

2004

# IOWA ENERGY PLAN UPDATE: A PROGRESS REPORT



Every two years, the Iowa Department of Natural Resources publishes a comprehensive energy plan update, providing a report on the state's energy consumption, along with progress in improving energy efficiency and expanding renewable energy use in the state.

Iowa's economy and environment continue to be affected by energy consumption and production. Energy is a required component of Iowa's economy, necessary to the manufacturing and transportation of goods and services. Homes and vehicles also are dependent on energy use.

Today, many Iowa communities, industries and utilities are finding methods to manage energy resources in ways that lessen impacts to the environment, while maintaining or improving productivity. Renewable energy continues to grow as a profitable, value-added industry, and many industries, facilities and

homes are saving millions of dollars through energy efficiency improvements.

These developments help create economic opportunities in Iowa while expanding affordable, reliable and secure energy resources. Just as importantly, Iowa's environment benefits from decreased pollution and a diversified portfolio of energy resources.

However, much more can be improved. Iowa continues to rely on energy imported from other states and nations for 97 percent of its consumption. Adequate transmission of electricity is a regional and national concern as an aging system constrains power transmission. Energy security is a high priority as the nation continues its dependence on imported resources.

This report provides a two-year overview of Iowa's energy consumption and spending, policy changes, and important developments in renewable energy and energy efficiency.





# SUMMARY OF MAJOR ENERGY TRENDS

THE DATA REPRESENTED COME FROM THE U.S. DEPARTMENT OF ENERGY'S ENERGY INFORMATION ADMINISTRATION (EIA). THE MOST RECENTLY AVAILABLE DATA FROM EIA ARE FROM 2000.

Iowa's energy bill was \$8.3 billion in 2000, a 25 percent increase from the year before. Most of the growth came from sharp increases in petroleum and natural gas prices. From 1999 to 2000, petroleum prices increased 39 percent, while natural gas prices increased 37 percent, due to a colder-than-normal winter and a world-wide economic recovery leading to unusually high demand that outpaced supply.

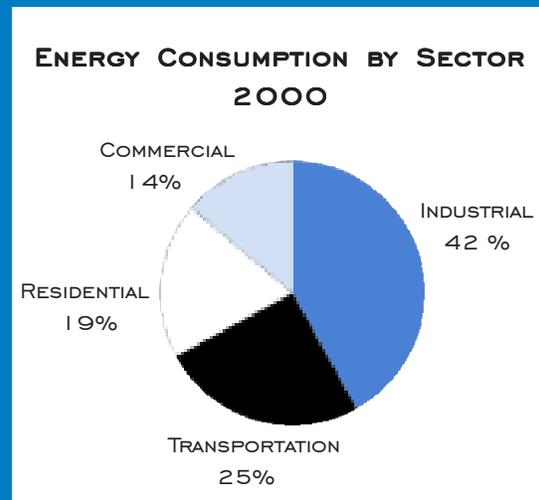
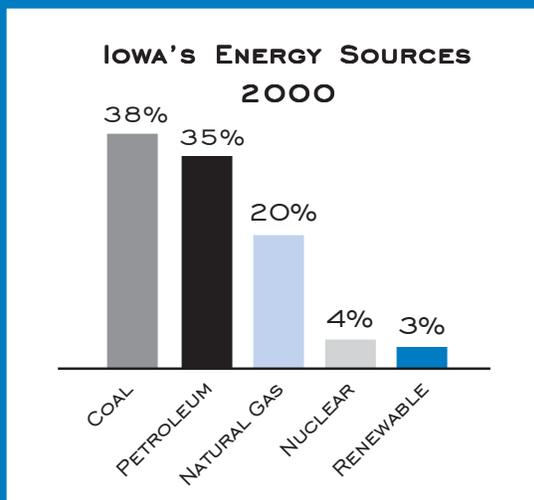
In contrast with the rest of the country, energy consumption in Iowa decreased by 2.3 percent between 1999 and 2000. The decreases were seen across all sectors, with the commercial sector decreasing the most at 4 percent, and the transportation sector decreasing the least at 1.3 percent. The decreases were most likely due to rapid increases in petroleum and natural gas prices.

The industrial sector, which includes agricultural activities, is the largest user of energy in Iowa, accounting for 42 percent of all energy consumed in 2000. Next is the

transportation sector with a 25 percent share of energy consumption, followed by the residential sector with 19 percent and the commercial sector with 14 percent.

In 2000, coal was the most-consumed energy source in Iowa, accounting for 38 percent of energy consumption. Petroleum was a close second, making up 35 percent of Iowa's energy consumption. Natural gas was 20 percent of all energy consumed, nuclear 4 percent, and renewable fuels including ethanol, hydro, wind, geothermal and biomass, represented 3 percent.

Energy consumption in Iowa is predicted to grow at an average rate of 1.4 percent from 2001 to 2025. Consumption trends normally increase when oil prices are low or the economic growth rate is high. If Iowa experiences high economic growth, consumption may grow an average of 1.8 percent during that period. If oil prices are high and economic growth is low, the consumption may grow 1.2 percent annually.



# NEW ENERGY POLICIES

In 2002 and 2003, Iowa and the nation passed several legislative initiatives affecting energy production and transmission, including many related to renewable energy and energy efficiency.

## ENERGY COORDINATION

In 2003, Governor Vilsack established the Energy Coordinating Council for state government to share information and discuss energy issues. The council includes the Dept. of Natural Resources, the Iowa Utilities Board, the Iowa Energy Center, the Dept. of Human Rights, the Office of Consumer Advocate, the Dept. of Economic Development and the Dept. of Administrative Services.

Governor Vilsack asked the Council to initially focus on two concerns: low-income energy programs and energy efficiency in state facilities.

## LOW-INCOME ENERGY PROGRAMS

The goal is to explore additional funding, stronger policies, and increased programming to provide appropriate assistance to low-income Iowans. Some of the options for achieving this goal include a public benefits fund, expanded disconnection protection for poverty-level households, or an expanded statewide customer contribution fund that collects donations to assist the needy. Some of these options would require legislative action.

## STATE FACILITY ENERGY EFFICIENCY

The goal is to reduce energy consumption in state-government-owned or -occupied buildings by an average of 10 percent by 2008. The Dept. of Natural Resources and the Dept. of Administrative Services are working to develop a baseline of energy consumption information for state facilities for a report of progress and recommendations.

Also in 2003, Iowa's state agencies issued a follow-up report to initial recommendations

made by the Governor's Energy Policy Task Force in 2001. Governor Vilsack appointed the state task force to conduct a one-year study on Iowa's energy consumption, supplies and efficiency. The group provided recommendations about adequate, affordable energy supplies, and maximizing energy efficiency and renewable energy developments in the state. A copy of the 2003 follow-up report can be found on the Internet at [www.state.ia.us/dnr/energy/taskforce/index.html](http://www.state.ia.us/dnr/energy/taskforce/index.html)

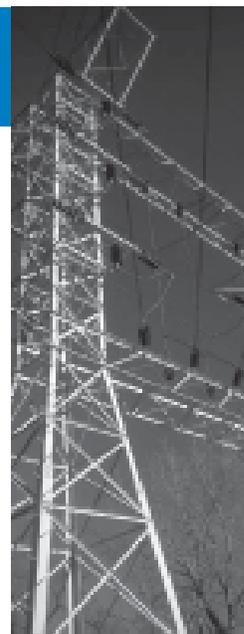
## ENERGY TRANSMISSION

Iowa and other Midwest states have formed a regional oversight group to work with the Midwest Independent System Operator (MISO), a regional and independent transmission system operator, and the Federal Energy Regulatory Commission (FERC). The organization is called the Organization of MISO States (OMS). The OMS and its numerous working groups are addressing transmission issues such as regional planning, transmission pricing, market structure and monitoring.

In February 2002, Governor Vilsack asked the Midwest Governors to establish a regional electricity transmission task force to coordinate the needs of Midwest states on the interstate transmission of electricity and to communicate the findings to federal policy makers. The task force first convened March 31, 2003 and is co-chaired by Diane Munns, Iowa Utilities Board chairperson.

## FEDERAL FARM BILL

The Farm Security and Rural Investment Act of 2002 was the first Federal Farm Bill to include a separate title devoted to energy. The bill works to increase research and development of agriculturally based renewable energy and industrial raw material supplies. It also provides opportunities for farmers and rural businesses to earn income through production and use of farm-based renewable energy.





The Farm Bill established more than \$405 million in funding for:

- ◆ **Biobased Product Purchasing** – a new program for the purchase of biobased products by federal agencies. Iowa State University is receiving \$1 million in annual funding to help test biobased products.

- ◆ **Biodiesel Fuel Education** – a grant program to educate government and private consumers about the benefits of biodiesel.

- ◆ **Loan and Grant Program** – a loan, loan guarantee and grant program to assist farmers in purchasing renewable energy systems and making energy efficiency improvements. In 2003, Iowa companies received \$1.2 million from the \$23 million available.

- ◆ **Producer Payments** – the continuation of payments to bioenergy producers who purchase agricultural commodities to expand biodiesel and ethanol production.

- ◆ **Biomass research and development activities.**

Additionally, the 2003 Federal Farm Bill amends the Conservation Reserve Program (CRP) to allow managed harvesting of biomass on CRP lands, consistent with CRP's conservation goals and guidelines. The bill also clarifies that farm and ranch-based renewable energy qualifies as a value-added product. Finally, wind systems and methane digesters are allowed to qualify for U.S. Department of Agriculture development loans and loan guarantees; solar systems already qualify for this assistance.

## FEDERAL ENERGY BILL

In the last two years, the U.S. Congress has worked to develop a federal energy bill that would address numerous aspects of the nation's energy infrastructure and supplies. As of January 2004, a federal bill still had not been passed, but work is expected to continue on this national legislation.

## IOWA LEGISLATION

In 2001-2003, Iowa passed several bills affecting energy in the state.

### HOUSE FILE 577

Passed in 2001, some of the provisions included in HF 577 are:

- ◆ All electric utilities are required to offer an alternate energy purchase program to customers. The energy offered must be produced by facilities in Iowa.

- ◆ Investor-owned utilities may receive advance ratemaking principles for new utility-owned alternate energy production facilities.

- ◆ Municipal utilities may jointly build generation or transmission facilities with tax-exempt bonding in accordance with federal requirements.

- ◆ Several decision criteria were removed from the generation plant siting chapter of Iowa law, including: 1) existence of a comprehensive energy plan, including load management, energy efficiency, and renewable energy, 2) consideration of purchased power and, 3) consideration of all feasible alternatives to the proposed facility including non-generation alternatives. The remaining criterion include: 1) willingness to construct, maintain, and operate the facility pursuant to the provision of the certificate and 2) minimizing adverse land use, environmental, and aesthetic impact.

- ◆ Rate-regulated utilities were required to file a plan and budget by April 1, 2002, and biennially thereafter, for managing regulated emissions from coal facilities. For more information about this provision, go to the Iowa Utilities Board *2002 Annual Report* at: [www.state.ia.us/government/com/util/reports.html](http://www.state.ia.us/government/com/util/reports.html)

### HF 2418 – BUILDING ENERGY EFFICIENCY STANDARDS

Passed in 2002, this bill allows government entities to adopt more stringent energy standards than the minimums required by the state building commissioner. The standards must be in accordance with model energy codes and standards developed by nationally recognized organizations.

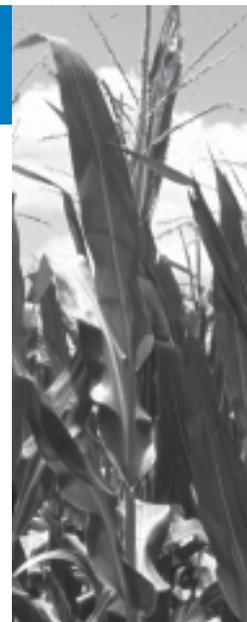
### HF 391 - COGENERATION PILOT PROJECTS

Passed in 2003, HF 391 establishes a pilot program for up to two cogeneration projects. A cogeneration facility may be either utility-owned or a qualified project facility. The projects must be 200 megawatts (MW) or less, located in Iowa, and approved by the Department of Economic Development.

### HF 659 - ALTERNATE ENERGY OWNERSHIP

Passed in 2003, this bill allows investor-owned utilities to own alternate energy facilities. The electricity output from the facility counts toward the company's share of Iowa's 105 MW renewable energy requirement. It also makes clear the IUB's authority to consider the cost of a utility's alternate energy production facilities and other generating facilities not yet in service when valuing an electric utility's property under Iowa Code Section 476.23 (1).

# RENEWABLE ENERGY DEVELOPMENTS



Iowa is continuing its leadership in the development of renewable energy resources.

## WIND POWER

Wind energy is the fastest growing renewable energy resource in Iowa and now provides the largest share of renewable electricity capacity – outpacing biomass, hydropower and solar energy. New wind installations in the last two years have included:

- ◆ Florida Power & Light constructed its second wind farm in Iowa in 2002. Located in Hancock County, the farm's 148 turbines produce about 98 MW per year. This facility was constructed as part of a long-term contract with Alliant Energy.

- ◆ In 2003, MidAmerican Energy announced its intention to build a 310 MW wind farm – it will be the largest wind farm in Iowa to date.

- ◆ Clipper Windpower completed construction of a 29-turbine, 43.5 MW wind farm near Spirit Lake in 2003. The energy produced at the facility is supplied to Alliant Energy under a long-term contract.

- ◆ In November 2003, Lenox and Wall Lake became the newest municipal utilities to produce electricity from wind, installing 750 kilowatt (kW) and 660 kW wind turbines, respectively.

## ALTERNATIVE FUELS

Ethanol production capacity increased 27 percent in Iowa between 2001 and 2003. Four new plants, with combined annual capacity of 139 million gallons, began operation in 2002 and 2003; another nine plants are currently in the planning stages. In 2001, ethanol-blended

gasoline represented nearly 54 percent of all gasoline sold in the state. By 2003, that market share had grown to more than 60 percent.

In 2002, Iowa's farmer-owned ethanol plants established the Iowa Renewable Fuels Association, a trade association to foster the development and growth of the renewable fuels industry. Iowa has five farmer-owned ethanol plants, with two scheduled to begin operating in the next year and three more under development.

Biodiesel production continues to grow. In 2002, West Central Cooperative, one of Iowa's two biodiesel production plants, expanded its annual capacity from 5 million gallons to 12 million gallons. A third plant, SoySolutions, began operating in 2003. Biodiesel use, largely in the form of B2 (2 percent biodiesel, 98 percent petroleum diesel), also expanded greatly. By 2003, biodiesel was offered at more than 150 sites across the state.

## BIOMASS

Biomass-fired electricity grew 13 percent from 2001 to 2003, adding 3,980 MW of capacity through a methane recovery system at Top Deck Dairy and oat-hull co-firing at the University of



NEW STAR-SHAPED PHOTOVOLTAIC ARRAYS AT MUSCATINE POWER AND WATER.



Iowa. At Top Deck Dairy, the methane recovery system captures methane gas from cattle waste and converts it into usable electricity under a unique arrangement with Alliant Energy. Waste heat is used in the methane recovery system and the surrounding facilities. The system also dramatically reduces odor levels. In 2003, the University of Iowa began co-firing oat hulls at 20 percent levels with coal.

The Chariton Valley Biomass Project (a joint effort by Alliant Energy, Chariton Valley RC&D, and the U.S. Department of Energy) is testing the feasibility of co-firing switchgrass with conventional coal-based generation at the Ottumwa Generating Station. Alliant conducted a test burn of 1,500 tons of switchgrass during the first two weeks of December 2003, with a longer-term test burn of 25,000 tons planned for 2004-2005. The test is designed to be proportionally equivalent to converting 35 MW of Ottumwa's capacity to biomass-based generation.

### SOLAR

Although it currently represents the smallest renewable energy source, solar power

has increased in popularity. Nine private systems, ranging in size from 200 W to 4 kW, were installed in 2002 and 2003. Muscatine High School installed a 1 kW photovoltaic array in 2002, becoming the state's first school-based system. Indian Creek Nature Center installed a 4 kW photovoltaic array that will meet about 40 percent of the nature center's electricity needs. In July 2003, Central College installed a third photovoltaic system at its campus; the 4 kW array powers a fountain at the entrance of the school's new Vermeer Science Center.

### THE ALTERNATE ENERGY REVOLVING LOAN PROGRAM (AERLP)

The Iowa legislature established the AERLP to help fund small alternative generating facilities. Administered by the Iowa Energy Center and funded by customers of Iowa's investor-owned utilities since 1996, more than \$4.9 million has been given in the form of no-interest loans for up to \$250,000 or half of a project's cost. Wind, solar, biomass and hydro are all eligible for funding.



(ABOVE) ELDORA NEW PROVIDENCE SCHOOL DISTRICT INSTALLED A WIND TURBINE IN 2003. (RIGHT) CENTRAL COLLEGE'S NEW VERMEER SCIENCE BUILDING INCORPORATES ENERGY EFFICIENCY TECHNOLOGIES AND SOLAR POWER INTO ITS DESIGN.



# ENERGY EFFICIENCY DEVELOPMENTS

Energy efficiency is helping Iowa's public-sector facilities, private-sector residences, commercial facilities and agricultural operations save money and improve the environment.

## UTILITY EFFICIENCY PLANS

Until 2002, Iowa's investor-owned utilities (IOUs) offered energy efficiency programs through plans approved in 1996. The Iowa Utilities Board (IUB) met with IOUs and their stakeholders in June 2001 to consider the need for new energy efficiency plans.

The 1996 legislation required the IOUs to complete an assessment of energy efficiency potential for Iowa and develop plans to meet that potential. The IOUs conducted a joint assessment, which was filed with energy efficiency plans in October 2002 and January 2003.

The assessment included: the establishment of base energy consumption levels for different market segments; statewide projections of energy and capacity savings potential; an analysis of cost-effective measures for Iowa's utilities; and a detailed assessment for each IOU of potential, and measures that could be used for the development of new energy efficiency plans.

Based on information from the assessment, each IOU developed new energy efficiency plans for implementation beginning in 2003. The individual utility plans were approved by the Iowa Utilities Board in 2003. The effects of the new plans are estimated as net savings of \$650 million over the next five years.

## UTILITY ENERGY EFFICIENCY RESULTS

Since 1990, Iowa's investor-owned, municipal and rural electric cooperative

utilities have conducted numerous energy efficiency programs for the commercial, residential and industrial sectors, with the following results:

- ◆ Electric energy efficiency programs are saving more than 1,000 MW of electric capacity each year, as much as 15 percent of summer peak demand. Programs include demand-reducing industrial curtailment, air-conditioner load control programs, customer equipment installations such as high efficiency air conditioners, compact fluorescent lamps, commercial lighting, and more.

- ◆ Energy efficiency programs have helped utilities delay the installation of new power plants for a number of years, saving hundreds of millions of dollars.

- ◆ The utility programs are saving electricity equal to more than 1 million MWh and more than 4 million Mcf of gas per year. That is enough electricity to power 100,000 average Iowa homes for a year, and enough gas for more than 40,000 homes.

- ◆ Iowa utilities are presently spending about \$68 million per year on electric efficiency and load management programs, and about \$21 million per year on natural gas programs.

## PUBLIC-SECTOR EFFICIENCY

The Dept. of Natural Resources has several programs to help public-sector facilities save energy:

- ◆ The Iowa Energy Bank helps schools, hospitals, local governments, private colleges and nonprofit organizations identify and implement cost-effective energy improvements. The program has saved \$104 million in energy costs since 1989 and continues to save \$13 million annually.

- ◆ Rebuild Iowa assists communities in





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implementing energy improvements by employing a local energy efficiency coordinator. Communities currently enrolled in the Rebuild Iowa program include: Polk County, Vedic City, Muscatine, Cedar Falls, Hamilton County and Centerville. This program has saved \$5.3 million in energy costs since 1997 and continues to save \$1.4 million annually.

◆ The State of Iowa Facilities Improvement Corporation (SIFIC) works with state facilities to implement dollar and energy saving improvements. SIFIC has saved \$86 million in energy costs for state government since 1988 and continues to save \$9 million annually.

## COMMERICAL AND INDUSTRIAL EFFICIENCY

“Industries of the Future” is a cooperative effort to help Iowa industries increase energy efficiency, improve environmental performance and boost productivity. The DNR has collaborated with the U.S. Department of Energy, the Center for Industrial Research and Service at Iowa State University, and the Iowa Energy Center to prioritize goals and strategies for the metal casting and

biobased agricultural products industries.

In the private sector, utilities offer many programs to commercial, industrial and agricultural facilities to improve efficiency through energy audits, rebates and incentives. Today, many builders are adopting energy efficiency standards in their construction.

## RESIDENTIAL EFFICIENCY

During the past decade, the DNR has partnered with several Iowa organizations to improve building energy code compliance in residential and commercial buildings. In the past two years, the Building Energy Code initiative has helped the cities of Sioux Center, Centerville, Monticello, Winterset, Pleasant Hill, Cedar Falls and Waverly adopt and enforce building energy codes that meet or exceed state requirements.

In the private sector, utilities offer many programs to homeowners to improve efficiency through energy audits, rebates and incentives. Today, many major homebuilders are adopting energy efficiency standards in their construction, often building to Energy Star standards.

## EDUCATION

Many Iowa organizations are working to educate students, homeowners, and businesses on energy issues.

Iowa colleges and universities are incorporating energy themes in their curricula:

◆ In 2003, Iowa State University established a graduate level course called Fundamentals of Biorenewable Resources, taught by Dr. Robert Brown, Director of the Center for Sustainable Environmental Technologies (CSET) at Iowa State University.

◆ The University of Iowa also established an upper level undergraduate class about Sustainable Systems for engineering students. The DNR will provide guest lecturers

for the 13-week class, which will focus on pollution prevention, energy efficiency and environmental performance practices.

◆ Iowa Lakes Community College, Estherville, is establishing a wind program to help train technicians in the construction and maintenance of wind turbines. The first classes will be taught in the fall of 2004.

Several Iowa organizations, including the Iowa Renewable Energy Association, the Iowa Association for Energy Efficiency, the Iowa Energy Center, utilities, universities and the DNR continue to conduct workshops with numerous audiences on adopting energy efficient technologies and renewable energy.