



Economic Development in the North Central Iowa Growth Region: Bioenergy Impacts

Produced for:
The Greater Fort Dodge Growth Alliance (GFDGA)

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Preface

Economic Development in the North Central Iowa Growth Region: Bioenergy Impacts

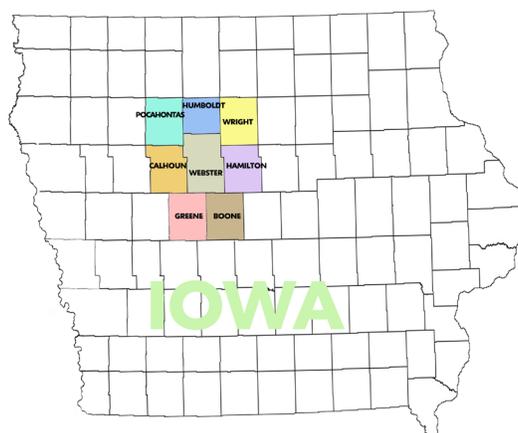
The Goss & Associates research team thanks the staff of the Greater Fort Dodge Growth Alliance for their assistance in facilitating the completion of this study. Goss & Associates also thanks Mr. Kelly Swenson, Business and Community Development manager at MidAmerican Energy, for providing estimated impacts for 2011, 2012 and 2013. In addition, researchers Tim Kelly, Adam Kinsinger and Jackie Kendrick were instrumental in completion of this study.

However, any errors, omissions, or misstatements are solely the responsibility of Goss & Associates and the principal investigator of this study.

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Preface

Economic Development in the North Central Iowa Growth Region: Bioenergy Impacts

In January 2014, the Greater Fort Dodge Growth Alliance (hereafter GFDGA) commissioned this study. GFDGA’s mission is to unify and coordinate accountable economic and community development, to enhance the quality of life in greater Fort Dodge, Iowa.²

The general goals of the study are to first estimate the impact of the attraction of additional companies to the eight-county economic area. A second goal of this study is estimate the construction and operations related to bioenergy industry³ development at Iowa’s Crossroads of Global Innovation (hereafter ICGI) for the eight-county region.

This project, while funded by GFDGA, was developed independently of this organization.⁴ GFDGA acknowledges and thanks the following organizations for their assistance in making this study possible:

- Farm Bureau - Webster County
- Iowa Central Community College, Fort Dodge
- MidAmerican Energy (in-kind)
- MidAmerican Energy, Des Moines
- Webster-Calhoun Cooperative Telephone Association, Gowrie
- Ripple Funds, Iowa Area Development Group, Des Moines
- Corn Belt Power Cooperative, Humboldt
- City of Webster City, Webster City
- Prairie Energy Cooperative, Clarion
- Calhoun County REC, Rockwell City
- Midland Power Cooperative, Jefferson
- Humboldt County Development Association, Humboldt
- Corn Investment Corp.

²<https://www.greaterfortdodge.com/>

³For the purposes of this study, bioenergy is defined as chemical manufacturing, NAICS code 325. This industry includes ethanol production as well as petrochemical and related production.

⁴Goss & Associates thanks Mr. Kelly Swenson, Business and Community Development manager at MidAmerican Energy, for providing estimated impacts for 2011, 2012 and 2013.

Specific goals of the study

For the eight-county region:⁵

- Estimate the impact of the attraction of an additional manufacturing firm on overall regional business activity.
- Quantify the spin-off effects by industry of an additional manufacturing firm to the region and state in terms of business activity.
- Estimate the impact of the attraction of an additional manufacturing firm on state and local tax collections.
- Measure the economic impact of ICGI bioenergy yearly operations and capital spending for 2012 and 2013.
- Estimate the impact of ICGI on the region for 2014-18.
- Estimate the impact of the bioenergy industry on area “brain gain.”

About the Greater Fort Dodge Growth Alliance

GFDGA’s mission is to unify and coordinate accountable economic and community development, to enhance the quality of life in greater Fort Dodge, Iowa.

⁵Where available and appropriate, impacts for the state of Iowa will be provided as well. The eight counties of the region are: Boone, Calhoun, Greene, Hamilton, Humboldt, Pocahontas, Webster and Wright

Executive Summary

Economic Development in the North Central Iowa Growth Region: Bioenergy Impacts

I. Bioenergy impacts on the region

- ⌘ **Due to cross-county commuting, bioenergy has had significant impacts on each of the eight counties in the region.**
- ⌘ **Bioenergy firms have encouraged the startup and/or relocation of manufacturing, wholesale and retail trade, construction, and other industries to Webster County, the surrounding seven counties, and the State of Iowa.**
- ⌘ **Bioenergy is a major contributor to research and development (R&D) spending in the region.**
 - Bioenergy firms in the region attract and help retain well-educated and trained individuals to the area, creating “brain gain.”
 - Bioenergy’s share of U.S. private R&D spending rose from 10.3 percent in 1998 to 19.0 percent in 2007.
 - The region’s bioenergy R&D spending more than tripled from \$24.7 million in 1998 to \$77.1 million in 2007 in the latest year of data availability.
 - This R&D spending requires higher education levels for the bioenergy industry and supports post-secondary education.
- In 2013 Iowa Central Community College provided specialized training for all new hires as CJ Bio America was preparing to begin operations, and continues to operate an industrial training program.
- Iowa Central Community College houses a nationally-recognized *Fuel Testing Laboratory* providing on-the-job training to student interns by industry professionals.
- Iowa Central’s new Process Technology Program trains technicians to determine ways to turn byproducts of production into useful and/or consumable products.
- From 2009 to 2014 Iowa State University’s College of Agriculture and Life Sciences experienced a 50.2 percent increase in enrollments.

Due to cross-county commuting, bioenergy has had significant impacts on each of the eight counties in the region.

In 2013 Iowa Central Community College provided specialized training for all new hires as CJ Bio America was preparing to begin operations, and continues to operate an industrial training program.

Executive Summary

II. Cross-county commuting patterns among the region's counties

Regardless of the location of new firms or the expansion of existing firms, the impacts will be experienced across the eight-county region. These impacts are due primarily to employees residing in one county, but working in other counties in the region.

■ The percent of total regional cross-county commuters by county for 2010 were:⁶

- Boone County: 2.5 percent of workers commuted to jobs in other counties in the region.
- Calhoun County: 19.6 percent of workers commuted to jobs in other counties in the region.
- Greene County: 5.7 percent of workers commuted to jobs in other counties in the region.
- Hamilton County: 7.2 percent of workers commuted to jobs in other counties in the region.
- Humboldt County: 20.1 percent of workers commuted to jobs in other counties in the region.
- Pocahontas County: 12.3 percent of workers commuted to jobs in other counties in the region.
- Webster County: 8.0 percent of workers commuted to jobs in other counties in the region.
- Wright County: 11.7 percent of workers commuted to jobs in other counties in the region.



CJ Bio America employee

⁶Source: 2010 Decennial U.S. Census

Executive Summary

III. 2013 estimated regional impacts

A: Attracting a 50-employee regional manufacturing firm:

■ For the regional economy:

- An increase of \$43.3 million in business activity or sales.
- An addition of \$6.4 million in wages and salaries.
- The support of 99.7 jobs in all industries with an average annual salary of \$64,358.
 - Manufacturing sector, 54.6 jobs with average annual salary of \$90,293.
- Produce almost \$787.3 thousand in state tax collections, and almost \$588.9 thousand in local tax collections for a total of almost \$1.4 million in state and local tax collections.

■ For spillover industries for one year of operations:⁷

- Business activity, or sales increases 2013:
 - Wholesale trade, \$422.8 thousand.
 - Healthcare providers, \$408.9 thousand.
 - Retail trade, \$393.9 thousand.
 - Construction industry, \$249.4 thousand.
 - Finance and insurance firms, \$193.3 thousand.
 - Professional, scientific and technical services firms, \$170.5 thousand.
 - Other regional industries, \$1.9 million.
- Wages and salaries additions 2013.
 - Healthcare providers, \$225.4 thousand.
 - Retail trade, \$159.8 thousand.
 - Wholesale trade, \$155.6 thousand.
 - Construction industry, \$117.9 thousand.
 - Professional, scientific and technical services firms, \$95.0 thousand.

- Finance and insurance firms, \$52.0 thousand.
- Other regional industries, \$674.4 thousand.
- Employment additions:
 - Retail trade, 6.8 jobs with an average annual salary of \$23,517.
 - Healthcare providers, 5.5 jobs with an average annual salary of \$40,611.
 - Construction industry, 3.2 jobs with an average annual salary of \$36,521.
 - Wholesale trade, 2.8 jobs with an average annual salary of \$56,062.
 - Professional, scientific and technical services firms, 2.5 jobs with an average annual salary of \$37,266.
 - Finance and insurance firms, 1.3 jobs with an average annual salary of \$39,929.
 - All other regional industries, 22.8 jobs with an average annual salary of \$29,554.

■ For state tax coffers annually:

- A boost in sales taxes of \$361.9 thousand.
- An increase in individual income taxes of \$310.2 thousand.
- An upturn in corporate income taxes of \$27.2 thousand.
- An expansion of \$87.9 thousand in other taxes and fees.⁸

■ For local tax collections annually:

- A gain in local optionsales taxes of \$95.6 thousand.
- An increase in property taxes of \$475.4 thousand.
- An expansion of \$17.9 thousand in other taxes and fees.⁹

⁷Spillover impacts are equal to the sum of indirect and induced impacts.

⁸Other taxes and fees include license plate revenues, insurance premiums, alcoholic beverage taxes, etc.

⁹ibid.

Executive Summary

B. 2013 impact of Iowa Crossroads of Global Innovation (ICGI)

For the regional economy:^{10,11,12}

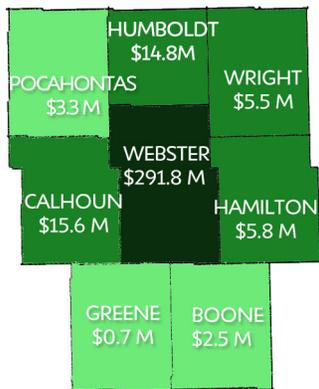
- An increase of \$341.0 million in business activity or sales.
- An addition of \$50.5 million in wages and salaries.
- The support of 785.3 jobs with an average annual salary of \$64,358.
- Produce more than \$5.5 million in state tax collections, and almost \$4.6 million in local tax collections for a total of approximately \$10.1 million in state and local tax collections.

In addition to the regional manufacturing sector impacts, the current three resident firms in the ICGI expanded the sales, salaries and jobs for scores of other industries in the region. These spillover impacts are significant and detailed as follows:

For spillover industries for one year of operations:¹³

- Business activity, or sales increases were.
 - Manufacturing sector outside ICGI, \$311.3 million.
 - Healthcare providers, \$3.2 million.
 - Retail trade, \$3.1 million.
 - Wholesale trade, \$3.3 million.
 - Construction industry, \$2.0 million.
 - Professional, scientific and technical services firms, \$1.3 million.
 - Finance and insurance firms, \$1.5 million.
 - Other regional industries, \$15.1 million.

Overall (Total) Economic Impacts of ICGI by County, 2013



CJ Bio America construction at ICGI

¹⁰Production for one year of manufacturing operations for the three firms in ICGI.

¹¹Cargill and CJ Bio America, in addition to the existing Valero Renewables formed today's ICGI. Currently the industrial residents of Cargill, CJ Bio America and Valero are laying the foundation for a new cooperative type of growth engine. By locating in close geographic proximity, these firms can produce benefits for the region from the economic returns of clustering.

¹²Construction spending includes the purchase of land.

¹³Spillover impacts include indirect and induced impacts.

Executive Summary

- Wages and salaries gains.
 - o Manufacturing sector, \$38.9 million.
 - o Healthcare providers, \$1.8 million.
 - o Retail trade, \$1.3 million.
 - o Wholesale trade, \$1.2 million.
 - o Construction industry, \$928.9 thousand.
 - o Professional, scientific and technical services firms, \$748.3 thousand.
 - o Finance and insurance firms, \$409.8 thousand.
 - o Other regional industries, \$5.3 million.
- Employment additions:
 - o Manufacturing sector, 430.6 jobs with average annual salary of \$90,293.
 - o Retail trade, 53.5 jobs with an average annual salary of \$23,517.
 - o Healthcare providers, 43.7 jobs with an average annual salary of \$40,611.
 - o Construction industry, 25.4 jobs with an average annual salary of \$36,521.
 - o Wholesale trade, 21.9 jobs with an average annual salary of \$56,062.
 - o Professional, scientific and technical services firms, 20.1 jobs with an average annual salary of \$37,266.
 - o Finance and insurance firms, 10.3 jobs with an average annual salary of \$39,929.
 - o Other regional industries, 179.8 jobs with an average annual salary of \$29,554.



Valero Renewables

■ For state and local tax collections: It is estimated that the ICGI bioenergy firms accounted for more than \$10.8 million in state and local tax collections for 2013 as follows:

- Property taxes of \$3.7 million.
- A rise in sales taxes of \$3.6 million which includes \$0.8 million in local option sales taxes..
- An additional \$2.5 million in individual income taxes.
- Increased corporate income taxes of \$214.6 thousand.
- Other taxes and fees of \$744.9 thousand.

It is estimated that ICGI bioenergy firms accounted for more than \$10.8 million in state and local tax collections for 2013.

Executive Summary

IV. Estimated impact of ICGI on the region for 2014 -2018

If, as expected, ICGI replicates the operational capacity of the Blair biorefinery campus in Washington County, Nebraska, the following impacts will be experienced over the five-year period from 2014 through 2018.

Not including construction and infrastructure spending that will likely accompany growth, impacts will be as follows:

- An increase in economic activity, or sales, across the region of more than \$7.2 billion with county sales increases of:
 - o Boone County, almost \$52.0 million.
 - o Calhoun County, nearly \$328.4 million.
 - o Greene County, more than \$14.5 million.
 - o Hamilton County, nearly \$144.4 million.
 - o Humboldt County, over \$312.7 million.
 - o Pocahontas County, in excess of \$69.8 million.
 - o Webster County, nearly \$6.2 billion.
 - o Wright County, approximately \$117.1 million.

Between 2014 and 2018:

- Wage and salary increases will total \$679.5 million across the eight counties.
 - o Boone County, almost \$4.9 million.
 - o Calhoun County, nearly \$30.9 million.
 - o Greene County, almost \$1.4 million.
 - o Hamilton County, nearly \$13.6 million.
 - o Humboldt County, approximately \$29.4 million.
 - o Pocahontas County, almost \$6.6 million.
 - o Webster County, approximately \$581.9 million.
 - o Wright County, approximately \$11.0 million.

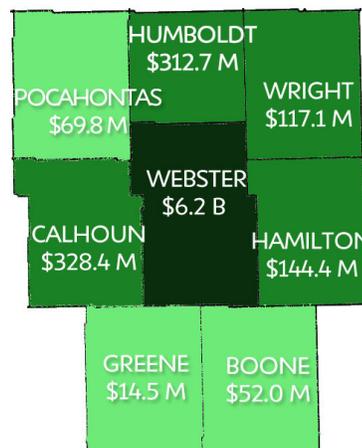
2,207.0 average jobs supported yearly, with impacts by counties of:

- Boone County, 15.9.
- Calhoun County, 100.2.
- Greene County, 4.4.
- Hamilton County, 44.1.
- Humboldt County, 95.4.
- Pocahontas County, 21.3.
- Webster County, 1,889.9.
- Wright County, 35.7.

State and local tax increases will rise during the five-year period by \$138.9 million, divided as follows:

- Property taxes will increase by nearly \$48.0 million.
- Sales taxes will increase by nearly \$46.2 million of which \$9.7 million are local option sales taxes.
- Individual income tax increase will increase by more than \$32.3 million.
- Corporate income taxes will rise by over \$2.7 million.
- Other taxes and fees will increase by almost \$9.7 million.

Overall (Total) Economic Impacts of ICGI by County, 2014-18



Chapter 1: Sustaining and Supporting Iowa's Economic Vision

The Greater Fort Dodge Growth Alliance (GFDGA)

The GFDGA, in its 2014 Strategic Plan, outlined a vision for the future of the region. This vision would build on previous success in the areas of :

- Combating population decline.
- Retention and expansion of local business and industry .
- Industrial recruitment.
- Supporting a vibrant downtown and Corridor of Commerce including a vital retail center.
- Supporting a high quality workforce, which includes maintaining and strengthening pre-k through post-secondary education and training.
- Providing quality healthcare.
- Creating modern infrastructure including efficient transportation and 21st century technology and telecommunications. Providing top-notch housing, recreation and entertainment and superior public safety.

In order to accomplish this vision, GFDGA has focused on development of the bioenergy industry to power overall growth. The remainder of this study will quantify and profile the impact of these efforts.

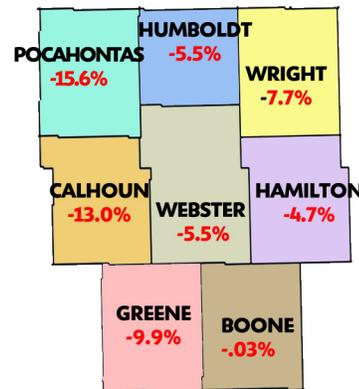


Downtown Fort Dodge, Iowa

The Region's Economic Track Record: 2000 - 2010

Combating a Declining Population. At the time of this report, counties in the region had all experienced significant population losses. The counties composing the region are displayed in Figure 1.1. From 2000 to 2010 population losses were: Webster County 5.5 percent, Hamilton County 4.7 percent, Greene County 9.9 percent, Humboldt County 5.5 percent, Calhoun County 13.0 percent, Boone County 0.3 percent, Pocahontas County 15.6 percent, and Wright County 7.7 percent.¹⁴

Figure 1.1: Population change 2000-2010

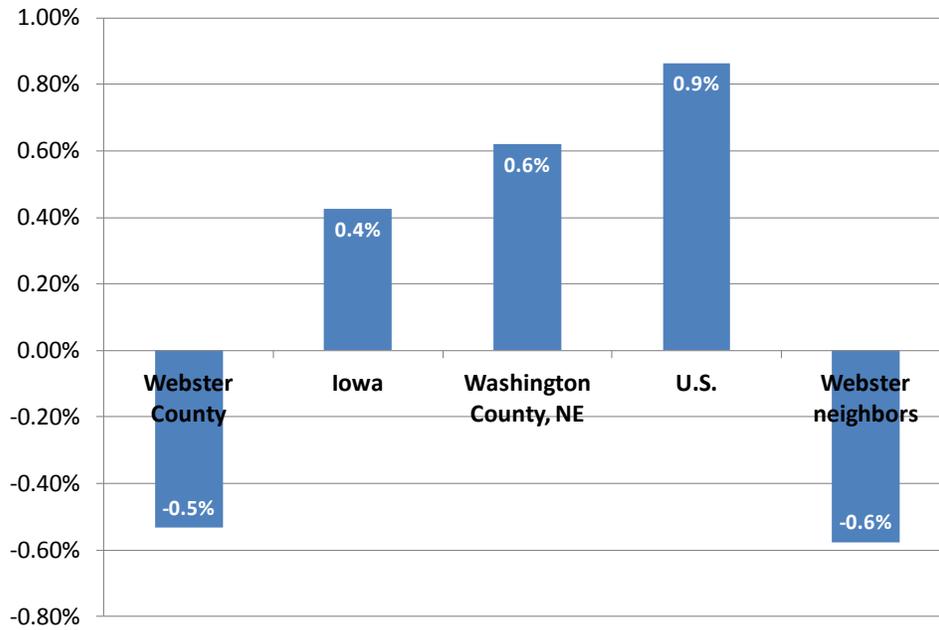


For selected areas, Figure 1.2 compares population change for 2001-13, and Figure 1.3 compares projected employment change for 2014-23.

¹⁴<http://www.indexmundi.com/facts/united-states/quick-facts/iowa/population-growth#map>

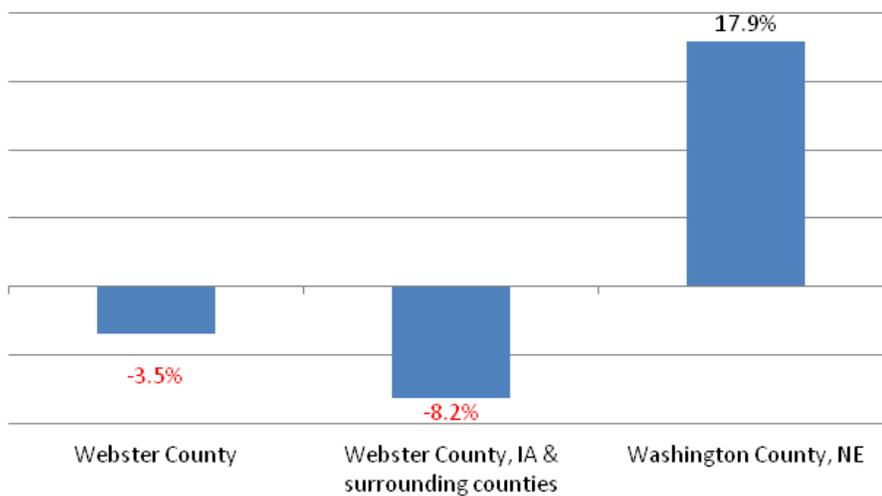
Chapter 1: Sustaining and Supporting Iowa's Economic Vision

Figure 1.2: Compound annual population growth, 2001-13



Source: U.S. Census Bureau

Figure 1.3: Percent change in employment 2014-2023



Source: MidAmerican Energy

Chapter 1: Sustaining and Supporting Iowa's Economic Vision

Figures 1.1, 1.2 and 1.3 support the economic need for greater growth in the region. The region has lagged the nation and Iowa in jobs, and population growth. Figure 1.2 shows annual population growth between 2001 and 2013 for Webster County, Iowa the U.S. and Webster County's geographic neighbors.¹⁵

Also included in Figures 1.2 and 1.3 are data for Washington County Nebraska, approximately 150 miles southwest of Fort Dodge, Iowa. This is included because one of the goals of the current commercial residents of ICGI is to match the experience of Cargill and collaborators at the Blair, Nebraska biorefinery campus in Washington County. This potential expansion, called the Growth Scenario, will be discussed in more detail later in this study.

As shown, without the planned development of ICGI, or other business attraction, there will continue to be substantial decreases in jobs for the region. Webster County would face a 3.5 percent decrease, Fort Dodge would experience a 19.3 percent decrease, and the region would see an 8.2 percent loss in employment.

On the other hand, substantial job gains are expected in Washington County, Nebraska, home to a fully-developed and functioning biorefinery campus—one very similar to that envisioned for ICGI. From 2014-2023, jobs are estimated to grow by 17.9 percent for the county, and 18.6 percent for the city of Blair where the biorefinery campus is located.



Novozymes in Blair, Nebraska

As shown, without the planned development of ICGI, or other business attraction, there will continue to be substantial decreases in jobs both for Webster county and the region.

¹⁵Counties bordering Webster County are: Boone, Calhoun, Greene, Hamilton, Humboldt, Pocahontas and Wright.

Chapter 1: Sustaining and Supporting Iowa's Economic Vision

A Changing Region

In 2010, a wet corn milling facility under construction by Tate & Lyle in Webster County was permanently shelved when the company changed its focus to specialty food ingredients. And with the 2011 closing of the Electrolux plant in Webster City, an important provider of jobs in Webster, Hamilton and Greene Counties, residents were moving to other areas where jobs were more plentiful, resulting in additional population losses.

To combat further loss, state, regional and local authorities and GFDGA began to target opportunities in an area where Iowa clearly stands out as a national leader—industries related to renewable energy. Iowa ranks first in the nation in the production of ethanol¹⁶ and is responsible for almost 25 percent of ethanol production in the U.S.



Cargill plant at ICGI

The area met with success in their recruitment of Cargill in 2011 to purchase and operate the corn wet mill ethanol facility in Webster County that had been idled by Tate & Lyle in 2010. In January 2012, it was announced that both Cargill and CJ Bio America would be locating in Webster County in ICGI.

Fundamental to the area's growth has been and will continue to be the economic success of the region's agriculture and energy related businesses. ICGI¹⁷ is an important element in delivering on this

promise. Currently the industrial residents of Cargill, CJ Bio America and Valero are laying the foundation for a new cooperative type of growth engine. By locating in close geographic proximity, these firms can benefit from the economic returns of clustering.

Operating in Webster County since 2005, Valero Renewables turns 43 million bushels of corn into 110 million gallons of denatured ethanol per year while processing 400,000 tons of distiller's grains. The company has the capacity to produce 120 million gallons of ethanol per year.¹⁸ In 2013 the Cargill plant joined Valero in the complex. Cargill, which began operations in November 2013, can produce up to 115 million gallons of ethanol per year, and uses up to 150,000 bushels of corn per day, producing a number of products including dextrose, ethanol and SweetBran feed for cattle.¹⁹

In a mutually beneficial situation, CJ Bio America constructed a facility adjacent to Cargill and immediately began to use Cargill's dextrose to manufacture amino acids used in swine and poultry feed.

Figure 1.4 on the following page depicts the current tenants of ICGI and the flow of commodities.

Iowa ranks first in the nation in the production of ethanol accounting for almost 25 percent of ethanol production in the U.S.

¹⁶ <http://www.iadg.com/iowa-advantages/renewable-energy.aspx> (accessed 1/28/14)

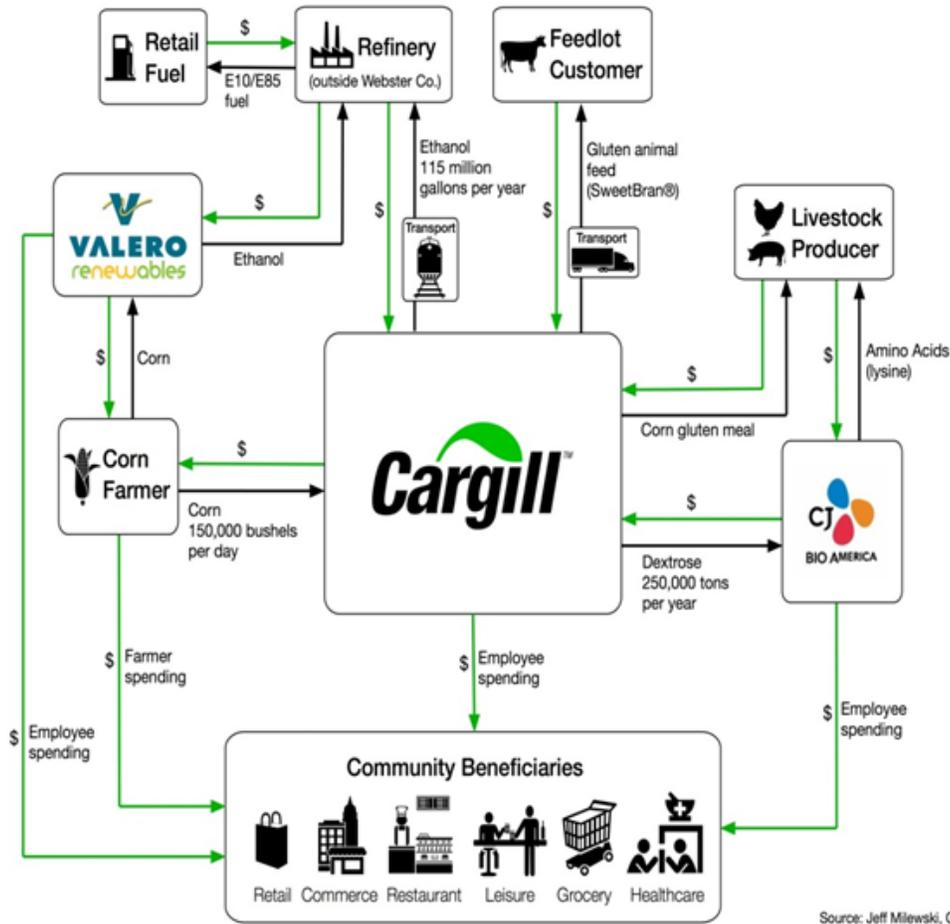
¹⁷ <https://www.greaterfortdodge.com/economic-development/available-buildings-a-sites.html>

¹⁸ <http://www.valero.com/ourbusiness/ourlocations/plants/pages/fortdodge.aspx>

¹⁹ <http://blogs.desmoinesregister.com/dmr/index.php/2013/11/06/cargill-cj-bio-america-plants-begin-production-in-fort-dodge/article>

Chapter 1: Sustaining and Supporting Iowa's Economic Vision

Figure 1.4: Current bioenergy industries located at Iowa's Crossroads of Global Innovation (ICGI)



Source: Jeff Milewski, Goss & Associates, March 2014

Chapter 1: Sustaining and Supporting Iowa's Economic Vision

Cargill stated a goal to match and potentially exceed the bioenergy development that been achieved at other fully-operational biorefinery campuses such as their location in Blair, Nebraska in Washington County.

The advantages of locating companies in the same industry in close geographic proximity to one another are several: 1) the output of Cargill is being delivered to one of their important customers, CJ Bio America, via pipeline, thus avoiding the cost of transportation via rail or truck; 2) drying and rehydrating products for the supplier and consumer; 3) firms can more successfully recruit workers to the region that are essential for greater growth; 4) over time, educational institutions such as Iowa Central Community College and Iowa State University can more effectively develop degrees, courses, certificates and training that match the needs of the industry.

All three current residents of ICGI – Cargill, CJ Bio America and Valero – as well as Poet Biorefining in Gowrie, Iowa In Webster County are in the bioenergy or chemical manufacturing industry as classified by the U.S. Census Bureau.²⁰

According to Nicole Reichert, senior communications counselor for Cargill Corn Milling of North America, “We see an opportunity in Fort Dodge to replicate the success we have had at our Blair, Neb., and Eddyville, Iowa, biorefinery campuses.”

Furthermore, according to Reichert, Cargill hopes to grow additional biobased businesses at the site in the coming years. At the Blair facility, Cargill has partnered with a number of other industry leaders including Novozymes, Evonik and also a Cargill-owned bioplastics facility, Natureworks LLC, to produce a wide range of products, from bioplastics to animal feed additives and catalysts.

Between 2004 and 2014, Washington County expanded bioenergy jobs by a compound annual growth rate of 19.2 percent.

Over time, educational institutions such as Iowa Central Community College and Iowa State University can more effectively develop degrees, courses, certificates and training that match the needs to the industry.

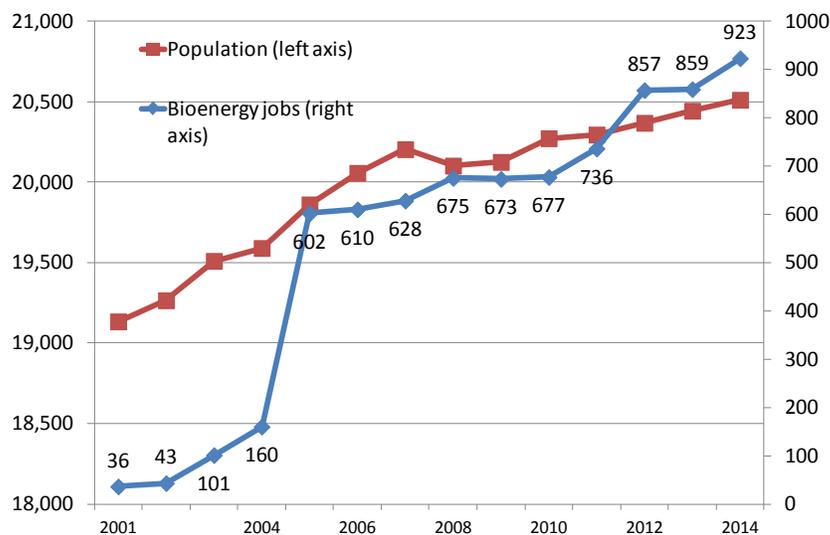
According to Nicole Reichert, senior communications counselor for Cargill Corn Milling of North America, “We see an opportunity in Fort Dodge to replicate the success we have had at our Blair, Neb., and Eddyville, Iowa, biorefinery campuses.”

325. This subsector does not include all industries transforming raw materials by a chemical process.

Chapter 1: Sustaining and Supporting Iowa's Economic Vision

Figure 1.5 shows how the Cargill operation at the Blair, Nebraska biorefinery campus has affected the total number of bioenergy jobs and population in Washington County, Nebraska. In Washington County, Cargill's expansion began in 2005. However, Cargill accounted for fewer than 100 of the added chemical jobs. Between 2004 and 2014, population and bioenergy manufacturing jobs rose by 4.7 percent and 476.9 percent, respectively, as a result of Cargill and related industry operations. Furthermore, total job growth was 5.6 percent during this same period of time. Thus, one can see the spillover jobs created by the initial jobs.

Figure 1.5: Bioenergy industry and population growth, Washington County, Nebraska, 2001-14



Source: U.S. Population, U.S. Census Bureau; Jobs, U.S. Bureau of Economic Analysis

Measuring the Bioenergy Industry Importance

Location Quotients. The clustering of jobs around the bioenergy industry development that took place in Washington County Nebraska with the growth of the Blair, Nebraska biorefinery campus can be measured with the use of a location quotient (LQ). Economic development researchers have used LQs as a valuable tool for quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. An LQ of 1.0 indicates that the area has the same degree of clustering as the nation. An LQ greater than 1.0 indicates that the area has a greater degree of clustering in a particular industry than the nation.²¹ This indicates that the region is a net exporter of products of this industry to the rest of the nation. An LQ less than 1.0 indicates that the area has a lower degree of clustering than the nation and is a net importer of products of a particular industry.²²

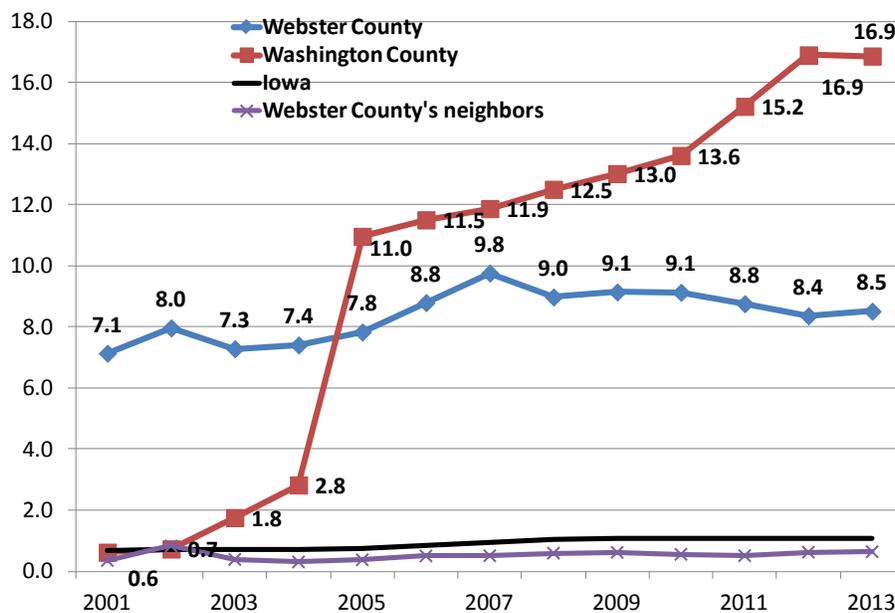
²¹A location quotient is calculated by dividing the percent of total county employment clustered in bioenergy divided by the percent of total U.S. employment in chemical manufacturing.

²²<http://www.economicmodeling.com/2011/10/14/understanding-location-quotient-2>

Chapter 1: Sustaining and Supporting Iowa's Economic Vision

Figure 1.6 shows location quotients for the comparison areas between 2001 and 2013. As shown, Washington County, home to the fully-developed and operational Blair biorefinery campus has a higher location quotient than Webster County. However, Webster county's LQ was higher than Iowa overall and Webster County's neighbors. This indicates that Webster County is a bigger net exporter of bioenergy products than Iowa, or its neighbors. For 2013, Webster County's LQ of 8.5 indicates that the county is deriving significant economic benefit from the export of bioenergy products.

Figure 1.6: Location quotients, bioenergy industry, 2001-13



Source: U.S. Population, U.S. Census Bureau; Jobs, U.S. Bureau of Economic Analysis

For 2013, Webster County's LQ of 8.5 indicates that the county is deriving significant economic benefit from the export of bioenergy products.

Chapter 1: Sustaining and Supporting Iowa's Economic Vision

County to County Commuting Patterns

As a result of Webster County's export of bioenergy products, workers are commuting to Webster County from other counties in the region. Table 1.1 lists the volume of workers commuting into Webster County in 2010. Data show that of Webster County's 15,501 private workers in 2010, approximately 23.7 percent reside outside the county. Per 1,000 in population, Calhoun County with 93.4 had the highest proportion of their working-age population commuting into Webster County. Data indicate that approximately 18.4 percent of the working-age population in neighboring counties commute to Webster County for work. Also, 8.0 percent of Webster County workers commute to other counties for work.

Table 1.1: Webster County workers commuting from other counties, 2010

County	Commuters		Working-age population	
	2010	2010	2010	Per 1,000 Residents
Boone	143	26,306	5.4	
Calhoun	903	9,670	93.4	
Greene	40	9,336	4.3	
Hamilton	397	15,673	25.3	
Humboldt	860	9,815	87.6	
Pocahontas	192	7,310	26.3	
Wright	322	13,229	24.3	
Other Iowa and U.S. counties	811	n.a.		
Total commuters from other counties into Webster County	3,668			

Source: U.S. Census Bureau

Data indicate that approximately 18.4 percent of the working-age population in neighboring counties commute into Webster County for work.

Chapter 1: Sustaining and Supporting Iowa’s Economic Vision

Regardless of the location of the new firm or the expansion of existing firms, the impacts will be experienced across the eight-county region. These impacts are due primarily to employees residing in one county but working in other counties in the region.

Table 1.2 indicates the percent of total regional cross-county commuters by county for 2010.

Table 1.2: Percent of workers commuting to other counties in the region, 2010	
County	Percent of workers commuting to other counties in the region for work
Boone	2.5%
Calhoun	19.6%
Greene	5.7%
Hamilton	7.2%
Humboldt	20.1%
Pocahontas	12.3%
Webster	8.0%
Wright	11.7%

Source: 2010 Decennial U.S. Census

Summary

Given the readiness, rural location, and the availability of producers to provide feed stocks, the potential to reach or exceed the operational performance of the Blair biorefinery complex is a viable goal. Chapter 3 of this study examines potential economic impacts assuming ICGI becomes a fully-operational bioenergy industrial complex, similar to the Blair biorefinery campus in Washington County Nebraska.

The next chapter identifies some of the qualitative impacts of bioenergy development in the region.

Chapter 2: The Qualitative Impacts of Bioenergy Development

In 2012, the Fort Dodge and Webster County Development Corporation and the Fort Dodge Area Chamber of Commerce merged into one entity, the Greater Fort Dodge Growth Alliance (GFDGA). This restructuring of resources helps to refine and expand the vision for economic development in the region, complementary with the goals of the Regional Innovation Grant (RIG)²³ to align workforce and economic development resources at the regional level.



The newly-organized GFDGA works with community leaders and agencies in the region, and the Mid Iowa Growth Partnership (MIGP) to address the needs of these new companies as well as existing businesses needs in the areas of skilled worker shortages and recruitment, housing and quality of life issues.

With the addition of the new plants at ICGI, by August 2013, the Fort Dodge unemployment rate had dropped to 5.8 percent after the previous year's high of 8.2 percent.

In November 2013, with the assistance of GFDGA, along with state and county officials, Cargill Corn Milling North America began operations at the ICGI in Webster County.²⁴ Together, Cargill and CJ Bio America invested in excess of \$500 million into ICGI and the community, and planned to employ roughly 320 workers.²⁵ According to Governor Branstad, "The Fort Dodge facility will create over 100 (Cargill) jobs in Webster County, and the addition of CJ will lead to further job growth in Fort Dodge."²⁶



CJ Bio America Groundbreaking at ICGI

Cargill and CJ Bio America joined Valero Renewables as resident firms in ICGI. Valero, a bio-refinery, has been located in Webster County since 2005. With the addition of the new plants at ICGI, by August 2013, the Fort Dodge unemployment rate had dropped to 5.8 percent after the previous year's high of 8.2 percent.²⁷

²⁴<http://blogs.desmoinesregister.com/dmr/index.php/2013/11/06/cargill-cj-bio-america-plants-begin-production-in-fort-dodge/article>

²⁵<http://blogs.desmoinesregister.com/dmr/index.php/2013/11/06/cargill-cj-bio-america-plants-begin-production-in-fort-dodge/article>

²⁶<http://www.cargill.com/news/releases/2013/NA3080855.jsp>

²⁷<http://blogs.desmoinesregister.com/dmr/index.php/2013/11/06/cargill-cj-bio-america-plants-begin-production-in-fort-dodge/article>

²³http://www.midiowagrowth.com/documents_not-protected/RIG_Fact_Sheet.pdf

Chapter 2: The Qualitative Impacts of Bioenergy Development

Iowa’s Crossroads for Global Innovation (ICGI)

ICGI, a vital component of “Iowa’s Crossroads of Global Innovation,” is located seven miles west of Fort Dodge and currently has approximately 600 acres of land available for development. Figure 2.1 shows the current ICGI boundaries in a future land use map indicating the portion of the site that is shovel-ready as well as additional land to the west to accommodate longer-term opportunities.

Figure 2.1: Iowa’s Crossroads of Global Innovation



Source: GFDGA

As the host to Valero, Cargill and CJ Bio America, ICGI attracts businesses and industry, and boosts employment for the county, region and state. The expansion of business in ICGI after the addition of Cargill and CJ Bio America was quickly followed by growth in area businesses and is decreasing the outflow of funds to areas outside Webster County and the state of Iowa. CJ Bio America has invested \$323 million in the community to date, adding 181 jobs for the period of 2012-2014, and Cargill has invested approximately \$200 million to date with 134 jobs created for the same time period.²⁸

CJ Bio America has invested \$323 million in the community to date, adding 181 jobs for the period of 2012-2014.

²⁸<http://www.messengernews.net/page/content.detail/id/553005/Job-security.html?nav=5010>. At the time of publication of this article Cargill had invested \$134 million.

Chapter 2: The Qualitative Impacts of Bioenergy Development

As illustrated in Table 2.1, positive economic impact of ICGI in 2012-2013 on Webster County was evidenced in part by the addition of a hotel, a family entertainment center, a retail drug store, an automobile dealer, a retail clothing store, a federal express location and six new eating establishments.

Table 2.1: A sampling of Webster County business establishments opened in 2012-13 accompanying bioenergy industry expansion.	
Hotels	 
Family entertainment center	
Retail drug store	
Automobile dealership	
Retail and department stores	 
Federal Express	
Eating establishments	     
Source: Greater Fort Dodge Growth Alliance	

Chapter 2: The Qualitative Impacts of Bioenergy Development

Economic impacts of Bioenergy Industry Development at ICGI

ICGI site development and operations impact jobs and income for residents of the region. This is accomplished through spending for locally-supplied goods and services affecting sales, employment levels, and subsequent tax payments to the city, county and state government entities.

There are also impacts on local business firms, industries, eating and drinking establishments, organizations and facilities, accommodations, construction, wholesale trade and other operations. In addition, there are impacts on basic sector firms, including manufacturing, customer service centers, agriculture, and wholesalers due to bioenergy industry development and operations at ICGI.

ICGI Readiness

ICGI has been fully vetted as a highly-desirable site for the location or relocation of industrial facilities.

Professionals determined the area's readiness for industrial development through an extensive and detailed property assessment of the 447-acre site west of Cargill, along with identification of transportation and utility infrastructure. ICGI is bordered by State Highway 7 to the north with close proximity to U.S. 169. To the east it is bordered by the Union Pacific Railroad, and the Canadian National Railroad to the south.²⁹

The site also has airport accessibility with Fort Dodge Regional Airport located one mile north of the city. In addition, Webster County is within the service area of Foreign Trade Zone #107 (Des Moines in Polk County), and in 2012 was approved access to FTZ #107 through a site framework procedure.^{30, 31}

²⁹<http://www.greaterfortdodge.com/economic-development/available-buildings-a-sites.html>

³⁰http://www.greaterfortdodge.com/images/pdf_cd/industrial_development_summary_review.pdf

³¹[https://www.federalregister.gov/articles/2012/10/01/2012-24125/reorganization-of-foreign-trade-](https://www.federalregister.gov/articles/2012/10/01/2012-24125/reorganization-of-foreign-trade-zone-107-under-alternative-site-framework-polk-county-ia)

To ensure ample passenger service to and from Webster County, and to accommodate future growth, GFDGA worked with the airport to develop a consumer survey with 322 respondents to help identify needs. As they work to accommodate growth, GFDGA is in the process of identifying another location for the next industrial development site while at the same time working with Canadian National, rail engineers, and Webster County regarding the dual class 1 rail service to ICGI.³²



Improvements being made at Cargill plant in ICGI

GFDGA also participates in post-secondary education career fairs at Iowa State University, University of Iowa, University of Northern Iowa and Iowa Central Community College, and collected more than 100 resumes for community positions. Internship and externships are promoted and supported and customized tours are provided for candidates and new employees at Nestlé, USG, Koch, C&S Products, Cargill, CJ Bio America, Valero, and US Water.

In order to support bioenergy development, GFDGA partnered with the Fort Dodge Messenger to perform outreach education regarding manufacturers in the region. They also created a collection of resources that includes job fairs, daycare providers and more, as well as marketing materials in both online and video format that a company can use to showcase the community.

[zone-107-under-alternative-site-framework-polk-county-ia](http://www.federalregister.gov/articles/2012/10/01/2012-24125/reorganization-of-foreign-trade-zone-107-under-alternative-site-framework-polk-county-ia)

³²<http://blog.iowalinkedup.org/2013/10/30/iowa-linkedup-forum-rescheduled-for-december-12/>

Chapter 2: The Qualitative Impacts of Bioenergy Development

Using ICGI to Market the Region

GFDGA staff makes every effort to discover newer and better ways to highlight the region and ICGI as the right place for new bioenergy development. Through their presence at the Bio International Convention and the World Congress on Industrial Biotechnology and Bioprocessing for the past two years, as well as participation in the Institute of Food Technologists (IFT), GFDGA maintains a high level of awareness of the challenges and requirements in sustainable energy industries.

As they maintain continual contact with industry leaders as well as travel throughout the Midwest to sell others on the community, region and state, GFDGA is determined to keep potential businesses informed about the suitability of ICGI for their facilities.



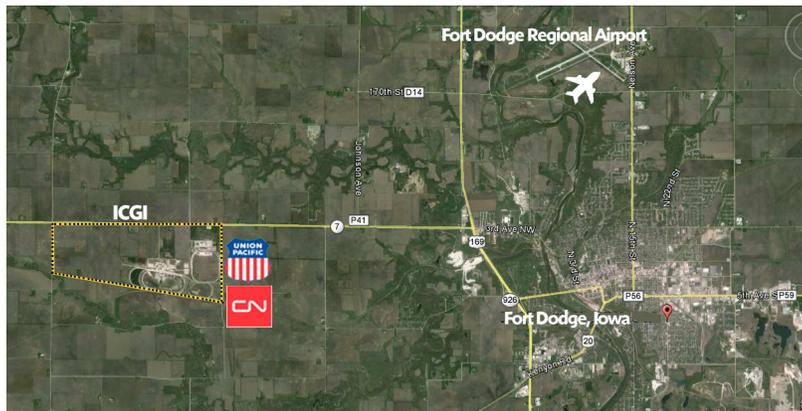
Market on Central, Fort Dodge, Iowa

Chapter 2: The Qualitative Impacts of Bioenergy Development

The Impact of Bioenergy Industries on the Economy

ICGI is among the most suitable locations in the U.S. for hosting bioenergy industries. The site is an urban industrial park adjacent to a rural area, with airport accessibility, served by dual rail, with ample producers to provide feed stocks for co-locating companies. Only five such sites exist in the nation. Figure 2.2 shows the proximity of ICGI to rail, rural and urban areas, and the Fort Dodge Regional Airport.

Figure 2.2: ICGI proximity map to rail, rural and urban areas and airport



Evidence of the benefits of bioenergy on job creation can be seen at the Blair, Nebraska biorefinery campus, in Washington County, located 150 miles southwest of Fort Dodge, Iowa, and shown in Figure 2.3. In 1995, Cargill opened a plant in the area, and by 2010 this bioenergy complex was hosting companies from Germany, the Netherlands and Denmark.³³ Today it is a fully functioning bioenergy industrial campus. The effectiveness of this complex has resulted in net job growth of more than 2,800 percent for the bioenergy industry in Washington County, Nebraska, home to the campus.

Figure 2.3: Blair BioRefinery Campus in Washington County, Nebraska



³³<http://www.wowt.com/home/headlines/155822045.html>

Chapter 2: The Qualitative Impacts of Bioenergy Development

Brain Gain

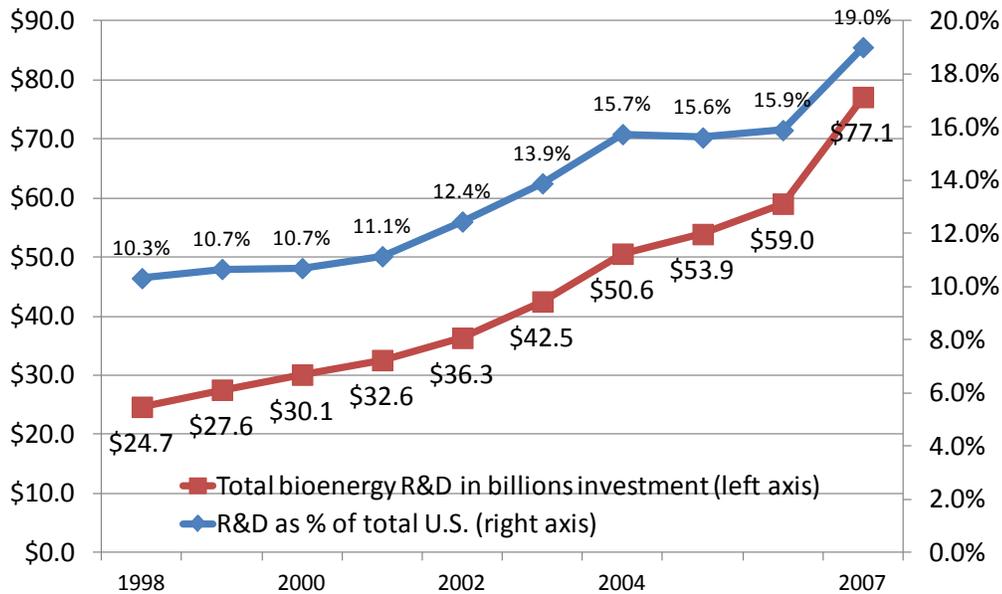
According to a study by the University of Iowa, from 1995-2000, Iowa was second only to North Dakota in net out-migration of young, single, college-educated residents. Citing a report provided by the Finance Authority of Maine, the study indicated that brain drain can be curbed through marketing, program and financial incentives, increased employment opportunities and greater social opportunities and cultural diversity.³⁴

With the entry of Cargill and CJ Bio America, along with the presence of Valero Renewables and Poet Biorefining, the employment opportunities at bioenergy industries located at ICGI and throughout the region have already begun to reduce the net population losses.

Companies in ICGI and other locations in the region have worked with GFDGA to expand the number of area residents possessing higher skills and educational credentials. A larger share of graduates from local schools and colleges remaining in the area will add economic vitality of the region and to the state.

The bioenergy industry is a major contributor to research and development (R&D) spending in the nation. Figure 2.4 profiles this spending from 1998 to 2007. As listed, bioenergy's share of U.S. R&D spending rose from 10.3 percent in 1998 to 19.0 percent in 2007. In billions of dollars of spending, R&D spending soared from \$24.7 billion in 1998 to \$77.1 billion in 2007.

Figure 2.4: Research & development spending for bioenergy industry, 1998-2007



Source: U.S. BEA

³⁴<http://www.uiowa.edu/~ican/Papers%202006/brainrain122806.p>

Chapter 2: The Qualitative Impacts of Bioenergy Development

A recent editorial in the Omaha World-Herald entitled “Ag-industry opportunities” highlighted the growth in agricultural education offerings in response to the projected demand for agriculture industry scientists in the coming years.³⁵ The editorial came on the heels of the release of results of a survey conducted by the Coalition for a Sustainable Agriculture Workforce which indicated that major companies such as Cargill, Monsanto, and Kellogg plan to increase their employment of ag scientists by 13 percent through 2015 and are concerned about a lack of trained personnel to meet their needs.

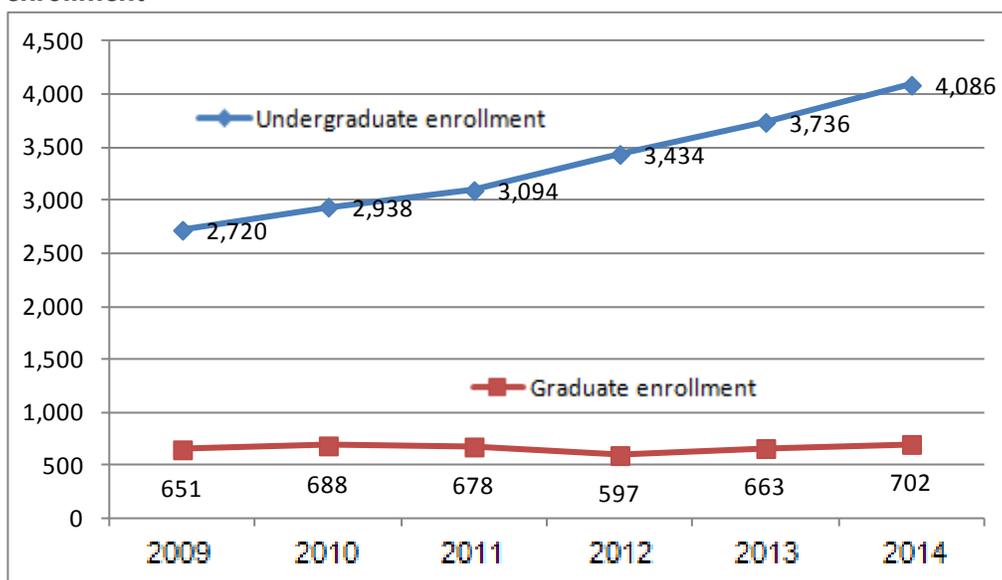
According to Dale Gruis, an Iowa Department of Education consultant, “Iowa State University’s College of Agriculture and Life Sciences had record student enrollment this year. A few years ago, because agriculture has always been inherently strong in the biological sciences, ISU changed the name from the ‘College of Agriculture’ to the ‘College of Agriculture and Life Sciences.’”

Figure 2.5 portrays the college’s enrollment growth over the past five years – a 50.2 percent increase from 2009 to 2014 in undergraduate enrollment and 7.8 percent growth over the same period for its graduate programs.

Some of the programs for which enrollment increases are particularly noteworthy are the “agriculture and life sciences education,” “agricultural business,” and “agricultural systems technology” at the undergraduate level, and “agricultural education and studies” and “agronomy” at the graduate level.

Gruis also indicated, “Many states have had shortages of high school agricultural education instructors for several years, and as a result, several agricultural education programs across the nation are in jeopardy or have been discontinued. Iowa has luckily had enough pre-service ag ed majors to fill vacancies, but I am not confident this will continue. Agribusinesses are hiring a significant number of majors, often before the college student completes student teaching to acquire their teaching endorsement(s).”

Figure 2.5: Iowa State University College of Agriculture and Life Sciences enrollment



Source: <http://www.registrar.iastate.edu/enrollment/StatsMajor>

³⁵<http://www.omaha.com/article/20140331/NEWS08/140339956/1677>

Chapter 2: The Qualitative Impacts of Bioenergy Development

As a result of the growing demand for ag educators, Iowa applied for and was one of 10 states selected to receive a “Teach Ag” grant through the National Association of Agricultural Educators (NAAE). States selected to receive these grants will serve as models for assessing, planning and implementing initiatives that will deliver results. They will receive support and guidance from the National Teach Ag Campaign for at least two years and will share their successes and challenges with other states.³⁶ “We are looking forward to working with neighboring states (such as Nebraska) to develop strategies to meet the demand,” Gruis said.

Gruis, who consults with and approves high school and community college agriculture programs, stated that, “Five high schools that have not had agricultural education programs previously have either started programs this school year or plan to start an agricultural education program in the next few years. For example, the Independence School District revived its agricultural education program last year after having not offered agricultural education courses for roughly 20 years; before the 2013-2014 school year started, approximately 150 students had enrolled in courses.”

And in 2014, membership in the Iowa FFA Association surpassed the all time record. Membership currently stands at 14,207 and is expected to grow before Iowa State Fair entries are completed. This is the highest membership for the Iowa FFA Association since the charter of the organization in 1929; the previous record was set during the 1977-78 school year with 14,204 Iowa FFA members.³⁷

³⁶[http://www.naae.org/teachag/resources/State%20Teach%20Ag%20Results%20Program%20\(STAR\)%20Overview%20.pdf](http://www.naae.org/teachag/resources/State%20Teach%20Ag%20Results%20Program%20(STAR)%20Overview%20.pdf)

³⁷<http://www.iowaffa.com/CMDocs/IowaFFAassociation/Press%20Releases/2014%20Press%20Releases/2014%20FFA%20Membership%20Announcement.pdf>

Self-sustaining Bioscience and Biotechnology Education for the Region

Iowa Central Community College provides skilled workers for agriculture-based industries in the region and beyond through its AAS Biotechnology degree.³⁸ The program offers hands-on training for specialized occupations related to the manufacture of biologically-based products.

The new Process Technology Program at Iowa Central teaches technicians to monitor the use of raw materials during production to determine ways to turn the materials or byproducts into useful and/or consumable products.

Students earning an AAS degree are taught both in the classroom and in the field in order to achieve familiarity with the many systems involved in the production process.³⁹

Iowa Central Community College’s Biosciences and Health Sciences building is an innovative training resource for students in Bioscience and Biotechnology. The newly-constructed building houses a nationally-recognized fuels testing lab that is ISO-9001:2008 accredited. The Iowa Central Fuel Testing Laboratory serves the fuel/biofuel industry by testing and analyzing a wide variety of fuels



Iowa Central Community College

³⁸<http://www.iowacentral.edu/science/biotechnology/index.asp>

³⁹http://www.iowacentral.edu/industrial_technology/process_technology/index.asp

Chapter 2: The Qualitative Impacts of Bioenergy Development

including but not limited to, biodiesel, diesel, ethanol, gasoline and home heating oils. As part of ICC's Biofuels Technology program, these testing services utilize ICC's testing instruments as well as ICC student interns to assist professionals in operating this self-sustaining business. In addition, the program's laboratory is the first in the nation to have achieved BQ-9000 Accreditation for biodiesel.

The Fuel Testing Laboratory's local, national and international customers include fuel producers, marketers, laboratories, consultants, transportation organizations, research firms and consumers. Through the Fuel Testing Laboratory, the student teachers utilize state-of-the-art instruments to provide biodiesel analyses according to ASTM methods.⁴⁰

Specialized training for individuals in the region helps fill bioenergy jobs as they become available. For example, in early 2013 as CJ Bio America was preparing to begin operations, all new hires underwent a rigorous training program administered by Iowa Central Community College - East Campus in their facility.⁴¹ In addition, Iowa Central obtained training funding of \$1 million for each of the ICGI companies through the Iowa New Jobs Training Program to aid in continuing the Industrial Training Program.⁴²

Clearly, Iowa ag education has been gearing up for – and benefiting in its own right – by the boon in ag industry development such as that taking place at ICGI as well as other locations in the region.



Iowa Central Community College Fuel Testing Laboratory

⁴⁰<http://www.iowacentral.edu/fueltesting/index.asp>

⁴¹http://issuu.com/messengernews/docs/cj_cargill_pages

⁴²Shelly Blunk, Director of Economic Development and Industrial Training at Iowa Central Community College.

Chapter 2: The Qualitative Impacts of Bioenergy Development

ICGI Supports Infrastructure

The presence of bioenergy industries located at ICGI has a profound impact on the ability to provide and maintain modern infrastructure in Webster County. In 2013, city officials toured construction progress of a new \$70 million water and waste water system designed to allow waste water to travel from ICGI to the water treatment plant in Fort Dodge. The treated water will then travel back through the system to industrial site. The additions and upgrades to the system, including a new generator will go far beyond benefiting the industrial center.

The improvements allow the water facility to keep the power plant up and running for the entire city in the event of power failure, while providing the capacity for further additions of additional pumps and reservoirs that may be needed in the future.⁴³ Due to upgrades made as a result of the

presence of Valero, Cargill and CJ Bio America, millions of dollars of improvements have resulted from the implementation of this state-of-the-art design in Webster County.⁴⁴

Infrastructure spending, unlike other types of spending by ICGI such as land, construction and equipment, provides important community resources that would otherwise be insufficient, or would be funded through taxpayer dollars or debt.

Not only have industries located in the ICGI provided substantial funds for a state-of-the-art water treatment system that serves the city of Fort Dodge, companies have also built additional railroads and streets that add further value to the industrial center itself and the region. This increases the attractiveness of the center for other bioenergy companies that consider locating in Webster County.

The next chapter examines the economic impact of industrial expansion in the region.



John Pray Wastewater Treatment Plant in Fort Dodge,

⁴³<http://www.messengernews.net/page/content.detail/id/569277.html>

⁴⁴<http://www.messengernews.net/page/content.detail/id/569277.html>

Chapter 3: Economic Impacts of Bioenergy Industries for the Region 2013-2018

Measuring Economic Impacts

Large portions of the impacts of ICGI bio-energy and other business and industrial development are made in the local economy. That portion spent locally adds to community income. Economic impacts that take place outside the local economy, for example spending in Minneapolis, are called leakages and reduce overall impacts. They are excluded when estimating economic impacts of the local area.

Additionally, industrial attraction and expansion increase retail sales in the region as non-resident employees and visitors spend a portion of their wages in the region. In other words, the ICGI bioenergy and other industrial development contributes to the region’s export of retail goods.

Appendix B of this report details the three components of the total economic impact: the direct economic impact, the indirect economic impact, and the induced economic impact.

Table 3.1 lists overall impacts indicating that the attraction of a 50 employee company to the region would generate almost \$43.3 million in sales, more than \$6.4 million in wages and salaries, and approximately 99.7 jobs.

Overall Impacts on the Region - 2013

This report estimates the impact of two options. First, the impacts of yearly operations on the region as the result of the attraction of a 50-employee manufacturing firm, or the expansion of an existing manufacturing plant by 50 employees, are estimated. Second, the impacts of yearly operations of the three firms in ICGI are estimated. No construction or capital investment impacts are listed in Table 3.1.

Appendix A contains estimated direct impacts.

Table 3.1: 2013 estimated impacts of regional manufacturing development (2013 dollars)

	50-employee manufacturer	ICGI
Sales or business volume	\$43,269,388	\$340,962,779
Wages & salaries	\$6,413,889	\$50,541,445
Jobs	99.7	785.3

For 2013, it is estimated that ICGI produced almost \$341.0 million in sales, more than \$50.5 million in wages and salaries and approximately 785.3 jobs.

Chapter 3: Economic Impacts of Bioenergy Industries for the Region 2013-2018

Estimated impacts of a 50-job manufacturer on industry sales, wages and jobs

Tables 3.2 and 3.3 list estimated impacts for a 50-job manufacturer by industry for 2013. As indicated, in terms of the top five industries in sales or business activity, manufacturing produces the largest impacts, followed by government, wholesale trade, healthcare services, and retail trade.

Table 3.2: 2013 estimated impacts of regional manufacturing development on industry sales (50-job manufacturer)

Industry	Sales	Wages & salaries	Jobs
Manufacturing	\$39,508,313	\$4,933,925	54.6
Government	\$585,995	\$226,031	4.8
Wholesale Trade	\$422,809	\$155,551	2.8
Health Care Services	\$408,876	\$225,363	5.5
Retail Trade	\$393,925	\$159,798	6.8
Transportation and Warehousing	\$306,684	\$99,304	2.2
Construction	\$249,431	\$117,877	3.2
Finance and insurance	\$193,305	\$52,002	1.3
Utilities	\$178,328	\$36,554	0.4
Professional, Scientific, & Technical Services	\$170,509	\$94,959	2.5
Information	\$161,945	\$37,020	1.1
Other Services (except Public Administration)	\$148,666	\$79,616	4.2
Accommodation & Food Services	\$138,511	\$46,374	3.5
Real Estate and Rental and Leasing	\$124,136	\$24,272	1.4
Waste Management and Remediation Services	\$111,259	\$55,755	2.9
Business home offices	\$56,976	\$31,115	0.2
Mining, Quarrying, and Oil and Gas Extraction	\$44,483	\$9,689	0.2
Agriculture, Forestry, Fishing and Hunting	\$24,128	\$6,554	0.2
Educational Services (Private)	\$22,169	\$14,094	0.7
Arts, Entertainment, and Recreation	\$18,940	\$8,036	1.0
Total impacts	\$43,269,388	\$6,413,889	99.7

Source: ICGI estimates—MidAmerican Energy; 50-employee manufacturer—Goss & Associates

Chapter 3: Economic Impacts of Bioenergy Industries for the Region 2013-2018

Estimated impacts of ICGI on industry sales, wages and jobs for 2013

Table 3.3: 2013 estimated impacts of ICGI on specific industry sales , wages and jobs

Industry	Sales	Wages & salaries	Jobs
Manufacturing	\$311,325,503	\$38,879,327	430.6
Government	\$4,617,639	\$1,781,128	37.9
Wholesale Trade	\$3,331,735	\$1,225,742	21.9
Health Care Services	\$3,221,945	\$1,775,864	43.7
Retail Trade	\$3,104,131	\$1,259,206	53.5
Transportation and Warehousing	\$2,416,673	\$782,513	17.4
Construction	\$1,965,518	\$928,870	25.4
Finance and insurance	\$1,523,241	\$409,777	10.3
Utilities	\$1,405,227	\$288,048	3.1
Professional, Scientific, & Technical Services	\$1,343,612	\$748,278	20.1
Information	\$1,276,123	\$291,714	8.5
Other Services (except Public Administration)	\$1,171,490	\$627,376	33.5
Accommodation & Food Services	\$1,091,464	\$365,426	27.2
Real Estate and Rental and Leasing	\$978,195	\$191,261	11.2
Waste Management and Remediation Services	\$876,720	\$439,349	23.2
Business home offices	\$448,969	\$245,188	1.8
Mining, Quarrying, and Oil and Gas Extraction	\$350,528	\$76,346	1.3
Agriculture, Forestry, Fishing and Hunting	\$190,129	\$51,644	1.8
Educational Services (Private)	\$174,694	\$111,063	5.4
Arts, Entertainment, and Recreation	\$149,243	\$63,323	7.6
Total impacts	\$340,962,779	\$50,541,445	785.3

Source: ICGI estimates—MidAmerican Energy; Goss & Associates

Chapter 3: Economic Impacts of Bioenergy Industries for the Region 2013-2018

Impact of construction and equipment spending for 2013

Tables 3.4 and 3.5 show the impacts of construction and equipment spending for the 50-job manufacturing firm and for ICGI for 2013 only.

Table 3.4: 2013 estimated construction and equipment impacts by industry on region (50-employee plant)

	Sales-business volume	Wages & salaries	Jobs
Construction	\$7,128,038	\$3,368,588	63.7
Wholesale Trade	\$22,298,274	\$8,202,816	120.7
Health Care and Social Assistance	\$775,141	\$426,282	10.4
Retail Trade	\$731,918	\$296,907	12.4
Finance and Insurance	\$377,412	\$98,277	2.4
Professional, Scientific, and Technical Services	\$354,616	\$198,358	5.2
Other industries	\$4,755,945	\$1,803,066	57.4
Total all industries	\$36,421,344	\$14,394,293	272.2

Source: Goss & Associates

Table 3.5: Impacts of construction and capital spending in ICGI, 2013

	Sales-business volume	Wages & salaries	Jobs
Construction	\$47,615,295	\$22,502,169	425.6
Wholesale Trade	\$148,952,470	\$54,794,808	806.2
Health Care and Social Assistance	\$5,177,945	\$2,847,566	69.5
Retail Trade	\$4,889,209	\$1,983,336	83.1
Finance and Insurance	\$2,521,111	\$656,488	16.1
Professional, Scientific, and Technical Services	\$2,368,838	\$1,325,029	34.8
Other industries	\$31,769,712	\$12,044,483	383.2
Total	\$243,294,581	\$96,153,880	1,818.4

Source: MidAmerican Energy

Chapter 3: Economic Impacts of Bioenergy Industries for the Region 2013-2018

Impact on State and Local Tax Collections

Not only do industries located in ICGI and recruited to the region pay taxes on profits and employer payroll taxes, their employees, residents and vendors, as well as businesses tied to these groups, pay state and local taxes. Table 3.6 provides detailed estimates of the impact on state and local taxes. As indicated, the outcome for 2013 totals more than \$10.8 million for a 50-employee manufacturer.

	50-employee manufacturer	ICGI
State taxes	\$787,300	\$6,204,000
Local taxes	\$588,900	\$4,640,000
Total state and local taxes	\$1,376,200	\$10,844,000

Goss & Associates calculations based on MidAmerican Energy Data



Ragbrai Activities, Pocahontas Iowa

Chapter 3: Economic Impacts of Bioenergy Industries for the Region 2013-2018

Return on Investment for the State of Iowa

The State of Iowa provided financing and tax credits associated with payment for construction, equipment and infrastructure associated with ICGI bioenergy industries. Table 3.7 summarizes these incentives which total \$27,045,284. The estimated payback period for state-provided taxpayer support is 4.5 years, assuming ICGI’s current employment.

The estimated payback period for state-provided taxpayer support is 4.5 years, assuming ICGI’s current employment.

Table 3.7: Funding programs and incentives

Funding program	Incentive
Direct state VAAPFAP financing CEBA (Community Betterment Account) PIAP (Physical Infrastructure Assistance Program)	\$3,810,280
Direct state HQJC (High Quality Job Creation) tax credits	\$11,070,620
State NJIP (New Jobs and Income Program) tax benefits	\$631,696
VAAPFAP (Value-Added Agricultural Products and Processes Financial Assistance Program)	\$1,940,571
Direct state VAAC loans	\$7,862,844
Direct state loans	\$1,729,273
Total	\$27,045,284

Source: Goss & Associates calculations, GFDGA and Iowa Economic Development Authority

Chapter 3: Economic Impacts of Bioenergy Industries for the Region 2013-2018

ICGI Impacts 2014-18

As identified earlier in this study, officials from Cargill as well as other Iowa economic development officials, expect the ICGI campus to grow and replicate the operational capacity of the Blair biorefinery campus in Washington County, Nebraska. This section of the study reflects the economic impacts for the eight-county growth region over a 5-year period if ICGI expanded at the same rate as the bioenergy industrial complex in Washington County, hereafter termed, the Growth Scenario.

Table 3.8 shows more than \$7.2 billion in overall economic growth for the region over the five-year period as a result of expanding ICGI operations. Importantly, these estimates do not include construction and infrastructure that will likely accompany the trend in operational capacity. The largest total impact takes place in the counties of Webster, Calhoun, and Humboldt with approximately \$6.2 billion, \$328.4 million, and \$312.7 million respectively. Other counties also experience significant impacts with Hamilton County output totaling \$144.4 million, Wright County with \$117.1 million, Pocahontas County with \$69.8 million, Boone County with \$52.0 million and Greene County accumulating \$14.5 million in economic impact.

Table 3.8: Estimated economic impact by county, 2014-18 Growth Scenario (2014 dollars)

County	2014	2015	2016	2017	2018	Total
Boone	\$7,048,364	\$8,398,399	\$10,421,286	\$11,923,750	\$14,207,611	\$51,999,411
Calhoun	\$44,508,203	\$53,033,249	\$65,807,140	\$75,294,731	\$89,716,595	\$328,359,919
Greene	\$1,971,570	\$2,349,203	\$2,915,045	\$3,335,315	\$3,974,157	\$14,545,290
Hamilton	\$19,567,837	\$23,315,836	\$28,931,821	\$33,102,999	\$39,443,509	\$144,362,002
Humboldt	\$42,388,765	\$50,507,856	\$62,673,467	\$71,709,267	\$85,444,377	\$312,723,732
Pocahontas	\$9,463,538	\$11,276,173	\$13,992,216	\$16,009,511	\$19,075,954	\$69,817,391
Webster	\$839,346,839	\$1,000,114,286	\$1,241,007,513	\$1,419,926,875	\$1,691,898,012	\$6,192,293,524
Wright	\$15,871,142	\$18,911,081	\$23,466,112	\$26,849,284	\$31,991,964	\$117,089,583
Totals	\$980,166,260	\$1,167,906,083	\$1,449,214,599	\$1,658,151,731	\$1,975,752,179	\$7,231,190,852

Source: U.S. Census Bureau and Goss & Associates Calculations

Chapter 3: Economic Impacts of Bioenergy Industries for the Region 2013-2018

Wage Impacts of ICGI 2014-18

Average wages and salaries generated across the eight-county region as a result of ICGI operations (Growth Scenario) are displayed in Table 3.9. As shown, total wages and salaries for the time period equal approximately \$679.5 million ranging from \$1.4 million for Greene County to \$581.9 million for Webster County.

Table 3.9: Wages and salaries by county, 2014-18, Growth Scenario (2014 dollars)

County	2014	2015	2016	2017	2018	Total
Boone	\$647,070	\$771,009	\$1,069,363	\$1,094,651	\$1,304,319	\$4,886,412
Calhoun	\$4,086,042	\$4,868,678	\$6,752,690	\$6,912,377	\$8,236,365	\$30,856,153
Greene	\$180,999	\$215,667	\$299,122	\$306,196	\$364,845	\$1,366,828
Hamilton	\$1,796,411	\$2,140,493	\$2,968,791	\$3,038,996	\$3,621,082	\$13,565,773
Humboldt	\$3,891,469	\$4,636,836	\$6,431,134	\$6,583,216	\$7,844,158	\$29,386,812
Pocahontas	\$868,793	\$1,035,201	\$1,435,788	\$1,469,741	\$1,751,254	\$6,560,777
Webster	\$77,055,610	\$91,814,747	\$127,343,921	\$130,355,332	\$155,323,442	\$581,893,052
Wright	\$1,457,038	\$1,736,118	\$2,407,936	\$2,464,879	\$2,936,999	\$11,002,969
Totals	\$89,983,432	\$107,218,748	\$148,708,745	\$152,225,388	\$181,382,463	\$679,518,776

Source: U.S. Census Bureau and Goss & Associates Calculations

Chapter 3: Economic Impacts of Bioenergy Industries for the Region 2013-2018

Jobs Impact of ICGI 2014-18

As listed in Table 3.10, ICGI supports an average of 2,207 employees per year for all counties in the region for the five-year period (Growth Scenario). Counties with the largest average yearly job impacts were Webster with 1,889.9, Calhoun with 100.2 and Humboldt with 95.4. Greene County will receive the smallest yearly job support at 4.4 jobs supported on average over the 5-year period.

Table 3.10: Yearly jobs supported by county, 2014-18, Growth Scenario

County	2014	2015	2016	2017	2018	Average jobs supported yearly
Boone	10.8	12.9	15.4	18.3	21.9	15.9
Calhoun	68.5	81.6	97.2	115.8	138.0	100.2
Greene	3.0	3.6	4.3	5.1	6.1	4.4
Hamilton	30.1	35.9	42.7	50.9	60.7	44.1
Humboldt	65.2	77.7	92.6	110.3	131.4	95.4
Pocahontas	14.6	17.3	20.7	24.6	29.3	21.3
Webster	1,291.1	1,538.4	1,833.1	2,184.2	2,602.6	1,889.9
Wright	24.4	29.1	34.7	41.3	49.2	35.7
Totals	1,507.7	1,796.5	2,140.6	2,550.7	3,039.2	2,207.0

Source: U.S. Census Bureau and Goss & Associates Calculations



New Cooperative, Inc.

Chapter 3: Economic Impacts of Bioenergy Industries for the Region 2013-2018

State and Local Tax Impacts

ICGI bioenergy employees, residents, and visitors pay state and local taxes, and through the spending related to industry construction and operations, state and local tax collections are created. Table 3.11 provides detailed estimates of the impact on state and local taxes for years 1-5 (Growth Scenario). As indicated, taxes collected will total approximately \$138.9 million.

Of that amount, nearly \$48.0 million is in the form of property taxes, sales taxes comprise \$46.2 million, individual income taxes total \$32.3 million, and corporate income tax collections total more than \$2.7 million. Other taxes and fees are estimated to total \$9.7 million.

Table 3.11: State and local taxes for the eight-state region, 2014-18, Growth Scenario (2014 dollars)

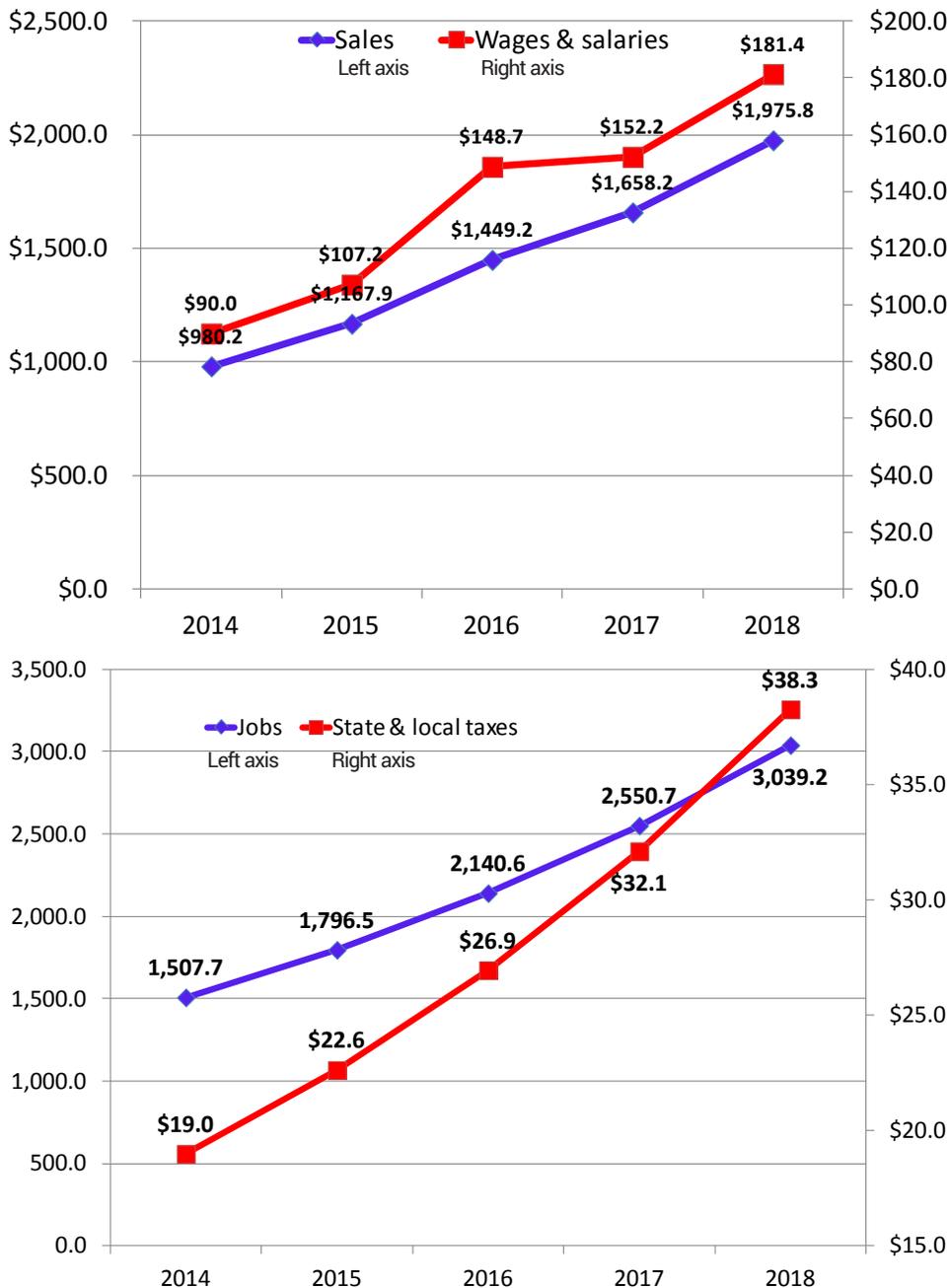
	2014	2015	2016	2017	2018	Total
Property taxes	\$6,556,791	\$7,812,671	\$9,309,100	\$11,092,153	\$13,216,732	\$47,987,447
Sales taxes	\$6,310,530	\$7,519,241	\$8,959,468	\$10,675,553	\$12,720,336	\$46,185,127
Individual income taxes	\$4,417,041	\$5,263,076	\$6,271,159	\$7,472,329	\$8,903,570	\$32,327,174
Corporate income taxes	\$375,556	\$447,490	\$533,202	\$635,331	\$757,021	\$2,748,600
Other taxes and fees	\$1,321,278	\$1,574,354	\$1,875,904	\$2,235,213	\$2,663,343	\$9,670,092
Total Taxes	\$18,981,196	\$22,616,832	\$26,948,833	\$32,110,578	\$38,261,001	\$138,918,440

Source: U.S. Census Bureau and Goss & Associates Calculations

Chapter 3: Economic Impacts of Bioenergy Industries for the Region 2013-2018

Figure 3.1 summarizes the estimated impact of ICGI assuming growth equal to that of the bioenergy industry in Washington County, Nebraska from 2014 to 2018 (growth scenario).

Figure 3.1: Estimated impact of ICGI, growth scenario assuming growth equal to that of the bioenergy industry in Washington County, Nebraska (in millions \$\$s), 2014-18



Summary

The eight-county north central Iowa growth region has proven to be one of the most suitable areas in the U.S. for hosting and supporting bioenergy industries. This assertion has been proven as the industry has become an engine of economic growth for the region over the past several years.

Furthermore, the growth that has been documented to date, along with the stated implication by industry experts that the region can meet or exceed the growth of a similar biorefinery complex in Washington County, Nebraska, exhibits great promise for the eight counties examined.



“The Future” Courtesy of Bob Wood

Appendices

Appendix A: The Importance of ICGI Spending on the Economy

Revenues from outside the region are more powerful than revenues of firms that deal in intra-city commerce in terms of job and income creation since a high proportion of these revenues are “new” to the area and are not offset by reduced spending in other area industries. This is the case with a significant share of ICGI bioenergy revenues.

Economic impacts identified in this study are short-run in nature and represent annual, recurring events. Indicators for long-run, more intangible impacts on the regional economy such as workforce development are recognized, but assignment of dollar values is outside the scope of this study. With regard to long-term, but less measurable impacts, the presence of ICGI increases the attractiveness of the community and encourages the startup and/or relocation of other businesses to the region. By contributing to the area’s attractiveness via

access to new businesses, education, and cultural events, ICGI influences community growth in non-bioenergy industries. And importantly, by increasing awareness of the region and ICGI – via visibility of the bioenergy industry, leading to additional companies locating in the region – contributes to the overall growth of state and local economic activity.



Table A1: Impact of ICGI bioenergy spending on the regional community and economic development

Issue	Measurement	Community Impact
Direct payments	Wages paid to employees	Increases sense of collective identity; builds social capital; learning opportunities; creates “quality jobs.”; encourages the in-migration of trained, educated workers
Purchase inputs/equipment/supplies	Payments to equipment and supply vendors	Encourages the startup and/or relocation of businesses to GFD to supply products & services
Funds from outside the state to host events	Community and state recognition; grants and contracts to institutions	Creates recognition of the area’s cultural, arts and athletic provisions; builds community pride; personal interaction of diverse individuals
Philanthropic and government support	Donated services	Businesses and community leaders provide valuable “free” services and donated assets to the community
“Brain gain”	Educated high human capital individuals	ICGI and related activity attracts to region highly educated, well-trained, highly-paid individuals

Source: Goss & Associates

Appendix B – Types of Economic Impacts

Figure B.1 on the following page illustrates the flow of funds into and out of ICGI bioenergy. As indicated, the total impact is the sum of direct (green arrows), indirect (blue arrows) and induced (red arrows) impacts minus leakages (gray arrows). Leakages represent ICGI bioenergy spending outside of the area. Input-output multiplier systems are used to estimate indirect and induced impacts from direct ICGI bioenergy impacts.

Direct Economic Impacts. Spending by ICGI bioenergy has direct economic effects on the local economy through expenditures for goods and services and employee salaries. The most obvious direct expenditures are payment of wages to workers employed by ICGI bioenergy. In addition, expenditures by visitors to companies at ICGI produce direct impacts on the region, affecting the manufacturing industry, among others.

Direct impacts are color coded green in Figure B.1. Table B.1 contains estimated direct impacts for each 100 jobs supported by ICGI bioenergy.

Indirect Economic Impacts. ICGI bioenergy spending also produces indirect economic effects on the area economy. For example, spending generates indirect effects by increasing sales by the region's wholesalers. Indirect economic impacts are color coded blue in Figure B.1.

Induced Economic Impacts. Induced impacts in the region occur as the initial spending feeds back to industries in the region when workers in the area purchase additional output from local firms in a second round of spending. That is, ICGI bioenergy spending increases overall income and population, which produces another round of increased spending adding to sales, earnings and jobs for the area. Examples of induced economic impacts are color coded red in Figure B.1.

Appendix B – Types of Economic Impacts

Figure B.1: Schematic of Impacts

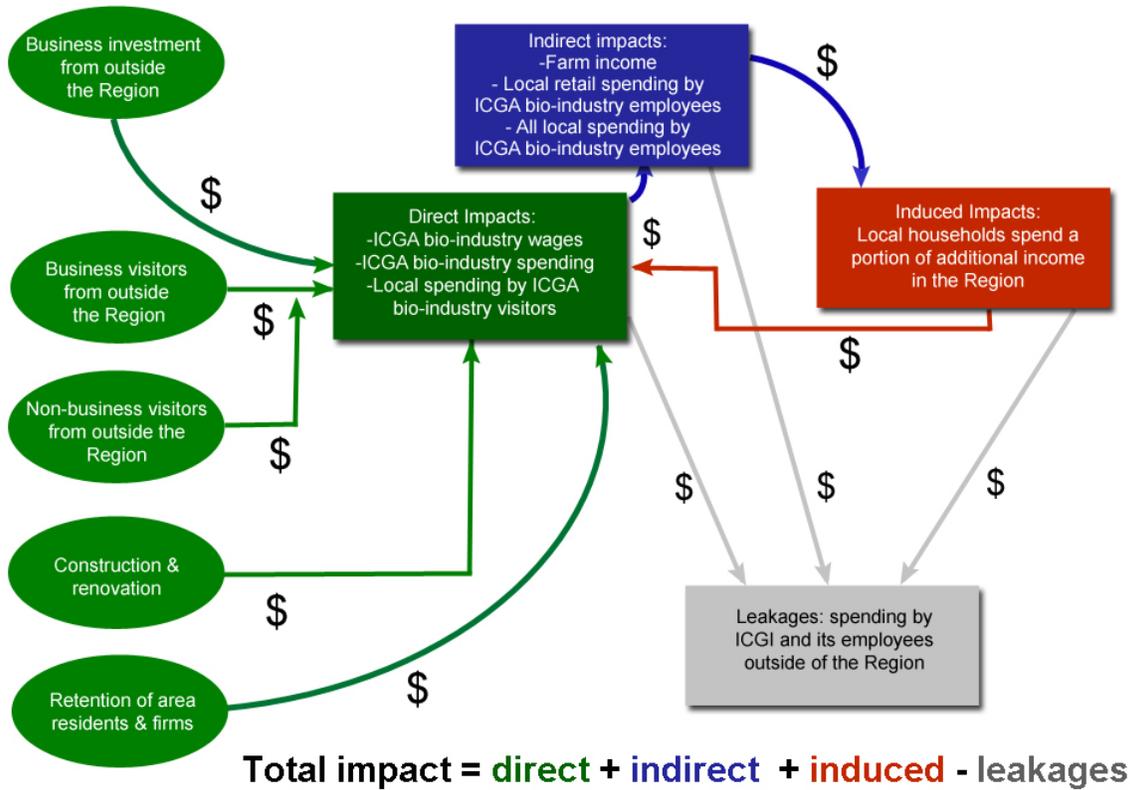


Table B.1 lists estimated impacts for each additional 100 ICGI bioenergy jobs. It is assumed that the additional revenue is not produced by reduced spending at other establishments in the area. In terms of spillover, or indirect plus induced impacts, data indicate that each 100 bioenergy jobs generates another 221 jobs across other industries.

Table B.1: Direct, indirect and induced Impacts for each 100 jobs in ICGA bioenergy, 2014

Impact Type	Direct effect	Indirect effect	Induced effect	Total effect
Output	\$181,005,806	\$19,481,568	\$8,295,738	\$208,783,112
Wages & salaries	\$10,143,856	\$6,137,122	\$2,563,038	\$18,844,015
Self employment income	-\$918,995	\$948,655	\$293,504	\$323,164
Value added (GDP)	\$18,969,887	\$10,807,077	\$5,255,200	\$35,032,163
Average year-round jobs	100	144	77	321

Source: Goss & Associates calculations based on MidAmerican Energy multipliers

Appendix C - Researcher's Biography



Ernie Goss is currently the Jack MacAllister Chair in Regional Economics at Creighton University and principal of the Goss Institute in Denver, Colorado. He received his Ph.D. in Economics from The University of Tennessee in 1983 and is a former faculty research fellow at NASA's

Marshall Space Flight Center. He was a visiting scholar with the Congressional Budget Office for 2003-04, and he has testified before the U.S. Congress, the Kansas Legislature, and the Nebraska Legislature. In the fall of 2005, the Nebraska Attorney General appointed Goss to head a task force examining gasoline pricing in the state.

He has published more than 100 research studies focusing primarily on economic forecasting and on the statistical analysis of business and economic data. His book Changing Attitudes Toward Economic Reform During the Yeltsin Era was published by Praeger Press in 2003, and his book Governing Fortune: Casino Gambling in America was published by the University of Michigan Press in March 2007.

He is editor of Economic Trends, an economics newsletter published monthly with more than 11,500 subscribers. He is the past-president of the Omaha Association of Business Economics, and past-president of the Nebraska Purchasing Management Association.

Goss produces a monthly business conditions index for the nine-state Mid-American region and conducts a survey of bank CEOs in ten U.S. states. Survey and index results are cited each month in approximately 100 newspapers. Newspaper citations have included the New York Times, Wall Street Journal, Investors Business Daily, The Christian Science Monitor, Chicago Sun Times and other national and regional newspapers and magazines. Each month 75-100 radio stations carry his Regional Economic Report.

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Appendix D - Goss & Associates Research Consultancies, 2011-14

1. Winter 2014. Contract with 4R Gun Club to determine the economic feasibility of a full-service shooting range in Omaha, NE.
2. Winter 2014. Contract with Creighton University School of Dentistry to determine the economic contribution of an expanded dental school on the state of Nebraska and city of Omaha.
3. Fall 2013. Contract with Greater Omaha Chamber of Commerce to investigate Nebraska's tax competitiveness.
4. Fall 2013. Contract with Metropolitan Entertainment & Convention Authority to estimate the impact of the CenturyLink Center on Omaha, Nebraska.
5. Summer 2013. Contract with Greenbrier Rail Service to perform a competitive demand and supply analysis for welders and construction laborers for 2013, Portland, Oregon.
6. Summer 2013. Contract with the Platte Institute for Economic Research to determine the impact of taxes and spending on economic development.
7. Winter 2013. Contract with Douglas County Health Center to estimate the impact of the organization on Douglas County and the state of Nebraska.
8. Fall 2012. Contract with Metropolitan Community College to estimate the impact of the institution on the state of Nebraska and its service area.
9. Summer 2012. Contract with the American Society of Engineering-Nebraska to examine the impact on costs of outsourcing.
10. Summer 2012. Contract with Consumer Energy Alliance to examine the impacts of the Keystone Pipeline, Houston, Texas.
11. Spring 2012. Contract with Lancaster County Agricultural Society to estimate the economic feasibility of Phase 3 of the Lancaster Event Center, Lincoln, Nebraska.
12. Winter 2012. Contract with New York First to estimate the impact of the New York property and casualty industry on the state of New York.
13. Winter 2012. Contract with East Campus Realty to estimate the impact of Midtown Crossing on the city of Omaha.
14. Fall 2011. Contract with Iowa-Nebraska Agriculture Equipment Manufacturers to estimate the impact of a sales tax exemption on agriculture repair and replacement parts for the state of Nebraska.
15. Summer 2011. Contract with Kirk and Michael Engineering to gauge the impact of the Gateway Trade Zone in Pottawattamie County, Iowa.
16. Summer 2011. Contract with City of Ralston to estimate the impact of the new ice arena on the state of Nebraska.
17. Winter 2010-11. Contract with Kansas Board of Regents to examine the impact of member universities and colleges on the state economy.

Appendix E - Acknowledgements

The Greater Fort Dodge Growth Alliance acknowledges and thanks the following organizations for their assistance in making this study possible:

Farm Bureau - Webster County
Iowa Central Community College, Fort Dodge
MidAmerican Energy (in-kind)
MidAmerican Energy, Des Moines
Webster-Calhoun Cooperative Telephone Association, Gowrie
Ripple Funds, Iowa Area Development Group, Des Moines
Corn Belt Power Cooperative, Humboldt
City of Webster City, Webster City
Prairie Energy Cooperative, Clarion
Calhoun County REC, Rockwell City
Midland Power Cooperative, Jefferson
Humboldt County Development Association, Humboldt
Corn Investment Corp.



Fort Dodge High Bridge