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ORNL says new wood-burning steam plant will pay for itself

By Frank Munger

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OAK RIDGE — Oak Ridge National Laboratory's new Biomass Steam Plant was four years in the making, one of the longest of the lab's many modernization projects over the past decade. But it's supposed to pay dividends — saving money and being gentle on the environment — for the next quarter century and perhaps beyond.

The new steam plant burns waste wood chips from local sources to produce 60,000 pounds of steam per hour, which is about half of the lab's requirements on the coldest winter day. According to government and contractor officials who gathered Thursday to celebrate the project's completion and early operations, the steam plant will significantly reduce the Oak Ridge lab's use of fossil fuels while paying for itself — and then some — with energy savings.

Jeff Smith, deputy lab director for operations, acknowledged that even though ORNL's research scientists and engineers tackle some of the nation's most challenging energy problems on a daily basis, the lab had not paid a lot of attention to the aging and inefficient workhorse in its own backyard.

"It took a while to get here, but we finally got our steam plant," Smith said.

The plant is the largest of several sustainability projects that were included in a $90 million Energy Savings Performance Contract that the Department of Energy signed four years ago with Johnson Controls Inc.

"Basically, they guaranteed us that if we implemented the projects ... that we'd save $8 million a year or more in energy costs, and those savings are being used to pay for the projects," Smith said.

Nexterra was the manufacturer of the $60 million the biomass gasification plant and equipment, which allowed ORNL to shut down four of its fossil-fuel boilers.

According to the lab officials, the wood chips, which are delivered in 10 to 12 truckloads per day from Oak Ridge Hardwoods, do not require any pretreatment before being fed into the system's gasification system. Once in the oxygen-depleted chamber, the biomass is converted to a synthetic gas at temperatures up to 1,800 degrees Fahrenheit. The "syngas" is then routed to an oxidizer, where it burns cleanly, with the hot flue gas directed through a steam boiler and then distributed to buildings across the sprawling ORNL campus.

The emissions are filtered and, even though the biomass system was in operation Thursday, there were no visible emissions coming from the stacks.

Iain Campbell, vice president and general manager of Johnson Controls, said there significant gains to be had by increasing the scale of sustainability projects. "Here at ORNL they decided to go big," Campbell said, noting that ORNL stands to save about $200 million over the next 25 years — far exceeding the project's cost.

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