In 2004, a fire consumed the two drying kilns operated by Chisholm Lumber in Tweed, Ontario. In this setback, the company saw an opportunity.

Already heating its two sawmills in nearby Roslyn with the big outdoor chunk-wood furnaces that are common in the region, “we decided we would like to put in a wood-fired boiler” at the Tweed site, “to provide heat and serve our dry kilns,” says company President Doug Chisholm.

“In the lumber business, you very rarely get a chance to build a greenfield operation,” he explains. “You’re always adding and expanding; you rarely get a chance to build from scratch.”

Taking this chance, Chisholm installed a dual heating system: a conventional oil-burning boiler alongside a modest-sized, 350 kW (1.2 MMBtu/hr) waste-wood boiler, to heat two dry kilns with a total capacity of 100,000 board feet. The wood boiler is a semi-automated system, meaning that wood fuel is moved by tractor from the storage pile into a hopper. The fuel is then automatically fed from the hopper into the boiler. This type of system requires more operator attention than a fully automated one, in which wood fuel is moved by augers from a large storage bin into the boiler without operator intervention.

Chisholm estimates that his operation uses the wood boiler, built by Grove Wood Heat located in Prince Edward Island, “about 95 percent of the time.”

“We fire it with green sawdust from our sawmill, mixed with dry shavings from the planing mill,” he says. “We’re using about two to three tractor-trailer loads a month. We would sell that for about $750-$800 CAD ($785-$840 US) [per trailer load] on the open market.”

He figures the company factors in “about $18,000 a year” as the value of the wood fuel it uses.

Sawdust and shavings can be sold to farms, for livestock bedding, and to the forest-products industry for fiberboard and similar composite products. Nevertheless, Chisholm notes, “nothing’s normal in the forest products industry these days—because a lot of the mills that would have taken these shavings in the past are closed down.”

Chisholm Lumber itself is running at only about 65-75 percent of its capacity. A diversified firm, it has been depending lately in large part on revenues from its retail yard and home-building operation. “Put it all in the air, and at the end of the day we’re surviving,” says Chisholm.

Fixing the Bugs, Mixing the Fuel

The company would be struggling even more if it had to heat its drying kilns with just the oil boiler. For three cold months at the start of 2005, Chisholm says, the oil system was up and running while the waste-wood system was still being installed—and the firm’s oil bill for those three months was $42,000 CAD ($44,100 US).

over
With the wood system on line, “we only use [the oil backup] when it’s very cold, or at peak periods when we need high temperatures for heat treating, something like that,” he explains. “It’s basically backup, but we do run them both to keep things going in the winter.”

The biomass boiler produces hot water, which is fed into a heat-exchange unit inside each drying kiln. The heat exchanger is, in essence, a large radiator; fans blow air over it, and circulate the now-heated air through the kiln.

The waste-wood system has a small fuel-storage bin, about 2.5 meters by 3.7 meters by 2.5 meters (8 feet x 12 feet x 8 feet), and operators use a front-end loader to fill it most working days. Dried shavings are heaped on one side of the bin, green sawdust on the other. Operators learn how to blend these fuels for optimum combustion.

“There’s a fairly big learning curve to mixing the fuel,” Chisholm says. “It’s not very scientific—a bucket of this, a bucket of that. The operator gets a pretty good feel for what we need. If we could run it on 100 percent green sawdust, we probably would—but the shavings seem to give it some air inside the furnace, so it runs much better.”

The firing of the dual system is computer-controlled, and favors the wood boiler until its capacity is exceeded. But operators still need to be on hand, Chisholm says.

“When the boys leave on Friday, there’s a roster of who’s going to look after the kilns on Saturday or Sunday, so we would have somebody there every day. We may not have to load [the wood boiler] every day, but somebody’s there.”

“It’s been pretty reliable,” he says of the biomass system—“some mechanical bugs, but we’ve pretty much got it down. Those bugs are pretty much involved with the installation of any equipment. Once you learn how to run it, you’re fine.” The manufacturer was helpful in that process, he adds.

 Asked what advice he’d give someone interested in installing a similar system, Chisholm says, “you need somebody who’s pretty hands-on. My cousin and business partner, Paul Chisholm, was instrumental in getting this thing operating—he can fix just about anything. You don’t just plug it in and hope it works. You have to have somebody who knows what they’re doing.”