The Joutsan Ekowatti woodchip district-heat business is a shareholder venture that operates, mostly, without people.

It’s centered in a simple blue metal building in an industrial park in Joutsa, central Finland. Inside is a one MW (3.4 MMBtu/hour) woodchip boiler that provides three businesses with heat via hot water distributed through an underground pipe network that covers just half of a kilometer (one-third of a mile).

All in all it’s a neat little package and a working model for small-scale, commercial, biomass district energy.

“I started this system because I was worried about oil cost for my window-manufacturing business in this little industrial park,” says business owner Tarmo Tamminen. “I wanted to burn woodchips because that is a very low-cost fuel and easily available, but my building was too small for a wood system. So I started a district heating system for the park.

“I chose my three partners, shareholders actually, to know things I didn’t know,” he continues. “We’re all professionals. One is an accountant, one has a wood supply business, and the other has a property management business—he handles the 24-hour remote supervision of our plant.”

The accountant does the system’s administrative work. The wood supplier, a logging contractor with about 50 employees, supplies the fuel, working within a 20-30-kilometer (10-20 mile) radius to harvest whole trees, mostly hardwoods, that otherwise lack commercial value. Because dried chips are lighter than fresh chips and so cost less to transport, workers chip the trees and pile them up in the woods, covering them with a heavy-duty paper.

“A lot of wood fuel in Finland for small heating plants comes from small-diameter trees,” notes Jyrki Raitila, research forester for biomass fuel production at the VTTTechnical Research Centre of Finland. “Often it is stored to dry at the roadside before chipping and transport. There are contractors who cover wood piles with this special paper to protect it from weather while it dries for a year.”

“We have an incentive to use a chipper instead of a grinder to produce our fuel, because you get less dust and better operation,” says Jouko Pirkkalainen, the partner who handles wood supply. “That’s easy for me, because I’m in the logging business and own the equipment. I have a vested interest in getting the best quality fuel because my partners and I are both the fuel suppliers and the plant operators.”

over
‘We Would Like to Own More’

To install their district system at the Joutsa industrial park, the Ekowatti partners put up a simple, slab-on-grade building and dug trenches to install the 450 meters (1,500 feet) of piping. They worked from specifications produced by an engineering company they had hired, one that specializes in small-scale energy systems. Their total investment in the district system: €500,000 ($650,000 US), including €100,000 for the distribution network.

“Conventional banks like to give money to municipal district heating systems, but not so much to privately owned ones like ours,” Tamminen notes. “We financed through a government bank that loans money to environmental projects. Our system is only one MW thermal, so we don’t need an air permit or emissions testing.”

Each customer paid an initial connection fee, and each continues to pay a monthly bill that includes a fixed charge and a usage charge, the latter based on metered heat consumption. The rates are indexed to the prices of wood and oil. The connection fees paid for the cost of the pipe network; the fixed charges on customer bills are paying off the building and its equipment. The shareholders will begin earning a profit as soon as their five-year loan for the plant is retired.

In creating their heating plant, the partners overbuilt capacity. Their boiler, building, and fuel-storage space are all larger than they need, so the system can expand, which its owners would like to do. The four have also built a second system, to supply other customers in another location.

“This was a simple project to do, and our second district heating project was so easy that we didn’t even hire a consulting engineer,” Tamminen says. “We got all the engineering we needed from the wood system vendor.”

Their second system, 10 kilometers (six miles) from the industrial park, serves a resort hotel and village, with cottages and an indoor swimming pool.

“We would like to own two more district heat systems,” Tamminen concludes.