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Woody Biomass

Montana Mill Provides Real Case Study

By Barbara Coyner

As regular TimberWest readers know, this column often deals in the abstract, providing emerging trends and innovations in the woody biomass industry. This time, however, we focus on a brand new woody biomass plant that just came online in western Montana.



F.H. Stoltze Land and Lumber Company in Columbia Falls, Mont.

New Wood Biomass Plant Operational

F.H. Stoltze Land and Lumber Company in Columbia Falls, Mont., rolled out its new woody biomass plant during Montana Forest Products Week in late October. With the state's governor, Steve Bullock, and over 200 guests on hand, the company officially dedicated its addition of biomass power supply to the grid, with the potential to power 3,000 homes in the Flathead Valley.

Stoltze and partner Flathead Electric Cooperative signed a 20-year power purchase agreement, along with an interconnection agreement with Bonneville Power Administration, to provide an annual average of 2.5

megawatts/hour for 8,400 hours, or 350 days a year.

The agreement enhances the cooperative's green renewable energy portfolio and beefs up Stoltze's image even more as an innovative leader in the timber industry. The company, along with corporate partner Algae Aqua-Culture Technologies (AACT), is currently in the final stages of constructing an organic carbon engine utilizing energy-rich algae to create bio-char, a clean methane gas to make energy and a soil amendment. The AACT system also incorporates wood wastes in its pyrolysis process along with the algae created at Green Power House.

"A number of my predecessors at Stoltze had wanted to build a woody biomass power facility but could never quite find the right combination to make it economically viable," says Chuck Roady, Stoltze's vice president and general manager since 2003. "This time the stars finally aligned, and working with our partner, Flathead Electric, we were able to make it a reality. We really wish we could have built a much larger plant but simply could not find a buyer for the power, so we will have to be content with taking a smaller step."

Left is Governor, Steve Bullock, and on the right is Stoltze.

Drivers Behind Project

Stoltze has never been one to shy away from challenges, and while the timber industry has seasawed up and down, the 100-year-old family-owned company has stayed proactive.

Groundbreaking for the new woody biomass plant took place in August of 2012, on the date the company celebrated its centennial of incorporation in Montana. The \$22 million project was financed largely with a loan from Northwest Farm Credit Services of Spokane, Wash. "They finance natural resource based businesses, from vineyards to dairies to sawmills," Roady says. "That's their forte, and they are very experienced in that arena."

For Stoltze, three main factors drove the woody biomass project: the company needed new boilers; there was a desire to better utilize the wood wastes from the mill and timberlands; and there were special air quality issues and time constraints associated with slash disposal burning efforts each fall because of being adjacent to Glacier National Park and the Flathead Valley airshed.

Wellons Chosen as Designer

On all three counts, the new biomass plant improves Stoltze's efficiency while benefiting the community. The co-gen equipment, designed and installed by Wellons, Inc. of Vancouver, Wash., replaces old boilers (some dating back to 1905) that were acquired from other nearby long gone mills in Kila and Eureka. The new boiler system can produce sufficient heat and steam to power the electric turbine/generator, supply heat to dry the lumber in the kilns, and heat the company's buildings.

"We shopped around during our due-diligence and chose Wellons because they offered a completely turn-key operation, coupled with a long history in working with the forest products industry," Roady says, noting that local contractors and workers were hired wherever possible during all phases of the installation. "The community looked at our project very favorably, and we appreciated their support every step of the way. We simply wish it could have been a bigger facility strictly from an economy of scale. Our conveyance system, water treatment and cooling systems, and the air emissions system all could be used in a significantly larger operation. However, once we installed a specific sized boiler, that instantly limited the amount of steam you can produce, and there are no easy modifications to increase the generation capacity in the future. Flathead Electric's entire distribution system is only about 160 megawatts, so they couldn't accept very much additional power."

Roady anticipates that the project will take 16 to 18 years for a complete return on investment, while adding 10 to 12 new workers to the company payroll. The mill operation and biomass plant share electricians, equipment operators, and millwrights, which is an advantage of combining such a facility with a wood products site. The company currently employs 120-130 workers and churns out over 70 million board feet of lumber products annually.



The Stoltz biomass facility produces enough energy to power 3,000 homes in the Flathead Valley.

Fueling the Plant





Fuel is almost always the major challenge facing a woody biomass plant, but Roady sees no problems with supply at Stoltze. The sawmill supplies nearly 80 percent of the needed fuel from its bark and other by-products, while the other remaining 20 percent comes from outside sources. Currently most of that outside fuel is coming from the bark generated by the Willis Enterprises chipping operation at the site of the old Stimson mill in Bonner, Mont. That fuel is being hauled in walking floor trailers, facilitating the unloading until Stoltze finishes construction of its trailer dumper later this year. The biomass plant can utilize bark, sawdust, wood chips, planer shavings, and hog fuel from forest slash.

"The small non-industrial forest landowners in our area are very glad to see this operation come to fruition, as many offer to bring in their hog fuel simply so they don't have to burn the slash in the woods," Roady adds.

Once the fuel is at the plant, the challenge becomes feeding clean fuels into the boiler. "We regrind everything, run through multiple metal detectors, and vibrating conveyors before we use it," Roady says. Unfortunately there are no rock or dirt detectors or practical methods to extract the impurities that are delivered with the fuel. "Rocks and dirt really hurt our system because they not only can damage the equipment, but they also drastically reduce boiler efficiency, wasting BTUs. Moisture content (MC) of the fuel is also very critical. It's the toughest issue to deal with besides dirt and rocks."

Roady notes that the moisture content changes the BTU generation and consequently increases the amount of fuel needed to fire the boiler. It is definitely an advantage to have the fuels dry in the woods or in the yard prior to grinding and using. Moisture content generally drops significantly during the warmer summer months and increases both in the fall and spring seasons. Such variables in the fuel require constant evaluation and mixing decisions by the power plant crew because at the end of the day, the electrical generation output must remain stable and consistent.

"We can't miss a beat in supplying that power," Roady emphasizes, regarding the requirements of the agreement with Flathead Electric. Even with Flathead Electric requiring 2.5 megawatts every hour, and Stoltze's internal demands of steam for its dry kilns and heat for its buildings, Roady foresees no problems in generating enough BTUs. After all, when Stoltze managers initially considered building the woody biomass plant, they envisioned a facility that could potentially generate 20 to 25 megawatts of power.

Personal Pride

With the official kick-off now in the history books, Roady and the others at Stoltze anticipate positive changes to their overall operation. The agreement to supply power to the residents of the Flathead Valley is now a reality, the mill has a new more efficient boiler system, and the popular tourist area will benefit from clearer skies. Eliminating slash burning and better utilizing mill wastes were big goals for Roady, who earned a Forest Resource Management degree from the University of Idaho and has spent his entire 37-year career in the forest products industry.

"The Stoltze family, their dedicated employees, as well as the rest of the management team and myself, are extremely proud of how far we have come over the last 100-plus years, where we are positioned today, and where we are headed in the future," said Roady. "The investments in new technologies in our facilities, such as that demonstrated in the renewable energy wood biomass co-generation plant, along with long time exemplary forest stewardship practices on the company timberlands, all point to a bright future for a second 100 years."

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