St. Davids-Queenston United Church

St. Davids, Ontario

Green Audit Report

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Audit Date – May 18, 2012
Report Date – May 24, 2012

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Faith & the Common Good
Seeking Common Ground for the Common Good

Greening Sacred Spaces

Living Faithfully – Living Green

Greening Sacred Spaces (GSS) is a practical program developed by *Faith & the Common Good* to assist faith communities in taking concrete actions to create a more energy efficient place of worship and to educate members of the community about ecological issues. Greening Sacred Space will help people of faith live out the call to protect our planet home within their own context. It also provides an opportunity to save money, help save the planet, and engage in meaningful conversations about the spirituality of eco-sustainability. See our resource kit, with guidebooks, workshops, posters, and the GSS Video, designed to help faith groups reduce greenhouse gases and live more sustainably.

Faith & the Common Good is an interfaith network of religious communities who understand the Earth as a sacred gift. We believe that our faith traditions are a key source of wisdom in the great spiritual quest of our time: Healing our beloved Earth. We believe that we are called to re-envision the way that we live.

Climate change may be the greatest threat to the well being of our planet today, and as such represents a challenge to people of all faiths. More than 2000 scientists, who contributed to the United Nations' Intergovernmental Panel on Climate Change, have predicted that by 2100, Earth's average temperature will climb between 1.5 and 6 degrees Celsius, rising twice as fast in the Arctic. The consequences threaten the health and safety of all living beings.

For more information please visit: http://www.greeningsacredspaces.net/

The Green Rule
Ecological Wisdom From Faith Traditions

The Green Rule presents sayings from more than a dozen of the world's great religious and spiritual traditions, demonstrating that all have at their core an awareness of the sacredness of creation.

Overview of St. Davids-Queenston United Church

Address:	1453 York Road St. Davids, ON L0S 1P0
Primary contact:	Steve Hardaker 905-685-7308 hardaker.sp@sympatico.ca
Building Age:	58 years
Number of levels:	2
Square Footage:	6,300 sq. ft.
Utilities:	Electricity, natural gas and water
Heating Source:	Natural gas hot water furnace and boiler and electric
Hot Water:	Conventional electric hot water tank
kWh per sq. ft.:	17.66 kWh per sq. ft. [1]
$ per sq. ft.:	$0.91 per sq. ft.

St. Davids-Queenston United Church is a 6,300 sq. ft. space located in St. Davids, Ontario. The Church Sanctuary was built over the years of 1946-1955, followed by a large addition, called the Christian Education Hall in 1964. The addition has 1 level, which includes a gym and a kitchen, while the original structure has 2 levels with the Sanctuary, children and youth areas, washrooms and various meeting/gathering rooms in the basement. The exterior of the building is constructed primarily of cement and brick, while the interior is either cement block or dry wall.

Electricity, natural gas (NG) and water are the Church's three utilities. Combined, utility expenditures for the year 2011 were $5,742.69 and for this period the Church's energy consumption contributed approximately 20.68 tonnes[2] of carbon dioxide to the atmosphere and consumed 17.66 kWh per sq. ft. This is just below our calculated average of 19.34 kWh per sq. ft.[3]

Overall, we feel that the Church is in good operating condition as a result of the care and foresight taken in the day to day operations of the building, yet still has an excellent opportunity to reduce electricity, NG and water consumption in the following areas, and which will be outlined in greater detail within this report.

Electricity Consumption

- Proceed as planned with the replacement of inefficient lighting. Focus on replacing the remaining T12 fluorescent tubes, all incandescent lighting and halogen pot lights
- Proceed as planned with the replacement of the forced air furnace and the inefficient fan
- Consider unplugging one of the refrigerators if it is not required for extended periods
- Consider installing timers or motion sensors in areas that do not require continuous lighting, such as in the washrooms and hallways
- Ensure office equipment such as computers and printers go into sleep or standby mode when not in use

[1] Gas (where applicable) and electricity combined for 2011
[2] Based on 0.17 kg of CO^2 per kWh and 1.95 kg of CO^2 per m^3 of natural gas consumed
[3] Based on kWh per sq. ft. average of 27 United Churches across Ontario and Quebec

- Reduce heating requirements by air sealing
- Consider an on demand hot water heater to replace the existing electric tank

Gas Consumption

- Proceed as planned with the replacement of the forced air furnace
- Proceed as planned with the replacement of the older windows and doors
- Reduce heating requirements by air sealing
- Wrap all hot water pipes with pipe insulation
- In long term, look at options to add insulation to all interior walls and bump up insulation levels in the Sanctuary attic
- Ensure that the ceiling fans are in operation at all times during the heating season

Water Usage

- Reduce water consumption with lower flow faucet aerators
- Capture rain water for exterior watering
- Fix the leaky exterior faucet on the south west wall of the building

Waste

- Consider starting a composting program, so that all food wastes and other compostables do not end up in the land fill
- Ensure that paper towels are composted rather than thrown in the garbage
- Ensure that members of the Church and third party users of the facilities are educated in proper use of the kitchen and meeting areas in order to reduce energy use and properly manage waste

Air quality

- Discontinue the use of toxic cleaners
- Use beeswax candles rather than the traditional paraffin variety
- In the long-term, consider replacing the gas range that has +10 pilot lights with a range with electronic starters

Details of Inspection

Energy Efficiency

Building Envelope/Insulation/Windows

Overview:

The building envelope is the outside of the building that includes the walls, roof, and foundation walls. These components are the third skin of the occupants, and act like another layer of clothing to us (our second layer). If we are not wearing proper clothes for the season, it leads to uncomfortable conditions, and us getting wet and cold, both of which, if maintained over long periods of time, will lead to damage and health problems. The temperature difference between the warm inside and cold outside is unstable and it wants to be at equilibrium. To do this there is a movement between the hot side and the cold side, trying to reach a similar temperature. The greater the temperature difference between the inside and outside, the greater the heat flow and air movement. Isolating the two sides from each other, reduces the ability of heat to flow to the outside of the building.

Failures around the components, where they change is typically where we see energy loss. For example when the wall stops and the windows start, we see dramatic air leakage in most locations at that joint. Similarly when the wall meets the floor joists, or foundation is a common air leakage point. Where the ceiling meets the wall, is again, another joint that causes leaks. Air leakage is also noted when there is a hole made through the envelope. This can be plumbing, wiring, or openings such as attic hatches, light fixtures and outlet covers (plugs and switches). Door and window seals themselves also can be a point of leakage. Depending on the type of construction this can even show up on interior walls as they may be connected via an air path to the attic or an outside wall. Cold air in the winter, noted in various locations inside the building, are merely taking a path from the outside to that location. When one looks at a building, and it's outside envelope, considering every joint in the façade on all surfaces, is really the starting point to understand how much air can move through a building uncontrolled. Finding out the initial point it enters the building in any of these situations is the only way that comfort can be had, and heating dollars saved.

Equipment such as a blower door are tremendously helpful in seeing this often times felt but invisible phantom of energy loss. If a blower door is not available, sometimes a smoke pencil, or a stick of incense can be used to note air movement near walls. The greater the temperature difference between inside and outside, the greater the effect.

Insulation added to any building traps in the thermal energy created by the heating systems. This building component prevents the movement of thermal energy between the inside and outside of the building envelope – the walls and ceiling. By having the proper amount of insulation in a building, the energy (furnace heat for example) stays inside the building and does not escape through the walls and ceiling, which reduces comfort and increases costs.

Building Envelope:

Observations:

Air leakage is a major source of heat loss for the Church and air sealing is both an easy and cost effective way of reducing energy consumption as air leakage can account for up to 35% of total heat loss in any given space. Listed below are the major sources of air leakage found on the day of the audit.

1. Exterior doors and Sanctuary window weather-stripping:



2. Cracks in between wood paneling in old doors:

3. Window frames:

4. All exhaust fans:


5. Sanctuary attic hatch:

6. Narthex addition where the drywall meets the brick:

7. Furnace and boiler rooms - old fresh air intakes:

8. All Sanctuary ceiling fixtures:

Recommendations:

1. Exterior doors and Sanctuary window weather-stripping:
   - Upgrade/replace/install weather-stripping around all exterior doors and older windows.
2. Cracks in between wood paneling in old doors:
   - Ideally, the Church should replace the basement door prior to this upcoming winter.
3. Window frames:
   - Caulk and air seal around all window frames
4. All exhaust fans:
   - Ensure all dampers close properly when the exhaust fans are off.
   - Caulk around exterior vents where required.
5. Sanctuary attic hatch:
   - The attic hatch is an outside door and should be treated as such by insulating and air sealing.
6. Narthex addition where the drywall meets the brick
   - Caulk or spray foam where the drywall meets the brick
7. Furnace and boiler room old fresh air intakes:
   - Confirm that the intakes are not required and install a more permanent solution with consideration towards insulation and air sealing.
8. All Sanctuary ceiling fixtures
   - Wires from all fixtures exit the Sanctuary through the ceiling allowing warm air to escape. Ideally, spray foam around the wires on the attic side of the ceiling

<u>Insulation and Windows/Doors</u>

Overview

Insulation added to any building traps in the thermal energy created by the heating systems. This building component prevents the movement of thermal energy between the inside and outside of the building envelope – the walls and ceiling. By having the proper amount of insulation in a building, the energy (furnace heat for example) stays inside the building and does not escape through the walls and ceiling, which reduces comfort and increases costs.

Observations:

Insulation throughout the building is minimal. With the exception of the Sanctuary attic, which has 4-8 inches (R-12.5 to R-25) of fiberglass batts, we expect that there is little to no insulation throughout the rest of the space. In the long term, look at solutions for adding insulation to the walls throughout, and consider bumping up the level of insulation in the Sanctuary to achieve a minimum of R-30 – 40. This is by no means a small job and may not be achieved without major structural changes. It is recommended that each area be looked at and tackled as a part of planned upgrades or renovations. It is important to consult an architect prior to making any major structural changes who will be able determine the best way to add insulation to each space and to create an overall plan for the building.

All windows in the Sanctuary are original to the building while the vast majority of the remaining windows have already been replaced or will be replaced in the near future with double paned models. Proceed with the planned replacement of these windows and add weather-stripping and continue to use storms on the exterior of the Sanctuary windows.

None of the exterior doors are recent models with the exception of the glass vestibule entrance which was completely redone in 1994. All remaining doors appear to be original to the building and should be repaired and/or replaced in the short term as air leakage around the edges and through the doors themselves were noted to be a major issue. New glass-less doors can come with insulation and can have R-values of up to 15, whereas older model doors will have R-values

less than 5. In the long term, consider replacing all exterior doors however weather stripping should be added or replaced on all of them in the short term.

Recommendations:

- Considering adding insulation to the Sanctuary to achieve R-values into the 30's or 40's.
- When major interior renovations are undertaken, look at options to add insulation to the walls throughout the building.
- Check all windows and doors to ensure they close properly. Fix those that do not. In the short term, replace weather stripping around all exterior doors.
- Continue with the plan of replacing the remaining older model windows.
- Check weather-stripping every year and replace it as needed. After replacing the weather-stripping, check the door seal again. If the door still does not seal tightly to all sides of the jamb you either installed the weather-stripping badly or the door is bent and in need of replacement.
- In the long term, look at replacing all older exterior doors with energy star models.
- Please refer to the book "Keeping the Heat In" as it has many useful and helpful tips with respect to insulating and air sealing spaces.

<u>Space Heating:</u>

Overview:

Using the most efficient heating and cooling appliances in the building will maximize the costs paid of turning a fuel (electricity, gas, propane, oil) into heat for your comfort. By using older less efficient furnaces or boilers for example, only 60% of your heating dollars are being turned into heat, while the rest is lost up the chimney. Switching to a more efficient unit (92% +)

obviously gives you more value for your dollar. The same is true for cooling. Putting conditioned air where you want it, and when you want it, is the final key delivery component to ensure occupant comfort.

Heating of the Church is performed by a combination of electric baseboards and forced air entrance way heaters, a natural gas hot water boiler and a natural gas forced air system. Finally, a large gas radiant ceiling unit is occasionally used in the CE hall. The electric baseboards are responsible for heating the washrooms and Narthex while the boiler heats the Sanctuary and basement. The forced air system and radiant gas system heat the CE hall.

The boiler was approx. 10 years old and its estimated efficiency is in the low 80's. It was controlled by a single programmable thermostat located in the Sanctuary and heats the Sanctuary and basement below it. The single thermostat posses a problem for the Church because the basement tends to be a few degrees colder than the Sanctuary as a result of the location of the thermostat and thus the basement can be extremely uncomfortable during the winter. It is recommended to discuss with your contractor whether or not a second heating zone can be created to resolve this issue. Finally, most of the hot water pipes running through the basement were not wrapped in pipe insulation. It is recommended to wrap all pipes so that the heat being delivered gets to its intended destination.



The forced air furnace in the CE hall is original to the addition (1964) and most likely very inefficient. Replacing this furnace as planned with a high efficiency furnace should save a huge amount of natural gas. This furnace is controlled by a dial type programmable thermostat. It has been set so that if it is ever turned up, it will automatically return to a pre-programmed set-back temperature and this feature appears to work well for the Church. As a result of the new furnace it is expected that the radiant heater will not be required, although it will not be removed. To this end, it may be beneficial to install a lock-box over the thermostat that controls the radiant heater to prevent users from turning it on.



Finally, the washrooms and entry ways are heated by electric baseboards and entry way inserts. The inserts are controlled manually and used sparingly while the baseboards are controlled with a programmable thermostat.



According to CMHC (Canada Mortgage and Housing Corp.) savings from setting back temperatures can be between 5% and 15% so continuing with this process will continue to save the Church money. It is also important that all regular uses of the facility be instructed on how to use the thermostats to ensure that the heat is only being called for when required. Also, ensuring that the ceiling fans throughout are in constant operation will assist in circulating the heat that rises to the roof.

Two other recommendations that will allow all radiators to heat the space more efficiently include keeping the elements clean of dirt and dust by vacuuming or dusting. This will allow the heating elements to dissipate heat more efficiently. Secondly, keep the radiators free of obstructions so that air can move freely over the elements.

Recommendations:

- Install lock boxes over all thermostats in order to prevent temperature tampering, if it is a problem.
- Instruct all regular users of the facilities on how the thermostats work and what the temperature settings should be when spaces are both occupied and unoccupied.
- Wrap pipe insulation on all accessible boiler pipes.
- Vacuum and dust all heating elements to ensure that they dispense heat more efficiently.
- It is important not to set-back temperatures by more than 6-8 degrees Celsius unless spaces are not being used for lengthy periods of time.

- Ensure that ceiling fans are in operation at all times during the winter so that the heat that rises to the ceiling is circulated back down. This will lower the amount of energy required to heat the space.
- Ensure the boiler and forced air furnace has a maintenance check at least once a year. This will extend their life as well as allow them to run more efficiently.

Water Heating

Observations:

There was one large conventional electric hot water tank noted on the day of the audit. The tank services the whole church including the kitchen and washrooms. None of the visible pipes were wrapped in insulation and it is recommended that all accessible hot and cold water pipes are wrapped with pipe insulation throughout the building. All faucets had aerators of 1.5 GPM. Ultra low flow aerators are available in the range of 0.5-1.0 GPM and could help cut hot water usage even further.



The Church mentioned that they will be replacing their current electric hot water tank with a NG tank. An on demand hot water heater was considered however the contractor mentioned a potential issue with water quality as a result of minimal usage. It may be worth it to reconsider the on demand water heater as the pay off is quicker the less hot water is used. Because the Church gets such minimal use during the week this type of heater may suit them perfectly. We have not heard of water quality issues from on demand systems but a little bit of further research into this may be warranted.

Recommendations:

- Ensure all faucets have the lowest flow aerators to reduce hot water consumption. Ultra low flow aerators are available in the range of 0.5-1.0 GPM.
- Ensure all exposed hot, and cold water pipes are wrapped with insulation.
- Consider installing on demand hot water heater, which will only heat water when it is called for.
- An insulating blanket can be purchased and installed around the water tank. This will add an extra layer of insulation around the tank thereby increasing the tanks efficiency.
  Please note: Extra care must be taken when insulating a gas tank as certain areas of the tank should not be covered up.

Lighting

Overview

Light within sacred spaces has tremendous meaning and must be part of the religious experience. It also must be functional so that people can read, move safely or carry out the required tasks within the space they are in. Lighting efficiency has taken leaps and bounds in the last few years, where savings can be seen such as 30% of your lighting bill, by switching fixtures.

Observations:

In the interior of the building, a mix of T8 and T12 fluorescent tubes, incandescent bulbs and halogen spot lights perform the lighting. The Church has already replaced a large portion of their lighting through the SaveOnEnergy program a few years ago and are about to retrofit the remainder of their lights, through the same program. Proceed as planned with the following recommendations.

1. Replace all remaining fluorescent T12 tubes with T8's.
2. Consider replacing the halogen pot lights in the vestibule with LED's.
3. Replace the incandescent bulbs in areas such as the washrooms with compact fluorescent lights.



After replacing lighting, the next step will be to manage lighting usage in both the interior and exterior to ensure that lights are not left on unnecessarily. To this end, motion sensors can be installed in the washrooms and hallways. In areas that do not have motion sensors, signs can also be posted under light switches advising people to turn off the lights when they leave a space. Also, ensure that lights sensors or timers are installed on all exterior lights and that if light or motion sensors are installed, that they function properly.

Recommendations:

- Replace all remaining fluorescent T12 tubes with T8's.
- Consider replacing the halogen spotlights in the vestibule with LED's.
- Replace incandescent bulbs in areas such as utility rooms, storage rooms, and boiler rooms with compact fluorescent lights.
- Timers, motion sensors and light sensors can be installed in locations that may not require continuous lighting, or typically have lights left on when the space is empty. Both timers and motion sensors are cost effective now for basic units, which go on the switch, and can be set to go off if there is no motion in the room, for, as an example 5 or 10 minutes.
- Install timers or light sensors on all exterior lights. If timers are installed, ensure they are set according to season. Ensure all lights sensors function properly to prevent exterior lights from being turned on during the day.
- Using daylight as much as possible is the most cost effective lighting, as it's free. Maximizing daylight through reflective surfaces, such as white areas around windows will allow light to penetrate deeper into a building.
- Education and awareness are the single most cost effective way to reduce lighting costs. This involves labeling switches that say, "Please turn me off." These cost effective signs have shown through studies to save money, and can be hand made, or purchased.

Please note:

- Incentives and rebates for retrofits and lighting are available from the Ontario Power Authority's **saveONenergy** program and are offered through your local utility company. Please visit the following website for more information:
    - https://saveonenergy.ca/Business/Small-Business.aspx

Technology and other Appliances

Overview

This category looks at computers, faxes, printers, and other unique electronic or electrical equipment and appliances in the building. Many of these elements can consume electricity when not in use, or are old enough that the more efficient equipment would pay for the change in energy saved. Measuring old appliances for example with a meter that measure kilowatts is a good process to see which appliances are costing you the most money to operate.

Beyond lighting and space heating, there are many other items that consume electricity within the Church and these include office equipment, kitchen equipment such as refrigerators/freezers, a dishwasher, and HVAC system equipment such as pumps and fans.

There are 2 refrigerators and a small chest freezer in use at the Church and all are relatively new. Typically, older refrigerators and freezers from the 1970's through the 90's can consume anywhere from 1000 to 2000 kWh per year while newer energy star models can consume as little as 350 kWh per year. It was discussed that the new, glass door refrigerator was purchased for use once a year. As the contents of both refrigerators could have fit in one of the units, the Church might consider turning one off when both are not required.

The fan for the forced air furnace was extremely old and when the Church replaces this furnace they should realize savings with the new fan in the high efficiency unit.

Desktop computers, printers, a photocopier and communication equipment were noted in the office area. It is recommended to set this computer up so that it goes into sleep mode after 15 minutes or so. Also, consider putting all electrical office equipment on easily accessible power bars. Many electronics continue to use electricity when they are plugged in, even when they are not in use or appear to be off. These are called 'Phantom loads'. Power bars with timers are also available.

There are also two A/C units in the Sanctuary. As they are newer installations it is expected that they are relatively efficient. Monitor the use of these units to ensure that they are not left on when the rooms are not occupied and in fact, it may help to post signs advising occupants to turn off the A/C units when leaving a room for a long period of time.

Recommendations:

- Consider if both refrigerators need to be plugged in and in use at all times.
- Ensure that all computer monitors are turned off or go to sleep mode at the end of the day or when not in use. CRT monitors should be switched off manually.
- Flat screen LCD monitors consume the least amount of energy. Laptop computers use considerably less energy than desktop computers.
- Ensure other office equipment is either shut down or in sleep mode when leaving for the evening or for an extended period of time.
- When upgrading all appliances, look for Energy Star stickers. An Energy Star sticker means that of all products in its class, it is one of the most efficient.
- Monitor A/C usage to ensure the units are not left on or used unnecessarily.

Renewables

Renewable energy is the use of energy that does not require fossil fuels such as solar, wind, micro hydro or geothermal.

Observations:

There are no renewable energy systems in use in the building however the Church does have a good opportunity to look at solar PV panels as the Christian Education Hall has a flat roof with a clear and unobstructed view south.

Solar hot air panels simply warm up the outside (or inside air) by sitting in the sun, as the air moves through the black tubes, the air inside the tubes is warmed and a fan blows that air into the building. This is very simple and relatively inexpensive and reduces heating loads simply through the rise of warm air.

Solar hot water panels preheat water by pumping cold water through a series of tubes in a collector on the roof. The return hot water is then sent into a hot water storage tank where it can be used in conjunction with regular hot water heating appliances. The electric or gas hot water heater will not come on, until the solar hot water panels cannot meet the demand.

You can also purchase Green Power from companies such as Bullfrog Power who add wind energy to the grid. It doesn't require any hook ups; you simply pay them, instead of your hydro company. There is a cost premium for this, but it can be written off as advertising in your books.

Wind generators use a turbine, micro hydro uses streams and geothermal exchanges the constant energy in the earth and puts it through a compressor to heat and cool the building. The first two may not be viable as the lack of water and the presence of very tall trees near the property.

Geothermal systems types, or heat pumps, include ground source or air source. Ground source systems require either tubes similar to a septic or a well, which can be quite expensive. Air source systems takes heat from the air, multiply heat, and deliver it into your space. If you were shopping for a new furnace or heating system, it's a technology worth looking into.

Recommendations:

- If there is interest in the use of renewables in some form at the Church, it would be advisable to have discussions with reliable competent professionals who are licensed professionals in the industry. Please feel free to contact me at that time for recommended people.
- Look into purchasing your electricity from Bullfrog Power Company.

Water Efficiency

Water Usage

Overview

The consumption of water costs money in some form or another. Whether through municipal rates or if on a well and septic, costs are incurred. Reducing water usage always makes sense and reduces the impact the faith community has on the environment.

Observations:

The Church used 66 m^3 of water over the course of 2011. Consider where water is being used most and look at opportunities to reduce consumption.

Recommendations:

- Monitor water use as a whole through the operations of the building. Respecting and understanding the resource is the first step in environmental stewardship.

Fixtures and Faucets

The actual usage of water through the various fixtures and faucets throughout the building require consideration, as to the amounts consumed and whether that amount can be reduced.

Observations:

There are only two toilets in the building. Both toilets have been upgraded with one being a 6 litre low flush model while the other is a dual flush model, which was excellent to see. Furthermore, all faucets had aerators of 1.5 gallons per minute (GPM). In most buildings, 2.2 GPM is the norm so this was also great to see. Even lower flow aerators are available in the range of 0.5 – 1.0 GPM and the Church could investigate if lower flow aerators are feasible.



When it comes to the kitchen taps, there must be a low and high flow aerator to be functional. The default should be low flow, and when required, like filling the sink, the option to draw more water, quickly is available. Many new kitchen faucet heads have this feature built in.

Recommendations:

- Ensure all faucets have low-flow aerators. It is a very low cost solution to lower water consumption. For bathroom faucets, look for 0.5 – 1.5 gallons/minute aerators. For kitchen faucets, look for 2-3 gallons/minute aerators.

Waste Water Management

Wastewater is the mixture of liquid and solid materials that residents and businesses flush down toilets and empty down sinks and drains. This material then flows through a network of pipes that make up the city's sanitary sewer system. After being treated at various stages, wastewater is eventually dumped into the local water system. Therefore, minimizing a buildings wastewater outflow and the number of chemicals within it will help to lower both the environmental impact of the wastewater and the buildings utility bills.

Observations:

Chemical based cleaning products will kill the natural and required biological elements within a healthy wastewater system. The use of toxic cleaners is unnecessary and should be avoided.

Recommendations:

- The use of chemical cleaning products should be replaced with more natural based cleaners.

Leaks

Overview

Regular inspection of plumbing lines ensures that they operate correctly and that if leaks are occurring that they are found and fixed immediately, reducing the consumption of water, and also reducing the concern for mould.

Observations:

One dripping faucet was noted on the exterior of building. Running toilets and dripping faucets can add up to hundreds of litres of water wasted if left unchecked. Regular inspection of all plumbing lines should be carried out so as to ensure leaks are not occurring and this faucet should be repaired.

Recommendations:

- Repair the dripping exterior faucet.
- Monthly inspections, or even more frequently, is a good idea to protect the building from water damage, and to catch and rectify leaks, so as to reduce the water consumption in the building from unnecessary issues. Having an inspection sheet identifying all areas to be inspected allows anyone within the congregation to carry out the inspection and reduces the responsibility from a few to many.

Kitchen/Washrooms

Overview:

The kitchen in many faith communities is the heart of the community and also the focal centre. Food is a major component in all faiths and celebrations with food is part of the joy that faith communities bring to the greater community. Kitchens are also the fundraising centre for many communities. It is with these ideas in mind that the efforts to make a kitchen more environmentally friendlier, reflects the values of the faith community to all who share its food.

<u>Recycling / Composting</u>

Overview:

The composting of food wastes and recycling recyclables is a simple and effective way to reduce the environmental footprint of any faith community.

Observations:

Recycling blue bins were not noted in many locations throughout the Church. The kitchen did have blue bins however there were no blue bins noted in any other locations. It is recommended that blue bins be put in all locations with the possibility of waste.

It was discussed that compost is picked up by the municipality but that the Church does not have a composting program. We recommend starting a green bin program so that all compostable wastes can be composted rather than ending up in the landfill. Disposable paper towels are used in the washrooms for the drying of hands, which also end up in a landfill. Paper towels can be composted and if possible ensure that the towels that are purchased are 100% recycled. A second option is to invest in super efficient "Blade" hand drying systems.

Finally, education may be the single most effective way to reduce waste and increase recycling and composting habits. The Church should consider a "Best Practices" hand out that can be given to caterers, renters and users of the facilities that clearly outlines the wishes of the Church in terms of waste and energy usage.

Recommendations:

- Put "Blue Bins" in all possible locations.
- Look into starting a composting program.
- Post signs above the boxes on what can and can't be recycled.
- Consider installing super efficient "Blade" hand drying systems to eliminate the requirement of using disposable paper towels.

<u>Dishes and Cutlery</u>

Overview:

The use of disposable dishes and cutlery greatly impacts the environment from a waste and toxic manufacturing process. Using regular dishware reduces the environmental impact.

Observations:

Disposable dishes and cutlery were not noted to be used excessively by the Church however we did note a large amount of Styrofoam product in the storage room off of the parlour. If disposable dishware must be used, a company called "Green Shift" offers biodegradable, disposable products and is a viable alternative to Styrofoam products.


Recommendations:

- Discontinue the use of single use dishware.
- Contact “Green Shift” for more information on biodegradable disposable products.

Air Quality

Vacuuming

Overview:

Vacuums represent the ability to clean the carpets in the building, but their exhaust can also exacerbate air quality concerns. A good quality vacuum can improve air quality within a building.

Observations:

We normally recommend vacuuming with HEPA filter vacuums, however the only thing better than a HEPA filter vacuum, is a central vacuum system, which ensures that even the tiniest dust particles are captured and not spewed out of the vacuum exhaust in the interior of the building. A central vacuum system had been installed in Church.

Recommendations:

- Ensure that all vacuuming is carried out with the central vacuum system.

Scent Free Policy

Overview:

Scent free policy is a policy that asks people to refrain from wearing strong perfumes, colognes and personal care products to the building. This policy is to allow all people, regardless of sensitivities to participate in the religious service. Under the Human Rights Commission people who have chemical sensitivities are recognized as deserving of such conditions.

Observations:

This is an opportunity to demonstrate inclusiveness and awareness of the toxicity of chemicals, particularly personal care products. Although it is expected that no policy is currently in place, there is no reason this could not be explored further.

Recommendations:

- If you are interested in pursuing this important issue, we recommend that you contact your local public health unit as to the best way to go about accomplishing this task.

Candles/Incense

Overview:

Candles are typically made from paraffin, which is a petroleum based carcinogen full of volatile organic compounds and often times the wicks contain lead. Burning these types of items in a building dramatically impacts the air quality in a negative manner.

Observations:

Candles were not noted to be a significant part of the Church's day to day operations however it is expected that a few are used on most Sunday's and on special occasions.

Recommendations:

- If and when candles are used, it is recommended to switch to more environmentally friendlier beeswax, palm oil or soy candles that are available in health food stores and co-ops. By removing the toxic candles and replacing them with earth friendly candles, it is a clear and

tangible demonstration showing that even small actions such as switching candles, shows stewardship for all to see.

Cleaning Products

Overview:

Cleaning products are one of the largest impactors of air quality within a building. Chemicals, typically petroleum-based are highly volatile, meaning they are unstable and disperse through the air quickly. These toxic ingredients are known carcinogens (cancer causing chemicals), reproductive disruptors, neurological agents (impacting brain functions), endocrine disruptors (the endocrine system regulates hormone production), and hormone mimickers (petroleum based estrogen mimickers are common ingredients in many cleaners and plastics). These cleaning products are oftentimes not even making spaces cleaner, but in fact more toxic for occupants. These harsh chemicals are not necessary to create a safe and clean building. Natural based cleaners available at health food stores are great alternatives that will meet all of your cleaning needs, and you can simply replace existing products for these. Alternatively you can clean your home with homemade recipes that use time tested ingredients like baking soda and vinegar. Stephen has dozens of recipes on his website if you wish to pursue this. www.yourhealthyhouse.ca The chemical cleaning products should be collected and taken to hazardous waste so that they can be properly disposed of in a safe manner.

Observations:

Chemical based cleaners were noted to be used throughout the building.

Recommendations:

- It is recommended that chemical based cleaning products be switched out for more natural based cleaning products. The chemical cleaners should be collected and taken to hazardous waste.
- If chemical based cleaners must be used, ensure that they are stored in a safe location away from the kitchen and air handler rooms.

Smoking

Smoking tobacco is known to be a health concern for many years for those who smoke. Second hand smoke is also a known health risk. Studies are now showing that "third hand smoke" or

the smoke that has attached itself to clothing and furnishings can and does impact those around smokers. This is especially true for those in the close proximity to a smoker, such as family, in cars, or sitting beside someone. This type of concern is both a health and an overall air quality concern.

Observations:

There is no smoking inside the Church, but it is expected that it is acceptable to smoke on the property.

Recommendations:

- It is recommended that the Church consider that there be no smoking on the property as a way of showing their concern for the congregation's health and well being, both those of the smokers, and those of the non smokers. It may be an opportunity as a community to help those who smoke to quit, and to ask them to consider not smoking in the clothes worn to the Church, so as to not impact other community member's health.

Property

<u>Pesticides / Herbicides</u>

Overview:

The use of chemicals upon the grounds around a faith building dramatically impact the natural health and well-being of the plants and animals, as well as the water quality of the ground water. These chemicals are cancer causing, impact nervous systems and reproductive systems and alter genetic material of both pests and humans. Historically we have not required such dangerous and toxic chemicals to have healthy natural beautiful grounds. There is a pesticide ban in Ontario now, and the use and application of pesticides and other chemicals is in fact prohibited.

Observations:

The Church property is primarily grass and gravel parking. It is not known whether or not pesticides or herbicides are in use but if so, it is recommended to discontinue their use.

Recommendations:

- If used, discontinue the use of pesticides and herbicides.

Storm-water Management

Overview:

The concerns with storm water around commercial buildings are the large surface areas that are taken up by buildings and the potential large volumes of water that are dumped in smaller locations at downspouts during heavy rains, and the impact that these actions can have on the surrounding areas. The planned control of rainwater can reduce the negative impact that the building has on the local environment and sewer systems where applicable. It also prevents the added water pressure up against the building's foundation, which could lead to potential water intrusion and mould growth within the basement. Water capture can also be used for water grounds around the building, or for flushing of toilets and other non-potable uses.

Observations:

Grading is the slope of the land around the building so that the water will want to run away from the foundation and not towards it. This is called a positive slope or grade. A negative slope or grade is where the water runs towards the building. This can add undo hydrostatic pressure to the foundation walls with the excessive water and will lead to the ultimate failure of the wall system and allow water to enter the building walls. Grading does not have to be dramatic, but it must have a positive slope away from the building on all sides. In general, the grading of the land around the Church is flat to positive and could be improved in some areas.

It is also important that rain water from the roof of the building be directed to as far away from the foundation as possible. Downspouts should extend a minimum of four feet away from the building.

Considering the large footprint of the Church, a tremendous amount of water could be captured and stored after every rainfall for use in every day activities. Consider utilizing rain barrels for the capturing and storage of rainwater for the use of watering the Church grounds. In the future, consider installing a large rain cistern for storing water for interior usages such as flushing toilets.

Recommendations:

- Understanding how water moves around the building is important to reduce the damage done by rainwater, and to utilize this free resource for other non explored uses such as watering the grounds.
- Rain barrels or large rain cisterns can be installed to capture rain for interior and exterior uses.

<u>Landscaping / Xeriscaping / Gardening</u>

Overview:

The outside grounds can easily reflect the nature and spirit of the Sacred Space inside by how it is maintained and what is done with the space that is available. Landscaping opportunities should consist of local and low water type plants, which is called xeriscaping. This creates low maintenance and highly attractive plantings that can help teach others how to do similar things through the educational actions of garden groups. The plantings of gardens and especially food gardens is an amazing way to help educate children and adults alike about the bounty of food and life and how we are all connected to the earth and it's abundance. Food is a key component of any Sacred Space as mentioned previously, and the planting, maintenance and harvest of food is an amazing way to demonstrate that.

Observations:

The Church has a fair amount of green space surrounding the building however much of it may be earmarked as cemetery space. There is room for a community garden and the Church should consider investigating the feasibility of one.

Recommendations:

- Investigate the possibility of a community garden. Many local environmental organizations may be able to assist in getting one off the ground.

Parking and Paving:

Overview

The paving of parking areas around the Sacred Space and the large amounts of parking space dedicated on property can have negative environmental impacts from the asphalt and tar to the heat island effect and water runoff. Considering parking alternatives and landscaping is an important feature of an environmental plan.

Observations:

The Church has a large gravel parking lot, which they are looking at expanding and paving. Due to the high costs of asphalt and concrete, the Church is currently considering tar and chip.

If interested in a greener alternative to asphalt or concrete parking lots, there are new paving techniques, materials and designs on the market that are intended to minimize the impact that parking lots have on the environment. These include pervious paving materials, green parking lots and designs that are intended to reduce environmental impacts. Pervious concrete lets water infiltrate to maintain a natural water cycle, recharging groundwater and reducing storm water run-off.

Renovations and Construction

Overview:

When considering renovations and construction within a faith community building it is important to be aware that standard construction is both wasteful, and impacts the environment. Consider choosing healthier materials and more environmentally sound building practices so that the investment into the construction benefits the environment and the community.

Observations:

The Church has recently completed a renovation of their basement. Further renovations such as replacing their remaining inefficient lighting and their natural gas furnace are in the works. In addition, the Church is currently getting quotes for a paved driveway.

Recommendations:

- When considering renovations, ask builders and designers for the healthiest building materials so that toxic building materials, which are standard for normal construction, do not impact the workers, and the Church. Consider more natural building materials such as wood, plaster, and less manufactured products, where possible. Consider maximizing energy efficiency through construction by utilizing passive solar design (capturing daylight in the winter and keeping it out in the summer) and smaller footprint size to reduce costs and improve efficiency.
- St. Gabriel's Parish in Toronto has recently completed a new building, which was designed to minimize energy use and maximize occupant comfort. Consider contacting St. Gabriel's for advice on healthy and green building opportunities: http://stgabrielsparish.ca/
- Trinity United Church in Cobourg, Ontario, has recently completed a multi-year renovation of their sacred space, which included adding insulation throughout the building and installing energy efficient lighting among other things - http://www.trinitycobourg.ca/index.asp.

Operations

Financial – Tracking Consumption

Overview:

The understanding and tracking of the consumption of a building is a key component to making changes and reducing operational costs and the environmental impact. Tracking monthly and yearly, the consumption of fuel oil, water, electricity, both in dollars and in units of consumption, helps to show where and when the largest amounts of energy are used, and can help determine why. Only through this monitoring can any building hope to see change and realize the benefits of their efficiency efforts.

Observations:

Utility payment is performed by the Church and both costs and consumption amounts are tracked.

Recommendations:

- It is recommended that tracking sheets be created and the information filled out. Included in this report is a comprehensive tracking sheet that looks at everything. It does not have to be used. Simple handwritten sheets or basic spreadsheets work just fine. It has to be understood, clear, and can help show the issues and concerns and allow monitoring to be ongoing. It is recommended that if older records are still around that they are collected and the data entered, at least a year back, and ideally two or three to start the baseline. From there, once efficiency activities are engaged, you should ideally start to see the fruit of those labours show up in the sheets.
- It is both impossible and frustrating to try to carry out efficiency upgrades in any building if you have no sense of, or an inability to see the improvements in some tangible form. Tracking sheets of consumption is the most appropriate way that with some short lessons, everyone can see and understand.
- Sustainability is used with respect to the environment a great deal. It is also used in financial circles. Faith communities need to see both as important, and by looking at the impacts and consumption, we can achieve both with ease.

Religious Activities

Overview:

The connection between the faith of this community and the environment is written in the Bible. It is part of the connection we have with Creation, and as such we should make those connections both physically through actions and also through our faith. This connection, through the actions of volunteers and members strengthens the actions and the faith of all involved.

Recommendations:

- Faith and the Common Good have a Greening Sacred Spaces kit, which includes a manual on Starting a Green Team for your faith community. There are lots of resources in the kit and on the website where your faith community could learn about the best ways to move things forward in a positive manner.

Secular Activities

Overview:

This part is the engagement of the community at large, beyond the walls of the faith community and some of the activities that go on within the building outside of the services.

Recommendations:

- With many people concerned about the environment in this day and age, they are looking for guidance and clarification on how to resolve the issues that they have. The Church can be a place to find those answers, at least some of them. By demonstrating and practicing stewardship and Creation care in the Church and beyond, it shows to the greater community

that this Church is in fact engaged beyond its own walls. This engagement can be reflected in the rental of the space to meet the social needs of the community. Groups like mother and child play groups, garden club meetings, environmental meetings, and other environmental and socially beneficial needs of the community. By tracking operational costs as mentioned previously, it is feasible to determine what renting the hall for an hour actually costs the building. By knowing this, realistic costs can be kept low, especially for groups of limited funds, but by opening the space up to the community, it helps demonstrate the connectedness that the Church has with the community and creation.

- It is also important to showcase the environmental actions of the faith community as a demonstration to others that it is possible. These are great achievements you have the opportunity to undertake with. Be proud of your efforts. You are helping to maintain the life of this Church and protect the earth at the same time. This is no small feat and engage the greater community to be a part of your process.

Conclusions

There are many opportunities within this faith community to make both small changes and to look at long-term suggestions. This is the beginning of a process that I hope you embrace and undertake to the best of your abilities, as it will ultimately benefit the bottom line of the Church, and have dramatic impacts upon the environment as well. As Stewards of Creation, the lessons that you will share with others, will leave positive impacts for generations.

I wish you nothing but success and thank you for letting us be a part of the process.

Sincerely,

David Patterson

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