

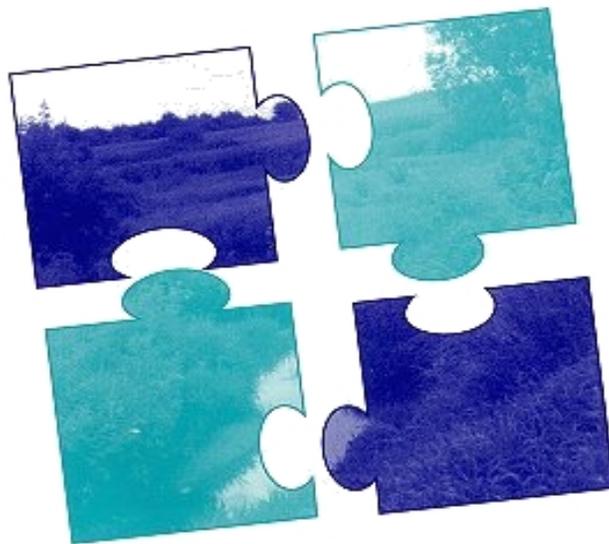
# IOWA energy BULLETIN

Department of Natural Resources  
Vol. 25, Num. 1, 1st Quarter 1999

## Buffer Strips: Not-So Puzzling Solutions for Iowa's Environment

Water Quality

Wildlife  
Habitat



Renewable  
Energy

Soil  
Conservation

**E**nhanced fish and wildlife habitat. Improved soil and water quality. Expanded potential for renewable energy resources. The diverse environmental benefits of buffer strips fit together like the pieces of a puzzle.

Buffer strips are small areas of land in permanent vegetation, designed to intercept pollution. Prairie grasses, shrubs and trees can be planted along streams, lakes, wetlands or fields to slow surface runoff. Ultimately, buffer strips can minimize the chance of sediment, fertilizers, pesticides, bacteria and other pollutants reaching surface water and ground water. In addition, buffer strips may also provide a potential cash crop from harvesting renewable energy resources.

### Putting the Pieces Together

How can buffer strips benefit Iowa's ecosystems?

**Soil Conservation.** Vegetation in buffer strips prevents soil from eroding into waterways. The plants develop deep root masses, resulting in improved soil quality and streambanks that resist collapse.

**Water Quality.** Buffer strips keep a variety of pollutants from entering

continued on page 7

### In This Issue.....

Message from Larry Bean...	2
Comparative Risk Report....	2
Analyst's Angle.....	3
Energy Poster Contest.....	4
New Wind Turbines.....	4
Ethanol in Small Engines.....	5
Vilsack Vice Chair of GEC..	6
New Director of DNR.....	6
Efficiency Conference.....	6
Calendar of Events.....	8

# Message from Larry Bean

## *Nothing to Lose, Everything to Gain*



**N**ext time you walk into a federally owned building — a post office, federal court house, or even the Smithsonian in Washington D.C. — think about the energy it takes to run that building. Next, think about who is paying for that energy.

The White House is currently considering an aggressive proposal to reduce energy use in federally owned facilities by 30 percent by 2005. The same proposal would also establish a goal for five percent of the federal government's energy needs to be met by renewables by the same date.

The proposal sets a standard for energy management that would reduce the federal energy bill by

multi-millions of dollars. Simultaneously, air emissions would be significantly reduced. Renewable, cleaner energy would be promoted.

Iowa serves as an example to the federal government and other states that energy-efficiency improvements in taxpayer-supported facilities can be achieved with low investments and high returns. Since 1986, Iowa's state-owned facilities have implemented \$11 million in energy improvements, saving more than \$19 million in total energy costs. Carbon dioxide emissions have decreased by 340,000 tons.

The federal government's effort to establish measurable goals for energy management goes a long way toward creating a healthier environ-

ment, saving money and finding innovative alternatives to meeting energy demand.

It's a prime example that when it comes to working toward a sustainable future for our country's energy needs, we have nothing to lose and everything to gain.

Sincerely,



Larry Bean  
Division Administrator  
Energy and Geological  
Resources Division

## Iowa Comparative Risk Assessment Report Available

A final report summarizing a two-year study on Iowa's environmental risks is now available to the public. The study, which established a list of Iowa's greatest environmental concerns, was funded by the U.S. Environmental Protection Agency (EPA) and facilitated by the Iowa Department of Natural Resources.

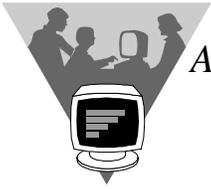
More than 600 Iowans, including private citizens, researchers, legislators and government officials, offered input about what issues provide the greatest environmental concern to the state. After a two-year process that included public surveys, town meetings, extensive technical reports and several committee meetings, the study ranked the following issues as needing immediate attention:

◆ water quality

- ◆ housing safety (household hazardous chemicals, lead poisoning, etc.)
- ◆ soil erosion
- ◆ animal production
- ◆ global climate change
- ◆ overuse of nonrenewable energy

The U.S. EPA has funded similar comparative risk studies in several other states. Iowa's process was unique because it also evaluated the energy link to the state's environmental concerns.

For more information about the Comparative Risk Assessment process, or for a copy of the report, contact John Torbert with the DNR at (515) 281-4262. E-mail: [jtortber@max.state.ia.us](mailto:jtortber@max.state.ia.us)



# A Trainload of Coal

The Energy Bureau is frequently requested to explain how much coal it takes to produce electricity at a traditional, coal-fired power plant. The answer may be surprising.

As a point of comparison, a recently refurbished hydroelectric plant in Mitchell County (near Osage) has a capacity of 600 kilowatts. The electricity generated annually at the hydroelectric plant is equivalent to the energy contained in **700** tons of coal.

However, to produce this amount of energy at a coal-fired plant — 600 kilowatts — it would actually take 2,400 tons of coal annually. Why?

## 24 Total Rail Cars

Picture a single train delivering coal to Iowa to produce electricity. Each rail car holds 100 tons of coal. To deliver **2,400** tons of coal (for the above scenario), the train would possess 24 rail cars.

## Minus One Car

Because coal does not originate in Iowa, it must be shipped here, normally from Wyoming. The energy equivalent of **one** entire coal car would be consumed to transport the coal to the state.

## Minus 16 Cars

In the power production process, coal is burned to produce steam. The



steam turns a steam turbine connected to a generator, which produces electricity. Up to **67** percent of the energy available in coal is dissipated as waste heat in this steam-generating process. That means that the energy equivalent of **16** of the 24 rail cars of coal that are burned do not result in electricity.

## Seven Cars Left

This leaves **seven** rail cars — or 700 tons of coal — to produce usable energy from the original 24 rail cars.

Now consider that 2,400 tons of

coal emit **6,236** tons of carbon dioxide, **16** tons of nitric oxide and nitrogen dioxide, **180** tons of sulfur dioxide, and **21** tons of particulate. Meanwhile, the hydroelectric plant in Mitchell County produces little or no air emissions.

Overall, inefficiency is inherent in transporting fossil fuel energy sources, as well as in the burning process for electricity generation. It translates into a trainload of coal being necessary to meet the same energy needs as one hydroplant in Iowa.

For more information about energy resources and consumption, contact Ward Lenz, Energy Analyst

*It takes 2,400 tons of coal to produce the same amount of electricity — 600 kilowatts — that can be generated annually at an Iowa hydroelectric plant in Mitchell County.*

## 1999 Iowa Energy Poster Contest



Enter the 1999 Iowa Energy Poster Contest today! Kids across the state are invited to design and enter posters about energy efficiency or renewable energy resources in Iowa. The contest is open to students in first through sixth grade, and two winners will be chosen from each grade level. Winners will receive a plaque displaying an 8 x 10" photograph of their poster, as well as a \$100 U.S. Savings Bond.

The contest is sponsored by the Center for Energy and Environmental Education (CEEE) at the University of Northern Iowa, in partnership with the Iowa Association of Electric Cooperatives, Iowa Association of Municipal Utilities, the Iowa Department of Natural Resources and the Iowa Energy Center. Entries must be postmarked by March 15, 1999.

For additional information about the Iowa Energy Poster Contest, contact Renae DeWitt with CEEE at (319) 273-7575, or e-mail: dewittr0255@uni.edu.

# Two Iowa Schools Harness Wind Power

**F**orest City and Akron-Westfield community school districts have each installed a 600 kW wind turbine as a cost-effective way to offset their electrical needs, while creating an opportunity for students to study renewable energy first-hand.

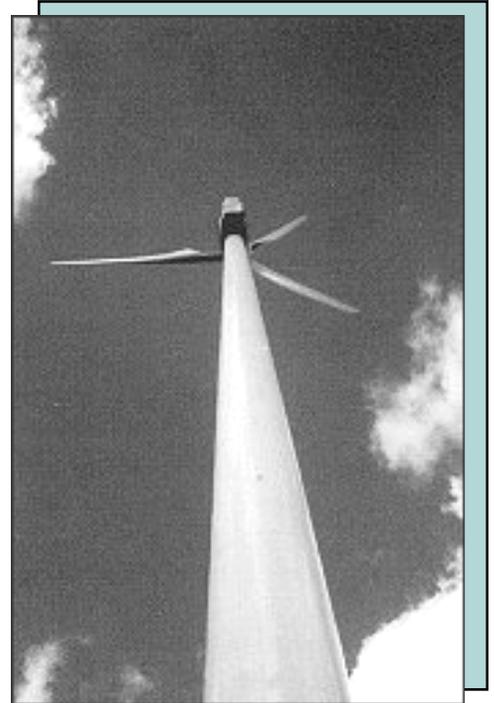
Forest City Community School District (CSD) began its wind turbine project when Paul Smith, a former student at the school, presented a research paper on wind energy to the city school board several years ago. The presentation generated interest in the current project, which utilizes a 50-meter-diameter Nordex Balcke-Duerr wind turbine.

The turbine is expected to provide 80 to 90 percent of the school's electrical needs and reap more than \$63,000 in annual savings.

Dwight Pierson, superintendent of Forest City CSD, said the educational benefit of the district's project was one of its greatest selling points. "We will give our students first-hand experience in a technology that may be a big part of their energy future. We also want to share this data with other school districts and wind energy enthusiasts," he said.

Students at Akron-Westfield CSD were involved with its wind project from the beginning. Twenty students were chosen to assist in the analysis, schematic design, construction documentation and construction administration of the turbine.

"We decided to look into wind because it is renewable, non-polluting and free," said Ron Wilmot, the school's technology coordinator. "People were a bit hesitant until the students provided information to the public on wind's energy efficiency, low maintenance and cost savings."



The Akron-Westfield turbine, designed by Vestas-American Wind Technology, is expected to save the district \$51,000 annually.

Both school districts' projects were funded in part by the Department of Natural Resources' Iowa Energy Bank and the Iowa Energy Center's Alternative Energy Revolving Loan Fund.

Two other Iowa school districts, Spirit Lake and Nevada, also use wind turbines to meet their electrical needs.

### Call the Iowa Energy Bank!

Your school or organization can take advantage of renewable energy and energy efficiency! Contact Chad Stobbe with the DNR at (515) 242-5851; e-mail: cstobbe@max.state.ia.us.



# Ethanol in Small Engines: Sawing Through the Myths

**A** majority of Iowans know ethanol is good for vehicles. But is ethanol also okay for lawn mowers and chainsaws? Does ethanol damage two-cycle engines? Does it affect the performance of small-engine power equipment? Here are the facts:

**Myth:** Ethanol blends should not be used in small-engine power equipment.

**Fact:** Ten-percent ethanol-blended gasoline is approved for use in the owners manuals of all major small-engine manufacturers, including Briggs & Stratton, Honda, Kawasaki, Kohler, and Tecumseh. In fact, ethanol is certified by all engine warranties that authorize unleaded gasoline, provided manufacturers' recommendations are followed.

**Myth:** Even though ethanol is approved for small engines, it still causes damage.

**Fact:** Actually, Des Moines area dealers, including P&P Small Engines, Des Moines; Bruce Engine, Clive; Accel Small Engines, West Des Moines; and True Value, Ankeny; also say a 10-percent ethanol blend is acceptable for small-engine power equipment. Some dealers caution against the use of ethanol blends in chainsaws because they run faster. However, the Portable Power Equipment Manufacturers Association (PPEMA) has had no reports of

ethanol damage to any portable power equipment, including chainsaws.

**Myth:** Ethanol blends burn hotter than regular, unleaded gasoline when used in two-cycle engines.

**Fact:** Ethanol by itself actually burns cooler than gasoline. Ethanol contains oxygen, which when blended with gasoline, "enleans" the air/fuel mixture, causing a more complete combustion and possibly higher cylinder temperatures. However, these temperatures are still well within the normal operating temperatures incorporated into the engine design.

**Myth:** Because ethanol is an alcohol, it will separate from gasoline and damage the engine.

**Fact:** Ethanol will not separate from gasoline unless it is contaminated with more than .5 percent water – a gallon of 100-percent gasoline can hold only .02 percent at the same temperature. If the fuel tank is kept dry, the ethanol and gasoline will not separate. Continuous use of an ethanol blend in small engines actually reduces the need for a gas-line antifreeze, while decreasing condensation in the fuel tank, helping to keep the fuel system dry.

**Myth:** It is acceptable to store ethanol-blended gasoline in the fuel tank of small-engine power equipment for extended periods of time.

**Fact:** All gasoline deteriorates in

storage, whether conventional or reformulated (like ethanol). Because power equipment is usually stored for extended periods, manufacturers recommend emptying the fuel tank after each use or season to prevent deterioration that can cause engine damage.

## Be Smart

To maximize the performance of small engines running on ethanol-blended fuel, consumers should follow these tips:

- ◆ Keep up regular maintenance of the engine, including routine servicing and replacement of air and oil filters.
- ◆ Use 10-percent ethanol blends or lower. Many owners' manuals caution against higher blends because of the increased alcohol levels, which may be more difficult for a small engine to handle. Any Iowa retailers selling an ethanol blend use E10 at the pump.
- ◆ Read the owner's manual to ensure equipment is designed to handle ethanol-blended fuel and follow any recommendations of the manufacturer.

For more information about ethanol and small-engine power equipment, contact Dewayne Johnson with the DNR at (515) 281-7018; e-mail: [djohnso@max.state.ia.us](mailto:djohnso@max.state.ia.us).

## Did You Know...

Hydropower is Iowa's leading renewable energy resource for electricity, accounting for 3 percent of overall electricity production.

## One-on-One: Public/Private Partnerships that Work

State energy offices from across the nation can learn how to establish energy efficiency programs for public buildings at an Iowa Department of Natural Resources (DNR) workshop May 19-21 in Des Moines.

The seminar will teach participants how to develop partnerships with the private sector, and create financing options for improvements in schools, hospitals, government buildings and other nonprofit organizations.

Since 1986, the Iowa DNR has implemented \$113 million in energy improvements in the public sector, saving \$16 million in *annual* energy costs. The workshop will teach states how to replicate Iowa's program, and show other state and federal successes as examples.

For conference registration information, contact Janice Anderson (608) 831-1127 ext. 307. E-mail: [janice@msbnrg.com](mailto:janice@msbnrg.com)

## Vilsack Named Vice Chair of Governors' Coalition

Governor Tom Vilsack has been elected vice chair of the Governors' Ethanol Coalition (GEC) for 1999, alongside current chair Governor Bill Graves of Kansas. Governor Vilsack will take over as chair in 2000.

The GEC represents 22 states and four countries: Canada, Brazil, Mexico and Sweden. The members of the GEC work to expand ethanol's market share in the nation and the world. Its accomplishments have included: assisting in the development of a national fueling infrastructure for

E85 (85 percent ethanol, 15 percent gasoline); bridging international markets; sponsoring nationwide consumer research on ethanol; and providing policy recommendations to the federal government on ethanol-related issues.

Former Governor Terry Branstad served as vice chair of the GEC in 1996 and chair in 1997.

For more information, contact Sharon Tahtinen with the DNR at (515) 281-7066, or e-mail her at [stahtin@max.state.ia.us](mailto:stahtin@max.state.ia.us)

## New Leader for Iowa DNR

Paul Johnson has been appointed by Governor Tom Vilsack as director of the Iowa Department of Natural Resources, taking office Jan. 15, 1999.

Johnson and his family have farmed near Decorah, Iowa, since 1974. He has served as Chief of the USDA's Natural Resources Conservation Service (formerly the Soil Conservation Service), and as state representative for District 31 in the Iowa Legislature. Two of his significant environmental accomplishments include helping to author Iowa's landmark Groundwater Protection Act of 1987, and being a major force

behind the state's Resource Enhancement and Protection Act.

Johnson is an advocate of furthering Iowa's energy management strategies. "Developing renewable energy and energy-efficiency practices are critical to preserving the state's natural resources," he said. "Doing so elevates Iowa's economy and environment."

Johnson is a graduate of the University of Michigan, with a B.S. and Masters in forestry. His wife Patricia teaches at Luther College in Decorah and they have three grown children.

## Integrated Energy Farm Model Now Available on Web

A computer model of a hypothetical energy-producing farm, developed by the DNR and Sunrise Energy of Blairstown, Iowa, can now be downloaded from the DNR-Energy Bureau website. The model is in a Microsoft Excel file called *Analysis Model for an Ethanol Plant*, and can be found by visiting [www.state.ia.us/dnr/energy/programs/ren/ethanol.htm](http://www.state.ia.us/dnr/energy/programs/ren/ethanol.htm)

The model allows users to input financial data regarding corn-to-ethanol production, cattle feedlot operation, methane digestion, aquaculture development and greenhouse use. Users can then examine the various components of the energy farm as stand-alone operations or as an integrated farm system, and evaluate their economic potential.

# Buffer Strips in Iowa, continued from page 1

waterways. Roots and soil act as a “living filter,” cleaning nearly all agricultural chemicals from the water before it moves to deeper aquifers, which are important sources of drinking water.

## Enhanced Fish and Wildlife Habitat.

Buffer strips provide shelter, food, and corridors of travel for many wildlife species such as pheasants, quail and songbirds. The vegetation also improves in-stream habitat; shade from vegetation reduces sunlight that reaches the stream, creating cooler temperatures required by many aquatic species. Leaves, branches and other plants fall into the water, providing sources of food, hiding places and reproductive sites for aquatic species.

## Renewable Energy Resources.

Some Iowa organizations are exploring how buffer strips can be used to cultivate renewable energy crops, while providing other environmental benefits. Switchgrass, a native Iowa prairie grass,

can be harvested and co-fired with coal for electricity generation. Another use for switchgrass is as a feedstock for ethanol production. The Chariton Valley Biomass Project is exploring the potential of switchgrass in Appanoose, Lucas, Monroe and Wayne counties.

Hybrid poplar trees, also planted in buffer strips, can be used as a fuelwood to replace propane for corn drying and heating out-buildings. The Center for Global and Regional Environmental Research (CGRER), based at the University of Iowa, has sponsored planting of hybrid poplar trees in buffer strips at the Amana Society Farm in Amana, Iowa, to demonstrate the energy potential.

Buffer strips for use as

energy crops are still in the research phase. At this time, energy applications for buffer strips are not a common practice, but may become more popular in the future.

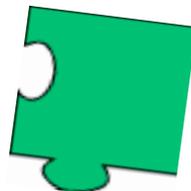
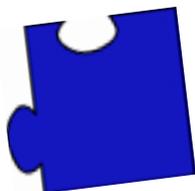
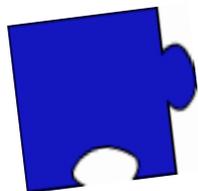
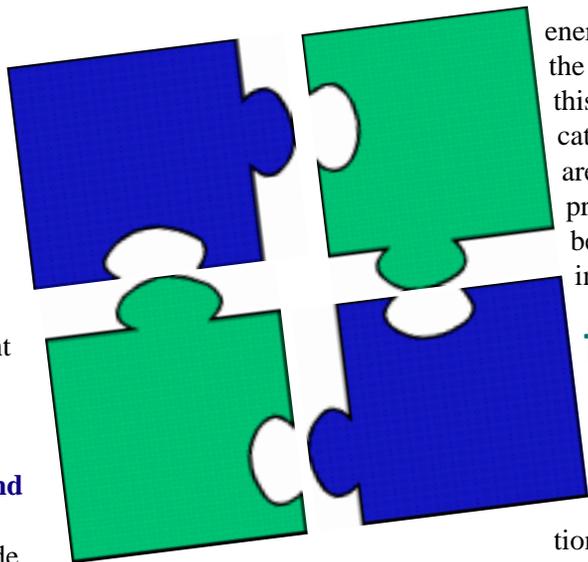
## The Big Picture

National, state and local organizations are putting the pieces together and realizing the full benefits of buffer strips. One such initiative is a partnership between the Iowa Department of Natural Resources and Pheasants Forever. Farmers across Iowa are enrolling land in the federal Conservation Reserve Program and planting buffer strips.

To learn more about the environmental benefits of buffer strips, contact:

◆ The Iowa Department of Natural Resources: Terry Little at (515) 281-8660, Don Bonneau at (515) 281-8663, or Alison Kovac with the Energy Bureau at (515) 281-8094.

◆ Your local USDA-National Resources Conservation Service office, or the website: <http://www.nrcs.usda.gov/ccs/buffers.html>



Published by the Energy and Geological Resources Division, Iowa Department of Natural Resources.

**Paul Johnson**, Director  
**Larry Bean**, Administrator, Energy and Geological Resources Division  
**Sharon Tahtinen**, Energy Bureau Chief  
**Monica Stone**, Executive Officer, Building Energy Management  
**Angela Chen**, Executive Officer, Energy Planning and Technology Transfer  
**Julia C. Tack**, Editor  
**Jessica Free**, Energy Information Intern



Programs and activities are available to all potential clientele without regard to race, color, national origin, sex, handicap or age. Anyone who feels that he or she has been discriminated against should send a complaint within 180 days to the Iowa Civil Rights Commission, 211 E. Maple, 2nd Floor, Des Moines, IA 50319.

This material was prepared with the support of United States Department of Energy grant number DEFG47-80CS769097.

However, any opinions, findings, conclusions or recommendations expressed herein are those of the authors and do not necessarily reflect the views of the DOE.

For additional copies or to comment, please write or call: Editor, Iowa Energy Bulletin Wallace Building Des Moines, Iowa 50319-0034 (515) 281-8665 (515) 281-8895 (fax) E-Mail: [jtack@max.state.ia.us](mailto:jtack@max.state.ia.us)



# Calendar of Events

**March 15.** Cedar Falls, IA. Deadline for Iowa Energy Poster Contest, Center for Energy and Environmental Education, University of Northern Iowa. For grades 1-6, teaching students about energy and the environment. Contact Renae DeWitt at (319) 273-7575; e-mail: dewittr0255@uni.edu

**March 20.** Des Moines, IA. Model UN Summit on Climate Change. For elementary, secondary and college students, along with their teachers and parents. Sponsored by the Iowa Division of the United Nations Association. Contact (319) 337-7290; e-mail: unaiowa@inav.net

**March and April 1999.** Several sites across Iowa. Demonstrations of the Home Energy Rating System. Contact Craig Swartzbaugh with Iowa Building Code Consultants at (515) 276-7419, or Tami Foster with the DNR at (515) 281-7015.

**April 16-22 and 23-28.** Hiawatha, IA. Post-and-beam straw-bale workshop. Sponsored by the Iowa Renewable Energy Association (I-Renew) and Prairiewoods. Contact I-Renew at (319) 338-3200; e-mail: irenew@igc.apc.org

**May 19-21.** Des Moines, IA. *One-on-One: Public/Private Partnerships that Work.* This DNR-sponsored training will teach other state energy offices how to deliver energy efficiency in public buildings through private-sector investments. Contact Janice Anderson at (608) 831-1127 ext. 307 for details.

**May 22-23.** Hiawatha, IA. PV systems and straw-bale structures workshop. Sponsored by I-Renew and Prairiewoods. Contact I-Renew at (319) 338-3200; e-mail: irenew@igc.apc.org

**June 22-25.** Cedar Rapids, IA. 15th Annual International Fuel Ethanol Workshop and Expo. "Where practical applications and research meet to improve grain and cellulose ethanol production technology." Contact Bryan & Bryan at (719) 942-4353.

**IOWA DEPARTMENT OF NATURAL RESOURCES**  
**Wallace State Office Building**  
**Des Moines, IA 50319-0034**

BULK RATE  
U.S. POSTAGE  
PAID  
DES MOINES, IA  
PERMIT NO. 1195