



St. Charles Church & School

Energy Savings Project

Description

St. Charles is a combination of a church and school within one building. The school wing is about 40 years old. The church, originally on the south side of the school, caught fire and a new church was built north of the school wing. The old church was bulldozed and no longer exists. When the new church was built, ground source cooling was installed for the church only. The school has no cooling. The heat for both the school and church is provided by a hot water boiler.

Energy Efficient Features

- Efficient boiler for heating with hot water
- Floor heat in chapel area heats people and objects without heating air
- Geothermal cooling for church
- CFL instead of incandescent lights
- T8 fluorescent lights with electronic ballasts
- Uses one ballast for two fluorescent fixtures
- LED exit signs

Heating

Originally the heat was provided by a coal boiler which provided live steam heating. Later a change in fuel was made to natural gas in order to improve efficiency and lower operation costs. Later yet it was found that the 250 HP boiler was nearly five times more powerful than it needed to be. A 50 HP boiler from an old theater was purchased and changes were made to bring it up to code. Another 50 HP boiler was bought new as a back up. It was also decided that the difficulty in keeping up with steam trap repairs and replacements in the live steam system was not worth the effort and the system was changed to hot water.

The boiler from the theater now provides all the hot water for both the school and the church. In the school, the hot water flows through univent heaters to provide heat for that wing. In the church the water runs through its own heating coil in the air handler. The air handler forces warm air past the heating coils and through ductwork into different parts of the church. In the chapel part of the church there is also radiant floor heating. The boiler sends hot water through coils of tubing in the cement floor. This heats the floor and other objects in the chapel without having to heat the air. Radiant heating is considered to be very efficient in this application and provides a great deal of comfort to the people in the chapel.

Cooling

Cooling is provided for the church using the same air handler and ductwork as the heating. A separate cooling coil in the air handler cools the air by passing cool water through it. The cool water is taken from the ground where it is a steady 50 F to 55 F. This is commonly referred to as "ground-source," or "geothermal" cooling. Geothermal cooling is very advantageous in this case because it is using a natural source to remove the heat from the building. This is an efficient and environmentally friendly source of cooling.

Exit Signs

The exit signs in the school and church are all now using LED bulbs instead of incandescent bulbs. The LED bulbs use 90% to 95% less energy than the incandescent bulbs did. The reduced cost of maintaining the lights may be even greater. Incandescent lights did not even last a year and the cost of replacing them exceeded the cost of operating them for a year. LED exit signs can last for up to 80 years and therefore cost virtually nothing for maintenance.

Lighting

The new church wing of the building was built with efficient T8 fluorescent lighting and compact fluorescents (CFLs) instead of incandescent lighting. This was recognized as a better and more efficient method of lighting than what the school was using and a lighting retrofit was started in the school wing. Nearly all incandescents have been switched to self-ballasted CFLs. The savings were noticed immediately. Not only were the energy savings large but according to maintenance person Pat Merren "the labor savings are out of sight." Pat says that now instead of changing each bulb several times a year he changes them once every several years. He also added that after a few minutes warm up time, the CFLs are just as bright as the incandescents.

The T12 lights in the school are currently being changed over to T8 lights as the ballasts burn out. The lights are situated two bulbs per fixture and with the T12s there was one ballast for every fixture. In order to maximize the savings from a retrofit, Pat has been using electronic ballasts made to handle four bulbs. He then uses one ballast for two fixtures by running wire to the other fixture. This is cutting the number of ballasts in the school in half making the retrofit much more affordable. The four bulb ballasts also use less energy per bulb giving additional energy savings. The benefit of using the electronic ballasts required to run 32 Watt T8 bulbs over the magnetic ballasts which run 40 Watt T12 bulbs is not just a reduction in bulb wattage. The electronic ballasts themselves only take 1/4 to 1/2 of an amp to run compared with the magnetic ballasts which took 5 to 7 amps. The results are a large reduction in electric consumption in the school.

For further information pertaining to this Energy Project or similar projects contact:

St. Charles Church & School
Pat Merren
505 S. Lafayette St
Greenville, MI 48838
(616) 754-4194

Feel free to contact us if you have any ideas for case studies or other questions :

Michigan Energy Office, Dept. of Labor & Economic Growth
P.O. Box 30221, Lansing, MI 48909
Phone 517/ 241-6228 Fax 517/241-6229
Or Tim Shireman at tashire@michigan.gov

