



**A National Association of
Conservation Districts Report**

Energy Conservation in Agriculture

Introduction

Seldom in history have America's farmers and ranchers been asked to do so much. In addition to providing food and fiber for a growing population at home and abroad, 21st century producers are growing energy crops needed to feed the rising demand for domestic, renewable energy.

Because the agriculture sector is a major user of energy in the American economy and because the high cost of energy inputs affects their own economic sustainability, producers are also working to conserve energy and generate renewable energy in their operations. In both cases, the net result is the conservation of increasingly costly nonrenewable energy. Despite the many noteworthy and important gains in the development of renewable energy sources, energy conservation remains the most effective way to reduce reliance on fossil fuels.

Farmers and ranchers, often with help from conservation partners, are finding ways to achieve new efficiencies and conserve energy. As this report underscores, the innovative spirit and can-do attitude are alive and well in rural America. Here we highlight how agricultural producers are changing farming and ranching practices to conserve energy, reduce consumption and generate energy from renewable sources.

The innovations include increasing reliance on wind and solar to power production systems and share energy with other users. Methane digesters are being used to produce power from animal wastes, turning a potential environmental problem into an opportunity. Equipment modifica-

tions, sometimes simple, sometimes high-tech, are helping producers achieve new efficiencies and energy savings. Producers are modifying irrigation practices to conserve energy and water. No-till and related cropping practices are reducing energy inputs and building healthy soil. Producers are also rapidly blazing new trails in the production and use of bioenergy.

It is clear that agricultural producers across America are changing farming and ranching practices to meet 21st century needs. In many cases, other benefits accrue. These include enhanced economic and environmental sustainability and achieving multiple resource goals. In addition, as this report highlights, producers are finding that new, efficient systems are saving them something most precious: Their own time.

While many producers have taken steps in this direction, there's much more work to be done. Significant barriers sometimes prevent broader application of practices highlighted here. These include cost and lack of technical assistance. More outreach and education is needed to supply producers with needed information.

Conservation districts and their partners – including the Natural Resources Conservation Service, resource conservation and development councils, state and local governments, private businesses, communities, nonprofit groups and other entities – are well situated to provide help. Many are already involved, providing technical assistance, education, cost-sharing and other support. One example is the suite of Energy Estimator tools made available by NRCS. These simple-to-use, web-based tools help producers calculate energy usage and potential savings in several categories.

Despite the many positive trends, the work has really just begun. Many producers have made changes at their own expense and will continue to do so. But to achieve maximum benefits, enlightened public policy will be needed at the federal, state and local levels. Future public policy should be focused on helping farmers and ranchers become part of America's energy solution. The private sector must play an equally important role in this era of cooperative conservation.

This report highlights some of the effective partnering strategies already in place.

In recent years, many states have adopted policies that encourage and provide cost-sharing for energy conservation and renewable energy production on farms and ranches. Agencies in the U.S. Department of Agriculture, Department of Energy and Department of the Interior provide



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programs that can assist producers as they work to achieve efficiency and energy independence in their own operations and for the nation. Wise public expenditures on programs that provide assistance to farmers and ranchers are an investment in America's energy self-sufficiency.

At the local level, energy conservation efforts and the emerging bioeconomy offer opportunities to link rural and urban populations as partners in conservation.

In the private sector, energy companies will need to find new ways to meet customer demands and reach the potential that a more distributive energy system offers. Many energy companies are responding to these needs and developing "green" strategies that are attractive to their customers and to producers.

Entrepreneurs will find countless new opportunities in the fields of energy conservation and renewable energy production, spurring economic development in rural and urban areas.

It is an exciting if demanding time in rural America.

The goal of this report is to help raise awareness among producers about the opportunities that exist today. NACD also will share the findings with a wide array of conservation, agricultural, commodity and nongovernmental organizations to act as information multipliers and secure the broadest possible distribution.

In many cases, the examples cited here are the actual voices of America's farmers and ranchers. What better way to encourage participation by their peers.

While this report highlights successes across the nation, it is not a comprehensive assessment of energy conservation activities. A more comprehensive survey of activities by region and state would be worthwhile. It would help producers, policy-makers, private businesses and conservation partners focus attention and efforts on strategies that will achieve maximum benefits for all.

May, 2007

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ABOUT THE REPORT:

The intent of this report is to provide examples of energy conservation activities on America's farms and ranches. It also focuses on renewable energy generation on farms and ranches, which leads to conservation of energy from nonrenewable sources. While the report offers examples from regions throughout the country, it is not a state-by-state accounting. Most of the examples cited here can be shared across regions and the country. We encourage broad sharing of this report to help farmers and ranchers learn from their peers.

SPECIAL THANKS:

The primary sources of information for this report came from state and local conservation partners and farmers and ranchers across the country. Thanks to our partners and the following states for their generous donation of time, talent and energy in helping gather information: California, Idaho, Georgia, Hawaii, Massachusetts, Minnesota, Mississippi, Nebraska, Nevada, New York, North Dakota, Ohio, Oregon, South Carolina, Vermont, Virginia, Wisconsin, Wyoming.

Energy Conservation in Agriculture

Georgia: Local biodiesel feedstock, local users

You could say that one thing led to another as Rick Huszagh and Crista Carrell put biodiesel to work on their Mountain Creek Farm near Athens. Rick brews the biodiesel on site, and it powers tractors and other equipment on the livestock/hay operation.

First, Rick got ahold of some stainless steel tanks, complete with agitators, from a friend. Then he found a state-based company that offered him a free feedstock – chicken oil, made from renderings of poultry processing operations. The chicken oil is low in free fatty acids, which makes for an excellent feedstock. “The key is locking up that feedstock. The beauty of it is if you have that feedstock, then cooperatives could be making biodiesel for their farmer members,” Huszagh says.

Making biodiesel involves several steps over a couple of days, but the end result is a valuable renewable fuel

source.

“It took awhile to get it right, but the beauty of it is I am taking a local source of oil and creating my own fuel. I can run any diesel vehicle on it,” he says. Well, he did have to modify the hoses on his old John Deere 4010, and while he uses mixes of 80 or 90 percent biodiesel in warm months, when it turns cold, more petroleum diesel is used then to prevent fuel jelling.

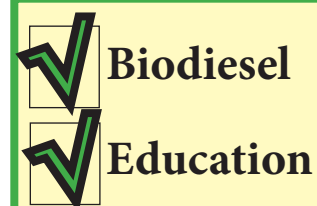
The family plans to break ground soon on a biodiesel manufacturing fa-



cility that will serve select customers, including a local municipality. It will have another function, too. “We’re big believers in environmental education, for our own children and others,” he says. They plan to use the facility to educate city and rural youths about the potential of renewable energy.

The word will spread beyond their farm, too. Rick was recently appointed to the state Biofuels Committee. Crista is a supervisor on the Walton County Soil and Water Conservation District Board, and she’ll spread the word through the district’s networks.

For more information on this project, contact Rick Huszagh at 678-522-6560 or rick@mountaincreekfarm.com.



Energy Conservation in Agriculture

Hawaii: Reaching for self-sufficiency on Kaua'i

Partnership is the name of the game in Hawaii, where Kaua'i Island Utility Cooperative (KIUC) has entered into four agreements with local and overseas farmers and businesses to build renewable energy facilities.

Upon completion, the plants could account for nearly half the island's electrical demand, according to East & West Kaua'i Soil and Water Conservation District Conservation Specialist Monika Mira. The district has helped to facilitate the projects.

Kaua'i is the northernmost of the main Hawaiian Islands. Known as the Garden Isle, it is about 550 square miles, with a population of more than 58,000 people.

KIUC partnered with tree farmer Bill Cowern and Green Energy Hawaii to build a biomass-to-energy facility that will burn wood chips from trees

grown on the island. Cowern owns Hawaiian Mahogany, which grows cabinet-quality trees on 3,600 acres. The power plant will burn chips from entire trees and wood waste from sawmill operations, according to the agreement. It is projected to be up and running by late 2007.

KIUC also has signed on with UPC Kaua'i Wind Power LLC to develop a wind plant on Kaua'i. The company is a joint venture of the Boston-based wind farm developer UPC and Makani Nui Associates, which is also developing a wind farm on Maui.

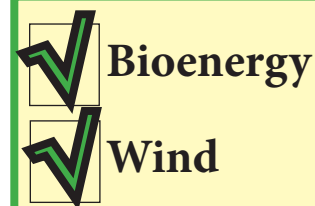
A third agreement is a waste-to-energy plant that Colorado-based Barlow Products will build. The system will be designed specifically for the volume of Kaua'i's trash flow.

The fourth facility is a biomass plant that Maine's Cleaves & Co. plans to

move from California. Initial plans are to import walnut shells as a fuel source and eventually to find a locally generated biofuel crop.

Size of the plants remains under negotiation, conservation district specialists say. The utility has agreed to purchase power at an agreed-upon price, but purchase-power agreements are still in the works.

For more information, contact Monika Mira, conservation specialist in the East & West Kaua'i Soil and Water Conservation District, 808-245-6513, ext 117; monika.mira@hi.nacdnet.net.



South Carolina: Saving energy through EQIP

Producers in central South Carolina work with the Orangeburg Conservation District and the local NRCS office to develop more efficient irrigation practices through EQIP. The same program is also helping producers convert to biodiesel fuels for their equipment.

From 2006 to 2007, five producers enrolled multiple systems in the program. That encompasses 1,200 acres



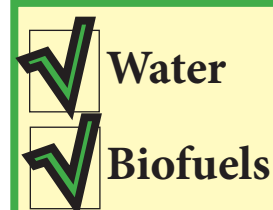
of corn, cotton, peanuts and grasses. Each participant went from a high-pressure to a low-pressure irrigation system. In some cases, landowners have calculated a water savings of 25 percent, says Frank Stephens, district conservationist. "It decreases drift and puts the water right where it needs to be," he says.

Retrofitting irrigation equipment not only saves water, but the increased efficiency of the systems saves time, too. "Guys are telling me they're getting done quicker," says Stephens. "It's a better turnaround, and they like not having to push their systems."

The district and NRCS also helped to enroll five producers in an EQIP program that encourages the use of B-20 biodiesel fuel in farm equipment. A cost-

share of 60 cents per gallon is offered on up to 10,000 gallons annually over a three-year period. Producers are eligible for a total cost savings of \$18,000 over the three-year period. "Our producers have said that the use of biodiesel fuel is good for American farmers, and it can help reduce our dependence on foreign oil," Stephens says.

For more information, contact Frank Stephens, district conservationist, NRCS Orangeburg, 803-534-2409 ext. 117, or email him at Frank.Stephens@sc.usda.gov.



Energy Conservation in Agriculture

Minnesota: Wind turbines feed needs of farmers

A few years ago, Minnesota farmer Mark Thelle began to think about alternative energy sources. "At the time I was thinking about retirement and not wanting to have a light bill to worry about," says Thelle.

Thelle purchased a recycled 17.5 KW Jacobs wind turbine at a cost of roughly one-third of a new model, he says. Thelle, a Carlton Soil and Water Conservation District supervisor, learned everything he could about his new power generator. Now, he and his son do most of the maintenance. Thelle actually had to train electrical inspectors on how to measure the energy it generates and feeds to the grid.

He is able to generate enough power to satisfy the needs of a farm that houses 120 beef cattle, 20 hogs,

and 900 chickens. In spring, fall and winter, the turbine has satisfied 100 percent of his energy needs, and he has as much as 500 kilowatts of overage some months. In the summer months, says Thelle, a lack of wind and more energy needs for his meat coolers reduce the turbine's service to roughly

"It is important that people see they can work. Hopefully it encourages others."

***~ Brad Matlack
Carlton Soil and
Water Conservation
District manager***

70 percent of his total energy needs.

"It works fine for me because I understand it," says Thelle. "For the average person, it might be better to pool resources and go with a larger model."

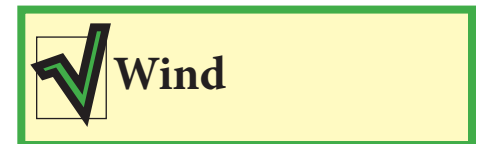
Minnesota's laws encouraging renewable energy production have benefited Thelle. "It's easier in Minnesota to do the

small operations because the power companies have to work with (producers) by law as long as they meet certain standards," says Thelle.

Thelle is one of two state SWCD supervisors to use a wind turbine. The conversion has not been perfect, says Carlton Soil and Water Conservation District Manager Brad Matlack, but it's helped others think about alternative energy.

"Traditionally, there have not been a bunch of wind turbines around," says Matlack. "It is important that people see they can work. Hopefully, it encourages others."

For more information on this project, contact Brad Matlack, manager of Carlton Soil and Water Conservation District, 218-384-3891, or email him at bradmatlack@carltonswcd.org.



Massachusetts: Veggie oil furnace heats greenhouses

Massachusetts organic vegetable grower Jeremy Barker Plotkin used a state grant to purchase a waste-oil burning boiler, which he uses to heat his 30-by-70-foot greenhouse. Plotkin burns used fryer oil that he collects from local restaurants and grocers. In addition to heating the air, the boiler system enables Plotkin to heat specific zones that are dedicated to the greenhouse's "hot benches" – plant beds that are heated hydronically.

The grants don't pay for installation, so Plotkin had to do most of that himself. "I spent a lot of time on the phone speaking with the manufacturers' technical support people, and I hired a

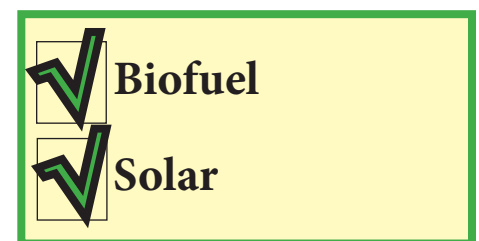
contractor to do a lot of the plumbing," he says. Over and above the grant of \$13,000, Plotkin figures he has \$2,700 of his own money invested in what he calls his "veggie oil burner." He estimates that, depending on the weather, he is saving \$1,000 to \$2,000 per year in fuel, and "the plants love it."

Plotkin also received a grant to purchase a passive heat storage system comprised of large black plastic water bags that soak up heat during daylight hours and radiate the heat at night.

He credits Mary E. Johnson, director/conservation planner for the Massachusetts Association of Conservation Districts, with helping develop a con-

servation plan for his grant applications to the department's Agricultural Environmental Enhancement Program, which funded the project.

For more information, contact Jeremy Barker Plotkin 413-323-9608.



Energy Conservation in Agriculture

Minnesota: Native grasses great for greenhouse

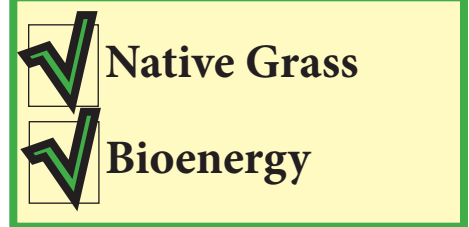
Minnesota greenhouse nursery owner Eric Kreibermacher is in the process of converting his heating system from LP gas to pelletized native grass and forbs. Kreibermacher's pellet power will come from native grasses he plants and harvests on his eastern Minnesota land near Lewiston.

Winona Soil and Water Conservation District Manager Tim Terrill says results of energy savings and output are being monitored by Winona State University and the Agriculture Utility Research Institute. The studies will provide data on efficiency and production, and the university also will examine soils and how wildlife and insects are affected. The goal is to provide information on how to protect the environment while using working

lands to grow energy crops.

The system will also show how a naturally restored prairie can work as a farm and in multiple ways rather than for a single use, Terrill says. Research at the University of Minnesota says prairie grasses can represent a new, valuable cash crop. In a "Science" magazine story, the researchers reported that a field planted with a medley of prairie grasses and flowering plants packed more than triple the energy of single-variety grasses. The study also estimated that mixed prairie grasses grown on marginal farmland would yield 51 percent more energy per acre than corn cultivated on fertile land.

For more information on this project, contact Tim Terrill at tim.terrill@mn.nacdnet.net.



Oregon: No-till calculations show big savings

No-till and other minimal tillage systems have had major impacts on farming practices across the country. Among them is cost-savings on fuel from reduced trips across the field.

Conservationists in the Wasco County Soil and Water Conservation District used NRCS Energy Estimator Tools to come up with dramatic proof of the savings for county wheat growers in 2006.

On 62,000 acres of winter wheat cropped under the no-till chemical fallow method, the calculated savings compared to conventional tillage came to a total of 239,320 gallons of diesel fuel. Using a base of \$2.30 per gallon, that's \$550,436 in total savings for Wasco producers.

The NRCS Carbon Estimator Tool also calculated sequestering of 7,496 tons of carbon through innovative cropping practices.

Seventy-four percent of the county's small grain production is in direct seed/no-till, says Ron Graves, Wasco

district manager. The practice has been in use for about 10 years. In the early years, the district used EQIP education funding to raise awareness about no-till benefits. "We took full advantage of educational dollars available in the early years of EQIP. We had a lot of workshops and got community leaders involved in no-till, and it mushroomed from there. It sure helped to have cost-share incentives available through Farm Bill programs, too," Graves says. Producers also benefited from grants the district obtained for cost-sharing, including EPA 319 Program grants and State Department of Environmental Quality grants.

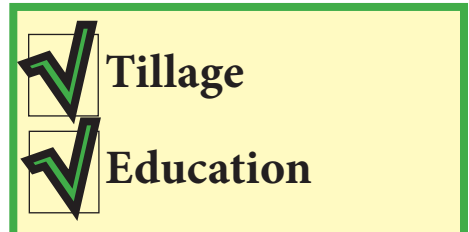
Several county growers also use precision agriculture technologies for most efficient cropping, adds Graves. The NRCS Energy Estimator Tool for Nitrogen shows savings of up to 20 percent on anhydrous ammonia fertilizer applications using overlap reduction technology on tractors. Variable

rate technologies for applying seeds, fertilizer and pesticides can boost savings by another 10 to 15 percent. The technologies include the use of GPS devices on no-till drills that produce savings by turning off fertilizer or pesticide applicators to prevent overlap.

"One of the biggest uses of energy in agriculture is the production of fertilizer," he says.

In addition to those savings, producers using these cropping systems enjoy other gains, including reduced wear and tear on equipment and, maybe best of all, savings on their own time, says District Conservationist Dusty Eddy.

For more information, contact Ron Graves at Ron.Graves@or.nacdnet.net.



Energy Conservation in Agriculture

Ohio: Corn heats a greenhouse to serve local markets

Corn is better than propane for an Ohio producer.

Larry Hall and his partner manage more than 1,000 acres of corn, soybeans and tobacco in Georgetown, near Cincinnati. Hall also operates a hydroponic greenhouse to produce tomatoes he sells locally to grocery stores and restaurants. A few years ago, Hall began exploring alternative heating options for his greenhouse.

By converting from propane to corn, Hall says he has trimmed his greenhouse heating costs significantly.

“I expanded the whole operation three years ago, realizing that propane was starting to go up,” he says. “Next to labor, it was my highest cost.”

Now Hall relies on corn for 80 percent of his heating needs, burning approximately 6,000 bushels in a heating season. His propane usage has been trimmed from 30,000 gallons to 8,000.

A holding bin stores up to 800 bushels, and the corn feeds automatically



into the boiler unit. Once a day, Hall cleans out the boiler of ash accumulation.

“I like it really well,” he says. “There’s a little more labor involved, but even at \$4 a bushel, it’s cheaper than what I pay for propane.”

Hall is a former member of the Brown Soil and Water Conservation District board of supervisors. Over the years, he has worked with the SWCD to install a variety of conservation practices, including grassed waterways and no-till planting.

“He and his partner were no-till pioneers in this county,” says Sheila Waterford, district administrator.

For more information on this project, contact Sheila Waterford, district administrator, Brown Soil and Water Conservation District, 937-378-4424, ext. 121, or email her at Sheila.waterford@oh.nacdnet.net.



 **Renewable
Heat Source**

Energy Conservation in Agriculture

Ohio: Organic methods combine with wind, sun

Produce grower Barry Adler turned greenhouses, orchard trees and a large garden on his nine-acre farm near Plain City, Ohio, into a local “green” growing business that operates year-round. He uses organic practices to grow crops and wind and sun to power the operation at RainFresh Harvests.

“No one else was doing it, and there appeared to be an impending energy and environmental crisis on the horizon,” he says. “I felt that I could do

the research and develop a renewable energy system for year-round production in a Midwest climate.”

Adler uses solar photovoltaic panels and a wind turbine for heating and electricity for two greenhouses.

Organic fertilizer, worm composting, crop rotation and cover crops aid production yields. Adler harvests and sells the crops the same day they are picked. Packaging also is “green,” using containers made from corn for retail sales and reusable containers for

restaurant deliveries.

Financial backing came from his family and cost-sharing grants from the Ohio Department of Development. RainFresh Harvests opened in December of 2003.

The past couple

of years have been spent “tweaking” and modifying the conservation system, he says. It is completely off-grid and uses minimal supplemental propane heat. In winter 2007, he plans to eliminate propane with solar thermal curtains and additional thermal mass. He is also expanding into another outdoor field, next to his orchard. “Production is very good, but there’s room for improvement,” he says, “and the demand is excellent.”

Adler hopes to market the system to other growers. Meanwhile, he is working on making year-round supplies of fresh, local foods available to chefs and grocers.

For more information, contact Barry Adler at (614) 738-9559, or visit his Web site, www.rainharvests.com.



Oregon: Swamp buggy rises again to save energy

Farmer Eric Horning of Benton County, Oregon, is an example of the age-old value of rural ingenuity and elbow grease applied to saving energy. In deciding to overhaul his well-used 1970’s era “swamp buggy” sprayer, Horning estimates he saved \$15,000 compared to the cost of replacing the machine with an updated but used version.

Horning significantly increased fuel efficiency by swapping out the old gas engine with a used diesel engine from a school bus. He outfitted the booms with new applicator guns for greater precision and efficiency. He did the work himself and is quick to

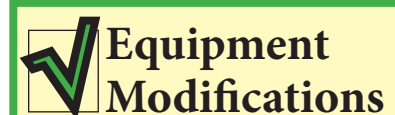
point out that the savings in dollars does not account for his time.

Horning also participates in EQIP for irrigation and residue management, both energy-savers for the farm. He also has a Conservation Reserve Enhancement Program (CREP) contract to protect a riparian area on his farm.

Horning is also keeping an eye on technologies that will enable him to produce his own ethanol and bio-diesel. He wants to explore the viability of building a wheat-based ethanol plant on his farm. He and other Oregon farmers are monitoring progress on a biodiesel microreactor being

developed at Oregon State University in association with the Oregon Nanoscience and Microtechnologies Institute (ONAMI). Researchers say the microreactor concept could enable farmers to produce all the energy they need from what they grow on the farm — utilizing a suitcase-sized unit.

For more information, contact Eric Horning at ehorning@casco.net.



Energy Conservation in Agriculture

Georgia: Tillage techniques are tried and tested

Cook County, Georgia, farmer Simmie King is a soft-spoken man who has made a big difference. A strip-till pioneer, King has saved countless dollars by limiting passes on his fields over the past 20 years. He uses clover to add “green nitrogen” to the fields and believes that the clover harbors beneficial insects that reduce the need for pesticides. An Alapaha Soil and Water Conservation District supervisor, King has worked with Cooperative Extension and University of Georgia on research that confirms the nitrogen-fixing potential of clover.

Rye and wheat are also used as cover

crops on the farm, where King grows corn, cotton, soybeans and peanuts. He strip tills rows about four to six-inches wide and uses a subsoiler to break up hardpan. “We try to leave most of the field untilled, and we don’t till after we plant,” he says. In addition to savings on inputs, the tillage method allows him to conserve moisture during dry periods and prevent soil erosion in flash storms.

King marvels at how well the system works. “I don’t know why people waited so long to get started. I guess we didn’t have the technology,” he says.

The Alapaha district encourages reduced-tillage practices. It operates a no-till grain drill that is used on fields across the county. King has also hosted field days highlighting his tillage practices.

For more information, contact Simmie King at 229-896-4386.



Oregon: Catching the rain makes natural sense

Delano Farms in Oregon is saving money through conservation efforts and helping restore waterways and wildlife habitats with its three-year-old roof rain catchment system.

The catchment system consists of solar panels installed on top of the barn and a submersible pump that runs off the panels and into a tank. From there, gravity feeds the water into the cattle trough. Rainwater is routed off the barn into the same tank, helping to meet needs on cloudy days.

“It’s awesome,” says ranch manager Rennie Squire. “It’s been trouble-free and low maintenance, and it provides water year-round. When it’s hot and dry, there’s plenty of sun to pump, and in the winter there’s plenty of rain.”

Overall, the system cost about \$14,000, she says, and in part was funded with EQIP cost-sharing. A good portion of the cost came in barn improvements to hold the system. Costs also included fencing four separate pastures on the 200-acre ranch to keep the 80 to 100 cattle away from ponds and creeks.

This was the last leg of a 10- to 12-year conservation plan for the farm that also included adding some native plants around the creeks for restoration and weed control for invasive species, she says. The improvements are important in a watershed where conservation efforts are focusing on increasing salmon population.

For more information on this project, contact Howard Delano of Delano Farms and ranch manager Rennie

Squire at 503-631-2315, and Jeffrey A. Kee, conservation specialist in the Clackamas Soil & Water Conservation District at 503-656-3499.



Energy Conservation in Agriculture

New York: District setting up community digester

A New York soil and water conservation district is coordinating one of the first community methane digesters in America. The Cayuga County Soil and Water Conservation District plans to use waste from three local dairy farms, and the power generated will service the energy needs of several county buildings.

It is a project that has been in the works for some time. In the early 1990s, Jim Hotaling started taking calls from concerned citizens in his district. The odor of animal waste had become a concern, and the people had turned to Hotaling to offer a solution.

Hotaling, the executive director for Cayuga County SWCD, hired a nutrient manager, tried using windmills to reduce the odor and urged landowners to alter manure-spreading methods. But the light bulb went on for Hotaling, he says, when he took a 1994 trip to Europe and had a chance to tour operations in the Netherlands and Denmark. "Once I saw what they were doing, I shook my head and thought, 'What are we doing?'" The Europeans were using methane digesters to dispose of animal waste and to create power.

Hotaling has spent the better part of the past decade trying to develop a pioneering community hydraulic-powered methane digester in his district. And, because a county nursing home, 911 call center, jailhouse, and the Farm Service Agency and district offices are all situated on the same parcel of land, Hotaling says the digester will be able to supply enough power to service all the buildings.

But the process has been long and taxing. Hotaling had to figure out how to overcome the considerable expense of transporting the waste to the plant. Through a partnership with Eco Tech-

nology Solutions, he was able to make it work. He's had to secure permits, get the approval of town and county representatives, provide road access, and work with European and American engineers. And, of course, he had to locate funding.

A New York State Research and Development grant has been a big help, as have USDA Rural Development and USDA/NRCS Innovation funds. CCSWCD has also worked with its congressional delegation to secure funding.

The building has been constructed, and Hotaling expects more progress to take place in 2007.

The plant has made arrangements with dairy farms of varying sizes to supply the waste. All are within a 10-mile radius of the plant. One operation has 900 cows, another has 250, and the third farm has 175. "We're working with the small guy as well as the large guy," said Hotaling.

The plant has room for growth, and Hotaling said there has been great interest from other local dairy farmers.

For more information on this project, contact Jim Hotaling, executive director for Cayuga County Soil and Water Conservation District, 315-252-4171, or email him at jhotaling@cayugaswcd.org.



Information on digesters

The April 2007 issue of the Conservation Technology Information Center Partners magazine includes information on community approaches to anaerobic digesters.

<http://www.conservationinformation.org/partners/040107/livestock.asp>

Other general resources include the following:

Agriculture Marketing Research Center provides research information on anaerobic digesters. The center is a national information source for value-added Agriculture at Iowa State University. <http://www.agmrc.org/agmrc/commodity/biomass/anaerobicdigesters/>

The Bioplex Project at West Virginia State University is a multidisciplinary research project focusing on adding value to agricultural residuals through anaerobic digestion. Resources and information are available at the Bioplex Project Web site. <http://bioplexproject.wvstateu.edu/index.html>

A US EPA AgStar paper on biogas recovery systems offers practical information for producers. <http://www.epa.gov/agstar/pdf/manage.pdf>

Community Manure Handling Systems bibliography by John Reindl of Dane County, Wisconsin, provides case studies and other information. <http://www.danewaters.com/pdf/systems.pdf>

The Minnesota Project analyzes the feasibility of digesters for mid-sized dairy operations. <http://www.mnproject.org/e-newdigesters.html>

Energy Conservation in Agriculture

Virginia: Switchgrass can meet multiple goals

Virginia's efforts to encourage producers to grow switchgrass touches a wide array of people, resource needs and concerns.

It involves farmers in southern Virginia, staff at the Conservation Management Institute at Virginia Tech, NRCS state staff and the state conservationist's Technical Advisory Committee.

Several projects are either under way or planned to convert boilers to burn organic substances. Included is one nearing completion at the state-owned Piedmont Geriatric Hospital in Burkeville. The boiler burns sawdust, but the conversion will allow for burning woody biomass and switchgrass. Another project in Gretna is focused on developing a pyrolysis system to convert switchgrass to bio oil, a substitute for fuel oil.

As these and other projects take root, more producers are becoming interested in growing warm-season grasses like switchgrass, says Jeff Waldon,

executive director of the Conservation Management Institute. Several have already planted fields in anticipation of demand.

In some cases, switchgrass will help generate income from former tobacco land that's underutilized. Using fertilizer from poultry operations in the Shenandoah Valley to boost yields may also help address concerns about nutrient loading in critical watersheds. Producers in the South who rely on cool-season grasses for livestock can boost summer yields substantially by integrating warm-season grasses into their systems, says Waldon.

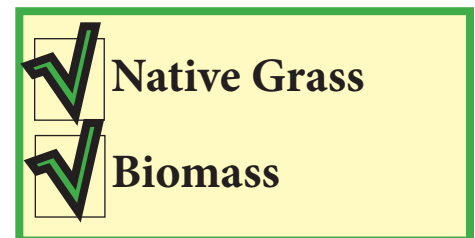
"We're working to encourage producers to grow more switchgrass," adds Ken Carter, NRCS assistant state conservationist for programs. The state Department of Agriculture supports putting the working lands back to use, and wildlife organizations favor the habitat potential of long-term switchgrass cropping.

The NRCS State Technical Advisory

Committee recently reviewed a proposal to add cost-sharing for planting switchgrass to the state's EQIP priorities. Funds will be available to producers in 2008 for removing existing vegetation and introducing switchgrass through no-till methods.

Switchgrass can take up to three to four years to mature to a harvestable crop, but once it's established, the potential is long-term. "We have established plots in the state from colonial times," says Carter.

For more information, contact Ken Carter at carter@va.usda.gov or Jeff Waldon at fwixchg@vt.edu.



Oregon: An on-farm hydroelectric plant

Lucien and Juliette Gunderman had a dream that their diversified livestock and timber operation could use hydro-power to meet their energy needs and supply others. It took about 20 years to fulfill the dream, but the project was completed in 2002.

Their Crown Hill Farm in northwest Oregon receives about 45-50 inches of rain a year. Working with a hydrologist and other experts, they built a series of lakes and collection ponds to store runoff. The water powers a 30-kilowatt hydro-power plant with two turbines that operate in unison. Output ranges from 500 watts to 30 kilowatts. Water leaving the powerhouse runs into a nearby creek.

The system monitors water temperature and lake levels to prevent releasing water that is too warm into the creek.

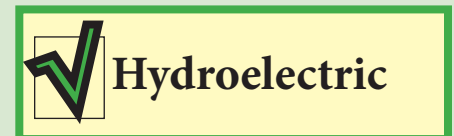
The Gundermans have a net metering contract with McMinnville Water & Light. Power fed to the grid is credited to the Gundermans under a net-metering agreement.

Recent improvements to the system are expected to double yearly output from the average 22,500 kilowatts generated annually.

Among the partners assisting with the project was the Northwest Oregon RC&D Council. Twenty-one local, state and federal agencies had jurisdiction or commented on the project.

The Gundermans have a 20-year hydro license.

For more information, contact Northwest Oregon RC&D Coordinator Rhoda Portis at rhoda.portis@or.usda.gov or 503-359-9594.



Energy Conservation in Agriculture

Idaho: District, utility, farmers work together

Franklin Soil and Water Conservation District in Idaho is partnering with Pacificorp (operating as Rocky Mountain Power in Utah, Wyoming and Idaho) to develop and operate a water and energy resource management program. Irrigation Energy Savers helps farmers improve energy efficiency in their irrigation systems.

Howard Nelson of Preston, Idaho, who owns and operates a 730-acre dairy farm that also raises alfalfa, corn for silage and small grains such as barley and wheat, entered the program in late summer last year. "We're doing

everything we can to be as efficient as we can," Nelson says.

The program allows farmers to receive new nozzles, gaskets and drains and cash incentives for pivot/linear system equipment upgrades. Many participants are installing a variable frequency drive into their pumping plant to adjust the speed of the pumping and avoid excess water and energy use.

On-site energy and water management consultations and pump tests also are done to determine whether engineering and other incentives are needed for comprehensive system upgrades. Farmers are adopting the district's suggestions for water sched-

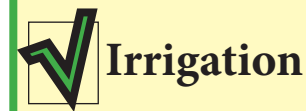
uling and soil moisture monitoring, District Manager Lyla Dettmer says.

The program has provided \$232,244 of incentives to replace and upgrade system components, which will result in more than 3 million kilowatt hours of energy savings. More than 50 water and energy consultations are complete, resulting in nearly 170,000 kilowatt hours of energy savings.

For more information, contact Lyla Dettmer, district manager, Franklin Soil and Water Conservation District, (208) 852-0562, ext. 101 or e-mail at administrator@IESavers.net.

"We're doing everything we can to be as efficient as we can."

**~ Howard Nelson
Idaho farmer**



North Dakota: Rancher fired up about solar pump

North Dakota rancher Wayne Kromarek utilizes a solar pump to meet the watering needs of his more than 100 head of livestock. Located in the southwestern corner of the state, Kromarek's fields are more than a mile from the nearest power source. It would cost several thousand dollars to run power lines to his operation.

Six years ago, he began to work with

the local NRCS office and the Bowman/Slope Soil Conservation District to examine energy alternatives. With their assistance and funding from an Environmental Protection Agency 319 cost-share grant (60 percent), Kromarek was able to add a solar water pumping system. In addition to energy savings, the system is an energy boost to his cattle. Having fresh water available has helped to add 50 pounds on average to his calves, he says.

"Without (the help of NRCS and the Bowman/Slope SCD), I wouldn't have been able to afford to put in the systems," says Kromarek.

Now the conservation partners organize well-attended tours of Kromarek's ranch to

educate others. Kromarek is happy to oblige. "I encourage it," he says. "It's so fascinating to me. I think it's a great technology."

"This has been a great collaborative effort with NRCS to provide cooperative assistance for Wayne," says Camie Janikowski of the Bowman/Slope district.

For more information on this project, contact Camie Janikowski, Bowman/Slope Soil Conservation District, 701-523-3871 ext. 106, or email her at camie.janikowski@nd.nacdnet.net.



Energy Conservation in Agriculture

Wisconsin: Sharing the bounty of cow power

Gale Gordon, owner of Gordondale Farms in Nelsonville, Wisconsin, was an anaerobic digester pioneer of sorts in Wisconsin.

“We were out in the front when there wasn’t help money, so it was a leap of faith,” Gordon says. “It’s working as well as we expected.”

Gordon installed the digester about five years ago when building a new dairy facility with the hopes of eliminating odor, conserving energy and being more environmentally sound. He put up the roughly \$700,000 cost and partnered with local electric utility Alliant Energy, which paid for the engine and generation equipment.

The digester breaks down manure from his 900-plus herd of dairy cows for bedding, electricity and cleaner air.

An anaerobic digester system is an enclosed tank in which manure

is passed through and broken down by naturally occurring bacteria. That produces biogas, of which methane is the main component. The methane produced is able to heat the Gordon dairy facility, milking house and office throughout the year. It is tied to the grid, producing enough energy to heat about 130 homes, Gordon says.

In addition, the digester eliminates odor, kills fly eggs and reduces greenhouse gases that contribute to global warming. Fiber separated in the digester is used for bedding, and other “leftover” materials rich in nutrients are returned to the 3,000-acre farm.

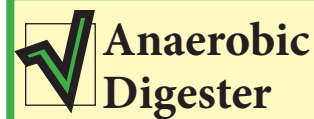
Wisconsin has 18 operational digesters – 17 on dairy farms and one on a duck farm. Several others are under construction, and about 15 are in the planning stages.

Many of the early digesters used

the Farm Bill Energy Title dollars for funding. Focus on Energy, a public-private organization in the state, has provided technical assistance on many of the projects.

Focus on Energy estimates that if Wisconsin had digesters on 54 farms with 1,000 or more cows, they would produce 13.5 megawatts of energy, sufficient to provide electricity to 10,600 homes. With digesters on 186 farms with 500 to 999 cows, the net energy production would be 27.9 MW, enough for 22,000 homes.

For more information on the Gordondale operation, contact Steve Bradley, Portage County, Wisconsin, conservationist, 715-346-1334.



Iowa: EQIP helps farmers, conserves energy

EQIP has helped Clarence Phipps as he irrigates his land along the Missouri River Bottom, south of Sioux City, Iowa. The EQIP Ground and Surface Water cost-share program has reduced his energy costs, and because of its efficient big-drop concept, Phipps has been able to conserve water.

“EQIP made it possible for me to improve my irrigation system,” says Phipps, who dropped from high pres-

sure to low pressure through the program. “I was able to lower my horsepower and that saved.” He is aware of other farmers who went from using an 80-horsepower motor for pumping to a 40-horsepower.

Phipps is one of many Iowa landowners utilizing EQIP.

Kathy Schneider, the district conservationist for the NRCS office in Monona County, says EQIP has brought about considerable savings.

NRCS has provided \$211,330 in cost-share dollars on 36 systems from 2004 to 2006, covering 6,687 acres. The cost share usually covers around 50 percent of the total cost, says Schneider. In 2007, another \$219,975 was projected to be allocated to 28 systems.

Of the \$211,330, about 32 percent went to adding drop tubes to existing low pressure systems. The remainder

converted medium pressure to low pressure pivots and a few high pressure systems to low.

Schneider says farmers can save roughly \$9 per acre for going from medium to low pressure and \$41 per acre for going from high to low pressure. “The standard pivot covers about 130 acres, so that amounts to a good investment,” she says. “I think it’s great that we can help get these guys converted to low pressure and save some energy.”

For more information on this project, contact Kathy Schneider, district conservationist, NRCS Monona, 712-423-2624, or email her at Kathy.Schneider@ia.usda.gov.



Energy Conservation in Agriculture

Wyoming: Energy conservation on the range

Rancher Mike Evans and his family own and operate a sustainable cow-calf ranch in Saratoga, Wyoming, and energy conservation is a way of life on the ranch.

Evans has successfully operated a solar well and pump system to more efficiently manage forage and pastures. This year, he added a photovoltaic solar system on his home.

The solar well and pump system has opened two pastures to use with reliable water supplies now in each, he says. This allows him to use the pastures in late summer and early fall, when other water sources often dry up.

The system has also improved the grazing rotation, providing additional options, he says. The pastures can now be utilized early in the growing season, then rested until they have

recovered and used again if needed.

The pump system is remote and has a production capacity of 500 watts, pumping about 10 gallons per minute. Panels are mounted on a sun-tracking rack to improve efficiency.

The system has been adequate to water about 200 cows, Evans said. The water pump system cost about \$3,600 and has paid for itself.

Evans predicted that his new home system could provide about 25 percent of energy needs. In just four months, the 1,670-watt system produced 38 percent of energy needs for the house and shop. The system also includes a water pump for the house and livestock.

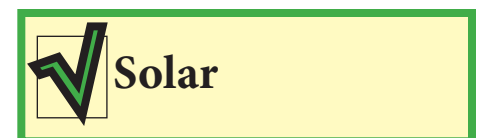
The system is tied to the grid, and the Rural Electrification Administration cooperated with Evans to make it feasible. Carbon Power and Light, the

local REA affiliate, has been helpful establishing the metering system and answering billing and credit questions for the energy produced and returned to the grid.

The residential array has a peak output of 1,700 watts and is mounted on the roof. It uses an inverter to convert the DC power to AC and interact with the demand of the house and the utility grid. It cost \$15,000, and should pay for itself in 18 years, he says.

Evans is considering more use of solar and wind in the future.

For more information, Contact Mike Evans at iroxranch@moose-mail.com.



Nebraska: Digester has producer in hog heaven

Danny Kluthe of Dodge, Nebraska, is blazing a trail of renewable energy generation by transforming his hog manure into electricity.

“When things work like this, it’s fun,” says Kluthe, owner of Olean Energy Facility. “I am still so amazed that hog manure can run this engine and make electricity. It’s exciting.”



Kluthe’s methane recovery project is the first in the state. Waste from Kluthe’s 8,000 hogs is pumped daily into an anaerobic digester that breaks down the waste into methane gas. The captured gas is sold back to the state’s Public Power District, which then feeds it to the local county district to provide electricity to about 35 homes.

The process also benefits the surrounding environment by reducing odor, applying a nutrient-rich byproduct back into the fields and producing an endless supply of manure for renewable energy.

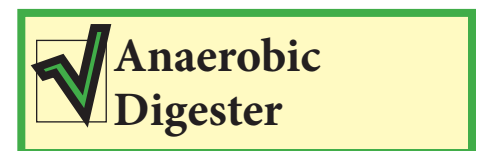
“Every day I fill this digester, and every day those hogs replace it,” Kluthe says. “It’s renewable energy seven days a week, 365 days a year.”

A USDA Rural Development grant financed about 25 percent of the project’s cost. A grant of about \$200,000

from the Nebraska Environmental Trust, and a cost-share grant from Natural Resources Conservation Service complemented Kluthe’s investment for the \$640,000 project.

The operation has helped prompt state legislators to develop bills encouraging conservation projects and offering incentives to farmers who adopt methods of conserving energy, Kluthe says.

For more information, contact Danny Kluthe at dannyk558@hotmail.com.



Energy Conservation in Agriculture

Mississippi: Demonstration farm spreads the word

The Delta Conservation Demonstration Center (DCDC) reaches out to Mississippi River Delta farmers in seven states with information on meshing practical conservation and efficient and profitable farming. The Washington Soil and Water Conservation District and other partners worked to establish the farm, located on land near the Greenville airport.

Executive Director Sam Newsom says focusing on reduced-tillage and using smaller equipment are among the practices DCDC promotes. "For energy conservation, we really believe in minimizing trips across the field and at looking at smaller tractors that can do the job," he says. Of the latter, he

notes, "Horsepower is money." It is also reduced fuel usage.

Delta reduced-tillage would actually be no-till if farmers could be convinced to avoid fall plowing after the fields have been cleared, he adds.

The center is working with the Conservation Technology Information Center to promote no-till and reduced tillage across the country.

DCDC has also been using a 20-percent biodiesel blend for its farm equipment for the past several years. "It's now second nature to us. We don't even think about it," Newsom says. The center also acquired a used tour bus that was retrofitted for biodiesel. The Soybean Promotion Board provided funds

for painting and adding logos advertising that the bus is soy-diesel powered.

Newsom serves as a commissioner with the Washington SWCD, first vice president of the Mississippi Association of Conservation Districts and a board member on the Mississippi Soil and Water Conservation Commission.

For more information, contact Sam Newsom at snewsom@dcdcfarm.org.



California: Solar power from an almond orchard

Phil Erro's almond orchard in western Fresno County is an example of how America's working lands can play an important role in helping to conserve use of nonrenewable energy by creating energy from renewable sources.

Erro installed a 28,500-watt solar system to produce energy for sharing on the Pacific Gas & Electric grid. "In California, we have net metering. It's like a bank account. I can deposit and

withdraw kilowatt hours," he says.

His withdrawals are needed to power a booster pump that moves irrigation water from a canal to an efficient micro-irrigation system that waters his trees. In a year's time, the solar credits offset about 70 percent of the power needed to run the pump.

To encourage distributive energy generation, California offers substantial subsidies for systems like Erro's. He receives a subsidy of about \$2.80

per watt, paid by the California Energy Commission. Erro also received a 30 percent tax credit on his cost of installation. Depreciation also supplies substantial federal tax deductions.

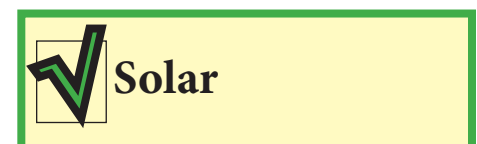
Erro likes those numbers but also sees the conservation value of the approach. "If every quarter section had a solar electric system, it would

do a number of good things. It would displace carbon production and burning of nonrenewable energy at utility plants and reduce the need for new plants," he says. "It's a huge savings for utilities on infrastructure and maintenance."

Erro is a director on the Westside Resource Conservation District, and he works to promote solar energy.

"My thought is that when people are putting in vineyards and orchards, they have virtually a 30-year window for planting. That's how long the orchard will produce," he says. "You might as well put in solar electric at the same time. The panels are guaranteed for 25 years, and while the costs are higher initially, they're lower over 30 years."

For more information, contact Phil Erro at philipperro@sbcglobal.net or 550-449-8125.



Energy Conservation in Agriculture

Ohio: Biosolid operation provides inexpensive fuel

In eastern Ohio, not far from the West Virginia border, farmer Kirke Porterfield refines the used cooking oil from local restaurants and fast food establishments to power his diesel trucks and tractors. The operation takes up less than six square feet of space and produces up to 40 gallons of fuel each day at a cost of 56 cents per gallon.

Forty gallons of the oil are heated at 120 degrees and pumped into the system. A pH test determines the amount of lye, and eight gallons of methane are added. After eight hours glycerine settles out, and the formula is misted with water and then allowed to set for another 12 hours. It is then drained and ready for use.

Porterfield will save roughly \$7,000 in fuel costs this year.



“Kirke is always looking outside the box to become competitive in today’s markets, but at the same time, he is a good steward of the land,” says Beverly Riddle, program administrator for the Belmont Soil and Water Conservation District. “He is not afraid to try new ideas that will improve his operation and efficiency and that of other landowners.”

Porterfield was a Belmont Soil & Water Conservation District supervisor for six years. His son, Brian, has worked for the district for three years as the agriculture technician. Since completing his term as supervisor, Kirke has served on the nominating and planning committees.

Porterfield has led by example, especially with new and different agriculture methods and practices, Riddle says. He has taken strip-mined ground and made it productive. He has used byproducts from the salad industry and old bread from the local bakery to feed his cattle. He has used lime from the water department, biosolids from the sanitation department and ammonium sulfate from steel mills to supplement his fertilization and lower his costs.

Porterfield raises 150 Angus brood



cows, and he manages several stores including Provident Supply (farm supplies), Porterfield’s Drive-Thru (Pet food and supplies) and Kirke’s Ice Cream Store.

For more information on this project, contact Beverly Riddle, program administrator for Belmont Soil and Water Conservation District, 740-425-1100 ext 105, or email her at Beverly.Riddle@oh.nacdnet.org.



Iowa: Wind assessment tool serves producers

Iowa farmers considering wind generation for power production are taking advantage of a wind assessment tool on the Iowa Farm Bureau Federation Web site.

Any farmer has the option to use the tool, says Rick Robinson, IFBF environmental policy advisor. “It helps them evaluate their options for adequate wind energy,” he says.

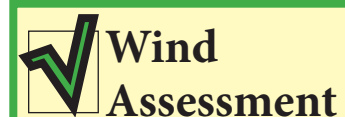
Through the IFBF Web page on wind energy link or by directly ac-

cessing the Iowa Energy Center Wind Page, farmers obtain information on wind energy projects, wind energy potential maps, a wind energy output calculator, access to a wind energy manual and other information.

Iowa farmers aren’t alone in the wind energy movement. According to the American Wind Energy Association, the state has more than 900 wind projects in place, with another 372 under construction. Iowa is the third

largest wind-producing state, behind California and Texas. Owners include schools, hospitals and municipalities.

For more information, contact Rick Robinson at rrobinson@ifbf.org.



Energy Conservation in Agriculture

Minnesota: Ag center burns corn, studies process

The Central Lakes Ag Center at Central Lakes College uses a corn burner to heat the 6,100-square-foot building in Staples, located in the central part of the state.

The Woodmaster unit manufactured in northwest Minnesota is situated close to a 350-bushel supply tank that feeds corn to a fluidized bed system. The system is rated to generate up to 180,000 BTUs an hour, well above what the building needs. It generates little smell or smoke, and the heat is 90 to 95 percent efficient. Ash is removed twice weekly and used as a field amendment. Cost for installation was \$13,500.

Director Norm Krause says the facility plans to burn distressed corn in the future, which is a waste product that is often landfilled.

University of Minnesota professors plan to study the project, focusing on overall economics and an analysis of the ash as a field amendment.

Krause is a district supervisor in the Todd Soil and Water Conservation District.

For more information, contact Kitty Tepley at the Todd SWCD, kitty.tepley@mn.nacdnet.net, or 320-732-2644.

Vermont: Mixing conservation and energy production

Dairy farmers Clark Hinsdale Jr. and Lorenzo and Onan Whitcomb are conservationists and energy pioneers. The three farmers were cited by the Winooski Natural Resources Conservation District in Williston as Farmers of the Year last year.

Hinsdale operates Nordic Farms, a 1,200-acre, 200-head dairy farm, the first in New England to use robotic

Also of note ...

milkers. His sophisticated operation includes a methane digester that produces electricity for the farm and the power grid.

The Whitcombs operate Williston Cattle Co., milking about 250 cows and growing corn and alfalfa on more than 500 acres. The farm's conservation practices include extensive use of filter strips planted without government assistance. They also employ a methane digester. Their major goal with the digester is to reduce the amount of waste to be spread on cropland.

For more information, contact Jessica Andreoletti, assistant district manager, at Jessica.Andreoletti@vt.nacdnet.net or Phone: 802-865-7895, extension 14.

Nevada: Agribusiness exploring the benefits of biodiesel

Nevada producer Donald Bentley has never been afraid to try new things. He developed a nuclear power monitoring system that he has since sold to General Electric, and he uses overhead irrigation systems to water his crops.

Bentley's company, Bentley Agrodynamics, is now turning to biodiesel to service all of the company's equipment. In time, Bentley Agrodynamics hopes to sell it commercially.

"Bentley is far and away the biggest agribusiness in our service area," says Mike Hayes, resource coordinator for Carson Valley Conservation District whose district services Carson City and Douglas County in Nevada, and Alpin and Mono Counties in California.

"He's very progressive," says Hayes. "He's not only a self-starter, he's a self-perpetuator."

For more information on this project,

contact Mike Hayes, resource coordinator for Carson Valley Conservation District, 775-782-3661 ext 102, or email him at Mike.Hayes@nv.nacdnet.net.

Oregon: School develops renewable energy engineering program

The Oregon Institute of Technology is developing the nation's first renewable energy engineering program. Students at OIT examine technology for a variety of alternative fuel sources, including solar, biomass, wind and hydroelectric.

Dr. Robert Bass heads up the program. "The idea was to meet a niche that was not being met by any of the schools in the state, or in the country," says Bass.

"The student interest has been phenomenal," says Bass. Students have flocked to the campus from all over the country, he says, most of them over the age of 30 and already carrying a bachelor's degree in another field. "It shows people are willing to make a big change in their lives."

Jeffrey Kee, conservation specialist for the Clackamas County Soil and Water Conservation District, helped to set up an industry advisory committee to satisfy a requirement for engineering students upon graduating.

"(Dr. Bass) inspired me to help him do whatever we could," says Kee. According to Kee, the demand for alternative energy projects in the district is constantly rising. Clackamas SWCD has helped local landowners incorporate a rainwater harvesting system and a solar water pump system. It will soon take on a methane demonstration project at a pig and cattle farm.

For more information on OIT renewable energy engineering program, contact Dr. Robert Bass, Oregon Institute of Technology, 503-725-5924, or email him at robert.bass@oit.edu.

Energy Conservation in Agriculture

Minnesota: RC&D helping to turn waste into renewable energy

The Laurentian Resource and Conservation Development Council in Duluth is engaged in a project that will convert municipal solid waste into a variety of useful products.

The waste is exposed to a plasma torch from which gas is collected. The hydrogen or propane substitute can then be used in boiler systems. The inorganic portion, or 'slag,' has a variety of uses, including as a supplement for floor tile with a retail price of \$14 per square foot.

"In looking to do something meaningful in the community, we came up with a plan to take waste material and turn it into value added revenue

streams," says Steve Kluess, coordinator for Laurentian RC&D.

The facility plans to consume roughly 36,000 tons of municipal waste each year.

"The neat thing is that we can provide three megawatts of power annually to feed approximately 3,000 homes," says Kluess. "So really, a community could become self reliant from the energy."

The project also will lessen the burden on overcrowded landfills.

Kluess says that this type of project could be placed virtually anywhere in the country, and he recently visited Louisiana to discuss how it might effectively help clean up the area damaged by Hurricane Katrina. Kluess says that while America does not have

any working plants yet, there are four in operation in Japan.

"The main intent is to have this owned by a county or city so that the local control is there," says Kluess.

The Minnesota project, to be located Koochiching County, is expected to get off the ground in early 2008 after a feasibility study is complete.

For more information on this project, contact Steve Kluess, coordinator of Laurentian Resource and Conservation Development, 218-720-5225, or email him at steven.kluess@mn.usda.gov.

Windbreaks: Low-tech, high value

Windbreaks are among the oldest and best tools for energy conservation on farms and ranches. In addition to providing an array of other values, well-designed and well-placed windbreaks can reduce energy costs by as much as 20 to 40 percent, according to Iowa State University Extension.

Farmers and ranchers in America have planted more than 85,000 acres of windbreaks/shelterbelts according to the Farm Service Agency. Nebraska is tops with more than 29,788 acres. South Dakota producers have planted more than 20,000 acres.

Effectively placed windbreaks benefit any heated building or confinement spaces by reducing wind chill in cold climates. In the summer, if buildings are exposed to hot winds, a windbreak may reduce cooling costs by reducing the infiltration of hot air.

Other benefits include reduced



wind erosion, snow control, livestock protection and wildlife habitat.

An Iowa State University Extension publication offers tips on design and other information.

Check with your local conservation district or USDA Service Center for information on cost-sharing for windbreaks/shelterbelts.



Energy Conservation in Agriculture

There are hundreds of sources of information on energy conservation opportunities on America's farms and ranches. Here are some key resources. Most of these have extensive links to other sources.

Building Better Rural Places is a US Department of Agriculture guide written for anyone seeking help from federal programs to foster innovative enterprises in agriculture and forestry in the United States.

<http://www.attra.org/guide/resource.pdf>

Midwest Rural Energy Council provides information on agricultural energy efficiency, energy generation and other rural energy issues.

<http://www.mrec.org/index.htm>

The National Association of Conservation Districts Web site provides frequently updated information on an array of topics related to energy conservation. It also includes a list of conservation districts on the Web, state conservation contacts and other information vital to partnering with local conservation leaders. The site includes an extensive list of links in a variety of conservation areas.

www.nacdnet.org

NACD's forestry web pages provide information on woody biomass opportunities in the field of energy conservation and renewable energy utilization and links to federal and state agencies and other partners working in these fields.

<http://forestry.nacdnet.org/>

NACD Catalog of Selected Federal Grants and Assistance Supporting the National Fire Plan includes information on programs that support energy conservation activities.

Resources

<http://forestry.nacdnet.org/biomass/Funding/>

The National Sustainable Agricultural Information Service managed by the National Center for Appropriate Technology offers information on cropping, soils, water management and farm energy.

<http://attra.ncat.org/>

The national 25x25 Initiative seeks the goal of having America's farms, forests and ranches produce 25 percent of the nation's energy by 2025. The initiative's Web pages include frequently updated information about renewable energy, including activities at the state level.

<http://www.25x25.org/>

Switchgrass as a Bioenergy Crop discusses agricultural production aspects of switchgrass. Varieties, seed sources, crop establishment, management, and harvesting issues are presented. Ecological considerations are also discussed, and a case study is presented along with references and further resources. The publication is offered by the National Sustainable Agriculture information service.

<http://attra.ncat.org/attra-pub/switchgrass.html#intro>

US Department of Agriculture energy information web pages provide an array of information about USDA programs that help farmers, other rural residents, and the nation respond to energy-related issues and opportunities. Included is a USDA energy matrix with comprehensive information on energy-related programs, funding opportunities, and technical support

across all USDA agencies and offices.
<http://www.usda.gov/rus/index2/0208/EnergyPrograms.htm>

USDA NRCS provides information on a variety of programs that assist farmers and ranchers in efforts to conserve energy.

<http://www.nrcs.usda.gov/>

USDA NRCS "energy estimator" tools help farmers and ranchers make energy-efficient conservation practice decisions. Energy estimators include: Energy Estimator: Animal Housing, Energy Estimator: Irrigation, Energy Estimator: Nitrogen, Energy Estimator: Tillage, All NRCS Energy Estimator Tools and Ag Propane Cost Estimator.

<http://www.nrcs.usda.gov/technical/energy/>

USDA Forest Service State and Private Forestry works with state foresters and other partners across the country to serve private landowners.

<http://www.fs.fed.us.spf>

USDA Rural Development is a potential source of funds and partnering opportunities.

<http://www.rurdev.usda.gov/>

US Department of Energy offers information on renewable energy, energy conservation and energy efficiency.

<http://www.energy.gov/>

US Environmental Protection Agency 319 cost-share grants may provide assistance in energy conservation efforts.
<http://www.epa.gov/OWOW/NPS/cwact.html>