



Iowa Office of Energy Independence

*Iowa Power Fund
Summary of
Economic Impact Study*

Office of Energy Independence

Vision

Iowans creating an economically viable and environmentally sound energy future

Mission

To achieve a clean and sustainable future by:

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

Guiding Principles

- ***The state is committed as 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***

Office of Energy Independence

Executive Summary

A newly completed study commissioned by the Iowa Office of Energy Independence shows increased jobs, tax revenue and economic activity as a result of Iowa Power Fund projects. The analysis is divided into two parts. Part I assesses the specific impacts of projects that have been funded directly. Part II offers an analysis of the long term impacts when projects are successfully replicated.

Part I highlights of results from 2007 – 2014 are:

- Average annual economic activity associated with ongoing project operations totaling nearly \$22.7 million, peaking at \$59.1 million in 2012
- Average annual economic activity associated with construction of more than \$84.9 million, peaking at \$285.2 million in 2012
- Increased employment, annually averaging more than 200 jobs, peaking at more than 430 in 2011 with an average annual payroll of \$7.8 million
- State tax revenues averaging more than \$859,000 annually, topping \$2 million in 2011 and 2012

Part II highlights of long term estimated cumulative results from 2014 – 2033 are:

- Economic output for Iowa of more than \$40.3 billion
- Cumulative workers' earnings of \$3.8 billion
- Employment in more than 8,487 jobs
- State tax revenues of \$475 million

The economic impact study shows Iowa is in a prime position to capitalize on investment in renewable energy technologies such as biofuels, wind and photovoltaic cells. At a time when jobs, economic downturns and unstable energy costs pose challenges to the state, these projects offer an opportunity for increased employment, community development, energy supply choices and the potential to reap dividends on commercialization of innovative energy technologies.

The projects set the stage for growth of manufacturing, agriculture and other economic sectors through future development of the energy industry in Iowa. Successful projects also repay the state's upfront investment as technologies are replicated.

The Power Fund invested \$38.3 million in 31 projects through September 2010, which is the end period for this analysis. Total cost of these projects is approximately \$368 million, including construction and other project costs. The Power Fund's investment represents 10.4% of total project budgets. Projects include research and early stage commercialization efforts, educational conferences and municipal programs to advance renewable energy. All projects focus on securing Iowa's energy future and making Iowa energy independent.

As of December 2010, the Iowa legislature has appropriated \$95 million in the Power Fund in total; \$7.5 million was directed toward flood recovery, \$9.75 million was allocated for education at the state's community colleges, and \$2.8 million was rescinded in state budget reductions. Of the \$75 million available for investment, \$51.6 million has been allocated in contracts as of December 2010. The remaining funds are pending obligation in contracts that are under negotiation.

The Office appreciates the reviews and comments provided by Power Fund Board members, Eric Lantz at DOE's National Renewable Energy Lab, Dave Swenson at Iowa State University, and Lane Palmer at Iowa Department of Economic Development.

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Iowa Power Fund Study Details

IOWA POWER FUND INVESTMENTS RESULT IN INCREASED ECONOMIC OUTPUT FOR IOWA

Three types of economic impacts were analyzed:

Direct - economic activities generated by construction and plant operations, employment and workers' earnings from activities funded by the project

Indirect - economic activities, employment and workers' earnings created in new or existing firms in the state, such as suppliers

Induced - economic activities supporting workers and their families such as retail stores, gas stations, banks, restaurants and service companies

The study shows that the majority of impacts would occur between 2009 and 2012. This information is summarized in the following table:

Table 1: Economic Output During the Term of the Projects (Excludes Construction)

Year	Direct	Indirect	Induced	Total
2007	\$398,983	\$216,042	\$116,658	\$731,683
2008	\$2,499,979	\$1,197,344	\$661,566	\$4,358,890
2009	\$18,115,100	\$8,402,244	\$4,797,192	\$31,314,535
2010	\$21,575,952	\$9,563,494	\$7,126,193	\$38,265,639
2011	\$19,828,943	\$8,766,254	\$6,851,748	\$35,446,945
2012	\$32,697,621	\$16,908,732	\$9,496,332	\$59,102,685
2013	\$5,000,000	\$2,628,898	\$1,463,419	\$9,092,317
2014	\$1,675,159	\$880,764	\$490,292	\$3,046,215



Iowa is a national leader in biofuels output. The Iowa Power Fund has been a catalyst for advancing technology in the biofuels industry capitalizing on Iowa's abundant natural resources.

Iowa Power Fund Study Details

IOWA POWER FUND INVESTMENTS RESULT IN INCREASED TAX REVENUES FOR IOWANS

The study summarizes the tax revenues that would flow to the State of Iowa as a result of the direct, indirect and induced economic activity generated by the 31 projects. Those projections follow.

Table 2: Revenue for the State During the Term of the Projects (Excludes Construction)

Year	Income Tax Collections	Sales Tax Collections	Corporate Income Tax Collections	Other Taxes and Revenues	Total State Revenues
2007	\$17,460	\$12,716	\$1,198	\$11,736	\$43,110
2008	\$49,730	\$75,319	\$6,692	\$39,617	\$171,358
2009	\$277,032	\$224,791	\$47,518	\$231,211	\$780,552
2010	\$360,242	\$290,736	\$80,938	\$287,016	\$1,018,932
2011	\$398,360	\$1,266,292	\$82,596	\$338,042	\$2,085,290
2012	\$268,496	\$1,691,556	\$95,058	\$198,965	\$2,254,076
2013	\$96,537	\$61,346	\$14,732	\$91,470	\$264,085
2014	\$99,433	\$56,076	\$4,936	\$94,214	\$254,659



Iowa ranks 2nd in the nation in wind generation. The Iowa Power Fund supports the wind industry by investing in research and development of cutting edge technology to improve the manufacturing and performance of turbine blades.

Driving the commercialization of new wind technology and processes will expand wind turbine manufacturing in Iowa and the Midwest.

Iowa Power Fund Study Details

IOWA POWER FUND INVESTMENTS LONG-TERM ANALYSIS

Three scenarios—low, mid and high—were used to estimate the 20-year economic impact in Iowa. Long term projections show that nearly 8,500 jobs would be created between 2014 and 2033, with a total payroll of \$3.8 billion. Those jobs could generate more than \$40.3 billion in economic activities and more than \$3.8 billion in workers’ earnings. Over the 20 year period, activities could generate more than \$475 million in state revenue and more than \$390 million in local property taxes.

Even though it is uncertain whether all the potential impacts will be realized, the projects represent significant economic potential for Iowa over the next two decades. The following two tables show the potential combined economic and fiscal impact estimated that results from this analysis:

Table 3: Potential Long-Term Economic Impacts from 2014 to 2033 for Iowa

Three Possible Scenarios			
	Low	Mid	High
Economic Output	\$40,319,182,228	\$76,363,785,672	\$113,453,377,174
Employment*	8,487	14,974	21,741
Cumulative Workers' Earnings	\$3,810,714,391	\$6,726,680,555	\$9,673,946,637

*Total permanent jobs added over the 20-year period. Values presented in 2010 dollars.

Table 4: Estimated State & Local Revenue in Iowa 2014 to 2033 From Long-Term Impacts

Three Possible Scenarios			
	Low	Mid	High
State Revenue	\$475,113,723	\$889,610,895	\$1,312,923,563
Local Taxing Entities Revenue	\$390,946,958	\$753,636,081	\$1,089,779,363

Values presented in 2010 dollars.

National-scale economic impact was also estimated. Under the low-replication scenario, there is a potential for economic activities of more than \$103 billion with employment of more than 24,000 garnering \$10.3 billion in earnings.

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Iowa Power Fund - Key Projects Exemplify Growth *POET Project Liberty*

The Power Fund's largest investment among the 31 projects studied is **POET Project Liberty** in Emmetsburg. The Power Fund invested \$14.7 million in the project's \$306 million budget.

A project that will transform the traditional biorefinery in Emmetsburg into an integrated corn-to-ethanol and

Impact highlights:

- Projections show more than \$481 million in direct, indirect and induced impacts related to construction between 2007 and 2014.
- Operations impact is estimated at \$99,447,894.
- More than 500 jobs are estimated at the peak of construction employment. Permanent employment will top 100 new and retained jobs.
- Payroll projections are \$31,118,292 for construction and \$21,963,680 for permanent employees between 2007 and 2014.
- Total state tax revenues during this period are projected at more than \$4 million and local tax revenues of more than \$4 million.



cellulose-to-ethanol biorefinery

This Iowa Power Fund project will expand ethanol production in Iowa. Project Liberty will bolt technology onto the existing ethanol plant, and the new technology will utilize corn cobs, husks and leaves to produce cellulosic ethanol.

Over the next 20 years, a conservative estimate of increase in direct, indirect and induced economic activities in Iowa related to Project Liberty is estimated at \$11.8 billion. This will potentially create more than 860 jobs with more than \$394 million in direct, indirect and induced worker earnings. Manufacturing and agriculture industries will benefit the most from the project.

The project is on the cutting edge of ethanol production research, developing the means to transform a traditional ethanol biorefinery into an integrated corn-to-ethanol and cellulose-to-ethanol biorefinery. The corn suppliers and biorefinery operators seek to take advantage of the economies of scope - reducing total average cost by increasing the number of different products offered.

In addition to producing ethanol, POET will create a new market for about 300,000 tons of corncobs and corn stover per year. Once Project LIBERTY is complete, POET anticipates purchasing this material at a price of about \$12 to \$14 million dollars from approximately 400 to 500 local farmers.

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Iowa Power Fund - Key Projects Exemplify Growth Green Plains Renewable Energy

A look at the economic impact of the **Green Plains Renewable Energy, Inc. Algae** project in Shenandoah offers another example of funding leveraged into research and development with both short- and long-term potential. The Power Fund provided \$4.1 million of the nearly \$11.5 million project cost.

Harvesting algae to create biodiesel feedstock

Impact highlights:

- Projections show \$10.3 million in direct, indirect and induced economic impacts of construction between 2009 and 2011.
- Operations impact is estimated at \$10,951,860.
- Peak construction employment of 43 and permanent employment of 32 are projected.
- Payroll projections are \$3.1 million for construction and \$2.8 million for permanent employees over the period (direct, indirect and induced employment).
- Total state tax revenues during this period are projected at more than \$187,000 and local tax revenues of more than \$122,000.



Green Plains Renewable Energy will utilize waste products from the existing ethanol plant in Shenandoah and advanced technology to produce algae oil, algae meal, and dry whole algae. The various forms of algae will be used as biodiesel feedstock and animal feed additives.

A low-level scenario estimates eight new algae farms would be constructed and become operational over the next 20 years. An increase of more than \$6.2 billion is projected in economic activities in Iowa, potentially creating 567 jobs offering \$367,898,400 in worker earnings. Manufacturing and wholesale trade industries benefit most heavily from the project.

This project is using breakthrough technology developed by BioProcess Algae for the mass production of a nonfood fuel feedstock: algae. The inputs for the mass production of algae are the waste products from an ethanol plant, CO₂ and wastewater. Should carbon credits or cap and trade policies be enacted, users of this technology could be eligible for considerable new revenue.

One of the goals of this project is to produce 50 million gallons of ethanol annually, producing enough oil for 5.8 million gallons of biodiesel and 51,000 tons of a high protein meal product. By capturing waste CO₂ from an ethanol plant and using a bioreactor system to produce mass amounts of algae, CO₂ could be eliminated from the environment.

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Iowa Power Fund Economic Impact Studies Summary

Iowa Power Fund Background

In 2010, Governor Chet Culver, the Iowa Legislature and the Iowa Power Fund Board of Directors asked for a study of the economic impact of the 31 projects funded at that time. In response to the request, the study reviewed projects funded from 2007 to 2010 and offered detailed analysis of the short- and long-term economic activity and tax revenues generated by the projects.

The Iowa Power Fund, established in 2007, seeks to accelerate research and development, commercialization, knowledge transfer, technology innovation and improve the economic competitiveness of renewable energy technologies; and increase the demand for and educate the public about energy technologies and approaches.

Detailed analyses of the 31 projects studied are available on the Iowa Office of Energy Independence website: www.energy.iowa.gov.

Study Background

The Iowa Power Fund conducted a competitive bidding process to secure proposals for the Economic Impact Study. The low bid was submitted by Impact DataSource of Austin, Texas, a firm that has conducted economic impact analyses of over 2,500 firms and projects in most industry groups in 26 states. Over the past five years, Impact DataSource has conducted over 60 economic impact analyses of the projects applying for grants from the Texas Enterprise Fund, a \$200+ million economic development fund for firms and projects locating or expanding in Texas.

Impact DataSource obtained information about each project from its application to POWER FUND and an economic impact data sheet e-mailed to each project manager to be completed and returned. Further information was gathered from discussions between Impact DataSource and the project manager.

Regional economic multipliers for Iowa from the U.S. Department of Commerce's Regional Input-Output Modeling system (RIMS II) were used. Three types of regional economic multipliers were used in the analysis: an output multiplier, an employment multiplier and an earnings multiplier. The multipliers are specific to the industry and the project type.

Further information about the methodology of the research can be obtained from:

Iowa Office of Energy Independence
Wallace State Office Building
502 East 9th Street
Des Moines, IA 50319
515-725-0431



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Wallace State Office Building, 502 E. 9th Street, Des Moines, IA 50319
515-725-0431