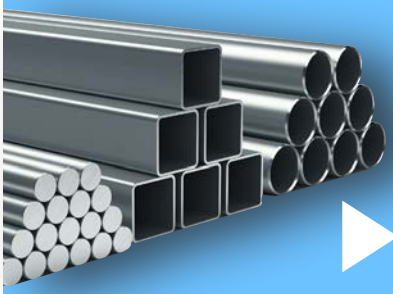

NEBRASKA

PROFIT OPPORTUNITIES FOR MANUFACTURERS OF

▶ FABRICATED METAL PRODUCTS

http://econdev.nppd.com

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EXECUTIVE SUMMARY

The "Fabricated Metal Product Manufacturing" subsector (NAICS 332) is the second largest manufacturing subsector, when measured by employment, in the United States. As fabricated metal product manufacturers continue to deal with slow growth in the U.S. and global economies, they face a variety of challenges, including rapidly increasing foreign and domestic competition, and opportunities that include expanding national and global markets.

This study has been developed specifically for use by fabricated metal product manufacturers to show how a Nebraska plant location can help them better respond to market conditions and significantly improve their competitive positions. Discussed are the many locational advantages the state offers, including performance-based tax incentives that enhance the state's high-ranking business climate.

As the U.S. economy experienced two major recessions between 2000 and 2009, manufacturing employment in Nebraska outperformed the Plains Region and the nation. This suggests that companies with Nebraska manufacturing plants benefit from location and other competitive advantages associated with doing business in Nebraska.

Nebraska's attractive business climate, a productive and well-educated labor force, competitive labor and energy costs, and central location are among the wide range of advantages the state offers manufacturers.

For an industry characterized by many small- and medium-sized production facilities, Nebraska provides substantial advantages in reducing costs, expanding capacity, and otherwise becoming more competitive.

Included in this study are example companies that have recently expanded their operation in Nebraska. These companies have found Nebraska to be a place to grow their companies and their profits.

Also 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 of the "Fabricated Metal Product Manufacturing" subsector (NAICS 332).

Sixteen states are examined in the analysis. These states include the top eight states in terms of value of shipments by the Fabricated Metal Product Manufacturing subsector and 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 15 alternative states, Nebraska is found to offer an annual savings of $295,447 in labor-related costs, which is 10.4 percent less than the average labor costs for the other states.

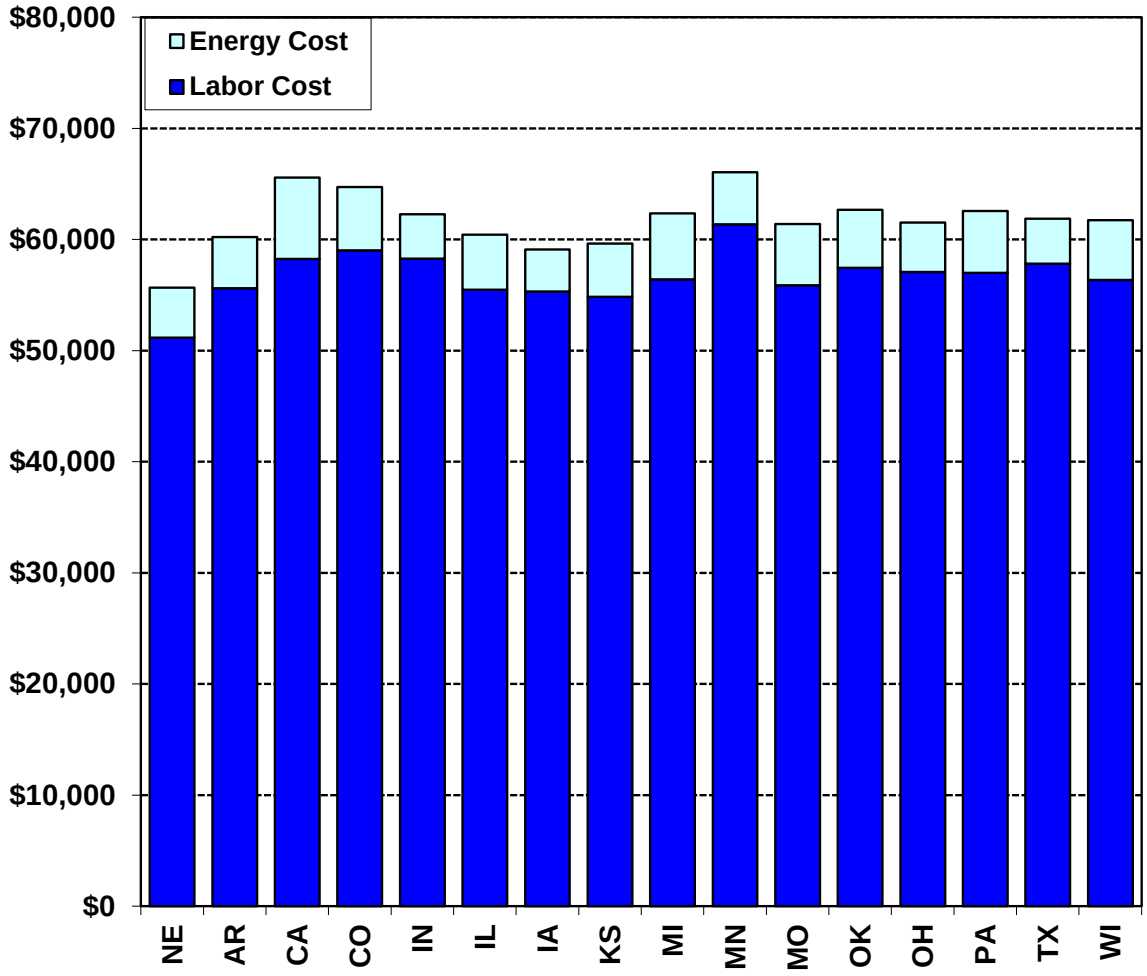
This study also concludes that a Nebraska plant location offers a significant energy cost advantage when compared to the average cost of the other 15 states. Industrial electric rates in the alternative states average 9.1 percent higher, and the average industrial gas rate is 22.3 percent more. Combining these advantages, Nebraska's energy cost for the model plant is 11.1 percent less than the average for the other 15 alternative locations.

Together, Nebraska's annual labor and energy costs for the model plant are $323,520, or 10.4 percent less than the average costs for the 15 alternative states. Conversely, the average labor and energy costs in the other 15 states are 11.6 percent more than the Nebraska labor and energy costs.

Figure 1 provides a summary of the labor and energy costs for the model plant for each of the 16 alternative states. These costs are shown on a per-production-worker basis.

Figure 1

Labor and Energy Costs per Production Worker for Fabricated Metal Product Manufacturers (NAICS 332)



Calculated labor (wages, workers' compensation insurance, unemployment insurance, social security, and fringe benefits) and energy (electricity and natural gas) costs for a fabricated metal product manufacturer (NAICS 332).

Source: Table A-6.

YES, NEBRASKA IS READY TO COMPETE

The opening of the impressive $17 million Omaha Steel Castings plant in Wahoo sends an important message: Nebraska Can Compete.

At a time when our country is focusing on raising workforce skill levels and taking advantage of new opportunities in manufacturing, Omaha Steel Castings shows the importance of embracing nimble, efficient business practices that meet the requirements of an intensely competitive global economy.

High performance in the manufacturing sector doesn't just happen. More than ever, it requires skilled, hardworking employees, a forward-looking business culture, and top-flight equipment.

Nebraska can buttress such economic performance with supports that include sensible tax and regulatory policies, strong worker training programs, properly prepared industrial tracts, and competitive electrical prices.

Omaha Steel Castings soon will shift all of its 175 employees to the new Wahoo plant, with a goal of doubling production and increasing employment to at least 250. This will be a terrific economic boost to Wahoo and Saunders County, with an overall estimated economic effect of some $32 million annually.

Nebraska's largest steel-producing facility, the Nucor Steel Complex in Norfolk, has exemplified that innovative spirit. Last month, the Nebraska Chamber of Commerce and Industry saluted Nucor's business acumen by designating it Nebraska's large-scale manufacturer of the year for business innovation.

Primary metals manufacturing is the 10th-largest manufactuing sector in Nebraska, according to the U.S. Bureau of Economic Analysis.

The U.S. steel industry has faced strong competitive pressures for decades, and some communities across the country have been hit hard. It's a tribute to the vision and skill of Nebraska's steel sector that it continues to stand tall.

Indeed, it exemplifies the forward-thinking mind-set that's crucial for competing in the 21st century.

Excerpts from October 14, 2013, Omaha World Herald editorial.

PART A

THE FABRICATED METAL PRODUCT MANUFACTURING SUBSECTOR

The "Fabricated Metal Product Manufacturing" subsector (NAICS 332) is the second largest manufacturing subsector[1], when measured by employment, in the United States. The 2012 Census of Manufactures indicates the fabricated metal product sector accounted for 12.3 percent of total employment by U.S. manufacturers. In 2012, fabricated metal product manufacturing establishments represented 18.7 percent of total U.S. manufacturing establishments and 5.9 percent of value of shipments.

As the data shown in Table 1 indicate, the value of shipments for the "Fabricated Metal Product Manufacturing" subsector in the U.S. totaled $339,774.5 million in 2012. Value added in the industry totaled $180,393.5 million, with total employees numbering 1,385,900 and production workers numbering 1,023,100. Capital expenditures for the subsector totaled $12,360.8 million in 2012.

Data for the 2002–2012 review period provided in Table 1 show declines in total "Fabricated Metal Product Manufacturing" subsector employment and the number of production workers from 2002–2005, increases in employment from 2005–2007, declines from 2007–2010, with dramatic employment declines from 2008–2009, and increases from 2010 to 2012. The declines in employment from 2002–2005 and from 2007–2010 are typical of the employment reductions in manufacturing following the recessions of 2001 and 2007–2009.

Table 1

The Fabricated Metal Product Manufacturing Subsector (NAICS 332), Characteristics and Trends, Selected Years, 2002–2012

Year	Total Employees	Production Workers	Value Added	Value of Shipments	Capital Expenditures	Avg. Hourly Earnings, Prod. Wrkrs.
	- - - - (Thousands) - - - -			- - - - (Million $) - - - -		($)
2002	1,574.8	1,169.2	138,972.0	247,059.5	7,964.3	11.27
2003	1,487.6	1,110.9	137,451.7	245,339.2	6,661.2	15.81
2004	1,468.5	1,082.0	144,994.8	261,100.5	7,209.4	16.26
2005	1,463.4	1,081.4	155,800.8	272,154.8	7,706.2	16.80
2006	1,491.8	1,110.9	169,321.7	298,368.9	8,340.3	17.33
2007	1,612.0	1,182.7	185,333.4	345,166.7	10,580.0	17.74
2008	1,570.3	1,152.2	189,113.7	358,257.0	11,324.3	18.45
2009	1,284.0	926.1	146,435.3	280,939.0	7,297.7	18.79
2010	1,236.2	902.3	156,888.3	293,889.0	7,866.1	19.72
2011	1,285.7	947.2	172,967.5	326,797.0	10,418.1	20.27
2012	1,385.9	1,023.1	180,393.5	339,774.5	12,360.8	20.41

Data for the subsector and industries as defined by the 2012 definition for NAICS 332, *Fabricated Metal Product Manufacturing.*

Source: U.S. Bureau of the Census, *Census of Manufactures, Geographic Series 2002 and 2007; Industry Series: Detailed Statistics by Industry for the United States: 2012;* and *Annual Survey of Manufactures, 2006, 2009, and 2011.*

[1]The North American Industrial Classification System (NAICS)—used by the statistical agencies of the United States, Canada, and Mexico—employs a hierarchical classification structure consisting of: *"National Industries," "NAICS Industries," "Sectors," "Subsectors,"* and *"Industry Groups."* For example, the *"U.S. Industry"* Industrial Valve Manufacturing (NAICS 332911) is part of *"NAICS Industry"* Metal Valve Manufacturing (NAICS 33291), *"NAICS Industry Group"* Other Fabricated Metal Product Manufacturing (NAICS 3329), *"NAICS Subsector"* Fabricated Metal Product Manufacturing (NAICS 332), and *"NAICS Sector"* Manufacturing (NAICS 31-33).

Between 2002 and 2007, the value of "Fabricated Metal Product Manufacturing" subsector shipments grew by 39.7 percent while the number of production workers increased by only 1.2 percent. From 2007–2012, subsector shipments declined by 1.6 percent and the number of production workers decreased by 13.5 percent. For the entire 10-year period from 2002–2012, the value of subsector shipments increased by 37.5 percent and the number of production workers declined by 12.5 percent.

Worker productivity increased significantly from 2002 to 2012, with output per production worker increasing 60.3 percent. During the 2002–2012 period, the value of shipments of fabricated metal product manufacturers adjusted for price changes[2] decreased 2.3 percent and the average hourly wage of production workers adjusted for price changes[3] increased 49.1 percent. During the Recession of 2007–2009, the levels of employment and output in the Fabricated Metal Product Manufacturing subsector declined dramatically. From 2008–2010, the number of production workers declined by 21.7 percent, output declined by 18.0 percent, and output per worker increased by 3.9 percent.

I. Industry Structure

The *2007 North American Industrial Classification System (NAICS)* divides the "Fabricated Metal Product Manufacturing" subsector (NAICS 332) into nine 4-digit NAICS industry groups shown in Table 2. As a subsequent table will show, these nine 4-digit industry groups are further subdivided into fourteen 5-digit NAICS industries.

The data presented in Table 2 provide a basic description of the "Fabricated Metal Product Manufacturing" subsector with further disaggregation into the major 4-digit NAICS industry groups. The table also provides insights into the relative sizes and growth in industry shipments of the industry groups.

For the "Fabricated Metal Product Manufacturing" subsector as a whole, industry shipments grew by 39.7 percent between 2002 and 2007 before declining by 1.6 percent from 2007 and 2012. "Forging and Stamping" (NAICS 3321) was the fastest growing

Table 2

The Fabricated Metal Product Manufacturing Subsector (NAICS 332), Value of Industry Shipments by Major Industry Group, 2002, 2007, and 2012

NAICS	Industry Subgroup	Value of Shipments			% Change		% of Total
		2002	2007	2012	2002–2007	2007–2012	2012
		- - - (Million $) - - -			(%)	(%)	(%)
332	**Fabricated Metal Product Manufacturing**	**247,059.5**	**345,166.7**	**339,774.5**	**39.7**	**-1.6**	**100.0**
3321	Forging and Stamping	21,374.1	33,510.5	34,488.4	56.8	2.9	10.2
3322	Cutlery and Handtool Manufacturing	10,721.4	11,009.5	9,893.5	2.7	-10.1	2.9
3323	Architectural and Structural Metals Manufacturing	60,045.5	91,084.0	75,700.0	51.7	-16.9	22.3
3324	Boiler, Tank, and Shipping Container Manufacturing	23,297.9	31,703.8	35,100.8	36.1	10.7	10.3
3325	Hardware Manufacturing	10,406.3	9,587.4	7,142.3	-7.9	-25.5	2.1
3326	Spring and Wire Product Manufacturing	9,034.8	9,603.1	9,019.2	6.3	-6.1	2.7
3327	Machine Shops and Threaded Product Mfg.	42,840.4	60,974.5	66,964.9	42.3	9.8	19.7
3328	Coating, Engraving, Heat Treating, and Allied Activities	18,931.9	26,619.8	26,825.3	40.6	0.8	7.9
3329	Other Fabricated Metal Product Manufacturing	50,407.2	71,074.1	74,640.1	41.0	5.0	22.0

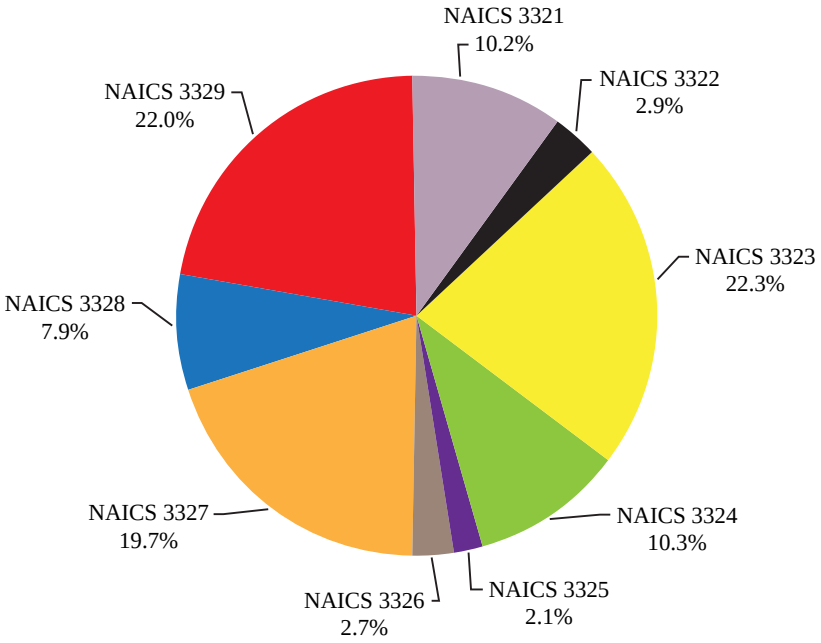
Due to rounding percentages do not total 100 percent.
Source: U.S. Bureau of the Census, *Census of Manufactures, Summary Series 2002 and 2007* and *Industry Series: Detailed Statistics by Industry for the United States: 2012* .

[2]Values adjusted using U.S. Bureau of Labor Statistics, *Producer Price Index for Fabricated Metal Products*.
[3]Values adjusted using U.S. Bureau of Labor Statistics, *Consumer Price Index for All Urban Workers*.

industry group during the pre-recession, 2002–2007 period, with industry shipments growing by 56.8 percent. The value of industry shipments for "Architectural and Structural Metals Manufacturing" (NAICS 3323), the second fastest growing industry group during the 2002–2007 period, grew 51.7 percent. Other "Fabricated Metal Product Manufacturing" subgroups experienced relatively faster growth in value of shipments between 2002 and 2007 included "Machine Shops and Threaded Product Manufacturing" (NAICS 3327), recorded a 42.3 percent increase; "Other Fabricated Metal Product Manufacturing" (NAICS 3329), recorded a 41.0 percent increase; and "Coating, Engraving, Heat Treating, and Allied Activities" (NAICS 3328), recorded a 40.6 percent increase.

Figure 2

Value of Shipments by Industry Group, Fabricated Metal Product Manufacturers (NAICS 332), 2012



Total 2012 Shipments - $339,774.5 Million

NAICS 3321 Forging and Stamping

NAICS 3322 Cutlery and Handtool Manufacturing

NAICS 3323 Architectural and Structural Metals Manufacturing

NAICS 3324 Boiler, Tank, and Shipping Container Manufacturing

NAICS 3325 Hardware Manufacturing

NAICS 3326 Spring and Wire Product Manufacturing

NAICS 3327 Machine Shops and Threaded Product Manufacturing

NAICS 3328 Coating, Engraving, Heat Treating, and Allied Activities

NAICS 3329 Other Fabricated Metal Product Manufacturing

Due to rounding percentages do not total 100 percent.
Source: Table 2.

The data in Table 2 and Figure 2 (previous pages) show the relative importance of fabricated metal product manufacturing subgroups, in terms of value of shipments for each industry group. "Architectural and Structural Metals Manufacturing" (NAICS 3323) is the largest industry group, accounting for 22.3 percent of total industry shipments. "Other Fabricated Metal Product Manufacturing" (NAICS 3329 – 22.0 percent), is the second largest industry group when measured by value of shipments, followed by "Machine Shops and Threaded Product Manufacturing" (NAICS 3327 – 19.7 percent); "Boiler, Tank, and Shipping Container Manufacturing" (NAICS 3324 – 10.3 percent); "Forging and Stamping" (NAICS 3321 – 10.2 percent); "Coating, Engraving, Heat Treating, and Allied Activities" (NAICS 3328 – 7.3 percent); "Cutlery and Handtool Manufacturing" (NAICS 3322 – 2.9 percent); "Spring and Wire Product Manufacturing" (NAICS 3326 – 2.7 percent); and "Hardware Manufacturing" (NAICS 3325 – 2.1 percent).

The data in Table 3 (next page) provide further detail for the "industry groups." Data showing the number of companies, establishments, employees, production workers, value added, value of shipments, and capital expenditures for 2012 are shown for the "Fabricated Metal Product Manufacturing" subsector (NAICS 332) as a whole and for NAICS 4-digit industry groups and 5-digit NAICS industries that make up the subsector. As noted previously, "Architectural and Structural Metals Manufacturing" (NAICS 3323) is the largest industry group, in terms of industry shipments.

The data in Table 3 show that "Machine Shops and Threaded Product Manufacturing" (NAICS 3327) is the largest industry group in terms of number of companies, number of establishments, total employees, production workers, value added, and capital investment. Also shown in Table 3, "Machine Shops" (NAICS 33271) is the largest 5-digit, NAICS industry in terms of number of companies, number of establishments, total employees, production workers, value added, and capital expenditures, while "All Other Fabricated Metal Product Manufacturing" (NAICS 33299) is the largest NAICS industry in terms of value of shipments.

Omaha Steel Castings Expands in Wahoo

From start to finish the plant can turn out finished steel castings in four weeks. That's one-half to one-third the time of most competitors, and saving time means savings to our customers. Omaha Steel, a leading producer of steel and stainless steel castings, built a new $17-million, 150,000-square-foot, steel foundry in Wahoo, Nebraska. ***"Everything we've done with the plant is lean process,"*** *said Phil Teggart, owner of Omaha Steel Castings Co.* ***"We can now compete worldwide."***

The company's goal is to double production and increase employment to at least 250 as the economy recovers and orders increase from heavy equipment maker customers. ***"The new plant is much more automated than the old one,"*** *he said, "****with less handling of the heavy casting molds and faster processes."*** *More than 95 percent of the sand and other materials used in the process is reused.*

Table 3

The Fabricated Metal Product Manufacturing Subsector (NAICS 332), Number of Companies and Establishments, Employment, Value of Shipments, Value Added, and Capital Expenditures by Major Sector and Industry Subgroups, 2012

NAICS Code	Industry Description	Number of Companies	Number of Establishments	All Employees	Production Workers	Value Added	Value of Shipments	Capital Expenditures
						----- (Thousand $) -----		
332	**Fabricated Metal Product Manufacturing**	**52,483**	**55,400**	**1,385,932**	**1,023,115**	**180,393,525**	**339,774,503**	**12,360,833**
3321	Forging and Stamping	2,332	2,531	111,044	83,759	15,181,989	34,488,412	1,366,009
33211	Forging and Stamping	2,332	2,531	111,044	83,759	15,181,989	34,488,412	1,366,009
3322	Cutlery and Handtool Manufacturing	1,104	1,188	35,484	25,242	6,389,454	9,893,488	402,072
33221	Cutlery and Handtool Manufacturing	1,104	1,188	35,484	25,242	6,389,454	9,893,488	402,072
3323	Architectural and Structural Metals Manufacturing	11,485	12,318	318,759	229,360	36,318,393	75,700,033	1,977,106
33231	Plate Work and Fabricated Structural Product Manufacturing	4,536	4,931	143,789	103,525	17,671,187	40,003,531	1,049,777
33232	Ornamental and Architectural Metal Products Manufacturing	6,949	7,387	174,970	125,835	18,647,206	35,696,502	927,329
3324	Boiler, Tank, and Shipping Container Manufacturing	1,241	1,523	87,790	65,879	14,804,863	35,100,841	802,370
33241	Power Boiler and Heat Exchanger Manufacturing	267	317	24,160	16,549	3,814,890	7,058,823	133,902
33242	Metal Tank (Heavy Gauge) Manufacturing	623	700	34,824	26,286	4,575,378	9,394,490	194,136
33243	Metal Can, Box, and Other Container Manufacturing	351	506	28,806	23,044	6,414,595	18,647,528	474,332
3325	Hardware Manufacturing	553	607	25,682	17,264	3,852,207	7,142,268	145,333
33251	Hardware Manufacturing	553	607	25,682	17,264	3,852,207	7,142,268	145,333
3326	Spring and Wire Product Manufacturing	1,161	1,300	39,080	29,152	4,302,913	9,019,197	361,609
33261	Spring and Wire Product Manufacturing	1,161	1,300	39,080	29,152	4,302,913	9,019,197	361,609
3327	Machine Shops and Threaded Product Manufacturing	23,339	23,750	386,671	292,583	42,139,523	66,964,897	4,074,682
33271	Machine Shops	19,031	19,240	246,334	183,711	25,655,596	38,927,421	2,408,269
33272	Turned Product and Screw, Nut, and Bolt Manufacturing	4,308	4,510	140,337	108,872	16,483,927	28,037,476	1,666,413
3328	Coating, Engraving, Heat Treating, and Allied Activities	5,290	5,762	125,125	98,079	16,306,299	26,825,254	937,357
33281	Coating, Engraving, Heat Treating, and Allied Activities	5,290	5,762	125,125	98,079	16,306,299	26,825,254	937,357
3329	Other Fabricated Metal Product Manufacturing	5,978	6,421	256,297	181,797	41,097,884	74,640,113	2,294,295
33291	Metal Valve Manufacturing	1,039	1,258	95,572	65,352	17,087,708	31,872,075	875,644
33299	All Other Fabricated Metal Product Manufacturing	4,939	5,163	160,725	116,445	24,010,176	42,768,038	1,418,651

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

II. Industry Production Characteristics

The manufacture of fabricated metal products encompasses a very large and diverse industry. In 2007, 60,895 establishments were primarily engaged in fabricated metal product manufacturing, a decrease of 2.1 percent from 2002 (see Table 4). It is interesting to note that the number of small establishments, as measured by employment, declined while the number of larger establishments increased during this period. Between 2002 and 2007, establishments in the "Fabricated Metal Product Manufacturing" subsector (NAICS 332) employing 20 or more workers increased by 789 or 4.6 percent, while those with fewer than 20 employees decreased by 2,113 or 4.7 percent.

The data presented in Table 4 compares selected characteristics of the "Fabricated Metal Product Manufacturing" subsector as a whole for 2002, 2007, and 2012. During the 2002–2012 period, total employment in the subsector declined by 12.0 percent. All of the reduction occurred between 2007 and 2012. During the same 2007–2012 period, the number of production workers in the subsector decreased by 12.5 percent with production workers' hours declining 11.0 percent. For the 2007–2012 period, total employment in the "Fabricated Metal Product Manufacturing" subsector decreased by 226,100 or 14.0 percent and the number of production workers declined from 1,182,700 to 1,023,100, a reduction of 159,600 or 13.5 percent.

As shown in Table 4, between 2002 and 2007, the "Fabricated Metal Product Manufacturing" subsector experienced substantial increases in cost of materials (49.3 percent) and the cost of purchased fuels (55.9 percent) with both increases exceeding the increase in the value of shipments (39.7 percent). During the same 2002 to 2007 period, the increases in labor costs (17.7 percent) and electric energy costs (23.2 percent) were less than the increase in value of shipments.

Table 4

Production Characteristics for the Fabricated Metal Product Manufacturing Subsector (NAICS 332), 2002, 2007, and 2012

				Percent Change		
	2002	2007	2012	2002-2007	2007-2012	2002-2012
Establishments						
Number	62,219	60,895	55,400	-2.1	-9.0	-11.0
With 20+ Employees	17,197	17,986	15,997	4.6	-11.1	-7.0
All Employees						
Number [thousands]	1,574.8	1,612.0	1,386	2.4	-14.0	-12.0
Payroll [million $]	57,534.9	67,709.1	67,498	17.7	-0.3	17.3
Production Workers						
Number [thousands]	1,169.2	1,182.7	1,023.1	1.2	-13.5	-12.5
Hours [millions]	2,321.7	2,404.8	2,067.0	3.6	-14.0	-11.0
Wages [million $]	36,607.7	42,663.5	42,189.8	16.5	-1.1	15.2
Average Hourly Wage [$]	15.77	17.74	20.41	12.5	15.1	29.4
Value Added by Manufacture [million $]	138,972.0	185,333.4	180,393.5	33.4	-2.7	29.8
Cost of Materials [million $]	108,101.2	161,447.7	160,558.0	49.3	-0.6	48.5
Value of Shipments [million $]	247,059.5	345,166.7	339,774.5	39.7	-1.6	37.5
Cost of Purchased Fuels and Electric Energy						
Electric Energy [million $]	2,522.5	3,107.2	3,250.1	23.2	4.6	28.8
Purchased Fuels [million $]	1,259.4	1,964.0	1,136.9	55.9	-42.1	-9.7
Quantity of Purchased Electric Energy [million kWh]	40,922.8	47,621.1	41,291.8	16.4	-13.3	0.9

Source: U.S. Bureau of the Census, *Census of Manufactures, Geographic Serices 2002; Census of Manufactures, Summary Series 2007* and *Industry Series: Detailed Statistics by Industry for the United States: 2012.*

The increase in cost of materials, primarily increases in steel and aluminum, during the 2002–2007 period was a major concern for fabricated metal product manufacturers. The Recession of 2007–2009 drastically reduced the demand for manufactured goods and temporarily eased the pressure on material prices. The rebound in the global and U.S. economies that began in 2009 is likely to spark renewed increases in the prices of materials.

Table 5 provides data for selected additional production characteristics for fabricated metal product manufacturing for 2012. The industry data presented in Table 5 are for "Fabricated Metal Product Manufacturing" (NAICS 332) as a whole; the "Machine Shops and Threaded Product Manufacturing" industry group (NAICS 3327) and the balance of the industry, excluding the "Machine Shops and Threaded Product Manufacturing" industry group.

As the data in Table 5 indicate, there were 52,483 companies and 55,400 establishments in the "Fabricated Metal Product Manufacturing" subsector in 2012. Establishments in the "Machine Shops and Threaded Product Manufacturing" industry group totaled 23,750 in 2012, or 42.9 percent of total sector establishments. Data on the distribution of manufacturing establishments by number of employees demonstrate that the industry consists of a large number of small establishments. In 2012, the average establishment in the "Fabricated Metal Product Manufacturing" subsector employed 18.5 production workers; 39,403 or 71.1 percent of the establishments had less than 20 employees; and only 5.2 percent had more than 100 employees.

Data in Table 5 show that, on average, establishments in the "Machine Shops and Threaded Product Manufacturing" industry group are much smaller than those in the balance of the "Fabricated Metal Product Manufacturing" subsector. In 2012, 78.7 percent of "Machine Shops and Threaded Product Manufacturing" establishments had fewer than 20 employees, only 2.6 percent had more than 100 employees,

Table 5

Establishment Characteristics for the Fabricated Metal Product Manufacturing Subsector (NAICS 332), Machine Shops and Threaded Product Manufacturing Industry Group (NAICS 3327), and Balance of Subsector, 2012

	NAICS 332 Fabricated Metal Product Manufacturing	NAICS 3327 Machine Shops and Threaded Product Manufacturing	Other Fabricated Metal Products
Number of Companies	52,483	23,339	29,144
Number of Establishments	55,400	23,750	31,650
Est. - with 20+ Employees	15,997	5,062	10,935
Est. - with 20+ Emp (% of Total)	28.9	21.3	34.5
Est. - with 100+ Employees	2,867	609	2,258
Est. - with 100+ Emp (% of Total)	5.2	2.6	7.1
Establishments per Company	1.06	1.02	1.09
Production Workers	1,023,115	292,583	730,532
Average Prod. Workers per Establishment	18.5	12.3	23.1
Value Added (Million $)	180,393.5	42,139.5	138,254.0
Per Establishment ($1,000)	3,256.2	1,774.3	4,368.2
Per Production Worker ($)	176,317.9	144,025.8	189,251.1
Value of Shipments (Million $)	339,774.5	66,964.9	272,809.6
Per Establishment ($1,000)	6,133.1	2,819.6	8,619.6
Per Production Worker ($)	332,098.1	228,874.9	373,439.6

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

and the average number of production workers per establishment was 12.3, 66.5 percent, of the subsector average. For the "Machine Shops and Threaded Product Manufacturing" industry group, 2012 average value added per establishment, $1.8 million, was 54.5 percent of the subsector average and 2012 value of shipments per establishment, $2.8 million, was 46.0 percent of the subsector average.

III. Industry Location Characteristics

Showing the geographic distribution of the "Fabricated Metal Product Manufacturing" subsector (NAICS 332), Table 6 presents data on employment, wages, capital expenditures, and value of shipments for 16 selected states. As indicated in the table, the 16 states accounted for $211.1 billion or 64.6 percent, of the $326.8 billion of value of shipments by Fabricated Metal Product Manufacturers in 2011.

Included in these states are the top eight states in terms of value of shipments by the "Fabricated Metal Product Manufacturing" subsector and other states near Nebraska with which it typically competes for industrial location projects. The 16 states are included in this study as alternative sites for plant locations and are evaluated in Part B of this report using the geographically variable labor and energy costs.

In terms of employment, the "Fabricated Metal Product Manufacturing" subsector is largest in California followed by Texas and Ohio. In terms of value of shipments, Ohio ranked first followed by Texas and California. As the data presented in Table 6 indicate, the 16 states included in this study accounted for 63.9 percent of the production workers and 64.6 percent of the total value of shipments by the "Fabricated Metal Product Manufacturing" subsector in 2011.

Ohio, with 71,942 production workers, led the nation in fabricated metal product manufacturing in 2011. Ohio's value of shipments of $28,704.6 million accounted for 8.7 percent of the U.S. total.

Table 6

Fabricated Metal Product Manufacturing Subsector (NAICS 332), Production Workers, Average Wages, Capital Expenditures, and Value of Shipments, Selected States and the U.S., 2011

State	Employees (1,000)	Production Workers (1,000)	Average Hourly Earnings ($)	Capital Expenditures ($1,000)	Value of Shipments ($1,000)	% of U.S. Value of Shipments (%)
Nebraska	**7,629**	**5,440**	**18.23**	**59,069**	**2,119,706**	**0.6**
Arkansas	13,290	10,288	19.82	76,210	4,826,774	1.5
California	125,189	90,973	20.48	903,724	27,138,650	8.3
Colorado	13,390	9,638	21.02	126,626	3,721,242	1.1
Illinois	84,750	62,967	20.50	792,087	22,292,532	6.8
Indiana	49,666	37,966	19.81	337,757	14,082,726	4.3
Iowa	17,787	12,896	19.60	122,618	4,126,006	1.3
Kansas	14,247	9,954	19.53	107,326	3,287,889	1.0
Michigan	64,316	48,009	19.94	589,781	15,392,312	4.7
Minnesota	38,179	27,119	21.70	351,496	10,268,895	3.1
Missouri	28,036	20,515	19.90	149,355	6,588,073	2.0
Ohio	97,406	71,942	20.41	921,315	28,704,566	8.8
Oklahoma	21,409	15,868	20.16	198,260	6,838,061	2.1
Pennsylvania	72,589	52,851	20.12	612,069	18,846,494	5.8
Texas	107,657	82,173	20.59	1,017,348	28,529,431	8.7
Wisconsin	63,015	46,885	19.91	461,758	14,332,952	4.4
Total Selected States	818,555	605,484	20.30	6,826,799	211,096,309	N/A
Percent of U.S.	63.7	63.9	100.2	65.5	64.6	64.6
Total U.S.	1,285,707	947,242	20.27	10,418,072	326,796,980	100.0

N/A - Not Available.

Source: U.S. Bureau of the Census, *Annual Survey of Manufactures , Geographic Area Statistics: 2011.*

The data in Table 7 show the shipment characteristics for fabricated metal products. As the data in Table 7 indicate, the average shipping distance for fabricated metal products in 2007 was 596 miles, which was 82.7 percent of the 721-mile average for all manufacturing industries.

Table 7

Shipment Characteristics for the Fabricated Metal Products Manufacturing Subsector (NAICS 332) and Selected Commodities, 2007

	Value (Mil. $)	Tons (1,000s)	Ton-miles (Millions)	Value Per Ton	Average Miles
Total Fabricated Metal Products (NAICS 332)	**338,290**	**118,350**	**44,620**	**2,858**	**596**
Selected Standard Classification of Transported Goods (SCTG) Commodities					
Pipes and Tubes (SCTG 3311)	75,999	45,561	18,243	1,668	243
Pipe and tube fittings (SCTG 3312)	45,275	13,172	5,181	3,437	355
Structures and Parts, Except Prefabricated buildings (SCTG 3320)	85,291	30,351	11,741	2,810	426
Nails, Screws, Bolts, Nuts, Washers, Staples Except in Strips, and Similar Fastening Articles (SCTG 3331)	39,814	7,830	2,987	5,085	552
Hand Tools and Cutlery, Except of Precious Metals (SCTG 3332)	18,642	1,584	1,330	11,769	730
Interchangeable Tools for Hand- or Machine-Tools (SCTG 3333)	17,594	877	444	20,062	723
Locks, Mountings and Fittings, Racks and Similar Fixtures, and Automatic Door Closers (SCTG 3334)	19,278	2,534	1,148	7,608	586
Containers of a Capacity Not Exceeding 300 Litres, Except Containers for Compressed or Liquified Gas (SCTG 3391)	17,683	7,129	2,486	2,480	865
Other (SCTG 3399)	68,717	22,886	8,783	3,003	733

Source: U.S. Bureau of the Census, 2007 Commodity Flow Survey.

IV. Capital Expenditures and Industry Outlook

Capital investment in the "Fabricated Metal Product Manufacturing" subsector (NAICS 332) was $12,360.8 million in 2012, which was $4,396.5 million or 55.2 percent higher than in 2002 and $1,780.8 million or 10.8 percent higher than in 2007. As data in Table 8 demonstrate, the rates of change in capital expenditures varied significantly both among the industry groups and over the 2002–2007 and 2007–2012 time periods. The "Machine Shops and Threaded Product Manufacturing" (NAICS 3327) recorded the greatest percent increase in capital expenditures (99.8 percent) between 2002 and 2012, followed by "Forging and Stamping" (NAICS 3321 – 78.8 percent), "Other Fabricated Metal Product Manufacturing" (NAICS 3329 – 56.6 percent), "Boiler, Tank, and Shipping Container Manufacturing" (NAICS 3324 – 46.8 percent), "Spring and Wire Product Manufacturing" (NAICS 3326 – 38.2 percent), "Coating, Engraving, Heat Treating, and Allied Activities" (NAICS 3328 – 36.3 percent), "Cutlery and Handtool Manufacturing" (NAICS 3322 – 29.2 percent) and "Architectural and Structural Metals Manufacturing" (NAICS 3323 – 21.5 percent. "Hardware Manufacturing" (NAICS 3325) experienced a 44.4 percent decrease over the period 2002–2012.

Economic growth of the "Fabricated Metal Product Manufacturing" subsector is dependent on many factors, including the overall performance of the U.S. economy, economic and business conditions internationally, and the competitive position of U.S. fabricated metal product manufacturers relative to their foreign competitors. Over the longer term, the "Fabricated Metal Product Manufacturing" subsector is expected to record slow, positive growth in output, accompanied by moderate declines in employment.

As indicated by the data presented in Table 9 (next page), employment in the "Fabricated Metal Product Manufacturing" subsector is projected to increase by 5.8 percent between 2012 and 2022. During the same period, real output is projected to increase 28.8 percent, which is about the same as the projected 27.2 percent increase for the entire manufacturing sector. The "Architectural and Structural Metals Manufacturing" industry group (NAICS 3323) is projected to experience the greatest growth in employment, 20.2 percent, and

Table 8

Capital Expenditures in the Fabricated Metal Product Manufacturing Subsector (NAICS 332), by Industry Subgroup, 2002, 2007, and 2012

NAICS	Industry Group	Capital Expenditures ($1,000)			% Change		2012 Cap. Exp. as Percent of Total
		2002	2007	2012	2002–2007	2007-2012	
332	**Fabricated Metal Product Manufacturing**	**7,964,345**	**10,580,048**	**12,360,833**	**32.8**	**16.8**	**100.00**
3321	Forging and Stamping	764,074	1,081,224	1,366,009	41.5	26.3	11.05
3322	Cutlery and Handtool Manufacturing	311,117	376,092	402,072	20.9	6.9	3.25
3323	Architectural and Structural Metals Manufacturing	1,627,545	2,052,244	1,977,106	26.1	-3.7	15.99
3324	Boiler, Tank, and Shipping Container Manufacturing	546,527	788,318	802,370	44.2	1.8	6.49
3325	Hardware Manufacturing	261,189	221,716	145,333	-15.1	-34.5	1.18
3326	Spring and Wire Product Manufacturing	261,660	230,479	361,609	-11.9	56.9	2.93
3327	Machine Shops and Threaded Product Manufacturing	2,039,249	2,942,008	4,074,682	44.3	38.5	32.96
3328	Coating, Engraving, Heat Treating, and Allied Activities	687,846	880,895	937,357	28.1	6.4	7.58
3329	Other Fabricated Metal Product Manufacturing	1,465,138	2,007,072	2,294,295	37.0	14.3	18.56

Source: U.S. Bureau of the Census, *Census of Manufactures, Geographic Series 2002 and Summary Series 2007,* and *Industry Series: Detailed Statistics by Industry for the United States: 2012.*

Table 9

Employment and Output, Fabricated Metal Product Manufacturing Subsector (NAICS 332), by Industry Subgroup, and for All Manufacturing, 2002, 2012, and Projected 2022

NAICS	Industry Sector / Subgroup	Part A -- Employment				
		Thousands of Jobs			Avg. Ann. Rate of Change	
		2002	2012	2022	2002-12	2012-22
31-33	**Manufacturing**	**15,258.7**	**11,918.9**	**11,369.4**	**-2.4**	**-0.5**
332	**Fabricated Metal Product Manufacturing**	**1,548.4**	**1,411.4**	**1,493.3**	**-0.9**	**0.6**
3321	Forging and Stamping	113.2	99.0	94.9	-1.3	-0.4
3322	Cutlery and Handtool Manufacturing	64.4	39.6	35.4	-4.7	-1.1
3323	Architectural and Structural Metals Manufacturing	399.1	341.4	410.4	-1.5	1.9
3324	Boiler, Tank, and Shipping Container Manufacturing	95.8	96.5	98.9	0.1	0.2
3325	Hardware Manufacturing	42.1	25.0	19.4	-5.1	-2.5
3326	Spring and Wire Product Manufacturing	70.0	41.6	31.3	-5.1	-2.8
3327	Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing	318.4	362.3	372.8	1.3	0.3
3328	Coating, Engraving, Heat Treating, and Allied Activities	149.1	136.1	141.7	-0.9	0.4
3329	Other Fabricated Metal Product Manufacturing	296.3	269.9	288.4	-0.9	0.7

NAICS	Industry Sector / Subgroup	Part B -- Value of Output				
		Billions of Chained-Weighted 2005 Dollars[(a)]			Avg. Ann. Rate of Change	
		2002	2012	2022	2002-12	2012-22
31-33	**Manufacturing**	**4,320.8**	**4,407.6**	**5,604.8**	**0.2**	**2.4**
332	**Fabricated Metal Product Manufacturing**	**267.6**	**258.4**	**332.8**	**-0.4**	**2.6**
3321	Forging and Atamping	23.5	24.5	29.1	0.4	1.7
3322	Cutlery and Handtool Manufacturing	11.0	16.0	16.8	3.8	0.5
3323	Architectural and Structural Metals Manufacturing	65.5	65.2	88.4	0.0	3.1
3324	Boiler, Tank, and Shipping Container Manufacturing	25.8	20.2	22.1	-2.4	0.9
3325	Hardware Manufacturing	10.9	19.5	25.6	6.0	2.7
3326	Spring and Wire Product Manufacturing	9.8	13.1	18.9	2.9	3.7
3327	Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing	46.4	35.6	48.5	-2.6	3.2
3328	Coating, Engraving, Heat Treating, and Allied Activities	20.2	19.4	25.5	-0.4	2.8
3329	Other Fabricated Metal Product Manufacturing	54.4	45.3	57.9	-1.8	2.5

[(a)] Output shown in billions of chain-weighted constant (2005) dollars.

Source: Employment Projections Program, U.S. Department of Labor, U.S. Bureau of Labor Statistics.

the third greatest output growth, 35.6 percent, between 2012 and 2022. The "Spring and Wire Product Manufacturing" industry group (NAICS 3320) is projected to experience the greatest increase in real output (44.3 percent) and the largest decline in employment, (a decrease of 24.8 percent) from 2012 to 2022.

On balance, the factors affecting firms producing fabricated metal products will depend to a great extent on the ability of companies 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 individual companies that can control costs and respond to emerging and changing market opportunities will be significantly enhanced. Part B of this study discusses how establishments producing fabricated metal products can better respond to market conditions and significantly improve their competitive positions with a Nebraska location.

Tejas Tubular Products, Inc. Announces Expansion to Norfolk, NE

Tejas Tubular Products, Inc., a leading manufacturer of Oil Country Tubular Goods for the petroleum industry, announced in late January that they would be expanding to Norfolk, Nebraska.

"It's great that Tejas Tubular is expanding their operations to Nebraska," *said Governor Dave Heineman.* ***"Their investment is a good example of how Nebraska is moving forward as a desired, premiere destination for companies looking to expand and create jobs. Tejas Tubular and our other outstanding private industry companies are learning that Nebraska has a quality workforce, good schools, safe communities, affordable homes, and an unmatched quality of life."***

One reason the Texas-based company chose to build their new 350,000-square-foot facility in Norfolk next to Nucor Steel Bar Mill was because Nucor will supply more than 150,000 tons of steel on an annual basis to Tejas Tubular.

Maximo Tejeda, Sr., owner of Tejas Tubular Products, Inc., said, ***"The city of Norfolk was instrumental in convincing us to locate here. I can readily see the quality and dedication of the local workforce, and am looking forward to hiring hard-working Nebraskans to manufacture our line of quality products."***

The manufacturing company will apply for incentives under the Nebraska Advantage. Additionally, the State of Nebraska is investing $1.4 million from its Site and Building Development Fund, and the city of Norfolk has earmarked $3.6 million in funds for the project, which is scheduled to be fully operational by late 2015.

"Bringing Tejas Tubular to Norfolk is a monumental accomplishment for the community and all of northeast Nebraska," *said Norfolk Mayor Sue Fuchtman.* ***"Our new industrial partner and its projected 200 employees will further cement Norfolk's role as a primary steel production community in the Midwest."***

"Many people have worked very hard to bring the Tejas Tubular project expansion to our local area," *said Tom Rudloff, general manager, Elkhorn Rural Public Power District.* ***"Elkhorn Rural Public Power District looks forward to working with others in the community to assist Max in making his expansion a success."***

Tejas Tubular will be served electrically by Elkhorn Rural Public Power District, a wholesale customer of Nebraska Public Power District.

Part B

Nebraska Advantages for Fabricated Metal Product Manufacturers

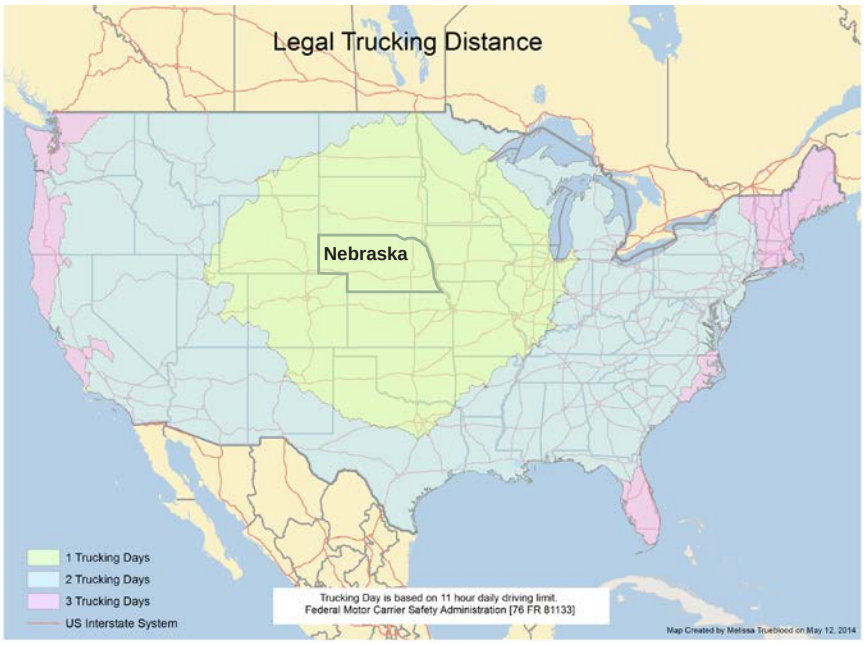
Nebraska offers a wide range of locational advantages to fabricated metal product manufacturers. In the continuing portion of this study, Nebraska resources and location attributes important to fabricated metal product manufacturers are discussed. An evaluation of geographically variable labor and energy costs for selected states using a model establishment manufacturing fabricated metal products is included in Appendix A.

I. Nebraska Location Resources

Nebraska lies near both the population and 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 fabricated metal product 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,

Figure 3
Truck Access to Regional and National Markets



Source: Nebraska Department of Economic Development. Legal Trucking Distances from Kearney, Nebraska [maps]. 2014 1:26,000,000; generated by Melissa Trueblood; using ESRI Business Analyst Desktop 10.2.1 Software and Data.

Grantee: Greater Omaha Chamber of Commerce) and in Lincoln (Zone No. 59, Grantee: Lincoln Chamber of Commerce). 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.

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, one of the largest trucking companies in the country, Werner Enterprises, is 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 the state. 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 the most technologically advanced dispatching facility 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 315 miles of track. Union Pacific's main line in central Nebraska is the busiest rail freight corridor in the world, with more than 145 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.

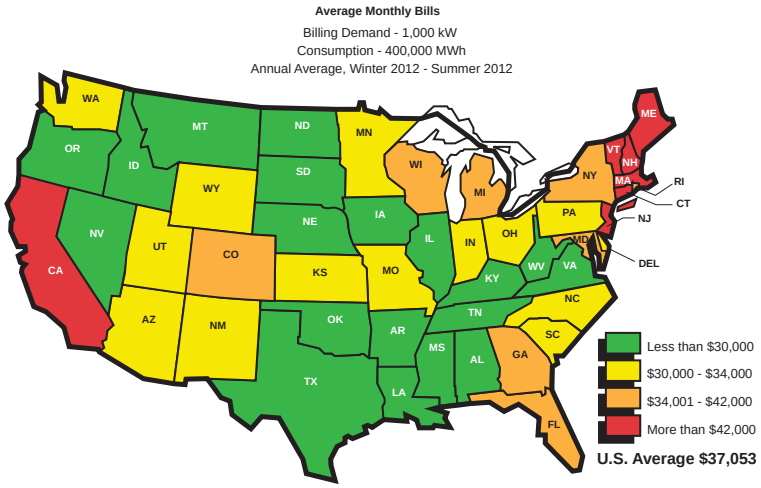
Low Cost Utilities

In providing a full range of reliable utilities with many cost advantages, Nebraska offers additional benefits to fabricated metal product manufacturers. Nebraska's electric rates for typical industrial customers are 21.0 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 "Fabricated Metal Product Manufacturing" subsector (NAICS 332), 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

Figure 4

Electric Costs for Industrial Service, Summer 2012–Winter 2013



Source: Edison Electric Institute, "Typical Bills and Average Rates Report," January 1, 2013 and July 1, 2012. State averages are weighted using eight months of January 2013 data and four months of July 2012 data. Nebraska data represent the average for Omaha Public Power District, Lincoln Electric System, and Nebraska Public Power District using the same seasonal weighting.

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, gas, oil, wind, and diesel sources.

Some major electric-generating facilities in Nebraska are:

- 1,300-megawatt 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 Nebraska City Station near Nebraska City, Unit No. 1 on-line in 1979 and Unit No. 2 online in 2009
- 800-megawatt NPPD Cooper Nuclear Station near Brownville, on-line in 1974
- 486-megawatt OPPD Fort Calhoun Nuclear Station, on-line in 1973

NPPD owns and operates a 59 MW wind generation facility near Ainsworth. NPPD has 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 being constructed near Steele City. NPPD has agreements with public power utilities sharing the output of these facilities.

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. The state was settled by individuals with the foresight and diligence to transform it into a world center of agricultural production. 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 2012, 90.5 percent of the state's population 25 years of age and older were high school graduates, compared to 86.4 percent nationally. In addition, the 2013 Nebraska high school graduation rate was 88.5 percent. One reason for the high graduation rate is the state's comparatively low student-teacher ratio—13.36:1 in 2010–11 compared to 15.97:1 for the nation. Finally, Nebraska students consistently score above the U.S. average on both standardized achievement tests and college entrance exams. In 2013 Nebraska students averaged 21.5 on the ACT college entrance test, compared to 20.9 nationally. Moreover, Nebraska's average composite ACT score was achieved with 84 percent of graduates taking the exam, compared to 54 percent of graduates nationwide.

Higher Education Resources

As part of a growing and rapidly changing industry, fabricated metal product manufacturers can benefit greatly from flexible state-of-the-art educational resources. The University of Nebraska, state colleges, and the community college network are important elements in providing resources to assist manufacturers in maintaining an educated and trained work force.

The University of Nebraska, is comprised of four campuses: the University of Nebraska-Lincoln, the University of Nebraska at Omaha, the University of Nebraska Medical Center, and the University of Nebraska at Kearney. It has the largest facilities among the state's 21 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 University of Nebraska-Lincoln (UNL) is the state's land-grant university. Nebraska was the first university west of the Mississippi to establish a graduate college (in 1896). UNL boasts 22 Rhodes scholars and 2 Nobel laureates among its alumni.

Research

The University of Nebraska-Lincoln is among the top 35 public universities in the U.S. in spending on research and development. Research funding has more than doubled since 2002, and extensive new research facilities have been built on the Lincoln campus and at the Medical Center. UNL has embarked on an exciting partnership called Nebraska Innovation Campus, a 249-acre private-public research and technology center adjacent to City Campus. The Innovation Campus is being developed with the support of 2015 Vision, a group of Lincoln, Nebraska, business leaders dedicated to strengthening research, education, and economic development through entrepreneurship and investment. The Innovation Campus will leverage UNL's research capacity by attracting private sector companies to locate near the university where they can work closely with university researchers, generating jobs and economic activity.

Engineering

The College of Engineering is situated on three campuses: Lincoln (City and East Campuses) and Omaha. Currently, the college has over 3,200 students enrolled and 300 permanent faculty and staff. Areas of engineering research and teaching at the University of Nebraska-Lincoln include Architectural Engineering, Agricultural Engineering, Biological Systems Engineering, Chemical & Biomolecular Engineering, Civil Engineering, Computer Science & Engineering, Computer & Electronics Engineering, Construction

Engineering, Construction Management, Electrical Engineering, and Mechanical & Materials Engineering.

Research at the College of Engineering is progressive and collaborative, supporting innovative research through two core facilities, housing six areas of research, and more than 16 research centers and laboratories. The two core facilities are supported by the Nebraska Research Initiative funded by the Nebraska Legislature to significantly enhance the scientific and research capabilities at UNL in technological areas with commercial potential. The Advanced Electro Optics Engineering Core Facility houses state-of-the-art lasers for producing a range of novel materials, thin films, and coatings that can be deposited with atomic precision on nanometer- to millimeter-sized areas/volumes. The Advanced Manufacturing Engineering Core Facility has the unique capability of synthesizing biological products, nanocomposites, and nanomachined electrical components. The programs residing in the research centers/ laboratories include a $10-million program for transportation research, an organization developing the technologies for the next generation of bridges and pavement, a trauma mechanics research initiative advancing the experimental and theoretical understanding of the mechanics of traumatic brain injury resulting from improvised explosive devices, and a facility developing vaccines against biological warfare agents and products that can be used as therapeutic countermeasures to treat people who have been exposed to biological agents.

The **Engineering and Science Research Support Facility (ESRSF)** is a dedicated, highly diverse technical facility with expertise in mechanical design, manufacturing, machining, fabrication, and technical services. The ESRSF technical staff combines high technical aptitude and background in hands-on instrument design, advanced machining, welding, fabrication, and materials testing. ESRSF will provide manufacturers with consulting services, prototyping, new part production runs, and other machining and construction services. Consulting services include: Workflow Management, Product/Process Design, Employee Technical Training, Machining Procedures, and Project Life Cycle Management.

- CNC & Conventional Machining, Welding, Fabrication, and Electroplating/Anodizing
- Flexible Machining
- Materials Testing Equipment

Equipment housed within the ESRS machine shop includes:

CNC Cincinnati-Milacron 1250 Sabre with Ab Acramatic 2100 Control

- has four-axis operation with a maximum of three-axis interpolation. This machine is used to machine a variety of drill system parts and components. Its large capacity allows for work pieces up to 50" x 30" x 26". This CNC machining center utilizes the latest computer technology for the machining of complex contours through parametric programming (equational programming), solid modeling programming through CAM software, and online quick programming of simple geometries. This feature enhances the technical staff's ability to accommodate a wide range of machining jobs.

BridgePort Series 1 CNC Milling Machines (2)

- provide additional resources for high volume machining and drastically cut delivery time to the customer. They are capable of machining smaller complex and simple 2-dimensional work pieces. Their conversational shop floor programming features allow tool makers to quickly program and machine the work piece.

CNC BridgePort Interact 412 Machining Center

- a three-axis, 12-tool station with a GE Fanuc Series O-Mate control that is available for multiple part production. Off-line part programming using a CAD workstation facilitates part design and production.

CNC Mazak Quick Turn ATC Lathe

- has a unique feature of live tooling on the turret. This feature allows the technical staff

to perform turning and milling operations in one setup. The result is a high precision machining process that can be performed without ever having to remove the work piece from the chuck, which eliminates costly secondary machining processes. The Mazak CNC lathe has been used to machine drill system components for the past eight years.

Engis Lapping Machine
- for precision machining, is used to machine and polish work pieces of extreme tolerances (.000001 inch). Common applications are thin film polishing and material removal, sharpening to razor edges, and finish machining of hardened materials. This lapping machine is located in the clean room facility of the engineering machine shop. During and after machining, the work piece is inspected with precision inspection equipment.

25" x 18" Nardini Gap Bed Lathe
- where much of the large cumbersome work pieces that require turning operations are performed. Drill system equipment such as barrels, large pulleys, housings, winch hubs, etc. are currently machined on the Nardini Lathe. Other heavy applications include the machining of train axles and wheels for material science research projects.

Conventional BridgePort Milling Machines (3)
- used for such applications as milling, drilling, boring, key-way cutting, etc.

Conventional 15" x 50" Clausing Lathes (2)
- used for turning, threading, and boring of cylindrical work pieces. All of the conventional machining equipment contains state-of-the-art digital readouts and tooling.

Kent Automatic Surface Grinder
- used for grinding flat and angular surfaces. This grinder has been used for sharpening ice coring cutters, core dogs, reamers, and surface grinding precision drill system parts. An Oliver tool cutter grinder is used for the complex geometry grinding on double angle cutters, core dogs, and reamers.

Tig, Mig, Gas, and Arc Welders
- all have a capacity ranging from very intricate applications to heavy-duty. The Tig and Mig welders can accommodate a wide range of steel and non-ferrous alloys. The shop has an acetylene/oxygen gas torch for brazing and flame cutting, along with a Plasma cutting unit.

Haas CNC Lathe
- allows technical staff to perform turning operations for high-precision machining.

Betenbender Heavy Duty Shear, Edwards 100-Ton Iron Worker, and Additional Hand Brakes and Foot Shears
- turn in-house fabrication and sheet metal work into routine services for the machine shop.

Materials Testing Bay
- the bay houses computer-controlled testing machines that can perform a variety of material and structural tests. The capacities of these testing machines are from 0 to 440,000 pounds. A torsion testing machine is available for testing barrels, well screens, drive shafts, gears, and more. Impact testing equipment is also accessible for impact tests on metals, plastics, and other materials.

A brief description of centers offering special expertise of interest to manufacturers of fabricated metal products follows.

Nebraska Center for Materials and Nanoscience (NCMN) is a multidisciplinary organization with more than 90 faculty members from UNL and other University of Nebraska campuses. The concern is with atomic manipulation, properties affected by nanoscale dimensions, self-assembly, ordered nanoarrays, quantum dots and wires, nanoelectronics, quantum computing, nanomechanics, nanooptics, molecular design, nanoelectro-mechanical systems, nanobiological function, and life sciences.

There are eight central facilities to support the NCMN's mission: Electron Microscopy, Materials Preparation, Mechanical and Materials Characterization, Scanning Probe Microscopy, X-Ray Structural Characterization, Nanofabrication, and Cryogenics. These facilities

are available to all UNL faculty as well as companies in Nebraska and elsewhere.

Center for Nontraditional Manufacturing Research is dedicated solely to the examination of nontraditional manufacturing methods. Projects involve both basic and applied research on numerous nontraditional manufacturing processes such as EDM, ECM, and USM. The Center's mission is to target existing and future needs for software and hardware related to machinability, surface integrity, adaptive control, and expert systems in the processing of new high-tech manufacturing materials and methods.

Along with research and development efforts at the University of Nebraska, Nebraska operates a state college system with campuses at Chadron, Peru, and Wayne. Undergraduate degrees are offered at these institutions in Industrial Technology and Industrial Management and teaching endorsements are offered in Industrial Technology Education and Trade and Industrial Education. A variety of private colleges and universities are also located in Nebraska including Creighton University in Omaha, Nebraska Wesleyan University in Lincoln, and others throughout the state (see Figure 5A) on page 24.

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 (page 24), the state has six community college areas, which provide services in 25 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, including Associate of Applied Science degrees in "Machine Tool Technology," "Manufacturing Engineering Technology," "Nondestructive Testing Technology," and "Welding Technology." 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.

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 **www.NebraskaAdvantage.biz**.

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, and headquarters (administrative). 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

Made in Nebraska, equipment goes to the end of the earth for scientific impact

The University of Nebraska-Lincoln's Engineering Science and Research Support Facility—known as ESRSF or simply the "Engineering Shop" on the UNL City Campus—has built equipment for several years of missions by ANDRILL, the ANtarctic geological DRILLing collaboration. ESRSF Manager, Jim McManis said, ***"It's great that we can build these items right here at the UNL College of Engineering, where resources developed in Nebraska can help advance this exploration."***

Based at UNL, ANDRILL includes 200 scientists, educators, and students from five nations: Germany, Italy, New Zealand, the United Kingdom, and the United States. ANDRILL manages and supports expeditions of scientists and field personnel who conduct the experiments and analyze the data.

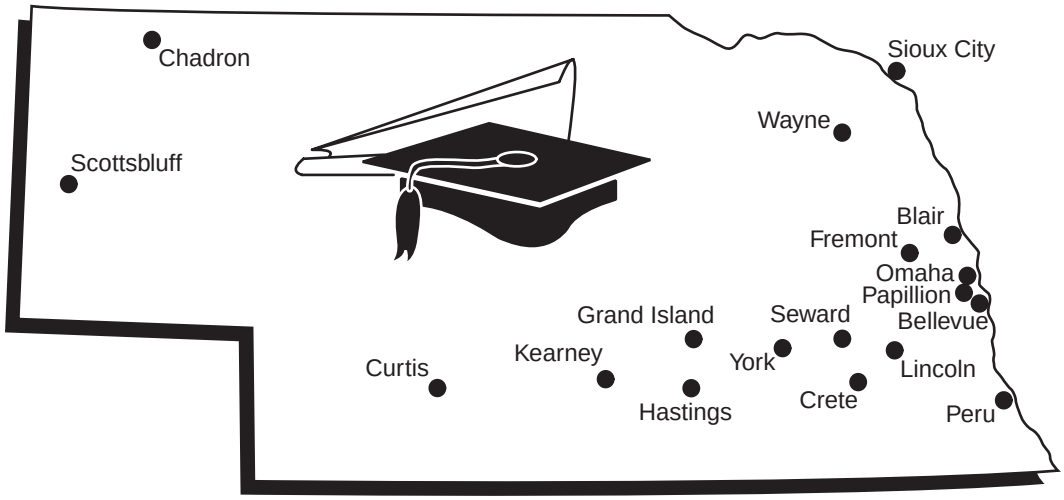
ESRSF has prepared a range of custom items for Antarctic projects, including scientific and drilling equipment to retrieve ice samples. In 2011, ESRSF designed and built a nozzle device that sprays near-boiling water to melt and abrade ice and deploy explosive charges for seismic tests. ANDRILL scientists use the samples to discover a history of paleoenviornmental changes that can guide understanding of the speed, size, and frequency of glacial and interglacial changes in Antarctica. In Autumn 2012, the team built a giant hose reel to help collect samples from deep beneath the ice (pictured).

McManis said his ESRSF team enjoyed the design-build challenges associated with equipment's use in extreme and remote environments such as Antarctica: ***"It's always fun to be part of new science and engineering, and this ANDRILL work has been really exciting science with a promising future."***

ANDRILL work was featured in the PBS NOVA program, Secrets Beneath the Ice, which can be viewed at **http://www.pbs.org/wgbh/nova/earth/secrets-beneath-ice.html**.

Figure 5A

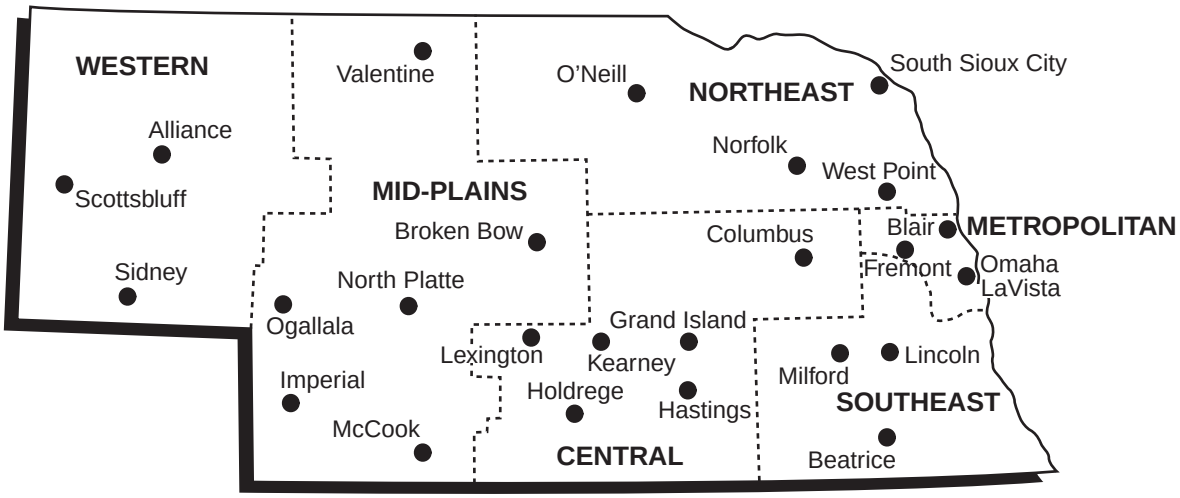
Location of Nebraska Area Colleges and Universities



Source: Nebraska Coordinating Commission for Postsecondary Education.

Figure 5B

Community Colleges in Nebraska



Source: Nebraska Community College System.

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 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 **www.neded.org**.

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

Nebraska Internship Program (InternNE), LB 386, is a partnership with Nebraska businesses to create new, paid internship opportunities for college and university students. The program provides matching grants to create new internship opportunities and are for 500 to 750 juniors and seniors studying at four-year institutions or students in their second year at a Nebraska community college.

Grant awards will be made on a first-come, first-serve basis to companies creating new internship opportunities, which are capped at 10 per business. Internships will pay at least minimum wage and range from 12-week to year-long programs. Grant amounts are lesser of 40 percent of reimbursable costs or up to $3,500 in non-distressed areas, and lesser of 60 percent of reimbursable costs or up to $5,000 in distressed areas.

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 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 **www.neded.org**.

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.

Nebraska Process Loan Fund - Focuses on making loans to qualifying small businesses. The minimum loan is $50,000, with a maximum of $2,000,000. Advantages with this loan are interest rates ranging from 0% to 4%, payment deferrals, and the ability to support loans that lack sufficient collateral to qualify the loan(s) from a private lender.

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 14.6 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). These data suggest that companies with Nebraska manufacturing plants benefit from location and other competitive advantages associated with doing business in Nebraska.

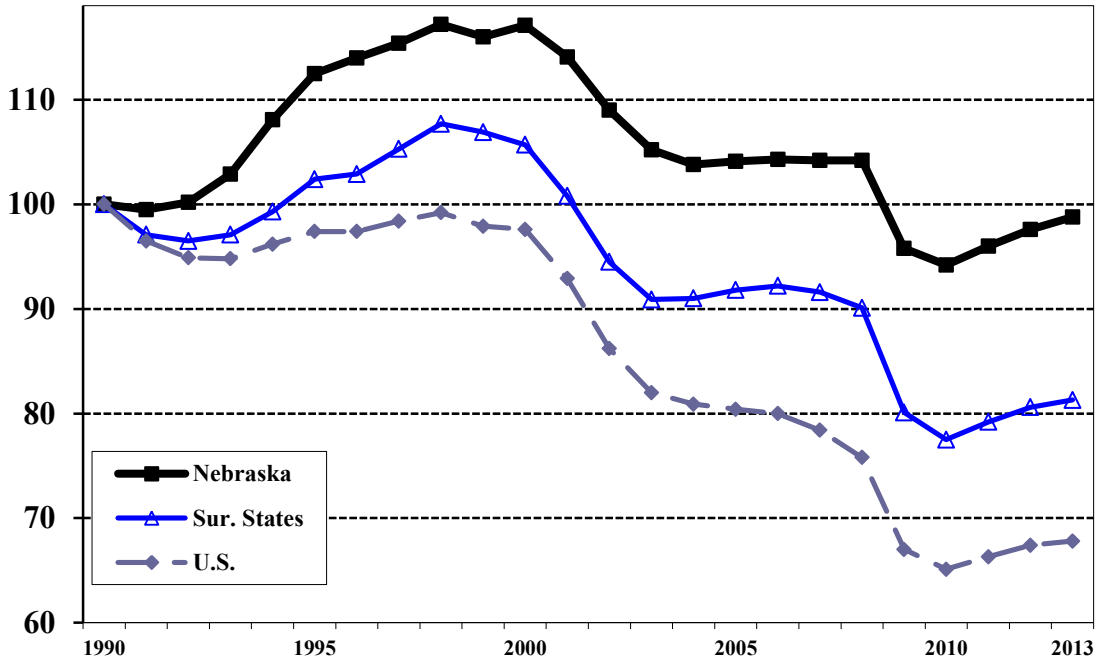
Quality of Life

For a potential newcomer to Nebraska, the state's livability is obviously also a consideration. Nebraska ranks high in quality of life studies—and at or slightly above average in cost of living measures. 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 Nebraska is consistently at or slightly below the national average. Data presented in Table 10 on the next page indicates on average, the cost of living in Nebraska is 4.7 percent less the U.S. average. Of particular interest is the cost of housing in Nebraska, which averages 6.5 percent less than for the U.S. as a whole for families renting a home.

Figure 6

Manufacturing Employment, Nebraska, Surrounding States, and the U.S., 1990–2013, 1990=100



Surrounding States include data for states contiguous to Nebraska, as a group, including Colorado, Iowa, Kansas, Missouri, South Dakota, and Wyoming.
Source: Bureau of Labor Statistices, **www.bls.gov**.

Table 10

Cost of Living in Nebraska, Compared to the National Average, October 1, 2014

	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	96.4	92.6	96.5	92.5	95.1	82.9	95.1	106.4
Omaha, NE	96.8	92.1	95.6	92.3	123.7	83.9	95.2	106.4
Lincoln, NE	102.1	95.9	96.6	94.1	111.1	98.8	95.1	106.4
Nonmetro NE [d]	94.6	92.2	96.6	92.3	86.9	77.5	95.1	106.4

[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 October 1, 2014.

CONCLUSIONS

This study concludes the fabricated metal product manufacturing industry is desirable for Nebraska and a Nebraska location is desirable for the industry. The locational advantages Nebraska offers appear well-suited to fabricated metal product manufacturers. They cover a wide spectrum, ranging from an attractive business climate to a high quality of life at a relatively low cost. But, as the study's model plant analysis demonstrates, in Appendix A on the following page, the competitive advantages Nebraska offers in such important cost areas as labor and energy 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 fabricated metal product manufacturing industry generally. Individual manufacturers will therefore need to further consider the locational requirements of their particular kinds of fabricated metal product manufacturing as well as the merits of specific sites within states. Certainly in terms of general locational situation for fabricated metal product manufacturers, Nebraska has much to offer.

The three organizations cooperating in the preparation of this study can also assist fabricated metal product 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
(800) 282-6773
Email: rjnelse@nppd.com
http://econdev.nppd.com

Nebraska Public Power District
Always there when you need us

Business Development Division
NEBRASKA DEPARTMENT OF ECONOMIC DEVELOPMENT
PO Box 94666
Lincoln, Nebraska 68509-9466
(402) 471-6513
(800) 426-6505
Email: dan.curran@nebraska.gov
www.neded.org

NEBRASKA Advantage

UNIVERSITY OF NEBRASKA-LINCOLN COLLEGE OF ENGINEERING
114 Othmer Hall
PO Box 880642
Lincoln, Nebraska 68588-6363
(402) 472-3181
Email: twei3@unl.edu
http://engineering.unl.edu

Nebraska Engineering

APPENDIX A
LABOR AND ENERGY COST ANALYSIS

Nebraska offers a wide range of locational advantages for fabricated metal product manufacturers. 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 best advantage on 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 include the top eight states in terms of value of shipments by the "Fabricated Metal Product Manufacturing" (NAICS 332) subsector and other states near Nebraska with which it typically competes for industrial location projects. The sixteen states account for 64.6 percent of the value of shipments from the fabricated metal products industry (see Table A-1).

Table A-1

Alternative Locations for a Model Plant for the Fabricated Metal Product Manufacturing Subsector (NAICS 332)

State	Percent of Value of Shipments [a]
Nebraska	**0.6**
Arkansas	1.5
California	8.3
Colorado	1.1
Illinois	6.8
Indiana	4.3
Iowa	1.3
Kansas	1.0
Michigan	4.7
Minnesota	3.1
Missouri	2.0
Ohio	8.8
Oklahoma	2.1
Pennsylvania	5.8
Texas	8.7
Wisconsin	4.4
Total Selected States	**64.6**

[a] Percent of the 2011 U.S. total value of shipments by manufacture for establishments in NAICS 311.

Source: U.S. Bureau of the Census, *Annual Survey of Manufactures*, 2011.

Table A-2

Characteristics of a Model Plant for the Fabricated Metal Product Manufacturing Subsector (NAICS 332)

	Total Model Plant	Per Production Worker
Production Workers	50	- - -
Value Added [dollars] [a]	9,130,463	182,609
Total Output [dollars] [b]	17,250,686	345,014
Energy Inputs [million BTUs] [c]	17,935	359

[a] Estimated value added applies the 2011 value added per production worker for the Fabricated Metal Manufacuring Subsector (NAICS 332) to the model plant (see Table 4).

[b] Estimated value of shipments derived by applying the 2011 value of shipments per production worker to the model plant (see Table 4).

[c] Estimated by applying the 2011 ratio of energy inputs per production worker to the model plant (see Table A-3).

Source: Calculated from data presented in Tables 4 and A-3.

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 fabricated metal product manufactures industry as a whole. To specify the relevant labor and energy costs, information was obtained from the *2007 Census of Manufacturing*, and the *2011 Annual Survey of Manufactures*.

Table A-2 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 $9,130,463 and the total annual output (value of shipments) is estimated to be $17,250,686. Energy inputs are estimated at 17,935 million BTUs, with all energy inputs supplied by electricity and natural gas.

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 (next page) presents data estimating energy use for the industry in 2011. 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 (page A-3) indicates the model plant, employing 50 production workers, will have annual energy inputs of 17,935.4 million BTUs. Electric energy inputs are estimated to be 7,855.7 million BTUs (2,302,381 kWhs), or 43.8 percent of the total energy inputs, while natural gas inputs are estimated at 10,079.7 million BTUs.

Table A-3

Energy Use in Fabricated Metal Product Manufacturing Subsector (NAICS 332)
Manufacturing Establishments

	Trillion BTUs	Percent
Purchased Fuels and Electric Energy	339.8	100.0
Purchased Electric Energy	148.8	43.8
Purchased Fuels	191.0	56.2

Source: Energy use estimated from data from the U.S. Bureau of the Census, *Annual Survey of Manufactures, 2011; U.S. Energy Information Administration;* and 2*010 Manufacturing Energy Consumption Survey.*

Part B

Energy Inputs for the Fabricated Metal Manufacturing Model Plant

	Million BTUs	Percent
Purchased Electricity	7,855.7 (2,302,381 kWhs)	43.8
Natural Gas	10,079.7	56.2
Total Energy Inputs	17,935.4	100.0

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

Labor-Related Costs

Labor costs in the fabricated metal product manufacturing industry are affected by several factors: wage rates, productivity of workers, fringe benefits, unemployment insurance, and workers' compensation costs. Estimated annual labor-related costs for a model, fabricated metal manufacturing plant operating at a Nebraska location and in each of the 15 alternative state locations are presented in Table A-4 (next page) and Figure A-1 (page A-5).

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 production workers have hourly wage rates significantly below the average for the alternative plant sites. For example, 2011 hourly wage rates for Nebraska production workers ($18.23) are 9.9 percent below the average wage rates for the other 15 states included as alternative plant locations.

The Nebraska costs for unemployment insurance and workers' compensation are significantly less than the other states. In the case of unemployment insurance contributions, the average cost per employee for the 15 alternative states is estimated at $445.00 or 96.0 percent greater than the Nebraska cost of $227.00. Insurance rates for workers' compensation average $1.92 per $100 of payroll for the 15 alternative states, 12.5 percent more than Nebraska's rate of $1.71.

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 $509,400 in annual savings when compared to Minnesota. When compared to the average labor costs for the 15 alternative locations, Nebraska's annual labor cost advantage is $295,447 or 10.4 percent lower.

Table A-4

Total Annual Labor-Related Costs for a Model Plant
for the Fabricated Metal Product Manufacturing Subsector (NAICS 332)

Plant Location	Hourly Wage Rate ($)	Number of Production Workers	Total Payroll ($)	Compensation Insurance ($)	Unemployment Insurance ($)	Social Security [a] ($)	Fringe Benefits [b] ($)	Labor Costs ($)	Cost Different States (-) Nebraska ($)	Cost Relative Other States (/) Nebraska (%)
Nebraska	**18.23**	**50**	**1,895,900**	**32,400**	**11,400**	**145,000**	**474,000**	**2,558,700**	**0**	**100.0**
Arkansas	19.82	50	2,061,100	$24,500	22,100	157,700	515,300	2,780,700	222,000	108.7
California	20.48	50	2,130,300	$62,200	24,500	163,000	532,600	2,912,600	353,900	113.8
Colorado	21.02	50	2,186,400	$31,000	20,300	167,300	546,600	2,951,600	392,900	115.4
Illinois	20.50	50	2,131,600	$60,300	26,600	163,100	532,900	2,914,500	355,800	113.9
Indiana	19.81	50	2,060,800	$23,900	16,800	157,700	515,200	2,774,400	215,700	108.4
Iowa	19.60	50	2,038,100	$38,700	24,400	155,900	509,500	2,766,600	207,900	108.1
Kansas	19.53	50	2,031,100	$31,300	16,300	155,400	507,800	2,741,900	183,200	107.2
Michigan	19.94	50	2,074,000	$35,900	33,800	158,700	518,500	2,820,900	262,200	110.2
Minnesota	21.70	50	2,256,500	$45,800	29,100	172,600	564,100	3,068,100	509,400	119.9
Missouri	19.90	50	2,069,900	$33,500	15,100	158,300	517,500	2,794,300	235,600	109.2
Ohio	20.41	50	2,122,700	$39,100	17,500	162,400	530,700	2,872,400	313,700	112.3
Oklahoma	20.16	50	2,096,900	$58,100	14,500	160,400	524,200	2,854,100	295,400	111.5
Pennsylvania	20.12	50	2,092,600	$45,000	29,200	160,100	523,200	2,850,100	291,400	111.4
Texas	20.59	50	2,141,500	$34,300	16,500	163,800	535,400	2,891,500	332,800	113.0
Wisconsin	19.91	50	2,070,200	$44,500	27,800	158,400	517,600	2,818,500	259,800	110.2

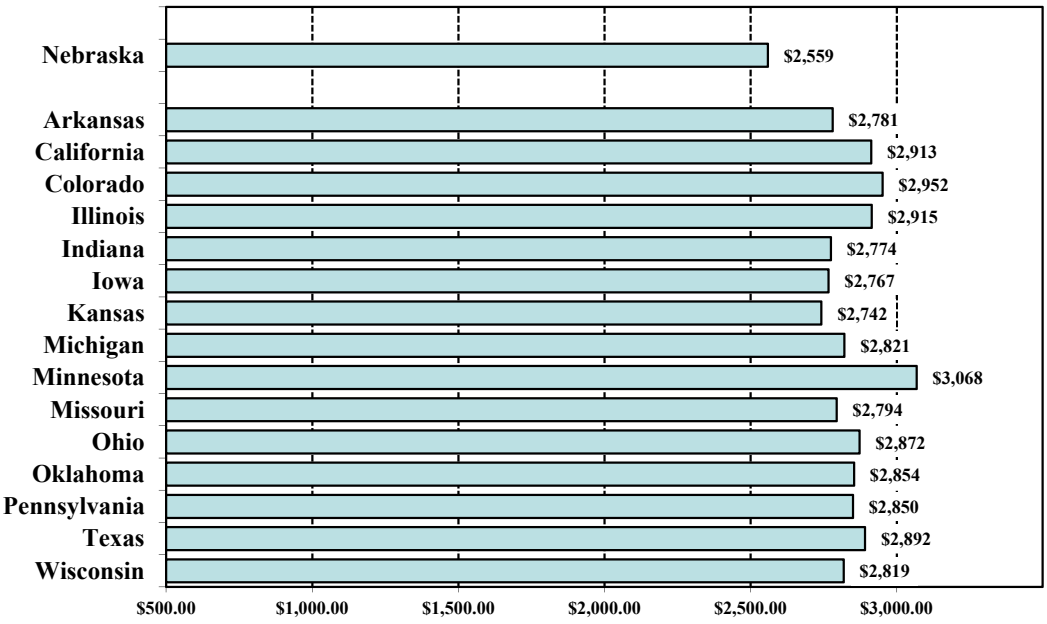
[a] Employer Social Security costs are 7.65 percent of payroll (wages).

[b] Fringe benefit costs are assumed to be 25 percent of payroll.

Source: Oregon Department of Comsumer & Business Services, Oregon Worker's Compensation Premium Rate Rankings Calendar Year 2012, February 2012.
U.S. Department of Labor, Bureau of Labor Statistics, August 2012.
U.S. Bureau of the Census, Annual Survey of Manufacturers, 2011.
U.S. Department of Labor, Employment and Training Administration, Unemployment Insurance Data Summary, 2012.
U.S. Energy Information Administration, 2010 Manufacturing Energy Consumption Survey.

Figure A-1

Estimated Total Labor Costs* for a
Fabricated Metal Product Model Plant, Alternative Plant Locations



(Labor Costs in Thousands of Dollars)

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

Source: See Table A-4.

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 generally less than the alternative states. 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 $0.0799 per kWh or 9.1 percent more than the Nebraska rate of $0.0732.

In the case of industrial rates for natural gas, the average for the 15 other states is 22.3 percent more than the Nebraska rate of $5.61 per million BTUs.

Table A-5 and Figure A-2 (next page) provide an analysis of the energy costs for the operation of the model plant. The total energy costs for the alterative 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 location, energy costs for the model plant are 62.9 percent more than the Nebraska energy costs. When compared to the average total energy costs for the 15 alternative states, Nebraska energy costs are 11.1 percent lower, translating into an average annual savings of $28,073.

Table A-5

Annual Energy Costs for a Model Plant for the Fabricated Metal Product Manufacturing Subsector (NAICS 332)

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	**0.0732**	**168,500**	**5.61**	**56,500**	**225,000**	**0**	**100.0**
Arkansas	0.0673	155,000	7.44	75,000	230,000	5,000	102.2
California	0.1284	295,600	7.04	71,000	366,600	141,600	162.9
Colorado	0.0955	219,900	6.42	64,700	284,600	59,600	126.5
Illinois	0.0565	130,100	6.84	68,900	199,000	-26,000	88.4
Indiana	0.0791	182,100	6.53	65,800	247,900	22,900	110.2
Iowa	0.0569	131,000	5.78	58,300	189,300	-35,700	84.1
Kansas	0.0809	186,300	5.28	53,200	239,500	14,500	106.4
Michigan	0.0926	213,200	8.27	83,400	296,600	71,600	131.8
Minnesota	0.0776	178,700	5.55	55,900	234,600	9,600	104.3
Missouri	0.0822	189,300	8.54	86,100	275,400	50,400	122.4
Ohio	0.0836	192,500	6.77	68,200	260,700	35,700	115.9
Oklahoma	0.0643	148,000	7.37	74,300	222,300	-2,700	98.8
Pennsylvania	0.0778	179,100	9.86	99,400	278,500	53,500	123.8
Texas	0.0696	160,200	4.20	42,300	202,500	-22,500	90.0
Wisconsin	0.0858	197,500	7.05	71,100	268,600	43,600	119.4

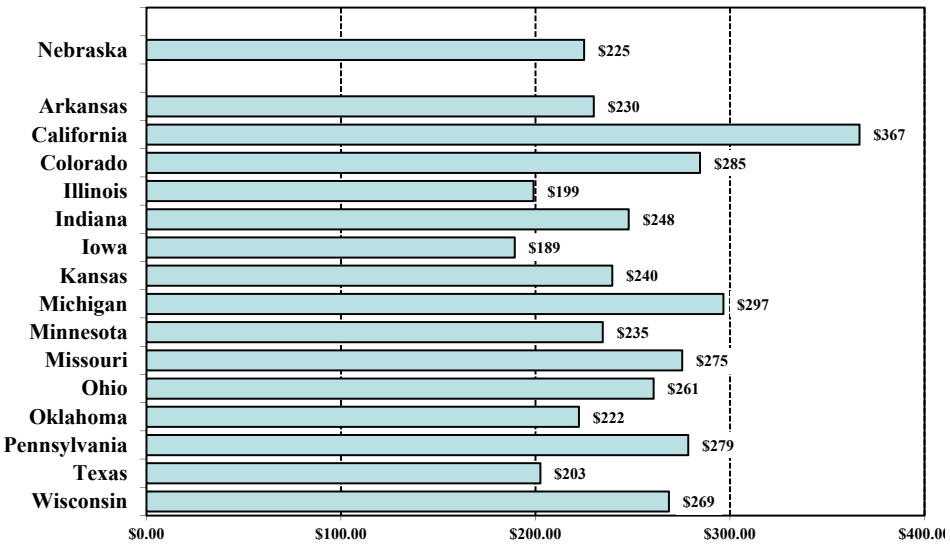
[a] Electric rate is cost per kWh using the average per kWh cost for 1,000 kW monthly demand with 400,000 kWh of consumption. The model plant is assumed to use 2,302,381 kWh annually.

[b] Natural Gas rate is per million BTUs. The model plant is assumed to use 10,079.7 million BTUs annually.

Sources: Natural Gas: U.S. Energy Information Agency, *Natural Gas Industrial Price, 2011*, **www.eia.gov/dnav/ng/ng_pri_sum_a_epg0_pin_dmcf_a.htm**. Values converted from price per MCF to per mmBTUs by dividing prices by 1.027.
Electric: Edison Electric Institute, "Typical Bills and Average Rates Report," January 1, 2012 and July 1, 2012. State averages weighted using eight months of January 2012 data and four months of July 2012 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 Fabricated Metal Product Model Plant, 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, a Nebraska location has a cost advantage over all of the 15 alternative states. When considering the average labor and energy costs for the 15 alternative states, the cost advantage of the Nebraska location is $323,520 annually, or 10.4 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 11.6 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, Nebraska fabricated metal product manufacturers 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 Fabricated Metal Product Manufacturing Subsector (NAICS 332)

Plant Locations	Total Labor Cost ($)	Total Energy Cost ($)	Total Labor and Energy Cost ($)	Cost Difference Other States (-) Nebraska ($)	Cost Relative Other States (/) Nebraska (%)
Nebraska	**2,558,700**	**225,000**	**2,783,700**	**0**	**100.0**
Arkansas	2,780,700	230,000	3,010,700	227,000	108.2
California	2,912,600	366,600	3,279,200	495,500	117.8
Colorado	2,951,600	284,600	3,236,200	452,500	116.3
Illinois	2,914,500	199,000	3,113,500	329,800	111.8
Indiana	2,774,400	247,900	3,022,300	238,600	108.6
Iowa	2,766,600	189,300	2,955,900	172,200	106.2
Kansas	2,741,900	239,500	2,981,400	197,700	107.1
Michigan	2,820,900	296,600	3,117,500	333,800	112.0
Minnesota	3,068,100	234,600	3,302,700	519,000	118.6
Missouri	2,794,300	275,400	3,069,700	286,000	110.3
Ohio	2,872,400	260,700	3,133,100	349,400	112.6
Oklahoma	2,854,100	222,300	3,076,400	292,700	110.5
Pennsylvania	2,850,100	278,500	3,128,600	344,900	112.4
Texas	2,891,500	202,500	3,094,000	310,300	111.1
Wisconsin	2,818,500	268,600	3,087,100	303,400	110.9

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

APPENDIX B
NEBRASKA INCENTIVES

The Nebraska Advantage consists of six "tiers" of investment and job creation activity. The following example spreadsheet illustrates the job creation and investment levels required and the tax incentives generated by Tier 2, which includes the estimated investment and jobs created for the model fabricated metal product manufacturer discussed in Part B of this report.

NEBRASKA Advantage

Nebraska Advantage - TIER 2
Minimum 30 New Jobs & $3 Million Investment

Potential Tax Credits and Refunds

Fabricated Metal Manufacturer
January 1, 2014

NOTE: BLUE values require input of project-specific variables.

I. Compensation Credit - Percent of annual compensation (Medicare wages)

Assumptions are as follows -

Number of New Employees in Qualifying Year 1:	50
Average Annual Salary * :	$37,918
Initial payroll:	$1,895,900
Annual Cost-of-Living Increase beginning Year 2	3%
Combined Local & County Property Tax Rate:	0.01844700

Projected Tax Credits and Refunds

① Wage credits earned after employer creates 10 fulltime qualified positions & makes $1 million investment

② *Only positions earning at least 60% of the Nebraska Average Wage are eligible to earn Compensation Credit*

*** Local & County Property Tax Rates: http://www.revenue.state.ne.us/PAD/research/valuation.html

	Employees	Payroll	Hourly Wage	Comp % *	Comp Credit
Year 1	50	$1,895,900	$18.23	5%	$94,795
Year 2	50	$1,952,777	$18.78	5%	$97,639
Year 3	50	$2,011,360	$19.34	5%	$100,568
Year 4	50	$2,071,701	$19.92	5%	$103,585
Year 5	50	$2,133,852	$20.52	5%	$106,693
Year 6	50	$2,197,868	$21.13	5%	$109,893
Year 7	50	$2,263,804	$21.77	5%	$113,190
Total		$14,527,262			**TOTAL**

Compensation Tax Credit
$726,363

*** Use Table below to determine appropriate Compensation Percentage for each year.**

NOTE: *Compensation credit can be used against sales, income tax and employee withholding up to amount paid in.*

	2013 Neb Ave Wage	60% NAW	75% NAW	100% NAW	125% NAW
Annual	$39,268.00	$23,561	$29,451	$39,268	$49,085
Hourly	$18.88	$11.33	$14.16	$18.88	$23.60
Compensation Credit %		3%	4%	5%	6%

*The Nebraska average wage for 2013 is utilized in 2014 to calculate wage incentives

II. Projected Investment

Initial assumptions about project investment are as follows *

A. **Real Estate Calculation - Where Business Owns Real Estate**

1. Purchase Price of Building; OR	$ -	
2. Cost of Constructing a New Building	$ -	
Total Value of Purchased or Constructed Building(s)		$ -

APPENDIX B – Continued

NEBRASKA ADVANTAGE - TIER 2

B.	**Equipment Purchases - Where Business Owns Equipment**			
	1. Purchase Price of Office and Other Equipment	$ 100,000		
	2. Purchase Price of Used Equipment Brought Into Nebraska	$ -		
	3. Purchase Price of Production Equipment	$ 2,700,000		
	Total Value of Equipment Purchases		$	2,800,000
C.	**Real Estate Calculation - Where Business Leases Real Estate**			
	1. Monthly Lease Payment:	$ 3,000		
	2. Term of Lease in Months:	60		
	Investment Referenced by Term of Lease; OR		$	180,000
	Potential Real Estate Investment Realized Over Max. 10 Year Period		$	360,000
D.	**Equipment Calculation - Where Business Leases Equipment**			
	1. Monthly Lease Payment:	$ 500		
	2. Term of Lease in Months:	60		
	Investment Referenced by Equipment Leasing		$	30,000
E.	**Additional Real Estate and Equipment Purchases (7 years)**			
	1. Cost of Purchasing or Improving Existing Building	$ 25,000		
	2. Equipment Purchases subject to sales tax	$ -		
	3. Equipment Purchases not subject to sales tax	$ 50,000		
	Value of Additional Investment Made Over 7 years		$	75,000
	PROJECTED AMOUNT OF INVESTMENT		$	3,085,000

③ *Assumes that building and equipment values are established prior to the application of any sales or use taxes*
④ *Utilize the original purchase price of used equipment brought into Nebraska to qualify investment tax credits*

III. Sales Tax Refund

	State Sales Tax Rate	5.5%		
	Local Sales Tax Rate *	1.5%		
	TOTAL SALES TAX RATE	7.0%		

* Current Local Sales & Use Tax Rates can be found at http://www.revenue.ne.gov/question/sales.html

A.	**Building Construction: (calculates sales tax on materials assumed at 50% construction costs)**				
	1. Initial Building Construction	$ -			
	2. Additional Building Construction	$ 25,000			
	50% Building Construction Costs Eligible for Sales Tax Credit		$	12,500	
B.	**Equipment Purchases Subject to Sales Tax**				
	1. Initial Office and Other Equipment		$	100,000	
	2. Additional Office and Other Equipment		$	-	
	Equipment Purchases Eligible for Sales Tax Credits			$	100,000
	Sales Tax Rate Applied to Eligible Investment		7.0%		Sales Tax Refund
	100% Estimated Sales Tax Refund =				**$7,875**

IV. Investment Credit:

Percent of investment in qualified property during 6-7 year entitlement period. Includes all investment in building, equipment and components. For leased space, investment is equal to annual lease rate times term of lease for up to 10 years. This credit may be applied to state corporate income or sales and use tax liabilities.

					Investment Tax Credit
$	3,085,000	x	10%	= $308,500	**$308,500**

ESTIMATED TAX CREDITS AND REFUNDS	**$1,042,738**

http://econdev.nppd.com

November 2014

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