



A Position Statement of the Michigan Society of American Foresters Wood-Based Thermal Energy Technologies

Position

The Michigan Society of American Foresters supports the development and adoption of advanced wood-based thermal energy technologies. These technologies provide a range of economic, environmental, and social benefits to society and support better management of Michigan forest resources and related goods and services.

Issue

Wood is an abundant Michigan forest resource with large volumes added to the inventory each year. Large volumes are lost to mortality, larger than the harvest volumes (Pugh 2018). Some of this underutilized mortality could be used to provide thermal energy. In addition, mortality from urban forests is also an underutilized resource that is often treated as waste and landfilled (Nowack et al. 2019). While there are insufficient forest and urban wood waste stocks to totally displace fossil fuels used in thermal applications, wood and wood-based products can serve as a significant feedstock across much of the state.

Issue

Much of Michigan lacks markets for low-quality standing timber. Removal (thinning) of low-quality trees is an essential component in building high quality and high value forest stands and for maintaining forest health and forest ecosystem services. Thermal energy technologies have great potential in utilizing low-quality forest trees and urban waste wood. And technologies and systems for buildings' wood-based renewable thermal energy already exist.

Issue

Though the potential for wood-based thermal energy is significant, adoption of technologies has been lacking. Capital expenditures for wood thermal systems are often higher than for traditional fossil fuel systems, but operating expenditures are often lower. Feasibility assessments must be tailored to each potential project to understand the short-term and long-term costs. For example, a wood pellet heating system has a much higher installation cost compared to heating oil and propane systems, but in the long term, it is lower cost than the other systems (Knudson, 2019).

Issue

In Michigan, incentives are sometimes provided for adoption of renewable energy technologies. This has not been the case for wood-based thermal energy technologies. Potential incentives and education include:

- The State of Michigan should promote and encourage the development of a wood-based thermal energy economic sector.
- Financial incentives should be provided for conversions to advanced wood-based thermal energy systems.
- Financial incentives should be provided to initiate bulk pellet delivery operations.
- Outreach and education efforts about wood-based thermal energy should increase, especially for designers, engineers, architects, and installers. Notably, new construction projects and boiler replacement projects should include consideration of an advanced wood-based thermal system.

Background

Wood is already commonly used for energy production, for both thermal and power applications, and wood is the largest source of renewable energy in Michigan (U.S. Energy Information Agency, 2021). Wood-based thermal systems can be installed for individual buildings or for district energy systems which serve multiple buildings.

The development of wood-based thermal energy can be a significant driver in regional economies and environmental health. Such technologies are sustainable, support local jobs and infrastructures, and help keep energy dollars in the state. In some cases, for some institutions, the community, economic, and environmental benefits of wood-based energy may be more important than financial benefits.

Regional examples can be found in parts of New England and in several European countries (e.g. Austria, Sweden, Finland, United Kingdom). A variety of technologies exist. Whereas, modern wood pellet devices can serve residences and small to medium sized business, advanced cordwood boilers might be best applied to small buildings and residences. Wood chip systems work best for larger applications, roughly 50,000 square feet and over, including district energy systems. With Michigan's large and continuously increasing forest inventory, there exists a significant opportunity to develop a wood-based thermal energy sector that contributes to community stability.

Thermal energy is defined as that energy required to heat and cool spaces (residences, businesses, institutions, etc.) and to produce domestic hot water. Thermal energy is distinct from, but can be connected to, electricity production and transportation fuels. Advanced wood thermal systems are clean, automatic, and highly efficient.

Woody feedstocks include wood chips, wood pellets, cordwood, demolition wood, and other woody municipal waste streams. There are also significant amounts of low-quality standing timber. These are all potential sources for thermal energy feedstocks.

References Cited

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U.S. Energy Information Agency. 2021. Michigan end-use energy consumption 2019, estimates. <https://www.eia.gov/beta/states/states/mi/data/dashboard/renewables>

Other References

BTEC - Biomass Thermal Energy Council, <https://www.biomassthermal.org>

IDEA - International District Energy Association, <http://www.districtenergy.org>

HTM - Heating the Midwest, <http://heatingthemidwest.org>

HTNE - Heating the Northeast, <http://www.nebioheat.org>

SWET - Michigan Statewide Wood Energy Team, michiganwoodenergy.msue.msu.edu

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A position adopted by the Executive Team of the Michigan Society of American Foresters on 7 November 2006. Revised and adopted on 30 April 2013, 29 May 2017, and 13 July 2022, and will expire after five years unless revised, extended, or withdrawn.

The Michigan Society of American Foresters is the scientific and educational association of professional foresters, including consultants, researchers, professors, students, and employees of public agencies and private firms. The Mission of SAF is to advance the science, technology, education, and practice of professional forestry to benefit current and future generations.