



Charting Our Own Course: Today's Challenges, Tomorrow's Opportunities



The Office of Energy Independence

Energy Independence Plan

December 2008



CHESTER J. CULVER
GOVERNOR

OFFICE OF THE GOVERNOR

PATTY JUDGE
LT. GOVERNOR

December 2008

Fellow Iowans,

Our state is a state of exploration and innovation. Now, there is an energy frontier open before us and we must explore it immediately. Iowa has unlimited potential in renewable energy, and we are up to the challenge of an energy independent future.

To achieve this goal, we must continue our commitment to research and development, through the Iowa Power Fund. The Power Fund, one of very few of its kind nationwide, is an Iowa success story. This commitment will help us address the climate crisis, free our country from foreign sources of energy, and create thousands of green-collar jobs of the future in Iowa.

Iowa is a national leader in renewable energy. This is because we have worked tirelessly with industry leaders, public and private entities, and federal agencies. Most of all, this happened because Iowans decided to be bold. Now, this second energy independence plan offers clear recommendations for action to build on our progress, while re-affirming our commitment to innovation and creativity in the new energy economy.

I believe the recommendations set forth in this plan will help us strengthen the biofuels and wind industries, while committing to energy efficiency as our first step in creating more jobs and providing a secure energy future for all Iowans.

This future is one of hope and possibility; this plan will help Iowa embrace the change that will lead to real energy independence.

Sincerely,

Chester J. Culver
Governor of Iowa

Patty Judge
Lt. Governor

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The events of the past year reinforce for lowans that there is no status quo in energy. Fortunately, lowans enjoy the benefit of our state leaders' commitment to energy independence through our dedicated funds that spur innovation, educate the public, and improve productivity. Our successes are also reflective of the collaboration and leadership provided by Iowa's state agencies, our utilities, our businesses and industries, and our academic institutions.

The Office of Energy Independence presents this second energy independence plan, which addresses the immediate need to spur the economy and create more jobs in the biofuels and wind industries. The plan also recommends strengthening our policies on energy efficiency. Energy efficiency must be a priority, before creating new generation; it's the most direct route to creating jobs while saving consumer dollars. Implementing the actions recommended in this plan will further our commitment to solving energy issues for Iowa and for the nation.

We have taken solid steps toward achieving our goals. In less than one year, the Office has received more than 160 pre-applications totaling more than \$308 million in requests and leveraging more than \$1 billion. The sheer number of applications indicates that lowans are driving the change necessary to achieve a vibrant energy future. The opportunity for impact, as demonstrated in these applications, also shows that lowans will not sit idly during a time of economic need.

There is no status quo, and we hope all lowans will join us in leading the change necessary to ensure a top position for Iowa in the new energy economy.

Roya Stanley
Director
Office of Energy Independence

The Iowa Power Fund is a critical investment tool in supporting Iowa's leadership in the new energy economy. With support from the state's leaders, the Power Fund will continue to leverage our investments to spur our economy and create more jobs in this time of need.

The Iowa Power Fund Board and the Due Diligence Committee were pleased to see the overwhelming response of lowans in the more than 160 pre-applications received totaling more than \$308 million, with matching funds nearing \$1 billion. Tasked with having to choose which projects to fund, we focused the investments on early commercialization for new technology, innovative improvements for existing technology, and projects that leveraged private financing that had the greatest impact for all lowans. The Board and Due Diligence Committee reviewed more than 25 full applications, and we expect that 20 will be signed contracts totaling \$29 million, with \$180 million in matching funds by the end of the year.

These projects represent a wide range of ideas that are vital investments in Iowa's energy future. We anticipate these projects to bring a number of jobs, which will employ the specific skills and training offered by our universities and community colleges. The investments in these projects will lead us to more electrical capacity through efficiencies and development in our wind and solar industries, while funds for the development of the biofuels industry promise a more economically and environmentally sustainable future.

In planning for the future, the Board is confident of the recommendations set forth in this second energy independence plan. We will continue to invest in projects that fall in line with this plan. It sets the tone for the coming year, which promises to be another exciting year of innovation.

Fred S. Hubbell
Chair
Iowa Power Fund Board

Iowa Power Fund Board

Fred Hubbell, Board Chair

John Bilsten, Algona Municipal Utilities

Peter Hemken, DuPont Company

Patricia Higby, University of Northern Iowa Center for Energy & Environmental Education

Carrie La Seur, Plains Justice

Richard Leopold, Iowa Department of Natural Resources

John Norris, Iowa Utilities Board

Bill Northey, Iowa Department of Agriculture & Land Stewardship

Lucy Norton, Iowa Renewable Fuels Association

Michael Tramontina, Iowa Department of Economic Development

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Senator Hubert Houser

Representative Nathan Reichert

Representative Chuck Soderberg

Senator Roger Stewart

Due Diligence Committee

Roya Stanley, Chair, Iowa Office of Energy Independence

Tom Barton, Iowa State University

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Ted Crosbie, Monsanto

Vern Gebhart, Alliant Energy

Patricia Higby, Power Fund Board of Directors

Fred Hubbell, Power Fund Board of Directors

W. Curt Hunter, University of Iowa

Acknowledgements

The Office of Energy Independence (OEI) developed a plan for Iowa's energy future that reflects and incorporates the values and goals of Iowans. Engaging Iowans through public forums helped the OEI identify our strengths and find opportunities to set long-term goals for energy independence. Countless individuals and organizations invested time and energy and contributed their opinions and expertise throughout the process in developing the contents of this plan.

The Office of Energy Independence recognizes and thanks the following for their support and assistance:

- The many individuals who provided input into the development of the plan by attending a forum or submitting comments to OEI;
- The organizations that provided facility space and hosted the OEI public input forums: Upper Iowa University, Cornell College, St. Joseph's Catholic Parish Hall, and Water's Edge Nature Center;
- The Power Fund Board and Due Diligence Committee members, who provided informative feedback and reviewed and approved the plan; and,
- The State Energy Council, the Department of Natural Resources, the Department of Economic Development, and the Iowa Utilities Board, which provided direction and guidance through the development of the plan.

References

For more information and data sources, visit: www.energy.iowa.gov or call 515-281-0187.

This Plan was developed and produced with the support of State Public Policy Group, Inc.

Executive Summary

The Office of Energy Independence presents Iowa's second annual energy independence plan, which highlights accomplishments achieved thus far and makes recommendations for the coming year. This plan shows that Iowa has made significant progress in building the foundation for reaching energy independence in just the past year. Continued investment and further efforts will enable Iowa to push toward even greater advances, while creating new jobs and diversifying local economies.

With those aims in mind, the state has been investing extensively in the new energy economy. One important example is the Iowa Power Fund, an annual appropriation from the Iowa General Assembly administered by the Office of Energy Independence. In less than one year, the Office has received more than 160 project applications totaling more than \$308 million in requests. The projects approved thus far will help advance Iowa's wind and solar industries, foster new energy efficiency practices, and develop the biofuels industry for a more economically and environmentally sustainable future.

Iowa's position as a leader in the new energy economy is dependent on the success of the Power Fund, and on the success of this plan. This plan clearly states that Iowa must boldly pursue a strong position in the emerging energy economy worldwide. To fulfill this goal, the Office of Energy Independence makes the following policy recommendations:

Energy Efficiency Recommendations:

- Enact an energy efficiency portfolio standard and expand energy education
- Promote smart growth and support workforce development in energy
- Develop coordinated and more uniform core utility energy efficiency programs

- Make energy efficiency the highest priority in utilities' planning processes

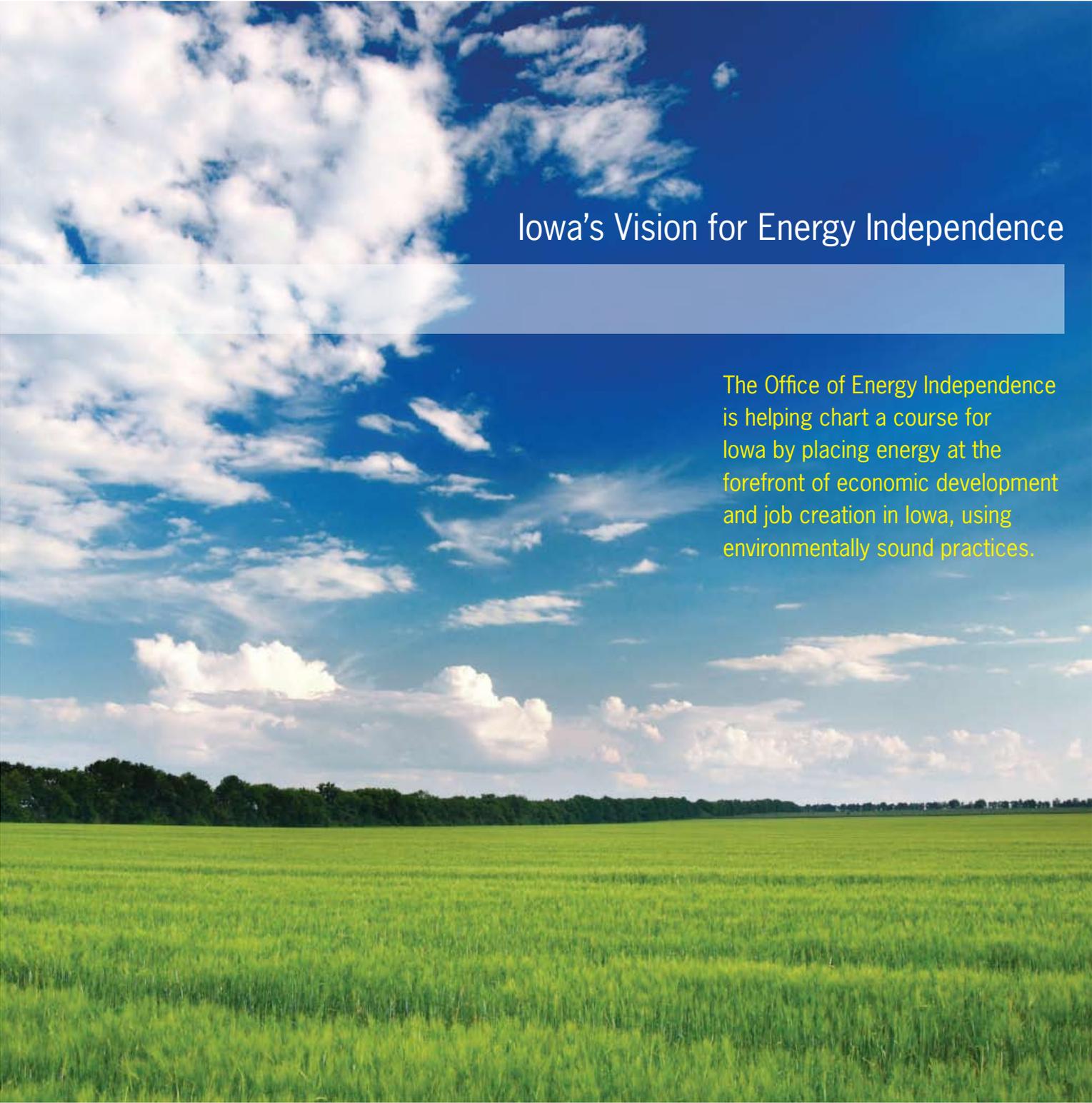
Renewable Energy Recommendations:

- Promote and ensure long-term growth of large utility-scale wind
- Promote small-scale distributed generation
- Promote the development of an environmentally sound biomass industry in Iowa

Biofuels Recommendations

- Enhance the economic and environmental viability of the biofuels industry
- Develop a biomass feedstock supply infrastructure for second generation biofuels
- Support development and deployment of integrated biorefineries
- Improve the analysis used to develop greenhouse gas performance measures

To be successful, these recommendations will have to be fulfilled in many different ways. Some will require legislative action and some may be achieved by executive order. Others can be achieved through advocacy at the national and regional levels. Still more may have to come from the investments of the Power Fund and the work of the Office of Energy Independence. Whatever method the recommendations require, taken together they will allow Iowa to further develop our strengths in the biofuels and renewable energy industries, while creating jobs and making energy efficiency a top priority.



Iowa's Vision for Energy Independence

The Office of Energy Independence is helping chart a course for Iowa by placing energy at the forefront of economic development and job creation in Iowa, using environmentally sound practices.

In 2007, Governor Chet Culver and Lieutenant Governor Patty Judge established a vision for Iowa as a national and world leader in energy efficiency, renewable energy, and biofuels. This vision culminated in House File 918, which was passed by the Iowa General Assembly and which created the Office of Energy Independence and the Iowa Power Fund.

In just its first year of operation, the Office has made significant progress in achieving these goals. The Office and the Power Fund Board have funded projects totaling more than \$29 million, which leveraged an additional \$180 million in private and federal funds. In addition to success with the Power Fund, the Office has helped the state government lead by example by spearheading Iowa's Green Government Initiative. Similar accomplishments have been matched on the national stage. Governor Culver now serves as Co-Chair of the newly created Governors' Wind Energy Coalition and is active on the Governors' Biofuels Coalition.

Because of the challenges facing our state and country, the substantial progress made thus far still does not offer Iowa the luxury of inaction or complacency. Worldwide, energy prices remain turbulent and the dangers to our environment increase by the day. In the United States, the competition over jobs in the new energy economy is increasing and national unemployment figures continue to rise.

Fortunately, Iowa has a skilled labor force, abundant natural resources, and a strong spirit of innovation to assist our state in winning the long fight ahead. To enhance these valuable qualities even further, this plan offers bold recommendations on energy efficiency, renewable energy, and biofuels, which require investments in workforce development, education, and transmission upgrades. These recommendations, combined with participation from the public, businesses, industry, and the other divisions of government, will allow Iowa to capture this moment in history and claim our place in leading the 21st century energy economy.

With these objectives in mind, the Office of Energy Independence (OEI) is pleased to present the second Iowa Energy Independence Plan – Charting Our Own Course: Today's Challenges, Tomorrow's Opportunities.

Vision

Iowans creating an economically viable and environmentally sound energy future.

Mission

To achieve a clean and sustainable energy future by:

- Providing leadership through education, research, planning, and investment.
- Developing policies and resources to produce market transformation.

Guiding Principles

- The state is committed to be a leader in ensuring Iowa's energy future.
- All Iowans are responsible for ensuring Iowa's energy future.
- Iowa values, economic, political, and market factors demand that Iowa is aggressive and innovative in ensuring Iowa's energy future.
- Iowa's policies and initiatives strengthen the economy, improve the environment, and ensure energy security.

The OEI sets the strategic direction for Iowa's new energy future by identifying goals to achieve energy independence by 2025. The goals of the OEI are:

- **Engage all Iowans in achieving the state's energy goals.**
- **Achieve greater energy efficiency.**
- **Develop, encourage, and use sustainable and secure energy.**
- **Improve Iowa's natural resources and environment.**
- **Ensure that energy is affordable.**



Energy Independence in Iowa

Power Fund: Investing in Our Energy Future

Iowa's Power Fund is an international model for investment in energy and innovation. It positions Iowa to lead the nation in supporting cutting edge research and technology, creating jobs, and achieving energy independence.

Since its inception in 2007, the Power Fund has received 162 requests for funding totaling more than \$300 million, with the opportunity to leverage an additional \$1 billion. These numbers demonstrate the overwhelming demand for investing in homegrown ideas and opportunities to place Iowa at the forefront of the new energy economy.

Power Fund projects to date:

- 2008 Biobased Industry Outlook Conference, Iowa State University, Ames
- Amana Renewable Energy Project, Amana Farms, Inc., Amana
- AmeriCorps Green Corps Program, Iowa Department of Economic Development/Iowa Department of Natural Resources, Des Moines
- Annual Iowa Energy Poll, University of Northern Iowa, Cedar Falls
- The Biodiesel Research Center, Renewable Energy Group Ames
- Clean Gasification Platform for Renewable Power, Iowa State University, Ames
- Determining Maximum Sustainable Production of Biomass with Mixture of Prairie Species, University of Northern Iowa, Cedar Falls
- Development of Less Expensive Dye Sensitized Solar Cells, University of Northern Iowa, Cedar Falls
- Efficient, Low Cost, Photovoltaic Solar Energy Conversion, Iowa State University, Ames
- Iowa Stored Energy Park, Dallas Center
- I-Renew Energy & Sustainability EXPO, I-Renew, West Branch
- Making Iowa Cities Sustainable – Greenhouse Gas Emissions Reduction Model, Fairfield
- Mobile Solid Biomass Briquette Plant, RENEW Energy Systems, Osage
- Novel Hydrogen Storage Materials for Fuel Cell Application, University of Northern Iowa, Cedar Falls
- POET Project Liberty, Emmetsburg
- Reducing the Energy and Environmental Costs of Drying Corn Distillers Grain, Cellencor Inc., Ames
- TPI Wind Blade Advanced Manufacturing Initiative, TPI Iowa LLC, Newton
- Utilizing Glycerol in Swine and Poultry, Novecta, L.L.C., Johnston

The Power Fund also provided \$2.5 million to support workforce training and economic development programs in renewable energy and energy efficiency practices at Iowa community colleges. The Power Fund provided \$7.5 million to Jumpstart Iowa for energy efficiency rebates in flood-affected areas.

The Power Fund is establishing Iowa's growing energy industry by investing in such efforts as:

The Renewable Energy Group Biodiesel Research Center

– will be created to focus on many of the immediate issues facing the biodiesel industry. The center will research alternative sources of feedstock for biodiesel production and seek new methods to measure the lowest levels of particulate matter in biodiesel. Not only could these developments lead to a fuller utilization of Iowa's existing biodiesel production capacity, but the center will also provide samples and internships to the students of Iowa's community colleges and high skilled jobs to Iowa's workforce.

TPI Wind Blade Advanced Manufacturing Initiative

– will foster the mass production of wind turbines in Iowa through improved labor productivity in wind manufacturing by up to 35 percent. This project will improve manufacturing through an Advanced Manufacturing Innovation Initiative, resulting in better paying and technically-challenging employment opportunities in the state. TPI has located in Newton, providing high quality jobs in a community recovering from the loss of an employer.

AmeriCorps GreenCorps

– will finance Iowa's GreenCorps to assist with energy efficient rebuilding of areas of Iowa that were affected by natural disasters in the summer of 2008. Through volunteer labor hours, the GreenCorps will conduct energy conservation and efficiency education programs and implement and advise property owners on energy efficiency and weatherization improvements in disaster affected communities. The GreenCorps will help Iowa rebuild for the future with energy efficiency initiatives coupled with disaster recovery efforts.

University of Northern Iowa Prairie Grass Project

– will research how to better use prairies for wildlife cover and for energy production. This research will build on Iowa's prairie resource to maximize biomass production for electrical generation. It will also determine the most effective management plans for sustainable use of prairie vegetation for biomass production while maintaining wildlife habitats and other benefits. This project will help Iowa maintain its leadership role in renewable energy.

Green Government: Leading by Example

Governor Culver signed Executive Order Six establishing the Green Government Initiative on February 21, 2008. With this Executive Order, the state of Iowa commits to leadership in environmental protection through increasing the use of renewable energy, alternative fuels, and energy efficient technologies. Executive Order Six established the Green Government Initiative to create jobs, improve energy efficiency, and reduce negative environmental impacts across state government.

The Green Government Initiative, led by the Director of the Office of Energy Independence, established three Task Forces – Energy Excellent Buildings, Sustainable Materials, and Biofuels. The goals of the Task Forces are to:

- Reduce the use of electricity, natural gas, fuel oil, and water in all state office buildings by at least 15 percent overall in the next five years, taking into account growth in the state workforce and/or changes in building operations.
- Promote resource efficiency by encouraging the use of materials that are recycled, renewable, and locally available, and the utilization of manufacturing processes that are environmentally and economically sustainable.

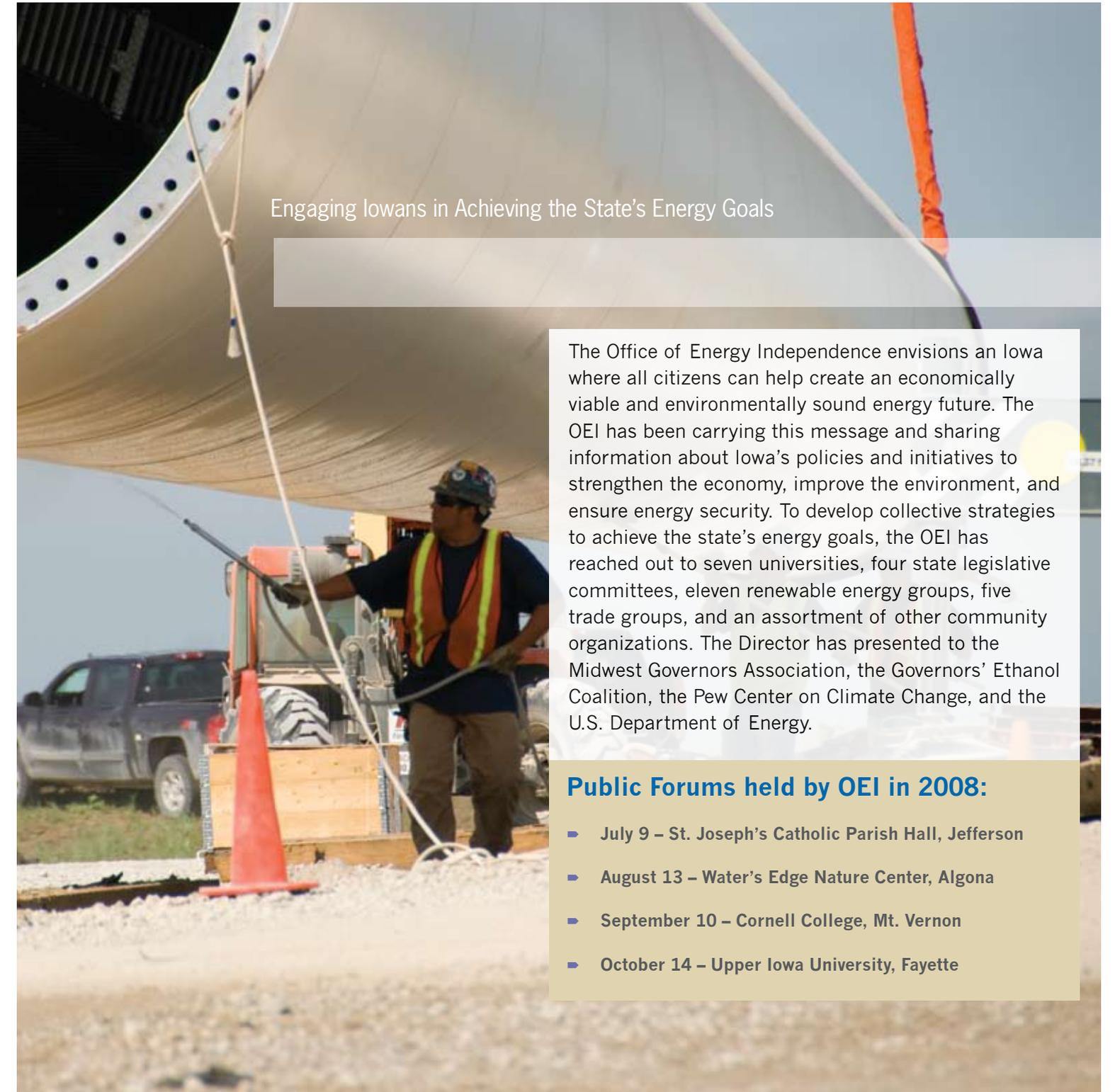
Using data gathered during the agency audits required by Executive Order Six, the Initiative will set specific

five- and ten-year targets related to at least three issue areas including but not limited to:

- » Increasing the use of biofuels by state agencies to the maximum amount feasible
- » Reducing the number of vehicle miles traveled by the state employee workforce
- » Increasing the fuel efficiency of the state vehicle fleet

The State Energy Council brings together state agencies to coordinate, among other things, efforts to meet the Green Government goals of Governor Culver's Executive Order Six. Formerly the Energy Coordinating Committee, the body has been reinvented as a forum to advise the Office of Energy Independence on key issues regarding energy efficiency, for collaboration on legislation from the participating state entities, and for sharing ideas for best practices on environmental and energy issues.

These Task Forces, along with the State Energy Council, have distributed the first statewide Green Government Survey. The survey is designed to gather data about each state agency's behaviors regarding progress toward meeting the goals of Executive Order Six. The data gathered from the survey will help each Task Force determine the necessary steps to reach the goals.



Engaging Iowans in Achieving the State's Energy Goals

The Office of Energy Independence envisions an Iowa where all citizens can help create an economically viable and environmentally sound energy future. The OEI has been carrying this message and sharing information about Iowa's policies and initiatives to strengthen the economy, improve the environment, and ensure energy security. To develop collective strategies to achieve the state's energy goals, the OEI has reached out to seven universities, four state legislative committees, eleven renewable energy groups, five trade groups, and an assortment of other community organizations. The Director has presented to the Midwest Governors Association, the Governors' Ethanol Coalition, the Pew Center on Climate Change, and the U.S. Department of Energy.

Public Forums held by OEI in 2008:

- July 9 – St. Joseph's Catholic Parish Hall, Jefferson
- August 13 – Water's Edge Nature Center, Algona
- September 10 – Cornell College, Mt. Vernon
- October 14 – Upper Iowa University, Fayette



Infrastructure to Meet the Energy Demands of Our Future

To achieve energy independence, Iowa must modernize and upgrade its infrastructure.

In recent years, there has been an increased desire and sense of urgency to address the state of the nation's infrastructure. Whether it is highways, roads and bridges, water distribution systems, sewer systems, natural gas pipelines, telephone lines and their successors, or fiber optic cable and broadband internet connections, there is serious concern over the failure to modernize and upgrade these transmission and distribution systems.

Iowa is faced with many of these same infrastructure concerns, particularly when considering Iowa's goal of energy independence by 2025. Iowa has made efforts to review and update current capacity for energy efficient buildings and the generation, transportation, and transmission of energy inside and outside of the state. Initiatives include evaluating energy efficiency standards and practices for residential, commercial, and industrial buildings; developing new energy efficiency programs with rural and municipal utilities; and expanding the infrastructure for and access to renewable fuels across the state.

In response to high fuel costs and increasing consumer demand for transportation options, the Iowa Department of Transportation, in cooperation with the OEI and the Iowa Department of Natural Resources, initiated a study of public transit options. The goal of the study is to identify transit improvements needed to meet state energy independence goals and the needs of Iowans.

It is expected that Iowa will significantly increase its wind power generation over the next several years to meet the federal goal of achieving 20 percent wind energy consumption by 2030. To successfully add wind power to Iowa's energy mix, more transmission and grid upgrades will be required. It is likely that Iowa will begin exporting greater amounts of power created by wind to other states, requiring more transmission to be built. New policies should emphasize the real need for new transmission capacity to transport emerging and future wind generation as well as power from current sources.

State and National Policy Issues



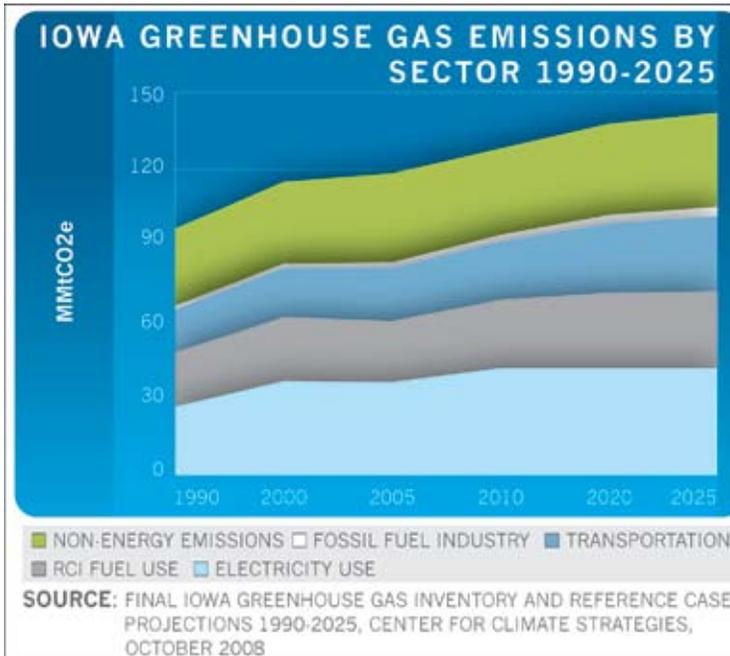
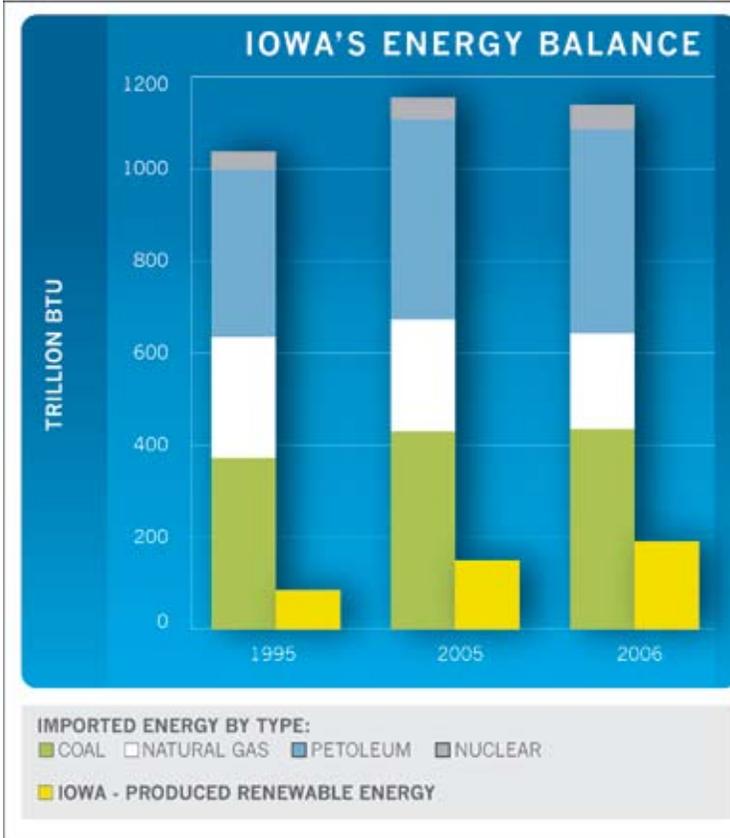
Throughout the last year, energy policy was brought to the forefront of the national debate by the 2008 presidential elections and rising energy costs. This urgency was reflected in the passage of the 2008 Farm Bill. From the \$348 million in new tax credits to spur the production of cellulosic ethanol to the \$320 million in grants and loan guarantees for the building of advanced biorefineries, the Farm Bill represented a substantial commitment to clean energy and the agricultural economy. In October 2008, the Congress extended this commitment even further by providing a one-year extension for the wind production tax credit.

Federal efforts were matched at the regional and state levels by multiple coalitions of governors. In November 2007, the Midwest Governors Association and its Canadian counterparts signed historic regional agreements on renewable energy technologies and strategies to reduce greenhouse gas emissions. Similar accomplishments were produced by the Governors' Biofuel Coalition, whose recommendation for a major expansion of the renewable fuels standard was incorporated into the Energy Independence and Security Act of 2007. The newly-created Governors Windpower Coalition seeks to match the model and success of the Biofuel Coalition in the coming year by fostering interstate collaboration and influencing federal and regional wind energy policy. Governor Culver is active in both coalitions as well as the Upper Midwest Transmission Development Initiative, a new transmission planning effort to promote regional electric transmission and investment.

Iowa's domestic energy production has increased by 185 percent in the last decade as a result of strong growth in biofuels production and wind energy development.

Iowa has laid the groundwork to be a leader in a variety of renewable energy fields for the future. Continued investment in wind power generation and biofuels development has placed Iowa at the forefront of renewable fuel generation. However, much work and investment remains. Recovery from the disasters of 2008 provides the state a unique opportunity to rebuild Iowa with a strong energy efficiency foundation.

Iowa continues to rely heavily on energy imported from other states and nations, as well as energy that emits increasing amounts of greenhouse gasses. The major imported energy sources in Iowa include petroleum, coal and natural gas. While the majority of Iowa's energy consumption comes from these out-of-state resources, it is important to note that Iowa's homegrown energy production has grown rapidly in the last decade. In fact, Iowa's domestic energy production has nearly tripled from 86 trillion Btus (British thermal units) in 1995 to an estimated 244 trillion Btus in 2007. This increase of 185 percent in Iowa's domestic energy production is mainly due to strong growth in biofuels production and wind energy development. Iowa's other domestic energy sources include hydroelectric power and biomass energy.

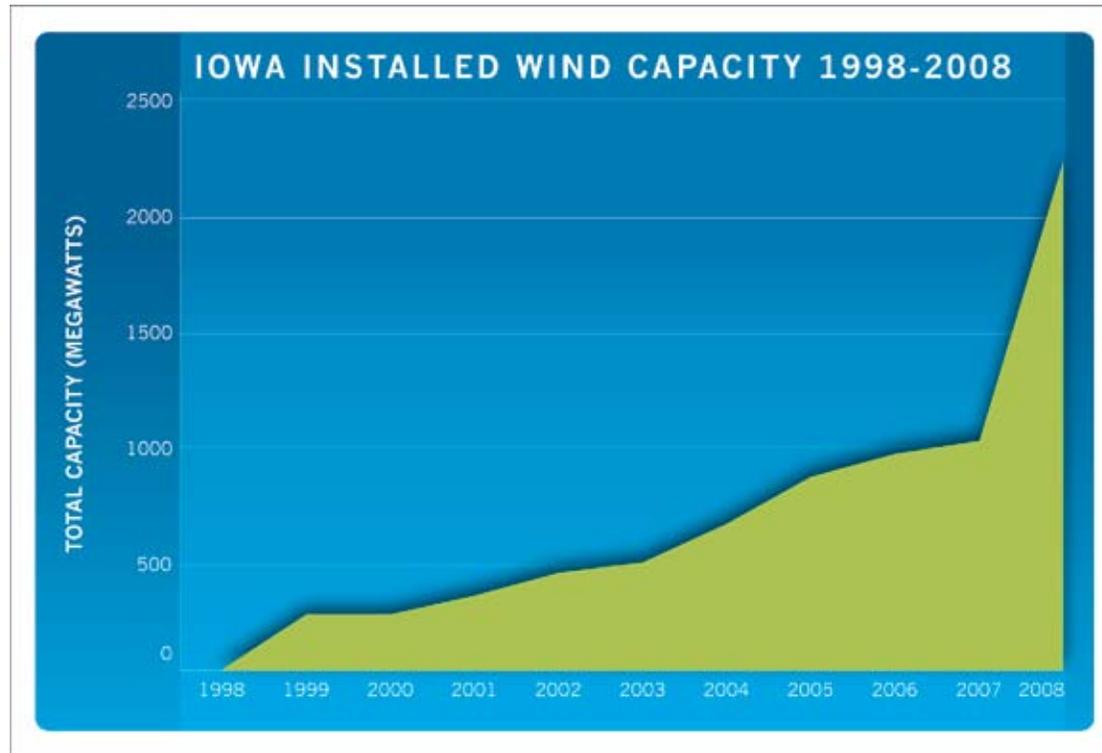


Ranked fifth among the fifty states in spending on electricity efficiency programs, Iowa is consistently ranked among the highest performers in statewide energy efficiency assessments conducted by the American Council on Energy Efficiency Economy (ACEEE). Iowa's investor-owned utilities – MidAmerican Energy, Alliant Energy, and Black Hills Energy – are required to offer energy efficiency programs for their customers and have a long record of administering these programs successfully. While this means that substantial progress has already been made, there is still great opportunity for Iowa to go even further.

The Iowa Utilities Board, which approves energy efficiency plans for the investor-owned utilities, evaluated the effectiveness of Iowa utilities' energy efficiency programs in a report submitted to the Iowa Legislature in January 2008. The report indicated that in 2006, Iowa's investor-owned utilities achieved 0.8 percent in incremental electric energy efficiency savings compared to retail sales. Rural electric cooperatives' savings were 0.6 percent and municipal utilities achieved savings of 0.15 percent. Cost-effectiveness is the major reason for energy efficiency; for every one dollar spent on energy efficiency, investor-owned utilities saw two dollars in benefits. As a result of the study, the Office of Energy Independence recommends that the state develop goals for energy efficiency that apply to all Iowa utilities, including regional electric cooperatives and municipal utilities.



Iowa's Wind Energy Production



One megawatt of wind energy can create enough electricity to power up to 300 households.

– American Wind Energy Association

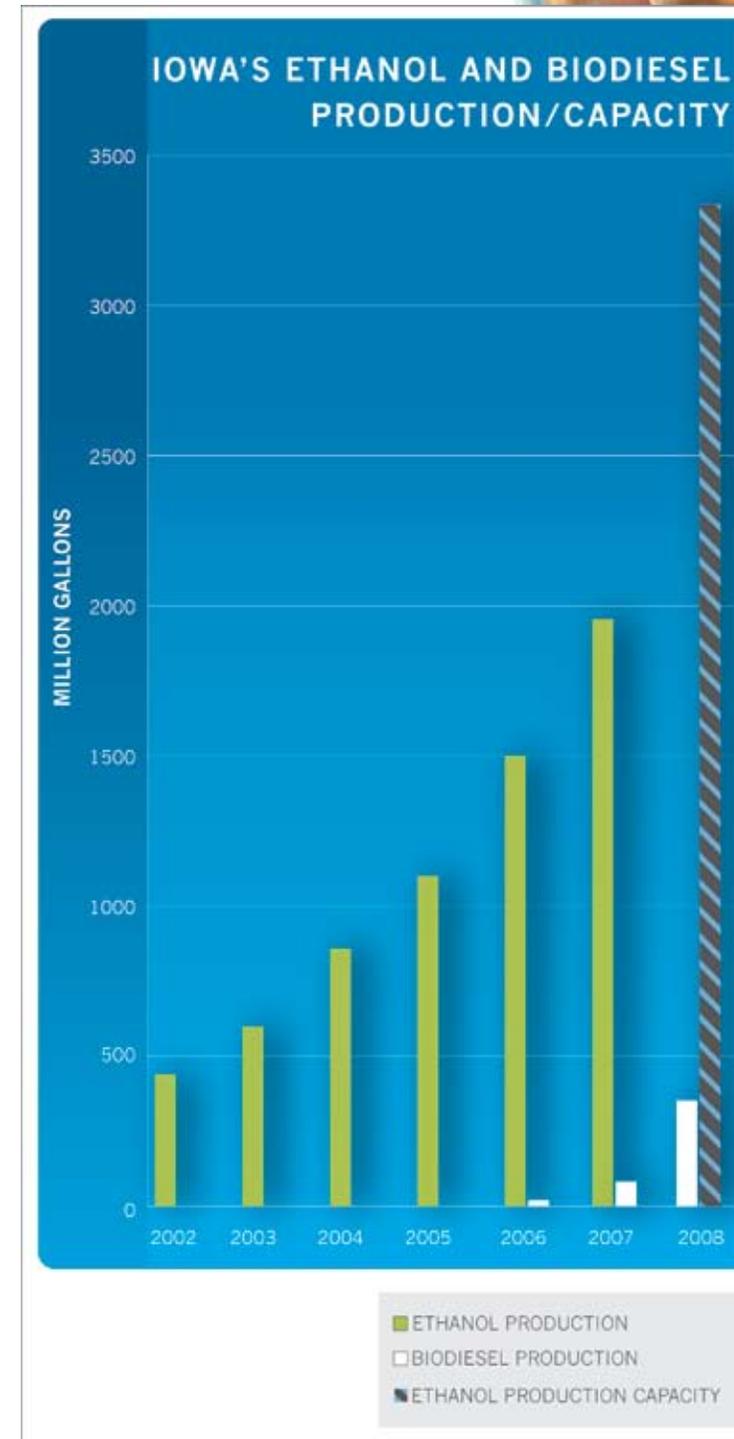
“Although Iowa has installed about 2,000 wind turbines to date, we’ve just begun to harness this abundant natural resource in terms of energy use, job creation, research activities, and economic growth.”

**Tom Wind,
Vice Chair, Iowa Power
Fund Board**

Iowa’s domestic, renewable energy production growth has been robust over the last ten years. Iowa is currently ranked third in wind power in the United States behind Texas and California. Iowa has positioned itself as a leader in wind power because of its early adoption of Renewable Portfolio Standards (RPS), development of necessary infrastructure and facilities, and strong public leadership.

By the end of 2008, Iowa’s wind energy capacity is estimated to be 2,200 megawatts, which means that about 10 percent of our electricity will come from wind power. Given Iowa’s motivation to install additional wind capacity, it is likely that we will surpass California in early 2009, making Iowa second in the nation in wind production.

Iowa: Leading the Way with Biofuels



Iowa is the leading producer nationally of both ethanol and biodiesel. As of November 2008, there were 35 ethanol refineries in Iowa with a total annual production capacity of 3 billion gallons, and an additional 715 million gallons of capacity under construction. Iowa’s 14 biodiesel refineries have the capacity to produce 317 million gallons annually.

It is important to note that production by Iowa’s biofuels facilities has been at less than total capacity due to difficult market conditions for the industry, particularly, rising costs for corn, soybeans, natural gas, and substantially higher plant construction costs. New, second-generation biofuels meet federal renewable fuel standard requirements, but face significant technology development and supply chain challenges often inherent in new industries.



ENERGY EFFICIENCY RECOMMENDATIONS

The OEI recommends the following policies:

- Enact an energy efficiency portfolio standard (EEPS) and expand energy education.
- Promote smart growth and support workforce development in energy.
- Develop coordinated and more uniform core utility energy efficiency programs.
- Make energy efficiency the highest priority in utilities' planning processes.

ENERGY EFFICIENCY

Energy Efficiency Portfolio Standard (EEPS)

Recommendation: Enact an energy efficiency portfolio standard (EEPS) and expand energy education. All utilities should be required to achieve annual energy savings of at least 1.5 percent of their retail energy sales. However, municipal utilities and rural electric cooperatives should be given a reasonable time to develop their programs to achieve the required savings levels.

Energy efficiency stands as one of the first and primary means to achieve the goal of energy independence. The state should work with local governments, the private sector, and educational institutions to increase energy efficiency through a variety of measures, including the enactment of an Energy Efficiency Portfolio Standard (EEPS), the promotion of smart growth practices, the development of coordinated and more uniform core utility energy efficiency programs, and by giving energy efficiency the highest priority in utilities' planning processes.

In addition to working toward energy policies that benefit all Iowans individually, both major corporations and small businesses alike can achieve significant job growth by implementing increased efficiency measures. One impediment to this goal is Iowa's limited amount of contractor resources to carry out many of the functions that will be needed to support these recommendations. To encourage careers in contracting and many other energy occupations, the state and local governments should consider establishing school programs dealing specifically with energy education. Such programs should be fostered with the prospect of future economic growth in mind. In just one example, a recent study by Management Information Services and the American Solar Energy Society found that the energy efficiency sector will account for 14 to 32 million jobs nationwide in 2030.¹

An EEPS establishes long-term efficiency targets for utilities. Applying a portfolio standard to achieve energy efficiency goals is a structure modeled after Renewable Portfolio Standards (RPS), which requires investment in

renewable energy resources. Currently, 18 states have established or are in the process of implementing an EEPS, including Connecticut, which has set a 4 percent EEPS standard to be met by 2010.

Iowa should require all utilities to achieve at least 1.5 percent reduction in retail energy sales per year over the next five years. Municipal utilities and rural electric cooperatives should be given reasonable time to develop their programs to achieve the required savings levels. By developing an EEPS, the state can set goals and establish measurable standards for more efficient generation, transmission, and use of electricity and natural gas resources.

Municipal utilities, rural electric cooperatives, and large wholesale buyers should be included in a statewide EEPS. Their energy efficiency programs are largely unregulated and the potential energy efficiency savings may be higher. Once an EEPS is implemented, a re-evaluation of progress and the appropriateness of the target should be conducted every three to five years. The creation of a portfolio standard should be elevated to the level of a legislative requirement to preserve its intent.

¹ *Energy Efficiency and Renewable Energy: Economic Drivers for the 21st Century*, American Solar Energy Society, 2007, 7.

ENERGY EFFICIENCY

Promote Smart Growth Approaches

Recommendation: Promote smart growth and support workforce development in energy. The State of Iowa should cooperate with the public and private sectors in community development and community planning principles as a means of conserving energy.

The state can also be a lead entity for energy efficiency through the promotion of smart growth initiatives. As Iowa continues to transform into a 21st century economy, measures should be considered to reduce urban sprawl and vehicle miles traveled (VMT). Reduction of vehicle miles traveled could include such innovations as the creation of telecommuting hubs around Iowa.

As new developments are considered, energy efficient measures should be a consideration of all development and construction projects. Incentives for infill and mixed-use development should be a consideration of policymakers. Developers should be encouraged to include provisions allowing for the construction of mass transit options, the inclusion of walking and biking paths throughout new developments, and bike lanes on new, urban streets. These ideas for development projects throughout Iowa can help reduce urban sprawl, reduce the number of abandoned and vacant properties, and plan for future public transit needs in new developments.

The OEI recommends denser growth in cities and advocates compact, transit-oriented, walkable, bicycle-friendly land use, including neighborhood schools, and mixed-use development with a range of housing choices. Long-range, regional considerations of sustainability should have priority over a short-term focus. The resulting energy savings would be significant and consistent with the goals of the OEI.

Iowa has a unique opportunity to rebuild many parts of the state after the disasters of 2008. While many of the disaster funds help the state return to the way it was, the state should also consider adding value to the recovery efforts and incorporating new approaches to growth while rebuilding to create an even better Iowa.

A specific example of a potential strategy to reduce VMT is the establishment of telecommuting hubs. Telecommuting hubs can keep vehicles off of the road, reduce gasoline consumption, and help stimulate the economies of smaller, rural areas. Telecommuting hubs are simply office spaces in communities that allow residents that normally commute out of town for work to stay in their community to work. The hubs are ideal for office jobs where the bulk of a person's day is spent on the phone or computer. When creating a telecommuting hub, existing buildings should be used in areas that are within walking distance of restaurants and amenities that office workers need for daily work to keep the VMT low. Incentives from state and local governments will also likely be needed to help with the creation of telecommuting hubs.

ENERGY EFFICIENCY

Coordinated Core Utility Energy Efficiency Programs

Recommendation: Develop coordinated and more uniform core utility energy efficiency programs.

Through streamlined implementation and attentive communication with customers, greater energy efficiency measures can be brought to residences and small businesses. In order for energy efficiency to take root in households and small businesses around the state, a coordinated and more uniform core utility energy efficiency program must be developed.

Several programs have already been implemented and are making progress in reducing the consumption of energy and in educating the public about the importance of energy efficiency. The state should take a lead role in working with municipal utilities, rural electric cooperatives, and investor-owned utility programs to ensure statewide coverage of successful energy efficiency programs and an expansion of programs for greater energy efficiency throughout Iowa. For example, the state should consider creating programs for local governments or utilities to provide financing for consumer energy efficiency measures.

Municipal utilities, rural electric cooperatives, and investor owned utilities are at different stages in development and implementation of energy efficiency programs. From home audits to appliance and component installation to public outreach, utility companies are already working to stimulate energy efficiency measures in Iowa. The state should encourage these efforts and work to ensure all available measures are accessible to Iowans statewide.

According to the American Council for an Energy Efficient Economy's 2008 U.S. Energy Efficiency Market Report, "In total, 1.63 million (U.S.) jobs are supported by efficiency-related investments."

"Energy efficiency and conservation are a top priority for many in this economy. Through our partnership with the Power Fund, the Green Iowa AmeriCorps program will be able to provide the education necessary for homeowners and businesses to make improvements in energy efficiency with specific focus on flood-affected communities."

Adam Lounsbury, Iowa Commission on Volunteer Service, Executive Director



ENERGY EFFICIENCY

Make Energy Efficiency the Highest Priority in Utilities' Planning Processes

Recommendation: Utilities should be required to demonstrate that they have pursued all available energy efficiency and demand reduction resources that are cost effective before being given permission to build additional generation capacity.

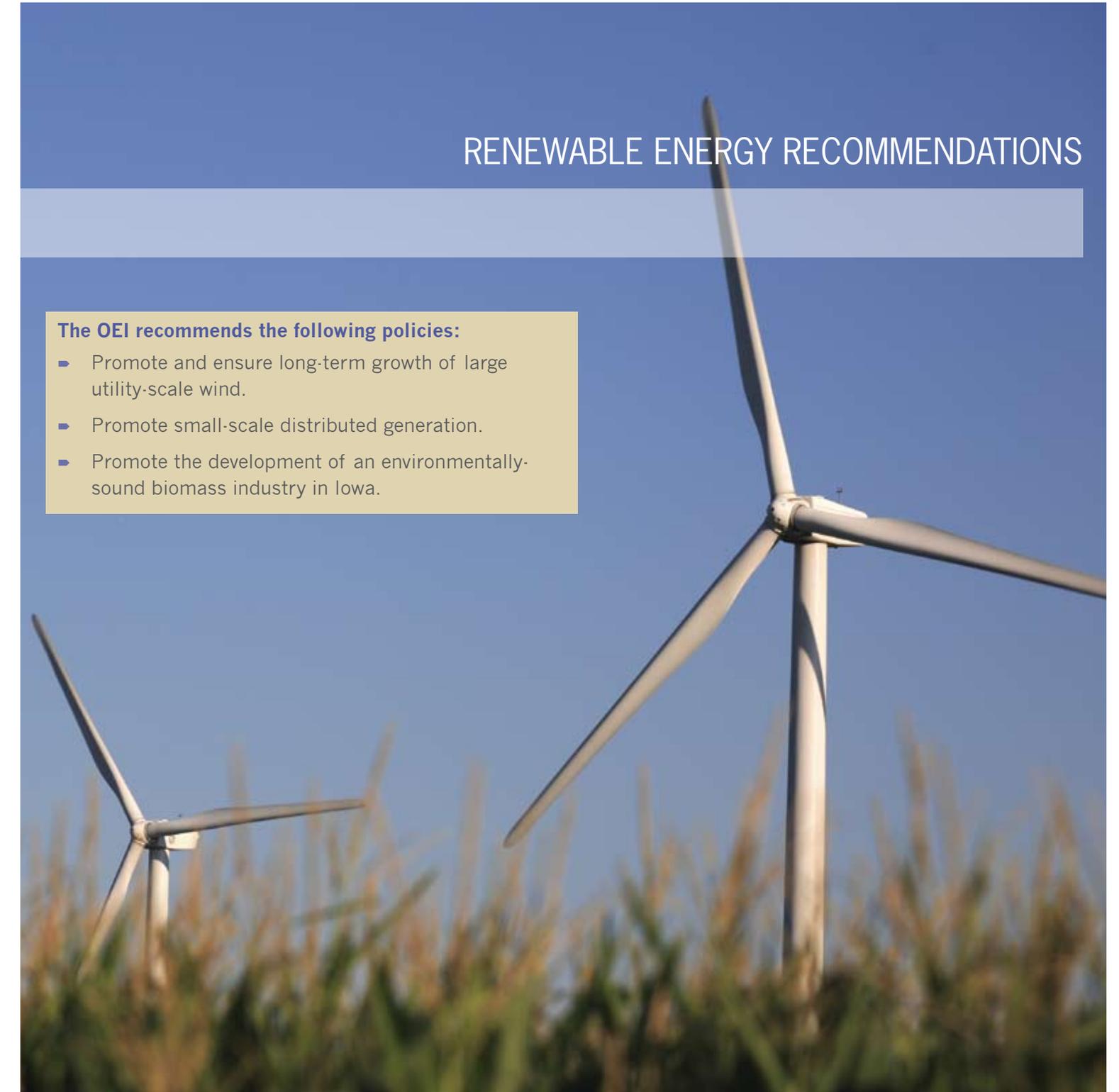
To further underscore the opportunity for utilities to reduce energy consumption and to incorporate energy efficiencies wherever possible, this recommendation places a burden of proof upon utilities seeking to expand generation capacity. Only when they demonstrate they have incorporated energy efficiency and consumption measures could a utility expand. A notable exception to this would be renewable energy development.

With traditional utility planning, planners take into consideration the demand, the reliability to be achieved, and applicable law. When evaluating the need for new generation using traditional planning, utilities do not incorporate a comprehensive analysis of how much projected new demand could be avoided cost-effectively.

The result is an opportunity to achieve lower overall costs than might result from considering only supply-side options. Including demand-side options presents enhanced possibilities for saving fuel, reducing negative environmental impacts, and most importantly, lowering customer bills, a strategic goal of the OEI.

Iowa faces new terrain in the energy sector. Our state, like the rest of the nation, can expect energy costs to continue to rise as the demand for more energy increases. Because the costs of new generation facilities will be significant, energy efficiency measures must be implemented to reduce prices and benefit consumers. In effect, efficiency must be the first fuel. This means that greater electric and

natural gas resource needs should first be met through all available energy efficiency and demand reduction resources that are cost effective or less expensive than supply.



RENEWABLE ENERGY RECOMMENDATIONS

The OEI recommends the following policies:

- Promote and ensure long-term growth of large utility-scale wind.
- Promote small-scale distributed generation.
- Promote the development of an environmentally-sound biomass industry in Iowa.

RENEWABLE ENERGY

Utility-Scale Wind

Recommendation: Promote and ensure long-term growth of large utility-scale wind.

Iowa has taken strides in becoming a national leader in renewable energy through investments in renewable energy generation. Currently, Iowa is ranked third in the country in installed capacity for wind and generates a larger portion of its power from wind than any other state. The amount of wind energy generated is expected to double within the next two years. A cost comparison of wind to other technologies shows that utility-scale wind is one of the most cost-effective technologies.

Iowa has made investments to ensure it is a national leader in the generation of wind energy; however, steps need to be taken to sustain and build on existing renewable energy investments in Iowa. As of November 2008, Iowa's wind energy capacity was 1,394 megawatts. According to the American Wind Energy Association, there is currently 1,480 megawatts of additional wind capacity under construction in our state, which would more than double current wind energy production. As wind generation in Iowa continues to increase, the state should work in a regional manner to deliver the energy statewide in Iowa and to other states.

Promotion of utility-scale wind can also help create jobs in Iowa. Successful efforts have already taken place to bring manufacturers of wind energy components to the state of Iowa. These include the creation of the TPI Composites manufacturing plant in Newton. Iowa is also the home to some of the biggest names in wind energy production, including Acciona Energia in West Branch, Clipper Wind Power in Cedar Rapids, and Siemens Wind in Fort Madison. Iowa should ensure that its workforce has the tools necessary to fill the jobs needed by existing and future wind energy manufacturers. Such employment tools will include training programs at community colleges.

As Iowa moves to play a greater role in wind energy and manufacturing, a wind turbine gearbox test facility will be a crucial missing element as determined by the Department of Energy's "Roadmap to 20% Wind by 2030." Prior to shipment and installation atop a wind turbine tower, the gearbox's performance must be verified. This requires gearbox operation at full power and speed, where specific speed and torque test points and accurate data on vibration, noise, lube oil temperature, and gear mesh geometry can be obtained. Iowa's three current manufacturers have to seek other facilities for their testing. Working to create a gearbox test facility can attract other major original equipment manufacturers and create jobs in Iowa.

As the generation of large-scale wind energy continues to grow in Iowa, infrastructure considerations must be made for transmitting that energy statewide and to potential buyers outside of Iowa. From financing incentives to load management to rights-of-way that may be needed for transmission corridors, regional planning is essential to ensuring Iowa is ready to become the national leader in large-scale wind energy generation and manufacturing. With this in mind, the OEI endorses the U.S. Department of Energy (DOE) report recommending that 20 percent of energy nationally come from wind energy by 2030.

"Iowa Lakes Community College is training wind technicians, putting quality jobs back in rural Iowa. We believe that this program is developing the necessary workforce to support new quality jobs for Iowa."

Al Zeitz, Wind Program Director, Iowa Lakes Community College

RENEWABLE ENERGY

Utility-Scale Wind

Iowa is working to meet the DOE 20 percent technical goal. In addition to using 20 percent wind in state by 2030, Iowa recognizes our important role to support other states to achieve 20 percent wind use. Iowa can generate more wind than other states and will be able to offer that resource to its neighbors. Currently, Iowa leads the nation in in-state electricity generated by wind at 5.5 percent. MidAmerican Energy leads all rate regulated utilities in wind-generated electricity; over 10 percent of its portfolio is from wind.

One Power Fund recipient, the Iowa Stored Energy Park, will use wind energy to compress and store air in underground porous rock. The rock will hold the air until demand for electricity rises. As this happens, the stored air will be released, heated, and used to drive electric generators. This project combines conventional natural gas storage techniques with a future vision for utilizing renewable energy.



RENEWABLE ENERGY

Small-Scale Distributed Generation

Recommendation: Promote small-scale distributed generation.

Though the majority of renewable energy capacity created in Iowa has been comprised of large-scale installations, attention should be given to small-scale distributed generation initiatives. Small-scale distributed generation from renewable resources frequently produces electricity near the load, thus reducing transmission and distribution costs and related energy losses.

In addition to grid and environmental reasons for a focus on small-scale distribution, there are other factors that make a case for its increased use, including the diversification of the economy through renewable fuels, increasing reliability of renewable energy, the increase in skilled jobs needed to install and maintain such devices, and the additional tax revenues to the state.

The state of Iowa should focus attention on increasing the capacity and output of small-scale distributed generation through increased investment in small-scale distributed generation. The state should work to reduce the time it takes to get a small-scale distribution generation entity going. By streamlining the utility interconnection process along with the permitting and inspection process, Iowa could help expedite the creation of new entities. The state should also look to increase the workforce of Iowa-based professionals trained and certified in small-scale systems.

As with other recommendations, an outreach component is essential to inform Iowans about small-scale distributed generation and its importance. Coinciding with an outreach effort, incentives to utilize small-scale distributed generation should also be implemented and emphasized. Tax incentives for purchasing locally-made systems, loan programs for the purchase of systems, and rebates over and above existing rebates should be considered. The state should call for all utilities to allow a standard form of net-metering across the state. Net-metering allows consumers of electricity who have installed improvements like wind turbines or solar panels to maximize their utility bill savings. The electric energy generated by that consumer and delivered to the local distribution facility is used to offset the electricity used by that consumer during the billing period. This means that net-metering provides additional energy for the local facility and also rewards the consumer for installing renewable energy improvements.

“Iowa has the opportunity to produce a vast amount of energy utilizing solar power. Iowa State University researchers will work with the Iowa Power Fund, PowerFilm, and Micron Technology to research materials to improve solar conversion efficiency. Our proposed research has the potential to produce vast improvements in Iowa’s solar capability and capacity that could secure a significant commercial competitive advantage.”

Dr. Vikram Dalal,
Professor, Iowa State University

RENEWABLE ENERGY

Environmentally Sound Biomass Industry

Recommendation: Promote the development of an environmentally-sound biomass industry in Iowa.

There is no question that Iowa is a national leader in wind energy production and biofuels production. However, opportunities exist to harness another renewable resource for energy production: biomass. Biomass is biological material that can be used as a fuel or for industrial production. Iowa has ample resources to develop an environmentally sound biomass industry. According to a 2005 National Renewable Energy Laboratory (NREL) study, Iowa has the greatest total biomass resources of any state in the U.S. Iowa leads the nation in mass of crop residue and is ranked third in methane emissions from manure management.

Iowa is well-versed in biomass-based industries, already leading the nation in ethanol production, making nearly twice the amount as the second-ranked state. Iowa has the natural resources and existing capacity to create significant expansion of its biomass industry. Synergies can be achieved across the various types of biomass from expanding existing research within Iowa to working with existing biomass-based industries to develop a comprehensive biomass industry within the state. Such research should focus on the harvesting, storing, and transporting of biomass. These efforts could contribute to advancing the use of biomass within both the renewable energy and biofuels industries.

The creation of a biomass set-aside within a renewable energy efficiency portfolio standard is a start to developing and expanding the industry. Setting a specific percentage of renewable energy that will be generated from environmentally-sound biomass will provide incentives to private sector entities to begin serious investment in

the industry. Such an industry would provide a diversified energy source for Iowans and economic benefits to local communities.

One source of focus for policymakers in an effort to expand the biomass industry is the promotion of biogas-powered generation from anaerobic digestion. Anaerobic digestion is a biological process in which biodegradable organic matters are broken down by bacteria into biogas. The biogas can be used to generate heat and electricity. The state of Iowa, in concert with the educational community, the agricultural sector, trade associations, and private industry should work to move manure-to-power plants beyond pilots to deployment around the state. These projects would be small scale and commercial scale plants, creating a variety of jobs in the construction and operation of the plant, and would also require a public awareness effort regarding the opportunities it creates and how it helps Iowa become a more energy independent state.



RENEWABLE ENERGY

The expansion of an environmentally-sound biomass industry should also include consideration of integrated biorefineries. Integrated biorefineries are beneficial due to the diversification in feedstock and products. There are currently several different levels of biorefineries, which adds to their sustainability, both economically and environmentally. The cost of feedstock is the most significant factor when analyzing the price of electricity generated from biomass.

Continued developments involving feedstock and conversion processes (both biochemical and thermochemical) enable more economical and environmentally sustainable options for integrated biorefineries. Economic and production advantages increase with the level of integration in biorefineries.

The Agriculture, Forestry, and Waste Management (AFW) Subcommittee of the Iowa Climate Change Advisory Council (ICCAC) has set a goal that in 2020, a total of 15.6 million dry tons per year of biomass be available: 10 million from agricultural crop residues, 5 million from dedicated energy crops, and an additional 600,000 from forestry residues. If this level of production could be achieved, it would be sufficient for up to 1 billion gallons per year of biofuels¹ and approximately 900 megawatts of stand-alone biomass power². There would be additional biopower production at the biofuels facilities.

Environmentally Sound Biomass Industry

1. Early biofuels plants will have lower yields than 100 gallons/ton.
2. More biomass power would be possible with higher efficiency power generation, such as using biomass integrated gasification combined cycle instead of direct combustion with a steam Rankine cycle.

“Our ever increasing need for energy has led the University of Northern Iowa to partner with the Iowa Power Fund to research biomass as a viable energy source. We plan to test several different mixtures of prairie species to find the best mix of biomass for the highest energy content. Iowa is the leader in biomass potential and it is important that Power Fund recognizes the need to capitalize this opportunity for Iowa.”

Dr. Daryl Smith, Principal Researcher, University of Northern Iowa's Tallgrass Prairie Center

BIOFUELS RECOMMENDATIONS

The OEI recommends the following policies:

- Enhance the economic and environmental viability of the biofuels industry.
- Develop a biomass feedstock supply infrastructure for second generation biofuels.
- Support development and deployment of integrated biorefineries.
- Improve the analysis used to develop greenhouse gas performance measures.



Recommendation: Enhance the economic and environmental viability of the biofuels industry through research and commercialization of innovative new technologies.

Iowa has been the national leader and model for the production of biofuels. While the industry has faced challenges as it grows and matures, biofuels remain an important source of economic growth for Iowa. For its part, the Iowa Power Fund Board has invested and will continue to invest in projects that address the long-term economic and environmental viability of the existing biofuels industry.

With assistance from a variety of public and private partners, the biofuels industry should seek to reduce its carbon footprint and to improve its environmental sustainability. Higher yields could also help to insulate production costs from the rising prices of feedstock. As biofuels technology progresses, the key will be to increase the amount of energy produced in the biofuels process and reduce any negative environmental impact, thus providing a long-term fuel supply for all Iowans. Further development of the industry can help ensure the long-term viability of the biofuels industry by converting many of the co-products from biofuel creation into additional sources of energy.



Recommendation: Develop a biomass feedstock supply infrastructure for second generation biofuels.

It is important to remember that policies to develop a broad biomass feedstock supply also protect and enhance the environmental sustainability of Iowa. Within the confines of a system that is environmentally sustainable, the state should look to develop improved crops and cropping systems to meet the large-scale requirements of an expanded biofuels industry.

To meet this recommendation, the state should assess the current and future state of farming practices in Iowa to revise and implement policies that ensure the long-term viability of the biomass industry. The assessment will include a look at research and development advances along with agricultural technology improvements. An examination of the harvest, storage, and transport (HST) infrastructure should also be a component. Advances in agricultural technology will help shape new HST policies.



BIOFUELS

Biorefineries

Recommendation: Support development and deployment of integrated biorefineries.

Second generation biofuels are being developed across the country. However, the feedstock for second generation biofuels will be more readily available across the nation. The increased focus on research and development will play to the strengths of other states such as California and Massachusetts. States with strong climate change policies will take a hard look at developing their own second generation biofuels. Given those reasons, the OEI recommends the state support the development and deployment of second generation biofuels production facilities. These integrated biorefineries will not only produce more biofuels, but will also produce the chemical building blocks for other valuable goods.

Iowa is taking a leadership role in the biofuels industry. POET LLC plans to conduct its first commercial harvest of corn cobs in the fall of 2009 through their Project Liberty initiative. The Emmetsburg, Iowa project includes converting POET's 50 million gallons per year (MMgy) grain-to-ethanol plant to an integrated corn-to-ethanol and cellulose-to-ethanol biorefinery that will produce 125 MMgy of ethanol, 25 MMgy of that from corn cobs.

Given that there can be strong synergies between first and second generation biofuels production, this recommendation should be designed to build on Iowa's existing competitive advantage and national leadership.

One step to supporting second generation biorefineries development is a state appropriation that will help leverage federal funds to help with development of such facilities. The state should monitor new federal policies regarding biofuels and act based on those policies and the ability of the state to help fund such projects. The state can also design regulatory policies that encourage the development of biorefineries. The development of a statewide program to address biorefinery siting and permitting can help speed the process of project development.

"POET is excited to help usher in the future of ethanol production where cellulosic technology complements the corn-to-ethanol production for which Iowa is already famous. Our Project LIBERTY is possible in part because of the strength of Iowa's biofuels industry and the leadership of the Iowa Power Fund."

Jeff Broin, POET CEO

BIOFUELS

Reduce Greenhouse Gas Emissions

Recommendation: Improve the analysis used to develop greenhouse gas performance measures.

Like nearly all other energy sectors, the biofuels industry must reduce its greenhouse gas emissions. Although some commentators have questioned the viability of further biofuels production, the vast array of research on the subject is far from definitive. Whatever the eventual outcome may be, the need to reduce greenhouse gases can be viewed as an opportunity. Indeed, even if the concerns prove to be unfounded, the efforts to reduce greenhouse gases can only help the economic and environmental security of Iowa in the future.

The OEI recommends that the state of Iowa should participate, influence, and be a resource in discussions about potential regulations regarding greenhouse gas performance of biofuels. The goal of Iowa's involvement in these discussions should be to improve the quality of the analysis used to develop greenhouse gas performance measures for biofuels. Iowa should also engage in the ongoing development of state, regional, national and international greenhouse gas policies with the goal of assuring that biofuels are treated fairly in assignment of greenhouse gas burdens among economic activities.

Given the importance of first generation biofuels to the Iowa economy, the state should support unbiased research on greenhouse gas emissions. The state should also develop an official position on lifecycle greenhouse gas emissions of biofuels and should support unbiased research into lifecycle analysis for all fuels. Iowa should work with federal, regional, and state stakeholders to be at the forefront of policies regarding greenhouse gas and biofuels. This is an opportunity for Iowa to become a national, if not global, leader in research and development of methods and technologies related to greenhouse gas emission reduction.



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