Bethlehem Lutheran

Bethlehem Lutheran has cut their carbon by approximately 44% with the installation of a geothermal system. When they needed to replace their poorly functioning 30-year old air source heat pump systems, they wanted to do the right thing for the earth and for their budget. So when a parishioner left a generous donation in their will, Bethlehem decided to install ground source heat pumps to heat and cool their building. Bethlehem has six separate systems, covering the various parts of the building.

David Easton shows off the two 5-ton heat pumps sitting back to back, providing 10 tons of heating and cooling for the sanctuary. He says, “The unit these replaced was a huge contraption, sitting near the center of our basement utility room. These two units consume about a fourth as much volume, and sit off to the side.”

The new system cost them $99,000 after a $18,000 rebate from the utility. If they had replaced the old air source heat pumps with new ones it would have cost them only about a third as much. That seemed like a lot, but after figuring in the rebate and cost of comparable quality replacement equipment, plus the projected savings, everyone went for the ground source heat pumps.

They expect to reach payback within 10 years, and after that they will be saving on lower energy costs for the remainder of the 30 plus years the system is expected to last.

Pastor Hedding is pleased with the arrangement, “There will be more money to spend on ministry instead of heating and cooling the building. Plus the building is more hospitable because the temperature is more comfortable.”

Geothermal has a 97% satisfaction rating, the highest of all HVAC systems. The outlet temperature at Bethlehem is 100 degrees, so there is no “cold blow” of the forced air making your skin feeling cool. Neither is there a “hot blast” like with a gas heating system.

“This was a great choice for Bethlehem,” says David Easton, a member of the site development committee that did the research, “because it has always been an all electric building. We will experience even greater savings should the cost of electricity go up over time.”

Bethlehem Lutheran used to run out of hot water during large meals, such as their Æbleskiver dinner, with their old water heater.

Æbleskivers are spherical pancakes!

On-demand water heater on wall

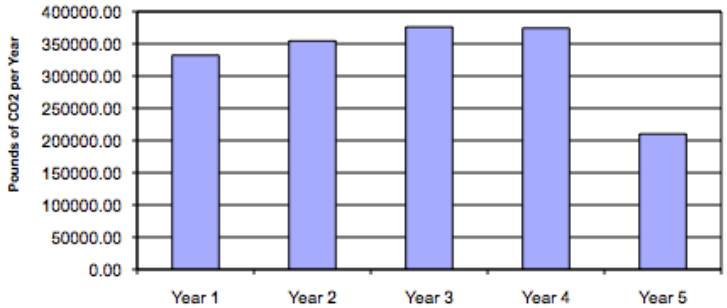
They recently completed the set-up of a "desuperheater" that extracts heat from the geothermal systems to pre-warm water that is held in their old hot water tank. The water is then supplied to their new 18 kW on-demand water heater as needed. The on-demand heater only holds one gallon, and does not heat water when not called for. So it's far more efficient. Now they never run out of hot water during their occasional big church dinners.

Bethlehem measured the carbon footprint of their building using the Cool Congregations carbon calculator before and a year after the geothermal system was installed. It shows how they cut their carbon by 44%. See graph below.

Progress Report

Bethlehem Lutheran

Total Carbon Emissions



Total Pounds of CO2	
Year 1	332200
Year 2	354420
Year 3	375980
Year 4	374220
Year 5	210100

Change from Prior Year	
Year 2	22220
Year 3	21560
Year 4	-1760
Year 5	-164120

Change from Yr 1	
Year 2	22220
Year 3	43780
Year 4	42020
Year 5	-122100

% Change from Yr 1	
Year 2	7%
Year 3	13%
Year 4	13%
Year 5	-37%

% Change from Prior Year	
Year 2	7%
Year 3	6%
Year 4	0%
Year 5	-44%

For more information on Bethlehem's switchover, email David Easton at djeaston@cfu.net.