

West Chester University: Long-Time Leader in Green Energy

Background

West Chester University has one of the largest geothermal exchange systems of any university in the country. In the early 2000s, the coal-fired heating system was in need of repair. When faced with the choice of upgrading the current system or replacing it, WCU opted for a greener alternative. The transition to geothermal began in 2005 and concluded in 2009 with the installation of the district system. Today, the university has five independent systems that are connected to individual buildings as well as one district system that is connected to 12 buildings.



1 Inside WCU's Geo-Exchange Pump House

How Geo-Exchange Works

Although “geothermal” is the word that is used most often in our area to describe heating systems that capture heat from below the frost line and transport it via water into a building as a heat source, this system type is more accurately called “geo-exchange”. By pumping water through pipes, heat can be exchanged and released or removed from a building depending on seasonal needs. Water is then stored in underground wells until it is eventually recirculated. One common misconception is that geo-exchange drains the water table. These systems utilize municipal water, and the water is only used to transfer heat. The soil around the wells is meant to be kept at a constant temperature, and many systems (the WCU one included) have a cooling tower where water is sent before returning to the soil. This ensures that the subsoil does not become overheated.

Benefits

The benefits of this project have been enormous. An initial study estimated that WCU would save over \$1 million per year in heating and cooling costs, with a projected payback of 29 years (although it will likely pay for itself sooner than this date). The campus has been able to reduce their total carbon emissions by 1/3. WCU now uses 95% less fuel oil than before the installation of its geo-thermal system. These changes come despite a 15% increase in the student body and a 20% increase in building space, making them even more impressive. The WCU campus has been able to save 40% on heating and 20% on cooling overall (many buildings on campus are not connected to the geo-exchange system).

Funding

The project as a whole cost \$33 million and received funding from both federal and state sources:

- \$6M from PA DGS
- \$252K from PA Energy Harvest Grant
- \$300,000 Congressionally directed grant via Congressman Sestak
- \$558K DOE ARRA grant
- \$4.142M DOE FY2010 appropriations grant
- \$1.5M West Chester University Funds
- \$15.1M PA DGS funds (awarded 2012)

Advice and Considerations

Part of the success of this project was its timing. Starting construction after the 2008 recession meant that there were lots of funding opportunities, both at a state and federal level. Today, many of these types of funding are once again available.

West Chester University's geo-exchange system is a great example of the financial as well as environmental benefits of making a large-scale switch to greener methods of heating and cooling.

More Information

- [This map](#) shows the extent of the geo-exchange network on campus, including which buildings are connected to the district geo-exchange system.
- You can watch a [brief video](#) on the University's Geo-Exchange system and how it helps the University meet its goals for carbon neutrality.