

June 30, 2022

Cooling Older Buildings Cheaply

Hot and humid air is miserable for human comfort—deadly, even. That’s why, with summer upon us, Canadians are all looking at ways to beat the heat and stay cool within our buildings. Before chasing the newest technology (provided you can even afford it) it is worth considering the unique ways that some buildings can cool naturally, as well as quick and easy ways to keep the heat out.

Cooling by Design: Smart Old Buildings

Many Church buildings are designed to enable natural cooling. In last month’s blog [‘Level up the energy efficiency of your building: Control air leakages’](#), I wrote about the ceiling vents found in many old faith community buildings and how these should be air sealed and insulated, so as to prevent heat loss in the cold weather. However, these ceiling vents actually benefited the building in the hotter months (pick your poison?). Their initial purpose was to cool the building down by creating a chimney effect to draw the hot air up. At the bottom, since we need a supply point, this was typically the windows along the sides of the sanctuary where the congregation gathered. These are hopper-style windows in the bottom of the stained glass (opening from the bottom hinge), or sash windows, that slide upwards. This cooling system would pull air across the congregation and then be sucked out the hole at the top. So if you can make those holes airtight in winter, and still operable in summer (just like normal doors and windows), then you can use the design to your advantage.



*A pretty fresh air inlet that is also stained glass
-St. Lambert United Church, Saint-Lambert, QC*



*A pretty exhaust chimney, that is also a steeple
-St John the Evangelist United Church, Crapaud PEI*

No sweat ways to keep it cool

Whether your building was built a century ago or a few decades back, there are several ways to cool your building that don't involve spending a lot of money. Take a look around your building, and you will be surprised to find many design elements that help with cooling.

Try opening doors, especially on the north side and front and back of the building, to help create a supply source of air. If you have an attic hatch, a door to a tower, minaret, or steeple, opening the access point in the summer will create the draft and exit point in your building. This natural ventilation also called the stack effect or chimney effect works pretty well. This will, of course, pull hot summer air in, but the breeze itself can create a cooling effect.

Tip: Staying safe is always more important than a nice breeze. Do remember, that if people are crawling around in the attic, or up on old ladders that safety must come first. Ensure to always consider the safety risks beforehand.

Make sure to insulate the attic. Insulation protects from the heat in the summer, and the cold in the winter. The more insulation in the attic, the more comfortable it is in the summer and in the winter.

Ceiling fans in the sanctuary should be running in the summer. This is the simplest, low-cost mechanical step to take first. We actually want the fans blowing down on us so we feel a breeze on our skin. This does seem counterintuitive since the hot air is up there, but it is actually the movement of air across our skin from a fan that makes us feel cooler, through transpiration.

Tip: Only run the fans while people are in the building, and let the stack effect work on its own. Another trick is to flush the building out at night by opening windows, and hatches, and closing them all up during the day. This can cool a building, including your home, and helps reduce the need for mechanical interventions.

When all else fails

The above recommendations are great ways to save money, relieve your community of the hot scorching weather, and reduce the need for mechanical cooling in your building. However, the likelihood that any of these tips will completely eliminate the need for mechanical intervention is rare. With the effects of global warming, some of these recommendations may not be as efficient and even backfire in certain regions with high humidity. This is an issue that is experienced more and more across the country, so it is important to pay attention to your local weather beforehand and make a suitable judgment call.

But what kind of mechanical intervention is beneficial? Well, we've discussed before the use of heat pumps in faith community buildings as a way to save energy in the winter; but they also provide much more efficient cooling in the summer as well. The old window air conditioner you may have in the office is a beast and costs you a lot of money to run. Switching it out for a heat pump, and maybe ceiling fans in offices and rental spaces will be worth the upfront cost as they will pay for themselves quickly in happiness. I worked with one congregation who was putting heat pumps in just to make sure their administrator didn't quit because it was too hot in her office in the summer!

By understanding your building better you can make better energy and environmental decisions moving forward. Start with free guides that we have on our [website](#). The DIY Faith Building Energy Audit Guidebook and the Energy Star Action Workbook for Congregations are amazing resources you can download, read, learn, and even take action for these free resources!

You can also utilize our professional knowledge with virtual [Green Audits](#) that look at energy, air quality, food, water, waste, maintenance, rental agreements, heritage, and much more.

The more you can learn about your building, the more you can save energy, minimize maintenance costs, and maximize the usage of your amazing faith community building.

Faithful Footprints Program

The United Church of Canada (UCCan) [Faithful Footprints](#) program offers grants, tools, and inspiration to help its congregations reduce their carbon footprint. With UCC's commitment to reducing its greenhouse gases (GHG) emissions by 80% by 2050, this one-of-a-kind program offers up to \$30,000 in grants toward energy conservation and renewable energy projects (conditions apply).

[Faith & the Common Good](#) is the delivery partner for UCCans Faithful Footprints program. To date, we have engaged over 200 UCCan congregations, camps, and buildings across the country. Your participation in the program puts your faith into action and helps UCC reach its target.

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May 10, 2022

Level up the energy efficiency of your building: Control air leakages

We have been trained to think about energy efficiency best practices for buildings in terms of improving insulation. It's an easy enough concept to understand because we can experience heat loss personally. For example, on a cold day, if you don't have a thick enough coat, you feel cold. It follows that more insulation will keep us warmer in colder weather. However, we often overlook other influences that affect energy efficiency, such as air leakage. If you have ever had the wind blowing up under your coat in winter, chilling you to the bone, you can probably envision the impact of air leakage as it relates to your buildings; a similar experience occurs when cold air enters through unsealed or exposed gaps. In addition to causing discomfort, air leakages in winter can create massive heat loss as well as condensation, resulting in damage to the building itself.

Many faith community buildings are made of materials like stones, blocks, bricks, and plaster. These 'heavy' buildings are considered thermally massive, as they perform differently than our thermally insulative homes (having insulation in the walls). Thermally massive buildings act like energy batteries; they store heat in the masonry and then release it when the temperature drops. This process helps effectively regulate the indoor climate of the building. This is why tile floors on the north of a building feel cool. The tile floors remain cool because they don't get warmed by the sun. By contrast, a stone path on a sunny but cold spring day feels really warm.



Old ceiling roundel at Calvary United Church in London, ON

Air Leakages – A Loss of Hot Air

In many houses of worship, if insulation isn't the issue, then air leakage is usually the main reason for heat loss. Since hot air rises, the taller the chimney the greater the draught. Typically, faith buildings are REALLY tall, often with a taller chimney attached to it, called a bell tower/spire. These

chimneys are so tall that the leaking air is sucked out of the holes at the top of the ceiling or into the tower. This air leakage can be measured as cubic metres of air per minutes.

This means (jokingly) that you might as well be standing under the chimney with the collection plate until all the \$20 bills are sucked up to plug the hole, because that's how much it's costing you!

The point is, the conditioned air is not where it needs to be. Instead, this air is exiting from around attic hatches and doors to the bell tower, and through old ceiling roundels. The image depicted above is an old ceiling roundel, and is basically a four foot diameter hole in the ceiling straight to the attic. This roundel is causing a large amount of heat to escape from the room to the upper attic. I've seen a church that had two – eight foot roundels in their sanctuary. Can you Imagine how much heating dollars were leaving those open holes out to the sky?

Plug it up!

There are several ways to reduce heat loss in faith buildings. For one, air sealing the holes in the ceilings, attic hatches and doors to attic spaces, is extremely important in saving energy. In the attic, consider installing an air barrier across the access, and then adding in some insulation. Batts of insulation in black garbage bags can be an easy and lightweight way to safely take care of this. The bags stop the air leakage, and the insulation adds thermal value to the hole. For attic hatches and doors, it is important to make sure they are tightly sealed. The same goes for doors; add weatherstripping and latches. You will see dramatic savings in your energy bills and a significant reduction in your building's total carbon output. With the carbon you reduce and the money you save, you'll be making a difference in your climate action goals.

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March 8, 2022

LED Lights – A Bright Idea for Your Faith Building

Light Emitting Diodes, also known as LED lights, have become commonplace at home, but not so much with houses of worship. It's time that this changes.

For a bit of history, LED lights have been around for almost 100 years, however it wasn't until the early 2000's that we started to see them really being used. Where did we see them first? Christmas lights of course! The use of LED Christmas lights drove the cost per bulb down dramatically enough that the economy of scale picked up and we were spotting them more and more in fixtures of various kinds. Since then, incandescent bulbs are hard to get, and hazardous, mercury-containing compact fluorescent bulbs are on their way out. LED lights have been filling all the gaps within the lighting world today.

But wait, weren't the old bluey-white LED Christmas lights ugly? Certainly! That blue-tinged white is referred to as a cool colour, while the yellow tinge we are familiar with from incandescents is referred to as warm colour bulbs. Fortunately, nowadays, you can buy warm or cool colour LED bulbs to meet your lighting needs. New and improved bulbs have also resolved the issue of brightness, as the old LEDs were not as bright as the incandescent bulbs.

So why should faith community buildings switch to LED lights? Well, what really drives the goal of using LEDs is energy and cost savings. Changing your faith-building lights to LEDs will pay for themselves easily and quickly. As you can see from the chart below, the savings on replacing your bulbs with LEDs is huge, and the payback can be measured oftentimes in months or even sooner (for example, 40 Watt exit lights have the potential to pay back in several weeks). With such large spaces, faith buildings can see drastic reductions in their energy usage when transitioning to LED lights.

From an aesthetics perspective, faith buildings can improve visibility, with brighter bulbs (lumens) as well as purchasing color-changing LED light bulbs (super popular on TikTok), which work via WiFi on any smartphone. This allows congregations to create cost-effective "stage lighting" in their spaces, for holidays, special events, or rentals.

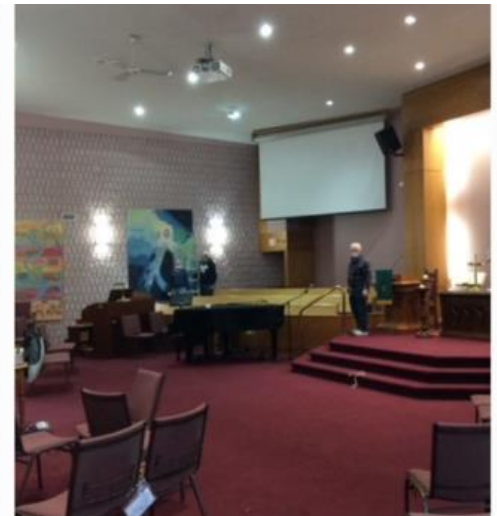


Image courtesy of <https://www.forbes.com/sites/kateharrison/2015/07/21/this-startup-is-helping-consumers-navigate-the-new-era-of-led-lighting-and-they-can-help-you/?sh=3b28dedc49c9>

Getting Started

Well, how does my congregation get started, you may ask? In the worship space, I always recommend changing all of the lights at the same time. This is because if you change lights at different times, there will be noticeable differences in the colour and warmth of the various types of lights. Although this isn't as important in other rooms, for the worship space and sanctuary, such disharmony is not ideal. [Faithful Footprints](#) participant, Trinity-Providence United Church in Bobcaygeon, Ontario, avoided this problem by installing new LED lights not only in one room but throughout its entire building.

"Now that we have LED lighting throughout our church, our church is a much brighter place!" - Armand Hachey, Co-Chair of Property at Trinity-Providence United, Bobcaygeon, ON



Trinity-Providence United Church installing new LED lights throughout its entire building.

For many congregations, changing lights can be done in-house, with worker bees, no need for professional assistance. New fixtures for the 2-foot and 4-foot fluorescent tubes are designed so that only the bulb needs changing—no messing around with ballasts or fixtures.

“We purchased 14 new light fixtures for the Parlour and Choir Room. Some of our Congregation members installed these new lights at no cost” - Paul Brown, Chair of Trustees & Property Committee at Palmerston United, Palmerston, Ontario



Before and After results of Palmerston United Church replacing light fixtures and installing LED lights.

Note: Please make sure to safely dispose of old fluorescent tubes and CFLs.

From Christmas lights to homes, LED lights can also be part of your congregation’s climate effort in becoming more energy-efficient. Pick a space in your building, and begin your transition today!

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