



Biomass hurdles

By LIZ MORRISON

MINNESOTA aims to get a quarter of its power needs from renewable sources, including biomass, by 2025.

That will create demand for agricultural biomass such as crop residues, says Joel Tallaksen, biomass gasification coordinator at the University of Minnesota West Central Research and Outreach Center. Tallaksen was a speaker



TALLAKSEN

Key Points

- Minnesota needs to develop a biomass infrastructure.
- Collection and handling are two of the biggest challenges.
- Researchers, industry partners are developing new methods.

at a recent biomass conference in Morris, which drew energy industry leaders, researchers and farmers from around the state. "But we need to develop the infrastructure to manage biomass," he says.

Two of the biggest hurdles for biomass producers are col-

lection and delivery, says Stuart Birrell, an Iowa State University agricultural engineer. "On most farms, logistics is the major limiting factor," Birrell says. Because of the Upper Midwest's short harvest window, speed is essential for crop residue collection. Birrell is leading research at ISU to develop a modular, one-pass corn stover harvester that can be attached to a standard combine.

Moving huge volumes of biomass from field edge to end user is another stumbling block, says Vance Morey, a U-M biosystems engineer. Farmers will collect biomass once a year

at harvest. Yet biomass users need a predictable year-round supply. A 50 million-gallon biomass-powered ethanol plant, for example, would need 500 tons of corn stover per day.

One option might be to set up temporary storage sites within a mile or two of cornfields, where bales could be coarsely ground and compacted into bricks — a process Morey calls "bale to bulk." Portable grinders and compacters are currently available. Compacted stover could then be trucked in 25-ton loads throughout the year, Morey says. He estimates that the cost per delivered ton of compacted

corn stover would be about \$75 to \$81. In 2008, U-M Morris paid \$63 per ton for loose bales delivered to its flexible-fuel biomass gasifier.

Harvesting only the corn-cobs would cost farmers around \$32 to \$46 per ton, according to estimates by Dave Archer, an agricultural economist at the USDA-Agricultural Research Service's Northern Great Plains Research Laboratory in Mandan, N.D. That includes the expense of collecting cobs, transporting them to the field edge and replacing lost nutrients.

Minnesota Valley Alfalfa Producers also is tackling the biomass-handling problem, says Keith Poier, MnVAP project manager. The 141-member cooperative operates an alfalfa pellet mill in Priam. It is testing technology that pulverizes, dries and pelletizes high-moisture agricultural fibers, such as stover, straw, alfalfa stems and grasses. The goal is to make biomass easier and cheaper to transport and store, Poier says.

Minnesota has yet to develop a workable biomass infrastructure, says Paul Kramer, president of Koda Energy in Shakopee, which will begin generating biomass power this year. But "the answers are out there," he says. "If we get enough people excited about this, we're going to find the answers."

Morrison is a writer based in Morris.

Conservation lands could provide biomass power

PUBLIC and private conservation lands could become sources of biomass for Minnesota's emerging biomass power industry, says Mark Lindquist, biofuels program manager for the Minnesota Department of Natural Resources. He spoke at a recent biomass conference at the University of Minnesota, Morris.

The state owns millions of acres of public nesting grounds, brush lands and forests, which could provide native grasses and wood for gasification or cellulosic ethanol.

For example, the DNR is working with U-M Morris and the Minnesota Valley Alfalfa Producers to test grass harvesting of wildlife

Key Points

- Conservation lands are potential sources of biomass.
- Harvesting grasses could augment prescribed burning.
- Low-value slash piles could also be used for biomass.

management areas. Harvesting on these lands could be done every five to 10 years to augment prescribed burning, Lindquist says.

However, private conservation lands may offer a larger opportunity for biomass production, he says.

"Prairie grass plantings need to be periodically rejuvenated. Fire was the primary mechanism for this rejuvenation and still remains the preferred

management tool," Lindquist says. "But prescribed burning is expensive, requires extensive training and is subject to weather limitations."

Harvesting grass from Conservation Reserve Program land every three to five years looks like a promising strategy that will improve habitat, won't cost the landowner anything and will provide part of the overall biomass supply, he adds.

Public and private forest lands could be another source of biomass. About 150,000 acres of Minnesota forestland are harvested each year, producing about 2 tons per acre of low-value slash — the tree tops, branches and residue left after timber harvest. Slash is currently worth about \$1 per ton on the ground, Lindquist says.



SCHMITT

Commercial wood products companies "have been using their waste wood for years to generate steam" to run their opera-

tions, says Ernest Schmitt, a DNR forestry technician from Douglas County. "We're just starting to get into marketing biomass from public forest-

lands." But this material is expensive to collect, dry and transport, Schmitt says. The DNR is working with other organizations, including the USDA and the Agroforestry Cooperative, to demonstrate more efficient collection methods, such as a slash baler.



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