

University To Use Earth's Temps To Heat Its Buildings

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[All Things Considered](#)



Georgia Perry

Machinery and pipes cover the muddy ground at Ball State University's geothermal heating/cooling construction site.

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In northeastern Indiana, environmentalists are closely watching a project on a scale that hasn't been attempted before in the United States. Ball State University is constructing the largest geothermal heating and cooling system of its kind — and promises to cut its carbon emissions in half.

Here's how it works: A few dozen feet below the Earth's surface, the temperature is between 52 and 55 degrees Fahrenheit. Depending on the time of year, geothermal systems use the Earth's temperature as a heat source — or sink — by sending water through miles of pipes and concentrating it to meet the temperature the thermostat calls for.

Ball State is attempting to use more than 660 acres to heat and cool nearly 50 buildings.

'This Is A Major, Major Change'

Drills the size of tree trunks punch through dirt, clay and limestone to create a polka-dot pattern that stretches over land equal to a half-dozen football fields. One of the 400-foot-deep holes could heat and cool a house. But 4,100 of the holes will take care of the entire campus.

Project engineer Jim Lowe says there's still a gee-whiz reaction to geothermal in a state where more than 95 percent of energy needs are met through coal and natural gas.



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Jo Ann Gora, president of Ball State University, says when the school tried to replace its four coal boilers, the \$50 million estimate led to sticker shock. So university officials started thinking creatively.

"They still think of it as technology that's strange, but it's not," he says. "This is a major, major change. Instead of thinking about building boilers and using coal and natural gas, we're shifting that paradigm to where we're relying on a renewable energy source here."

When the Muncie, Ind., school originally tried to replace its four Eisenhower-era coal boilers, Ball State President Jo Ann Gora says a \$50 million estimate led to sticker shock — and that's before factoring in the cost of coal. So the school started to think outside the smokestack.

"It really shows that America has renewable energy sources if you just have the will to use them," she says. "We're using the renewable energy that the ground represents. Buildings rest on the ground. The ground is the source of renewable energy. Why don't we use it?"

Unlike wind and solar, which don't operate efficiently 24/7, geothermal systems are on all the time. But each one must be installed on-site, meaning it would take thousands of these projects to equal the heating and cooling power of just one coal plant.

Financial Hurdles

Jim Huddleston manages the project he says will keep 80,000 tons of carbon emissions from the skies above Muncie. But he says the initial cost of geothermal is steep and that keeps many from digging deep into their pockets to pay for it.



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Mark Tucker releases steam from a coal-burning furnace in the Ball State University coal plant. In coal-fired boilers like these, steam is used to turn turbines, which produce electricity.

"Problem is, when you and I go to buy a house and I need every penny I have to get that down payment and to get the fixtures that my wife wants and put these curtains up — and we don't spend the extra 30 percent," Huddleston says.

It could cost Ball State as much as \$80 million to build the system. But officials estimate energy savings of up to \$2 million a year. And right now, even with \$40 million from the state and \$5 million in federal stimulus funds, Ball State has raised just over half the money it needs. Despite the financial hurdles, Oregon Institute of Technology professor John Lund says Ball State will show that large-scale geothermal is a viable resource.

"There are probably over 50 schools that have heat pumps, but this would be the largest," Lund says. "It does show that it can be done on a large scale — i.e., this can be done all over the country, from North Dakota down to Florida, from Maine down to Texas.:

Across Ball State's campus, Mark Tucker dumps coal into an enormous boiler, which rages at 1,800 degrees Fahrenheit. He says they go through 130 tons of coal a day among the four boilers.

It could take five to 10 years for Ball State to complete this project as the school moves forward to tap the Earth for its heating and cooling needs.