

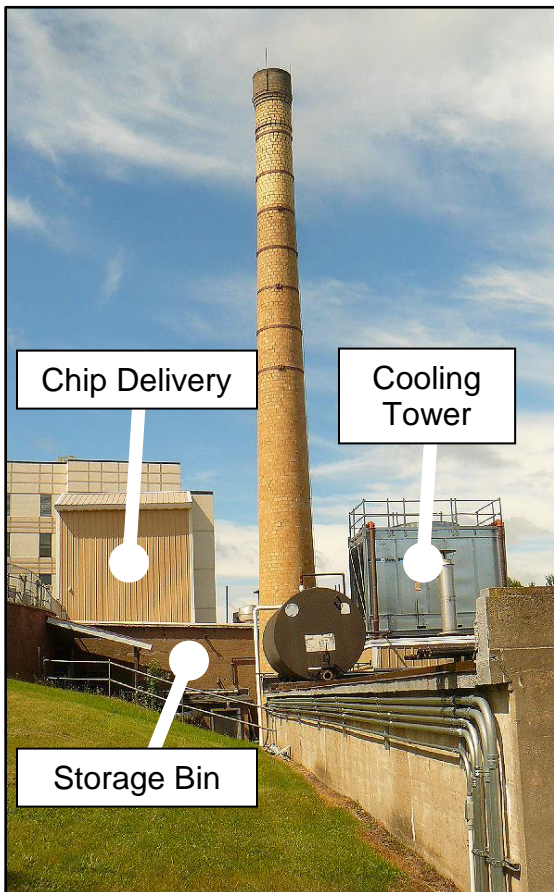
Michigan District Energy Facility Case Studies

Bill Cook, Michigan State University Extension, 2015.

Pinecrest Medical Care Facility
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Pinecrest is located in Powers, Michigan, in northern Menominee County in the south central part of the Upper Peninsula. The facility offers medical care, Alzheimer's care, physical, occupational, and speech therapy, and can house up to 160 residents. There are 170,000 square feet in four buildings that are both heated and cooled using a low-pressure steam district energy (DE) system fueled primarily by wood chips. Cooling is provided by a Trane absorption chiller, which runs water at 42 degrees (Fahrenheit). The system also provides domestic hot water, high-temperature hot water (e.g. dishwashing), and hot water for the laundry. There are two natural gas back-up boilers. Pinecrest also has a 10 kw solar panel array connected to the grid, that was funded by the Michigan Energy Office.



The DE system was installed in 1984 by Solid Fuels of Hillside, Illinois. The company is no longer in business. Installation was funded through commercial loans, which were repaid within 3-4 years, largely from fuel savings. The system has gone through several modifications and upgrades in the pursuit of increased efficiency and cost reduction.

The gasification burner is fed from the top with wood chips, with gasses heating the boiler. The boiler size is approximately 6.9 million btus and carries a fluid volume of 10,000 gallons. There are about 1000 feet of two-inch or four-inch pipe with 10 pounds of steam to three of the buildings. The main building carries a steam pressure of 60-80 pounds through a six-inch pipe. All underground piping is insulated steel.

Wood chips are delivered to a small building above a storage bin that can store 60 tons of chips. Three walking floors move chips into the burner via a conveyor. The system burns 30-35 tons of chips every three days, roughly a van load. The chip operation runs all-year, with the lowest demand in October, which is down-time for maintenance and

inspection. The facility consumes about 2800 tons of green chips per year at an annual cost of about \$120,000. Annual savings over natural gas exceeded \$10,000 per month in 2014.

Maintenance is minimal when the system is managed properly, which takes an average of about an hour per day (about twice that of a natural gas boiler). Each year, one of five grate assemblies are replaced. Replastering and rebricking is done as needed and there is the occasional hydraulic repair. Ash disposal fills a 55 gallon barrel about once per week. Emissions are treated via a cyclone collector in the boiler room and precipitators in the chimney stack. Pinecrest has experienced no smoke visibility or odor issues.

Pinecrest hosts numerous tours and queries each year. Staff has made presentations at several professional wood energy conferences.



Above: wood chip storage bin with walking floors.



Above: Absorption chiller.

Below: 10kW solar array.



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