

Smart Business Service REPORT for

Rideau Park United Church

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envirocentre



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EnviroCentre is pleased to present this electricity and energy audit of the Rideau Park United Church including the results of your estimated baseline electricity use, load profile, and recommendations for reducing your bills.

Your cost for heating is quite high; almost double your electricity bills. You are losing most of your heat through the windows. There is potential here to save on natural gas costs by improving this area. Our review of your electricity consumption indicates that almost all of your electricity is used for the lighting. The greatest potential for savings on your electricity bills therefore lies in this area.

The major recommendations and their potential savings are summarized below:

Recommendation	% Savings of Bills	Estimated Savings per Year	Estimated Cost	Payback (Years)
Install more efficient lighting	25%	\$5,515	\$3,863	0.7
Install a solar water heater for heating	11%	\$2,500	\$16,000	6.4
Add insulation to flat attics and sloped ceilings	9%	\$1,946	\$26,700	13.7
Install high efficiency boilers	7%	\$1,633	\$20,000	12.2
TOTAL	51%	\$11,253	\$66,563	5.9

If you just completed the top two recommendations; more efficient lighting and solar hot water for heating, your current annual electricity and gas bills **could be reduced \$8,015 per year**. This represents **36% savings** and means that the improvements could **pay for themselves in about three years**.

The estimated cost to complete all of the above recommendations is \$66,563. Your current annual electricity and gas bills **could be reduced \$11,253 per year**. This represents **51% savings**. This means that the improvements could **pay for themselves in about 6 years!** The other recommendations and their estimated savings are outlined in the recommendations section.

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BREAKDOWN OF ELECTRICITY USE

As previously mentioned you are using most of your electricity for lighting. The rest is being used by the mechanical systems, kitchen appliances, office equipment and fridges. You can see this, as well as your other consumption clearly below in Figure 1.

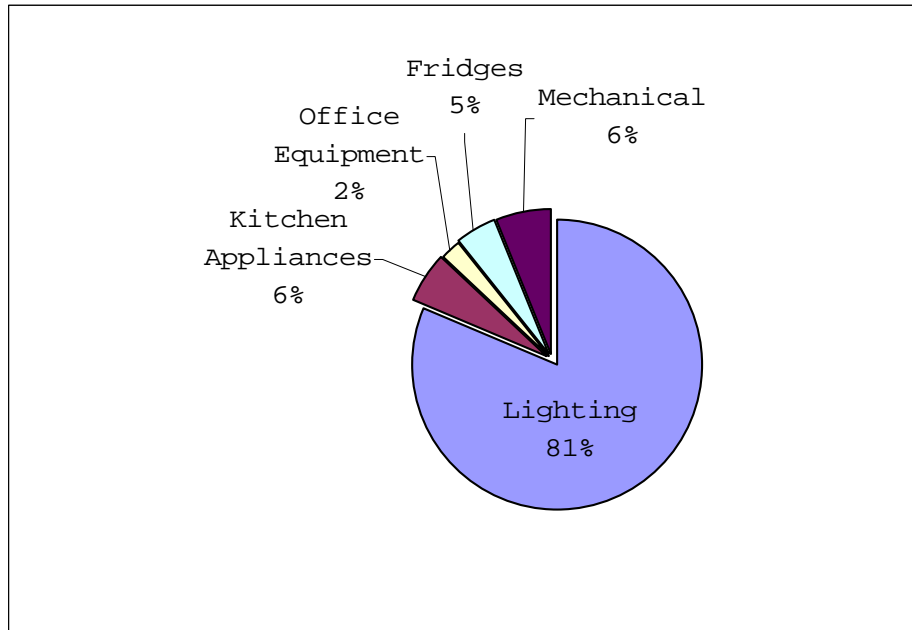


Figure 1: Components of Electricity Use

More than three quarters of your use is for lighting. This is mostly used to light the outside, the Beecroft Hall, and the exit signs. The rest is divided up between the office equipment, the fridges, the kitchen appliances, and the mechanical pumps.

Please remember that following recommendations can have effects on the comfort of the building in different ways. For example, by switching to more efficient lighting or fridges you may keep the building cooler in the summer because they won't be generating as much heat.

COMPONENTS OF HEAT LOSS

The energy audit has revealed where you are losing heat. The Rideau Park Church is a newer building, only being built in 1954. There are adequate amounts of wall and basement insulation. There are a lot of windows to lose heat through, but not too much air leakage. The breakdown of the heat loss can be seen below in Figure 2.

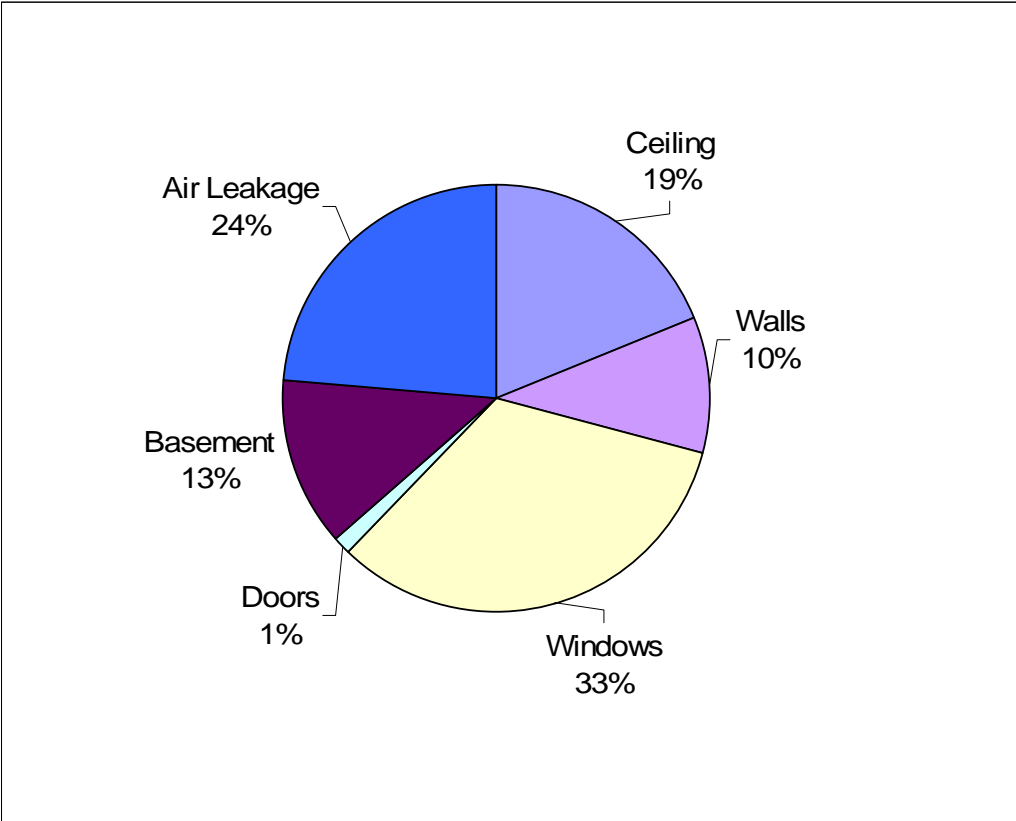


Figure 2: Components of Heat Loss

Most of the heat is being lost through the windows, the ceiling (both flat and sloped) and air leakage (ventilation). Most of the recommendations to reduce heating costs will focus on these areas, as well as others that can be upgraded. Although the air leakage seems like a large portion of your heat loss, the blower door tests indicated that relatively speaking it is not that great. This will be explained further in the recommendations.

TIME OF DAY METERING

We had a certified electrician measure the consumption at your main meter. This tells us how much power you are using and when. It takes a reading every 15 minutes, 24 hours per day for one week. The total power consumed at the time of a reading along with the time it was recorded allows us to determine your consumption rate and peak periods.

We've compiled the information into Figures 3-9. This is your load profile over a one-week period which means how many kilowatts (kW) you are using at each 15 minute sample over the 7 days. kW is the total power consumption at any given time. For example if you have ten, 100 W light bulbs on you would be consuming:

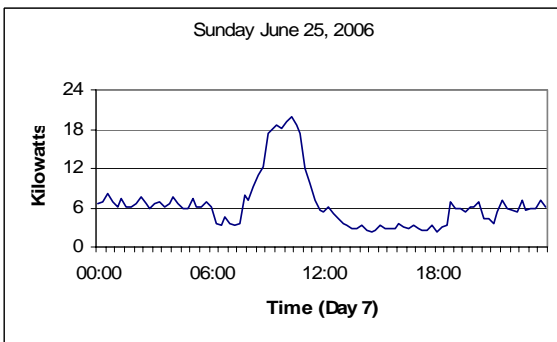
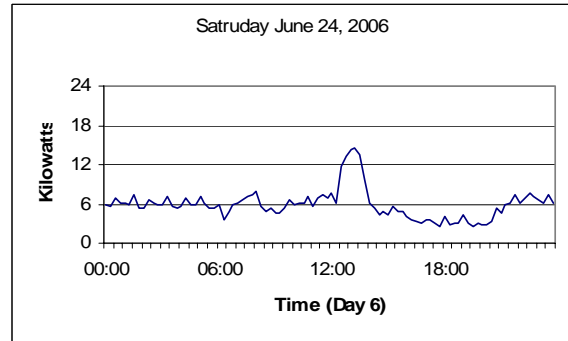
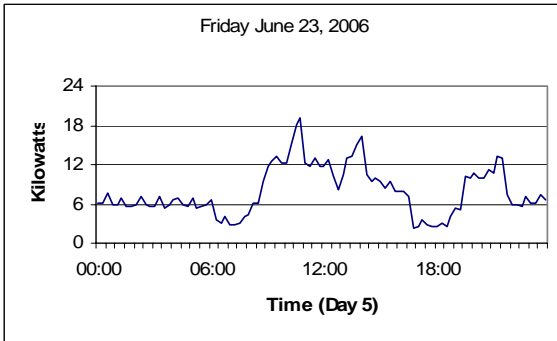
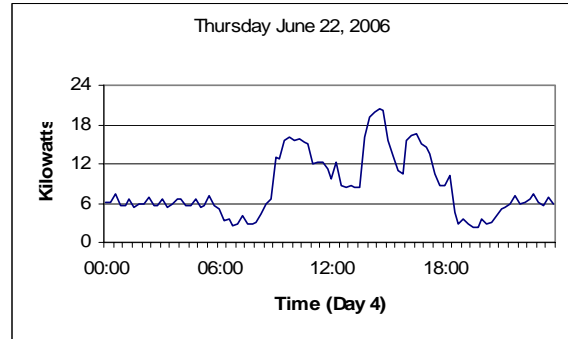
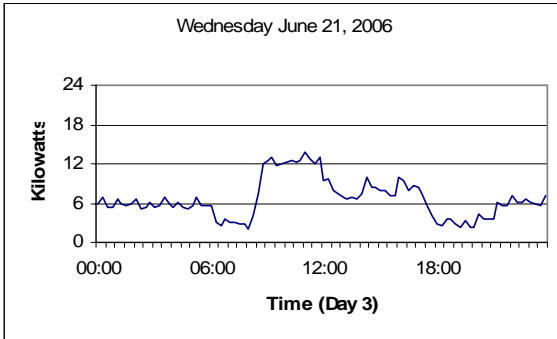
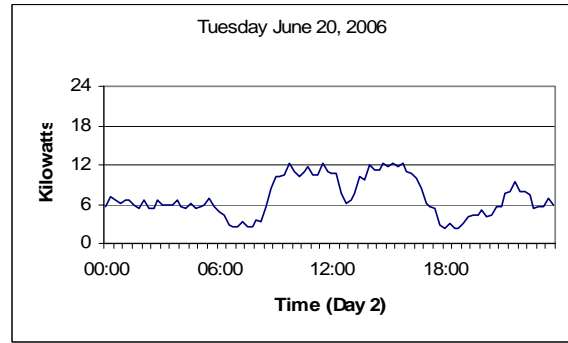
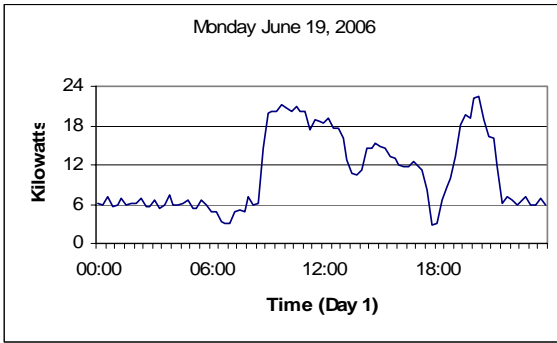
$$10 * 100W = 1,000W = 1kW \text{ of electricity at any given time}$$

This is not what you are charged for. You pay for kWh, which is how many kW's you are using, multiplied by how long you used them for. If you had those bulbs on all day you would be using:

$$1kW * 24h/day = 24kWh/day$$

This is recorded by your hydro meter, and you are billed for the kWh you use each billing period. More details about this will be discussed in the section, "Billing Analysis".

The load profiles are showing your electricity use for each day, from Monday to Sunday June 25, 2006. You can see the times in which the building is unoccupied and the consumption is lower.



Figures 3 to 9: Load Profile for Monday to Sunday

Above, in Figures 3 to 9, the consumption profile for each day can be seen. The church is always using at least 2,000W worth of electricity (2 Kilowatts). This baseline is equivalent to 20, 100 W lightbulbs being left on all the time. You should try to determine what is being left on overnight, and turn off as much as you can.

The other main times of use seem to be from 9am until about 6pm on weekdays, from 8am until 1pm on Sundays, and for a few evenings per week. These spikes go as high as 23kW, equivalent to 230, 100W light bulbs. This is most likely due to the high power lightbulbs in the Beecroft Hall, the basement rooms, and the sanctuary. Without using these lights or using them at a different time (i.e. off peak hours) your best option is to reduce your demand overall by using the most efficient lighting and appliances and to lower the baseline (ie. Shut things off at night).

Smart Meters

The Government of Ontario has already started rolling out smart meters to residents and businesses. They intend to have 800,000 installed by December 2007 with the intention of completing the installation by the end of 2010. Smart meters will measure not only how much electricity you use, but when you use it as well. You will then be billed more for electricity you use at certain times of the day, which are the peak times. The schedule of anticipated electricity prices will be:

Summer

7 am to 11 am.....	7.5 cents/kWh
11 am to 5 pm.....	10.5 cents/kWh
5 pm to 10 pm.....	7.5 cents/kWh
10 pm to 7 am.....	3.5 cents/kWh
Weekends.....	3.5 cents/kWh

Winter

7 am to 11 am.....	10.5 cents/kWh
11 am to 5 pm.....	7.5 cents/kWh
5 pm to 8 pm.....	10.5 cents/kWh
8 pm to 10 am.....	7.5 cents/kWh
10 pm to 7 am.....	3.5 cents/kWh
Weekends.....	3.5 cents/kWh

Smart meters will allow you to reduce your costs for electricity if you shift your loads to the lower rate times: the morning, afternoon, and most importantly the evening and weekends. You should avoid using electricity between 11am and 5pm all year, and between 5pm and 8pm in the winter once you have a Smart Meter and are being charged the time of day rates. Your estimated bill, once the Smart Meter is installed, is discussed in the Billing Analysis section below.

The current costs for the electricity in Ontario are 5.8 cents per kWh up to 600 kWh per month, and 6.7 cents for any consumption above that. This second threshold is expected to be reduced to 1,000 kWh per month in the winter. **This is the cost of electricity only.** It does not include the transmission, delivery, regulatory and debt retirement charges, which are all based on consumption as well. So the more you use, the more you pay for these other charges as well.

The current costs for these other factors are:

Delivery Charges	1.95 cents/kWh
Regulatory Charges.....	0.62 cents/kWh
Debt Retirement Charge.....	0.694 cents/kWh
Transmission Charge.....	0.95 cents/kWh
Total.....	4.214 cents/kWh

There is one more charge you should be aware of, which is the fixed charge. You pay this fee every month, even if you use no electricity. The current fixed rate for you is **\$7.88 per**

month. All of the above rates are quoted as of Sept. 27, 2006 and can be found at https://www.hydroottawa.com/residential/index.cfm?lang=e&template_id=118

BILLING ANALYSIS

Electricity

Based on the consumption of electricity indicated in your bills you are using on average **238 kWh per day**, for a total of **86,972 kWh per year**. This is costing you approximately **\$8,729 per year**. The “Other” costs, which include delivery, regulatory, debt retirement, transmission, and tax go up and down each month as well. This is because they too are based on consumption. Therefore the more electricity you use the more other charges you pay. Your electricity consumption over the past two years can be seen below in Figure 10.

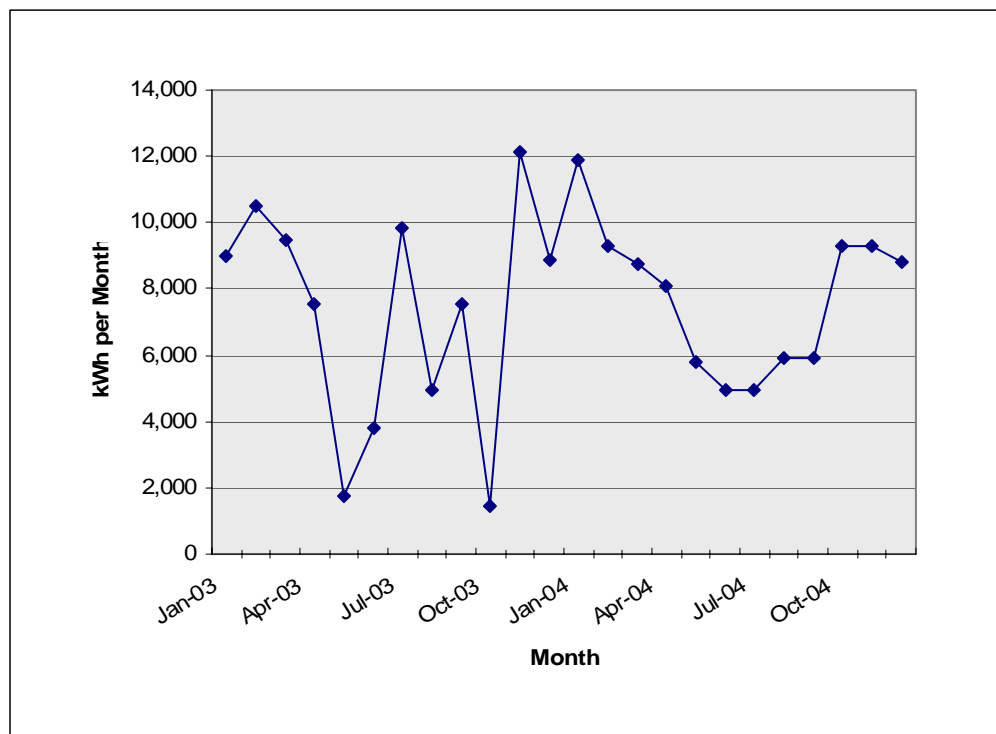


Figure 10: Monthly Electricity Consumption for 2003-2004

Based on the data gathered and the electricity audit conducted most of your electricity is being consumed by the lighting.. The breakdown of each component can be seen graphically in Figure 1 on Page 2, and in a table form below in Figure 11.

Electricity Use	kWh / Year	Yearly % Of Bill	Cost / Year
Lighting	70,749	81%	\$7,101
Kitchen Appliances	4,816	6%	\$483
Office Equipment	1,893	2%	\$190
Fridges	4,131	5%	\$415
Mechanical	5,378	6%	\$540
Totals	86,967	100%	\$8,729

Figure 11: Table of Annual Electrical Consumption

If you had a smart meter and were being charged the different rates at different times of the year right now **you would be paying about \$1,700 more per year**. This is not a huge increase, but is equivalent to about 12%. The best way to keep this from increasing is to change when you use lighting and appliances, and to reduce your overall consumption by increasing the efficiency. To accomplish this you should follow all the electricity recommendations in this report, notably the ones to do with lighting. If you do, your overall consumption **would be lowered from the current amount of 7,248 kWh per month to 2,316 kWh/month**, meaning even with a Smart Meter, the new higher rates and time of day premiums you would be paying less than you are now.

Please see the recommendations for the best ways to reduce consumption during peak periods, as well as overall.

Natural Gas

Based on your bills provided you are using on average **15,110 m³ of natural gas per year**. This ranges from a minimum of 35 m³ for August of 2001 up to 3,314 m³ in February 2004. The gas that you use for heating and hot water is costing you approximately **\$13,328 per year**. A graph of your consumption over the last two years can be seen below in Figure 12.

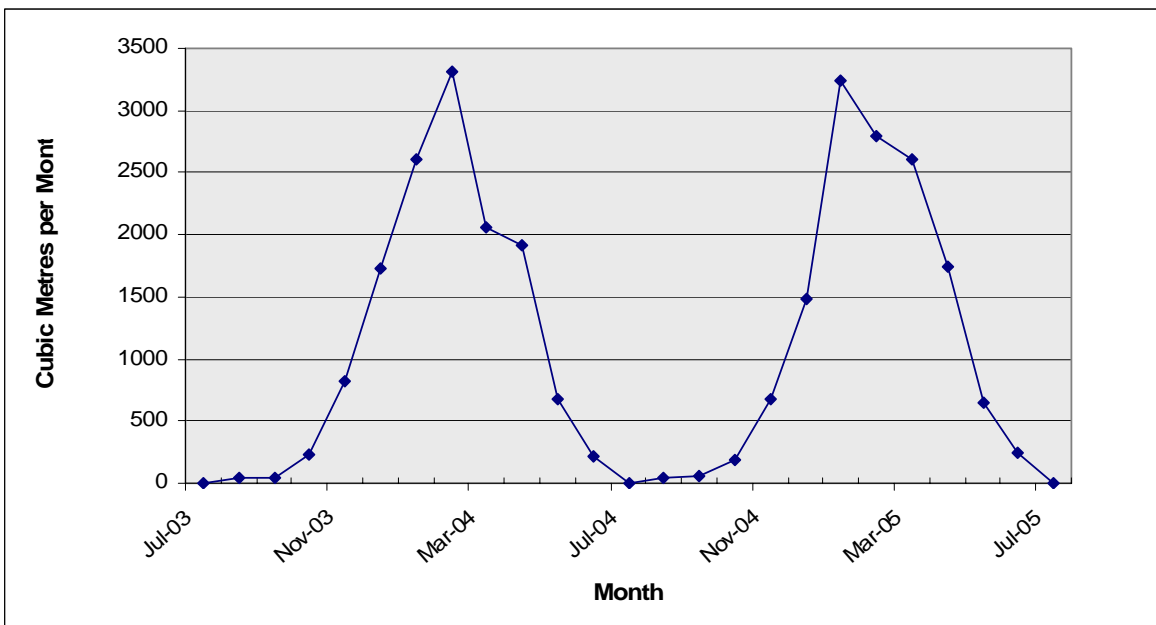


Figure 12: Monthly Natural Gas Consumption

RECOMMENDATIONS AND POTENTIAL SAVINGS

The written recommendations below are specific to Rideau Park Church. They are ordered from the ones that will save you the most, to the ones that will save you the least. We have **estimated the capital cost of materials and the labour cost** for each recommendation to the best of our knowledge. You should speak to your service company, a mechanical contractor, or the appropriate professional that can give you the most accurate estimate of the cost to complete the work. A list of potential contacts is included with this report in Appendix 2. To make sure the work gets done professionally and with minimal worry consider contacting Energy Ottawa, they are available to price contractors, and make sure all the upgrades are completed properly. There may also be funding opportunities that we encourage you to take advantage of. Please contact “Natural Resources Canada” and ask about the “EnerGuide for Existing Buildings” program.

A summary of the potential savings has been provided below in Figure 13 and Figure 14. The detailed recommendations are outlined below the tables.

Electricity Use	Savings (kWh/Year)	Savings (GJ/Year)	Savings (\$)	Cost (\$)	Payback (Years)	Priority
Lighting	54,947	197.81	\$5,515	\$3,863	0.7	1
Kitchen Appliances	0	0.00	\$0	\$0	-	-
Office Equipment	794	2.86	\$80	\$350	4.4	9
Fridges	1,842	6.63	\$185	\$2,600	14.1	6
Mechanical	1,594	5.74	\$160	\$700	4.4	7
Total	59,177	213	\$5,939	\$7,513	1.3	

Figure 13: Potential Annual Electricity Savings

Upgrade	Savings			Payback (years)	Priority
	(GJ)	Savings (\$)	Cost (\$)		
Ceilings	118	\$1,946	\$26,700	13.7	3
South Windows	7	\$120	-	-	-
East	2	\$26	-	-	-
North	7	\$122	-	-	-
West	6	\$97	-	-	-
All Windows	22	\$364	\$3,000	8.2	5
High Efficiency Boiler(s)	99	\$1,633	\$20,000	12.2	4
Instant Gas HW	7	\$117	\$3,000	25.7	8
Solar Hot Water Heating	105	\$2,500	\$16,000	6.4	2
TOTAL	330	\$6,202	\$68,700	11.1	

Figure 14: Potential Annual Heating and Hot Water Savings

1. Lighting

Estimated Savings = \$5,515 per year

Lighting is your biggest user of electricity by far. We recommend that you continue to replace incandescent lighting with compact fluorescents everywhere that is possible. This includes outside, in the Beecroft room, in the sanctuary, and in the halls. This is especially true for bulbs that are on more than 4 hours per day. Make sure that all these lights are replaced with Compact Fluorescent Lightbulbs (cfl's). You can also save by replacing all the T12 fluorescent tube lighting with T8 bulbs, and electronic ballasts. This will reduce humming and provide the same amount of light while using about 30W less per fixture.

Your exit lightbulbs should be replaced with LED bulbs with equivalent sockets. These only use about 2W when on instead of 25W.

To replace lights and fixtures you may have to invest up front, but the savings will pay for the cost within 1 year. Generally all 60, 100, 150, and 200W incandescents should be replaced with compact fluorescents of equivalent light output, 14, 23, 39, and two 23W respectively. We are not aware of a compact fluorescent that can put out 200W worth of incandescent light, but are recommending that you use a fixture with 2 x 23W cfl's instead. This will give you lots of light by will require the fixture to be changed as well.

2. Solar Hot Water Heater

Estimated Savings = \$2,500 per year

In residential construction solar domestic hot water doesn't always make financial sense, but in your case you are spending about \$13,000 per year on hot water for heating and washing. For this reason using the sun to heat this water makes great sense. We have provided an incentive form from the Federal Government that you may use to get up to 25% of the project cost paid for. The link for the application can be found in Appendix 4.

You should install a solar hot water heating system that preheats the water for your boiler, and also heats your hot water in the summer. You would need a large tank to store the hot water. The system may not be able to heat the water all the way to the temperature needed by the boiler but it would preheat it so the boilers would not need to use as much fuel to heat the water to its usable temperature.

This is just a very preliminary estimate; please consult a professional installer for more accurate savings estimates and the feasibility of connecting a solar hot water heater to a boiler heating system. The estimates completed for this report assumed you use most of the south facing roof of the sanctuary to install he panels. It also assumes that you use evacuated tube solar collectors; these will extract the most heat from the sun in the winter.

3. Add Insulation to Ceilings

Estimated Savings = \$1,946 per year

The flat attics and the sloped ceilings in Rideau Park Church have about 4” of batt insulation providing about R12 worth of insulation. You should upgrade this to R40 in the flat ceilings. This would involve having cellulose insulation blown into the cavities, at least 9 inches.

For the sloped ceilings of the chapel and sanctuary we recommend you add a layer of extruded polystyrene insulation to the interior. Rigid polystyrene comes in varying thicknesses from 1” to 2.5”. Each inch of thickness would give you R5 worth of insulation. We are recommending you add one layer of 2.5” thickness. This will increase the insulation to almost R 25, with minimal cost. It must be then covered with a fire barrier like drywall in order to comply with the fire code.

4. Install High Efficiency Heating System

Estimated Savings = \$1,600 per year

Your gas for heating makes up about 60% of your total bills for the year. To use your gas more efficiently we recommend 90% efficient or more gas boilers. Your current boilers run at a steady state efficiency of about 80%. This means you are wasting a full 20% of the gas that you are paying for up the chimney.

The size you need is determined by the heat load for the building. The current heat load is **506,494 btu/hr**. If you were to complete all the building envelope upgrades that we have recommended (including all insulation and window panes) you would only need a heating system with an output heat capacity of **458,933 btu/hr**. plus a minimum 10% safety factor. You should really complete the building upgrades first, so you won't have to invest in as

large of a heating system. The current capacity of your heating system is $678,000 \times 2 =$
1,356,000 btu/hr.

Since the capacity of your current system is so large you may be able to just replace one boiler with a high efficiency model, and maintain the second lower efficiency boiler as a backup when needed. They should operate in series, only using the second boiler when the capacity of the first is not enough.

5. Install Storm Windows

Estimated Savings = \$364 per year

The minimum you need to do with your windows is make sure they are sealed up properly in the winter. If they are single paned windows they really could benefit from a storm window installed on the exterior. Before installing these exterior storms you **MUST** make sure that the windows are air sealed from the inside. This will make sure that no moisture gets trapped between the two panes. You can proceed to install plexiglass storms on the exterior of the single paned windows. The preferable distance between the two panes is about ½ inch. This will reduce the conductive heat loss through the windows.

We are making this recommendation under the assumption that you don't want to replace your windows, because of the heritage style or cost. If this is not true by all means replace your windows with new ones with the following energy efficient features:

- Vinyl frames
- Low-e coating
- Insulated spacers
- Double panes
- Argon gas filled panes
- Fixed or casement windows

You should expect to pay about \$75 per square foot for windows with these features, and \$100 per square foot for the most efficient triple paned insulated fibreglass or wood frames. This means it would cost you approximately \$23,000 to replace all of your single paned windows. The plexiglass storms would cost about \$5 per square foot, for a total of about

\$1,500. That is why we recommend first improving the efficiency of the windows by decreasing air leakage through them and adding storms.

6. Refrigerator(s)

Estimated Savings = \$185 per year

You have three fridges using more than 700 kWh per year. This includes the Kenmore fridge in the basement (828 kWh/yr), the parlour kitchen fridge (723), and the Foster Commando 90 (1,400) in the large kitchen. These fridges should all be replaced with new Energy Star models that use approximately 450 kWh per year.

The two freezers are using approximately 500-600 kWh per year. A newer Energy Star 13 cu. ft. freezer would only use about 320 kWh per year. Since one of these freezers was empty, I recommend that before replacing it you just unplug it when it is not needed.

7. Mechanical Systems

Estimated Savings = \$160 per year

The mechanical systems include:

- The window air conditioners,
- The elevator,
- The circulation pumps for the boiler system,
- The hot water circulation pump,
- The exhaust fans.

For the window A/C's we recommend you make sure they are Energy Star models, with an EER rating of at least 10.7 or greater. These are available for as little as \$180. The elevator and circulation pumps for the boiler need to be used so there is really nothing that can be done other than keeping from using them needlessly. Also, the lower you set the thermostat the less the circulation pumps for the boiler will be used.

The hot water circulation pump wastes a lot of electricity. It pumps hot water continuously around the building so that hot water will be available quickly whenever someone turns on a hot water tap. We recommend that you turn this pump OFF when hot water is not immediately needed (ie. when the building is unoccupied). Installing a timer will turn the pump on and off as needed automatically. When the pump is turned off hot water will still be available but it may take a while for it to get to the tap.

The exhaust fans in washrooms should only be used when the room is being used. This can easily be accomplished by installing a motion sensor timer on the lights and fans. This will automatically turn them off 15 minutes (or another set time) after the room is empty.

8. *Install an Instantaneous Hot Water Heater*

Estimated Savings = \$117 per year

This is another option to reduce your energy required for hot water. An instantaneous hot water heater only heats the water when you need it, so there is no tank to lose heat from. Because there is no tank, you don't run out of hot water. Make sure to size the on demand water heater properly (match its output in gallons per minute to your maximum requirement). Instantaneous hot water heaters either run on electricity or natural gas.

You may want to complete a water audit and find out where you are using most of your hot water, and install point of use instantaneous heaters instead. These are small heaters that don't supply the whole building, just one area. For example installing one for each set of washrooms, and one for each kitchen may work. These should work even if you heated your hot water with solar.

At the minimum consider insulating your hot water tank with a fibreglass, or radiant heat blanket (available from EnviroCentre) and the exposed hot water pipes coming from the heater. This will save you about \$15 per year.

9. Office Equipment and Appliances

Estimated Savings = \$80 per year

Your office equipment includes computers, the photocopier, stereos, TV and VCR. The main way to save here is to replace the normal (cathode ray tube) computer monitors with LCD monitors, and make sure to unplug or turn off everything when it is not being used. This means turning off all the computers and copiers at night.

The kitchen appliances include the coffee maker(s), dishwasher, microwave, and stoves. You are limited here because you need to use these appliances when feeding and entertaining. We recommend installing an Energy Star dishwasher. This would only save you about \$20 per year in electricity; but this estimate doesn't include the hot water savings. It would cost about \$900 dollars to purchase one with an EnerGuide rating of 200 kWh per year.

Secondly you should make sure all appliances with an electronic clock or with a transformer on the plug (large box where it plugs in) are unplugged when not in use. This includes the all cell phone chargers, or power adaptors.

10. Reduce Air Leakage

There are no estimates of savings to go with air leakage because the building is quite airtight and it would be very difficult to accurately estimate any savings. This should not be a priority improvement unless there are areas where the comfort is compromised because of cold drafts in the winter. The reason that the air leakage makes up such a large percentage of your heat loss but is not that bad overall is because of the size of the building. The surface area of the church is so large that multiple small leaks really add up.

The blower door test was used to find out where the air leaks are in the building. Cold air can leak in, and warm air that you have paid to heat can leak out around doors, windows, and other areas. This exchange of air is caused by the ‘stack effect’. As the air inside is heated in the winter, it rises and escapes through leaks in the upper part of the building. Since air is escaping it must be replaced by fresh air to balance the pressure in the building. This movement of air will draw cold outside air in from the lower part of the building (basement).

We recommend you reduce the air leakage in order to improve comfort in drafty areas, and save on your heating costs. Follow the guide below and please take a look at “Keeping the Heat In”, included with this report for details on materials, and methods for effective insulation and air sealing.

Basement

The main leaks on this floor were:

- The ceiling vent near the top of the stairs leading to the kitchen or apartment area,
- The washroom vents by the electrical room,
- Inside room B24,
- The electrical room,
- The corners of the exterior door in the NE hall,
- The exhausts, combustion air supply, screen, and windows in the boiler room.

Any vents either exhaust or other could be leaking air in two ways. Either there is a gap around the vent housing and the wall, or the damper on the exterior is not closing properly. Make sure to seal between all vents and exhaust fans and the wall, and then check the dampers on the exterior; if they aren’t closing properly replace them.

The doors to B24 and the electrical room were locked so the exact area of the air leakage is unknown.

Any exterior doors should be checked to make sure that they have updated weatherstripping and threshold seals (for the bottom of the door). For weatherstripping we

recommend the v-type. It is made from foam coated in vinyl and provides a very good flexible seal, even in cold weather. One particular brand is known as Zerodraft.

The leaks to the exterior in the boiler room should be sealed up except for the combustion air supply. It is a large duct coming in from outside to provide air for the boiler.

Main Floor

You should seal the following areas on this floor with expanding foam or caulking, depending on the size of the gap. Caulking can be used for cracks up to 1cm wide. The main leaks on this floor were:

- Under the stage in the Beecroft hall,
- Underneath the choir area floor,
- The Beecroft Hall windows,
- The top of the operable windows in the sanctuary (Fig. 15),
- The ceiling vent in the main kitchen,
- The bathroom vents.
- The secretary's office,
- Inside the office for Mrs. Inrig,
- The music directors room,
- Room A18,
- The pot lights in the halls,
- The side exterior doors by offices,
- The bottom of the exterior front doors,
- The sides of the wood columns in sanctuary (Fig. 16),
- The radiator penetrations in floor,
- The hole in the wall by the electrical panel (Fig. 17),
- The electrical plugs in the choir area,

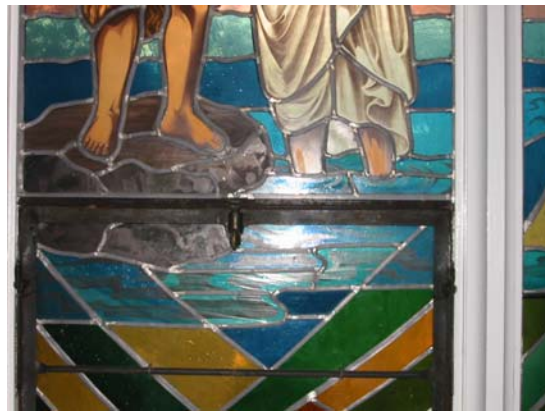


Figure 15: Sanctuary Window



Figure 16: Sanctuary Columns

The area under the stage and under the choir should be investigated for holes or cracks to the outside. They should then be sealed with caulking or spray foam.

Any leaks around windows should be sealed from the inside with caulking. If you intend to open them again consider removable caulking, or weatherstripping for casement windows. This could work well in the sanctuary.

The kitchen exhaust fan and bathroom vents should be sealed in three places; firstly the gap between the duct and the inside wall, secondly between the duct and the outside wall, and thirdly the damper should be checked on the outside to make sure it is closing properly. Replace it if necessary.

Again the secretary's office, Mrs. Inrig's office, the music directors office, and room A18

were not accessible so the exact leaks could not be found. It may be because of the air

conditioners though. They tend to leak air through their vents and around their edges where it meets the window. Make sure they are installed and sealed properly in the summer, and removed in the winter.

Pot lights should be sealed from the attic with an airtight fireproof box built over top of them. Make sure to check with the manufacturer for proper distances.

These doors need new weatherstripping. For the best advice on types of weatherstripping, consult with "Keeping the Heat In", page 36. We recommend 'ZeroDraft' or similar products made of vinyl covered foam.

Any cracks in the side of the columns should be sealed with caulking. The holes in the wall and floor should be sealed with expanding foam.

Exterior outlets and switches should be sealed with foam gaskets, caulking, and safety plugs, as in "Keeping the Heat In" pages 35 and 50 for detailed instructions.



Figure 17: Hole in Wall

Loft Area

You should seal the following areas on the second floor with expanding foam or caulking, depending on the size of the gap. Caulking can be used for cracks up to 1cm wide:

- The windows in the loft area,
- The baseboards in the loft,
- The radiator pipe penetrations,
- The hole in the wall between the narthex and the sanctuary,
- The switches and plugs.

Any leaky windows should be sealed with caulking. If you intend to open them again consider removable caulking, or weatherstripping for casement windows.

The baseboards should be sealed. The best way to do this is to remove them, seal any gaps between the floor and the wall, and then put them back. An easier way is to just caulk the bottom and top of the baseboards and while leaving them in place.

The radiator pipe penetrations in the floor and the hole in the wall should be sealed with expanding foam and the switches and plugs should be sealed as mentioned above.

Exterior outlets and switches should be sealed with foam gaskets, caulking, and safety plugs, as in “Keeping the Heat In” pages 35 and 50 for detailed instructions.

CONCLUSION

Rideau Park Church is consuming about 87,000 kWh per year, which is costing you about **\$8,700 each year for electricity**. A lot of the electricity is being wasted because you don't have very efficient light bulbs. Incandescent light bulbs only convert 10% of the electricity into the light; the rest is given off as heat.

You are also consuming about 13,900 m³ of natural gas per year, costing you an additional **\$13,300 for heat and hot water**. This makes your total annual bills for one year about **\$22,000**.

By following ALL the recommendations in this report you could cut your costs by 51% allowing you to reinvest about \$11,253 back into the church each year. The cost of all these recommendations may be close to \$67,000 but will pay for themselves in six year if they are all implemented.

To really save money, you should invest all or a portion of your energy savings in additional efficiency upgrades, saving you even more money in the future. Perhaps just start with something that has a quick payback, like the lighting. Take the money saved from this and invest it for one year. You will then have even more to spend on a new heating system or more insulation. This concept will eventually allow you to have the most efficient building possible, reducing your expenses for years to come. Remember as well that as electricity and gas prices go up, you will be saving even more every year after the improvements have been completed.

APPENDIX 1 – SBO GENERAL TIPS

SMART BUSINESS



OTTAWA (SBO)

A viable energy management strategy for businesses

Energy Savings Tips for Your Business

In addition to your customized written report, here are some steps you can take on your own to further reduce energy consumption while continuing to provide a comfortable and cost effective environment for yourself, your customers and your employees.

LIGHTING TIPS:

- ✓ Keep the bulbs and lighting fixture clean and reduce lighting where possible.
- ✓ Turn off lights in unoccupied areas, remove excess lighting, and turn off signage and other lights not necessary for security and safety.
- ✓ Install a carbon monoxide (CO) sensor in underground parking lots to save electricity needed to run exhaust fans and to also increase safety and security.

HVAC TIPS:

- ✓ Install programmable thermostats to automatically control room temperature settings and install an adjustable speed drive (ASD) to match the operation of your HVAC equipment to your

building's needs, avoiding energy waste.

Air conditioning

- ✓ Adjust the thermostat up in the summer.
- ✓ Air conditioning thermostats should be set no cooler than 25.5°C (78° F). Each degree setting below 26°C will increase your energy consumption by approx 8%.
- ✓ If you haven't already done so, request an **SBO** assessment of your air conditioning system.
- ✓ Ensure peak performance by frequently changing the filters that get extremely dirty and quickly in restaurant settings.

Heating

- ✓ In the winter, adjust the thermostats down –no warmer than 22°C (71°F).

REFRIGERATION TIPS:

- ✓ Each month, clean condenser coils and check for the proper amount of refrigerant. Also check the seals, gaskets and latches on doors to make sure they form an airtight seal when closed.
- ✓ Consider adding strip curtains to walk-in coolers to reduce the amount of energy lost to the surrounding air. Your system will use less energy and won't work as hard, cutting maintenance costs. As an added bonus, these curtains repel windborne

contaminants like dust and pollutants.

- ✓ Keep the temperature at the manufacturer's recommended optimal setting. Better yet, consider installing variable speed drives, which automatically adjust the level of refrigeration and can be used on the motors of all kinds of refrigeration units.

OFFICE EQUIPMENT TIPS:

- ✓ Choose ENERGY STAR products when upgrading or adding new equipment. These products meet federal standards for energy efficiency and are often available at the same cost as less efficient models. And since most ENERGY STAR equipment powers down during periods of inactivity, you'll save even more.
- ✓ Turn off or set office equipment to power down when not in use. Turning off one computer and monitor nightly and on weekends can save up to \$50 a year. And setting PCs, monitors and copiers to use sleep mode when not in use can help cut office electricity costs by up to 50%.

For energy efficient products and services, or to book your SBO audit, contact **envirocentre**

580-2582 or visit us on-line
www.envirocentre.ca

APPENDIX 2 – SERVICES and CONTRACTORS

FURNACE CONTRACTORS

Ideal Combustion
Gloucester
613 747-8454

Holmes Heating
Kanata
613 592-8170

JC Robinson
Ottawa
613 733-2481

Parent Heating and Cooling
Ottawa
613 739-4515

AIR SEALING AND INSULATION

Wooly Insulation
1-888-749-6659

A. Mackay and Sons Insulation
Ottawa
613-821-2373

Warmth Insulation (Spray Foam only)
Perth
1-800-363-7280

Energy Ottawa Inc. is a diversified and innovative energy company that generates green power and offers residential and commercial customers a variety of energy related products and services including an energy procurement advisory service. Energy Ottawa is a wholly owned subsidiary of Hydro Ottawa Holding Inc. and an affiliate of Hydro Ottawa.

Commercial Energy Services

Energy Procurement Services

- **Analysis and aggregation** of customer energy consumption data.
- **Strategy Development** to help customers make the right choices and mitigate risk, whether it is staying on standard supply service (SSS) or purchasing power from the market.
- **Purchasing assistance** either in a “back room” role or on the customer’s behalf.
- **Ongoing Supply Management** to ensure that customers are kept informed, billing is monitored and verified and contracts are optimized.

Energy Management

- **Analysis** of energy efficiency opportunities within customer facilities.
- **Design** of lighting, HVAC, automation and building system improvements.
- **Implementation** of energy efficient measures in a turnkey fashion.
- **Metering Services** for web based access to historical and real time data.

Electrical Services

- **Turnkey Services** to provide maintenance, design and implementation of electrical systems such as transformers, switchgear, uninterruptible power supplies, surge protection and metering.
- **UPS Turnkey Services** for the design, installation and commissioning of uninterruptible power supply facilities.

Energy Ottawa, through its predecessor utilities, has enjoyed a long and rich tradition of supplying electricity and providing related services to our customers in Ottawa. Our history dates back over 100 years to 1882. We look forward to assisting our customers, for 2005 and beyond, in preparing for the changes and opportunities that have resulted from the restructured Ontario electricity market.

APPENDIX 3 – ENERGY SAVINGS CALCULATOR

Energy Savings Calculator Results

	Total Energy (GJ)	Energy Cost (\$)	Savings (GJ)	EGH Rating (Diff)	Savings (\$)	Upgrade Cost (\$)	Payback (Yr)
Base Case	881.7	15551.15	0.0	0.0	0.0	0.00	N/A
Flat or Cathedral Ceiling	763.6	14136.13	118.2	0.0	1415.02	0.00	0.0
South Window	874.4	15463.53	7.3	0.0	87.62	0.00	0.0
East Window	880.1	15531.77	1.6	0.0	19.38	0.00	0.0
North Window	874.3	15462.31	7.4	0.0	88.83	0.00	0.0
West Window	875.8	15479.97	5.9	0.0	71.17	0.00	0.0
All Windows	859.6	15286.50	22.1	0.0	264.64	0.00	0.0
Heating System	782.6	14362.93	99.2	0.0	1188.21	0.00	0.0
Domestic Hot Water	874.6	15464.95	7.1	0.0	86.20	0.00	0.0
All Upgrades	656.9	12856.49	224.9	0.0	2694.66	0.00	0.0

APPENDIX 4 – GRANT OPPORTUNITIES

To help pay for the cost of this audit and any work you might do please consult with NRCan and the EnerGuide for Existing Buildings program:

<http://oee.nrcan.gc.ca/commercial/financial-assistance/existing/retrofits/index.cfm?attr=20>

EnviroCentre is working with Faith and the Common Good in Ottawa to help religious buildings gain access to these grants from NRCan. For the most up to date information on this please contact Kristina Inrig at:

ottawa@faith-commongood.net

(613) 889-8576

An application form under the REDI program to pay up to 25% of solar domestic hot water heating systems can be found here:

<http://www2.nrcan.gc.ca/es/erb/erb/english/View.asp?x=647&oid=973>

More info about REDI can be found here:

Renewable Energy Deployment Initiative

Renewable and Electrical Energy Division

Natural Resources Canada

615 Booth Street, Room 150

Ottawa, Ontario K1A 0E9

Email: redi.penser@nrcan.gc.ca

Telephone: 1-877-722-6600 (Toll Free)

Fax: (613) 943-6517

Also check out the Canadian Solar Industries Association for information on incentives for installing solar systems:

<http://cansia.ca/government.asp>