Nebraska
PROFIT OPPORTUNITIES
FOR FOOD MANUFACTURING

Nebraska Public Power District

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EXECUTIVE SUMMARY

The "Food Manufacturing Industry" (NAICS 311) is one of the largest manufacturing sectors in the United States. The U.S. Census Annual Survey of Manufactures, 2015 indicates the total value of shipments from the food manufacturing sector totaled $775,600.4 million and accounted for 10.5 percent of the total value of shipments by U.S. manufacturers in 2015. Value added in the industry totaled $282,636.6 million in 2015. Moreover, food processing establishments accounted for 12.5 percent of total manufacturing employment in the United States.

This study has been developed specifically for use by manufacturers of food and related products to show how a Nebraska plant location can help them better respond to market conditions and significantly improve their competitive position. Nebraska provides substantial advantages for both small and large food production facilities. An attractive business climate, a well-educated and productive labor force, reliable supplies of low cost energy, ready access to raw materials and intermediate processed inputs, and a location central to the national consumer market are among the leading advantages the state offers manufacturers of food products.

Included in this study is an analysis of geographically variable labor and energy costs. The analysis makes cost comparisons among states on the basis of a model manufacturing plant. The model plant assumes employment of 50 production workers and the manufacture of a product representative for the food manufacturing industry as a whole. Sixteen states are examined in the analysis. Besides Nebraska, these states include those that currently have the largest production in the industry as well as other states near Nebraska with which it typically competes for industrial location projects.

In the model plant analysis, estimated labor related costs include the direct wages paid to production workers and costs associated with workers' compensation insurance, unemployment insurance, social security, and fringe benefits. Compared to the average labor costs for the 15 alternative states, Nebraska is found to offer an annual savings of $103,249 in labor related costs, which is 3.7 percent less than the average labor costs for the other states.

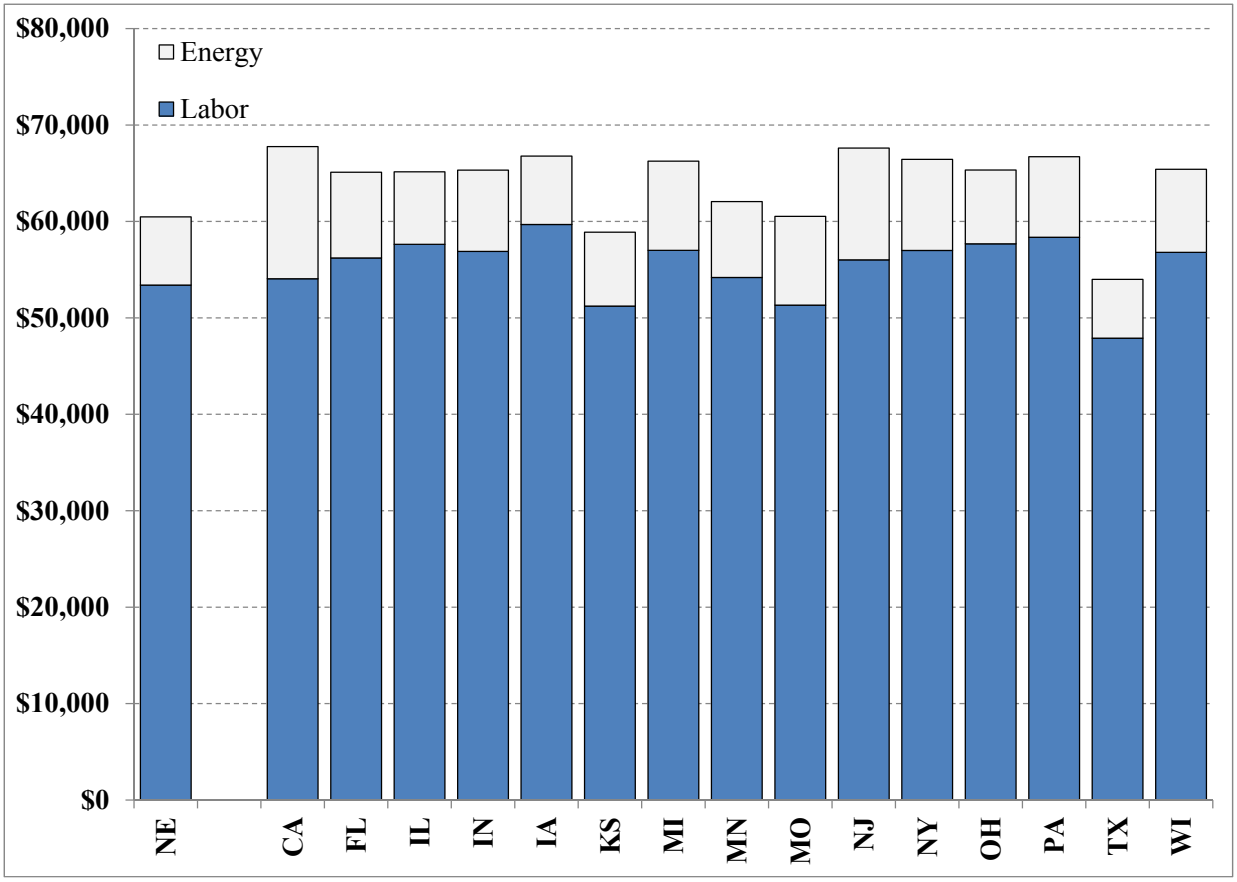
This study also concludes that a Nebraska plant location offers a significant energy cost advantage. Industrial electric rates for the 15 alternative states average 20.7 percent more than the Nebraska rate and the average industrial gas rate is 31.4 percent more. Combining these advantages, Nebraska's energy cost for the model plant is 19.2 percent less than the average energy cost for the 15 alternative locations.

Together, Nebraska's annual labor and energy costs for the model plant are $187,278, or 5.8 percent less than the average annual labor and energy costs for the 15 alternative states. Conversely, the average labor and energy costs in the other 15 states are 6.2 percent more than the Nebraska labor and energy costs.

Figure 1 (following page) provides a summary of the labor and energy costs for the model plant in Nebraska and for each of the 15 alternate plant sites. These costs are shown on a per-production-worker basis.

Figure 1

Labor and Energy Costs per Production Worker for the Food Manufacturing Industry (NAICS 311)



Calculated labor (wages, workers' compensation insurance, unemployment insurance, social security, and fringe benefits) and energy (electricity and natural gas) costs for the food manufacturing industry (NAICS 311).

Source: Table A-6.

PART A

THE FOOD MANUFACTURING INDUSTRY

I. Industry Characteristics and Trends

The "Food Manufacturing Industry" (NAICS 311) is one of the largest manufacturing sectors in the United States. The *Annual Survey of Manufactures, 2015* indicates the food manufacturing sector accounted for 10.5 percent of the total value of shipments by U.S. manufacturers in 2015. Moreover, food manufacturing establishments accounted for 12.4 percent of total manufacturing employment in the United States.

As the data shown in Table 1 indicate, the value of shipments for the food manufacturing industry in the U.S. totaled $775,600.4 million in 2015. Value added in the industry totaled $282,636.6 million, with total employees numbering 1,389,200 and production workers numbering 1,100,700. Capital expenditures for the food manufacturing industry totaled $17,433.5 million in 2015.

Data for the 1997–2015 review period provided in Table 1 show there has been significant current dollar growth in value added, the value of shipments, and capital expenditures, while industry employment has declined slightly. Between 1997–2015, the value of shipments by industry establishment grew by 83.9 percent, industry value added increased by 72.7 percent, and annual capital expenditures grew by 61.4 percent. During the same period, the number of production workers decreased by 1.0 percent and total employment in the food manufacturing industry decreased by 5.3 percent. Obviously, the growth in value added and the value of shipments occurring during the eighteen-year review period resulted from increases in worker productivity.

Worker productivity in the food manufacturing industry has been enhanced by growth in capital expenditures made by industry establishments.

Table 1

The Food Manufacturing Industry (NAICS 311), Characteristics and Trends, Selected Years, 1997–2015

Year	Total Employees	Production Workers	Value Added	Value of Shipments	Capital Expenditures	Avg. Hourly Earnings, Prod. Wrkrs.
	- - - - (Thousands) - - - -		- - - - (Millions $) - - - -			($)
1997	1,467.0	1,112.3	163,675.3	421,737.0	10,799.2	11.27
2002	1,506.9	1,140.6	203,639.6	458,786.5	10,954.1	13.27
2007	1,464.9	1,139.1	240,900.9	589,859.0	13,196.5	15.18
2008	1,437.8	1,113.7	246,222.0	649,056.2	15,649.5	15.37
2009	1,384.7	1,084.9	258,084.5	627,185.3	13,582.6	15.89
2010	1,364.2	1,075.5	265,919.2	646,451.5	14,064.2	16.45
2011	1,346.2	1,063.1	264,192.4	708,682.7	15,738.5	16.62
2012	1,400.0	1,094.5	259,078.5	738,515.0	17,143.9	16.85
2013	1,373.9	1,084.3	265,552.5	762,847.6	15,820.2	17.27
2014	1,374.3	1,087.6	274,956.9	790,508.7	17,197.8	17.65
2015	1,389.2	1,100.7	282,636.6	775,600.4	17,433.5	18.24

Data for the food industry as defined by the 2012 definition for NAICS 311, Food Manufacturing.
Source: U.S. Bureau of the Census, *Census of Manufactures, Geographic Series 1997, 2002, and; 2007; Industry Series: Detailed Statistics by Industry for the United States,* 2012; and *Annual Survey of Manufactures, 2009, 2011, 2014, and 2015.*

During the 1997–2015 review period, annual capital expenditures increased 61.4 percent, from $10,799.2 million in 1997 to $17,433.5 million in 2015. With a 1.0 percent decrease in the number of production workers during the same period, the annual capital expenditures per worker by food processing manufacturers increased by 63.1 percent, from $9,709 per production worker in 1997 to $15,839 in 2015.

Until recently, the growth in worker productivity has not contributed to significant increases in payments to workers during the review period, at least not in real terms. As the data presented in Table 1 (previous page) show, average hourly wages for production workers in the food manufacturing industry increased by 61.8 percent, from $11.27 per hour in 1997 to $18.24 per hour in 2015; this includes a $0.59 per hour increase in 2015. During the same period, the consumer price index increased by 47.7 percent, resulting in a much more modest increase in average hourly earnings for industry production workers in real, or inflation-adjusted terms. When average hourly earnings are adjusted using the consumer price index, the change in average hourly earnings for the 1997–2015 period was an increase of 9.7 percent during the 18-year review period or an annual increase of 0.5 percent per year.

II. Industry Structure

As the reader will note, the "Food Manufacturing Industry" (NAICS 311) is subdivided into nine 4-digit NAICS code classifications. And as a subsequent table will indicate, these nine 4-digit industry classifications are further divided into additional 5-digit NAICS subgroups.

The data presented in Table 2 show the general categories of products produced and sold by the food manufacturing industry. The table also provides insights into the relative sizes of the industry subgroups and the growth in industry shipments among the primary (4-digit NAICS) industry subgroups. The fastest growing industry subgroup at the 4-digit NAICS level was "Animal food manufacturing" (NAICS 3111), for which industry shipments grew by 52.8 percent between 2007 and 2015. The value of industry shipments for "Other food manufacturing" (NAICS 3119), the second fastest growing industry subgroup, grew by 43.4 percent between 2007 and 2015. For the "Food Manufacturing Industry"

Table 2

The Food Manufacturing Industry (NAICS 311),
Value of Industry Shipments by Major Industry Subgroup, 2007, 2012, and 2015

NAICS	Industry Subgroup	Value of Shipments			% Change	% of Total
		2007	2012	2015	2007–2015	2015
		- - - Million Dollars - - -			(%)	(%)
311	**Food manufacturing**	**589,859.0**	**738,515.0**	**775,600.4**	**31.5**	**100.0**
3111	Animal food manufacturing	39,009.9	58,384.7	59,606.1	52.8	7.7
3112	Grain and oilseed milling	69,490.6	101,540.8	89,457.6	28.7	11.5
3113	Sugar and confectionery product manufacturing	27,249.3	32,774.1	34,863.9	27.9	4.5
3114	Fruit and vegetable preserving and specialty food manufacturing	60,956.1	69,215.7	74,183.3	21.7	9.6
3115	Dairy product manufacturing	91,683.5	107,714.2	112,565.7	22.8	14.5
3116	Animal slaughtering and processing	160,128.9	199,303.8	215,983.6	34.9	27.8
3117	Seafood product preparation and packaging	11,024.2	10,692.4	11,958.2	8.5	1.5
3118	Bakeries and tortilla manufacturing	55,547.2	64,441.4	69,791.5	25.6	9.0
3119	Other food manufacturing	74,769.4	94,447.8	107,190.3	43.4	13.8

Source: U.S. Bureau of the Census, *Census of Manufactures, Summary Series 2007 and Industry Series 2012* and *Annual Survey of Manufactures, General Statistics, 2015.*

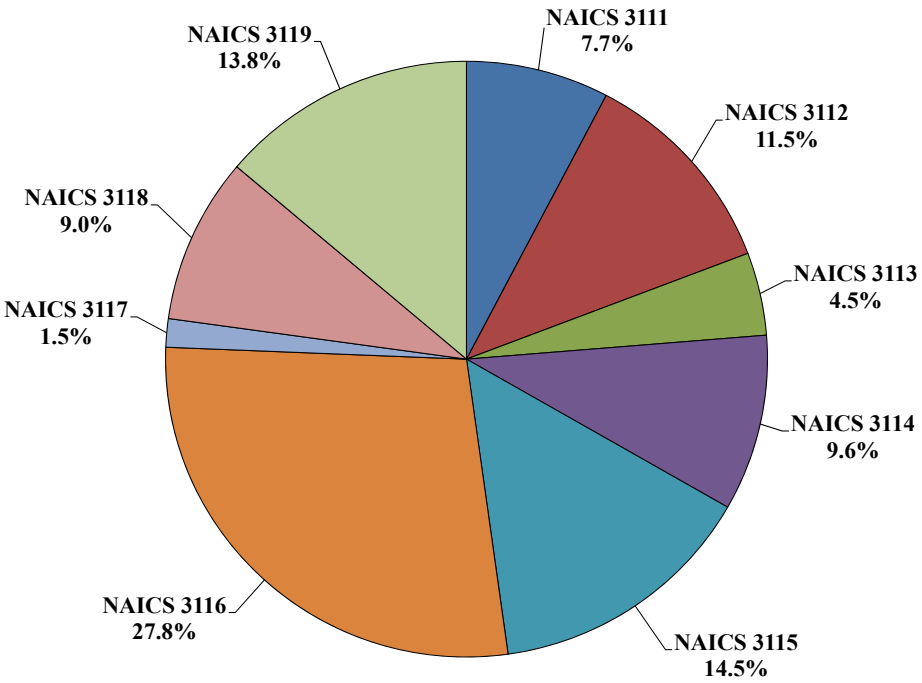
(NAICS 311) as a whole, industry shipments grew by 31.5 percent between 2007 and 2015.

Other food manufacturing industry subgroups experiencing growth in the value of shipments between 2007 and 2015 included "Animal slaughtering and processing" (NAICS 3116) which experienced a 34.9 percent increase, followed by "Grain and oilseed milling" (NAICS 3112) which experienced a 28.7 percent increase, "Sugar and confectionery product manufaturing: (NAICS 3113) which experienced a 27.9 percent increase, "Bakeries and tortilla manufacturing" (NAICS 3118) which experienced a 25.6 percent increase, "Dairy product manufacturing" (NAICS 3115) which experienced a 22.8 percent increase, "Fruit and vegetable preserving and specialty food manufacturing" (NAICS 3114) which experienced a 21.7 percent increase, and "Seafood product preparation and packaging" (NAICS 3117) which experienced an 8.5 percent increase.

The data in Table 2 and Figure 2 show the relative importance of the food manufacturing industry subgroups, in terms of value of shipments for each industry subgroup. "Animal slaughtering and processing" (NAICS 3116) sector is the largest industry subgroup, accounting for 27.8 percent of total industry shipments in 2015. The second largest sector, "Dairy product manufacturing" (NAICS 3115) accounted for 14.5 percent

Figure 2

Value of Shipments by Industry Subgroup, Food Manufacturing Industry (NAICS 311), 2015



Total Industry 2015 Shipments - $775,600.4 Million

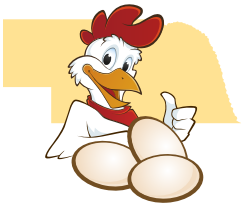
NAICS 3111 Animal food manufacturing
NAICS 3112 Grain and oilseed milling
NAICS 3113 Sugar and confectionery product manufacturing
NAICS 3114 Fruit and vegetable preserving and specialty food manufacturing
NAICS 3115 Dairy product manufacturing
NAICS 3116 Animal slaughtering and processing
NAICS 3117 Seafood product preparation and packaging
NAICS 3118 Bakeries and tortilla manufacturing
NAICS 3119 Other food manufacturing

Note: Percentages may not total 100% due to rounding.
Source: Table 2.

followed by "Other food manufacturing" (NAICS 3119 - 13.8 percent), "Grain and oilseed milling" (NAICS 3112 - 11.5 percent), "Fruit and vegetable preserving and specialty food manufacturing" (NAICS 3114 - 9.6 percent), "Bakeries and tortilla manufacturing" (NAICS 3118 - 9.0 percent), "Animal food manufacturing" (NAICS 3111 - 7.7 percent), "Sugar and confectionery product manufacturing" (NAICS 3113 - 4.5 percent), and "Seafood product preparation and packaging" (NAICS 3117 - 1.5 percent).

The data presented in Table 3 (next page) provide further detail for the industry subgroups that comprise the food manufacturing industry. Data showing the number of companies and establishments for 2012 and number of employees, production workers, value added, value of shipments, and capital expenditures are shown for the "Food Manufacturing Industry" (NAICS 311) as a whole for 2015 and for the NAICS 4-digit and 5-digit subgroups that make up the food manufacturing industry. As previously shown, the "Animal slaughtering and processing" sector (NAICS 3116) is the largest industry subgroup in terms of industry shipments. As the data presented in Table 3 (following page) show, it is also the largest food industry sector in terms of employees, production workers, value added, and capital expenditures. It is also of interest to note that the largest 5-digit NAICS subgroup is "Animal slaughtering and processing" (NAICS 31161), which is identical to the 4-digit NAICS 3116 sector.

The largest industry subgroup, in terms of the number of companies and establishments, is the "Bakeries and tortilla manufacturing" (NAICS 3118) subgroup. This industry subgroup accounts for 9,877 of the total 22,086 companies in the food manufacturing industry and 10,546 of the total 25,575 industry establishments. Further inspection of the data for this sector reveals that the 5-digit sector, "Bread and bakery product manufacturing" (NAICS 31181), account for almost 90 percent of the companies and establishments in this industry sector.



New Chicken Hatchery, Grand Island, Nebraska

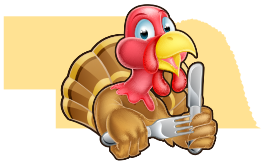
Hendrix Genetics constructed a new, $10 million, 24-million chicks per year hatchery in Grand Island Nebraska. The hatchery serves Hendrix Genetics' ISA Poultry Division and began operation in 2017.

New Fremont, Nebraska Plant Will Increase Nebraska Broiler Production by 17 Million Birds Per Year

In 2016, Lincoln Premium Poultry and Costco Wholesale Corporation announced plans to construct a new broiler facility with hatchery and feed mill in Fremont, Nebraska. These facilities will employ about 1,000 and should begin operations in 2018.

Beef Plant Expands in Columbus, Nebraska

Cargill has invested $111 million to convert its ground beef plant at Columbus, Nebraska to produce cooked meats. The conversion began in December 2015. The plant resumed operations in 2016 and reached full capacity in 2017. The conversion was to large volume, cooked meat products for customers, primarily food service. Cargill employs more than 4,000 people in Nebraska.



Turkey Hatchery Built in Beatrice, Nebraska

In 2016, Hybrid Turkeys announced plans for a state-of-the-art parent stock hatcher in Beatrice, Nebraska. The 30,000-square-foot facility was up and running in 2017 and employs about 25 full-time employees.

Table 3

The Food Manufacturing Industry (NAICS 311), Number of Companies and Establishments, Employment, Value of Shipments, Value Added, and Capital Expenditures by Major Sector and Industry Subgroups, 2015*

NAICS Code	Industry Description	Number of Companies*	Number of Establishments*	All Employees	Production Workers	Value Added	Value of Shipments	Capital Expenditures
						----- (Thousand $) -----		
311	**Food Manufacturing**	**22,086**	**25,575**	**1,389,182**	**1,100,658**	**282,636,587**	**775,600,378**	**17,433,546**
3111	**Animal food manufacturing**	**1,103**	**1,680**	**44,179**	**30,661**	**17,567,481**	**59,606,130**	**1,159,964**
31111	Animal food manufacturing	1,103	1,680	44,179	30,661	17,567,481	59,606,130	1,159,964
3112	**Grain and oilseed milling**	**473**	**808**	**53,655**	**38,786**	**24,586,644**	**89,457,591**	**1,438,559**
31121	Flour milling and malt manufacturing	237	404	18,624	13,054	6,660,557	20,281,376	368,681
31122	Starch and vegetable fats and oils manufacturing	199	341	22,818	15,737	13,648,742	59,447,897	841,230
31123	Breakfast cereal manufacturing	37	63	12,214	9,995	4,277,345	9,728,317	228,648
3113	**Sugar and confectionery product manufacturing**	**1,705**	**1,847**	**72,316**	**53,358**	**16,431,887**	**34,863,942**	**1,226,808**
31131	Sugar manufacturing	43	75	14,073	11,599	3,278,195	9,419,804	445,547
31134	Nonchocolate confectionery manufacturing	421	439	18,427	13,863	4,671,382	8,208,543	429,645
31135	Chocolate and chocolate confectionery manufacturing	1,241	1,333	39,816	27,895	8,482,310	17,235,595	351,616
3114	**Fruit and vegetable preserving and specialty food manufacturing**	**1,377**	**1,695**	**162,518**	**136,417**	**34,282,969**	**74,183,326**	**2,143,969**
31141	Frozen food manufacturing	540	693	86,636	73,422	14,486,474	32,299,540	976,435
31142	Fruit and vegetable canning, pickling, and drying	837	1,002	75,882	62,996	19,796,495	41,883,786	1,167,534
3115	**Dairy product manufacturing**	**1,142**	**1,599**	**131,486**	**99,880**	**32,167,414**	**112,565,732**	**2,726,229**
31151	Dairy product (except frozen) manufacturing	799	1,211	113,478	84,866	29,121,867	105,049,865	2,505,185
31152	Ice cream and frozen dessert manufacturing	343	388	18,008	15,014	3,045,547	7,515,867	221,044
3116	**Animal slaughtering and processing**	**3,053**	**3,591**	**477,054**	**415,016**	**60,084,180**	**215,983,573**	**4,061,222**
31161	Animal slaughtering and processing	3,053	3,591	477,054	415,016	60,084,180	215,983,573	4,061,222
3117	**Seafood product preparation and packaging**	**501**	**595**	**32,005**	**26,840**	**4,991,137**	**11,958,248**	**327,026**
31171	Seafood product preparation and packaging	501	595	32,005	26,840	4,991,137	11,958,248	327,026
3118	**Bakeries and tortilla manufacturing**	**9,877**	**10,546**	**241,363**	**171,739**	**39,535,676**	**69,791,530**	**1,935,475**
31181	Bread and bakery product manufacturing	8,880	9,409	172,449	116,034	25,132,328	40,951,885	1,054,974
31182	Cookie, cracker, and pasta manufacturing	662	773	51,778	41,368	12,070,861	24,890,811	744,556
31183	Tortilla manufacturing	335	364	17,137	14,336	2,332,487	3,948,833	135,946
3119	**Other food manufacturing**	**2,855**	**3,214**	**174,606**	**127,960**	**52,989,201**	**107,190,307**	**2,414,296**
31191	Snack food manufacturing	510	607	50,808	40,249	19,637,213	36,764,493	853,203
31192	Coffee and tea manufacturing	414	446	15,379	10,314	5,393,067	14,353,874	241,022
31193	Flavoring syrup and concentrate manufacturing	132	147	7,498	4,405	7,247,396	9,949,332	246,564
31194	Seasoning and dressing manufacturing	620	703	32,108	21,468	9,463,417	19,778,963	499,118
31199	All other food manufacturing	1,179	1,311	68,814	51,525	11,248,107	26,343,645	574,389

* Values for "Number of Companies" and "Number of Establishments" are for 2012 and from the *U.S. Census of Manufactures, 2012* .

Source: U.S. Bureau of the Census, *Annual Survey of Manufactures, General Statistics, 2015.*

III. Industry Production and Location Characteristics

The food manufacturing industry encompasses a very large and diverse industry. In 2012, 25,575 establishments were primarily engaged in food processing, a decrease of 0.2 percent from 2007. From 2007 to 2012, establishments with fewer than 20 employees increased by 2.2 percent while establishments with 20 or more employees decreased by 4.8 percent.

The data presented in Table 4 compares selected characteristics for the food manufacturing industry as a whole for 2007, 2012, and 2015. Over the 2007–2015 period, the number of employees declined by 5.1 percent from 1,464,200 to 1,389,200, while production workers decreased by 3.9 percent, from 1,139,300 in 2007 to 1,100,700 in 2015.

The cost of materials (purchased inputs) increased by 40.4 percent, from $351.5 billion in 2007 to $493.4 billion in 2015. Another important factor contributing to the 31.5 percent increase in the value of shipments or the value of output produced by the food manufacturing industry was the value added by manufacture, which increased by 17.2 percent, from $241.1 billion in 2007 to $282.6 billion in 2015.

The Table 4 data, along with data from the *Census of Manufacturers*, indicate that establishments in the "Food Manufacturing Industry" (NAICS 311) are more labor intensive than manufacturing establishments generally. In 2015, production workers accounted for 79.1 percent of total employment in the food manufacturing industry, compared to 69.9 percent for all manufacturing.

The importance of production workers relative to total employment in the food manufacturing industry has also increased over time. The number of production workers in the industry decreased from 1,139,300 in 2007 to 1,100,700 in 2015—a decrease of 3.4 percent. Total industry employment declined by 5.1 percent for the same period. Total production worker hours declined by a slightly smaller rate, 0.8 percent, than total

Table 4

Production Characteristics for the Food Manufacturing Industry (NAICS 311) 2007, 2012, and 2015

				Percent Change	
	2007	2012	2015	2007-2012	2012-2015
Establishments					
Number	25,616	25,575	N/A	-0.2	N/A
With 20+ Employees	8,594	8,183	N/A	-4.8	N/A
All Employees					
Number [thousands]	1,464.2	1,400.0	1,389.2	-4.4	-0.8
Payroll [million $]	50,387.9	54,546.0	59,567.5	8.3	9.2
Production Workers					
Number [thousands]	1,139.3	1,094.5	1,100.7	-3.9	0.6
Hours [millions]	2,282.8	2,195.6	2,263.8	-3.8	3.1
Wages [million $]	34,674.9	36,995.3	41,298.3	6.7	11.6
Average Hourly Wage [$]	15.19	16.85	18.24	10.9	8.2
Value Added by Manufacture [million $]	241,064.1	259,078.5	282,636.6	7.5	9.1
Cost of Materials [million $]	351,493.5	481,481.2	493,448.5	37.0	2.5
Value of Shipments [million $]	589,725.6	738,515.0	775,600.4	25.2	5.0
Cost of Purchased Fuels and Electric Energy					
Electric Energy [million $]	4,855.8	5,398.4	5,597.1	11.2	3.7
Purchased Fuels [million $]	5,493.1	3,829.2	3,794.2	-30.3	-0.9
Quantity of Purchased Electric Energy [million kWh]	80,297.9	77,834.1	73,123.7	-3.1	-6.1

N/A: Not Available.

Sources: U.S. Bureau of the Census, *Census of Manufactures, Summary Series 2007 and Industry Series, 2012* and U.S. Bureau of the Census, *Annual Survey of Manufactures, General Statistics, 2015.*

production workers and total production worker wages grew by 19.1 percent between 2007 and 2015. These data highlight the increasing importance of reliable and productive sources of labor for the food manufacturing industry.

As previously noted, the total cost of materials increased by 40.4 percent between 2007 and 2015. Energy inputs are an important production input for which the cost has increased less rapidly or declined during the same time period. The cost of purchased electricity increased by 15.3 percent, while the cost of purchased fuels decreased by 30.9 percent from 2007 to 2015.

Table 5 provides data for selected additional production characteristics for the food manufacturing industry for 2012. The industry data presented in Table 5 are for the "Food Manufacturing Industry" (NAICS 311) as a whole, the "Animal slaughtering and processing" subsector (NAICS 3116), and the balance of the industry, excluding animal slaughtering and processing. As the data indicate, there were 22,086 companies and 25,575 industry establishments in the food manufacturing industry in 2012. Establishments in the "Animal slaughtering and processing" sector totaled 3,591 in 2012, or 14.0 percent of the total industry establishments. Further inspection of the data indicates that the "Animal slaughtering and processing" sector had, on average, much larger establishments than for the balance of the industry.

Data showing the distribution of manufacturing establishments by size is also of interest as one compares the "Animal slaughtering and processing" sector to the balance of the food manufacturing industry. Food processing establishments with 20 or more employees accounted for 32.0 percent of total industry establishments in 2012. For the "Animal slaughtering and processing" sector, establishments with 20 or more employees accounted for 37.8 percent of establishments,

Table 5

Establishment Characteristics for the Food Manufacturing Industry (NAICS 311), Animal Slaughtering and Processing (NAICS 3116), and Other Food Manufacturing, 2012

	NAICS 311 Food Manufacturing Industry	NAICS 3116 Animal Slaughtering and Processing	Other Food Manufacturing
Number of Companies	22,086	3,053	19,033
Number of Establishments	25,575	3,591	21,984
Est. - with 20+ Employees	8,183	1,357	6,826
Est. - with 20+ Emp (% of Total)	32.0	37.8	31.0
Est. - with 100+ Employees	3,154	722	2,432
Est. - with 100+ Emp (% of Total)	12.3	20.1	11.1
Establishments per Company	1.16	1.18	1.16
Production Workers	1,094,518	413,908	680,610
Average Prd. Wrkrs. per Estab.	42.8	115.3	31.0
Value Added (Million $)	259,078.5	52,645.6	206,432.9
Per Establishment ($1,000)	10,130.1	14,660.4	9,390.1
Per Production Worker ($)	236,705.6	127,191.5	303,305.7
Value of Shipments (Million $)	738,515.0	199,303.8	539,211.2
Per Establishment ($1,000)	28,876.4	55,500.9	24,527.4
Per Production Worker ($)	674,739.9	481,517.1	792,247.0

Source: U.S. Bureau of the Census, Census of Manufactures, *Detailed Statistics by Industry for the United States*, 2012.

while for the balance of the industry the comparable statistic was 31.0 percent. The differences between the "Animal slaughtering and processing" sector and the balance of the industry are more pronounced when looking at the number and share of establishments with 100 or more employees. For the food manufacturing industry as a whole, 12.3 percent of the establishments had 100 or more employees. This statistic for the animal slaughtering and processing manufacturing industry was 20.1 percent, compared to only 11.1 percent of establishments with 100 employees or more for the balance of the industry.

The average establishment in the food manufacturing industry had 42.8 production workers in 2012. Further review of the data in Table 5 indicate establishments in the "Animal slaughtering and processing" sector were much larger, with an average of 115.3 production workers per establishment, which was 3.7 times the average size of 31.0 production workers per establishment for the balance of the industry. Obviously, a few very large plants and many small establishments characterize the "Animal food manufacturing sector".

Companies in the food manufacturing industry tend to locate plants in areas that provide a balance between access to material inputs and market orientation. Over the past few years, however, the location orientation has shifted somewhat, with access to material inputs combined with access to national markets gaining in importance, relative to a location orientation to local and regional markets.

The data in Table 6 show the transportation characteristics of commodities produced by the food manufacturing industry. Data in Table 6 indicate shipping distances for "Meat, poultry, fish, seafood, and their preparations" and "Milled grain products and preparation, and bakery products" have increased, while shipping distances for "Animal feed, eggs, honey, and other products of animal origin" and "Other prepared foodstuffs, and fats and oils" have decreased. In 2012, the average distance shipped for "Animal feed, eggs, honey, and other products of animal origin" was slightly less than 400 miles and the average shipping distances for the other three categories ranged between 230 miles for "Other prepared foodstuffs, and fats and oils" and 262 miles for "Milled grain products and preparation, and bakery products".

To provide an indication of the geographic dispersion of the food manufacturing industry, Table 7 (following page) presents 2015 data, the most recent year these data are available for this report, on employment, production workers, value added by manufacturer, and value of shipments for 16 selected states. As indicated in the table, establishments located in the 16 states for which data are presented contribute 63.4 percent of total value added in the food manufacturing industry. Moreover, these states account for 65.9 percent of total industry shipments and 59.4 percent of total production workers in the food manufacturing industry.

Table 6

Shipment Characteristics for the Food Manufacturing Industry (NAICS 311)
Related Commodities, Selected Commodities, 2007 and 2012

Commodity Sector	Value (Mil. $) 2012	Tons (Thous.) 2012	Ton-miles 2012 (Mil.)	Average Miles 2007	Average Miles 2012	% Change 2007-2012
Animal feed, eggs, honey, and other products of animal origin	114,147	223,393	57,800	494	383	-22.5
Meat, poultry, fish, seafood, and their preparations	302,921	90,439	43,185	206	243	18.0
Milled grain products and preparations, and bakery products	164,323	120,915	58,984	169	262	55.0
Other prepared foodstuffs, and fats and oils	597,943	522,932	180,437	318	230	-27.7

Source: U.S. Bureau of the Census, *Census of Transportation, 2007 and 2012 Commodity Flow Survey.*

Included among these states are Nebraska and neighboring states that typically compete with Nebraska for plant locations. Also included are the leading states with the greatest concentrations of food processing activity. The 16 states are included in this study as alternative sites for plant locations and are evaluated in Appendix A of this report using the geographically variable labor and energy costs.

In 2015, California, with total shipments by food processing establishments of $78,152 million, was the largest food manufacturing state, accounting for 10.1 percent of the total U.S. food product shipments. Texas, with shipments of food products totaling $45,433 million, ranked second among the states and contributed 5.9 percent of the total industry shipments. In terms of the value of shipments of food products, Wisconsin ranked third, followed by Illinois, Iowa, Pennsylvania, and Ohio. Nebraska, with shipments of food products totaling $31,201 million, ranked eighth among the states and accounted for 4.0 percent of total industry shipments.

The average hourly earnings of production workers in the food manufacturing industry shown in Table 7 indicate Nebraska production workers had average hourly earnings ($18.39) that were 0.8 percent higher than the U.S. average of $18.24, and 2.4 percent less than the average of $19.01 for the other 15 selected states. In highlighting Nebraska's average hourly earnings, it is notable that Nebraska has a higher concentration of its food manufacturing industry (and workers) in the "Animal slaughtering and processing" sector (NAICS 3116). And, as wages in the meat products manufacturing sector are generally lower than in other food industry sectors, one would expect Nebraska wages to be less than other areas.

Table 7

Food Manufacturing Industry (NAICS 311)
Production Workers, Average Wages, Value Added, and Value of Shipments,
Selected States and the U.S., 2015

State	Employees (1,000)	Production Workers (1,000)	Average Hourly Earnings ($)	Value Added (Million $)	Value of Shipments (Million $)	% of U.S. Value of Shipments (%)
Nebraska	**33.8**	**28.7**	**18.39**	**6,795**	**31,201**	**4.0**
California	151.3	115.3	18.36	30,360	78,152	10.1
Florida	25.5	19.4	19.36	5,614	14,351	1.9
Illinois	72.6	56.4	19.70	15,364	43,597	5.6
Indiana	34.6	26.0	19.64	8,649	22,863	2.9
Iowa	49.3	40.4	20.44	11,441	39,682	5.1
Kansas	27.7	23.6	17.65	6,337	24,480	3.2
Michigan	28.9	21.7	19.58	6,926	16,797	2.2
Minnesota	44.3	34.9	18.58	8,693	27,166	3.5
Missouri	38.2	32.8	17.61	7,841	23,650	3.0
New Jersey	28.6	20.4	19.02	5,089	12,906	1.7
New York	41.4	30.5	19.42	7,806	20,081	2.6
Ohio	51.8	40.0	19.86	14,398	32,244	4.2
Pennsylvania	64.4	49.1	19.94	13,910	34,742	4.5
Texas	79.2	64.0	16.50	16,006	45,433	5.9
Wisconsin	64.6	51.1	19.43	13,878	43,696	5.6
Total Sel. States	836.2	654.3	18.85	179,104	511,040	65.9
Percent of U.S.	60.2	59.4	103.3	63.4	65.9	65.9
Total U.S.	1,389.2	1,100.7	18.24	282,637	775,600	65.9

Source: U.S. Bureau of the Census, *Annual Survey of Manufactures, General Statistics: 2015.*

IV. Capital Investment and Industry Outlook

Capital investment in the food manufacturing industry was more than $17.4 million in 2015. As the data presented in Table 8 show, capital investment totaled $17,433.5 million, a 32.1 percent increase from 2007.

As data provided in Table 8 also indicate, the growth and rate of capital investment in the food manufacturing industry varied significantly among the industry subgroups. The "Animal food manufacturing" (NAICS 3111) sector recorded the greatest increase (67.5 percent) in capital expenditures between 2007 and 2015, followed by "Sugar and confectionery product manufacturing" (NAICS 3113 - 58.7 percent), and "Animal slaughtering and processing" (NAICS 3116 - 49.2 percent).

One subgroup experienced a decline in capital expenditures. The "Grain and oilseed milling" (NAICS 3112) subgroup experienced a decline of 7.9 percent.

The food manufacturing industry in the United States is expected to record stable or slightly declining employment change and moderate output growth over the long term. As indicated by the data presented in Table 9 (next page), employment in the food manufacturing industry (NAICS 311) increased moderately during the 2006–2016 period and is projected to decline by an average rate of 0.1 percent per year between 2016 and 2026. This projected decline is less than an average annual decline of 1.4 percent per year for all manufacturing employment between 2006 and 2016 and a projected average annual decline of 0.6 percent for the 2016–2026 period.

Real, constant-dollar, output in the food manufacturing industry is projected to increase by 13.0 percent, or by an average annual rate of 1.2 percent, in real, inflation-adjusted terms between 2016 and 2026. As the data presented in Table 9 indicate, this is slightly less than the projected increase in output for the total manufacturing sector (19.4 percent, or an average annual rate of 1.8 percent) for the 2016–2026 projection period.

The long run outlook for the food manufacturing industry is very positive. Expanding global markets and incomes will provide large and growing markets for this industry. On balance, the factors affecting individual companies producing food products will depend to a great extent on their ability to compete within their industry and in the markets for their products. While many external factors will influence the overall performance of the industry, the outlook for the individual companies that can control costs and respond to emerging and changing market opportunities and consumer tastes and behavior will be significantly enhanced. Appendix A of this study discusses how food processing establishments can better respond to market conditions and significantly improve their competitive positions with a Nebraska plant location.

Table 8

Capital Expenditures in the Food Manufacturing Industry (NAICS 311), by Industry Subgroup, 2007, 2012, and 2015

NAICS	Industry Group	Capital Expenditures - - - - (Thousand $) - - - - -			% Change		2015 Cap. Exp. as Percent of Value Added
		2007	2012	2015	2007–2012	2012–2015	
311	**Food manufacturing**	**13,196,530**	**17,143,913**	**17,433,546**	**29.9**	**1.7**	**6.17**
3111	Animal food manufacturing	692,604	1,023,463	1,159,964	47.8	13.3	6.60
3112	Grain and oilseed milling	1,561,443	1,777,630	1,438,559	13.8	-19.1	5.85
3113	Sugar and confectionery product manufacturing	772,978	1,197,114	1,226,808	54.9	2.5	7.47
3114	Fruit and vegetable preserving and specialty food manufacturing	1,636,394	2,305,592	2,143,969	40.9	-7.0	6.25
3115	Dairy product manufacturing	1,869,415	2,771,426	2,726,229	48.3	-1.6	8.48
3116	Animal slaughtering and processing	2,721,718	3,723,343	4,061,222	36.8	9.1	6.76
3117	Seafood product preparation and packaging	297,933	261,253	327,026	-12.3	25.2	6.55
3118	Bakeries and tortilla manufacturing	1,513,211	1,763,157	1,935,475	16.5	9.8	4.90
3119	Other food manufacturing	2,130,834	2,320,935	2,414,296	8.9	4.0	4.56

Source: U.S. Bureau of the Census, *Census of Manufactures, Summary Series 2007* and *Industry Series 2012* and *Annual Survey of Manufactures, General Area Statistics, 2015.*

Table 9

Employment and Output, Food Manufacturing Sector by Industry Subgroup, and for All Manufacturing, 2006, 2016, and Projected 2026

NAICS	Industry Sector / Subgroup	Part A -- Employment				
		Thousands of Jobs			Avg. Ann. Rate of Change	
		2006	2016	2026	2006-2016	2016-2026
31-33	**Manufacturing**	**14,155.8**	**12,348.1**	**11,611.7**	**-1.4**	**-0.6**
311	**Food manufacturing**	**1,479.3**	**1,554.2**	**1,540.2**	**0.5**	**-0.1**
3111	Animal food manufacturing	49.4	58.0	57.8	1.6	0.0
3112	Grain and oilseed milling	60.5	59.7	56.4	-0.1	-0.6
3113	Sugar and confectionery product manufacturing	75.1	76.5	71.8	0.2	-0.6
3114	Fruit and vegetable preserving and specialty food manufacturing	176.2	173.3	165.3	-0.2	-0.5
3115	Dairy product manufacturing	131.2	140.7	141.7	0.7	0.1
3116	Animal slaughtering and processing	506.0	494.5	493.1	-0.2	0.0
3117	Seafood product preparation and packaging	40.7	39.7	35.8	-0.2	-1.0
3118	Bakeries and tortilla manufacturing	280.4	304.0	300.5	0.8	-0.1
3119	Other food manufacturing	159.8	207.8	217.7	2.7	0.5

NAICS	Industry Sector / Subgroup	Part B -- Value of Output				
		Billions of Chain-Weighted 2009 Dollars[(a)]			Avg. Ann. Rate of Change	
		2006	2016	2026	2006-2016	2016-2026
31-33	**Manufacturing**	**5,298.3**	**5,449.9**	**6,509.8**	**0.3**	**1.8**
311	**Food manufacturing**	**604.8**	**687.3**	**776.8**	**1.3**	**1.2**
3111	Animal food manufacturing	43.6	52.2	67.1	1.8	2.5
3112	Grain and oilseed milling	75.8	100.9	112.9	2.9	1.1
3113	Sugar and confectionery product manufacturing	31.9	32.5	34.9	0.2	0.7
3114	Fruit and vegetable preserving and specialty food manufacturing	65.9	66.2	69.5	0.0	0.5
3115	Dairy product manufacturing	78.2	102.7	119.2	2.8	1.5
3116	Animal slaughtering and processing	158.6	178.2	202.0	1.2	1.3
3117	Seafood product preparation and packaging	11.6	10.5	11.9	-1.0	1.3
3118	Bakeries and tortilla manufacturing	63.1	51.4	55.8	-2.0	0.8
3119	Other food manufacturing	77.6	90.2	99.9	1.5	1.0

[(a)] Output shown in billions of chain-weighted constant (2009) dollars.

Source: U.S. Bureau of Labor Statistics, Office of Occupational Statistics and Employment Projections, **bls.gov/emp/** Employment and Output Projections for 2026 (2017).

Part B

Nebraska Advantages for Manufacturers of Food Products

The food manufacturing industry appears to have both a market orientation and a resource orientation depending on the specific product produced, the type of establishment, and the market area served. Those establishments which appear to be oriented to plant locations near markets they are serving tend to be the smaller industry establishments which may have identified local market opportunities. Establishments which appear to be more resource oriented in terms of their plant locations tend to be the larger establishments, which produce goods for national distribution or serve significant regional markets. For the industry as a whole, the location orientation tends to favor a combination of resource availability and market access.

I. Availability of Inputs in Nebraska

Agriculture and agribusiness represent an important segment of the Nebraska economy and provide the basic economic foundation for continued expansion of the state's economy. Essential services available to the agricultural sector and the processing, distribution, and packaging for related food products have provided much of the impetus for growth of the Nebraska economy. The substantial availability of agricultural and agriculturally related resources represent a significant advantage for Nebraska's existing food manufacturing sector and for new and expanding food processing establishments.

Table 10 provides data on Nebraska companies engaged in various types of food processing activity. The largest concentration of Nebraska food industry establishments is found in NAICS 31161, "Animal slaughtering and processing," followed by NAICS 31111, "Animal food manufacturing." As indicated by the data provided in the table, 117 establishments in the state slaughter and further process animal and meat products. Moreover, this industry subgroup employs the most workers, with 28 of these establishments employing 100 or more

Table 10

Nebraska Food Manufacturing Establishments by Industry and Employment Size, 2015

NAICS	Industry Group	Total	Employment Size: Less Than 100 Emp.	100-499 Emp.	500-999 Emp.	1,000 or More Emp.
		- - - - - (Number of Establishments) - - - - -				
31111	Animal food manufacturing	60	56	4	0	0
31121	Flour milling and malt manufacturing	8	6	2	0	0
31122	Starch and vegetable fats and oils manufacturing	9	6	3	0	0
31123	Breakfast cereal manufacturing	2	0	1	1	0
31131	Sugar manufacturing	1	0	1	0	0
31134	Nonchocolate confectionery manufacturing	2	2	0	0	0
31135	Chocolate and chocolate confectionery manufacturing	2	2	0	0	0
31141	Frozen food manufacturing	4	3	1	0	0
31142	Fruit and vegetable canning, pickling, and drying	4	4	0	0	0
31151	Dairy product (except frozen) manufacturing	9	6	3	0	0
31152	Ice cream and frozen dessert manufacturing	2	2	0	0	0
31161	Animal slaughtering and processing	117	89	16	4	8
31171	Seafood product preparation and packaging	0	0	0	0	0
31181	Bread and bakery product manufacturing	42	39	3	0	0
31182	Cookie, cracker, and pasta manufacturing	1	1	0	0	0
31183	Tortilla manufacturing	3	2	1	0	0
31191	Snack food manufacturing	3	3	0	0	0
31192	Coffee and tea manufacturing	0	0	0	0	0
31193	Flavoring syrup and concentrate manufacturing	0	0	0	0	0
31194	Seasoning and dressing manufacturing	0	0	0	0	0
31199	All other food manufacturing	9	7	1	1	0
311	**Food manufacturing**	**278**	**228**	**36**	**6**	**8**

Source: U.S. Census Bureau *County Business Patterns: 2015.*

workers, 12 employing 500 or more workers, and 8 employing 1,000 or more workers.

A review of the types of existing food product manufacturers reported in Table 10 (previous page) reveals that many of the significant inputs required by other food manufacturing industry establishments are currently available in Nebraska. Major beef processors operate some of the industry's largest processing facilities in Nebraska. A variety of additional food processors will be able to take advantage of these significant and important local inputs.

The significant concentration of major food processors within Nebraska is related to the substantial availability of agricultural commodities produced in the state. Nebraska provides substantial agricultural inputs for beef, poultry, and dairy products processors. Moreover, the food and feed grains and other crops in the state represent an important agricultural resource both for supporting the livestock, poultry, dairy, and related products industry and as a raw materials input for further processing by Nebraska's food products manufacturers.

Table 11 provides data on agricultural production for selected crops (Part A) and livestock commodities (Part B on next page) in Nebraska. As these data illustrate, the state accounts for a substantial share of total U.S. production for these agricultural commodities.

Nebraska ranks third in the production of corn for grain with 1,664.7 million bushels in 2017. As shown in Part A of Table 11, Nebraska's corn crop accounted for 11.4 percent of total U.S. production. Sorghum for grain production in Nebraska totaled 14.4 million bushels, accounting for 4.0 percent of the total U.S. production. Nebraska also produced significant amounts of soybeans (7.4 percent of U.S. production), wheat (2.7 percent of U.S. production), hay (4.3 percent of U.S. production), and dry edible beans (11.7 percent of U.S. production).

One of the most significant attributes of Nebraska, in terms of agricultural output, is the production of livestock and livestock products. As the data provided in Part B of Table 11 show (next page), 18.9 percent of the nation's cattle on feed as of January 1, 2017, were in Nebraska,

Table 11

Production of Selected Agricultural Commodities in Nebraska

Part A -- Selected Crops

	Corn for Grain, 2017		Sorghum for Grain, 2017	
	Acres Harvested	Production	Acres Harvested	Production
	(1,000)	(1,000 Bu.)	(1,000)	(1,000 Bu.)
Nebraska	9,300	1,664,700	150	14,400
% of U.S.	11.2	11.4	3.0	4.0
U.S. Total	83,119	14,577,502	5,049	355,633

	Wheat, 2017		Soybeans, 2017	
	Acres Harvested	Production	Acres Harvested	Production
	(1,000)	(1,000 Bu.)	(1,000)	(1,000 Bu.)
Nebraska	1,020	46,920	5,650	327,700
% of U.S.	2.7	2.7	6.3	7.4
U.S. Total	37,586	1,740,582	89,471	4,425,279

	All Hay, 2016		Dry Edible Beans, 2017	
	Acres Harvested	Production	Acres Harvested	Production
	(1,000)	(1,000 Tons)	(1,000)	(1,000 CWT)
Nebraska	2,450	5,748	170	4,114
% of U.S.	4.6	4.3	8.4	11.7
U.S. Total	53,461	134,781	2,033	35,312

Table continued on following page (including source notes).

Table 11, continued

	Part B -- Selected Livestock, Poultry, and Related Products		
	Cattle on Feed, Jan. 1, 2017	**All Cattle & Calves, Jan. 1, 2017**	
	Number	**Number**	
	(1,000 Head)	(1,000 Head)	
Nebraska	2,470	6,450	
% of U.S.	18.9	6.9	
U.S. Total	13,067	93,585	
	Milk Cows, Jan. 1, 2017	**Commercial Cattle Slaughter, 2016**	
	Number	**Number**	**Live Weight**
	(1,000 Head)	(1,000 Head)	(1,000 Pounds)
Nebraska	60	7,237	10,265,929
% of U.S.	0.6	23.7	24.7
U.S. Total	9,349	30,578	41,576,495
	Hogs & Pigs, Dec. 1, 2016	**Commercial Hog Slaughter, 2016**	
	Number	**Number**	**Live Weight**
	(1,000 Head)	(1,000 Head)	(1,000 Pounds)
Nebraska	3,400	7,987	2,234,343
% of U.S.	4.8	6.8	6.7
U.S. Total	71,525	118,220	33,302,171
	Milk Produced, 2016	**Chicken (Excl. Broilers), Dec. 1, 2016**	
	Quantity	**Number**	**Value**
	(Million Pounds)	(Number Head)	($1,000)
Nebraska	1,399	10,660	41,574
% of U.S.	0.7	2.2	2.0
U.S. Total	212,436	494,524	2,075,417
	Layers and Eggs, 2016		
	Avg. Number of Layers	**Eggs**	
	(1,000 Head)	(Million)	
Nebraska	8,844	2,570	
% of U.S.	2.4	2.5	
U.S. Total	365,336	101,953	

Source: U.S. Department of Agriculture, National Agricultural Statistics Service (USDA, NASS), *Agricultural Statistics, 2017,* **nass.usda.gov/**

which ranked first among the states in terms of this measure. Nebraska also led the nation in the commercial cattle slaughter in 2016, accounting for 24.7 percent of the total live weight.

Other livestock and livestock products, of which Nebraska produced significant quantities in 2016, include hogs (6.8 percent of the U.S. total, commercial slaughter), chickens excluding broilers (2.2 percent of the U.S. total inventory), and layers (2.4 percent of U.S. Total inventory), and egg production (2.5 percent of the total, U.S. eggs produced).

II. Nebraska Location Resources

In addition to the significant availability of raw materials and intermediate inputs, Nebraska offers a wide range of other locational advantages for food processors. In this section of the study, Nebraska resources and location attributes important to establishments in the food manufacturing industry are presented and discussed. An evaluation of geographically variable labor and energy costs for selected states is presented in Appendix A, which follows this section, using a model manufacturing establishment producing a representative food product.

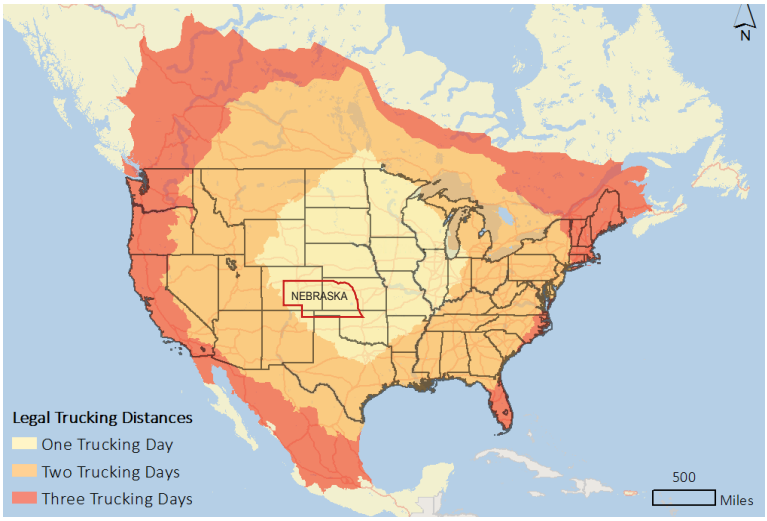
Nebraska lies near both the population and the geographic centers of the United States (Figure 3). The nation's population center moved across the Mississippi River for the first time in 1980 and continues to shift westward. The current population center is near Plano, Missouri, and the geographic center is in Butte County, South Dakota (the geographic center of the 48 contiguous states is Smith County, Kansas). Within one day, goods shipped by truck from Nebraska reach more than 25 percent of the U.S. population; add a second day and the percentage skyrockets to more than 90 percent.

In addition to being a prominent location for national markets, Nebraska is well situated to serve international markets, which are important to many food products manufacturers. For example, the Union Pacific's main railroad line in central Nebraska is the busiest freight corridor in the world; many of the trains carry grain to West Coast ports for shipment around the world. Also, the state currently has operating Foreign Trade Zones in Omaha (Zone No. 19, Grantee/Operator: Dock Board of the city of Omaha/Douglas Civic Center) and in Lincoln (Zone No. 59, Grantee/Operator: Lincoln Chamber of Commerce Foreign Trade Zone). Foreign trade zones reduce or eliminate duties and excise taxes by allowing "domestic activity involving foreign items to take place as if it were outside of U.S. Customs territory".

Access to Markets - Transportation

Nebraska's central location is especially advantageous for transportation services. The state's communities are connected by a good highway system that includes 8,539 miles of interstate, freeway, and arterial roads. That system includes a 455-mile stretch of Interstate 80, the most traveled east-west transcontinental route of the interstate highway system. North-south interstate highways that add to Nebraska's market include Interstate 29, which passes along the state's eastern border in Iowa, and Interstate 25, which passes in close proximity to the state's western border.

Figure 3
Truck Access to Regional and National Markets



Source: Nebraska Department of Economic Development. Legal Trucking Distances from Nebraska. Generated by Andrew Eckerson using ESRI Business Analyst Desktop.

More than 13,500 licensed motor carriers with worldwide connections are based in Nebraska and serve businesses throughout North America. Largely because of Nebraska's good interstate connections, the state is home to one of the largest trucking companies in the country, Werner Enterprises, headquartered in Omaha.

The nation's two largest rail companies—BNSF Railway Company and Union Pacific Railroad—provide rail service to many Nebraska communities. Ten freight railroads operate more than 3,200 miles of track throughout Nebraska. No major city in the United States is more than five days by rail from Nebraska. Amtrak provides passenger service in Nebraska with stops in five communities.

The Union Pacific (UP) maintains headquarters in Omaha and is one of the largest railroads in North America with 32,000 miles of track in the western two-thirds of the country. UP operates more than 1,000 miles of track in Nebraska. The Harriman Dispatching Center in Omaha is one of the most technologically advanced dispatching facilities in the country. Union Pacific's Bailey Yard in North Platte is the largest rail freight car classification yard in the world. The yard covers 2,850 acres, switches 10,000 rail cars daily, and has more than 300 miles of track. Union Pacific's main line in central Nebraska is the busiest rail freight corridor in the world, with more than 115 trains operating over the line every 24 hours.

BNSF Railway Company (BNSF) operates more than 1,500 route miles of track in Nebraska, is one of the state's primary railroads transporting two million carloads of freight in Nebraska each year, and employs more than 4,000 people in the state. BNSF has rail yards in Alliance, Lincoln, McCook, and Omaha; intermodal and automotive facilities in Omaha; and mechanical shops in Alliance and Lincoln.

Commercial airline service is available in nine Nebraska cities, providing direct service to major hubs. Scheduled air freight service is provided to five additional communities with on-demand service available. A total of 81 public-use airports are located throughout the state.

With the Missouri River forming Nebraska's eastern border, the state is a western terminus for barge traffic. Barges have access to both the Gulf of Mexico via the Mississippi River and to the Atlantic Ocean via the Great Lakes and the St. Lawrence Seaway.

Low Cost Utilities

In providing a full range of reliable utilities with many cost advantages, Nebraska offers additional benefits to food processors. Nebraska's electric rates for typical industrial customers are 19.1 percent less than the U.S. average and are among the lowest of the 48 contiguous states (Figure 4, next page). This benefit is of particular importance to the food manufacturing industry, with its high level of electricity use relative to total energy consumption. A statewide grid system with regional interconnections assures reliability of service and adequacy of supply.

One of the reasons for Nebraska's low electric rates is its close proximity to the vast low-sulfur coal fields of eastern Wyoming. It is also the only state in the nation with electric service provided entirely by public power. Nebraska's two largest utilities, Nebraska Public Power District (NPPD) and Omaha Public Power District (OPPD), have under their control an efficient and dependable "mix" of generating systems to supply current and projected needs; the mix includes coal, nuclear, hydro, wind, gas, oil, and diesel sources.

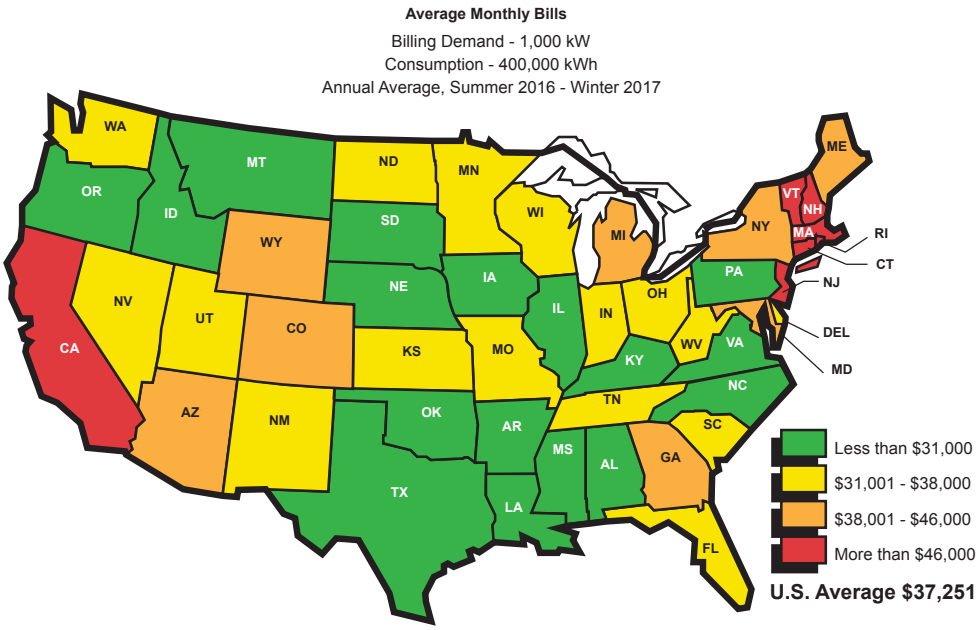
Some major electric-generating facilities in Nebraska are:

- 1,300-megawatt (MW) NPPD coal-fired Gerald Gentleman Station near Sutherland, Unit No. 1 on-line in 1979 and Unit No. 2 on-line in 1982
- 1,330-megawatt OPPD coal-fired plant at Nebraska City, Unit No. 1 on-line in 1979 and Unit No. 2 on-line in 2009
- 800-megawatt NPPD Cooper Nuclear Station near Brownville, on-line in 1974

NPPD owns and operates a 59 MW wind generation facility near Ainsworth. NPPD has

Figure 4

Electric Costs for Industrial Service, Summer 2016–Winter 2017



Source: Edison Electric Institute, "Typical Bills and Average Rates Report," January 1, 2017 and July 1, 2016. State averages are weighted using eight months of January 2017 data and four months of July 2016 data. Nebraska data represent the average for Omaha Public Power District, Lincoln Electric System, and Nebraska Public Power District using the same seasonal weighting.

long-term agreements to purchase 122 MW of wind generated power from Nebraska facilities located near Bloomfield, 80 MW from a facility near Petersburg, 75 MW from a facility located in Custer County, and 75 MW from a facility near Steele City.

Nebraska utilities also operate 12 hydroelectric plants and receive a power allotment from the Western Area Power Administration (WAPA) hydroelectric facilities on the Missouri River. The utilities operate with a reserve capacity that protects users against voltage reductions and brownouts. Furthermore, the utilities are members of the Mid-Continent Area Power Pool (MAPP), the Southwest Power Pool (SPP), and the Western System Power Pool (WSPP).

Natural gas in Nebraska is also attractive to industry for service, supply, and price. A gas-producing state, Nebraska is close and well connected by pipeline to the major gas fields of the central and southern plains. The state's average cost of industrial gas is less than both the regional and national averages.

The pipelines of two major companies, Northern Natural Gas and Kinder Morgan, provide an ample supply of natural gas to most areas of Nebraska. Depending on usage requirements, natural gas is offered both on a "firm" and "interruptible" basis.

High Quality Work Force

Any industry derives benefits from a productive and well-educated labor force. Nebraska's labor force has a strong work ethic and technical proficiency. Individuals with the foresight and diligence to transform it into a world center of agricultural production settled the state. Their descendants maintain a work ethic and mechanical aptitude that carry over into the state's manufacturing sector. Contributing to Nebraska's high labor productivity are very low absenteeism and labor turnover rates. Furthermore, Nebraska employers pay among the lowest unemployment insurance and workers' compensation costs in the nation.

Nebraska's work force quality is also highly rated by the state's employers and by various

national comparisons. In 2016, 90.9 percent of the state's population 25 years of age and older were high school graduates, compared to 87.5 percent nationally. In addition, the 2014–2015 Nebraska public high school graduation rate was 90.0 percent. One reason for the high graduation rate is the state's comparatively low student-teacher ratio—13.60:1 in 2014–2015 compared to 16.07:1 for the nation. Finally, Nebraska students consistently score above the U.S. average on both standardized achievement tests and college entrance exams. In 2017 Nebraska students averaged 21.4 on the ACT college entrance test, compared to 21.0 nationally. Moreover, Nebraska's average composite ACT score was achieved with 84.0 percent of graduates taking the exam, compared to 60.0 percent of graduates nationwide.

Higher Education Resources and Research

Companies within the food manufacturing industry can be major beneficiaries of flexible, state-of-the-art education resources helping assure a trained, technically skilled work force in Nebraska.

University of Nebraska System

The industry relies on the presence of quality institutions of higher learning for research, teaching, and a flow of skilled workers. The University of Nebraska (NU) system, with campuses in Lincoln, Omaha, and Kearney, has the largest facilities among the state's 20 colleges and universities and offers advanced degrees in most professional fields. It is a major center for both basic and applied research and has a combined student enrollment of more than 45,000.

Founded in 1869, the Lincoln campus of the University of Nebraska is the state's land-grant university. Nebraska was the first university west of the Mississippi to establish a graduate college (in 1896); today, NU is one of the top 50 American universities in the number of doctoral degrees granted annually. The University of Nebraska boasts 22 Rhodes scholars and 2 Nobel laureates among its alumni. In 2015, U.S. News & World Report recognized four University of Nebraska-Lincoln online programs as some of the top programs in the nation. These included NU's online graduate education, bachelor of science in applied science, master of engineering management programs, and the master of business administration. These programs are among the more than 100 degree, certificate, and endorsement online programs offered by the four campuses of the University of Nebraska system.

The Food Processing Center - University of Nebraska-Lincoln (**fpc.unl.edu**) is a major resource available to food manufactures. The Food Processing Center understands that food is both a science and a business but are also two different, yet interconnected worlds. The Food Processing Center at the University of Nebraska-Lincoln provides technical support to the food industry in product and process development as well as business assistance to small companies and entrepreneurs. Through a unique combination of science, engineering, and business development services that parallel the growing needs of the industry, the Food Processing Center supports the food industry by way of improving their market and economic vitality.

The mission statement of the Food Processing Center is to advance the value-added food manufacturing industry by partnering on technical and business development from idea through ongoing market support. The Center's goals are to stimulate the development of new food businesses, assist current manufacturers to become more efficient, productive, and diverse. The Food Processing Center assists new, as well as existing food processors, through educational programs for administrators, managers, and employees within the industry. Current programs and services are provided to meet the ever-changing challenges of the food industry, with new, innovative services and workshops continually added in order to meet these needs. All services are provided on a strictly confidential basis.

The Food Processing Center Team

The Food Processing Center team is made up of food scientists and business professionals that are wholly committed to providing services to the food industry. Services are provided to food processors ranging from micro-entrepreneur start-ups to established Fortune 500 food

companies. The Food Processing Center's team has access to state-of-the-art pilot plants and labs which allow them to provide outstanding assistance within the following service areas:

- Applied Research & Engineering
- Labeling & Regulatory Compliance
- Laboratory Services
- Pilot Plants
- Product & Process Development
- Professional Development Opportunities & Education
- Sensory Analysis Laboratory
- Small Business Development Services

The Food Processing professional team works in conjunction with the Food Science and Technology faculty as well as faculty in other departments within the University of Nebraska, such as Agricultural Economics, Animal Science, Agronomy and Horticulture, Plant Sciences, and Biological Systems Engineering.

Applied Research & Engineering

This unit, known as ARE, serves as the bridge between fundamental research and the food industry. ARE utilizes and adapts the findings of original scientific research to meet specific industry needs. ARE helps businesses improve efficiencies and sharpen their competitive edge.

Labeling & Regulatory Compliance

Understanding FDA and USDA labeling regulations can be a daunting task for any company. Labeling assistance and reviews are provided to ensure that packaging is in compliance with regulations.

Laboratory Services

From routine analysis to specialized research projects, the Food Processing Center provides rapid and accurate microbiological testing so companies can make appropriate decisions regarding the safety of their food products. These comprehensive services allow companies to bring safe products to the market and quickly address food safety issues.

Pilot Plants

The Food Processing Center has extensive equipment that can be used to produce samples or to develop, scale-up, and test product formulas and food ingredients. Utilizing the Center's equipment saves a company time and money in bringing finished products to the marketplace.

Product & Process Development

The Food Processing Center provides innovative formulation and process development for a wide range of food and beverage products. This includes concept and prototype development, scale-up, ingredient application, and line extensions.

Professional Development Opportunities

Providing the opportunity for employees to learn new skills and update their knowledge is critical for any company to remain viable in the marketplace. The Food Processing Center provides companies with a variety of unique educational and training opportunities so companies can continue to be successful.

Sensory Analysis Laboratory

Sensory analysis studies allow companies to better understand, determine, and target specific markets. The Center designs and conducts studies in their sensory facility to meet the objective of each client.

Small Business Development Services

Launched in 1989, the National Food Entrepreneur Program has helped thousands of entrepreneurs nationwide realize their dream of starting a food company. The program begins with the one-day Recipe to Reality Seminar and individualized consultation is provided through Product to Profit.

Other State Colleges

In addition to the University of Nebraska system, Nebraska operates a state college system with campuses at Chadron, Peru, and Wayne. A variety of private colleges and universities are also located in Nebraska including Creighton University in Omaha, Nebraska Wesleyan

Success Story: Apollo Foods

Friends & Sports Enthusiasts Launch Healthy Frozen Novelities

Apollo Food Group, LLC of Boston, MA, produces and markets healthy frozen Greek yogurt novelties under the brand name Yasso™ —a variation of the Greek word yassou which means hello.

Amanda Klane and Drew Herrington were standout high school athletes—Amanda in soccer and Drew in track and field—and went on to compete collegiately at the Division I level. In July of 2009, the duo teamed up to explore the idea of starting a food manufacturing business after Amanda was introducted to frozen Greek yogurt while working as a food broker. Inspired by the product, Amanda and Drew embarked on a journey to create a healthy, high protein frozen novelty product utilizing Greek yogurt.

To help with the development of their product, they began looking for outside assistance. After determining a private laboratory would be too expensive, they started exploring universities as a more affordable solution. They came across the Food Processing Center at the University of Nebraska-Lincoln and contacted Laurie Keeler, senior manager of Product Development, who has a background in the dairy industry and wide-ranging experience with developing novel food products.

Drew and Amanda worked with Laurie and her product development colleague, Julie Reiling, on the creation of a frozen dairy novelty utilizing Greek yogurt. The goal was a scalable formulation for mass production; one resulting in a high protein product containing less than 70 calories per 75-gram serving. The final product, Yasso™, was a healthy frozen Greek yogurt delivering 6 grams of protein and only 70 calories per bar.

Additional product attributes include:

- Made from probiotic-rich Greek style yogurt
- All natural
- Fat-free
- Gluten-free
- Made with rBST-free milk
- A good source of calcium
- No corn syrup or artificial sugars
- Kosher
- No added sodium

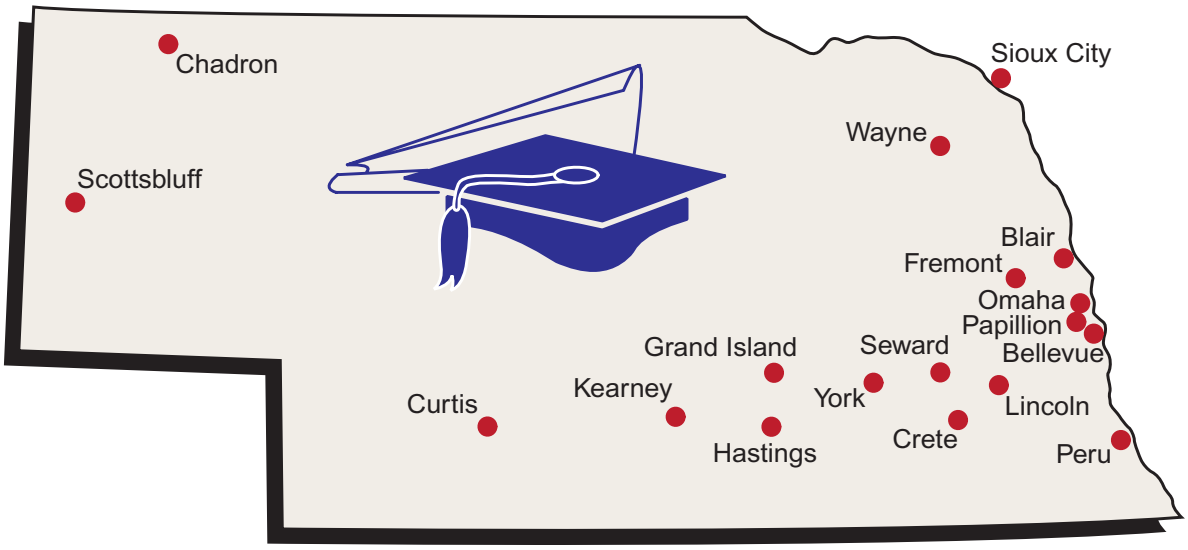
The first order of Yasso™ Greek yogurt bars was delivered to retailers in March 2011. As of 2015 the bars are available in more than 30 different retail chains nationwide with a heavy concentration on both coasts.

University in Lincoln, and others located throughout the state (see Figure 5A, next page).

Another important facet of higher education in Nebraska is the statewide community college system that provides specialized training programs for new and expanding industries. As indicated in Figure 5B (next page), the state has six community college areas, which provide services in 26 cities across the state. The colleges offer a full curricula of occupational courses, which provide a steady flow of skilled graduates to Nebraska industries. As examples, Hastings and Milford Community College campuses offer vocational/technical training in more than 50 different one-year and two-year programs. Training is accomplished through the extensive use of hands-on activities and is centered around practical application of technical knowledge gained in lecture and laboratory sessions.

Figure 5A

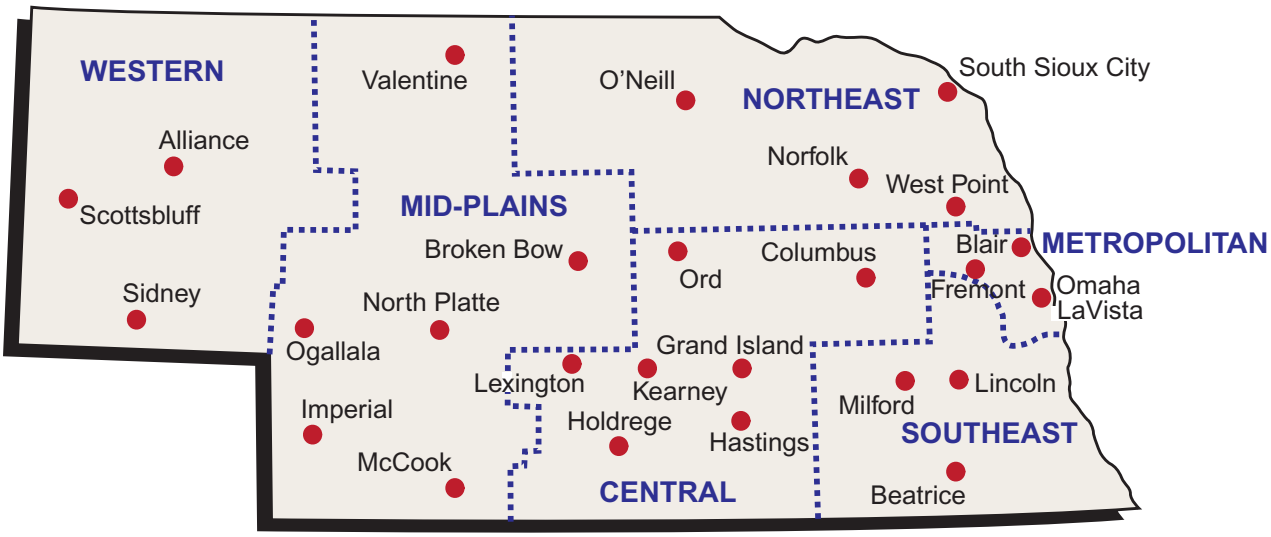
Location of Nebraska Area Colleges and Universities



Source: Nebraska Coordinating Commission for Postsecondary Education.

Figure 5B

Community Colleges in Nebraska



Source: Nebraska Community College System.

Performance-Based Tax Incentives

In 2005 the Nebraska Legislature enacted the Nebraska Advantage Tax Incentive Program and amended the program in 2008 and 2010. The Nebraska Advantage package replaced and improved on Nebraska's existing tax incentive programs and created a business climate that makes Nebraska the preferred location for business start-ups and expansions. The Nebraska Advantage rewards businesses that invest in the state and hire Nebraskans. In this progressive, pro-business climate, corporate income and sales taxes are reduced or virtually eliminated. Further information about the Nebraska Advantage is summarized in this study and is available at **opportunity.nebraska.gov/why-nebraska/incentives/**.

The legislative components of the Nebraska Advantage package include:

Nebraska Advantage Act (LB 312)

- Expanded incentives for six "tiers" of investment and/or job creation
- Small business advantage
- Research and development advantage
- Microenterprise tax credit advantage
- Rural development advantage
- State and local sales tax exemptions of manufacturing machinery, equipment, and related services

Qualified businesses for Tier One include scientific testing, research and development, manufacturing, and targeted export services. Qualified businesses for Tiers Two, Three, Four, and Five include the above plus data processing, telecommunications, insurance, financial services, distribution, storage, transportation, headquarters (administrative), and the production of electricity using renewable energy sources. All businesses other than retail qualify for Super Tier Six. Retail sales of tangible personal property to specified markets can also qualify under Tiers Two through Six.

Nebraska Agricultural Innovation Advantage (LB 90)

- Agriculture opportunities and value-added partnership act
- Building entrepreneurial communities act
- Ethanol production incentive cash fund enhancement

Other components in the Nebraska Advantage package are:

Nebraska Customized Job Training Advantage - Provides a flexible job training program with grants from $500 to $4,000 per job. Additional funds may be available for new jobs created in rural or high poverty areas. Companies can design their own training or a statewide training team can assist with training assessments, training plans, curriculum development, and instruction.

Nebraska Research and Development Advantage - Offers a refundable tax credit for research and development activities undertaken by a business entity. The credit is equal to 15 percent of the federal credit allowed under Section 41 of the Internal Revenue Code of 1986. The credit is increased to 35 percent of the federal credit allowed under Section 41, if the business firm makes expenditures on the campus of a Nebraska college or university or a facility owned by a college or university in Nebraska. An important feature—businesses with little or no income may take advantage of the tax credit by receiving a sales tax refund or a refundable income tax credit.

Nebraska Microenterprise Tax Credit Advantage - Provides a 20 percent refundable investment tax credit to micro businesses on new investment in targeted communities. Applicants may qualify for a maximum $10,000 throughout the life of the program. The credit is geared to companies with five or fewer employees, including start-ups. Credits are approved through an application process with the Nebraska Department of Revenue and evaluated on expected local economic impacts. The credits are earned on new expenditures for wages, buildings, certain expenses, and non-vehicle depreciable personal property.

Additional Tax Savings:

- Sales Tax Exemption On:
  - Manufacturing equipment
  - Manufacturing or processing raw materials
  - Common carrier vehicles
  - Utilities used in manufacturing
- No Tangibles Tax
- No Inventory Tax
- Sales Tax Refund on Pollution Control Equipment
- 100% Tax Exemption on Certain Personal Property

In a tax policy incentive, Nebraska determines the taxable income attributable to Nebraska operations using a single factor, or "sales only," formula. This method for determining corporate income tax allocation provides a significant advantage to multi-state unitary firms that sell products or services outside Nebraska. Nebraska also provides a capital gains exemption. State residents may elect, on a one-time basis, to subtract from their income tax liability the gain from the sale of capital stock of a corporation acquired during Nebraska-based employment with the corporation.

New Economic Development Initiatives

Nebraska has recently adopted several new legislative initiatives and programs designed to build Nebraska's innovation economy and foster new high-quality job opportunities. Additional information on all these initiatives can be viewed at **opportunity.nebraska.gov**.

Talent & Innovation Initiative (TI2) - The four-part TI2 was developed to enhance momentum in Nebraska's fastest growing industries, maintain Nebraska's world class workforce, and leverage private sector innovation.

Nebraska Internship Program (InternNE), LB 476, is a partnership with Nebraska businesses to create paid internship opportunities for full-time students who are in the eleventh or twelfth grade in a public or private high school, enrolled full time in a college, university, or other institution of higher education, or applies for an internship within six months following graduation from a college, university, or other institution of higher education. Grant awards are capped at ten per business, five per location. Internships must pay at least minimum wage and have a duration of at least 160 hours. Applications are accepted continuously and reviewed for consideration by-monthly. The program will reimburse a business 50 percent of their cost of wages paid, up to $5,000 per internship.

Business Innovation Act, LB 387, is intended to help businesses develop new technologies and leverage innovation to enhance quality job opportunities in the state. It will provide competitive matching grants for research, development, and innovation and will also help expand small business and entrepreneurial outreach efforts. Eligible grant activities may include: prototype development, product commercialization, applied research in the state, and support for small business and microenterprise lending.

Site & Building Development Fund, LB 388, makes state resources available to increase industrial site and building availability and support site ready projects. State funding will be focused initially on land and infrastructure development and building rehabilitation, with 40 percent of funding available to non-metro areas. Communities will provide matching funds. This program also makes funding available to assist with demolition of dilapidated residential and industrial buildings and offers direct support to communities that lose a major employer.

Angel Investment Tax Credit, LB 389, encourages investment in high-tech startup enterprises in Nebraska by providing a 35–40 percent refundable state income tax credit to qualified Nebraska investors investing in qualified early-state companies. Capped at $3,000,000 annually, the program requires a minimum investment of $25,000 for individuals and $50,000 for investment funds. Eligible small businesses must have fewer than 25 employees, with the majority based in the state.

Other Development Assistance Programs

Building on traditional advantages, Nebraska offers additional development assistance

programs. Among those programs are the following:

Tax Increment Financing (TIF) - An additional incentive program of note is Nebraska's Tax Increment Financing. TIF is a method of financing the public improvements associated with a private development project in a blighted area by using the projected increase in property tax revenue that will result from the private development.

Community Development Block Grants (CDBG) - Eligible businesses may be able to qualify for CDBG through local governments so they may make improvements to the public infrastructure serving the project site. Performance based loans of up to $1,000,000 may be awarded to qualifying companies creating new investments and jobs. Fifty-one percent of the new jobs must be held by or made available to low- or moderate-income persons. Other federal requirements apply. The program is administered by the Nebraska Department of Economic Development. More details are available at **opportunity.nebraska .gov**.

Industrial Revenue Bonds - All Nebraska counties and municipalities, as well as the Nebraska Development Finance Fund, are authorized to issue industrial revenue bonds to finance land, buildings, and equipment for industrial projects. No general election is required for an issue.

Other Financing Assistance - Supplementing traditional sources, financing assistance is also available through the Nebraska Investment Finance Authority, the Business Development Corporation of Nebraska, and the local development corporations. The Nebraska Department of Economic Development also administers development finance services, with staff helping assemble government financing with conventional financing to put together the best comprehensive package.

It is important to recognize the Nebraska Advantage package replaces and significantly enhances Nebraska's previous performance-based tax incentive programs. Those earlier incentives, the first of which was passed by the Nebraska Legislature in 1987, had a profound effect in stimulating business investment, expansion, and job creation. Nebraska's previous tax incentive programs contributed to substantial investment and job creation, including total investment of more than $23.5 billion and 121,000 jobs.

The combination of many factors, including Nebraska's attractive business climate, tax incentives, labor productivity, and effective job training programs as well as other positive attributes, has resulted in Nebraska's manufacturing sector significantly outperforming both that of the surrounding states and the U.S. as a whole. Manufacturing employment in Nebraska grew by 17.1 percent between 1990 and 2000. As the U.S. economy experienced two major recessions between 2000 and 2010, manufacturing employment in Nebraska declined but outperformed the Plains Region and the nation (Figure 6, next page). These data suggest that companies with Nebraska manufacturing plants benefit from location and other competitive advantages associated with doing business in Nebraska.

Quality of Life

For a potential newcomer to Nebraska, the state's livability is obviously also a consideration. Nebraska ranks high in quality of life studies. The state's landscape is clean and spacious, both in urban and rural areas. Residents blend Midwestern values with Western enthusiasm for growth and change. This helps create a high degree of citizen participation in both neighborhood and community-wide activities.

The cost of living in non-metropolitan Nebraska is consistently at or slightly below the national average. Data presented in Table 12 (next page) indicates on average, the cost of living in Nebraska is 7.7 percent below the U.S. average. Of particular interest is the cost of housing, which in Nebraska averages 14.2 percent less than for the U.S. as a whole for families owning a home and the cost of utilities, which is 26.2 percent less than the U.S. average.

Table 12

Cost of Living in Nebraska, Compared to the National Average, As of January 1, 2018

	All Items Index[a]	Consum-ables	Transpor-tation[b]	Health Services	Monthly Rent[c]	Home Value[c]	Utilities	Income/ Payroll Taxes
U.S. Average	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Nebraska	92.3	93.7	102.1	104.1	91.9	85.8	73.8	88.6
Omaha, NE	94.8	95.5	89.4	98.8	116.4	86.2	85.3	88.6
Lincoln, NE	98.6	96.5	104.8	107.0	104.6	99.4	71.4	88.6
Nonmetro NE [d]	88.0	92.6	104.8	104.8	81.8	80.1	71.4	88.6

[a] Cost of living values computed for a family of three with an annual income of $50,000.

[b] Transportation costs assumes ownership of two cars valued at $14,312 which, are driven a total of 20,000 miles annually.

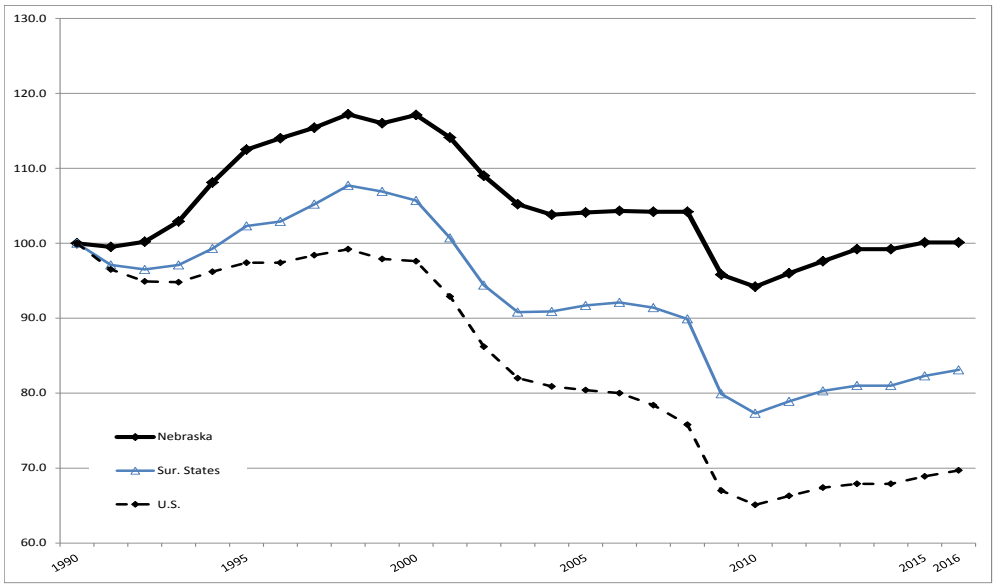
[c] Assumes a house of 1,613 square feet for both rental assumption and home value.

[d] Nonmetro Nebraska data represent the average of 14 Nebraska cities outside of the Omaha and Lincoln metropolitan areas. These cities include Beatrice, Columbus, Dakota City, Fremont, Grand Island, Hastings, Kearney, McCook, Norfolk, North Platte, O'Neill, Scottsbluff, South Sioux City, and Valentine, Nebraska.

Source: Index values computed from cost-of-living data obtained from Economic Research Institute (ERI), Relocation Assessor Database as of January 1, 2018.

Figure 6

Manufacturing Employment, Nebraska, Surrounding States, and the U.S., 1990–2016, 1990=100



Surrounding States include data for the states contiguous to Nebraska, as a group, including Colorado, Iowa, Kansas, Missouri, South Dakota, and Wyoming.

Source: Bureau of Labor Statistics, **bls.gov**.

CONCLUSIONS

This study concludes the food manufacturing industry is desirable for Nebraska and a Nebraska location is desirable for the industry. The locational advantages Nebraska offers appear well-suited to food products manufacturers. They cover a wide spectrum, ranging from an attractive business climate to a high quality of life at a relatively low cost, to the substantial raw materials and intermediate inputs Nebraska provides for food products manufacturers. But, as the study's model plant analysis demonstrates, in Appendix A, the competitive advantages Nebraska offers in important cost areas which vary geographically, such as labor and energy costs, are particularly noteworthy. The state's well-educated and productive labor force is a long-standing asset, as are its very favorable electric and natural gas rates.

Essentially, the analysis presented in this study was based on state-to-state comparisons applicable to the food manufacturing industry generally. Individual manufacturers will therefore need to further consider the locational requirements of their manufacturing as well as the merits of specific sites within states. Certainly in terms of a general location situation for food products manufacturers, Nebraska has much to offer.

The three organizations cooperating in the preparation of this study can also assist food manufacturers in assessing advantages in Nebraska for a specific new location or expansion project. To obtain this assistance, write or call:

Economic Development Department
NEBRASKA PUBLIC POWER DISTRICT
PO Box 499
Columbus, Nebraska 68602-0499
(402) 563-5534
(877) 275-6773
Email: mmplett@nppd.com
sites.nppd.com

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NEBRASKA *Advantage*

Business Development Division
NEBRASKA DEPARTMENT OF ECONOMIC DEVELOPMENT
PO Box 94666
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opportunity.nebraska.gov

Food Processing Center
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THE FOOD PROCESSING CENTER
University of Nebraska–Lincoln

APPENDIX A
LABOR AND ENERGY COST ANALYSIS

As shown in the previous sections, Nebraska offers a wide range of locational advantages for manufacturers of food and related products. In this appendix, labor and energy production cost factors that have geographic variability are analyzed. Such analysis permits the identification of the plant site providing the greatest advantage relative to these important input factors.

In the analysis of geographically variable labor and energy costs, the following procedures are used:

1) Selection of alternative plant locations for evaluation of the geographically variable labor and energy costs.
2) Definition of a model manufacturing plant for identifying labor and energy inputs and costs.
3) Evaluation of labor-related costs associated with each alternative plant location.
4) Evaluation of energy costs for each alternative plant location.

Alternative Plant Locations

Sixteen alternative plant locations were selected for comparison in this analysis. The plant locations essentially included two groups of states: (1) states that currently have the largest concentration of manufacturers of food products and (2) neighboring states that typically compete with Nebraska for industrial location projects. The first group of states includes California, Florida, Illinois, Indiana, Michigan, Minnesota, New Jersey, New York, Ohio, Pennsylvania, Texas, and Wisconsin. The second group of states includes Iowa, Kansas, Missouri, and Nebraska. Combined, these two groups of states account for 63.4 percent of the value added by manufacture in the food manufacturing industry (see Table A-1).

The Model Plant

To facilitate the analysis of the comparative labor and energy costs for the alternative states, it is useful to define a model plant for which the geographically variable costs can be quantified. The model plant is assumed to manufacture a product representative of the "Food Manufacturing Industry" (NAICS 311) as a whole. To specify the relevant labor and energy costs, information was obtained from the *Annual Survey of Manufactures, 2015,* and the U.S. Energy Administration *2014 Manufacturing Energy Consumption Survey.*

Table A-2 (following page) presents industry characteristics used in developing the model plant, which is assumed to employ 50 production workers. Estimated production worker hours total 104,000 annually or 2,080 hours per worker. Value added by manufacture is estimated to be $12,838,950 and the total annual output (value of shipments) is estimated to be $35,232,150. Energy inputs are estimated at 36,326 million BTUs, with all energy inputs supplied by electricity and natural gas.

Table A-1
Alternative Locations for a Model Plant for the Food Manufacturing Industry (NAICS 311)

State	Percent of Value Added by Manufacture [(a)]
Nebraska	**2.4**
California	10.7
Florida	2.0
Illinois	5.4
Indiana	3.1
Iowa	4.0
Kansas	2.2
Michigan	2.5
Minnesota	3.1
Missouri	2.8
New Jersey	1.8
New York	2.8
Ohio	5.1
Pennsylvania	4.9
Texas	5.7
Wisconsin	4.9
Total Selected States	**63.4**

[(a)] Percent of the 2015 U.S. total value added by manufacture for establishments in NAICS 311.

Source: U.S. Bureau of the Census, *Annual Survey of Manufactures,* 2015.

Table A-2

Characteristics of a Model Plant for the Food Manufacturing Industry (NAICS 311)

	Total Model Plant	Per Production Worker
Production Workers	50	- - -
Value Added [dollars] [a]	12,838,950	256,779
Total Output [dollars] [b]	35,232,150	704,643
Energy Inputs [million BTUs] [c]	36,326	727

[a] Estimated value added applies the 2015 value added per production worker for the Food Processing Industry (NAICS 311) to the model plant (see Table 4).

[b] Estimated value of shipments derived by applying the 2015 value of shipments per production worker to the model plant (see Table 4).

[c] Estimated by applying the 2015 ratio of energy inputs per production worker to the model plant (see Table A-3).

Source: Calculated from data presented in Table A-3 and from U.S. Bureau of the Census, Annual Survey of Manufactures, 2015.

Energy Used in the Model Plant

The assumption that the model plant is representative of the industry as a whole leads to the assumption that energy used in the plant also should be characteristic of industry use patterns. Part A of Table A-3 presents data estimating energy use for the industry in 2015. The estimated energy use for the model plant was derived using the ratio of energy inputs to industry value added. It was further assumed all energy inputs for the model plant are derived from electricity and natural gas.

Part B of Table A-3 indicates the model plant, employing 50 production workers, will have annual energy inputs of 36,325.6 million BTUs. Electric energy inputs are estimated to be 11,333.6 million BTUs (3,321,691 kWhs), or 31.2 percent of the total energy inputs, while natural gas inputs are estimated at 24,992.0 million BTUs, 68.8 percent of the total energy requirements.

Table A-3

Energy Use in Food Manufacturing Establishments

Part A

Estimated 2015 Industry Energy Inputs

	Trillion BTUs	Percent
Purchased Fuels and Electric Energy	799.7	100.0
Purchased Electric Energy	249.5	31.2
Purchased Fuels	550.2	68.8

Source: Energy use estimated from data from the U.S. Bureau of the Census, *Annual Survey of Manufactures, 2015* and *U.S. Energy Information Administration, 2014 Manufacturing Energy Consumption Survey.*

Part B

Energy Inputs for the Food Manufacturing Model Plant

	Million BTUs	Percent
Purchased Electricity	11,333.6 (3,321,691 kWhs)	31.2
Natural Gas	24,992.0	68.8
Total Energy Inputs	36,325.6	100.0

Source: Calculated from data in Table A-2 and Part A of this table.

Labor-Related Costs

Labor costs in the food manufacturing industry are affected by several factors: wage rates, productivity of workers, fringe benefits, and unemployment insurance and workers' compensation costs. Estimated labor-related costs for a model, food processing plant operating in Nebraska and in each of the 15 alternative state locations are presented in Table A-4 and Figure A-1 (next pages).

Table A-4 also includes data on wage rates for the states identified as alternative plant locations. An analysis of state wage levels indicates Nebraska's food manufacturing production workers have hourly earnings, which are significantly less than all but two of the alternative plant sites. For example, 2015 average hourly earnings for Nebraska food processing workers ($18.39) are 3.2 percent less than the average hourly wage rates for the other 15 states included as alternative plant locations.

The Nebraska costs for unemployment insurance and workers' compensation are significantly less

FOOD FROM THOUGHT

The Food Processing Center

eCreamery, Personalized Ice Cream Gifts

Becky App and Abby Jordan wanted to provide gift-givers a new personalized gift; something the receiver would like and that would connect the gift to the receiver in a way only the giver could communicate.

The model for **eCreamery.com** materialized in 2006 when their investor, Mark Hasebroock, purchased an existing, though somewhat dysfunctional, website that allowed users to create custom ice creams. Immediately, Abby and Becky had the idea to move away from customized self-purchase and create a space that invited personalized gifting.

To learn more about the intricacies of starting a food business Abby and Becky attended the Food Processing Center's seminar "From Recipe to Reality." This nationally recognized workshop is specifically designed for food entrepreneurs and provides an overview of the marketing, business, and technical apsects that need to be taken into consideration.

The education they received from this course included information on federal and state regulations, packaging requirements, distribution channels, and valuable contacts with industry experts. The pair subsequently worked on recipe development, distribution (shipping), and revamping the website. The duo launched **eCreamery.com** in mid-2007.

In 2011 Abby and Becky were approached by The Food Processing Center to take part in a new initiative pioneered by Gallup, Inc. Since that time, Gallup has been adapting their globally validated behavioral economic sciences/systems specifically to help entrepreneurs increase sales, profits, and ultimately, to sustainably grow their businesses. The end product—the Entrepreneur Acceleration System (EAS)—uses one-on-one mentoring to facilitate an entreprise's growth strategy.

Since Recipe to Reality and the knowledge that The Food Processing Center has been able to give to **eCreamery .com**, they have seen tremendous sales and growth. As people continue to learn ice cream gifts exist and the public's comfort level with shipping frozen foods increases, **eCreamery.com** is confident in the continued growth of their company. Currently, as they look towards expansion they have begun researching ways to lower shipping costs to their customers. Production and distribution capabilities on either coast are their latest move in order to better serve the needs of their target audience.

Table A-4

Total Annual Labor-Related Costs for a Model Plant for the Food Manufacturing Industry (NAICS 311)

Plant Location	Hourly Wage Rate	Number of Production Workers	Total Payroll	Workers' Compensation Insurance	Unemployment Insurance	Social Security [a]	Fringe Benefits[b]	Total Labor Costs	Cost Difference Other States (-) Nebraska	Cost Relative Other States (/) Nebraska
Nebraska	**$18.39**	**50**	**$1,912,600**	**$31,940**	**$5,355**	**$146,314**	**$573,780**	**$2,669,989**	**$0**	**100.0**
California	18.36	50	1,909,400	61,865	12,984	146,069	572,820	2,703,138	33,149	101.2
Florida	19.36	50	2,013,400	33,422	5,638	154,025	604,020	2,810,505	140,516	105.3
Illinois	19.70	50	2,048,800	45,688	15,571	156,733	614,640	2,881,432	211,443	107.9
Indiana	19.64	50	2,042,600	21,447	11,439	156,259	612,780	2,844,525	174,536	106.5
Iowa	20.44	50	2,125,800	39,540	18,707	162,624	637,740	2,984,411	314,422	111.8
Kansas	17.65	50	1,835,600	25,882	8,444	140,423	550,680	2,561,029	-108,960	95.9
Michigan	19.58	50	2,036,300	31,970	15,476	155,777	610,890	2,850,413	180,424	106.8
Minnesota	18.58	50	1,932,300	36,907	12,560	147,821	579,690	2,709,278	39,289	101.5
Missouri	17.61	50	1,831,400	35,163	10,256	140,102	549,420	2,566,341	-103,648	96.1
New Jersey	19.02	50	1,978,100	57,761	20,374	151,325	593,430	2,800,990	131,001	104.9
New York	19.42	50	2,019,700	57,158	12,522	154,507	605,910	2,849,797	179,808	106.7
Ohio	19.86	50	2,065,400	29,948	11,153	158,003	619,620	2,884,124	214,135	108.0
Pennsylvania	19.94	50	2,073,800	38,158	25,508	158,646	622,140	2,918,252	248,263	109.3
Texas	16.50	50	1,716,000	24,882	7,894	131,274	514,800	2,394,850	-275,139	89.7
Wisconsin	19.43	50	2,020,700	41,626	16,368	154,584	606,210	2,839,488	169,499	106.3

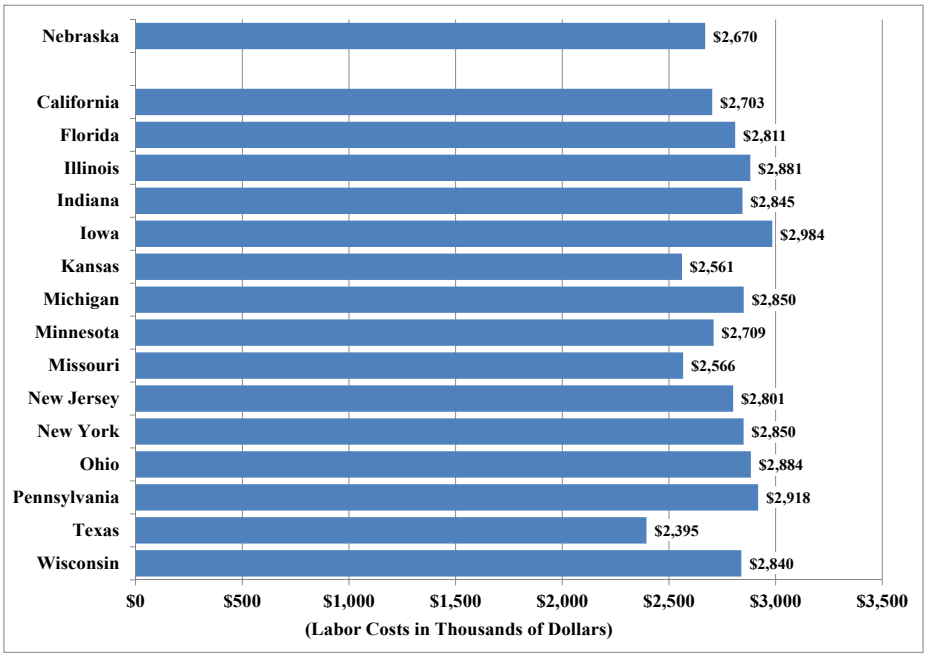
[a]Employer Social Security costs are 7.65 percent of payroll (wages).

[b]Fringe benefit costs are assumed to be 30 percent of payroll.

Sources: Oregon Department of Consumer & Business Services, *Oregon Workers' Compensation Premium Rate Rankings Calendar Year 2016, October 2016.*
U.S. Department of Labor, Bureau of Labor Statistics, August 2016.
U.S. Bureau of the Census, *Annual Survey of Manufactures, 2015* .
U.S. Department of Labor, Employment and Training Administration, *Unemployment Insurance Data, 2017.*

Figure A-1

Estimated Total Labor Costs* for a Model Plant for the Food Manufacturing Industry, Alternative Plant Locations



*Calculated labor costs include wages, workers' compensation insurance, unemployment insurance, social security, and fringe benefits.

Source: See Table A-4.

than the other states. In the case of unemployment insurance contributions, the average cost per employee for the 15 alternative states is estimated at $273.13, 155.3 percent higher than the Nebraska cost of $107.00. Insurance rates for workers' compensation average $1.95 per $100 of payroll for the 15 alternative states, 16.9 percent more than Nebraska's rate of $1.67.

If located in Nebraska, the model plant has a significant labor cost advantage over the alternative locations. The Nebraska labor cost advantage reaches as high as $314,422 in annual savings when compared to Iowa. When compared to the average labor costs for the 15 alternative locations, Nebraska's annual labor cost advantage is $103,249 or 3.7 percent lower.

Energy Costs

The availability and cost of energy are increasingly important factors in the industrial location process. Rates for industrial electricity and natural gas for the alternative plant locations are presented in Table A-5 (next page). For both energy sources, Nebraska's rates are substantially less than all but one of the alternative locations. The average electric rate for a 1,000 kW billing demand with monthly usage of 400,000 kWhs for the 15 alternative plant sites is $0.0919 per kWh or 20.7 percent more than the Nebraska rate of $0.0761.

In the case of industrial rates for natural gas, the average for the 15 other states is 31.4 percent more than the Nebraska rate of $4.04 per million BTUs.

Table A-5 and Figure A-2 (following page) provide an analysis of the energy costs for the operation of the model plant. The total energy costs for the alternative locations include the cost for the assumed level of electrical energy and natural gas inputs for the operation of the plant.

Nebraska provides a significant energy cost savings compared to the average of the alternative plant locations. When considering the California and New Jersey locations, energy costs are more than 50 percent greater than the Nebraska energy costs. In the case of the California plant location, energy costs exceed the Nebraska costs by 93.6 percent. When compared to the average total energy costs for the 15 alternative states, Nebraska energy costs are 19.2 percent lower, translating into an average annual savings of $84,029.

Table A-5

Annual Energy Costs for a Model Plant for the Food Manufacturing Industry (NAICS 311)

Plant Locations	Electricity Rate[a]	Electricity Cost	Natural Gas Rate[b]	Natural Gas Cost	Total Energy Cost	Cost Difference Other States (-) Nebraska	Cost Relative Other States (/) Nebraska
Nebraska	**$0.0761**	**$252,847**	**$4.04**	**$100,968**	**$353,815**	**$0**	**100.0**
California	0.1551	515,161	6.79	169,696	684,857	331,042	193.6
Florida	0.0904	300,364	5.77	144,204	444,568	90,753	125.6
Illinois	0.0753	250,107	5.03	125,710	375,817	22,002	106.2
Indiana	0.0894	296,884	4.99	124,710	421,594	67,779	119.2
Iowa	0.0713	236,961	4.70	117,462	354,423	608	100.2
Kansas	0.0876	290,947	3.69	92,220	383,167	29,352	108.3
Michigan	0.0959	318,550	5.75	143,704	462,254	108,439	130.6
Minnesota	0.0870	289,037	4.19	104,716	393,753	39,938	111.3
Missouri	0.0912	302,938	6.29	157,200	460,138	106,323	130.1
New Jersey	0.1249	414,813	6.59	164,697	579,510	225,695	163.8
New York	0.0975	323,906	5.92	147,953	471,859	118,044	133.4
Ohio	0.0790	262,497	4.81	120,212	382,709	28,894	108.2
Pennsylvania	0.0700	232,452	7.40	184,941	417,393	63,578	118.0
Texas	0.0718	238,597	2.65	66,229	304,826	-48,989	86.2
Wisconsin	0.0917	304,582	5.05	126,210	430,792	76,977	121.8

[a] Electric rate is cost per kWh using the average per kWh cost for 1,000 kW monthly demand with 400,000 kWh of consumption. The model plant is assumed to use 321,691 kWh annually.

[b] Natural Gas rate is per million BTUs. The model plant is assumed to use 24,992 million BTUs annually.

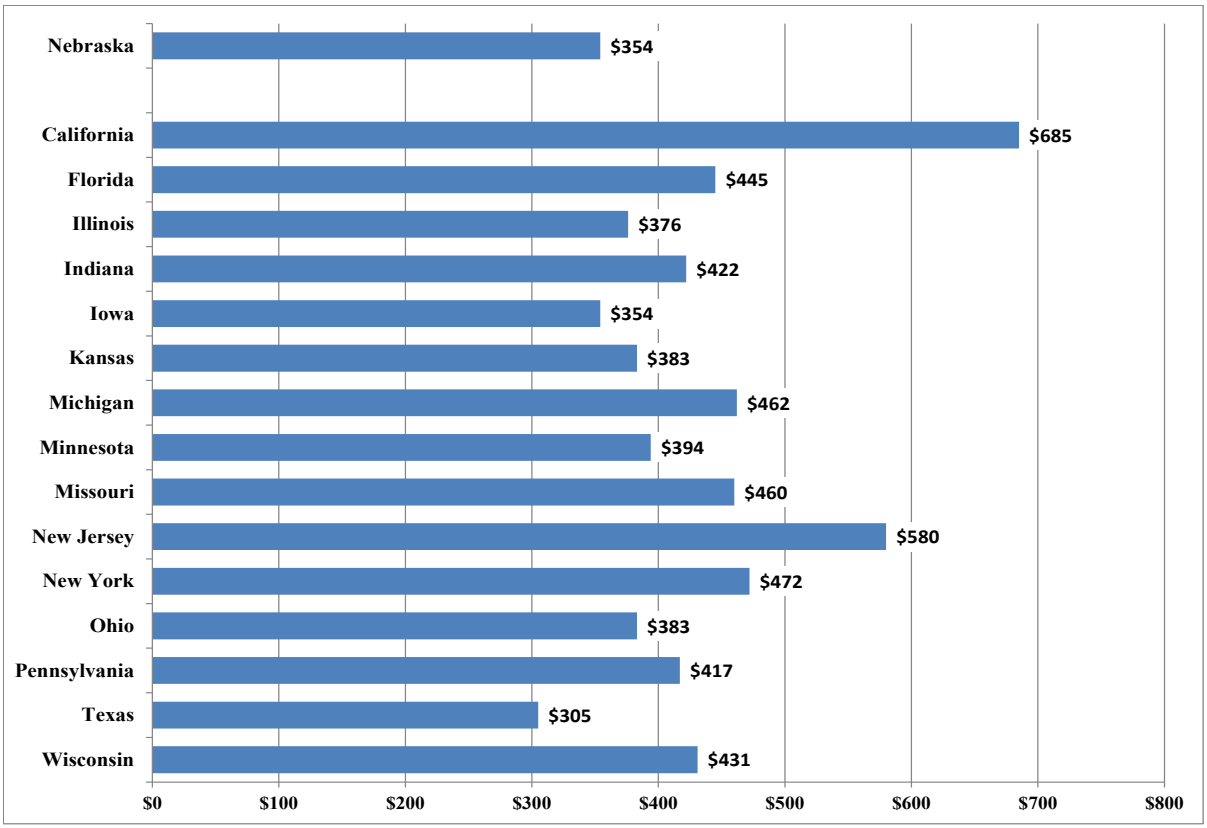
Sources:

Natural Gas: U.S. Energy Information Administration, *Natural Gas Data*, **eia.gov/dnav/ng/ng_pri_sum_a_epg0_prs_dmcf_m.htm. Accessed October 2017**.

Electric: Edison Electric Institute, "Typical Bills and Average Rates Report," July 1, 2016 and January 1, 2017. State averages are weighted using four months of July 2016 data and eight months of January 2017 data. Nebraska data represent the average for Omaha Public Power District, Lincoln Electric System, and Nebraska Public Power District using the same seasonal weighting.

Figure A-2

Estimated Total Energy Costs* for a Model Plant for the Food Manufacturing Industry, Alternative Plant Locations



(Energy Costs in Thousands of Dollars)

*Calculated energy costs include electricity and natural gas costs.

Source: See Table A-5.

Labor and Energy Cost Summary

Combining the labor and energy cost findings, the results of the model plant analysis are summarized in Table A-6. As the table shows, the comparative annual cost advantage associated with the Nebraska location reaches a high of $364,191 when compared to the California site. When considering the average labor and energy costs for the 15 alternative states, the cost advantage of the Nebraska location is $187,278 annually, or 5.8 percent less than the average costs for the other 15 plant sites considered.

Conversely, the average labor and energy costs for the alternative states are 6.2 percent more than the costs associated with a Nebraska location. Inescapable from these results is the conclusion that, in terms of major labor and energy input costs, manufacturers of food products with Nebraska facilities have a clear competitive advantage over manufacturing establishments in the industry not so fortunately located.

Table A-6

Summary of Labor and Energy Costs for a Model Plant for the Food Manufacturing Industry (NAICS 311)

Plant Locations	Total Labor Cost	Total Energy Cost	Total Labor and Energy Cost	Cost Difference Other States (-) Nebraska	Cost Relative Other States (/) Nebraska
Nebraska	**$2,669,989**	**$353,815**	**$3,023,804**	**$0**	**100.0**
California	2,703,138	684,857	3,387,995	364,191	112.0
Florida	2,810,505	444,568	3,255,073	231,269	107.6
Illinois	2,881,432	375,817	3,257,249	233,445	107.7
Indiana	2,844,525	421,594	3,266,119	242,315	108.0
Iowa	2,984,411	354,423	3,338,834	315,030	110.4
Kansas	2,561,029	383,167	2,944,196	-79,608	97.4
Michigan	2,850,413	462,254	3,312,667	288,863	109.6
Minnesota	2,709,278	393,753	3,103,031	79,227	102.6
Missouri	2,566,341	460,138	3,026,479	2,675	100.1
New Jersey	2,800,990	579,510	3,380,500	356,696	111.8
New York	2,849,797	471,859	3,321,656	297,852	109.9
Ohio	2,884,124	382,709	3,266,833	243,029	108.0
Pennsylvania	2,918,252	417,393	3,335,645	311,841	110.3
Texas	2,394,850	304,826	2,699,676	-324,128	89.3
Wisconsin	2,839,488	430,792	3,270,280	246,476	108.2

Source: Calculated from data presented in Tables A-4 and A-5.

January 2018

Nebraska Public Power District (NPPD), Nebraska's largest electric utility, is proud of the areas it serves and has published this document in an effort to assist in the economic development of the NPPD service area. For more information on Nebraska as a business location, contact the Economic Development Department, Nebraska Public Power District, General Offices, 1414 15th Street, P.O. Box 499, Columbus, Nebraska 68602, (877) 275-6773. Visit our web site at **sites.nppd.com**.

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