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Boardman coal-burning power plant may have a future after all: biomass

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PGE is trying to decide whether to close its coal-fired power plant near Boardman, in Eastern Oregon, or convert it to burn biomass, which could be less of a problem environmentally.

Portland General Electric has three options for its Boardman power plant: close it, stop burning coal there, or make costly upgrades to clean up emissions.

Most of the debate about Boardman, Oregon's only coal-fired power plant and the state's largest single source of air pollution, has focused not on whether, but when, it should shut down. But the utility is looking at the possibility of keeping Boardman open by burning biomass instead of coal to spin its turbines.

They aren't the only utility considering replacing some of their coal with plant material, but they are among the few thinking about doing away with coal entirely by using biomass, said Christopher Wright, a research engineer and biomass energy specialist at the Idaho National Laboratory.

"In that regard, they are on the forefront of that thinking when we look out on the landscape," Wright said.

Coal-fired power plants in Europe, charged with reducing emissions of climate-changing gasses, are already replacing portions of their coal with wood pellets imported from British Columbia, the southeastern United States and elsewhere.

"Once the Europeans realized that that was a fairly cost efficient way to meet the goals for renewable energy standards, the demand started to grow very rapidly over the last four or five years," said Keith Balter, senior economist with Forest Capital Partners in Portland.

North America's pellet industry has grown from having the capacity to produce about 1 million metric tons in 2003 to an estimated 6 million tons last year, according to a recent U.S. Department of Agriculture study.

U.S. coal plant owners see similar regulations on the horizon, so utilities like **PGE** are considering mixing wood pellets with coal in their boilers.

"We're actually looking at doing some co-firing with green pellets in the very near future, just as a test," said Jaisen Mody, director of generation projects for PGE.

Right now, Oregon's wood pellet industry is focused on home-heating stoves and animal bedding products.

Andrew Haden, vice-president of **A3 Energy Partners**, a Portland pellet-for-energy company, did some back-of-the-envelope calculations and found that if just 15 percent of Boardman's energy needs came from biomass, that would require about 500,000 tons of pellets year.

"That would mean a doubling or even tripling of Oregon's pellet production," Haden said.

Assuming testing at Boardman goes well, and they could find enough pellets, the Portland-based utility estimates it can replace up to 20 percent of the coal at their 585-megawatt Boardman plant with wood pellets similar to those used to heat homes.

While that would drop Boardman's contribution to climate change, PGE would still need to install expensive upgrades at the plant to comply with clean air laws, which is what prompted the utility's **recent announcement** it could close the plant by 2020, about 20 years ahead of schedule, or switch to an alternative fuel.

"When you replace all the coal with biomass, you could reduce the amount of that equipment substantially," said Mody.

So PGE is looking at whether it can replace all of the millions of tons of coal it burns a year at Boardman with plant material that has been pre-treated through a still experimental process called torrefaction.

In torrefaction, plant material is roasted at high temperatures – 200 to 300 degrees Celsius – until it becomes a dry, high energy substance similar to the Kingsford charcoal you might use to grill steaks on your Weber.

This so-called torrefied biomass can be easily converted to pellets, making it easy to haul and simple to burn at pulverized coal plants like Boardman.

"This acts like coal and behaves like coal," Wayne Lei, director of research and development at PGE.

But it's not nearly as easy to find as coal.

There are no commercial-scale torrefaction facilities in the U.S. And PGE estimates it would need about 2 million tons of torrefied biomass a year to operate Boardman, which supplies about 15 percent of the energy used by its more than 800,000 customers.

And though the torrefied material has a high energy content, it requires significant energy to produce, calling into question whether it's a truly renewable resource.

"At this point, it doesn't seem realistic, because torrefaction is really in an experimental phase and not at a commercial scale," said Cesia Kearns, an anti-coal activist with the **Sierra Club**.

Kearns said PGE should focus on a mix of renewable energy projects and energy efficiency initiatives to replace Boardman's power production. The utility could also replace part of Boardman's output with new natural gas plants.

"It's not going to be a silver bullet, but rather silver buckshot" that replaces Boardman, Kearns said.

Mody said that torrefied biomass, what little there is, costs from \$100-120 per ton, roughly three to four times coal hauled by rail from Wyoming.

A big part of that price difference is the cost of transporting the biomass to Boardman.



Lei, PGE's research chief, said the answer to the supply question could lie in a tall, reed-like grass called *Arundo donax*, or giant cane.

Californians know the plant as an imported species that has run wild along some of their waterways, causing extensive environmental damage. But PGE thinks the plant can be safely grown as a crop in Oregon and converted to fuel for Boardman.

They would need to convince enough farmers that it's in their economic interest to grow a lot of giant cane, about 90,000 irrigated acres worth. Morrow County, home to **Boardman**, has a total of 89,897 acres of irrigated farmland planted in food crops.

"Can they routinely, sustainably get that amount every year from the Oregon countryside?" said Wright of the Idaho national lab.

That's just one of the questions PGE will consider as it spends the next several years planning for Boardman's future, or lack thereof.

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