

BIOMASS

CASE STUDIES SERIES

Woodchip Heating System

Heating Capacity (output): One 540,000 kW (1.8 MMBtu/hr) boiler

Annual Wood Fuel Amount: 300 tonnes (330 US tons)

Emissions Reduction and Combustion Control Equipment: O₂ sensor control, moving grates

Year Installed: 2003

Thermal Output: Hot water



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MADSEN'S CUSTOM CABINETS, EDMONTON, ALBERTA, CANADA

For a Custom Woodworking Business in Alberta, Waste that Was a Headache Is Now Heating Fuel

Asked how he got into heating his high-end woodworking business in Edmonton, Alberta with its own wastewood, Kent Madsen says: “To be perfectly honest, what motivated me to do this was, my partner drove me nuts.”

“This was Myron’s baby,” says Madsen, president of Madsen’s Custom Cabinets, of his now-retired partner, Myron Jonzon. “His daughter was in university, and she did a paper on waste heat—she’s an environmentalist—and she used our shop as a model. We were terrible: a poorly insulated building in northern Canada, our heat bills were crazy.

“She came up with a few ideas. Then we were doing an addition and expansion, and we said, ‘We’ve got to do something.’ They didn’t get a lot of buy-in from me at first. But when we got into it, I said, ‘This is pretty cool.’”

Madsen’s Cabinets produces custom cabinetry, doors, and architectural millwork: recent projects include the Alberta Art Gallery and the Air Canada lounge at Edmonton International Airport. In 2003, it installed the wastewood system, with a 540,000 kW (1.8 MMBtu/hour) capacity, that now heats its entire 2,790 square meter (30,000 square foot) facility. Virtually every ounce of wastewood the operation produces—scraps, shavings, and sawdust—goes into 300 tonnes (330 US tons) of fuel that its heating plant burns each year.

“We’re burning particle board, we’re burning raw lumber—you name it,” Madsen says. “It all goes through our system. It burns very, very clean.

“I saw how this was working, and how the air quality in our plant was so much better,” Madsen says. “Our plant is spotlessly clean all the time. We suck up all the dust we can, so we can use it for heat.



“We built a much healthier environment for our employees, I’ll tell you. The other side of it is the amount of money we were spending on fuel—it’s not even an issue any more.”

When the company did its feasibility study for burning wood, in 2002, it compared the costs of installing and running a biomass plant with the costs of keeping its then-active heating system, which burned natural gas.

“We all know what’s happened to natural gas prices since then,” Madsen says. “We still have the gas system in place. I think last year we turned it on for about two days.”

‘They Have Plenty of Fuel’

The heating plant at Madsen’s Custom Cabinets was built in Austria by KÖB, and was sold to Madsen’s Custom Cabinets by Fink Machine, Inc., of Enderby, British Columbia. Fink Machine owner Burkhard Fink worked with Myron Jonzon of Madsen’s Cabinets to design the right system for the facility.

over

Pictured on front: In 2003, Madsen's Custom Cabinets installed a wastewood system, with a 540,000 kW (1.8 MMBtu/hour) capacity, that now heats the entire 2,790 square meter (30,000 square foot) facility. Right: Ash is automatically removed from the boiler and can be stored for disposal or other uses such as a fertilizer treatment.

Along with the wood boiler, the business needed to install two additional, key pieces of equipment. The first was a grinder, to reduce the size of larger wood waste. “They had a dust-collection system in place,” says Fink. “We improved and added onto that.”

The other new piece of equipment was a briquette press. That now squeezes sawdust and other fine wood waste into puck-shaped fuel, about five-by-five centimeters (two-by-two inches) in size.

In a boiler like this, to burn kiln-dried wood dust from a sanding machine “is not a good thing—it burns too hot, wants to explode,” Fink explains. “We avoided all that by installing the press.”

Before the briquette press was installed, Madsen's silo for its collected airborne dust and particles wasn't big enough to handle all the waste the business was producing. It had to be emptied around mid-summer; then, halfway through the winter, the business would be forced to buy woodchips for heating fuel.

“Once we put the press in, they didn't have to dump anything in the summer,” Fink says. “And now they have plenty of fuel for the winter.”

The company now lists its fuel costs as zero. But, says Madsen, the real cost is “actually negative—because, you see, I used to pay people to haul that stuff away.

“A lot of people come into our plant and say, ‘Oh yeah, this is great!’ One of the reasons it's great for us is, we have the fuel. We're taking a product that was a headache, that we had to deal with by garbage trucks coming in every day, making a big mess, driving back and forth to the landfill—and now we're using it as a fuel.

“I like the system now, but the accolades go to Myron and his daughter. I just wanted to go to work, flip the switch, turn the gas on, and forget about it. But now that we've got [the biomass system] in place, the benefits to the company far outweigh any of the work we have to do.”



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For more information on this and other biomass energy projects, contact:

Biomass Energy Resource Center
PO Box 1611, Montpelier, VT 05601
ph 802-223-7770 | fax 802-223-7772
info@biomasscenter.org
www.biomasscenter.org