

GREEN ACRES PUBLIC HOUSING COMPLEX, BARRE, VERMONT, UNITED STATES**How a Chip System's Savings Made a Housing Complex Affordable Again****Residential District Woodchip Heating System****Heating Capacity (output): 600 kW (2.2 MMBtu/hr)****Year Installed: 1992****Thermal Output: Hot water**

In the late 1980s, low-income residents at Green Acres, a 50-unit affordable-housing complex in Barre, Vermont, were paying an average of \$250—often more than \$300—every winter month to heat their apartments. The complex had all-electric heat and hot water, and tenant after tenant was abandoning Green Acres after the bills had piled up too high. Others were using dangerous kerosene heaters, and nearly everyone was trying to get by in under-heated living spaces, leading to problems with mildew, icing, condensation, and “decreased tenant comfort and satisfaction,” noted a consultant’s 1988 report on the problem.

The electric heat that had looked like a good, cheap option when it was installed in 1970 was now threatening the future of the complex. After commissioning the consultant’s study, the Barre Housing Authority (BHA), which owns Green Acres, decided to install a new woodchip-fired heating and hot water system.

Installed in 1992 as part of a complex-modernizing project funded by the US Department of Housing and Urban Development (HUD), the chip system generated average, per-apartment fuel costs of \$24.49 per month during its first five years.

In its 10th year, the total costs of running the chip boiler and a backup oil unit, together with operation and maintenance costs for the whole system, were \$32,282—42,682 less than what it would have cost to run the old electric system at 2002 rates.

“I would recommend the woodchip system to almost anybody—but be careful with the installation,” says Don VanArsdale, maintenance director for the BHA. “Make sure the specifications are followed, especially the manufacturer’s specs.”



He says so because in recent years the BHA has had persistent trouble with corrosion in copper piping that was improperly installed back in 1992. The lesson learned, says Tim Maker, the BERC staff person who served as a consultant to the Green Acres project, is that it’s vital to choose the right engineering firm to oversee the installation of a system like this.

“Hire an engineering company that has experience with European district heating pipe systems,” Maker advises. “These systems have a long, proven history of reliable operations, without failure—but if you hire a local engineering company to do this, to bury the pipe the way the system is designed, they may not do as good a job as a company that specializes in this type of work.”

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Pictured on front: Green Acres Housing Complex. Right: With the cost of heat and hot water removed from their electric bills, tenants saw those bills decrease, during heating season, from an average of \$250 per month to \$53 per month.



There are only a handful of such engineering firms in the country, Maker adds. “But they are worth seeking out, and paying for.”

Green Acres’ experience is useful in other ways as well. To finance its system, BHA entered into a 10-year contract with the Vermont Energy Investment Corporation. Infrastructure for the new heating system was funded with \$540,000 of HUD money; installation of the chip boiler itself cost \$195,000 for a total of \$735,000 system cost.

Under the contract, the fuel-cost savings—compared with previous electric-system costs—were calculated at the end of each fiscal year. The system’s expenses were paid from the arrived-at savings; the remaining balance was put into three BHA funds.

Over the first five years, those funds grew from zero to \$140,310, entirely with savings generated by the chip system. The money was placed in a repair fund, an energy fund, and a tenant services fund. At the end of year nine, the repair fund had grown to \$27,917, and repairs had been so little-needed that fund was used, in 2001, to pay for upgrading and modernizing the wood energy system.

In 1997, a five-year summary report on the performance of the Green Acres system by Maker’s Energy Efficiency Associates noted that “woodchip prices have increased less compared to the other energy sources. Over five years, woodchip prices paid by BHA have increased a total of four percent. Electric rates have increased 19.5 percent, oil by 17 percent, and general inflation has seen a 15 percent rise.”

In 2002, the 10-year summary report found that the complex’s monthly fuel cost to supply heat and hot water per apartment, averaged over the year, was \$30.83. “Under the previous electric heat system,” the report notes, “heat and hot water would have cost \$124 per apartment per month.” With the cost of heat and hot water removed from their electric bills, tenants saw those bills decrease, during heating season, from an average of \$250 per month to \$53 per month.

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