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Brooklyn Park-based Bixby Energy invents process that superheats coal, separating it into gas, carbon

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Bixby Energy Systems Inc. is trying to clean up the coal industry's smudged image by superheating coal in a closed-loop system (above) and creating synthetic natural gas to fire electric power plants (see pipeline at back right corner of plant). Founded in 2001, Bixby Energy Systems is headed by Robert Walker, who in a past corporate life founded Select Comfort Corp. The company just sold five Bixby Model 625 units to the city of Shanxi, China. (Graphic supplied by Bixby Energy)

Many environmentalists scoff at the idea of "clean coal," a term they describe as an oxymoron.

Maybe not. Robert Walker, who is best known for pioneering the Sleep Number bed sold by Select Comfort Corp., now says he's come up with a way to convert coal into synthetic natural gas — with a closed-loop system that superheats the fuel without burning it.

Walker founded Brooklyn Park-based Bixby Energy Systems Inc., which sold biomass stoves fueled by corn stalks, as a side business. He developed what's now called "the Bixby Process," which heats coal to 1,400 degrees in a sealed chamber.

At that temperature, the coal separates into synthetic natural gas and semi-activated carbon. The gas can be drawn off to burn at power plants; much of the carbon can be marketed, as well.

"It's a radical departure from the way people usually generate energy," said Walker, who is chairman, president and CEO of the company. "Our focus has been on coal because we're the No. 1 polluter in the world."

The company, which opened a plant in 2008 to manufacture equipment that produces gas and coal, announced this week that it had made the first sale of its patent-pending technology.

Advertisement And its announcement comes at a time when coal-fired energy, which makes up just over half of U.S. power supply, increasingly has come under fire from environmental groups and others who oppose greenhouse gas emissions from coal-fired electric plants.

The process sounds a lot like many gasification technologies. But, because no oxygen is present, the coal does not burn — dramatically reducing the amount of carbon formed and emissions produced during the process.

Many utilities, including Minnesota-based Xcel Energy, have installed natural gas-fired generation units as alternatives to coal plants or retro-fitted coal plants to operate as cleaner-burning natural gas plants.

Converting old coal plants to natural gas typically boosts efficiency from 35 to 65 percent. Walker claims that the Bixby Process can capture up to 80 percent of the power from coal.

So far, prospective Bixby Energy Systems customers have one choice — the Bixby Model 625. But they can arrange to get more than one unit.

Each Bixby Model 625 is capable of generating 6.25 megawatts of energy a day by converting 192 tons of coal into synthetic natural gas.

While conventional natural gas is capable of producing 1,000 BTUs per cubic foot, Walker said the synthetic gas produced by the Bixby Process has produced between 950 and 1,020 BTUs.

The company's system, which measures 10 feet by 15 feet and 50 feet in height, is available for lease on a monthly basis, he said. Compared to utility executives and policymakers in the United States, Walker said officials in energy-hungry China have been far more receptive to leasing the Bixby that U.S. government officials have been.

International expansion potential

Walker said the city of Shanxi, China, has ordered five Bixby Model 625s to fit into a building that eventually could house 10 units. If filled with Bixby units, the building would create enough natural gas to generate 62.5 megawatts of electricity per day.

That Shanxi order, which is worth millions of dollars, is part of the first wave of business that should bring smiles to the faces of Bixby Energy Systems' 1,800 investors.

"We're creating a whole new industry here," said Walker, who added that the purchase from Shanxi could easily be replicated in other Chinese cities.

He said Bixby Energy Systems is working with Beijing-based Global Partners United to contact coal and gas utilities in hopes of increasing the number of Bixby Model 625s in the world's most populous country.

And China is one of five countries that have expressed interest in using synthetic natural gas to supplement their energy.

Though Walker would not disclose the names of those countries, he said energy producers and governments from other countries already have visited Bixby Energy Systems' facilities. There

has been interest, although low profile, from representatives of coal companies and U.S. utilities that generate much of their energy from coal, he added.

“I’ve learned very quickly that the coal industry is a very complicated industry,” Walker said. “It’s become such a fallacy that we don’t even like to talk about clean coal.”

Backed by more than \$40 million in private investments, the nine-year-old company built a pilot system two years ago in North Wilkesboro, N.C., where research on the synthesized natural gas also takes place.

One of the more novel aspects of the Bixby Energy Systems model is that it doesn’t require the amount of infrastructure that conventional energy plants and coal mines require.

So Bixby Energy Systems synthetic natural gas units could be placed where they are most needed — near mines or pipelines that transport the gas.

“We think the evolution process is that most of our units will end up near the mouths of pipelines,” Walker said.

“With 70 countries having coal reserves, we think it’s a great transitional technology to convert that energy to gas while other technologies are being developed,” he added.

What about the cynics — those who say Walker’s story about transforming energy into a less-polluting venture is just talk?

“The coal companies say, ‘You must be using magic coal,’” Walker said. “But the reality is it just flat works. We have now gotten to the point where we don’t need to go out and evangelize these people about how these things work.”