

Michigan Wood-based Thermal Energy

YMCA Storer Camps

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YMCA Storer Camps
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The YMCA Storer Camps are located among the Irish Hills of southern Michigan, including the 240-acre Stoney Lake. The facilities are owned by the YMCA of Greater Toledo, serving about 17,000 people each year, mostly youth, from all over the world. The camps operate year-round. The rambling 1250-acre campus has numerous buildings, woodlands, and old fields. The largest building is Malachi Dining Hall, about 16,000 square feet, and is heated with a comparatively simple cordwood system. Wood-based heating saves the camps about \$10,000 per year.



Heat and domestic hot water is supplied with a pair of EPA Phase 2 certified [HeatMaster G-Series](#) outdoor gasification wood boilers servicing a forced air system.



HeatMaster Cordwood Boilers.

The smaller G200 boiler (200,000 btu) was installed in 2011, then a larger G400 boiler (375,000 btu) in 2015. A 1600-gallon thermal storage tank is housed in a small building separate from Malachi Hall, near to the boilers, which are not in a building.



1600-gallon thermal storage tank.

Three heat transfer units are placed between the stoves, the storage tank, Malachi Hall, and the domestic hot water system. Computer control relays are in Malachi Hall. All insulated piping is underground. [RLS Energy](#) of Eaton Rapids, Michigan installed the system. There is also a small solar array that supplies about 15 percent of the power used by Malachi Hall. The facility has natural gas backup.



Hot water piping & insulation.



Computerized controls.

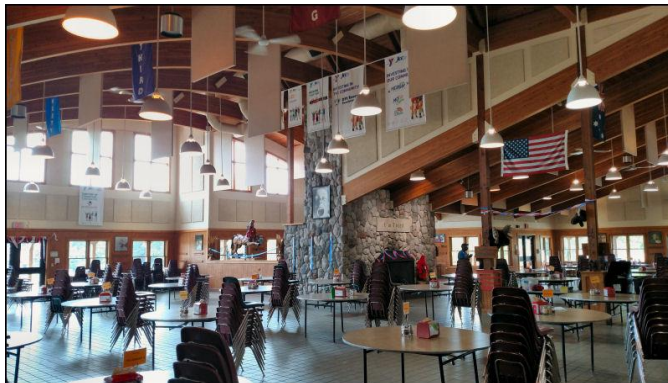


Domestic hot water tanks.

Capital costs were \$175,000 with \$76,000 in federal funds, a matching \$78,600, and in-kind gifts of \$17,800. Construction time was about one year.

Cordwood is self-supplied from the YMCA Storer Camp woodlands, over 600 acres, using a three-person crew that harvests, hauls, splits (with 15 volunteers), and piles the firewood. Recently mortality from the emerald ash borer has left many dead trees. During the summer months, about a standard cord is needed every two weeks for domestic hot water. The same quantity of wood during the coldest periods is required every day or two. Cordwood is currently not stored indoors, though that may be a future project.

Part of the camp programming includes a natural resource sustainability component and the wood-based heating system is used in the curriculum.



Malachi Hall.



Heat transfer unit.