Heat for the Kilns: Making Energy Decisions at the Mill

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• 10 MMBF / year pine sawmill,
• boiler & kilns,
• planer mill, and
• retail yards.
• Focus here will be considerations in burning wood waste.
• We’ve been burning pine waste since 1988.
As a cost example:

- In 1998 we built a building, and
- bought, installed, piped and wired
- a 160-hp rated wood-burning steam boiler,
- for $428,000,
- including sawdust bin and bin unloader.
Decision to burn wood waste was based on:

• beliefs and emotion,
• as much as
• wood vs. oil vs. gas boiler abilities.
I hated the thought of burning oil, while we literally piled up dry hogged planer end trims that farmers didn’t want to buy!
• I can not compare costs of burning oil vs. wood vs. natural gas,

• but I can tell you that if you have mill wood residue you control your cost of fuel, not OPEC!
Advantages of burning wood vs oil or gas:

• Lower cost of fuel (wood waste residue) - this is a huge factor.
• Non environmentally hazardous transport, storage, piping, leaks.
• No sulfur emissions (pollution) when burning wood.
Advantages ..... 

• Can perform electrical co-generation and use “waste steam” to heat kilns, buildings.

• Ash is not environmentally hazardous.
Disadvantages of burning wood:

• Blowing, conveying or bucket loading fuel in hopper.

• Requires a larger furnace than oil or gas (higher initial cost?).

• Requires lots of airflow (fan HP) to burn wood vs. oil & gas (ours = 40 hp).
Disadvantages ……

• Oversize wood chunks can clog feed system.
• Frozen winter wood is less efficient fuel when you have greatest need for heat.
• Ash settles in firetubes, requiring cleaning or costly air agitation systems.
Wood vs. Oil

Cost / Value Comparison:

• A ton of green softwood is equivalent to 40-45 gallons of fuel oil, hardwood about 50 gallons.

• If a ton of pine chips is worth $12/ton at our mill, equal to about $70-78 worth of fuel oil at $1.75/gallon.
Wood vs. Oil Cost ....

• Or.... $12 divided by 40 gallons = –30c per gallon oil cost.

• Unfortunately, we are burning some sawdust worth $25/ton.

• So, our cost would be equivalent to about 55-60c/gallon.

• Still cheap!
Sizing your wood boiler:
I’m not an expert, but……..

• Kilns drying white pine can require up to 80 btu/mbf for proper heating and extensive venting needs.

• Obviously, kilns drying oak require a fraction of that.
• Wood boilers aren’t often supplied the 35% mc fuel specification that our boiler’s HP rating was based.
• So, you may want to “oversize” a new boiler based on an average of frozen winter fuel and drier summer sawdust.
• Our boiler was rated at 160 hp, but we have only realized 111 hp with higher moisture fuel and no auto air dampers tied to combustion sensors.

• Take it from me, size it big enough the first time for future kiln needs.
Summary:

• Overall, I am very pleased that we are burning wood, especially with oil hitting record high prices almost weekly.

• I would recommend a boiler system sophisticated enough to automatically adjust its combustion efficiency.
• I would recommend Co-Gen to someone considering a new installation.
• Co-Generation is not a slam dunk, but many states are pushing for more renewable energy, and therefore have grants available to assist in feasibility research, planning and even capital costs.
Thank you!
Questions,
Comments?