

Michigan Wood-based Thermal Energy

DeTour Area Schools

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DeTour Area Schools serve about 100 students in a rural and rather picturesque part of Michigan's eastern Upper Peninsula, off the natural gas grid. The 68,000 square foot building houses the K-12 student body and the public library. The locker room has in-floor heat. The K-6 Academy is structured as a charter school. In 2012, the school converted from fuel oil to a Messersmith wood chip system. The boiler is a 1.5 million btu Hurst unit that also supplies domestic hot water. There is no thermal storage separate from what is in the piping and the 500-gallon domestic hot water tank.

The new heating system was part of a larger \$1.5 million bond that included the heating plant building, other renovations, and conservation measures. Funding was through Michigan's Qualified Zone Academy Bond (QZAB) program. Back-up heat is provided by a pair of fuel oil boilers but the school seldom uses these. Most of the piping is above-ground or in access tunnels, except between the heating plant and the school building, a distance of about 75 feet. The hydronic system has no heat transfer units.



A new building was constructed to house the new heating system and to hold chips. Chip trucks and vans back into the storage area for unloading. A walking auger moves chips from the storage area floor into a conveyor trough. The conveyor moves wood chips into the boiler metering bin where fuel is added to the boiler as computer controls dictate.

Chip storage and power plant building.



Chip conveyor lift to boiler feedbox.



Firebox and boiler unit.



Fly ash collection barrel.

During the cold winters of 2013 and 2014, the school saved over \$70,000 in fuel costs. Wood chips are produced by Maples Sawmill, in nearby Hessel, and delivered to the school through various truckers. The school uses about 100 yards of chips every two weeks, at a cost of about \$15/yard or \$58/ton. Annual wood chip expenses run about \$16,000. Maintenance costs are low, less than 15 minutes per day required for monitoring and minor adjustment. Johnson Controls provided a maintenance performance contract but that was bought-off within the first 18 months of operation. Both boiler ash and fly ash are disposed of on-site, sometimes spread on icy parking lots.

"In retrospect, I wish we would have oversized the boiler so that we could have heated our sidewalks to eliminate the need for salt and the tracking in of the salt into the building in the winter time and the cost for shoveling the sidewalks. The whole system is easy to control and staff are now used to asking for room temperatures to be adjusted by the system instead of trying to regulate them by overriding the system."

- Angie Reed, Superintendent



Domestic hot water storage.