

St. Paul's UCC, Stoverstown
2173 Stoverstown Rd.
Spring Grove, PA 17362
Rural

Present building build in 1984 – founded in 1880 (dedicated the original church that year)
Worshippers – 60 avg.

Heating and Cooling of St. Paul's UCC, Stoverstown – changing our carbon footprint.

Urgency to do something: It was in late winter of 2009 when the heat pump for our Sunday School wing decided to quit after about 25 years of trouble free service. In the year or so preceding its demise two of the three air conditioning compressors for the Sanctuary went on the fritz. Add to that a cracked manifold on one of the oil-fired furnaces and we were facing a perfect storm of no heat, and not enough air conditioning. It was decided to look into repairs or replacement of the existing equipment and to seek out replacing everything with a geothermal system.

Action taken: The initial cost of the geothermal solution was greater than other solutions, however, our decision to take that route had a strong basis on the environment so the transition from fuel oil and all the emissions from our chimney directly into the atmosphere made sense. Our system is made up of 10 400' deep wells in the yard alongside the church. A continuous tube loops down and back up in one well and then onto the next and so on until all wells have the loop of tube. The wells were back-filled with a grout solution so all the tubes have direct contact with the ground for better transfer of heating/cooling of the ground to the loop. The tube then connects to our compressors in our old "furnace" room. A pump circulates a refrigerant solution through the 8,000 or so feet of tubing back through the compressors when heating or cooling is called for. The compressors use the rather constant (50 to 60 degrees) temperature of the ground, that is transferred to the solution, instead of outside air as would be used in a heat pump.

Fuel Cost Comparisons: In the years 2005-2008 we averaged using 31,795 kilowatts of electricity at a cost of \$3,500 and we also paid about \$3,500 for fuel oil, for a total expense of \$7,000. For the years 2010 – 2014 we averaged using 55,574 kilowatts at a cost of \$5,310.

Final thoughts: With this system we were able to remove all outside equipment (heat pump, three air conditioning units) and the large fuel oil tank buried along the building. We were also able to add air conditioning to our social hall which could get quite warm and muggy during the summer. An additional plus with geothermal forced air is the reduced temperature coming from the vents, and the cleaner (no oil fumes that were evident on occasion) air in the building. Our organ may also be operating better (fewer cyphers or other problems) because of the geothermal system. We do have to be more prudent on filter changes and on timing for heating or cooling as it does take longer to increase or decrease temperatures due to the vent temperature differences.

More Info?: A few pictures of the system are at: <http://bit.ly/2n20mZp>
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