


IOWA ENERGY CENTER

FY 2014 ANNUAL REPORT

JULY 1, 2013 - JUNE 30, 2014

iowa energy center

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VISION STATEMENT

The Iowa Energy Center supports Iowa economic growth through collaborative projects that bring smart and sustainable energy technologies closer to market and by providing Iowans with reliable, objective information on energy and efficiency options.

ABOUT THE IOWA ENERGY CENTER

The Iowa Energy Center was created by the Iowa Energy Efficiency Act of 1990 with a mission to:

- Strive to increase energy efficiency in all areas of Iowa's energy use.
- Serve as a model for state efforts to decrease dependence on imported fuels and to decrease reliance on energy production from nonrenewable, resource-depleting fuels.
- Conduct and sponsor research on energy efficiency and conservation.
- Conduct and sponsor research to develop alternate energy systems that are based upon renewable resources.
- Assist Iowans in assessing technology related to energy efficiency and alternative energy production systems.
- Support educational and demonstration programs that encourage implementation of energy efficiency and alternative energy production systems.

DIRECTOR'S MESSAGE

> The Iowa Energy Center is an important component in creating a robust economic development ecosystem in Iowa in the energy field that includes student education, applied research, technology development, workforce development, and community development.

The mission of the Iowa Energy Center is well known. The state legislature established the Energy Center in 1990 to support economic development, environmental sustainability, and social well-being through advances in alternative energy production technology and energy efficiency measures. Notably, the Energy Center is an important component in creating a robust economic development ecosystem in Iowa in the energy field that includes student education, applied research, technology development, workforce development, and community development. The Energy Center partners with other state resources in all these areas to create an engine for economic growth for Iowa.

With this end in mind, the Energy Center is focusing on four program areas, which are highlighted in this annual report covering July 1, 2013, through June 30, 2014: energy efficiency, bioenergy, renewable energy, and education and outreach. We support these areas in a variety of flexible ways — through our loan and grant programs, through our collaborative research, and through our training and public outreach activities, for example. Our programs and activities are continuing to evolve to keep pace with Iowa's needs.

That spirit of evolution certainly characterizes FY 2014. The Energy Center has made substantial structural and programmatic changes that have made it more effective in helping Iowa's economic growth through alternative energy and energy efficiency technologies.

In particular, the grant programs have been revamped to make Iowa colleges, universities, and nonprofit organizations more competitive in bringing investment dollars to the state. You see, the resources of the Energy Center, in isolation, can have only a limited impact on Iowa's energy future. A better way for the Energy Center to further its mission is to use its resources to help secure larger, sustainable federal, nonprofit, and industrial dollars for the state. It is those broader resources that will propel Iowa's education, research, and innovation, which are necessary for dynamic economic growth.

Three new grant programs have been established that are explicitly aimed at supporting Iowa colleges, universities, and nonprofit organizations seeking external funding for projects related to energy research, technology development, demonstration, deployment, education, workforce development, or community development. In addition to our ability to provide valuable seed funding for new initiatives across the state, the Energy Center has been proactive in finding external funding opportunities, building relationships with potential sponsors, broadcasting promising leads, fostering partnerships among Iowa groups, and actively helping with external proposals.

The commitment to bring outside investment to Iowa has been remarkably successful. In the first year under its new programs, the Energy Center has helped Iowa universities and nonprofit groups capture over $4.7 million in national nonprofit foundation and federal agency competitions.

I have been overwhelmed by the growing enthusiasm around the state for our new programs and the Energy Center's can-do attitude. The Energy Center has attracted a much broader set of Iowa partners — covering a wider set of energy and energy efficiency topics — than ever before. Project topics have included energy efficiency, solar and wind power, bioenergy, transportation, workforce development, and education.

Iowa citizens can expect further evolution of the Energy Center's programs as we seek to more effectively respond to the state's energy needs. Right now, for instance, we are laying the groundwork for new initiatives to enhance Iowa energy entrepreneurship and education. I invite you to call or visit the Iowa Energy Center to give me your thoughts on ways the Energy Center can improve the well-being of Iowans through advances in alternative energy and energy efficiency.

Sincerely,

Mark C. Petri, Ph.D.
Director, Iowa Energy Center

ENERGY EFFICIENCY

ENERGY EFFICIENCY PROGRAM MANAGER

Xiaohui (Joe) Zhou, Ph.D., P.E.

PROGRAM OVERVIEW

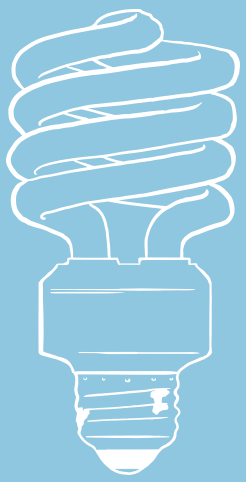
The Iowa Energy Center's Energy Efficiency Program includes building, industrial, agricultural, and transportation efficiency. The Energy Center's internal research and training focuses on the commercial building sector, given the unique features of the Energy Resource Station in Ankeny, Iowa. In FY 2014, the Energy Center continued to lead the U.S. Department of Energy (DOE) supported Iowa Public Building Energy Benchmarking Phase II Project, which successfully benchmarked the energy usage of 657 Iowa public buildings (in addition to the 1,200 buildings benchmarked in Phase I). Building and utility data for another 377 buildings are now being compiled. The project has been successful in populating a statewide database for a wide range of public building types. Moreover, the project team has engaged Iowa utilities on integrating the benchmarking platform into utility energy efficiency initiatives.

The Iowa Energy Center has capitalized on its technical expertise to secure new external funding. The Energy Center is teaming with the Iowa Army National Guard and Taylor Engineering to lead a two-year, $500,000 U.S. Department of Defense (DOD) award to demonstrate advanced control algorithms on building energy systems at five Army National Guard facilities throughout Iowa. The project will attempt to demonstrate significant energy savings in the pilot buildings through a control methodology first developed at the Energy Center. If the methodology is successful, DOD will likely widely adopt it.

The Energy Center has also won a two-year, $124,000 award from the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) for the project "Low Energy LED Lighting Heat Gain Distribution in Buildings." The results from the research will help building professionals design and build more energy efficient buildings and will be published in the ASHRAE fundamental handbook.

In addition, the Energy Center partnered with the Iowa Capital Complex facility management team and The Weidt Group on a two-year project to monitor and analyze the energy of the Iowa Utilities Board/Office of the Consumer Advocate building in Des Moines. This building is an exemplary high-performance building with over 74% net reduction in energy use compared to building energy codes. A technical report was published and is accessible to the public in the grant library database on the Iowa Energy Center's website (www.iowaenergycenter.org/grant-and-research-library).

GRANT PROGRAM HIGHLIGHTS



In FY 2014, the Iowa Energy Center supported 16 projects in energy efficiency related projects through its grant programs. During the first year of implementing its new competitive grant programs, the Energy Center awarded three Planning Grants, one Opportunity Grant, and five Matching Grants in the energy efficiency area, with $292,591 awarded overall. Of the seven projects funded under the Legacy Grant Program—projects begun prior to the Energy Center's three new grant programs — two projects are worth special mention here.

AGRICULTURE | DR. MARK HANNA
IOWA STATE UNIVERSITY

Dr. Hanna and his team at ISU worked with the Farm Energy Task Force to study energy efficient grain drying techniques and provide on-site education and outreach for Iowa farms (http://farmenergy.exnet.iastate.edu/).

MANUFACTURING | CHRISTOPH BECKERMANN
THE UNIVERSITY OF IOWA

Professor Beckermann leads a team of researchers exploring efficiency opportunities within the casting industry. Risers are used for the delivery of liquid metal to the casting and are removed during finishing. Existing sleeves tend to use overly conservative designs that result in waste and inefficiencies. With the support of an Energy Center grant, the team is creating an industry database of sleeve properties and preparing standardized modeling guidelines for commonly used riser sleeves in the casting industry. Optimally sized sleeves have the potential to improve the casting yield by 5-10%.

IMPACT AWARD RECIPIENT
ENERGY EFFICIENCY

Mufit Akinc, Materials Science and Engineering and Chemical and Biological Engineering, Iowa State University

REVOLUTIONARY INSULATION TECHNOLOGY

With the help of an Iowa Energy Center grant, Professor Mufit Akinc and his team of graduate students are developing the next generation of insulation materials that will radically improve the energy efficiency of buildings and appliances. Akinc's focus is on novel, but inexpensive, nano-porous materials that can be used as core material for vacuum insulation panels. These will have a thermal conductivity 10 times lower than conventional polyurethane foam insulation. His ideas to reduce the manufacturing costs of vacuum insulation panels may lead to the widespread use of this energy-saving technology.

A BREAKTHROUGH

Insulation is one of the most important components of refrigerating appliances, cold rooms, containers, transportation vehicles, and buildings. Traditional closed-cell polyurethane foam is the most commonly used material for refrigerators and freezers. Ever increasing ecological concerns and demand for energy conservation are driving manufacturers to offer appliances and structures with higher energy efficiency. Since heat loss is the primary source of energy inefficiency in these systems, there is a critical need for developing materials and systems with better insulation characteristics. Vacuum insulation panel technology is emerging as one of the most promising solutions for the reduction in energy consumption in these applications. Replacing polyurethane foam insulation with vacuum insulation panels will not only result in significant energy savings, but can also reduce the volume of bulky insulation needed. Vacuum insulation panel technology has potential applications in appliances, building envelopes, home and industrial insulation systems, refrigerated transportation containers, as well as food preservation and processing industries.

> "This project will have a huge impact on energy efficiency and fuel use in buildings and many other applications. In particular, the heat loss through the buildings represents half of the energy use in the buildings. If we can cut down on this heat loss, it's going to be huge. - Mufit Akinc"

"If this project is successful, even partially successful, and leads to the establishment of a new, small, start-up company, which will manufacture these vacuum insulated panels to be used in a refrigerator or in a building—if I walk by that building and say I had something to do with it or my graduate students developed this thing, this would be the greatest accomplishment I can imagine," said Akinc.

ABOUT THE ENERGY RESOURCE STATION (ERS)

The Iowa Energy Center's Energy Resource Station (ERS) is helping to solve the most critical problems and to enhance technologies in commercial building energy efficiency. No other facility in the nation has capabilities that are as integrated as those at ERS. The facility, in Ankeny, Iowa, is designed to simultaneously test and demonstrate multiple, full-scale commercial building heating, ventilating, and air conditioning (HVAC) systems. The facility allows for real world demonstrations of HVAC equipment and control systems, as well as training opportunities related to energy efficiency. Research projects conducted at ERS are part of the Energy Center's applied research portfolio and often involve collaborations with national energy laboratories, universities, and industry.

KEY BENEFITS:

The Energy Resource Station supports the state's economy and environment, as well as Iowa's role as a national leader in implementing energy efficiency technology.

- Cost and energy savings for commercial, industrial, and residential buildings.
- Increased energy efficiency, boosting Iowa's economy and reducing energy dollars leaving the state.
- Establishing unbiased product performance information for businesses and homeowners to make more informed investments.

BIOENERGY

BIOENERGY PROGRAM MANAGER

Norm Olson, P.E.

PROGRAM OVERVIEW

It has been a priority this past year to align the Iowa Energy Center's bioenergy activities with national priorities set by the U.S. Department of Energy (DOE), U.S. Department of Agriculture (USDA), Environmental Protection Agency (EPA), and others, so that the Energy Center can most effectively use its resources to capitalize on funding and economic development opportunities being identified by federal agencies.

Indicators at the federal level point to a bright future for the biorenewables area. DOE's 2014 Biomass Conference attracted a record attendance, and USDA projections in a report entitled *Why Biobased?* included the following:

"…the biobased economy is, in fact, growing and it offers great potential for increased job creation in numerous sectors across the U.S. For instance, one report cited concludes that biobased chemicals are expected to constitute over 10% of the chemical market by 2015. Another report in the study concludes that there is a potential to produce two-thirds of the total volume of chemicals from biobased materials, representing over 50,000 products, a $1 trillion annual global market. It's estimated that U.S.-based jobs for the renewable chemicals sector will rise from approximately 40,000 jobs in 2011, which represents 3-4% of all chemical sales, to over 237,000 jobs by 2025. This employment level would represent approximately 20% of total chemical sales."

The Energy Center continues to invest in identifying ways to meet DOE's overarching goals of $3/gallon-of-gasoline-equivalent (GGE) drop-in fuels and $80/dry ton of biomass production. In FY 2014 the Energy Center was actively meeting with DOE program managers and participating in planning meetings to better understand federal priorities. As a result, several topical areas of interest to federal agencies became evident. Significant emphasis will be placed on:

- The co-production of bio-chemicals with bio-fuels to improve overall process economics.
- New energy crops such as algae and sorghum.
- Conversion technologies such as anaerobic digestion and hydrothermal processing.
- Soil and water sustainability for bioenergy crops.

GRANT PROGRAM HIGHLIGHTS

Current and past Iowa Energy Center investments align nicely with many of the new federal areas of interest, providing a competitive advantage to Iowa organizations as federal resources flow to these topic areas. In FY 2014, the Energy Center supported 14 projects through its competitive grant programs in the field of bioenergy, representing a commitment of $1,103,632. Here is one example of the investments the Energy Center is making.

FUELS | ROBERT C. BROWN
IOWA STATE UNIVERSITY

Robert Brown's research focuses on demonstrating a system for catalytically converting whole algal biomass into high value benzene, toluene, and xylene (BTX) and other aromatic hydrocarbons suitable for blending with paraffinic molecules for the production of chemicals or drop-in aviation fuels. Brown's team is developing a process that converts whole algal biomass into liquid hydrocarbons through hydropyrolysis in the presence of zeolite catalysts. Lipids, carbohydrates, and proteins rapidly decompose and volatilize in the high-temperature, oxygen-free environment. The vapors diffuse into the pores of the zeolites, where oxygen and nitrogen are removed catalytically and the organic compounds are converted into aromatic compounds, especially BTX. Significantly, much of the nitrogen from the protein is converted to ammonia, a co-product that can be recovered for use as fertilizer.

IMPACT AWARD RECIPIENT
BIOENERGY

Robert C. Brown, Director Bioeconomy Institute, Iowa State University

A LONG-TERM INVESTMENT IN BIOENERGY TECHNOLOGY DEVELOPMENT

Robert C. Brown received a 2014 Iowa Energy Center Impact Award for his work in producing activated carbon from fast pyrolysis biochar for purifying liquid and gas streams in syngas and bio-oil production processes. Over the past 20 years, Dr. Brown has received nine grants from the Energy Center for a wide range of projects.

"My partnership with the Iowa Energy Center started in the early 1990s shortly after it was established by the State of Iowa. I approached them with the notion that biomass energy may have made a lot of sense for Iowa, and yet I had no evidence. The suggestion was that we do a broad analysis of the potential for biomass in Iowa and from there I looked at the analysis and what technologies made most sense for Iowa. One of those was in the area of gasification of biomass. Shortly after that the Energy Center supported our first research program," said Brown.

> "The Iowa Energy Center is now proposing to help leverage state money to win federal money, not only to seed some work within the state to get the ideas to the point where they are compelling to the funding agencies, but also to provide funds that could be used to provide at least part of the cost share. This is a really wonderful development that I have actually been waiting years to see at the Iowa Energy Center. - Robert C. Brown"

Brown has been one of the most successful grantees in terms of attracting outside funding, having received nearly $70 million, largely based on the work he began with Energy Center support.

BIOCHAR AS KEY TO A CARBON-NEGATIVE ECONOMY

Fast pyrolysis, which uses an oxygen-free, high-temperature environment to decompose organic material, is a promising technology for producing bio-oil and biochar. Bio-oil can be refined into hydrocarbon fuels in a way that is carbon neutral. Using biochar as an agricultural amendment returns carbon to the soil, making the overall bioenergy system carbon negative — actually removing carbon from the atmosphere and storing it permanently in the soil. Brown's work with the Energy Center has focused on upgrading biochar to activated carbon and then using that material to remove contaminants in liquid and gas streams that inhibit fermentation and catalytic processing in biomass conversion processes. Those "contaminants," though, are useful agronomic nutrients that can be returned to the soil to improve crop yields and soil quality. This work, then, may represent a significant leap forward in developing bioenergy resources that are both economically and environmentally sound.

ABOUT THE BIOMASS ENERGY CONVERSION (BECON) FACILITY

The Iowa Energy Center's Biomass Energy Conversion (BECON) facility in Nevada, Iowa, supports the state's most innovative and collaborative biomass projects. Through BECON, the Energy Center has established a platform for researchers to turn promising ideas into commercial-scale biomass conversion units. It is open to researchers from all of Iowa's colleges, universities, and non-profit organizations, and from the private sector. An important objective of BECON is to provide a place where researchers can collaborate and exchange ideas and information.

KEY BENEFITS:

- Increasing exposure to potential investors, funding agencies, and legislators who can witness pre-commercial technologies being refined firsthand.
- Demonstrating full-scale biomass conversion technologies, increasing adoption and commercialization.
- Strengthening Iowa's economy by actively leading discussions and sharing technologies across Iowa and around the world.

RENEWABLE ENERGY

RENEWABLE ENERGY PROGRAM MANAGER

Bill Haman, P.E.

PROGRAM OVERVIEW

Iowa is one of the nation's leaders in its policymaking and investment in renewable energy. Iowa is the top producer of ethanol and biodiesel liquid fuels and ranks third nationally in wind energy installed capacity. Solar energy, not previously adopted broadly by Iowans, has benefited from recent steep price declines coupled with lucrative tax incentives and is now one of the fastest growing energy generation sectors in the state. Thousands of manufacturing and construction jobs related to those renewable energy technologies have helped Iowa maintain a strong economy throughout the recent economic downturn. The Iowa Energy Center continues to invest in renewable energy research that offers advancements to wind and solar energy technologies and their operations.

ABOUT THE ALTERNATE ENERGY REVOLVING LOAN PROGRAM (AERLP)

The Iowa Energy Center's Alternate Energy Revolving Loan Program (AERLP) was created by the Iowa legislature in 1996 to promote the development of renewable energy production facilities in the state. Through this program successful applicants receive a low-interest loan that consists of a combination of AERLP and lender-provider funds. The AERLP provides up to 50% of the total loan, up to a maximum of $1 million with a maximum term of 20 years. The lender manages the entire loan and arranges repayment of the AERLP share to the Energy Center, which is then revolved back into the program and made available to new applicants.

By 2010 the Iowa legislature had provided a total of $15.9 million to the AERLP through a combination of appropriations and a one-time assessment on Iowa's investor-owned utilities. Since these funds continually revolve back into the program as loans are repaid, the AERLP has supported the development of hundreds of alternate energy production facilities throughout the state including wind, solar, biomass, biofuel, and hydroelectric installations.

Over the past 18 years, the AERLP has received 550 loan applications that have led to 263 total projects generating an excess of 2 million megawatt-hours annually. A total of $33.3 million in AERLP loans through FY 2014 have been leveraged against nearly $230 million of other capital investment.

This fiscal year the Energy Center funded primarily solar energy projects and a few wind energy projects, totaling 51 new projects with a estimated annual generation of 3,221 MWh, for a total of $3,565,580 in AERLP loans made.

ALTERNATE ENERGY REVOLVING LOAN PROJECTS

	ANNUAL TOTAL FROM FY 2014		TOTAL SINCE 1996	
Technology	Annual Projects	Annual Energy (MWh)	Total Projects	Total Annual Energy (MWh)
SOLAR	48	2,803	74	3,765
LARGE WIND[2]	1	324	114	317,388
SMALL WIND[2]	2	94	47	1,481
BIOMASS[1]	-	-	22	1,748,922
HYBRID[3]	-	-	5	108
HYDRO	-	-	1	2,863
TOTAL	**51**	**3,221**	**263**	**2,074,527**

[1]Includes the electrical equivalent of projects producing fuels such as ethanol, biodiesel and wood.
[2]Small Wind = 20 kW nameplate rating or less; Large Wind = more than 20 kW nameplate rating.
[3]Includes a combination of solar, hydro, small wind, large wind or biomass.

ALTERNATE ENERGY REVOLVING LOAN PROGRAM EXPENDITURES

	FY 2014	SINCE 1996
AERLP LOANS MADE	$3,565,580	$33,300,549
LEVERAGED RESOURCES	$3,783,462	$229,547,114
CONSTRUCTED PROJECT COSTS	$7,349,042	$262,847,663

IMPACT AWARD RECIPIENT
RENEWABLE ENERGY

Hui Hu and Anupam Sharma, Aerospace Engineering, Iowa State University

INNOVATIVE DESIGN TO IMPROVE WIND POWER EFFICIENCY

Professor Hui Hu and Assistant Professor Anupam Sharma of Iowa State University received a 2014 Iowa Energy Center Impact Award for their center-funded project to design an innovative dual-rotor wind turbine that will improve turbine performance and wind farm efficiency. Their novel concept of adding a second, smaller, aerodynamically optimized rotor can help an individual turbine capture more of the wind's energy that would otherwise be lost near the main rotor's hub. In addition, the added blades promote rapid mixing of air streams in the turbine's wake, disrupting wake fields that would reduce the productivity of downwind turbines.

> "We look at all the wind turbines on the wind farm; there are hundreds of wind turbines. We look at all the wake interference, which can cause up to 40-50% energy loss for the downstream wind turbines. So with this dual-rotor concept we can actually reduce that wake interference loss and improve downstream wind turbines by 15%. That's a huge improvement compared to traditional ways. - Hui Hu"

These wake loses are often substantial, as high as 40% under some conditions. Another key advantage of this design is that it can extract energy at lower wind speeds than current, single-rotor turbines can. This should improve the operational flexibility of wind systems, which often suffer from dramatic cutoffs in power production when the wind dies.

The Iowa State team estimates that a 5% improvement in wind farm efficiency, which they believe the dual-rotor design can achieve, would bring benefits of approximately $100 million to current Iowa wind farms. This would bring the percentage of power Iowa receives from wind to 30% without any new wind farm construction projects.

With an Energy Center Opportunity Grant, they were able to complete early concept-demonstration work, which included complex fluid dynamic analyses and laboratory-scale experiments in an instrumented wind tunnel. As a result, the team was able to successfully compete for a $330,000 award from a National Science Foundation program that supports fundamental engineering research related to the sustainable production of electricity and transportation fuels.

The ability of the Energy Center to help Iowa organizations be more successful in securing sustainable funding from outside sponsors is key to helping the state become a leader in clean energy technology development and commercialization.

GRANT PROGRAM HIGHLIGHTS

The Iowa Energy Center endorsed and supported 15 renewable energy projects in FY 2014. Under the new grant programs the Energy Center endorsed two Planning Grants, two Opportunity Grants, and nine Matching Grants. Eight of these projects received funding, representing a commitment of over $524,000. Here is one example in the area of solar energy.

SOLAR | VIKRAM DALAL
IOWA STATE UNIVERSITY

Under the leadership of Professor Vikram Dalal, Director of the Microelectronics Research Center at Iowa State University, and with support from the Energy Center, new discoveries in solar energy are being made. Dalal's research focuses on increasing the energy efficiency in solar cells by reversing the performance degradation traits of organic photovoltaic solar cells. As a result, his work has identified and created a new type of device that combines a tandem organic cell with an inorganic top cell that has shown improvements in cell efficiency beyond 10%. These discoveries address a significant market barrier for low-cost solar cell technology. Professor Dalal's team of Ph.D. students will continue their research through FY 2015 using Energy Center funding leveraged with funding from other sponsors.

EDUCATION AND OUTREACH

EDUCATION AND OUTREACH PROGRAM COORDINATOR

Sandra Cannon

PROGRAM OVERVIEW

Over the past year, the Iowa Energy Center has been building partnerships with a wide range of public education and workforce development stakeholders in Iowa. The aim is new energy education programs that can leverage additional resources, having a greater impact statewide than previous Energy Center efforts. The plan is to pilot these emerging initiatives in FY 2015 and establish one or more formal programs in FY 2016.

As part of this new direction the Energy Center wants to honor its partnerships with energy leaders and innovators that have received funding and support. As a result the annual Impact Awards were created in the four program areas: energy efficiency, bioenergy, renewable energy, and education and outreach. To broaden awareness educational videos were produced of the Impact Award winners, along with the four program areas highlighting additional grant recipients and partnerships. These can be found on the Energy Center's video channel www.vimeo.com/iowaenergycenter.org. These individuals and organizations are making an impact on Iowa's energy future.

In FY 2014 the Energy Center continued to support the Legacy Grant projects that related to education and outreach. These education and outreach activities included the creation of an interactive educational kiosk about renewable energy, as well as the development of online educational tools for educators and homeowners. Energy Center projects reached students, educators, schools, citizens, and communities in both rural and urban Iowa.

GRANT PROGRAM HIGHLIGHTS

In FY 2014, the Iowa Energy Center supported and endorsed 15 projects related to education and outreach through its competitive grant programs. Under the Energy Center's new grant programs, one Planning Grant was awarded to a community college workforce development project and two Matching Grant projects were endorsed, although neither went on to win external funding, so no Energy Center funds were expended. Twelve projects received no additional funding in FY 2014, but continued to complete their work and final reports. Of those projects supported under the Legacy Grant Program—projects begun prior to the Energy Center's three new competitive grant programs — two are worth special mention here.

ENERGY EFFICIENCY | KEVIN FEINE

EAST SAC COUNTY COMMUNITY SCHOOL

Three of the four school buildings of East Sac County Community Schools are older, multistory buildings built between 1916-1930. This rural public school district had a plan to benchmark current energy demand and reduce consumption by 10%. The Iowa Energy Center helped by providing a $20,000 Legacy Grant to implement educational activities and promote awareness of energy consumption to change behaviors, as well as promote life-long habits of conservation and a sustainable commitment towards energy management.

BIOENERGY | KURT ROSENTRATER

IOWA STATE UNIVERSITY

Kurt Rosentrater, a researcher at Iowa State University, used an Iowa Energy Center grant to develop a biofuel high school education module aligned with National Teacher Standards. The curriculum included:

- Current corn ethanol and soy-diesel systems.
- An awareness of the biofuel industry's impact on Iowa and the growing needs for renewable energy.
- An appreciation towards energy efficiency and conservation in processes.
- An awareness of future challenges for agricultural and biorenewables industries, as well as issues related to sustaining growing populations.
- Iowa's unique role in the future of biofuels and new energy technologies.

IMPACT AWARD RECIPIENT
EDUCATION AND OUTREACH

Larry Beall, Director Iowa Energy and Sustainability Academy, Des Moines Public Schools

ADVANCING ENERGY EDUCATION

With support from the Iowa Energy Center, Larry Beall, an innovative educator for Central Campus in Des Moines and director of the Iowa Energy and Sustainability Academy, is providing his students with hands-on learning opportunities in renewable energy and bioenergy. In partnership with the Des Moines Area Community College (DMACC) the academy offers both high school and college credits, with students earning four years of high school science credit, two years of high school math credit, and 21 hours of college credit in environmental science. An Energy Center grant provided funding to support solar energy and bioenergy activities as part of the overall curriculum.

The Iowa Energy and Sustainability Academy was established by the Des Moines Public Schools in 2010 to provide career and technical training for grades 9-12 throughout the school district in the areas of energy sustainability, energy conservation, green technologies, and renewable energy.

Energy Center funding helped the academy purchase solar energy training kits for individual and small-group welding and assembly of solar cells into working panels. The students could then test the performance of their panels under different operating conditions. Moreover, the Energy Center supported an all-day field experience at Iowa State University's BioCentury Research Farm and the Center for Biorenewable Chemicals. Students learned about the latest research on bioenergy resources and bio-conversion technologies.

Demonstrations and experiments included the effects of temperature on the conversion of plants to biofuels, the energy density of plant material, alternative storage of plant materials, and the conversion of crops to biorenewable fuels and chemicals.

"This is so important for the State of Iowa because, as most people are aware, they can see wind generators going up all over the state and right now Iowa is leading the pack in that area. We want to also employ strategies in the area of solar, because I think that solving the problem of energy is utilizing all forms, not looking at just one. We want these kids to be well educated in all alternative forms of energy," said Beall.

By exposing students to energy issues at an early age, Beall hopes they will have a better appreciation for our planet and all the resources that it offers, as well as be better prepared for emerging job opportunities in Iowa.

> "The reason we did the solar project is because we want to give these kids an edge or a step up to the competition they're going to be facing in college. We're looking at all energies - wind, solar, hydroelectric, and so forth - and this was a fantastic way for us to give the kids a little more of an edge in the area of solar energy, which is becoming very big. – Larry Beall"

2014 IMPACT AWARDS

OUR IMPACT AWARDS HONOR LEADERS AND INNOVATORS IN OUR FOUR PROGRAM AREAS: BIOENERGY, RENEWABLE ENERGY, ENERGY EFFICIENCY, AND EDUCATION AND OUTREACH.

ABOUT THE LEARNING INSTITUTE

The Iowa Energy Center continues to invest in growing and improving its online resources to support public education in energy and energy efficiency options. This includes timely announcements on funding and professional development opportunities.

This past fiscal year, the Learning Institute actively incorporated technology and leveraged social media to build a more robust online presence, bringing more content to Iowans and Energy Center partners. With a newly developed video channel and a company profile page on LinkedIn, the Energy Center is providing engaging educational content about competitive grant programs, recipients, and funding opportunities. You can connect with the Energy Center on Twitter, Facebook, LinkedIn, and Vimeo (www.vimeo.com/iowaenergycenter.org).

The Energy Center continues to be a repository for professional development and learning opportunities for the State of Iowa through its events calendar. In FY 2014 announcements for 185 events (training, workshops, presentations, webinars, and conferences) were posted. Educators can continue to find information on the Energy Center's Youth and Energy Scholarship Program, as well as links to educational resources.

KEY BENEFITS:

- Hands-on educational experiences for schools, nonprofits, and businesses through scheduled tours at our two research facilities.
- Educational resources for homeowners about geothermal energy, energy tips, and financial incentives.
- Professional and workforce development opportunities through training, workshops, conferences, presentations, and webinars.
- Educational videos on energy innovation throughout Iowa.

PROGRAM OUTREACH ACTIVITIES

ENERGY EFFICIENCY PROGRAM

PROFESSIONAL AND WORKFORCE DEVELOPMENT TRAINING

(LIGHTING) Lighting technology
(CONTROLS) Advanced variable-air-volume (VAV) controls
(CODES) IECC-2012 and ASHRAE 90.1-2010 energy codes
(SOFTWARE) OpenStudio: building energy simulation modeling software
(INDUSTRIAL FACILITIES) Low-cost energy improvements for industrial facilities

200 PARTICIPANTS

670 PROFESSIONAL DEVELOPMENT TOTAL HOURS

SPONSORSHIPS

Iowa Association for Energy Efficiency (IAEE)
Partnership for Industrial Energy Efficiency (PIE2)
Compressed Clean Air Challenge

BIOENERGY PROGRAM

FACILITY TOURS

U.S. Department of Agriculture (USDA)
Australia Agriculture Group
Iowa EPSCoR
Iowa State University, Economics Department
Iowa AmeriCorps
Iowa International Center
Maharishi University, Environmental Class
NH3 Fuel Conference
Biomass Energy Conversion (BECON) facility open house
Iowa High School Renewable Energy Conference
Coe College, Cedar Rapids
Boone High School

12 TOURS

357 PEOPLE

RENEWABLE ENERGY PROGRAM

OUTREACH ACTIVITIES

Iowa Association of Municipal Utilities (IAMU), Energy Conference
Iowa Association of Municipal Utilities (IAMU), Superintendent and Foremen's Meeting
Institute of Electrical and Electronics Engineers (IEEE), Central Iowa Chapter Meeting
Iowa Association of Energy Efficiency (IAEE), Webinar Series
Washington Economic Development Group
ISU Extension and Outreach, Solar Energy Workshop
Ames Town and Country Kiwanis
Louisa County Solar Energy Program
Iowa State Fair

SPONSORSHIP

Iowa Wind Energy Association

EDUCATION AND OUTREACH PROGRAM

The Speaker Series was created in FY 2013 to bring locally and nationally recognized experts in the areas of bioenergy, renewable energy, and energy efficiency to Iowa. These are the three professionals that presented in FY 2014.

PROFESSIONAL DEVELOPMENT EVENTS

ENERGY EFFICIENCY – RON BINZ
"The New Energy Future: Meaningful Regulation for Iowa"
BIOENERGY – DOUG WILLIAMS
"Let the Numbers Speak: A Review of Biofuels Production Unit Economics"
RENEWABLE ENERGY – DEAN CRIST
"MidAmerican Energy Company's Commitment to Wind Energy in Iowa"

SPONSORSHIPS

Momentum is Building Conference (ICEE)
Iowa Energy Summit (IAEE)
Youth and Energy Scholarships, State Science and Technology Fair of Iowa

INTRODUCING THE NEW GRANT PROGRAMS

> Over the past year, under the new grant programs, Iowa universities and non-profits have captured over $4.7 million in national federal and nonprofit foundation competitions.

MARK C. PETRI, PH.D.
Director, Iowa Energy Center

Since its beginnings, the Iowa Energy Center has offered competitive grants to Iowa colleges, universities, and nonprofit organizations for a large range of projects related to energy and energy efficiency. Prior to FY 2014, the Energy Center would typically fund projects that would last for three years or longer. A number of those Legacy Grant projects have extended into the new fiscal year, and some will last through FY 2015. Meanwhile, in the spring of 2013 the Energy Center solicited input from stakeholders around the state on the effectiveness of its grant programs and concluded that a major revamping of the programs would better meet Iowa's needs.

Starting in FY 2014 three wholly new competitive grant programs were launched with the explicit aim to help Iowa organizations be more successful in attracting sustainable, external funding for projects related to energy research, technology development, demonstration, deployment, education, workforce development, and community development. These grant opportunities are available throughout the year so that they can be responsive to external solicitations being offered by industry, federal or state government agencies, non-government organizations, international agencies, or other sponsors. Moreover, the Energy Center has greatly streamlined its grant application and review process to more quickly provide funds to Iowa organizations pursuing external opportunities.

First, the Planning Grants provide funding to bring potential partners together to strategize, plan, or execute a response to a known or likely external funding opportunity. Activities might include travel to gather prospective (in-state and out-of-state) team members or to meet with sponsors; focused strategy, planning, and proposal-writing workshops; and workshop facilitation. Typical projects range from $3,000 to $5,000.

Second, the Opportunity Grants support near-term projects, such as proof-of-concept tests, early experimentation, economic viability analyses, preliminary studies, and comprehensive literature surveys, necessary to strengthen Iowa proposals to external funding agencies. Opportunity Grant projects are typically between $10,000 and $200,000 and are aimed to give at least a 5:1 return on investment in terms of new money for Iowa being sought from the external sponsor.

Finally, the Matching Grant program assists Iowa institutions in meeting matching or cost-sharing requirements for external funding opportunities. Here, the Energy Center will commit up to 20%, up to $200,000, as required cost share against the total external funding expected to come to Iowa.

As with the new grant programs, the three-year Legacy Grant projects have been encouraged to align their FY 2014 work scopes toward securing sustainable external funding and other important metrics.

In addition to the seed funding provided, the Energy Center has helped by building relationships with potential external sponsors, communicating funding opportunities to Iowa organizations, and building teams to successfully compete for funds. These efforts have paid off. One example is the Midwest Wind Energy Center, which was established through a successful proposal to a highly competitive Department of Energy national solicitation. The Energy Center first brought this opportunity to the attention of potential Iowa partners. It convened a statewide teleconference to discuss an Iowa approach to the funding opportunity, helped hone the group's strategy, and provided cost share (through the Matching Grant program) that helped the Iowa-Minnesota team win. The Midwest Wind Energy Center will help identify barriers to further the adoption of wind power in a ten-state Upper Midwest region, putting it in a good position to seek additional funds as the Department of Energy pursues ways to overcome the identified barriers. The Energy Center's new direction provided the flexibility to respond rapidly to this emerging funding opportunity.

Under the new program, Opportunity Grant proposals are submitted to a panel of national-level, subject-matter experts for review. The Energy Center now has 90 experts on call as reviewers. They come from universities, national laboratories, industry, venture capital firms, educational institutes, and government agencies from outside Iowa, covering a wide range of energy and energy efficiency topics. These, of course, would be the same type of experts who would review proposals submitted to federal funding agencies. Applicants to the Energy Center, then, get valuable feedback and insights from nationally recognized experts in the field, even when the reviews do not result in Energy Center funding.

NEW GRANT PROGRAM SUCCESS STORIES

PLANNING & MATCHING GRANTS ENERGY EFFICIENCY

ERIC DREGNE
Community Foundation of Greater Dubuque

Grants to Green is a grant program with an overall goal to increase the sustainability of nonprofits by building, renovating, and operating their facilities to be as green as possible. Through the leadership of Eric Dregne, a three-year $1.25 million Grants to Green Replication Grant was awarded to the Community Foundation of Greater Dubuque by the Community Foundation of Greater Atlanta.

Supported in part by the Iowa Energy Center's Planning and Matching Grant Programs, the Grants to Green project will provide building energy assessments and implementation grants for energy efficient building upgrades such as new heating, ventilation, and air conditioning (HVAC) systems; insulation; and lighting. The energy cost savings will enable nonprofits to lower their operational costs and free up resources to provide more services to the community.

The $5,000 Planning Grant was used to hire engineering firms to perform local building energy assessments. This allowed the Community Foundation of Greater Dubuque to understand the energy savings potential in their area, evaluate engineering firms, and provide critical data for developing the project proposal. The Grants to Green project is using a $200,000 Matching Grant to continue energy efficiency assessments and provide funds for implementation grants.

The $1.25 million coming to Iowa will be used over a three-year period for building upgrades through implementation grants, the administration of the program, and free energy assessments to nonprofits. Grants to Green will be working with a variety of nonprofits: shelters, food banks, medical clinics, daycares/preschools, private schools, social halls, retirement centers, museums, theaters, libraries, and office spaces for nonprofit administration. Nonprofits residing in the Iowa counties of Allamakee, Clayton, Delaware, Dubuque, Jackson, and Jones are eligible for this program.

The projection over the three-year period is to have performed a minimum of 75 energy assessments and have awarded 20-30 implementation grants for building upgrades. The use of the $200,000 Matching Grant will go towards the purchase of equipment upgrades and supplies, consultant fees for energy assessments, and costs for subcontracted partners.

> The Iowa Energy Center's Planning Grant and Matching Grant were critical to our Grants to Green application success. The funding clearly made our application standout, resulting in a great, new opportunity for Northeastern Iowa nonprofits." - Eric Dregne

PLANNING GRANT EDUCATION AND OUTREACH

CHUCK CRABTREE
Indian Hills Community College

Through a $5,000 Planning Grant, the Energy Center co-funded a Bioenergy Technology Education Center Partner Summit to help Indian Hills Community College gather potential partners in preparation of a 2015 proposal submittal to the National Science Foundation. The team is seeking $3 million to develop a program among the Upper-Midwest partners to provide training, education, and career opportunities in bioenergy technology. The Energy Center award leveraged a National Science Foundation (NSF) Advanced Technology Education grant for planning the development of the education center. Indian Hills envisions a regional network of two-year colleges, universities, government, and industry in the Upper-Midwest that will collaborate in traditional and innovative ways to educate a diverse workforce to help grow and sustain the bioenergy industry.

OPPORTUNITY GRANT RENEWABLE ENERGY

PABLO CARRICA
The University of Iowa

Recognizing an opportunity for optimizing the energy generation in the behavior of an entire wind farm, as opposed to just a single turbine, Professor Pablo Carrica and Assistant Professor J. Ezequiel Martin from the The University of Iowa were awarded an Energy Center Opportunity Grant. These funds will be used to develop and demonstrate foundational modeling algorithms that can simulate and optimize the operation of an entire wind farm. Understanding the wake interaction effects between individual turbines and rows of turbines is necessary to characterize and predict the wind farm performance as a single generating entity. Early results show the promising ability of the model to maximize the energy generation of the entire wind farm. The work completed through this grant will better position the team for future federal funding.

OPPORTUNITY GRANT BIOENERGY

LYSLE WHITMER
Iowa State University

The Iowa State University Initiative for a Carbon Negative Economy is planning to test their concept of "carbon negative energy" at the university's power plant. The idea is to pyrolyze biomass to form bio-oil and biochar, with the bio-oil used for electric power generation and the biochar sequestered in agricultural soils. To utilize the bio-oil, Lysle Whitmer and his team have developed bio-oil co-firing fuel, a solid fuel consisting of 70% crushed coal and 30% "heavy ends" from bio-oil. Lab-scale tests show that this fuel has a heating value nearly identical to that of coal and suggest that the co-firing fuel could replace coal in industrial boilers. With help from an Iowa Energy Center Opportunity Grant, the ISU team set out to design upgrades to donated pyrolysis equipment and engineer equipment needed to blend bio-oil heavy ends into co-firing fuels and to store and handle biochar for field application. Morever, they developed a plan for field testing of fast pyrolysis biochar and performed technoeconomic and life-cycle analyses to assess the benefits of the proposed process. Based on the promising results of this preliminary work, ISU secured funds to make upgrades to the pyrolysis system and is now pursuing funding from the Department of Energy and private partners to take the work to the next stages.

IN FY 2014 IOWA ENERGY CENTER GRANT PROJECTS CONTRIBUTED TO:

- **26** PROFESSIONAL JOURNAL PUBLICATIONS
- **1** ISSUED PATENT
- **5** ISSUED PH.D. DEGREES WITH 10 PENDING
- **7** ISSUED M.S. DEGREES WITH ONE PENDING
- **22** B.S. DEGREES PENDING
- **7** FUNDED EXTERNAL PROPOSALS (OVER $4.7 MILLION) WITH NINE AWAITING AN AWARD DECISION

NEW GRANT PROGRAM TABLE

PROGRAM AREA	ORGANIZATION	GRANT TITLE	ENDORSED	FY 2014 AWARD
PLANNING GRANTS				
Education and Outreach	Indian Hills Community College	Bioenergy Technology Education Center Partner Summit - NSF Regional Center Proposal Planning	-	$5,000
Energy Efficiency	Community Foundation of Greater Dubuque	Grants to Green	-	$5,000*
Energy Efficiency	Iowa State University	NSF Sustainability Research Network: Urban Surface Evolution	-	$5,000
Energy Efficiency	Iowa State University	Building a Team to Research the Performance of Energy-Efficient Learning Environments		$3,000
Renewable Energy	Iowa Association of Municipal Utilities	Collaborative Worskhop to Plan Full Application for DOE Solar Market Pathways Grant	-	$2,533
Renewable Energy	Iowa State University	DOE Energy Frontier Research Center for Achieving Stability in Organic Energy Materials & Structures	-	$5,000
OPPORTUNITY GRANTS				
Bioenergy	Iowa State University	Carbon Negative Energy at ISU	-	$95,353
Bioenergy	Iowa State University	Building a Highly Adaptable Microbial Consortium for Efficiency Biomass Utilization	-	$75,000
Energy Efficiency	Iowa State University	Sustainable, Smart Buildings: Integrating Design, Adaptive Controls and Predictive Design	-	$79,591
Renewable Energy	Iowa State University	Innovative Dual-Rotor Wind Turbine Designs to Improve Wind Farm Efficiency	-	$116,143*
Renewable Energy	The University of Iowa	Realistic Simulation of a Wind Farm Unit for Energy Production Optimization	-	$88,840
MATCHING GRANTS				
Bioenergy	Iowa State University	Algal Biofuels in Attached Growth Cultivation System and Hydropyrolysis of Whole Algae	$200,000	**
Bioenergy	Iowa State University	Hybrid Thermochemical/Biological Processing for Production of Fuel Precursors	$200,000	**
Education and Outreach	Kirkwood Community College	Virual Sustainable Village: Exploring the Built and Natural Environments	$35,000	**
Education and Outreach	Eastern Iowa Community College District	MILES (Model of Informal Learning in Environmental Stewardship) Project	$30,000	**
Energy Efficiency	Community Foundation of Greater Dubuque	Grants to Green	$200,000	$200,000*
Energy Efficiency	Iowa State University	Applying Structural Pattern Recognition in Automated Fault Detection and Diagnostics of HVAC Systems	$49,912	**
Energy Efficiency	Iowa State University	Achieving 30% Energy Savings for Small Office and K-12 School Buildings	$23,820	
Energy Efficiency	Iowa State University	Predict Plug-In Electric Vehicle Market in NY State Based on Travel and Parking Behavior	$15,000	**
Energy Efficiency	Iowa State University	Linking NASA and DOE Research Programs to Develop Piezoelectric Energy Harvesting Technologies	$3,000	**
Renewable Energy	Iowa Association of Municipal Utilities	A Public Power Model for Solar Market Pathways	$200,000	**
Renewable Energy	Iowa Association of Municipal Utilities	IAMU Participation in Iowa Statewide Solar Readiness Initiative	$21,316	$21,316*
Renewable Energy	Iowa State University	Non-Destructive Evaluation for Wind Turbine Blades	$176,234	
Renewable Energy	Iowa State University	High-Volume, Accurate, Composite Fabric Automation Methods	$176,229	
Renewable Energy	Iowa State University	Design for Manufacturability for Wind Turbine Blades	$88,115	
Renewable Energy	Iowa State University	Hexcrete Tower for Harvesting Wind at Taller Hub Heights	$83,510	$83,510*
Renewable Energy	Iowa State University	Acquisition of Ultraviolet Photoemission Spectrometer Instrument with Kelvin Probe	$20,000	**
Renewable Energy	Iowa Wind Energy Association	Midwest and Prairie Regional Wind Resource Center	$60,000	IEC Award* Pending
Renewable Energy	The University of Iowa	Laser-Based Onsite Structural Repair for Wind Turbine Blades	$100,000	**

* Projects that led to external funding (6 projects)

** External proposal unsuccessful

LEGACY GRANT TABLE

PROGRAM AREA	ORGANIZATION	GRANT TITLE	FY 2014 AWARD	CUMULATIVE AWARD
LEGACY GRANTS				
Bioenergy	Iowa State University	Development of a Novel Hollow Fiber Membrane Biofilm Reactor for Enhancing Mass Transfer in Syngas Fermentation	-	$193,596
Bioenergy	Iowa State University	Hybrid Processing for Biorenewable Fuels and Chemicals Production Symposium	-	$4,500
Bioenergy	Iowa State University	Sustainable Corn Stover Biomass Harvest for Renewable Cellulosic Ethanol Bioenergy Production	-	$25,000
Bioenergy	Iowa State University	Renewable Diesel Production from Biofuel Co-Products	$181,072	$181,072
Bioenergy	Iowa State University	Experiments, Technoeconomics, and Optimization of Bioenergy Systems Based on Bio-Oil Gasification	$177,365	$328,829
Bioenergy	Iowa State University	Liquid Phase Refinery of Biomass to Fuels by Graphene Derived Nanocatalysts	$121,584	$211,710
Bioenergy	Iowa State University	Catalytic Processing of Whole Algal Biomass into Aromatics and Ammonia	$119,858	$119,858
Bioenergy	Iowa State University	Conversion of Biomass into Fuels and Chemicals Using Solvolysis	$103,006*	$103,006
Bioenergy	Iowa State University	Hybrid Processing for Robust Production of Biorenewable Fuels and Chemicals	$101,870	$204,729
Bioenergy	Iowa State University	Production of Activated Carbon from Fast Pyrolysis Biochar	$99,024	$199,797
Education and Outreach	Center On Sustainable Communities	Best Practices in Energy and Resource Efficiency for Iowa Homeowners	-	$25,000
Education and Outreach	Des Moines Public Schools - Iowa Energy and Sustainability Academy	Enhanced Energy Education for the Iowa Energy and Sustainability Academy	$12,300	$12,300
Education and Outreach	East Sac County Schools	Energy Education, Conservation and Efficiency: Sustainability in Iowa's Rural Schools	-	$20,000
Education and Outreach	Eastern Iowa Community College District	Energy Project: Energy from Nature and Educational Resources for Green Youth	-	$25,000
Education and Outreach	Fossil and Prairie Center Foundation	Demonstration, Education and Monitoring of Hybrid Wind/Photovoltaic Electrical Generating System	-	$19,620
Education and Outreach	Iowa Environmental Council	Real Potential, Ready Today: Solar Energy in Iowa	-	$20,000
Education and Outreach	Iowa Green Renewable Electrical Energy Network	I-GREEN Learning Center Solympiad Series	-	$25,000
Education and Outreach	Iowa Interfaith Power & Light	Faith in Changing Climate Conference 2013	$7,500	$7,500
Education and Outreach	Iowa State University	Promote Renewable Energy through Education Exhibition and Competition with a Solar Car	-	$15,000
Education and Outreach	Iowa State University	Developing Biofuels Educational Modules for Iowa High School Agricultural Education Programs	-	$6,000
Education and Outreach	Main Street West Union	Small Town, Big Time District Energy Efficiency	-	$25,000
Education and Outreach	University of Northern Iowa	FREE Loan Program, FUNdamentals Workshops, and Iowa Energy Poster Contest	-	$25,000
Energy Efficiency	Iowa Association of Municipal Utilities	Water and Wastewater Treatment Costs, Energy Consumption and Efficiency Potential	$13,338	$13,338
Energy Efficiency	Iowa State University	Municipal and Hydrocarbon Waste Streams - an Alternative Source for Fuels	$130,099	$130,099
Energy Efficiency	Iowa State University	ISU Farm Energy: Applying Energy Efficiency to Farm Enterprises	$99,479	$197,895
Energy Efficiency	Iowa State University	Next Generation Insulation Material for Appliance, Transportation and Building Systems	$76,959	$76,959
Energy Efficiency	Iowa State University	Distillation Bottoms as a Warm Mix Asphalt Technology	$53,620	$124,140
Energy Efficiency	Iowa State University	Developing Direct Injection Systems to Increase the Engine Load Limit Using Ammonia	-	$201,770
Energy Efficiency	The University of Iowa	Riser Sleeve and Mold Ablation Technologies for Improving Energy Efficiency in Steel Casting	$128,922	$257,367
Renewable Energy	Iowa State University	Smart Sensory Membrane for Wind Turbine Blades	$103,923	$103,923
Renewable Energy	Iowa State University	Novel Equichromic Organic/Inorganic Solar Cell	$103,002*	$185,861

* Projects that led to external funding (2 projects)

FINANCIAL REPORT

The Iowa Energy Center receives primary funding from an assessment on the revenue of utility companies. Total assessment funding for the FY 2014 totaled $3.8 million. These funds are paid by the utilities to the Iowa Utilities Board, which then remits funding to Iowa State University. Iowa State administers the Energy Center, as mandated by statute.

The Energy Center also receives revenue from user fees at the Biomass Energy Conversion (BECON) facility in Nevada, Iowa, and the Energy Resource Station (ERS) in Ankeny, Iowa. These fees are utilized to offset the expenditures incurred in operating the facilities. The Energy Center also receives interest income on unspent funds.

The Alternate Energy Revolving Loan Program (AERLP) is managed by the Energy Center, and the enabling legislation allows for one-half the interest earned on unspent funds to be used to offset marketing and administrative expenditures by the Energy Center on behalf of the program. This spendable interest ($34,938 for FY 2014) is not sufficient to cover the actual costs of administration of the program, and the Energy Center utilizes assessment funding to pay for costs in excess of the limit.

The financial statement presented here is shown on a modified cash basis, and reflects actual outlays of funds, plus encumbrances of funds, for the fiscal year. This methodology is not in accordance with Generally Accepted Accounting Principles (GAAP), and substantially omits all the statements and disclosures required by GAAP. While the statement itself is unaudited, the Energy Center is subject to audit from both the State of Iowa and outside audit firms as part of Iowa State University. For FY 2014, the Energy Center placed 100% of assessment funds received into service. As the grant programs continue to evolve, the awards will no longer be tied to program award solicitations for a specific fiscal year. The Energy Center targets keeping a cash reserve of approximately one-half the annual assessment amount, to ensure our ability to meet obligations for both operational and grant expenditures. Past statements have referred to this amount as a "carry forward." Due to the changing nature of grant award terms, this amount is considered to be, and referred to as, a reserve to ensure cash flow obligations can be met. Iowa State University is not obligated to fund any cash shortfalls incurred by the Energy Center.

The nature of the Matching Grant program results in timing issues related to expenditures. An award in FY 2014—an endorsement committing funds upon winning an external funding opportunity—must await the final sponsor award to ensure the matching funds will be required. These funds will likely not be expended in the fiscal year in which the Energy Center's award is made, but will be expended when the requests for payment are made to the final sponsor. For multi-year external projects, then, Energy Center expenditures for a FY 2014 Matching Grant award may be two or more years in the future. As of the end of FY 2014 the Energy Center had made awards under the Matching Grant program totaling $281,316, and had endorsed awards, which await final sponsor approval, of an additional $627,330.

Opportunity Grant awards awaiting disbursement as of the end of FY 2014 totalled $176,132.

FY 2014 (12 MONTHS ENDED JUNE 30, 2014)	UNAUDITED	
CASH ON HAND, JULY 1, 2013	**2,500,673**	
Utility Assessment Revenue	3,767,307	
Interest Income on Invested Assessment Funds	66,131	
Total Funds Available for Use	6,334,111	
GRANT EXPENDITURES		
Legacy Grants	1,330,745	
Planning Grants	10,538	
Opportunity Grants	99,897	
Matching Grants	2,410	
Total Grant Expenditures	1,443,590	
Add: Encumbered (Incurred Not Disbursed)	*478,806*	
TOTAL FY 2014 GRANT SPENDING	**1,919,612**	
CENTER OPERATIONAL EXPENDITURES		
Personnel (Includes Cost-Recovered Salaries of $66,432)	1,321,146	
Travel	22,634	
Contracted Services and Information Technology Services	326,872	
Supplies	137,289	
Repairs and Maintenance	44,286	
Utilities	51,248	
Miscellaneous	3,012	
Scholarships	4,523	
Total	1,911,010	
Less: Expenditure Cost-Recovered Salaries	*(66,432)*	
TOTAL CENTER OPERATIONAL EXPENDITURES	**1,844,578**	
TOTAL DISBURSED FUNDS, FY 2014	**3,764,190**	
CASH ON HAND, JUNE 30, 2014, NET OF ENCUMBRANCES	**2,569,920**	
BREAKDOWN OF OPERATIONAL EXPENDITURES BY FUNCTIONAL AREA		
Administration	750,660	
Energy Efficiency Program	274,524	
Bioenergy Program	68,769	
Renewable Energy Program	23,715	
Education and Outreach Program	72,919	
Unrecovered AERLP Administration Expenditures	107,106	1,297,693
Service Centers, Unrecovered Cost:		
Energy Resource Station (Ankeny)	266,877	
Biomass Energy Conversion Facility (Nevada)	280,008	546,885
TOTAL CENTER OPERATIONAL EXPENDITURES		**1,844,578**
EXPENDITURES CHARGED TO SPONSORED RESEARCH PROJECTS		
Personnel	10,589	
Contracted Services and Information Technology Services	160,215	
Travel	681	
Maintenance and Repair	12,253	
TOTAL EXPENDITURES CHARGED TO SPONSORED RESEARCH PROJECTS	**183,737**	

IOWA ENERGY CENTER STAFF

Mark C. Petri, Ph.D., Director

ENERGY EFFICIENCY PROGRAM AREA, ENERGY RESOURCE STATION (ERS)
Xiaohui Zhou, Ph.D., P.E., Program and Facility Manager
Ran Liu, Ph.D., Postdoctoral Research Associate
Scott Lochhead, P.E., Mechanical Engineer
Denise Junod, Administrative Assistant

BIOMASS PROGRAM AREA, BIOMASS ENERGY CONVERSION (BECON) FACILITY
Norm Olson, P.E., Program and Facility Manager
Troy Barker, Facility Mechanic, Biomass Energy Conversion Facility

RENEWABLE ENERGY PROGRAM AREA, ALTERNATE ENERGY REVOLVING LOAN PROGRAM (AERLP)
Bill Haman, P.E., Program Manager and Loan Program Manager

MARKETING AND COMMUNICATIONS, EDUCATION AND OUTREACH PROGRAM AREA
Sandra Cannon, Communications Coordinator
Kelly Madsen, Student Staff Writer
Liz Zabel, Photojournalism Intern

BUSINESS ADMINISTRATION
Keith Kutz, Contract Coordinator
Patty Prouty, Grant Specialist
Martin D. Watt, Office Coordinator/Fiscal Officer
Julie Charlson, Administrative Assistant
Linda Hintch, Safety and Security Officer

ADVISORY COUNCIL

The advisory council assists the Iowa Energy Center director in fulfilling the Iowa Energy Center's mission by providing advice on budgets, planning, and policies.

RESEARCH AND EDUCATION SECTOR

Peter Damiano, DDS, MPH, Director, Iowa Public Policy Center, The University of Iowa
Kavita Dhanwada, Ph.D., Associate Dean and Associate Professor, College of Natural Sciences, University of Northern Iowa (Council Vice Chair)
Valerie Newhouse, President, Iowa Lakes Community College
Arun Somani, Associate Dean, College of Engineering, Iowa State University
Gary Steinke, President, Iowa Association of Independent Colleges and Universities

PUBLIC SECTOR

Jennifer Easler, J.D., Office of Consumer Advocate
Paritosh Kasotia, Team Leader - Energy, Iowa Economic Development Authority
John Selmer, Director, Research and Technology Division, Iowa Department of Transportation
Sheila Tipton, Board Member, Iowa Utilities Board

UTILITY SECTOR

Dean Crist, Vice President – Regulation, MidAmerican Energy Company (Council Chair)
John Euchner, CEO, Nishnabotna Valley Rural Electric Cooperative
Vern Gebhart, Vice President, Customer Service Operations, Alliant Energy
Todd Kielkopf, General Manager, Indianola Municipal Utilties

Members are listed by constituency for the July 1, 2013 - June 30, 2014 term.

CONTACT US

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