When the Swedish town of Mullsjø went from oil to wood pellets to fuel its district heating system in 2006, it brought in three modular units manufactured by the Danish company Lin-Ka Energy, each pre-assembled with a complete boiler house and pellet silo. The cost, for buildings, boilers, and pellet storage, was 18 million Swedish kroner ($2.2 million US), for a system that serves 95 percent of the 5,000-resident town.

The modular units now stand and operate side by side, providing district heat to 160 local customers, including 130 single-family homes. Adding in the cost of distribution piping, the town’s complete investment in its district system was SEK 35 million ($4.2 million US).

“The district heating company is making a profit every year,” says Hans Gille, the operating engineer. “After we have completed five years, we will start to pay some of the profit back to the municipality. They can use the money for anything they want: schools, roads, nursing home, whatever.”

Gille explains. “The district energy company borrowed all the money to build the system from a local bank, and the municipality provided the security for the loan.”

Residential customers pay SEK 0.85 per thermal kWh ($30 per MMBtu); commercial and industrial users pay SEK 0.60-65 ($23-$25 US). Rates comprise two components—the cost of energy, which is variable, and the system’s capital cost, which is fixed. The district energy company pays SEK 1,400 per tonne ($154 US per US ton) for its pellet fuel.

‘No Concerns Any More’

A town of 5,000, Mullsjø originally hired Gille to study the potential for converting its oil-fired heating system to biomass.

“After we submitted our report they decided to make the investment and offered me the job of designing it, overseeing the construction, and running the system,” he says.
The municipality is currently looking to expand its system to serve another 40 customers. “When we do an expansion,” says Gille, “we do not need to hire a consulting engineer. Even though I am an electrical engineer, I am able to do the design myself.

“Before we built the system here there was a huge debate in town,” Gille recalls. “Some people thought there would be noise, smell, smoke. It really surprised me. But after it was built, nobody has seen anything bad and there are no concerns any more.”

The kommun has kept its old oil boilers as backup, but rarely has to use them.

“We have strict regulation of ‘dust’ emissions (particulate matter) in Sweden, based on national standards,” Gille says. “The kommun can impose stricter standards if local conditions require it. Our pellet boilers have to emit less than 100 mg/m³ of dust and tested at 92-97 mg. The kommun tells us how often we have to test.

“The hot water district energy pipe we use in Europe is all based on strict standards developed in Europe in the late 1970s. The standards are high and have needed very few modifications in the last 30 years,” Gille concludes. “It’s a commodity and all the pipe is the same, whether it’s manufactured in Sweden, Denmark, Austria or Finland. We just buy from whoever is cheapest at the time we bid it.”

Among the buildings served by the district system are a number that are owned by the kommun—not just the town hall but also, as is common in Sweden, the local school, swimming pool, elderly housing, and nursing home. When it decided in 2005 to move to biomass district heat, the kommun set itself the goal of reducing by 50 percent the total oil consumed through municipal operations.

A year later, with the quickly installed modular heating plant up and running, the kommun found it had already reduced its total oil use by 75 percent.