

Resource

A newsletter covering research, demonstration and education projects of the Iowa Energy Center.

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Home Heating and Cooling book available – free of charge

HOME SERIES BOOK ONE AND TWO AVAILABLE

The Home Series booklets, filled with everyday energy-saving tips to help Iowans make a positive impact on family budgets, are available – free of charge – from the Iowa Energy Center.

The average Iowa family spends more than half of its annual household energy bill on heating and cooling. That's a significant number, but you can dramatically reduce these costs—up to 30 percent, according to the U.S. Department of Energy—by making some simple energy-saving weatherization and insulation improvements to your home. In addition—with a little attention to proper ventilation—you can protect your home from moisture damage year-round, reduce problems caused by ice dams on the roof during the winter and significantly cut summer cooling costs.

If you like to fix things around the house, you can handle many of the projects suggested in the Home Series books and make the most of your energy improvement budget. However, don't hesitate to call a professional for help if you'd rather not do the work yourself; the dollars gained through energy savings in upcoming years will be worth the expense.

To get your free copy of the Home Series:

- Call your utility company.
- E-mail: iec@energy.iastate.edu
- Call the Energy Center: 515-294-8819.

Just released

Home Series 2: *Home Heating and Cooling*. This and Home Series 1: *Home Tightening, Insulation and Ventilation* are both available – free of charge.



Take the Iowa Weatherization Challenge

more information on page 5

Swartz Named Chair of Iowa Energy Center Advisory Council

Jim Swartz, professor of chemistry at Grinnell College, has been named chair of the advisory council of the Iowa Energy Center.



JIM SWARTZ

The Vice-President for Academic Affairs and Dean of the College, Swartz has served on the advisory council since the founding of the Energy Center in 1990, and is the only remaining original member still serving on the council.

Swartz, who has taught a course on solar energy technologies at Grinnell College, has also served as legislative analyst on energy issues in the office of U.S. Representative Claudine Schneider.

The Energy Center's advisory council consists of 13 representatives of energy related state government agencies, public utilities, and higher education institutions. It was designed to provide the Energy Center and its director with input on planning and budgeting issues, ensure the Energy Center's portfolio of activities is balanced and make certain the Energy Center's procedures are fair, equitable, and open.

NEED Summer Conference

IOWA TEACHERS APPLY NOW FOR SCHOLARSHIP

For the third year, the Iowa Energy Center will sponsor Iowa teachers at the National Energy Education Development (NEED) Summer Conferences for Educators 2006. Through these scholarships, the Energy Center is supporting the involvement of teachers and students in energy education – an investment in the future of energy.

About the Conferences

The NEED National Energy Conferences for Educators are hosted each July to train teachers to incorporate energy programs into their classroom and extracurricular activities. In 2005 the Energy Center sponsored 20 Iowa teachers. These five-day programs cover all aspects of energy education and offer three graduate credits to participating educators. Each conference includes a one-day field experience, allowing educators to get an "up close" view of a variety of energy topics.

2006 NEED Conferences are scheduled for:

July 9 – 13, Denver, CO

July 16 – 20, Cambridge/Boston, MA

July 26 – 30, Seattle, WA

The Energy Center's sponsorship includes the teacher's registration fee (\$1,000) and reasonable travel expenses. CEU's and single occupancy charges are not included in the scholarship.



Applying is easy

Download the application guidelines at www.energy.iastate.edu/funding/NEED_index.html/.

To receive a faxed version, call the Energy Center office, (515) 294-8819.

Deadline for the Energy Center's NEED scholarship application is Monday, March 6, 2006.



Iowa educators take advantage of the one-day field experience for teachers attending the 2005 NEED Conference in Las Vegas (top) and New Orleans (bottom). The Iowa Energy Center's funds made it possible for 20 Iowa teachers to attend the 2005 conferences.

Energy Education Opportunity

FIRST THROUGH SIX GRADERS' POSTER CONTEST

The Iowa Energy Poster Contest is right around the corner. This statewide contest gives first through sixth grade children the opportunity to create a poster that focuses on the importance of energy efficiency or renewable sources of energy.

Posters can be submitted on an individual basis or through your local school. Utility providers or organizations interested in energy efficiency and/or renewable energy may host local poster contests. Any group interested in doing a local contest should contact the Center for Energy and Environmental Education (CEEE) for free assistance.

A local contest deadline of Feb. 15 is suggested. Submissions for the statewide contest must be postmarked by Mar. 15. Entries can be made to your local contest provider or the University of Northern Iowa's CEEE.

Poster contest winners will be honored at a ceremony at the Des Moines State Capitol. In addition, their work will be showcased in the Traveling Art Gallery, which is displayed in schools, museums, and businesses.

The Iowa Energy Center is a sponsor of the Iowa Energy Poster contest.

For more information about the Iowa Energy Poster Contest, please contact Holly Kagy at (319) 273-3850 or visit the CEEE Web site: www.uni.edu/ceee/postercontest.



Iowa Energy Poster Contest judges Keith Kutz, Iowa Energy Center, and Mike Adams, Iowa Department of Natural Resources, review the artwork from the 2005 competition.

opportunity

USDA Energy Estimator

<http://ecat.sc.egov.usda.gov/>

"Energy Estimator: Tillage", is the first Web-based energy consumption awareness tool being built by the U.S. Dept. of Agriculture, Natural Resources Conservation Service (NRCS). This first tool concentrates on diesel fuel used in the production of selected crops across common tillage systems in your area.

Other NRCS tools being built include one for estimating and comparing energy consumption across different nutrient management systems and another for different irrigation systems. These tools are intended to provide an idea of the magnitude of energy savings that could be incurred under different management systems.



The results generated by these tools are estimates based on NRCS models and are illustrative of the magnitude of savings possible.

Please visit your local NRCS office for additional assistance.

National Building Controls Information Program

NBCIP: TESTING TO ENSURE THAT BUILDING CONTROLS WORK

Energy use of buildings represents 36% of the total primary energy consumption in the United States. Commercial and institutional buildings are plagued by control problems that lead to significant energy waste and poor indoor air quality.

Experts estimate that energy savings on the order of 15% can be achieved by making the heating, ventilating, and air-conditioning (HVAC) equipment in buildings operate properly. Proper operation of the HVAC equipment can only be achieved if the computer-based building control system, the "brain" of the building, operates properly. Recognizing the key role that controls play in energy efficient building operation, in 2001 the Iowa Energy Center founded the National Building Controls Information Program (NBCIP) to facilitate the adoption of energy efficient building control products and strategies through testing, demonstration, education and dissemination of product information.

Sensors are key components in building control systems. Modern building control systems use sensor data to monitor conditions both inside and outside the building, and as inputs to computer algorithms that determine how to control HVAC equipment in response to these conditions.

Relative humidity sensors are considered one of the least reliable sensors used in building control systems, and yet they are common components in these systems. Commercial buildings such as office buildings and schools commonly use relative humidity sensors to control the amount of outdoor air that is brought into a building. Inaccurate measurements from relative humidity sensors can result in control decisions that cost hundreds or thousands of dollars a year in extra air-conditioning energy use because either too much or too little outdoor air is brought into the building. NBCIP selected relative humidity sensors

as the target of its first project specifically undertaken to evaluate the performance of a building control device.

All manufacturers publish performance specifications for their products. These specifications and personal experience with products are how consumers make purchase decisions. Manufacturers of relative humidity sensors are no different. One of the goals of NBCIP product testing is to determine whether building control products, in this case relative humidity sensors, actually perform as well as the manufacturers claim.

Rigorous testing was performed on relative humidity sensors from six different manufacturers. The testing included an evaluation of the performance of the relative humidity sensors when they were new, as they aged under typical operating conditions over a one-year period, and after they were exposed to extreme conditions that were not typical of normal operation.

The results of the testing as well as general relative humidity sensor application considerations are summarized in two reports that can be downloaded free of charge from the NBCIP Web site. The reports include the manufacturer names so professional engineers who select or specify building control components can analyze the results and use them to make informed purchasing decisions.

NBCIP is sponsored by NSTAR Electric and Gas Corporation, the California Energy Commission, and the Iowa Energy Center. For more information on the program, visit www.buildingcontrols.org.

**National
Building
Controls
Information Program**
www.buildingcontrols.org

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controls

Supercritical fluid research at BECON gets funding boost

The biomass to fuels and chemicals research conducted by the Iowa Energy Center has received additional support from the Energy and Water Appropriations legislation recently approved by the U.S. Congress.

Through the bill, the Energy Center's Biomass Energy Conversion (BECON) facility will receive \$500,000 to continue its supercritical fluid project.

"Research funded by the Energy Center has shown that supercritical fluids exhibit great promise in rapidly converting biomass such as corn stalks into fermentable sugars," noted the Energy Center's Director, Floyd Barwig. "These sugars can then be processed into ethanol and a variety of other useful chemicals."

Iowa Congressman Tom Latham was critical in securing the additional funding for this research.

Supercritical Fluid

A supercritical fluid is a gas or liquid such as water, carbon dioxide, ethanol or propane, in a state above its critical temperature and critical pressure where the fluids exhibit very unique properties. This supercritical fluid has a high dissolving power making it ideal for biomass conversion to chemicals and fuels. The process is fast and versatile, and uses relatively compact equipment.

Also at BECON

Biomass to fuels and chemicals conversion processes at BECON:

- Anaerobic Digestion
- Biodiesel Pilot Plant
- Alcohol Fermentation
- Thermal Gasification
- Pyrolysis

Fuel cell added at BECON



A fuel cell system will soon be added to the list of energy sources at the Iowa Energy Center's Biomass Energy Conversion Facility (BECON) in Nevada, IA.

Alliant Energy donated two lightly used 1 kW PEM fuel cells worth \$10,000 to the Iowa Energy Center's BECON facility. The Independence 1000™ fuel cell will provide backup power for BECON's industrial controls.

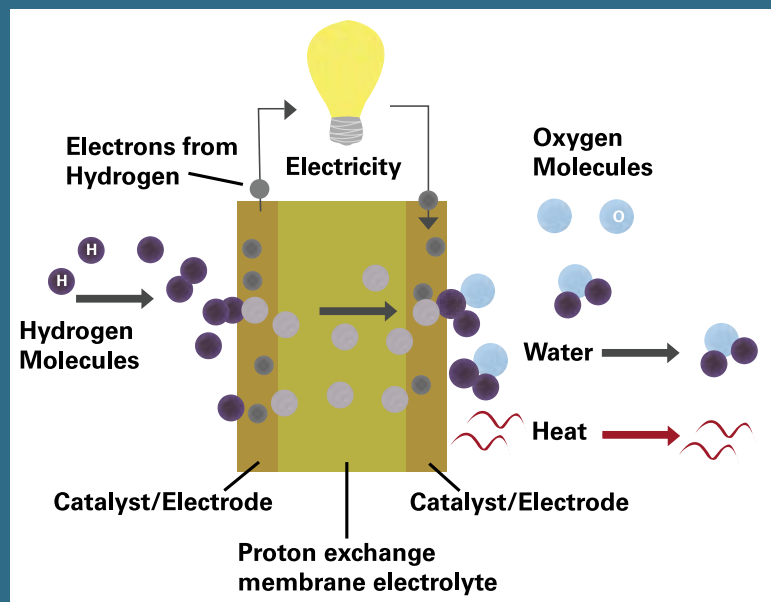
"It's a great opportunity for researchers to demonstrate fuel cell energy production at BECON," said Floyd Barwig, Iowa Energy Center director. "The Energy Center will also invest in the fuel cell installation costs as well as the purchase of a DC-AC inverter."

The fuel cell will not be tied to the electric grid, and will generate electricity on demand using hydrogen, with a little heat and pure water being the only by-products.

"This fuel cell is designed for easy maintenance and can be placed outside the BECON highbay," said Norm Olson, BECON Manager. "It will be interesting to see how well the fuel cell performs on a long-term basis."

How a Fuel Cell Works

Hydrogen is sent into one side of a proton exchange membrane. The hydrogen proton travels through the membrane, while the electron enters an electrical circuit, creating a DC electrical current. On the other side of the membrane, the proton and electron are recombined and mixed with oxygen from room air, forming water.





Feb. 9-10
Des Moines

- Gain insight into new techniques from top-of-the-industry, nationally known speakers.
- See the latest building products and technologies.
- Network with other building, electrical and HVAC professionals.

The conference is sponsored by Iowa's Electric Cooperatives, with financial support from the Iowa Energy Center.

Registration information available at:
www.momentumisbuilding.com

For more information contact:
Kathy Roth Eastman, (515) 255-0882,
or by email kathyeastman@mchsi.com

Windustry's Community Wind Energy 2006

March 7 - 8, 2006

Iowa Events Center, Des Moines

National Conference bringing agriculture and wind energy together to advance opportunities for locally-owned clean energy production and rural economic development.

Who should attend: farmers, ranchers, rural landowners, elected officials, business leaders, trial representatives, economic development professionals, money lenders, bankers, city planners, and community leaders.

To register

Online: www.windustry.org
Call: (612) 870-3461
E-mail: info@windustry.org

Best Practices Sourcebook for Food Industry

The Center for Industrial Research and Service (CIRAS) at Iowa State University has just released "Energy-Related Best Practices: A Sourcebook for the Food Industry."

The sourcebook will help food processors increase profitability by saving money on energy. The heart of the publication is the chapter "Energy Management," which describes a systematic approach that can be scaled up or down to fit the company size.

Development of the Sourcebook was funded by the Iowa Energy Center.

For more information, look online:
www.ciras.iastate.edu/

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To be added to the Energy Center's mailing list, call (515) 294-8819 or email iec@energy.iastate.edu. An online version of this publication is available at www.energy.iastate.edu/.

The Iowa Energy Center was created by the 1990 Iowa Energy Efficiency Act. Its mission is to help Iowans reduce their reliance on imported fuels and nonrenewable resources and to increase efficiency in all areas of energy use. This is accomplished in part through a competitive grants program which sponsors energy efficiency and renewable energy research and demonstration projects.

The Iowa Energy Center does not discriminate on the basis of race, color, age, religion, national origin, sexual orientation, gender identity, sex, marital status, disability, or status as a U.S. veteran. Inquiries can be directed to the Director of the Iowa Energy Center, (515) 294-8819.



Geothermal Training

Geothermal Heat Pump Systems
IGSHPA Accredited Installer Training

FEBRUARY 1-3, 2006
ENERGY RESOURCE STATION
ANKENY, IA

An intensive and practical three-day course covering the design and installation of geothermal heat pump systems for residential and light commercial projects. Attendees may also qualify for accreditation to become an International Ground Source Heat Pump Association (IGSHPA) installer.

Participants gain hands-on experience using real geothermal heat pump equipment and piping loops.

Registration is required. For more information:
www.energy.iastate.edu/ers or call (515) 965-7055

GeoExchange Conference 2006
IOWA HEAT PUMP ASSOCIATION

March 15 & 16, 2006
DUBUQUE, IA

Look online for more information:
www.iaheatpump.org/ or call 877-950-6000

Sponsored in part by the Iowa Energy Center



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