Biomass-fueled district heating is a Finnish specialty: about half of the country’s buildings, large and small, receive heat through a biomass district system.

“All municipalities and cities have district heating, using all kinds of biomass—woodchips, wood pellets, and peat,” says Pekka-Juhani Kuitto, executive director of FINBIO, a nonprofit organization promoting bioenergy in Finland and beyond. “The big urban systems produce combined heat and power, but the smaller cities and towns have district heating only.”

Then there are the very small systems, which are dotted all over Finland. Typical of those is the mini-district heating operation installed, run, and fueled with wood harvested by A. Reponen Oy, a family-owned company with 14 employees in the forested lakes district of central Finland.

“We didn’t pay too much for this system,” says Mr. Reponen, owner of the business. “We bought the wood boiler and built everything else ourselves—the building, the fuel handling equipment.”

Reponen’s woodchip boiler has a capacity of 250 thermal kW (850,000 Btu/hour). It heats a metal fabrication shop, where the family business makes components for backup electrical generators, along with Reponen’s home 150 meters (500 feet) away and an equipment repair shop out back for the family’s excavation and construction operations. The manufacturing shop is 2,000 square meters (21,000 square feet); the equipment shop is 150 square meters (1,600 square feet).

The Reponens produce their own chips using a mobile grinder that they own. The family has about 100 hectares (250 acres) of forestland, from which it harvests about half the wood that it needs for heat. The rest it buys as recycled pallets, running all the wood for the district system through the family’s grinder. The Reponens also own and use a harvester and a forwarder, a wagon used for transporting logs out of the woods.

When they built their district system in 2007, “We ran the pipe from the boiler house to the other buildings ourselves—not very expensive,” Reponen says. “We moved an old oil boiler in for backup.”

**Pushing Oil Heat to the Margins**

As a nation, Finland is working to remove petroleum fuel completely from its heating and power systems. “There is still oil used for heat in remote areas and for peaking power plants,” says Kuitto. “We need to kick it out!”

*over*
“The European Union has given Finland a high target for renewable energy by 2020, since we are already ahead of other countries,” he adds. “We now get 28.5 percent of our energy from renewables, and by 2020 our target it 38 percent. There’s much to do.”

For the hard-working Reponen family, this is all about reducing the cost of heat. They invested €130,000 ($165,000 US), in their district heating system, about €100,000 less than they might have paid an outside contractor for the project. At the time they installed their system, heating oil was about €0.80 per liter ($4 US per gallon); it has since dropped to €0.60.

“Compared to other European countries, Finland has low oil prices,” notes Kuitto. “This has forced wood system manufacturers to innovate and compete against each other on price, to drive system costs down.”

Mr. Reponen reports few, if any, problems with the home-built system. A 15-minute daily check makes sure the heating plant is working smoothly. Once a week, another 15 minutes is spent cleaning out the ash.

“We basically leave the thing alone,” Reponen says. “It has an electronic call system, so if anything goes wrong with the boiler, we get a cell text message.” Sensors in the boiler report operating data, such as the temperature of the heated water as it’s piped out of the plant. Two cameras in the boiler room also allow Reponen to look in from either his home or his office. The boiler has no emissions control devices, yet meets Finnish air-quality standards.

The system burns fuel of a wide range of quality, and up to 50 percent moisture content. The only trouble, Reponen says, comes if wood arrives too wet, frozen and mixed with snow.

Otherwise, the system runs fine. And that’s a good thing, because Reponen is a busy man. Asked if he is satisfied with his investment, he has an efficient answer.

He says, “Yes.”