

Roof replacement and insulation upgrade

July 25, 2022

Summary

The Sanctuary roof needs repair. It's leaking over the balcony/crying room, causing damage where the Sanctuary building meets the CE building, and the shingles have reached the end of their life. Because we'll be doing significant work to the roof, this would be an ideal time to add insulation.

The furnaces serving the Sanctuary and Suthwyn Hall will need replacing next year. If we add insulation to the Sanctuary roof, we can reduce the number of furnaces we need, thereby reducing the cost of replacement.

Adding insulation and renewing our heating system will reduce our carbon footprint by about 16 Tonnes per year.

Recommendation

The Building and Property Team recommends replacing the shingles on the Sanctuary roof, building a bridge roof between the choir room and the CE Building, and repairing the roof over the Sanctuary entrance/balcony during the summer of 2022. The cost to do this, including taxes, would be \$60,200.

Because we are removing the shingles and exposing the decking, it is an ideal time to add insulation to the roof. We propose adding blown cellulose insulation to the rafter chambers and adding one 2-inch layer of foil-faced polyisocyanurate foam board (Enerfoil) to the surface of the roof to increase the R-value from R-7 to R-25. Insulation will be added to the attic spaces above the choir room and the narthex to increase the insulation value to R-50. Based on recent quotations and approved grants and rebates of \$10,200, the additional cost for insulation, including taxes, will be about \$82,800.

Total cost for the project, including taxes and rebates, will be \$143,000.

Note that we have the option to add two layers of 2-inch Enerfoil to the roof, increasing the insulation to R-37. Total cost for this option would be \$164,200.

Future impacts

Next year, we will recommend replacing the furnaces serving the Sanctuary and Suthwyn Hall with air source heat pumps, as we are doing this year in Yale Hall. If we increase the insulation as described above, we will be able to reduce the number of heat pumps/furnaces required from four to two. Based on this year's costs, and adjusting for

anticipated cost increases of 10%, as advised by our contractors, the cost to replace the furnaces will be about \$70,000 plus taxes.

If we choose to only do the required roof repairs and not add insulation, we will have to continue to use four furnaces/heat pumps for these areas. Costs would be about \$120,000.

If we add insulation as above, and replace our furnaces as above, our annual energy savings will be about \$660 based on 2021 energy prices. We will reduce our carbon footprint by about 16 tonnes per year.

Background

On July 25, 2022, the 44th General Council of the United Church of Canada issued a statement which begins,

The United Church of Canada has committed the whole church to the aspirational goal of an 80% decrease in carbon emissions by 2030.

This daring public commitment galvanizes every part of the church into common action to address the climate crisis, now become climate catastrophe. The new target accelerates a 2018 commitment that called for an 80% reduction by 2050.

<https://united-church.ca/news/united-church-canada-adopts-bold-new-emissions-reduction-target>
retrieved July 25, 2022

TMUC has a history of caring for the environment and planning for the future. We recognize that taking action that reduces our energy use provides for long term savings in operating costs.

The most recent part of our journey to make our building a greener space starts with the insulation of Yale Hall in 2012. In 2017, we completed our major renovation of the CE Building, ensuring it incorporated the latest technology in low-energy lighting and heating. In the ensuing few years, we've updated the lighting in our Sanctuary and Yale Hall to LED lighting.

These projects were completed while dealing with other planned,

Our green plan	
2012	Insulate Yale Hall
2017	CE renovation incorporating LED lighting, mini-split heat pumps, and an ultra-high efficiency boiler
2019	First draft of our Environmental Policy
2020	LED lighting in Sanctuary
2021	LED lighting in Yale Hall
2021	Adoption of our Environmental Policy
2022	Replace three furnaces with two air source heat pumps (Yale and Springfield Halls)
2022	Add insulation while doing necessary roof repairs
Next steps	Replace four furnaces with two air source heat pumps for the Sanctuary and Suthwyn Hall, assuming we improve the insulation
	Add insulation while repairing the stucco siding
	Install solar panels

and unplanned, building maintenance projects. In 2018, the foundation of the Sanctuary building needed \$60,000 worth of repair to deal with ongoing basement flooding issues. Also in 2018, most of our furnaces failed their annual inspection and we had to pay several thousand dollars to replace heat exchangers in all of them.

Currently, we're in the middle of a project to replace the furnaces serving Yale Hall and Springfield Hall with cold climate air source heat pumps backed up by 98% efficient gas furnaces. This is being done at no cost to the congregation, being fully funded by a Manitoba Building Sustainable Communities grant, the United Church of Canada's Faithful Footprints program, and a rebate from Efficiency Manitoba.

Throughout our green journey, we've taken advantage of incentives and grants. Manitoba Hydro and Efficiency Manitoba rebates made significant contributions to our LED lighting. We continue to look for funding and rebate opportunities.

It's now time to take the next step in our journey.

Roof replacement and needed repairs



Our shingles were last replaced in 1999. The consensus opinion from several roofers is that our existing shingles need to be replaced this year. This is an opportune time to improve the insulation in our roof because the old shingles will be torn off, giving relatively easy access to the underlying structure.

The existing roof has 2 inches of rock wool insulation in the rafter chambers with an insulation value of R-7. The attic space above the

choir room and narthex have about 5 inches of rock wool and fiberglass for an insulation value of R-15. For reference, new construction generally provides an insulation value of R-40 or higher.

We have recently calculated the heat loss for the building, and have calculated that heat loss in the Sanctuary on the coldest days is about 150,000 BTU/h. More than 1/3 of this heat loss is through the roof.

Construction of the CE Building in 1964 created a valley in the roof between the old and new buildings. This created an ice dam problem which in turn has caused damage to both buildings. We need to add a bridge roof to extend the flat roof of the CE Building to the peak of the roof over the choir room, eliminating this valley.



Grants, rebates, and cost savings

There are programs available to help offset the cost of adding insulation to a building. These offsets would not be available if we were to just replace the shingles and repair the roof as in option 1 below.

Efficiency Manitoba will provide a rebate of about \$8,500 if we upgrade the Sanctuary roof insulation. Efficiency Manitoba will cover 70% (\$1,700) of the cost to insulate the attic spaces above the choir room and narthex. Total Efficiency Manitoba rebates are \$10,200.

Options and costs

This year

	Option	Initial cost	Offset	Final cost
1	Replace the shingles, construct the bridge roof, and repair the roof over the Sanctuary entrance/balcony. Do not insulate and remain at R-7.	\$60,200	none	\$60,200
2	Do everything in option 1, add insulation above the choir room and narthex, and blow cellulose insulation into the existing rafter chambers to increase the R-value from R-7 to R-13.	\$85,000	\$10,200 (Efficiency MB)	\$74,900
3	Do everything in option 2, and add one layer of 2-inch Enerfoil board to the surface of the roof to increase the R-value from R-7 to R-25.	\$153,200	\$10,200 (Efficiency MB)	\$143,000
4	Do everything in option 2, and add two layers of 2-inch Enerfoil board to the surface of the roof to increase the R-value from R-7 to R-37.	\$174,400	\$10,200 (Efficiency MB)	\$164,300

In addition to the above offsets, options 3 or 4 will provide an ongoing savings in our energy use of about \$350 per year, based on 2021 energy prices.

Next year

We currently have four furnaces serving Suthwyn Hall and the Sanctuary. The heat loss in these areas is too high for two furnaces to manage.

These furnaces are nearing the end of their lives. In fact, one of the Suthwyn Hall furnaces has been out of service for over a year. It's getting hard to find parts for these older units and we would like to plan now to replace them, rather than scramble to replace them should one of them fail.

The single furnace in Suthwyn Hall is sufficient most of the time. However, we monitored this furnace during the coldest weeks of January and February of 2022, and found that at times it was barely able to keep the area at 16°C. This wasn't a problem because there was virtually nothing going on in Suthwyn Hall at that time. Had we needed to heat the area to 20° or more, it would not have been possible.

Because of the volume of the Sanctuary and the lack of insulation in the roof, we need two furnaces to serve this area.

Insulating the roof with at least one layer of 2-inch Enerfoil will allow us to reduce the number of furnaces required from four to two. The heat loss in the sanctuary will be reduced from 150,000 BTU/h to 110,000 BTU/h. Reducing the heat loss in the sanctuary has an impact on the heat loss in Suthwyn Hall because there is no insulation between these two spaces. Insulating the Sanctuary roof will allow us to heat these two spaces with two furnaces, thereby cutting replacement costs almost in half.

If we don't insulate, replacing all four furnaces would cost at least \$120,000 based on today's prices and allowing for the 10% cost increase that contractors have told us to expect.

If we do insulate, reconfiguring the ductwork and replacing two furnaces will cost about \$70,000.

Grants and offsets

Ongoing

We are currently replacing the three furnaces serving Yale Hall and Springfield Hall with two cold climate air source heat pumps backed up by 98% efficient gas furnaces. The total cost for this ongoing project is \$70,000. We have secured grants and rebates of \$70,000. This project will be completed at no cost to the congregation.

This year

We have secured \$10,200 in rebates from Efficiency Manitoba for our roofing project. We have applied for a \$50,000 grant for this project, but have not yet been approved.

Next year

Efficiency Manitoba has a rebate program for cold climate air source heat pumps. This would contribute about \$10,000 to the replacement of the furnaces serving the Sanctuary and Suthwyn Hall.

One of the funders that contributed to the furnaces in Yale Hall suggested we should apply again next year, and ask for more money this time.

We continue to look for funding partners. Currently there is about \$70,000. in the Building Fund (after the amount owing on our remaining loan with the United Church of Canada.)

Benefits

Reduced costs and maintenance

Insulating the Sanctuary roof will allow us to shut down one of the furnaces serving the Sanctuary.

When we replace the furnaces serving the Sanctuary and Suthwyn Hall, we will be able to install more appropriately sized units, thereby allowing them to run more efficiently.

Reducing this portion of our mechanical system by half will reduce the opportunity for mechanical failure by half.

If we do option 3 or 4 above, we estimate that heating costs will be reduced by about \$350 per year.

Demonstrated commitment to the environment

Option 3 or 4 will immediately reduce our carbon footprint by about 3 to 4 tonnes per year.

If we are able to replace our furnaces with cold climate air source heat pumps next year, we will reduce our carbon footprint by a further 16 tonnes per year.

This project will help the United Church of Canada meet its goal of an 80% reduction in carbon emissions by 2030.

TMUC's Environmental Policy, approved by the congregation in March of 2022, begins,

Background

A New Creed

The United Church of Canada's New Creed calls us *to live with respect in Creation.*

Creation, including our Earth, is a gift from God. To show our respect for God, we must treat the gifts that God has given us with respect. This is part of our spiritual commitment.

TMUC's Mission

As a Church, we seek justice, foster and nurture growth by teaching, worshipping, through music, sharing and being welcoming to all. We value and share our gifts, protect the earth and walk humbly with our God.

In recognition of our spiritual commitment to live with respect in creation, our church community has made the commitment to protect the Earth.

Environmental Policy Statement

Every action that TMUC takes will be taken with consideration of that action's impact on the environment. We will strive to

- minimize our negative environmental impact
- maximize our positive environmental impact
- advocate for positive environmental change
- continually improve this Environmental Policy

Taking this action will demonstrate our commitment to our Environmental Policy.

Other benefits

The AC unit on the furnace that we shut down can be repurposed for the time being to provide cooling in Suthwyn Hall. There would be an added expense to reconfigure the ductwork.

The Sanctuary will be more comfortable because of more even heating and cooling.

Future plans

It's obvious that the stucco siding on our building needs repair. This would be an opportune time to improve the insulation in the walls. There is a six-inch space in our stud walls with 2 inches of rockwool insulation. Blowing cellulose into the stud spaces would make a significant improvement to our insulation.

We have a large, south-facing, steep roof that happens to be almost the perfect angle for a solar panel installation. We also have a large, flat roof on the CE building that is also amenable to a solar installation. We will continue to look for funding opportunities to subsidize the installation of solar panels.

Submitted on behalf of the Building and Property Team



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