

## Green Leaders for the Community:

### Installing Geothermal Heating and Cooling



With a vision to lead the transformation to a carbon free future, The United Church in Meadowood (UCiM) is replacing our aging natural gas heating system with a Geothermal/Ground Source Heat pump system. This fossil fuel free technology will provide reliable heating and cooling all year round while reducing our green house gas emissions for heating and cooling to zero.

*Goals: Addressing  
Climate Change and  
Inspiring Action in  
Others ~ Creating  
Hope*

This greening project has three goals: to address the climate crisis by reducing harmful emissions, to ensure the building continues to serve the community with accessible and affordable space, and, to serve as a visible model to demonstrate possibilities and inspire action from others. UCiM is well placed to achieve these goals. The congregation has the essential strength, expertise and commitment. The church is a known and trusted pillar of the community, and the members of the congregation are well connected in the broader

community. Collectively and individually, as we tell our story of positive response to the climate dilemma that seems overwhelming, we are confident we can contribute to shifting culture away from despair toward positive action.

### UCiM is a Centre for Community

The United Church in Meadowood is a vibrant, multi-aged congregation serving the community of South St. Vital in Winnipeg. We currently have 235 sustaining families and serve more than 350 families with pastoral care and support. We are a progressive, diverse and welcoming congregation where *all* people find a sincere welcome. There are no ideological or theological barriers limiting participation in our services and programs. We offer programs open to all the community, for all ages, including recreation, special events, concerts, crafting, meals, day camp and others. Our outreach projects support poverty

relief locally and in the inner city and we have taken leadership in education and advocacy for social inclusion and social justice for the vulnerable.

UCiM is a centre for community. The congregation partners with many organizations to make community services available. We are a vital community hub. The building is used extensively through out the week by groups including: Youville Centre (Baby and Me), Meadowood Senior's Club (with programs almost every day), Embers (formerly Brownies), Collège Jeanne-Sauvé Choral program (Louis Riel School Division), Alzheimer's Society, St. Vital Art Group, and a variety of community choirs and music programs. Because of our size, flexible space and openness, we have welcomed people of various faiths, often from immigrant communities, when they need a space to hold large gatherings, including funerals and other ceremonies. Many of these users pay no or nominal fees as the congregation is committed to being a place to foster strong and healthy community. We have a large and lovingly maintained green space and garden which is frequented by our neighbours, including people from our direct neighbour, Dakota House, a large assisted living facility. Our parking lot is used for overflow parking by the neighbouring Collège, Community Centre and Dakota House.

*UCiM plays vital role for programs and social gatherings for the whole community.*

The congregation and the programs held in the building draw people from South St. Vital and beyond, including the expanding subdivisions to the east of us. As these new neighbourhoods are developed, the creation of community space is not keeping pace. Churches do not have the capacity to erect new buildings and publicly funded community space is limited. Increasingly, the United Church in Meadowood is playing a role like the historic churches in older neighbours as a location for programming and social gathering for the whole community.

The 14,000 square foot (1,300 square metre) building was designed with accessibility in mind with no stairs, an entrance at grade and a spacious parking lot. It was also designed with flexibility in mind. The part of the building which is used as a sanctuary on Sunday mornings is entirely flexible (chairs) and continuous with the fellowship hall so we are able to host community events of up to 400 people. We have a well designed kitchen which is used extensively.

## The Decision for Green Technology

A Congregational decision to install a geothermal system was made in April 2023 after careful evaluation of the options. The construction is anticipated to take 3 to 4 weeks during the Summer of 2024. The education to the wider community about options to address climate change has begun and will continue through out the construction period and beyond.

UCiM's building is heated by a system of 3 natural gas furnaces, augmented by localized electric baseboard heating. A roof top air conditioning unit cools the office area only. At 34 years old, these mechanical systems are at the end of their predicted life expectancy.

As temperatures rise, and are predicted to rise even more, the congregation realizes that without air conditioning in the large multi purpose space its use for community activities will be limited. For example, Canadian Blood Services no longer holds donor clinics in the building because it is not air conditioned.

There are two steps to the Geothermal Heat Pump project: the laying of an underground closed fluid loop that will collect and disperse heat according to the season, and the installation of a mechanical condenser system, consisting of 3 heat pumps, to extract the heat and circulate warm or cool air through out the building.

While the upfront costs of geothermal are greater than other options, the long-term operational costs are lower. In 2024 there will be a 25% reduction in operating cost over natural gas, even with additional air conditioning, by 2030 that reduction increases to over

40%, based on increasing carbon charges. **This reduction in operating cost will assist the congregation in continuing to host community groups for no or very low rental fees.** Also factored into the bottom line is the benefit of eliminating reliance on fossil fuels as a step to mitigate against the costly impact of changing climate. Our current natural gas furnaces produce 18 tonnes of GHG (Green House Gas) emissions annually. Conversion to a geothermal system will reduce UCiM's emissions for heating and cooling to zero.

Geothermal heating and cooling systems are in use all over the world for residential, commercial and industrial applications. While geothermal applications have been successfully operating in Canada for nearly 50 years, this green technology is still not well

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known, although awareness is rapidly growing as people are perceiving the need to meet carbon emissions reductions. Once geothermal applications become more common, the initial costs will drop, just like solar which was once prohibitively expensive in some jurisdictions is now cheaper than electricity produced by other means. Until geothermal costs are lowered, investment by civil society and government is essential to support early adopters, who can publicize and evangelize for the technology.

## The Construction Process

UCiM engaged Geoptimize, an internationally recognized leader in the design of Geothermal systems, to conduct an initial feasibility study, measuring the energy needs of the building, assessing the geology of the lot and providing a preliminary design. They concluded the 2 acre (8400 square metre) site is suitable and that the current forced air ducting adequate for geothermal.

The plan involves laying a closed loop, 10 metres (33 feet) underground under the parking lot and back yard using horizontal drilling. A small trench will be opened and the piping is installed without needing to disrupt the surface at all. Many of us shake our heads in wonder at this technology, but it is common now and is utilized in road construction and pipeline construction all over the world. The loop will enter the building in the mechanical room in the basement, just as the current natural gas pipe does. The pipe will be filled with a benign anti-freeze solution. After installation the trench will be back-filled, the sod replaced and no sign of the loop will be visible. It would even be possible to construct a building overtop of the loop in the future. The loop has a life expectancy of upwards of 75 years.

In the mechanical room, the existing furnaces will be dismantled and replaced with 3 heat pumps. The heat pumps

## How Geothermal works

In the winter, geothermal systems collect heat from the ground which is at a stable temperature of about 6 degrees. Inside the building, the fluid is compressed into a gas in a heat pump where the heat is concentrated, extracted, and sent into the building. Then the liquid, now cooled, is sent back into the ground to repeat the cycle. In the summer, the system is run in reverse, so the fluid absorbs warmth from the building and that heat is dumped into the ground.

Heat pumps are comparable in size to furnaces. The heat pump requires electricity to run the compressor, but it is a very small amount in comparison with heating and cooling a building with electricity only. The bulk of the energy needed for the heating and cooling comes free from the ground. In Manitoba, we are fortunate that electricity is generated from hydro dams and is fossil fuel free.

have a 25 year life expectancy. Adjustment will be made to the ducting and some electrical work will be required. A new computer control system will be installed along with new thermostats. The system will be tested and balanced during the commissioning process.

## Project Partners

The congregation engaged in a thorough education and discernment process leading to the decisions to become green leaders and undertake this project. As we have been spreading the word among our community partners and in the larger community the response is inspiring! People are keen on lending support to a project which holds out hope for a positive future.

Faithful Footprints, a partnership of Faith and the Common Good and the United Church of Canada, devoted to assisting in the reduction of our carbon footprint is on board. They have offered advice and encouragement and are committed to a \$30,000 grant. In meetings with Efficiency Manitoba, we have been encouraged to proceed and they too will provide grant assistance. Likewise, meetings with representatives of all three levels of government have resulted in endorsement and commitments to champion this project, including with funding.

*Urgent action is needed to care for Earth, a gift from Creator and our only home.*

## Reaching Net Zero by 2050 requires leadership now

The severity of the changing climate is impacting all of us and the need to make positive change is urgent. This conversion will enable the congregation to dramatically reduce our carbon emissions, which is essential to reaching Net Zero by 2050, the internationally agreed upon goal to address disastrous climate change. Equally important, this publicly visible project will serve as a motivator to others in the community to take emissions reducing actions in their homes and workplaces. We believe the need for leading by example is essential to help overcome climate anxiety and replace it with tangible hope-giving action.

“Living with respect in Creation” is a line from The United Church of Canada creed. This is a goal for the congregation. Earth is a gift from God, our Creator. Our task is to care for it and to equitably share its abundance in a sustainable way.

On the reconciliation journey with Indigenous people we are learning how significant respect for the earth is to accomplishing reconciliation. Over the last few years, we are being led to new understanding and action in light of this learning.

The economics of this project work because our heating system needs to be changed, our lot is large enough. we have a relatively new, well insulated building that does not require renovation to convert from natural gas, and a healthy congregation filled with many skilled professionals who are keen to provide leadership which is focused outward on the community.

Manitoba has a large amount of green hydro electricity, but it is limited. As we move to electric vehicles (new gas car sales end in Canada in 12 years) and attempt to lessen our fossil fuel consumption for heating, we must take every opportunity available to draw energy from sustainable sources other than hydro electricity. Hydro electricity should be used where other options are not practical. It would be a shame not to utilize this geothermal opportunity to lower emissions and increase the supply of energy in our community.

*A geothermal opportunity to lower emissions and increase the supply of green energy in Manitoba*

## Success of the project will be known when we see

- UCiM's building continues as a vital community asset, hosting activities and groups that strengthen healthy community;
- the Geothermal system is performing as expected and operational costs for heating and cooling are reduced;
- the congregation and community are well informed about the Geothermal option and are motivated to take similar action to reduce GHG emissions in their home, workplace and other community places.

