
IOWA
economic development
Iowa's Leadership in Biofuels and Beyond
2015
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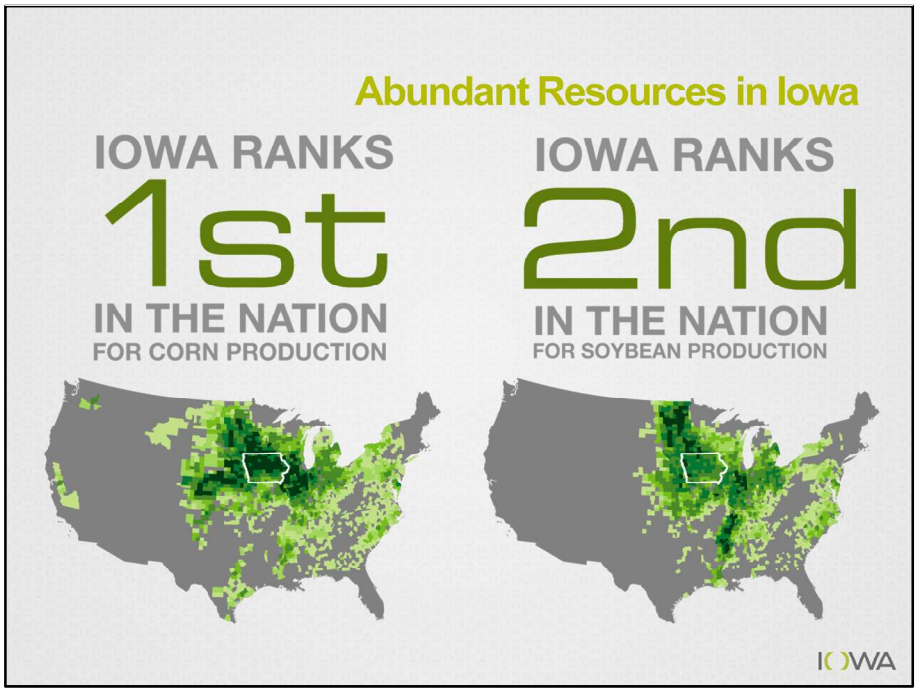
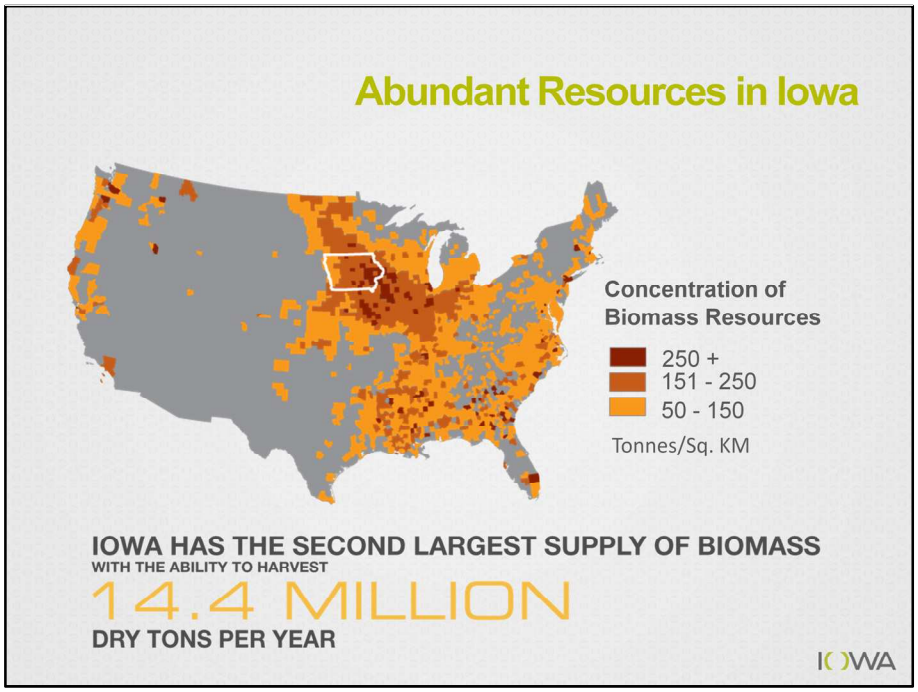
Director
Iowa Economic Development Authority



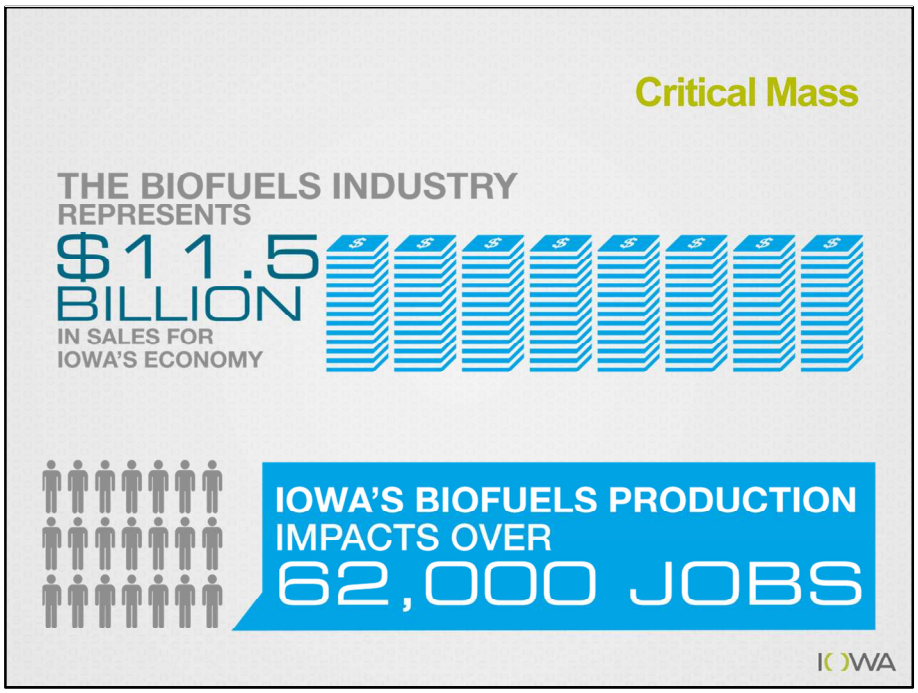
Iowa's success in the biofuels space is thanks in large part to the natural resources that are abundant in our state.

Iowa is one of the nation's leaders in the production of both corn and soybeans, principal feedstocks for the biofuels industry.

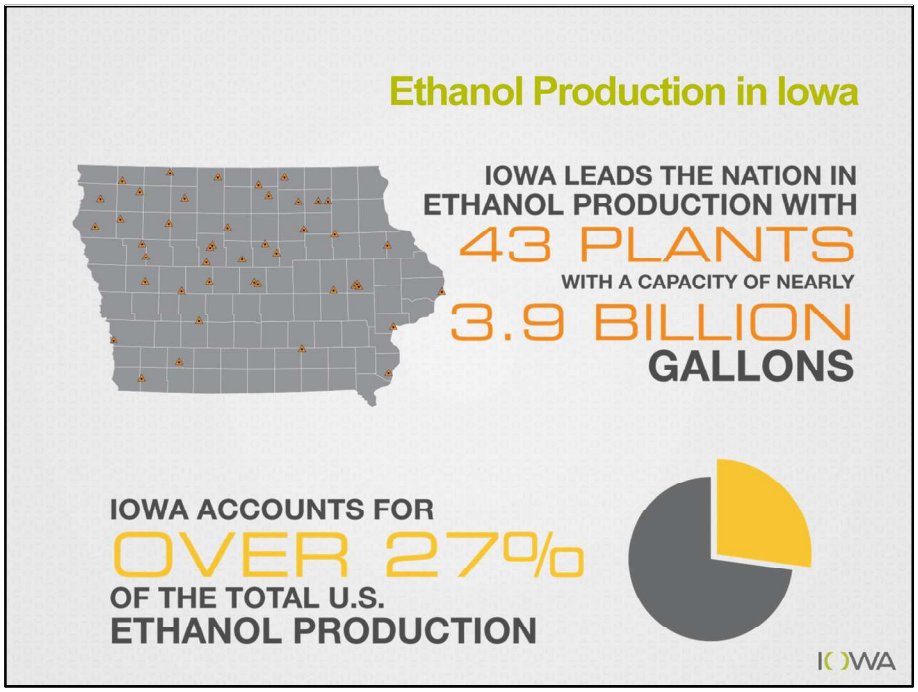


Iowa provides the nation's second largest supply of biomass with the ability to harvest 14.4 million dry tons of biomass per year (total cellulosic and crop biomass). Additionally, our state can boast one of most robust industrial biotechnology infrastructures available in the United States.

Consequently, we are focused on the use of biomass as feedstocks for the production of a broad range of industrial bio-based products that not only include fuels, but chemicals, polymers and materials as well.



Resources, coupled with innovation and Iowa ingenuity, has allowed the state's biorenewables industry cluster to blossom. Iowa's biofuels industry has added $11.5 billion to its economy, generated $4.0 billion in new household income and created and supported 62,000 jobs.

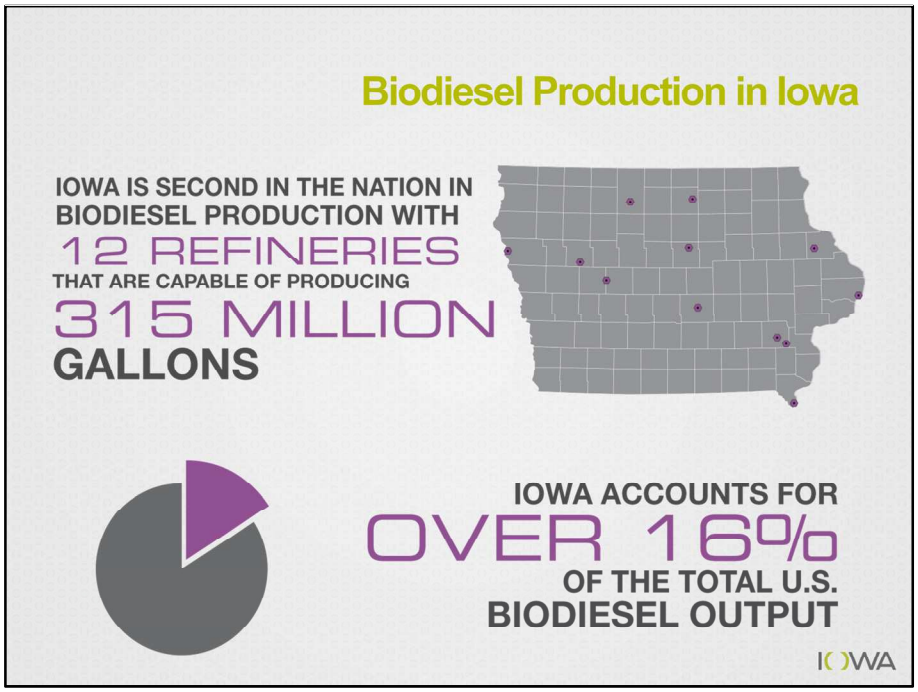


Iowa's wealth of ethanol and biodiesel plants underscores its leadership in biofuels and biochemicals.

Perhaps the most recognized area of Iowa's dominance in biosciences is in the area of ethanol. The state continues to lead the nation in ethanol production, with 43 ethanol plants in operation that have a capacity of over 3.9 billion gallons. These ethanol plants account for roughly 27 percent of total ethanol production in the United States. From 2000 to 2013, Iowa ethanol production increased by 773% from 440 million gallons to 3.8 billion gallons.

In addition to leading the nation in production, Iowa's ethanol future looks even brighter as research confirms the success that companies are experiencing converting outputs into secondary product lines such as DDGs. In 2011 Iowa produced 1.2 billion bushels, the highest amount of all U.S. DDG production.

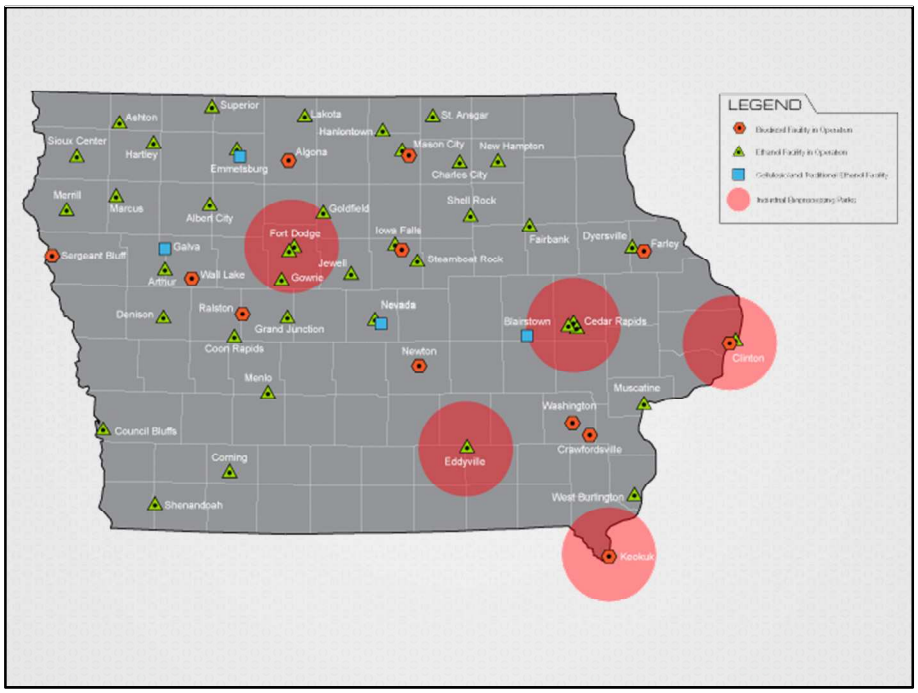
Iowa again was at the forefront when the Governor signed the nation's first tax credit for the retail sale of E15. It also increased the E85 Promotion Credit from a sliding scale to 16 cents per gallon, standardizing the rate for six years and provided a tax credit for retailers that aggressively push renewable fuels. If a retailer has up to 12% of their sales in renewable fuels, they get a 6.5 cent per gallon tax credit.



Iowa is second in the nation when it comes to biodiesel production. The state currently has 12 biodiesel refineries that are capable of producing 325 million gallons of biodiesel or 13% of the U.S.' total biodiesel output. In the span of just seven years, biodiesel production increased from 25,000 in 2005 to 325 million gallons annually in 2011.

State policies are also very supportive of the biofuels industry. Iowa legislation created the Biodiesel Production Refund which allows biodiesel producers to get a limited refund on the amount of sales or use tax paid during the production of biodiesel, now two cents per gallon.

Our office has also provided grant funding to bio-energy projects through both federal and state funds. Sponsored projects included training, education, infrastructure development, and research on a wide variety of bioenergy projects. These projects include the construction of a biodiesel bulk blending facility and workforce training on the installation of flexible fuel kits for automobiles. Many of these projects also evaluated the effectiveness of biomass feedstocks such as prairie grass, corn stover, algae, and municipal solid waste. Process technologies applied included gasification, pyrolysis, fermentation, and anaerobic digestion. End products ranged from ethanol, to biodiesel, to butanol, biogas and other bio-based petroleum substitutes. Research also evaluated process by-products to optimize the use of the biomass materials.


LEGEND
Biodiesel Facility in Operation
Ethanol Facility in Operation
Cellulosic and Traditional Ethanol Facility
Industrial Bioprocessing Parks
Superior
Ashton
Sioux Center
Hartley
Emmetsburg
Algona
Lakota
Hanlontown
St. Ansgar
Mason City
New Hampton
Charles City
Merrill
Marcus
Albert City
Goldfield
Fort Dodge
Shell Rock
Iowa Falls
Fairbank
Dyersville
Farley
Sergeant Bluff
Galva
Arthur
Wall Lake
Jewell
Gowrie
Steamboat Rock
Denison
Ralston
Grand Junction
Coon Rapids
Nevada
Blairstown
Cedar Rapids
Clinton
Newton
Menlo
Muscatine
Washington
Council Bluffs
Crawfordsville
Corning
Eddyville
Shenandoah
West Burlington
Keokuk

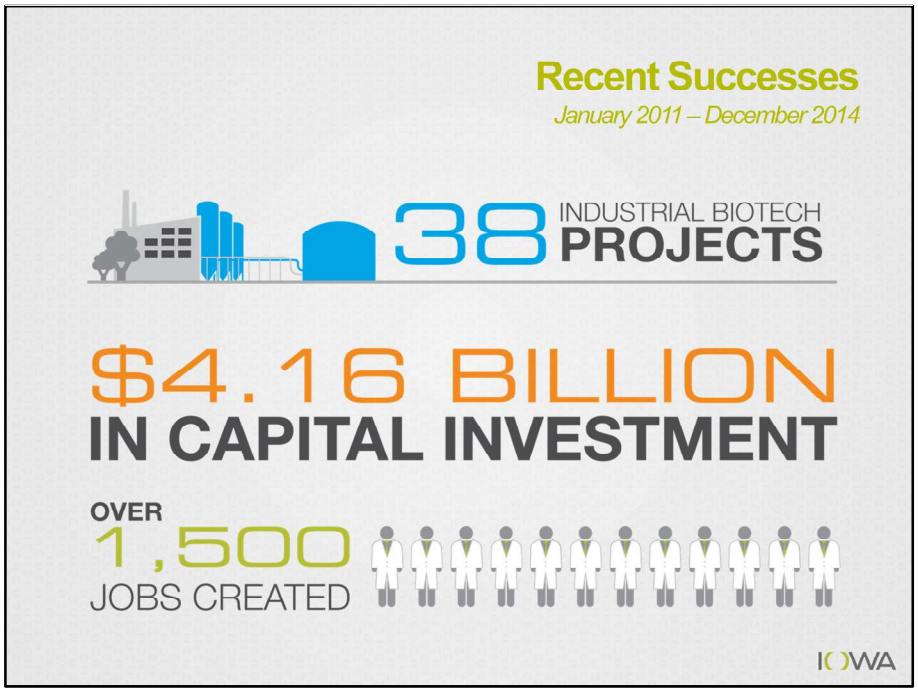
In the past few years, we have been proud to announce three major biorenewable and cellulosic plant projects in Iowa that will revolutionize biofuel generation:

1) Poet-DSM has built a 25-million-gallon-a-year plant, known as Project Liberty, next to Poet's corn-ethanol plant in Emmetsburg. The Emmetsburg plant celebrated its grand opening in September and will produce 20 million gallons of cellulosic ethanol annually.

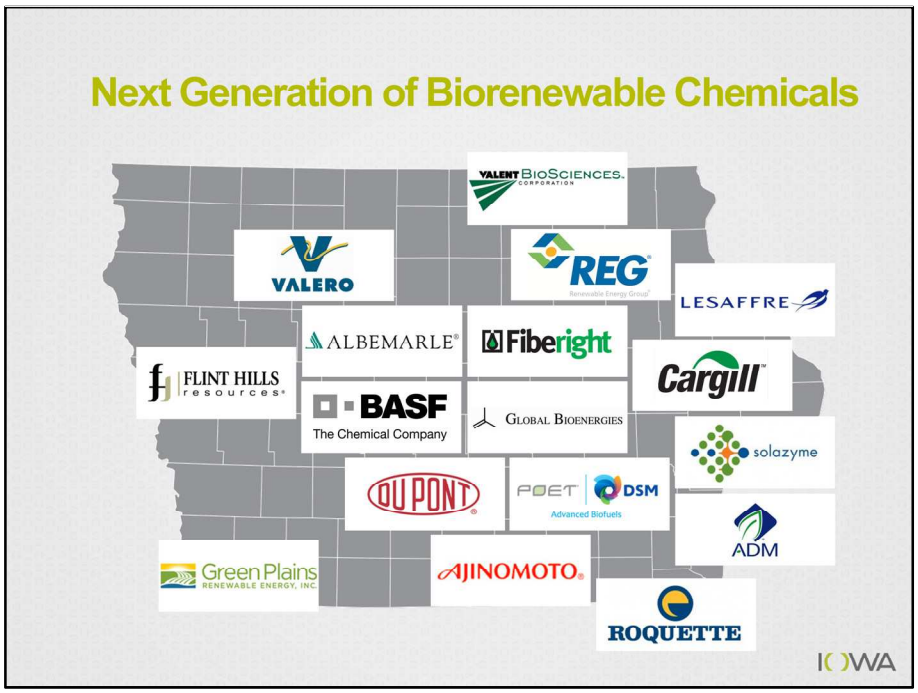
2) DuPont is building a commercial-scale cellulosic ethanol plant adjacent to Lincolnway Energy conventional ethanol plant in Nevada. The Iowa plant, which will begin production later this year, is designed to process 1,300 tons/day of corn cobs, leaves, and stalks and produce 27.5 million gallons/year of ethanol.

Biobutanol developer Butamax Advanced Biofuels has reported that Lincolnway Energy of Nevada and Corn LP of Goldfield, Iowa, are exploring the usage of biobutanol - a high performing drop-in biofuel that can be blended at higher concentrations than ethanol, without the need for infrastructure changes while delivering twice the renewable energy content of current biofuel blends. We are excited about the advancements in the area of bio-butanol, as it could assist the industry with the challenge of overcoming the blend wall and in meeting the renewable fuels standard.

3) Quad County Corn Producers in Galva Iowa is turning corn kernel fiber, a cellulosic feedstock, into high-octane, clean-burning ethanol. The new facility is expected to produce 2 million gallons of cellulosic ethanol from a feedstock already onsite.



Natural resources, a savvy workforce, existing infrastructure, access to agricultural biomass combined with widespread support and excellent research institutions continue to strengthen Iowa's biofuels and biorenewables industry. Companies that already call Iowa home include globally respected industry leaders to start-ups who are leading the innovations of tomorrow. In the last few years, the Iowa Economic Development Authority has assisted in 38 industrial biotech projects that have created over 1500 jobs and leveraged over $4.16 billion in capital investments for the state. (January 2011 to December 2014)



Here is a sampling of the many companies that have Iowa locations. We know we are attracting the right companies, innovators and leaders as they continue to not only solve our energy challenges, but also move us toward new technologies in the development of biorenewables.

As the biofuels market evolves, Iowa companies are at the forefront of developing the facilities, new harvesting and processing technology, and providing industry insights and resources to create innovations such as cellulosic renewable chemicals. These innovations will take projects from demonstration scale to commercialization.

Due to Iowa's strategic advantages, we have been able to attract major investments by those in the industry.

The continued catalyst for Iowa's revolutionary industrial biotech achievements is the focus on research and development by nationally recognized research institutions such as Iowa State University, the University of Iowa, and the University of Northern Iowa. These institutions have R & D facilities dedicated to finding tomorrow's innovative industrial biotech solutions.

Iowa State University's **Bioeconomy Institute** seeks to advance the use of biorenewable resources to produce chemicals, fuels, materials and energy. The institute has more than 160 faculty and more than $51 million in sponsored research funding from federal agencies and industry.

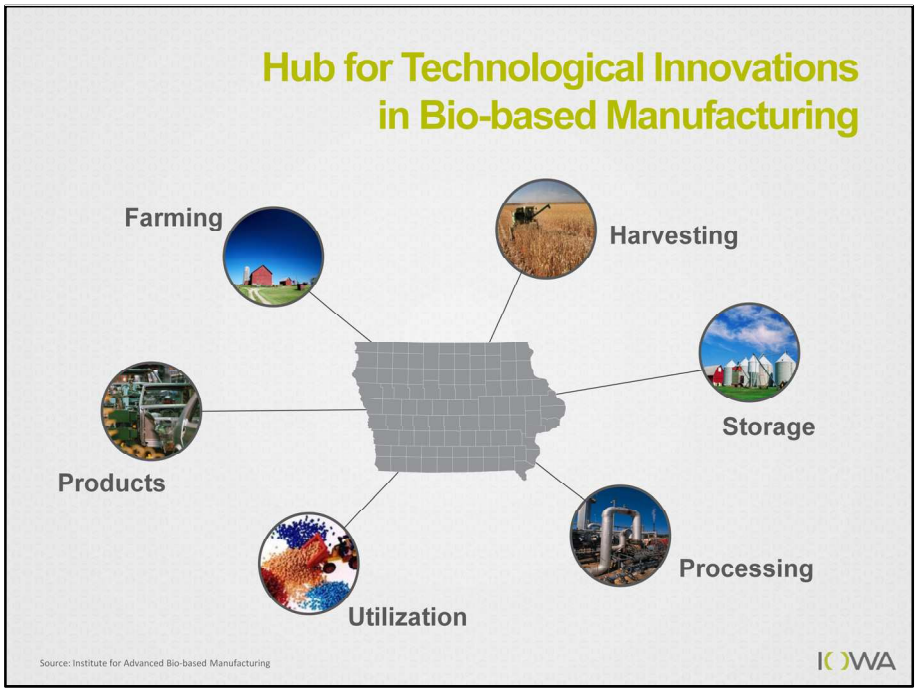
The BioCentury Research Farm at Iowa State University is the world's first fully integrated biomass production farm and processing facility. It allows testing and demonstration of processing technologies before ramping up to commercial-scale production.

The Center for Biorenewable Chemicals at Iowa State University, established by a grant from the National Science Foundation, integrates biological and chemical catalysis systems to produce biorenewable chemicals.

The Center for Bioplastics and Biocomposites is bringing together university researchers and industry members to push the boundaries of renewable resources and establish new revenue creating processes and products. The center will focus on developing high-value biobased products from agricultural feedstocks.

The **Ames Laboratory** is a is a government-owned, contractor-operated research facility of the U.S. Department of Energy that is run by Iowa State University. For more than 60 years, the Ames Laboratory has sought solutions to energy-related problems through the exploration of chemical, engineering, materials, mathematical and physical sciences.

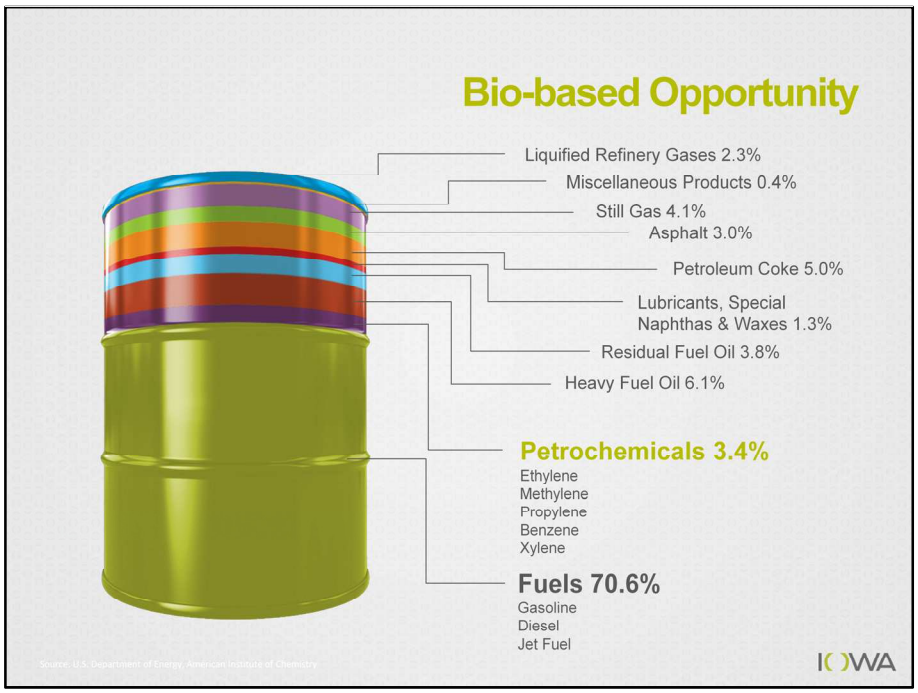
The Center for Biocatalysis and Bioprocessing at the University of Iowa uses state-of-the-art facilities to help develop products and processes for industry, government and academia.



Those projects are telling of the kind of environment we have in Iowa – one that is ever-changing and forward facing. Even as a leader in today's biofuels, our industry, our government, our academics, continue to explore Iowa's future in this arena.

The ground-breaking research going on at bioscience companies and research institutions across Iowa is giving the state momentum in its quest to grow the innovative industries and jobs of the future. Iowa's innovations keep the state on the cutting edge of bioscience and show no signs of stopping.

The future of Iowa's bioeconomy platform lies in the state's quest to become **THE** hub for technological innovations in the industrial biotech arena. By serving the many facets of this intricate industry, from farming to product commercialization, Iowa is well-positioned to remain at the forefront of this sector.



Iowa has already proven its might in the biofuels arena – our future opportunities can be found in the development of biochemicals.

Crude oil prices will most likely remain at levels sufficient to encourage the development of technologies to convert biorenewable resources as replacements for petroleum-derived gasoline and diesel fuel. It is also likely that these higher oil prices will provide incentive to the development of biorenewable resources for producing commodity chemicals.

The future of biorenewables includes value-added products as well as fuels. Examples include industrial and specialty chemicals, materials (including plastics, fibers, etc.), pharmaceuticals, and food and feed ingredients. Currently, the petroleum industry annually creates more than $400 billion worth of petrochemical products ($480 billion in 2011) – approximately as much value as motor fuels. Our future lies in the ability and capacity to think much like petroleum companies and seek ways to produce value-added products as well as biofuels.

Iowa is already at the forefront of this – as we are already converting biomass to transportation fuels and chemicals. But we continue to strive for the development of a defined vision of discovering advanced technologies that will make possible carbon-negative fuels and biobased products and investing in research and development that make these technologies environmentally, economically and socially sustainable. Iowa's track record of leading this industry places the state in a competitive position of opportunity and prosperity.

Proposed FY16 Tax Credit Programs

- **IEDA is proposing the creation of a new incentive for the production of Renewable Chemicals from biomass feedstocks**
- **Proposed Structure:**
  - Incentivizes the production of high-value "building block" chemicals
  - Must be produced from "biomass feedstocks" such as starch, sugar, oil, lignin, etc
  - Must create higher value products from the feedstocks (not available for the production of ethanol, biodiesel, or animal feed)
- **Features:**
  - Part of IEDA's business tax credit cap (no proposed increase)
  - Annual award amounts limited to $1 million for start-ups and $500,000 for established businesses
  - Credit would be refundable, but NOT transferrable
  - Only available to a company for five years

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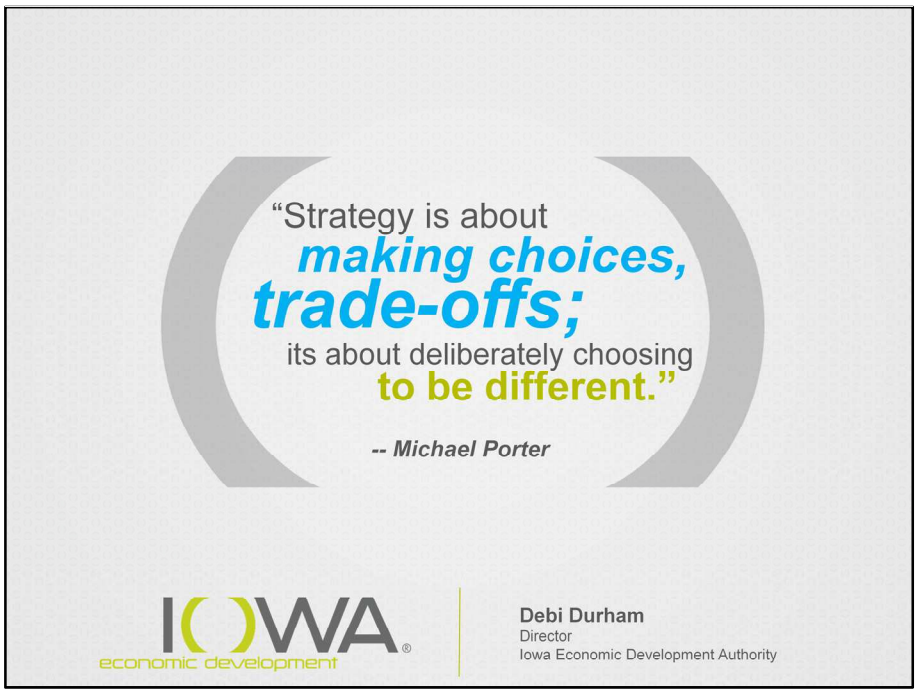
"Strategy is about
making choices,
trade-offs;
its about deliberately choosing
to be different."
-- Michael Porter
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