

Biorenewable solutions from Iowa: Cultivating fields of the future

OUR GRANDPARENTS' CROPS PRODUCED FOOD. OUR PARENTS' CROPS ALSO PRODUCE FUEL. WHAT WILL TOMORROW'S CROPS PRODUCE? THE ANSWER MAY VERY WELL COME FROM IOWA. OUR STRONG AGRICULTURAL FOUNDATION AND WORLD-CLASS RESEARCH INSTITUTIONS MAKE IOWA A NATURAL FIT FOR BIOSCIENCES.

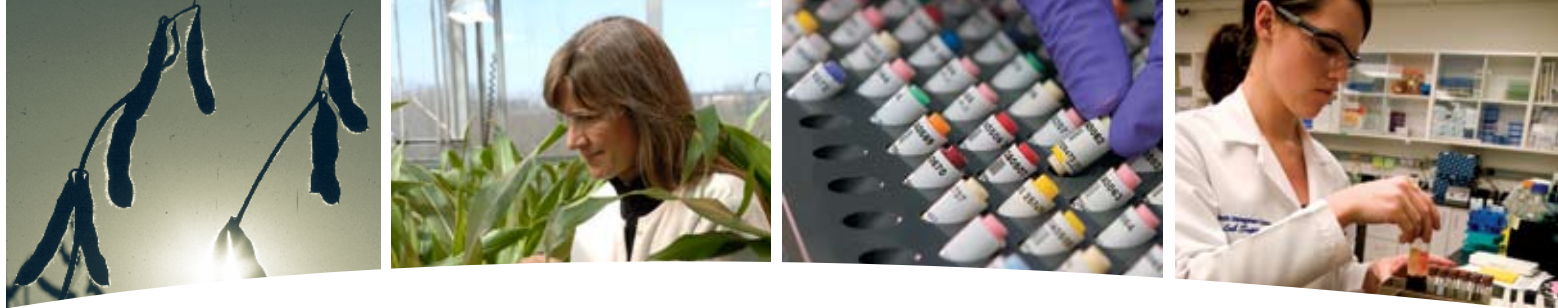
In Iowa, an aggressively pro-business economic climate with world-class research institutions are working in collaboration with each other and a growing biosciences industry, creating enormous potential for life-changing advances. University research concentrated in plant, animal and human genomics form the foundation for a system of interrelated disciplines and areas of study that support and assist one another.

Both this groundbreaking research and the scientists behind it are readily accessible to the bioscience companies in Iowa. The state's biofuels industries have added \$11.5 billion to Iowa's economy, generated \$2.3 billion in new household income and created and supported 70,000 Iowa jobs. Iowa's well-educated and adaptable workforce provides these companies higher-quality output and lower operational costs. Key bioscience industry clusters continue to emerge as more and more companies discover the fields of the future in Iowa.

Iowa's principal crops of corn and soybeans are focal points for exciting biotechnology discoveries. A living laboratory for agri-biotechnology research and technology transfer is provided in Iowa through its three renowned public research institutions and their open-door policy of working with business. The University of Iowa ranks 12th among public research universities for National Institute of Health (NIH) funding. The Iowa State University Research Foundation ranks third in licenses and options executed on intellectual property and fourth in licenses and options yielding income. The Biosciences Alliance of Iowa

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Excerpts from a presentation given by Mike Blouin, President of the Greater Dubuque Development Corporation, at the second annual German American Energy Conference, March 2010.

Biofuels grow Iowa's green economy

As you may already know, Iowa is one of the leading producers in the United States for a number of biofuels, including ethanol and biodiesel. As a result, the biofuels industry is one that has particular importance to our state economy.

Many reasons exist as to why Iowa has been able to succeed in its efforts to lead the United States in biofuel production, but perhaps the single biggest factor is something we are thankful to have inherited: our central geographic location.

Having natural resources is only half the reason Iowa has become a leader in the biofuels industry. What has truly allowed Iowa to take the lead in production is the support and economic incentives that have been put in place to support the infrastructure of this industry.

In 2007, legislators and the governor established the Iowa Power Fund, a \$100 million commitment to invest in cutting edge research and development required in the new energy economy. Also, as part of the Iowa Power Fund, our state established the Office of Energy Independence, which is not only responsible for coordinating energy policy programs, but also is empowered with pursuing new research investment funds from public and private sources and establish renewable energy performance measures.

Perhaps one of the most unique programs offered in Iowa is what we call the Industrial Jobs Training Program, providing businesses expanding their Iowa workforce with new employee training. The program is administered by Iowa's 15 community colleges and financed through bonds sold by the colleges.

In terms of business development, a number of programs are in place to not only help recruit new business to Iowa, but also demonstrate our commitment to growing this industry in our state. For example, the Alternative Energy Revolving Loan

Program (AERLP) provides loan funds to individuals and organizations who build renewable energy production facilities in Iowa. Efforts to retain and enlarge the footprint of this industry in our state is paying off. Iowa's biofuels industries have added \$11.5 billion to Iowa's economy, generated \$2.3 billion in new household income and created and supported 70,000 Iowa jobs.

What does the Iowa biofuels industry look like? When it comes to ethanol, Iowa is the leading U.S. producer, accounting for approximately one-fourth of the nation's ethanol supply. Iowa produces more than double the ethanol volume of Illinois, the next highest producing state.

We have 38 ethanol plants in operation, producing approximately three billion gallons per year. Two of those plants are currently expanding capacity. And 10 new ethanol plants are under construction. Iowa alone accounted for more than 25 percent of the entire U.S. ethanol production and continues to grow. The Iowa Department of Economic Development recently funded several second generation ethanol plants that will lead the way in this industry.

With respect to biodiesel, Iowa now ranks third in biodiesel production nationwide and accounts for almost 11 percent of the entire U.S. biodiesel production capacity. Iowa has 14 biodiesel plants in operation, producing approximately 318 million gallons per year. And two new biodiesel plants are under construction. In 2009, the 690 million gallons of biodiesel produced displaced 38.1 million barrels of petroleum with a clean-burning, efficient fuel grown in the U.S.

What's next? Iowa's resources are rich and the state's commitment to this field is strong. Through government resources and top-notch research facilities, we have been able to redirect our future by taking what we do best – like growing crops – and effectively show the world how the biofuels industry can thrive and have an impact on the environment and economy. ♦

Project Liberty continues Iowa's leadership in biofuels

POET's \$200-million expansion gleans ethanol from biomass

IN EMMETSBURG, IOWA, THE LARGEST ETHANOL PRODUCER IN THE WORLD IS SETTING ITS SIGHTS ON MAKING RENEWABLE FUEL FROM BIOMASS.

POET, which began transforming corn into clean-burning ethanol 22 years ago, now produces more than 1.6 billion gallons of ethanol annually from 26 production facilities nationwide. The company is leveraging that leadership position in biorefining and will soon break ground on the nation's first major commercial-sized facility to produce cellulosic ethanol. POET will use the waste from an existing corn fuel facility — the cobs, husks and stalks — to make a marketable ethanol.

According to Jim Sturdevant, POET's director of the cellulosic ethanol initiative known as Project Liberty, the facility is co-locating at the company's existing Emmetsburg 50-million-gallon-per-year biorefinery. "The \$200-million Project Liberty facility will not only produce fuel from cellulosic materials," he says. "It'll also include technology that reaps more value from a each kernel of corn, including 11 percent more ethanol from a bushel of corn, 27 percent more ethanol from an acre of corn while using 83 percent less energy needed to ferment corn into ethanol and reducing water consumption at an ethanol plant by 24 percent."

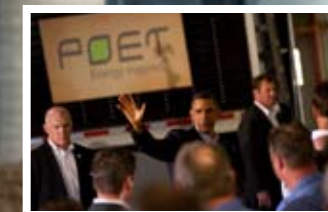
It takes one ton of biomass to produce approximately 100 gallons of ethanol, and Sturdevant explains that POET has been partnering with Iowa's research universities, industrial enzyme makers, agricultural equipment manufacturers and area farmers to have the infrastructure in place for the 770 tons of biomass that'll be needed each day at the Emmetsburg biorefinery.

"POET's long-term goal is to eventually capture 20 percent of the 16 billion-gallon industry by 2022," says Sturdevant. "To do this the ethanol industry will need to produce 3.5 billion gallons of cellulosic ethanol. To reach this goal, POET will produce 1.1 billion gallons by adding cellulosic technology to our 26 existing corn ethanol plants, 1.4 billion gallons by licensing the technology to other corn ethanol producers, and an additional one billion gallons from branching out to other feed-stocks like wood chips and municipal solid waste."

Project Liberty is an important priority for both POET and the ethanol industry. The project already has benefited from an \$80-million U.S. Department of Energy grant as well as a series of tax abatements and credits from the Iowa Department of Economic Development-administered Enterprise Zone program. "The need to commercialize cellulosic ethanol is apparent as we continue to move away from our dependence on fossil fuels," says Sturdevant. "POET has been working very hard at developing technologies and making advancements the past several years. Project Liberty is a major step toward reaching that goal."

In Iowa, 38 ethanol plants are currently transforming Iowa's corn crop into nearly 3 billion gallons of the biofuel ethanol each year. With each gallon produced, companies like POET are helping support Iowa's agricultural economy and Iowa's communities with the creation of high-quality green jobs.

With Project Liberty coming on line in 2012, the production of ethanol from biomass such as crop waste, grass or other materials may hold the key to helping the U.S. reduce its reliance on imported fossil fuels. ♦



PRESIDENT OBAMA LEARNS ABOUT BIOFUELS DURING A RECENT VISIT TO A POET ETHANOL REFINERY.



Genencor \$52-million Iowa expansion complete

The Danisco division adds Grain Processing Applied Innovation Center and manufacturing capacity

Genencor, a division of Danisco, officially opened the doors on its new Grain Processing Applied Innovation Center in Cedar Rapids, Iowa with a recent ribbon-cutting ceremony. The new state-of-the-art 20,000-square-foot world-class facility sits adjacent to the company's 140,000-square-foot enzyme manufacturing plant.

At the September 2009 ceremony, attended by many of the region's major grain processors and state and city dignitaries, Danisco CEO Tom Knutzen said, "This facility represents our tremendous commitment to fuel ethanol producers and carbohydrates processors. We announced this investment more than a year ago, and today we're joining our customers, employees, and supporters to celebrate its completion."

Genencor is a world leader in industrial biotechnology and a pioneer in enzyme innovation. Its Cedar Rapids facility is one of 10 manufacturing plants throughout the world, and says Knutzen, an integral piece of its manufacturing and distribution network that spans more than 40 countries. ♦



Iowa's Pioneer Hi-Bred expanding plant genetics research facilities

\$40-million investment to focus on advanced plant genetics to help farmers boost agricultural productivity

For the third time in as many years, Iowa-born Pioneer Hi-Bred — a DuPont business — is expanding its central-Iowa research facilities (pictured below). Pioneer, founded by Henry Wallace, who later became the 33rd Vice President of the U.S., is the world's leading source of customized solutions for farmers, livestock producers and grain and oilseed processors.

According to Paul E. Schickler, Pioneer president, the \$40-million expansion will enhance the company's cutting-edge plant genetics research and help farmers increase agricultural productivity. The planned investment will include new research facilities and space for 400 new research positions based in Johnston, Iowa. This increased investment in research will help meet the global challenge to double agricultural productivity by 2050 and will provide a significant boost to the economy in Iowa.

"First-class research facilities and world-class people are required to deliver innovative solutions to farmers worldwide, and we have both," says Schickler. "Our planned expansion will take Pioneer's R&D capabilities to the next level, which is critical to meet the growing demand for agricultural products."

The investment in more than 200,000 square feet of state-of-the-art laboratories furthers Pioneer's global growth plan, and its new and existing Iowa research facilities support all of Pioneer's molecular breeding initiatives around the world. To accommodate its rapidly growing business, Pioneer has expanded by more than 130,000 square feet of office and laboratory space in central Iowa in the past

two years alone. During that period, Pioneer's central Iowa work force grew by approximately 500 employees and today numbers about 2,400. Pioneer employs more than 9,500 people worldwide.

Schickler says this latest expansion will provide agricultural scientists and geneticists the tools to bring new corn and soybean seed technologies to market. "We have a world hungry for food and fuel, and the ingenuity of our research teams continue to find innovative ways to increase the yields of crops," he says. "We will continue to strive to create corn and soybean varieties that increase the amount of ethanol that can be squeezed out of a kernel of corn, build drought tolerance and insect resistance into corn and soybean plants, and develop grains that can more efficiently use fertilizer."

And for the third time in as many expansions, Pioneer's multi-million-dollar investment was assisted by a series of tax benefits and credits from the Iowa Department of Economic Development's High Quality Jobs program.

By continuing to make large advances in plant genetics, Pioneer is fulfilling its priority initiative to increase global food production. With its latest planned expansion, Pioneer will have more than one million square feet of office and laboratory space. And in that central-Iowa space, the creative spirit of world-class scientists and researchers will continue to unlock the mysteries of corn and soybean genetics, helping satisfy the growing global appetite for food and energy. ♦

FDA Approves Telles

The joint venture between Metabolix and Archer Daniels Midland puts Iowa in the center of biobased biodegradable polymer production



Telles, a joint venture between Metabolix and Archer Daniels Midland, recently received approval from the U.S. Food and Drug Administration (FDA) for its biodegradable Mirel F1005 and F1006 bioplastics to be used in food-contact products such as caps, eating utensils, trays and hot cup lids. The FDA also approved Mirel for use in cosmetics, house-ware and medical packaging. Mirel can also be used for freezing, boiling and in microwaves.

Telles' first commercial-scale plant is located near the ADM wet corn mill in Clinton, Iowa.

"With the Clinton plant now in operation, and this FDA clearance, we now can move forward with brand owners' requests to use Mirel in their injection molded food packaging applications," stated Richard Eno, CEO of Metabolix. "These applications, which currently consume billions of pounds of petroleum-based polymers per year, offer considerable opportunity for growth of our biobased, biodegradable polymer, Mirel."

The market for biodegradable plastics reached 541 million pounds in 2007, and is expected to reach 1.2 billion pounds by 2012. The company is also developing technology for co-producing plastics, chemicals and energy from crops such as switchgrass, oilseeds and sugarcane. ♦

"Pioneer's announcement is about three things – jobs, jobs, jobs," says Iowa Governor Chet Culver. "I want to thank Pioneer for continuing to choose the state of Iowa as a place to grow their business and create jobs. Today's announcement is one more sign of what we have known all along – that with our highly skilled workforce, inviting business climate and quality of life, Iowa is a great place for business. As Governor, I will not rest when it comes to helping Iowa businesses to expand business and create jobs like these in the state."



U.S. Chamber of Commerce Recognizes Iowa's Economic Growth
'Iowa ranks eighth nationally for growth; seventh in exports'
 May 27, 2010

Press release distributed by Iowa Governor Chet Culver's office

The United States Chamber of Commerce and the National Chamber Foundation have identified Iowa as one of the top states in the country to do business, according to a study released today. The study identified Iowa's stability in key industries, success in exports, competitive workforce and business-friendly regulatory environment as factors in the ranking.

"All Iowans can be proud of what we have done to work our way out of this national recession," said Governor Chet Culver. "This is the latest in a series of indicators that Iowa's economy is turning around. Our state's fiscal house is in order, and I thank all hard-working Iowans and their employers for rebuilding Iowa's economy as the national economic crisis comes to an end. I will continue to do all I can to make sure businesses have a willing partner in state government, putting people to work as our economy recovers."

The Chamber's "Enterprising States" study ranked Iowa eighth in terms of top economic performance, and Iowa ranked high among most of the criteria established by the study.

In addition, earlier this year, *Forbes* magazine, the national economic and business journal, named Des Moines as the No. 1 city in America for businesses and careers, and ranked Cedar Rapids as the No. 1 city for projected job growth.

In 2008, Iowa had the eighth-fastest growing economy in the nation, according to the Bureau of Economic Analysis. CNBC's 2009 "Top States for Business" survey ranks Iowa the fourth best in the nation and No. 1 for low costs of doing business. Finally, last year *Market-Watch*, another national financial publication, named Des Moines No. 1 in the country for doing business.

Energy Solutions
 May 28, 2010

DES MOINES, IA - Iowa's leadership in wind energy continues to gain momentum as the state looks to ramp up efforts to export wind energy beyond its state lines – all while moving toward exceeding national goals of the amount of energy produced from wind. With 14 percent of Iowa's in-state energy produced by wind, the state is looking to make significant strides in transmission infrastructure policy as the industry matures in the United States.

As a result of Iowa's efforts, regions looking to increase their renewable energy portfolios, like the Tennessee Valley Authority and WE Energies of Milwaukee, can tap into wind energy from Iowa to meet their renewable energy standards. The next frontier will be efficient transmission of wind power across multiple state lines to East Coast population centers that need wind power most.

To read the entire story, visit www.onlinetes.com and search for Iowa.

Area Development Magazine
 April/May 2010
'Biotech, Medical Devices and Life Sciences Sectors Strong Despite Economy'

Predicting the business future of most industries has been nearly impossible for the past few years, and the recession has made any hazy image in the crystal ball downright scary. For those in the pharmaceutical, biotech and medical equipment industries, the long debate over health care reform has complicated business conjecture.

In the "Lively Life Sciences Clusters" section, the article points out Iowa's strengths:

Iowa benefits from biotechnology activities beyond health care applications, particularly biofuels. The state leads in ethanol production, with an annual capacity exceeding 3 billion gallons from more than 36 plants.

To read the story in its entirety, visit www.AreaDevelopment.com and search for Iowa.

Business Facilities
 March 2010

Biotech is Growing from the Ground Up

Every year, *Business Facilities* takes an in-depth look at the perennial growth sector of biotechnology. Usually, this takes us into the realm of high-tech labs: who is building them, where they are locating and how these locations are laying the foundation for impressive biotech hubs.

The article cites Iowa's growing commitment to biotechnology innovation:

Through funding and incentives for companies, Iowa has staked a claim as the ideal place for start-up and established biotechnology companies. With an aggressive business climate, world-class research institutions and an established agricultural base, the state leads the nation in biofuel output accounting for 26 percent of U.S. ethanol and 12 percent of biodiesel production capacity.

To read more, visit www.BusinessFacilities.com and search for Iowa.

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 515.725.3000, business@iowa.gov

Iowa Office of Energy Independence
www.energy.iowa.gov/OEI

Renewable Fuel Infrastructure Program
www.IowaLifeChanging.com/business/renewablefuels.aspx

Iowa Renewable Fuels Association
www.iowarfa.org

Energy Bureau, Iowa Department of Natural Resources
www.energy.iowa.gov

Iowa Biodiesel Board
www.iowabiodiesel.org

National Ethanol Vehicle Coalition
www.e85fuel.com

National Renewable Energy Lab
www.nrel.gov

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is helping to make proprietary research at Iowa's universities readily available to companies engaged in the biosciences industry.

Iowa's pro-business government has committed millions of dollars to the Grow Iowa Values Fund, a progressive initiative that offers extensive incentives to new and expanding companies. In addition to Iowa's outstanding business climate, the state offers employees an enviable quality of life. With our safe neighborhoods, affordable housing, easy commutes, excellent schools and clean environment, Iowa's not just a great place to work, it's a great place to live.

Building upon the legacy that began 80 years ago in Iowa — Henry A. Wallace's development of hybrid corn — the revolution in agricultural science and technology over the past eight decades is no less phenomenal than other scientific fields. Iowa's researchers and agricultural scientists are leading a bioscience revolution that continues to forge paths to unimagined places. Their present and future discoveries will allow farm production to outpace a rapidly growing global population while discovering evermore ideas to squeeze new products and profits from our bounty.

Leverage the economic infrastructure and workforce advantages in Iowa and join the thousands of companies who are finding success and moving the industry forward. You will see why Iowa truly is life changing.

To find out how your bioscience company can profit from an Iowa location, contact an Iowa Department of Economic Development project manager at 800.245.IOWA (4692) for a confidential discussion. Or visit www.iowalifechanging.com. ♦



IOWA BIOTECH FACTS

- Iowa leads the nation in ethanol production – 38 ethanol refineries with a combined annual capacity of more than three billion gallons. (Iowa Renewable Fuels Association, 2009)
- Iowa is first in the nation in raw biomass production and has the ability to harvest 68.4 million dry tons of biomass per year. (National Renewable Energy Laboratory, 2008)
- Iowa is the nation's leading producer of corn and soybeans, the major feedstock for ethanol and biodiesel. (USDA, 2008)
- Iowa is third in the nation in biodiesel production - 14 biodiesel refineries with a combined capacity of more than 318 million gallons (The Biodiesel Board, 2009)
- Iowa's ethanol industry produced approximately 10.8 million tons of distillers grains in 2009 representing 30 percent of total U.S. distillers grains production. (Iowa Renewable Fuels Association, 2009)
- Iowa accounts for roughly 25 percent of total U.S. ethanol production. (Renewable Fuels Association, 2009)
- Iowa's biofuels industries have added \$11.5 billion to Iowa's economy, generated \$2.3 billion in new household income and created and supported 70,000 Iowa jobs. (LECG LLC, 2009)
- Annual ethanol production in Iowa increased by 599 percent from 2000 to 2009, from 440 million gallons in 2000 to three billion gallons today. (Renewable Fuels Association, 2009)
- Iowa alone produces more than 11 percent of the total U.S. biodiesel production. (The Biodiesel Board, 2009)
- Biodiesel production increased from 50,000 to more than 318 million gallons annually from 1999 to 2009. (Iowa Renewable Fuels Association, The Biodiesel Board, 2009)