



CHP
TECHNICAL ASSISTANCE
PARTNERSHIPS

F. H. Stoltze Land & Lumber Lumber Mill

3.75 MW CHP Facility

Quick Facts

LOCATION: Columbia Falls, Montana
MARKET SECTOR: Lumber Mill
FACILITY PEAK LOAD: 3.75 MW
EQUIPMENT: Wellons Steam Boiler; Dresser Rand Extraction Turbine
FUEL: 60,000-65,000 Green Tons wood residue (30-35k Bone dry tons)/year
USE OF THERMAL ENERGY: Drying of lumber, space heating
ENVIRONMENTAL BENEFITS: Drastically reduced CO2 emissions and maximized water use efficiency.
TOTAL PROJECT COST: \$22 million
PAYBACK: 20 years
CHP IN OPERATION SINCE: 2013



IMAGE COURTESY OF F.H. Stoltze Land and Lumber

Site Description

F.H. Stoltze Land & Lumber began operations in 1912, located between Whitefish and Columbia Falls, Montana. The multi-product sawmill is one of the few family-owned lumber companies remaining in the Northwest, employing approximately 120 people and managing about 38,000 acres of timberland. The 145 acre site includes a sawmill, dry kilns, planning mill and various administrative offices. In 2012, Stoltze upgraded their boilers to a brand new cogeneration facility. A Power Purchase Agreement between Stoltze and Flathead Electric Co-Op began in October of 2013. This PPA extends over a 20 year period.

The Stoltze Co-Generation Power Plant burns residual fiber (wood waste) that comes from the mill and from outside sources (Post and Pole plants or in-woods grinding) to produce high pressure steam. This super-heated steam spins a turbine which creates around 2.5 MW/HR of electricity all of which is sold to the grid. As the steam loses pressure and energy, 50 PSI steam is extracted out to dry lumber and use on-site for heating buildings. The mill produces approximately 70 MM board feet of lumber annually that has been dried in these kilns.

Reasons for CHP

Several reasons led to the decision to incorporate CHP into Stoltze's operations. One of the primary goals was to increase efficiency in drying lumber through the replacement of five existing boilers that had been running between 50-60% efficiency or less. Other key drivers include:

- Diversification of the company's business beyond solid-wood products by including electricity generation
- Increase lumber drying efficiency in dry kilns by replacing the aging boilers
- Improve air quality through the reduction of boiler emissions and decreasing slash pile burning in the forests

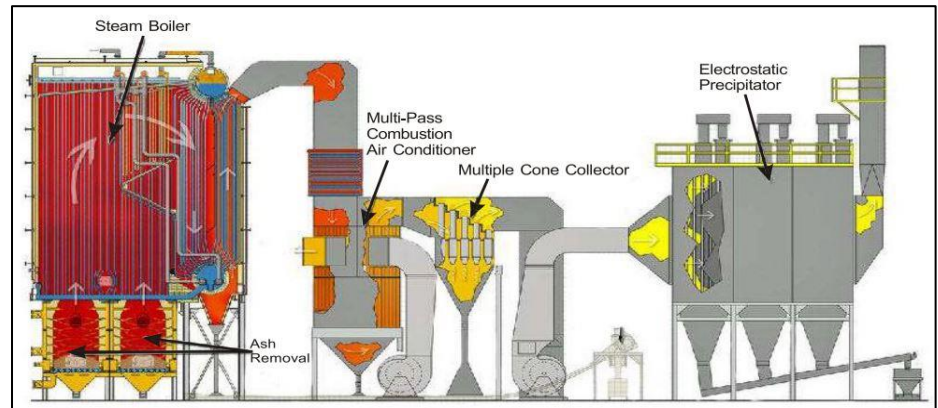
- Create an outlet for biomass residues from forest management activities – also adding market security to manufacturing activities for by-product values

Cogeneration System and Operation

The equipment in this system includes:

- Wellons, single cell, watertube modular constructed boiler system
- Dresser Rand extraction turbine
- Toyo Denki Power Systems Generator with a max capability rating of 3750 KW.

The CHP system at Stoltze includes the high-pressure steam boiler, a turbine, a generator, an electrostatic precipitator, cooling tower, fuel storage, fuel delivery conveyers and piping for the steam delivery system for the dry kilns. The biomass (fuel), consisting of bark, sawdust, planer shavings and forest/log yard hog fuel, feeds into the boiler, which can produce around 40,000 pounds per hour of superheated steam (725°F) at 650 pounds per square inch gauge. This is used in the kilns to dry lumber, provide heat for the sawmill and spin the turbine generator.



Boiler and emissions equipment diagram

IMAGE COURTESY OF MONTANA DEQ

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The installation of the high-pressure boiler required licensed boiler engineers with certification to operate such systems. A partnership with a local community college enabled training curricula in order to fulfill these jobs.

Lessons To Share

A key success factor to note is that the turbine has a 93% uptime for the past five years (since 2015). This includes planned and unplanned down time.

Several lessons were learned throughout this project such as:

- Just because it's a new plant doesn't mean there aren't ways to make improvements. In the past four years Stoltze has reduced their well water use by over 7 million gallons per year.
- There was an unexpected cost for infrastructure upgrades. This one-time cost was in addition to the interconnection agreement between Stoltze and Flathead Electric.
- Stoltze is working with the Montana Department of Environmental Quality (DEQ) to identify potential markets for the wood ash resulting from the new boilers, such as use on farms and ranches to neutralize manure in pastures and/or amendment for topsoil. Previously, ash from the old boilers was combined with other wastes and disposed in the county landfill.

"Make the highest quality steam at the lowest possible cost."

- Lee Starkel

***Steam and Power Plant Manager
F. H. Stoltze Land & Lumber Company***

For More Information

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