B:

Lighting Analysis

Building Improvement Program
Energy Inventory Form - Lighting Inventory

Date: 10-Jan
Inventory by: Rob Baxter

Building Name: Jericho Sailing

Lighting Type	Area	area (ft2)	density / w/ft2	total kW	Run hours			kWh
					days	avg. hrs/ day	avg. hours	
Gen office		19,950	1.14	22.8	365.2	8.17	2,982	92,315
Parkade Exterior		0		0.0				
Total		19,950	1.55	31.0				92,315
Savings	Interior		0.36	7.3				
	Total		0.36	7.3				
After	Interior		0.78	15.5				
	Total		0.78	15.5				

T12 and Inc Lamp Retrofits																
Item 4.2.1	Type	SOLUTION	NO. UNITS		AVG HOURS USED		ENERGY USED		ENERGY SAVED:		COSTS: HYDRO \$ SAVED/YR	INITIAL COST	SIMPLE PAYBACK PERIOD	HYDRO CHARGES RAW \$ SAVED/YEAR:		
			BEFORE	AFTER	BEFORE	AFTER	BEFORE	AFTER	WATTS: TOTAL	TOTAL KWH/YR				COST	DEMAND	ENERGY
4.2.1.1	A	to 2-F25W and new ballast 2F34T12 Type Retrofit	126	126	2,440	2,440	68	43	3,150	7,685	\$569	\$7,560	13.29	\$7,560	\$0	\$542
4.2.1.2	B	to 1-F25W and new ballast 1F34T12 Type Retrofit	6	6	3,706	3,706	34	22	72	267	\$20	\$258	13.07	\$258	\$0	\$19
4.2.1.3	C	to LED lamp for exit signs 25T6-12 Type Retrofit	16	16	8,768	8,768	25	2	368	3,227	\$239	\$400	1.68	\$400	\$0	\$227
4.2.1.4	D	to 15W CFL reflector 65R30FL Type Retrofit	23	23	2,292	2,292	65	15	1,150	2,635	\$195	\$276	1.42	\$276	\$0	\$186
4.2.1.5	G	to 20W CFL 100 W Incan Type Retrofit	4	4	381	381	100	20	320	122	\$9	\$40	4.44	\$40	\$0	\$9
4.2.1.6	H	to 15W CFL 60 W Incan Type Retrofit	23	23	1,610	1,610	60	15	1,035	1,666	\$123	\$184	1.49	\$184	\$0	\$117
4.2.1.7	R	to 15W CFL 60W Incan Potlight Type Retrofit	23	23	2,323	2,323	60	15	1,035	2,404	\$178	\$184	1.03	\$184	\$0	\$169
4.2.1.8	S	to 15W CFL Globe 60WG30 Type Retrofit	3	3	2,192	2,192	60	15	135	296	\$22	\$30	1.37	\$30	\$0	\$21
Item 4.2.1		TOTAL SOLUTIONS	224	224					7,265	18,302	\$1,354	\$8,932	6.59	\$0	\$1,290	

MOTION SENSOR LIGHTING RETROFITS																			
Item 4.2.3.2	Type	SOLUTION	NO. UNITS		HOURS USED		ENERGY USED		ENERGY SAVED:		COSTS: HYDRO \$ SAVED/YR	INITIAL COST	SIMPLE PAYBACK PERIOD	HYDRO CHARGES RAW \$ SAVED/YEAR:					
			BEFORE	AFTER	BEFORE	AFTER	BEFORE	AFTER	WATTS: TOTAL	TOTAL KWH/YR				COST	DEMAND	ENERGY			
4.2.1.9	Motion	WRMS(2)																	
		FC8T9/FC12T9	8	8	3,689	1,845	84	84	0	1,240	\$365	\$800	2.19	\$800	\$0	\$	348		
		FC8T9/FC12T9	6	6	3,689	1,845	84	84	0	930									
		2-F25W	5	5	3,689	1,845	43	43	0	397									
		FC8T9/FC12T9	7	7	3,689	1,845	84	84	0	1,085									
		FC8T9/FC12T9	6	6	3,689	1,845	84	84	0	930									
		1-F25W	1	1	3,689	1,845	22	22	0	41									
		2-F25W	4	4	3,689	1,845	43	43	0	317									
		motion sensor																	
4.2.1.10	Motion	Locker room(1)																	
		2-F25W	31	31	2,922	1,461	43	43	0	1,948	\$144	\$600	4.16	\$600	\$0	\$	137		
		motion sensor																	
4.2.1.11	Motion	Vending Machine Energy Misers																	
		1 Candy, I Pop	2	2	8,736	2,000	200	200	0	2,694	\$199	\$400	2.01	\$400	\$0	\$	190		
		motion sensor																	
Item 4.2.3.2		TOTAL SOLUTIONS	70	70					0	9,580	\$709	\$1,800	2.54				\$0	\$48	

Unit Costs

One Motion Sensor + Labor \$200

ACKNOWLEDGEMENTS

SES Consulting Inc. would like to acknowledge the valuable assistance of the following personnel in providing the necessary information for this report.

This report was created and written by Scott Sinclair, Brad White, and Rob Baxter of SES Consulting Inc. Rob Baxter prepared the original inventories for spreadsheet generation.

In addition, this report was prepared with the assistance of Mike Cotter, Benj Rummen, and Arnold Heyden (Jericho Sailing Centre Association). Mike and Benj provided access to the facility and energy data. Arnold led a walking tour of the facility and helped answer questions about the building's mechanical systems.

Their cooperation and contributions to the project are greatly appreciated.

Power Smart Product Incentive Program

Light Emitting Diodes (LED)

The Product Incentive Program provides financial incentives to organizations who replace inefficient products with energy-efficient technologies or add on products to existing systems to make them more efficient. Not all products are eligible. Please consult the BC Hydro web site at www.bchydro.com/incentives for all program policies, eligible products and performance criteria before purchasing products.

For more information call **1 866 522-4713** or **604 522-4713** in the Lower Mainland.

Existing Technology	Product Replacement Description	Incentive (\$)
LED Lamps		
Incandescent bulb (< 50 W)	Screw-in LED ≤ 5 W	\$15
	Screw-in LED ≤ 5 W – decorative	\$4
	Hardwired LED ≤ 5 W	\$15
Incandescent bulb (> 50 W)	Screw-in LED > 5 W	\$20
	Hardwired LED > 5 W	\$22
Halogen	LED MR 16 ≤ 5 W	\$4
Permanent Outdoor Incandescent light string	Screw-in ≤ 5 W LED	\$2.50
LED Exit Signs		
Incandescent Exit Sign	LED Retrofit Kit	\$5
	LED Replacement Lamps (2 required)	\$5
	LED Exit Sign	\$10
CFL Exit Sign	LED Retrofit Kit	\$2.50
	LED Replacement Lamps (2 required)	\$2.50
	LED Exit Sign	\$5
LED Light Strings		
Holiday Light String (Incandescent mini)	LED String (Mini and C-6)	\$2.50/string
Holiday Light String (Incandescent C-7 and C-9)	LED String (C-7 and C-9)	\$5/string
	Screw-in LED lamp (C-7 and C-9)	\$0.20/lamp
LED Signage		
Neon	LED strips	\$6/Linear ft.
Fluorescent	LED strips	\$10/Linear ft.
High Voltage Message Board	LED Message Board	\$0.10/kWh saved in 1st year of operations
Incandescent Scoreboards	LED Scoreboards	\$0.10/kWh saved in 1st year of operations

Power Smart Product Incentive Program

Fluorescent T8

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For more information call **1 866 522-4713** or **604 522-4713** in the Lower Mainland.

Existing Technology	Product Replacement Description	Incentive (\$)
Fluorescent T12		
2' 1 lamp T12 magnetic ballast	Standard T8 – 1 lamp fixture with ballast	\$4
	Standard T8 – 2, 1 lamp fixtures sharing one ballast (tandem wired)	\$11
2' 2 lamp T12 magnetic ballast	Standard T8 – 2 lamp fixture with ballast	\$11
	Standard T8 – 2, 2 lamp fixtures sharing one ballast (tandem wired)	\$24
3' 1 lamp T12 magnetic ballast	Standard T8 – 1 lamp fixture with ballast	\$9
	Standard T8 – 2, 1 lamp fixtures sharing one ballast (tandem wired)	\$16
3' 2 lamp T12 magnetic ballast	Standard T8 – 2 lamp fixture with ballast	\$16
	Standard T8 – 2, 2 lamp fixtures sharing one ballast (tandem wired)	\$32
4' 1 lamp T12 magnetic ballast	Energy Saver T8s	
	Energy Saver T8 – 1 lamp fixture with ballast	\$7
	Energy Saver T8 – 2, 1 lamp fixtures sharing one ballast (tandem wired)	\$14
	Standard T8s	
	Standard T8 – 1 lamp fixture with ballast	\$6
	Standard T8 – 2, 1 lamp fixtures sharing one ballast (tandem wired)	\$12
4' 2 lamp T12 magnetic ballast	Energy Saver T8s	
	Energy Saver T8 – 2 lamp fixture with ballast	\$14
	Energy Saver T8 – 2, 2 lamp fixtures sharing one ballast (tandem wired)	\$30
	Standard T8s	
	Standard T8 – 2 lamp fixture with ballast	\$12
	Standard T8 – 2, 2 lamp fixtures sharing one ballast (tandem wired)	\$25
4' 3 lamp T12 magnetic ballast	Energy Saver T8s	
	Energy Saver T8 – 3 lamp fixture with ballast	\$24
	Energy Saver T8 – 3 lamp fixture with 2 ballasts (switched applications)	\$24
	Standard T8s	
	Standard T8 – 3 lamp fixture with ballast	\$20
	Standard T8 – 3 lamp fixture with 2 ballasts (switched applications)	\$20
4' 4 lamp T12 magnetic ballast	Energy Saver T8s	
	Energy Saver T8 – 4 lamp fixture with ballast	\$30
	Energy Saver T8 – 2 lamp fixture with ballast (overlit area)	\$54
	Energy Saver T8 – 2, 2 lamp fixtures sharing one ballast (tandem wired and overlit)	\$30
	Energy Saver T8 – 3 lamp fixture with ballast (overlit area)	\$35
	Energy Saver T8 – 4 lamp fixture with 2 ballasts (switched applications)	\$30

Power Smart Product Incentive Program

Fluorescent T8

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For more information call **1 866 522-4713** or **604 522-4713** in the Lower Mainland.

Existing Technology	Product Replacement Description	Incentive (\$)
Fluorescent T12		
4' 4 lamp T12 magnetic ballast	Standard T8s Standard T8 – 4 lamp fixture with ballast	\$25
	Standard T8 – 2 lamp fixture with ballast (overlit area)	\$52
	Standard T8 – 2, 2 lamp fixtures sharing one ballast (tandem wired and overlit)	\$25
	Standard T8 – 3 lamp fixture with ballast (overlit area)	\$32
	Standard T8 – 4 lamp fixture with 2 ballasts (switched applications)	\$25
8' 1 lamp T12 magnetic ballast	Energy Saver T8s Energy Saver T8 – 4' 2 lamp fixture with ballast	\$12
	Energy Saver T8 – 8' 1 lamp fixture with ballast	\$8
	Standard T8s Standard T8 – 4' 2 lamp fixture with ballast	\$10
	Standard T8 – 8' 1 lamp fixture with ballast	\$6
8' 2 lamp T12 magnetic ballast	Energy Saver T8s Energy Saver T8 – 4' 4 lamp fixture with ballast	\$20
	Energy Saver T8 – 8' 2 lamp fixture with ballast	\$20
	Standard T8s Standard T8 – 4' 4 lamp fixture with ballast	\$16
	Standard T8 – 8' 2 lamp fixture with ballast	\$16
Fluorescent T12 VHO		
4' 1 lamp T12 VHO magnetic ballast	Energy Saver T8 – 4' 2 lamp fixture with ballast	\$35
	Standard T8 – 4' 2 lamp fixture with ballast	\$35
6' 1 lamp T12 VHO magnetic ballast	Energy Saver T8 – 4' 2 lamp fixture with ballast	\$35
	Standard T8 – 4' 2 lamp fixture with ballast	\$35
8' 1 lamp T12 VHO magnetic ballast	Energy Saver T8 – 4' 2 lamp fixture with ballast	\$35
	Energy Saver T8 – 4' 4 lamp fixture with ballast	\$35
	Standard T8 – 4' 2 lamp fixture with ballast	\$35
	Standard T8 – 4' 4 lamp fixture with ballast	\$35
Fluorescent T12 HO		
4' 2 lamp T12 HO magnetic ballast	Energy Saver T8 – 4' 2 lamp fixture with ballast	\$35
	Standard T8 – 4' 2 lamp fixture with ballast	\$35
	Standard T8 – 4' 2 lamp fixture with high ballast factor ballast	\$40
	Standard T8HO – 4' 2 lamp fixture with ballast	\$35

Power Smart Product Incentive Program

Fluorescent T8

The Product Incentive Program provides financial incentives to organizations who replace inefficient products with energy-efficient technologies or add on products to existing systems to make them more efficient. Not all products are eligible. Please consult the BC Hydro web site at www.bchydro.com/incentives for all program policies, eligible products and performance criteria before purchasing products.

For more information call **1 866 522-4713** or **604 522-4713** in the Lower Mainland.

Existing Technology	Product Replacement Description	Incentive (\$)
Fluorescent T12 HO		
6' 1 lamp T12 HO magnetic ballast	Energy Saver T8 – 4' 2 lamp fixture with ballast	\$35
	Standard T8 – 4' 2 lamp fixture with ballast	\$35
6' 2 lamp T12 HO magnetic ballast	Energy Saver T8 – 4' 3 lamp fixture with ballast	\$35
	Energy Saver T8 – 4' 4 lamp fixture with ballast	\$35
	Standard T8 – 4' 3 lamp fixture with ballast	\$35
	Standard T8 – 4' 4 lamp fixture with ballast	\$35
8' 1 lamp T12 HO magnetic ballast	Energy Saver T8 – 4' 2 lamp fixture with ballast	\$35
	Standard T8 – 4' 2 lamp fixture with ballast	\$35
8' 2 lamp T12 HO magnetic ballast	Energy Saver T8 – 4' 3 lamp fixture with ballast	\$35
	Energy Saver T8 – 4' 4 lamp fixture with ballast	\$35
	Standard T8 – 4' 3 lamp fixture with ballast	\$35
	Standard T8 – 4' 4 lamp fixture with ballast	\$35
	Standard T8 – 4' 4 lamp fixture with high ballast factor ballast	\$40
	Standard T8 – 8' 2 lamp fixture with high ballast factor ballast	\$40
	Standard T8HO – 4' 4 lamp fixture with ballast	\$35
	Standard T8HO – 8' 2 lamp fixture with ballast	\$35
Fluorescent T8		
8' T8 lamp	8' Energy Saver T8 lamp	\$1
4' T8 lamp	4' Energy Saver T8 lamp	\$1

Power Smart Product Incentive Program

Fluorescent T8

The Product Incentive Program provides financial incentives to organizations who replace inefficient products with energy-efficient technologies or add on products to existing systems to make them more efficient. Not all products are eligible. Please consult the BC Hydro web site at www.bchydro.com/incentives for all program policies, eligible products and performance criteria before purchasing products.

For more information call **1 866 522-4713** or **604 522-4713** in the Lower Mainland.

Existing Technology	Product Replacement Description	Incentive (\$)
<i>Incandescent</i>		
Incandescent Luminaire (≤ 100 W)	Energy Saver T8s Energy Saver T8 – 4' 1 lamp fixture with ballast	\$25
	Standard T8s Standard T8 – 4' 1 lamp fixture with ballast	\$24
	Standard T8 – 3' 1 lamp fixture with ballast	\$25
	Standard T8 – 2' 1 lamp fixture with ballast	\$30
Incandescent Luminaire (> 100 W)	Energy Saver T8s Energy Saver T8 – 4' 2 lamp fixture with ballast	\$55
	Standard T8s Standard T8 – 8' 1 lamp fixture with ballast	\$28
	Standard T8 – 4' 2 lamp fixture with ballast	\$50
	Standard T8 – 3' 2 lamp fixture with ballast	\$50
	Standard T8 – 2' 2 lamp fixture with ballast	\$50

Power Smart Product Incentive Program

Compact Fluorescent Lighting (CFL)

The Product Incentive Program provides financial incentives to organizations who replace inefficient products with energy-efficient technologies or add on products to existing systems to make them more efficient. Not all products are eligible. Please consult the BC Hydro web site at www.bchydro.com/incentives for all program policies, eligible products and performance criteria before purchasing products.

For more information call **1 866 522-4713** or **604 522-4713** in the Lower Mainland.

Existing Technology	Product Replacement Description	Incentive (\$)
<i>Incandescent bulb</i>	Compact fluorescent screw-in	
	Compact fluorescent < 42 W	\$2
	Compact fluorescent < 42 W and GU 24 socket	\$2
	Compact fluorescent ≥ 42 W	\$12
	Compact fluorescent hardwired	
	Compact fluorescent < 42 W	\$30
Compact fluorescent ≥ 42 W	\$45	
	Cold cathode compact fluorescents	\$2



Natural Resources
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Ressources naturelles
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ecoENERGY
an ecoACTION Initiative

ecoENERGY Retrofit Incentive for Buildings

Application Guide Version 2.0

Revised October 9, 2007

Canada 

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Natural Resources Canada's Office of Energy Efficiency
Leading Canadians to Energy Efficiency at Home, at Work and on the Road

Introduction

Energy retrofits can reduce your utility bills, increase your competitiveness and create a healthier and more comfortable workspace. Also, by using less energy, you help reduce greenhouse gas emissions and air contaminants, which contributes to a cleaner environment for Canada.

Natural Resources Canada's (NRCan's) Office of Energy Efficiency (OEE) offers the **ecoENERGY Retrofit Incentive for Buildings**, a component of the ecoENERGY Retrofit – Small and Medium Organizations program. The program uses contribution funds to help accelerate the implementation of energy efficiency improvements. This guide will assist you when submitting a project for consideration during the second Call for Proposals period which runs from October 15, 2007 to December 14, 2007. It is important that you read this document thoroughly.

Organizations that own, manage or lease eligible buildings with floor space of 10,000 square metres (107,639 square feet) or less may be eligible. To qualify, you must submit an accurate and complete application form detailing the energy efficiency project based on a pre-project energy audit (technical energy analysis) of each affected building. We will consider your project if you meet all the eligibility and technical requirements. If the number of submissions exceeds the available funding, we may approve projects on a first-come first-served basis.

Please note that application requirements, processes and forms are subject to change. The application guide and forms available to you on the day you apply will be considered valid for your project, so it is important to consult our Web site to ensure you are using the most recent versions. For example, if you downloaded the guide and forms prior to October 15, you should download and thoroughly read Version 2.0 or later since there are important updates that could affect your project. You can find program updates, including release dates for materials and descriptions of updates, at www.oeo.nrcan.gc.ca/buildings/retrofit/updates.cfm.

Section 1 Eligibility and Requirements

A Eligible Types of Buildings

- **Commercial or institutional buildings** such as retail stores, hotels, restaurants, office buildings, schools, colleges, universities, stand-alone warehouses, health care facilities and places of worship;
- **Multi-unit residential buildings**
 - that have a common entrance and are at least four stories above ground,
 - that have a common entrance and a ground-floor area of at least 600 square metres (6,458 square feet), or
 - that are a mixed-use commercial/residential building.
- **Provincial, territorial or municipal buildings.**

B Ineligible Types of Buildings

- **Manufacturing and agricultural facilities** including attached warehouses, that might be eligible for the ecoENERGY Retrofit Incentive for Industry;
- **Smaller residential buildings** such as houses, duplexes, townhouses, individual condominium units, individual apartments and multi-unit residential buildings three and a half stories or less that might be eligible for the ecoENERGY Retrofit Homes grant;
- **Buildings owned by the Government of Canada**, including those owned by federal departments, agencies and Crown corporations.

You can find links to other OEE programs at www.oeenrcan.gc.ca/corporate/programs.cfm. The link to the ecoENERGY Retrofit page is www.oeenrcan.gc.ca/retrofit and the link to the ecoENERGY Retrofit Incentive for Buildings page is www.oeenrcan.gc.ca/buildings/retrofit.

C Mandatory Building Requirements

- You can include more than one building in your project, but each building must have an interior floor area of **10,000 square metres** (107,639 square feet) or less.
- All buildings in the project must have been occupied for **the last five years** and used for the **same or similar purpose**. For example, you cannot use this incentive to convert from a store to a restaurant or from an empty building to condominium units.
- Organizations that **own, manage or lease** eligible buildings can apply if paying for the retrofit measures and able to provide utility bills. If your organization manages or leases space, the lease must be for at least six months following the completion of the project.
- If your space is connected to another structure owned, managed or leased by another organization, it must be clearly distinguishable as an **independent unit** and have **separate utility meters**. If the project includes free-standing buildings that are heated by a central plant or connected by a pedway, we will consider these as separate buildings. If you have two wings with a common wall and heating system, we will consider this as one building.

D Mandatory Project Requirements

- When applying, you must submit all required materials and complete all mandatory fields (gray boxes and checkboxes) in the *Application Form*.
- This must be a **NEW** energy efficiency project. Any **costs that you incur** related to this project are not eligible if you have not yet received a copy of a legally-binding *Contribution Agreement* that has been signed by all parties. Incurred costs refer to goods that have been received and/or services that have been rendered. The pre-project energy audit, for example, is not eligible for funding.
- We will approve **only one project** per organization during a Call for Proposals period. Your project can include **more than one building**, but you must complete an *Application Form* for each building and submit them together at the same time. If we receive forms for additional buildings at a later date, we cannot consider them until the next Call for Proposals period.
- The project must have a simple **payback period not less than one year**. You can calculate simple payback (the number of years it will take for the project to pay for itself) by taking the total eligible project cost minus funding from all sources (including this incentive), divided by your annual energy cost savings. If necessary, we will reduce your incentive amount to ensure that payback is at least one year.
- After the Government of Canada signs the *Contribution Agreement*, you have **12 months** to complete the project. We cannot offer any extensions past this date. Some flexibility exists for projects in remote northern communities on a case-by-case basis.
- Other requirements, including the need to submit a **pre-project energy audit** and sample copies of recent **utility bills** when applying, as well as **status reports** at key milestones, are detailed in Section 3.

E Eligible Measures and Costs

To maximize your potential savings and incentive, we encourage you to implement multiple measures within a single project. The following are some examples:

- **Materials and labour costs**, related to high-efficiency fixtures and equipment, such as:
 - **Interior and exterior lighting**, including compact fluorescent lighting, electronic and/or electromagnetic ballasts, reflector systems, controls, efficient lamps (e.g., T8 or T5 fluorescents), light-emitting diodes (LED) and high-intensity discharge (HID) lighting;

- **Building envelope**, including insulation, weatherproofing and glazing;
- **Energy management controls systems (EMCS)**, including direct digital controls (DDC), occupancy/motion sensors, thermostats, photocells and direct load controls;
- **Water heating**, including high-efficiency water heaters, heat pumps, solar-assisted technology, heat traps and repairs;
- **Motors**, including high-efficiency motors and variable speed drives (VSD);
- **Heating, ventilating and air-conditioning (HVAC)** systems, including high-efficiency chillers and boilers, economizers, control systems, variable air-volume (VAV) systems, load control, heat pumps, space heaters, air conditioners, systems for thermal storage and heat recovery systems; and
- **Replacement equipment or major appliances** that are essential to your operations such as refrigeration equipment, dishwashers or vending machines.
- **Project management and administration costs**;
- **Travel and accommodation costs** incurred during the implementation of the project if your building is located in a remote or rural area at least 200 kilometres from a city with a population of at least 30,000 people;
- **Certain net sales taxes** explained in detail in Section 3.

Equipment or major appliances that are designed for residential use should be ENERGY STAR[®] qualified, meaning they are among the most energy-efficient products in that class on the market.

All costs must be measurable and verifiable, and we will ask you to provide proof in the form of receipts and/or invoices.

F Ineligible Measures and Costs

- Project development such as pre-project energy audits, technical analyses, feasibility studies, baseline establishment and preparation of the application forms;
- Monitoring and tracking systems, including utility analysis, software and sub-meters;
- Tenant or employee communications and awareness programs;
- Employee training or workshops;
- Financing, leasing or interest charges and performance guarantees;
- Portable equipment or appliances such as lamps, microwaves or electronic equipment;
- New structures or building additions;
- Non-energy-related renovations;
- Removal or storage of contaminated materials (PCBs, asbestos, etc.);
- Projects that are in progress or that have already been completed, including those for which you have incurred costs.

G Other Incentives and Rebates

- You can apply for **complementary incentives and rebates** from other sources without penalty as long as the combined simple payback from all funding is at least one year and you meet all other mandatory criteria. You can refer to the following Web page for a partial list of incentives and rebates: www.oeenrcan.gc.ca/buildings/incentives.cfm.
- You cannot receive **multiple incentives from NRCan** for the same measures. For example, if your comprehensive retrofit includes solar air or water heating, you can choose to apply for that portion of the project through either the ecoENERGY Retrofit program or the ecoENERGY Renewable Heat program, but not both.

H Training

- We recommend that you register for the “**Dollars to \$ense**” series of workshops at www.oeenrcan.gc.ca/workshops. Energy professionals may also benefit from an introductory training seminar on **RETScreen[®] Version 4.0** software at www.retscreen.net.

Section 2 How the Incentive Is Calculated

We calculate the incentive based on the following criteria:

- \$10 per gigajoule (GJ) of estimated annual energy savings, or
- 25 percent of eligible project costs
- to a maximum of \$50,000 per project and \$250,000 per organization over the duration of the incentive program (2007 to 2011).

A GJ represents 277.8 equivalent kilowatt hours. Our *Gigajoule and Energy Intensity Calculator* at www.oeo.nrcan.gc.ca/buildings/gj.cfm converts various units of energy for you.

The amount of your incentive is subject to our determination of your eligible costs and savings, and you will receive the total incentive after you have completed the project and we have verified the work. We will calculate your payback, which must be not less than one year. Please note that the figures in the following examples are for illustration purposes only.

Example 1: Single-Building Project	Incentive is the lower of the two following calculations:
Estimated annual savings: 450 GJ	A) \$10 per GJ of estimated annual energy savings = \$10 × 450 GJ = \$4,500
Eligible project costs: \$22,000	B) 25 percent of eligible project costs = 0.25 × (\$22,000) = \$5,500
Therefore:	ecoENERGY Retrofit incentive: \$4,500 (Method A) Your net cost: \$17,500
If your projected annual savings are \$4,000 , your simple payback would be 4.4 years (eligible project costs of \$22,000 minus the incentive of \$4,500 divided by savings of \$4,000).	

Example 2: Multi-Building Project With Complementary Incentive	Incentive is the lower of the two following calculations:
Estimated annual savings: Building 1: 200 GJ Building 2: 650 GJ Building 3: 2,500 GJ	A) \$10 per GJ of estimated annual energy savings = \$10 × (200 + 650 + 2,500) GJ = \$33,500
Eligible project costs: Building 1: \$ 2,500 Building 2: \$18,000 Building 3: \$65,000	B) 25 percent of eligible project costs = 0.25 × (\$2,500 + \$18,000 + \$65,000) = 0.25 × \$85,500 = \$21,375
Complementary Incentive: \$10,000	
Therefore:	ecoENERGY Retrofit incentive: \$21,375 (Method B) Complementary incentive: \$10,000 Your net cost: (\$85,500 - \$10,000 - \$21,375) = \$54,125
If your projected annual savings are \$25,000 , your payback would be 2.1 years (eligible project costs of \$85,500 minus the incentive of \$21,375 minus the complementary incentive of \$10,000 divided by savings of \$25,000)	

Section 3 Steps to Apply

This section explains how to apply for the ecoENERGY Retrofit Incentive for Buildings. To help you submit a complete application, we have included a *Checklist* in Appendix C.

Step 1: Access the Application Guide and Forms

- **Receive the materials:** You can access this application guide and the accompanying forms in the “Special Orders” section of our Contact Us Web page at www.oeenrcan.gc.ca/buildings/contact. By providing your e-mail address and checking the box to request the guide and forms, you will receive the documents automatically in an e-mail.
- **Receive the materials and future updates:** You can make a similar request, and also receive future program updates and announcements, by subscribing to our *Heads Up Energy Efficiency* newsletter at www.oeenrcan.gc.ca/headsup.
- **If you have trouble receiving the materials by e-mail:** You can request electronic or paper copies by calling us toll-free at 1-877-360-5500, but it may take several days for us to respond.

To view the *Application Guide*, you will need Adobe Reader which is pre-installed on most computers or available free at www.adobe.com/ca. The forms are presented in Microsoft Word and Microsoft Excel, or you can download OpenOffice www.openoffice.org which contains free and compatible word processing and spreadsheet software in both official languages.

If you do not have access to a computer, you can complete a paper version of the application forms, but this will delay the approval process since we will need time to manually enter the data into our electronic systems before we can start processing your application.

Step 2: Conduct a Pre-Project Energy Audit

Before completing the *Application Form*, you must arrange for a pre-project energy audit (technical energy analysis) of each affected building at your own expense. This audit is a worthwhile investment in the future of your building, and will help us ensure that your estimated energy savings are accurate. The effectiveness of any energy efficiency measure will ultimately depend on the thoroughness of the audit, as well as the planning, implementation and operation of your measures.

The audit must be performed by either a Professional Engineer, Certified Engineering Technologist, Architect or someone with similar qualifications who possesses at least three years experience performing energy analyses of building systems. Ensuring the services of a competent energy professional throughout your project will help you realize estimated energy savings.

This audit should give a breakdown of your current energy use by end-use type (such as lighting, space cooling, space heating, water heating, ventilation, refrigeration and plug loads), the physical characteristics of the buildings, and a description of the major equipment and sources of heating and cooling. Most importantly, it should provide an analysis of recommended energy-saving measures and their effect on other energy systems in your building. It should provide enough information for us to evaluate your project without requesting further details and must have been completed within two years prior to the date you submit your application. From the list of recommended options, you will include those that you plan to implement in Part 3 of your *Application Form*.

We strongly recommend a comprehensive audit that examines multiple measures so you can consider all your options and increase your potential savings. If your project will only involve one type of measure, we may accept a detailed analysis of that measure as long as there is enough information to complete the application form. We will still require a percentage breakdown of energy use in the building and if that measure will affect heating and cooling loads. For example, where more efficient lights create less heat, you would need to show how this affects your heating load in winter and your cooling load in summer.

The individual performing the audit may wish to use a tool such as Natural Resources Canada's RETScreen® software Version 4.0 at www.retscreen.net, which helps identify and analyze possible savings. Please note that we cannot accept a RETScreen report as a substitute for the energy audit

Unless you have someone in your organization with the required qualifications and experience in analyzing the energy efficiency of buildings, you will need to retain an outside service provider or consultant. To start your search, you can consult the *Energy Management Services Directory* at www.oeo.nrcan.gc.ca/providers, but, as noted in the disclaimer on that page, NRCan does not pre-qualify or endorse the companies that are listed. You may also look for local energy consultants or engineers in your yellow pages or through an Internet search. It is your responsibility, however, to ensure that the person you select has the necessary training, credentials and experience.

It is important to remember that since you will conduct this analysis prior to sending us an application and before you receive a signed *Contribution Agreement*, any costs associated with the pre-project energy audit are **ineligible** under this incentive.

Step 3: Complete the Application Form

The incentive is based on the information you provide in the *Application Form*. **If there is incorrect or missing information, or if you are not using the latest version of the application form (Version 2.0 or later), we may reject your application.** When completing the form using Microsoft Excel or OpenOffice, you can consider the following helpful hints:

- Move from page to page by clicking on the worksheet tabs at the bottom of the spreadsheet.
- Enter information in the mandatory grey fields, and if there is pre-existing text, you can usually replace it with your own text. The form automatically completes most white boxes.
- In most cases, you can use the Tab key to move to the next box.
- For drop-down menus, place your cursor in the box and click once. If an arrow appears to the right of the box, place your cursor on the arrow, click and select from the options.
- When inputting numbers, do not use words, dollar signs, commas or other non-numeric characters.
- To add multiple lines of text or a hard return in a cell, hold down the Alt key and press Enter.
- Except where indicated, provide energy units in GJs.
- When you have completed the form, re-name the file with the name of your organization or building and save the document on your computer.
- To print multiple pages, highlight the first tab and while holding the Shift key click the last tab so that all tabs are highlighted. You can print by pressing Ctrl-P.

Cover Page:

The first worksheet tab is the cover page which contains the release date of the form, a table of contents and the general instructions listed above. In the grey boxes, insert the legal name of your organization, the name of the building and the date you are submitting the form to us.

Part 1: General Information

Since the form automatically fills in the name of your organization and building from the cover page, provide your head office address. We also require the mailing address, phone, fax and e-mail address for your organization's internal contact person and financial signing authority. The contact person should be someone who works inside your organization who can be available throughout the approval and implementation process to answer questions. Your contact cannot be an external consultant or contractor. The financial signing authority should be the most senior official in your organization capable of signing cheques such as the owner or president. If one person is both the contact person and the financial authority, there is no need to repeat the contact information. If not already a subscriber, you can sign up for our *Heads Up Energy Efficiency* electronic newsletter using the form.

Indicate if you own, manage or lease the affected building in the project. If managed or leased, you must arrange for the building owner or legally-authorized representative to sign the *Building Owners Consent Form* (Appendix B).

Include the date the pre-project energy audit was completed, the organization and name of the person who performed the work, their title, e-mail and telephone number. We also require their type of credentials (either Professional Engineer, Certified Engineering Technologist, Architect or "other"), and a brief description of their experience and the number of years they have performed energy audits or analyses of building systems. Also indicate if RETScreen® software version 4.0 was used while preparing the pre-project energy audit.

When describing the buildings in the proposed project, provide the street address and postal code, the type of building (using the pull-down menu), the total interior floor space area in square metres or square feet, the approximate number of people who typically occupy the building, the normal hours of operation when occupants are present, the year the building was constructed and any special features such as swimming pools, portable classrooms or ice rinks. Indicate if the building has been occupied for the last five years for a similar purpose and if the building is attached to another structure or shares a utility metre with another organization.

Tell us how many buildings are in the project, and assign a number to each building. If you package and submit *Application Forms* for multiple buildings at the same time, we will consider it as one project. Since most of the general information in the form will be the same in multiple-building projects, you can complete one form and then create a template for additional buildings using the "Save as" feature in Microsoft Excel or OpenOffice.

Part 2: Utility Data and Energy Use

We require the names of your energy utilities, as well as a breakdown of your current energy use by end-use type identified in your pre-project energy audit. When applying, attach one copy of a utility bill from each energy utility (electricity, gas, oil, etc.).

Input your energy costs and consumption for the most recent 12-month period using the type of units printed on your energy bills (such as kilowatt hours of electricity or cubic metres of natural gas) or in GJs. For electricity, we require both the energy use (in kilowatt hours or GJs) and the energy demand (in kilowatts). You can also choose other types of energy sources such as oil #2 (light or diesel fuel oil - bunker a), oil #4 (diesel and residual fuel oil - bunker b), oil #6 (residual fuel oil or heavy fuel oil - bunker c), propane or wood. You must input special sources, such as steam, in GJs. The form automatically converts all totals into GJs at the bottom and to the right.

If you have adjusted the energy consumption figures for weather, include the heating degree-days (HDD) and the cooling degree-days (CDD).

Part 3: Measures and Equipment

We recommend that you arrange for the individual who performed your pre-project energy audit to complete this technical section.

There is enough space in the form for 20 measures per building. For each measure, provide the category (such as lighting, controls, space heating), the existing equipment you plan to replace and the proposed retrofit equipment. If the measure you are proposing is not in the list, select "Other" and type directly in the boxes. Depending on the category you select, we may ask for specific details such as the number of units and hours used per day, and it is important that you respond to all questions. We also require a brief description of the existing equipment such as manufacturer, model number, physical condition and years of service.

Include the estimated net energy savings expressed in GJs per year, estimated energy cost savings and the estimated cost of the measure before taxes. The form calculates total consumption and simple payback for each measure. Also indicate if the measure impacts the heating or cooling load.

Part 4: Eligible Net Taxes

This section allows you to claim certain net sales taxes as an eligible cost, including Canada's Goods and Services Tax (GST), the Harmonized Sales Tax (HST) used in Atlantic Canada and provincial sales taxes (PST). Net sales taxes refers to the taxes you pay after you subtract any rebates, offsets or input tax credits such as the GST credit.

Since the incentive is often based on the \$10 per GJ formula, claiming net sales taxes as an expense may not result in a higher incentive. If you wish to claim the eligible net taxes, someone familiar with your organization's tax rates must complete this optional form. If you choose "yes" to the first question, you must complete all the questions. Regardless of your intention to claim these taxes, your organization's financial signing authority must sign this page.

Part 5: Environmental Assessment Screening

In some cases, an Environmental Assessment of a project may be required under the *Canadian Environmental Assessment Act* if it meets certain conditions. The information you provide will help us determine if we need to make additional inquiries.

If you do not check all the boxes in the bottom half of the form, we will require a written explanation.

Part 6: Financial Summary and Declaration

The form automatically calculates the costs and estimated savings of the proposed measures based on the data you entered in Part 3. You can also add other eligible costs such as project management, travel and accommodation detailed in Section 1E of this guide.

Disclose all other financial incentives or grants related to the project including complementary incentives and rebates from all government departments, utilities and manufacturers. Tentative amounts are acceptable at the time of the application, but you must report actual amounts during Step 7 (Submit the Final Report Form and Invoice).

Your financial signing authority must certify the accuracy of your application. This individual must declare: that your organization has not incurred eligible costs in relation to this project before all parties have signed a *Contribution Agreement*; that all work will be completed within 12 months after NRCan signs your *Contribution Agreement*; and that we have your organization's permission to share the contents of the *Application Form* and subsequent information with project co-funders, stakeholder organizations and other government representatives.

Step 4: Submit Your Project for Consideration

We will accept your applications between October 15, 2007 and December 14, 2007. We will announce future dates in December 2007.

After your financial signing authority has signed the *Application Form* for each building in the project, you must send the following **by mail or courier** to the address on the last page of this guide:

- 1) the original signed paper form or forms
- 2) a copy of your pre-project energy audit
- 3) the *Buildings Owner's Consent Form* (Appendix B) if applicable
- 4) a sample copy of a recent bill from each of your energy utilities (electricity, gas, oil, etc).

At the same time as you send the paper materials, send an **electronic copy** of the *Application Form* to info.services@nrcan.gc.ca. Since we cannot guarantee the security of external e-mail networks, you have the option of burning the electronic copy to a compact disc and sending this by mail.

To process your submission, it is **important you submit both paper and electronic versions** by the deadline date. As discussed in Step 1, if you are unable to submit an electronic version of the form, delays will occur.

Step 5: OEE Review and Approval Process

Our technical staff will review the details in your *Application Form* and compare it with your pre-project energy audit. If you claim ineligible measures such as technologies not substantiated by a recognized third party or if your expected savings do not align with common industry benchmarks, we will reduce your estimated GJ savings accordingly. The final decision on eligible costs and savings is at our discretion.

For the October 15 to December 14, 2007 call for Proposals period, we plan to notify all applicants of the status of their application by mid-February 2008. If we recommend your application for approval, we will prepare and send a *Contribution Agreement* for your signature. This document provides the legal framework for your project and includes a number of clauses, a summary of the data from your approved *Application Form* and the basis and timelines for payment. At that time, we will also send you the *Final Report Form* and an *Invoice Template* that you can use in Step 7 when the project is complete.

After your authorized financial signing authority signs and returns the *Contribution Agreement*, it must then be signed by a senior official at NRCan before it becomes legally binding. In the province of Quebec, for institutional organizations falling under the *Loi sur le ministère du Conseil exécutif* (Chapter M-30), NRCan's *Contribution Agreement* is signed with Québec's Agence de l'efficacité énergétique (AEE) who then signs a second agreement with your organization.

It is important to remember that costs related to this project are not eligible until you receive a signed copy of the *Contribution Agreement*.

Step 6: Implement the Project and Send Status Reports

You will have up to 12 months to complete your project after Canada has signed the *Contribution Agreement*. We cannot offer any extensions past this date, with the possible exception of projects in remote northern communities. If you have not fully implemented all your measures, this will cause delays in your payment since we will need time to re-calculate and exclude the related cost savings and GJ savings from your incentive.

By Tuesday, April 1st, 2008, we will require you to notify us by fax or e-mail with your total incurred costs as of March 31, 2008, which is the end of the government fiscal year. We require this report for our records, even if you have not yet started or if you have completed your project. We will also require written notification when your project is complete. Failure to send us these mandatory status reports may result in the cancellation of your incentive.

Step 7: Submit the Final Report Form and Other Documents

Within 120 days after the end of the project, complete the *Final Report Form* and have it signed by your financial signing authority. This form confirms that you have implemented the project as described in the *Contribution Agreement* or explain any variances. If you do not implement all the measures as described in the *Contribution Agreement*, we will decrease the incentive accordingly.

For your convenience, we will provide you with an *Invoice Template* to claim your incentive, or you can use your own organization's regular invoice form. You should print your invoice on official letterhead with your organization's head office address clearly indicated.

Attach copies of all invoices or receipts associated with the eligible costs of the project that you have incurred. Do not include pre-project costs since these are not eligible. Mail this package to the address on the last page of this guide

Step 8: OEE Project Verification

Before releasing payment, a representative of the OEE may conduct a visual inspection of your building. We request your cooperation in providing reasonable access to the individual conducting the verification. Under normal circumstances, you should receive a visit within six weeks after we receive your final paperwork, and the verification itself should take less than a few hours. In some cases, we may also arrange a more detailed third-party post-project audit to verify technical and financial information. If we determine that all work has not been completed as described in your *Final Report Form*, we may cancel all or part of your incentive.

Step 9: OEE Payment Process

Our financial services office will send you a cheque for the total eligible incentive after you have completed the project and we have verified the work. Administrative delays are generally beyond our control, especially during busy periods such as the end of the fiscal year in March/April.

Step 10: Celebrate Your Success

If you are planning a news release or a ribbon-cutting event for your project, we may be able to arrange participation from the Government of Canada if you contact us well in advance. We sometimes publicize successful projects with case studies, newsletter articles and other methods after obtaining your approval. We may also use some of your energy consumption and savings data for benchmarking studies or other purposes.

Section 4 Contact Information

If you still have questions about the **ecoENERGY Retrofit Incentive for Buildings** after you have read this guide and reviewed the accompanying forms, please contact us at:

Buildings Division

Office of Energy Efficiency
Natural Resources Canada
1 Observatory Crescent, Building # 3
Ottawa, ON K1A 0E4 (Mail)
Ottawa, ON K1Y 4X2 (Courier)

Tel.: 1-877-360-5500 (toll-free)

Fax: 613-947-4121

E-mail: info.services@nrcan.gc.ca

OEE site: www.oeecan.gc.ca

OEE Buildings Division: www.oeecan.gc.ca/buildings

ecoENERGY Retrofit: www.oeecan.gc.ca/retrofit

Buildings incentive: www.oeecan.gc.ca/buildings/retrofit

Web contact form: www.oeecan.gc.ca/buildings/contact