

Turning energy dreams into reality

Straight facts to fuel the revolution

Extension answers new questions as Minnesota takes steps in renewable energy

Look around Minnesota and you see signs of a continuing shift to renewable energy production. Already, 895 wind turbines, 16 ethanol plants and three biodiesel plants are popping out of the landscape. That's only the start. University of Minnesota scientists are discovering the science that will drive the next generation of renewable energy.

The vision for Minnesota's renewable energy future is clear. We are going to change corn-stalks, switch grass, trees and animal waste into energy. That vision turns a little fuzzy when talk turns to details. Scientists are still researching the best chemical process for converting cellulose into energy. Extension's role in ethanol's evolution will be to answer the practical questions about how to use Minnesota's land for renewable fuel.

Talk to Gary Wyatt and you get an idea of the challenge that involves. The Mankato-based Extension educator helps individuals grow trees and prairie grasses to protect the environment. He is eager to apply his knowledge to biofuels, but knows there will be hard ground ahead. "No farmer will make the multi-year commitment to grow biofuel crops without confidence that there is a plant that will buy their biofuel crop. On the other hand, businesses won't want to build until they know they have the raw material," he said.

Wyatt frets about that conundrum, but he is not waiting for politicians and economists to solve it. He needs to get ready to help growers raise grasses and trees for energy while protecting the environment. Wyatt and Diomy Zamora, an educator in northern Minnesota, prepare by keeping in touch with research partners. One of those is Gregg Johnson. For eight years, Johnson has planted biofuel crops on the fertile soils of the University's Southern Research and Outreach Center near Waseca. The University of Minnesota researcher studies the biofuel potential of such diverse crops as willows, poplars, alfalfa, perennial flax, a wood legume known as false indigo, switch grass and a mixture of diverse plants. He is searching for answers on how to plant biofuel crops, which varieties to pick and where to plant them. Johnson explains his role this way, "I conduct research to get the basic production understanding of how to grow biofuel crops and where to grow them. Gary is on the ground trying to move these crops from a research project to reality."

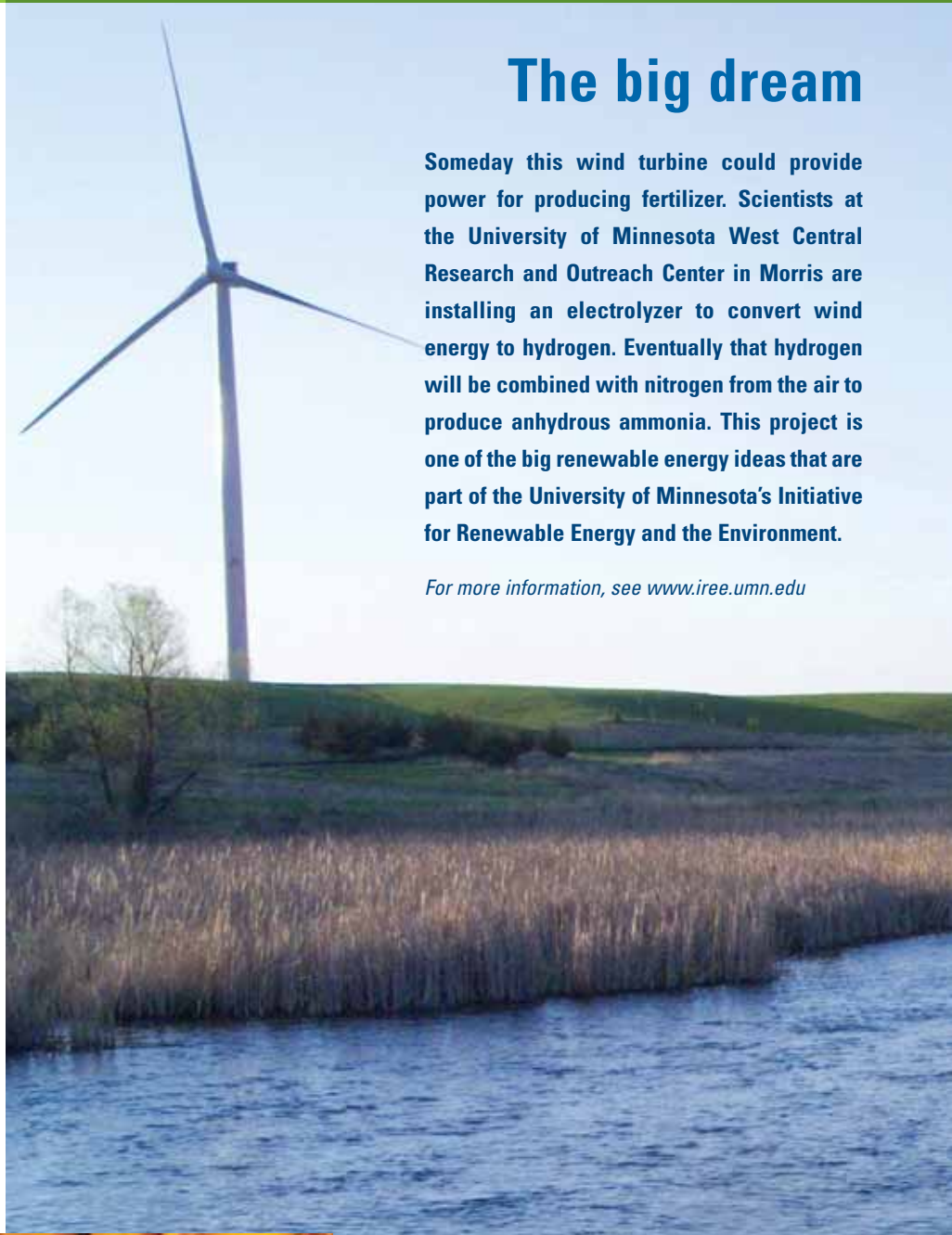
In southern Minnesota, Gary Wyatt, (left) natural resources educator, and Gregg Johnson, U of M biofuels crops researcher, work together to make Johnson's research results on the biofuel potential of diverse crops available to producers.



The importance of translating research into on-farm actions is also echoed by Craig Sheaffer, another College of Food, Agricultural and Natural Resource Sciences researcher whose career has focused on growing perennial grasses. The agronomy and plant genetics professor says perennial grasses will reach their biofuel potential when growers have answers to questions about selecting the right species, establishing the stands, managing fertility, harvesting the crop, and doing all this while protecting the environment. Ask him how to get those answers and he responds, "Establish on-farm applied research plots where Extension and local farmers work together to figure out what works best in their ecoregion."

While Wyatt prepares for renewable fuel challenges, Mark Whitney is already on the front line. Minnesota pumps out 620 million gallons of corn ethanol a year, but only the starch from the corn kernel goes into your tank. The Mankato-based Extension educator comes up with ways to use the leftovers. "Poultry and swine producers in particular are interested in reducing costs by feeding by-products to their animals," he said. Whitney provides research-based solutions to feeding ethanol byproducts to animals based on years of University of Minnesota research. In a similar manner, Extension will answer new questions that emerge as Minnesota takes the next steps in renewable energy.

*For more information, see
www.extension.umn.edu/woodlands*



The big dream

Someday this wind turbine could provide power for producing fertilizer. Scientists at the University of Minnesota West Central Research and Outreach Center in Morris are installing an electrolyzer to convert wind energy to hydrogen. Eventually that hydrogen will be combined with nitrogen from the air to produce anhydrous ammonia. This project is one of the big renewable energy ideas that are part of the University of Minnesota's Initiative for Renewable Energy and the Environment.

For more information, see www.iree.umn.edu

Burning ring of fire



A corn burner at Central Lakes College in Staples, Minn. is both a practical source of heat and the subject of several research projects.

Norm Krause is proud of the corn burner that heats a 6,000-square-foot building at Central Lakes College in Staples, Minn. The director of the college's Ag Center is even more interested in the burner's potential as a research tool. Krause is working with Extension economist Steve Taff to analyze the energy efficiency and the economics of the burners. In addition, Extension soil scientist Carl Rosen is testing how ash residue from the burner affects soil fertility.

The burner is one impact of the focus of Clean Energy Resource Teams (CERTs) on community-scale energy efficiency and

clean energy projects. CERTs are part of the Regional Sustainable Development Partnerships, a University of Minnesota Extension effort focused on long-term sustainability of natural resource-based industries and the communities that depend on them. The CERTs effort includes dozens of demonstration projects and received the 2006 Minnesota Environmental Initiative's Partnership of the Year award for its efforts.

*For more information, see
www.regionalpartnerships.umn.edu*