

Nebraska's Highway 81 4-Lane Expansion: An Engine of Economic Growth, 2017-2018 and Beyond

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Preface

Nebraska's Highway 81 4-Lane Expansion: An Engine of Economic Growth, 2017-2018 and Beyond

In 1969, the Nebraska Department of Roads (NDOR) first identified the need for an expressway system for northeast Nebraska. The planned system included the Highway 81 expansion which amounts to 43 miles of Highway 81 from York to 7 miles south of Columbus.

The purpose of the expressway system is to: (1) connect urban centers with a population of 15,000 or more to the Interstate system, (2) add those routes which have an average daily traffic of 500 or more heavy commercial vehicles, and (3) add additional segments to provide 4-lane continuity.

Based on the estimates provided by NDOR, the proposed expansion of Highway 81 will cost approximately \$145 million. For the purposes of this study, it is assumed that the expansion will consist of converting the current 43 miles of two-lane highway to divided four-lane highway.

Goss & Associates thanks the Board of Directors and staff of 4 Lanes 4 Nebraska. Executive Director Josh Moenning was especially helpful in providing timely data and answers to questions from our staff. Goss & Associates also thanks NDOR for accident and traffic count data. However, any errors, omissions, or misstatements are solely the responsibility of Goss & Associates and the principal investigator.

This study, while funded by the Nebraska counties of Platte, Polk and York, and 4 Lanes 4 Nebraska, was developed independently of this organization. Any conclusions, findings, errors or mis-statements contained in this study are solely the responsibility of Goss & Associates, Economic Solutions, LLC.¹

¹This study was completed independent of Creighton University. As such, Creighton University bears no responsibility for findings or statements by Ernie Goss, or Goss & Associates, Economic Solutions.

Goals of the study

The overall goal of this study is to evaluate the economic importance and contributions of the Highway 81 expansion to counties that are traversed by the expansion, and to the remainder of the state.

Specific goals of the study are to estimate impacts of the highway expansion on:

1. The direct and spillover economic impacts related to the actual construction of the expanded highway.
2. The monetized contribution to the reduction in accidents and deaths for the region and state.
3. The monetized contribution to reduced commute times for workers in the Highway 81 counties.
4. Overall economic activity including:
 - Employment-contribution to the job base.
 - Wages and salaries-contribution to wages and salaries.
 - Proprietorship-contribution to the income of self-employed individuals.
 - Taxes-contribution to state and local tax collections.
 - Population growth.
5. The study also evaluates alternative funding options in light of what is being successfully adopted across the nation.

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Glossary

| Term | Definition |
|--------------------------|--|
| Discounted | Unless stated otherwise, all financial data in this report are stated in 2015 dollars. |
| Direct effects | The set of expenditures, or initial spending, applied to the predictive model for impact analysis. |
| IMPLAN | Using classic input-output analysis in combination with regional specific Social Accounting Matrices and Multiplier Models, IMPLAN provides a highly accurate and adaptable model for its users. The IMPLAN database contains county, state, zip code, and federal economic statistics which are specialized by region. |
| Input-output analysis | A type of applied economic analysis used in IMPLAN that tracks the interdependence among various producing and consuming sectors of an economy. More particularly, it measures the relationship between a given set of demands for final goods and services and the inputs required to satisfy those demands (U.S. Bureau of Economic Analysis). |
| Jobs supported | A job in IMPLAN = the annual average of monthly jobs in an industry. Thus, 1 job lasting 12 months = 2 jobs lasting 6 months or = 3 jobs lasting 4 months each. A job can be either full-time or part-time. |
| Labor income | Wages & salaries plus self-employment income. |
| Overall or sales impacts | Amount of additional sales, including insurance premiums, retail sales, wholesale expenditures, construction sales, etc. It is analogous to gross domestic product (GDP), but will include some double counting and will thus exceed GDP. |
| Payroll | All forms of compensation, such as salaries, wages, commissions, dismissal pay, bonuses, vacation allowances, sick-leave pay, and employee contributions to qualified pension plans paid during the year to all employees. |
| Private workers | All those working excluding government workers, state, local and federal. |
| Productivity | Growth in Gross Domestic Product (GDP) per worker. |
| Self-employment income | Income of proprietors of non-incorporated companies including attorneys, accountants and consultants. |
| Wages and salaries | The total payroll cost of the employee paid by the employer. This includes wage and salary, all benefits (e.g. health, retirement, etc.) and employer paid payroll taxes (e.g. employer side of social security, unemployment taxes, etc.). |

Executive Summary

Nebraska's Highway 81 4-Lane Expansion: An Engine of Economic Growth, 2017-2018 and Beyond

I. The Need for Expanding Highway 81

The area planned for highway expansion has a much higher density of agriculture and manufacturing output than the rest of the state. These are two sectors that are heavily dependent on adequate highways.

- **Manufacturing:** The manufacturing sector demands high-quality highways and roads to operate successfully in an area. In a 2014 survey, *Site Selection Magazine*² found that manufacturing executives and industry consultants named “highway accessibility” as the No. 1 location factor, leapfrogging business concerns about “availability of skilled labor.”

Per 100 highway miles for the expansion counties of Butler, Platte, Polk and York:

- o Manufacturing employees: Highway 81 counties 1,738.9; the rest of the state 883.6.
 - o Manufacturing firms: Highway 81 counties 30.4; rest of the state 17.4.
 - o Machinery manufacturing³ employees: Highway 81 counties 225; rest of the state 100.2.
 - o Machinery manufacturing firms: Highway 81 counties 5.1; rest of the state 1.8.
- **Agriculture:** The agriculture industry demands extensive and high-quality highways and roads. Furthermore, farm output per highway mile is higher among Highway 81 counties than in other counties in the state.
 - Per highway mile for the expansion counties of Butler, Platte, Polk and York:
 - o Cattle: Highway 81 counties had 708.3 head compared to the rest of Nebraska's 638.4 head.
 - o Farms: Highway 81 counties had 7.2 farms compared to the rest of Nebraska's 4.9.
 - o Cropland in acres: Highway 81 counties had 3,045.9 acres compared to the rest of Nebraska's 1,841.8.

In a 2014 survey, *Site Selection Magazine* found that manufacturing executives and industry consultants named “highway accessibility” as the No. 1 location factor, leapfrogging business concerns about “availability of skilled labor.”

²<http://chiefexecutive.net/highway-accessibility-no-1-concern-manufacturing-ceos-site-selection/>.

³Machinery manufacturing has been found to be an industry that is more heavily dependent on quality roads than other manufacturing industries.

Executive Summary

II. The Economic Development Impact of Expanding Highway 81

- The expansion of Highway 81 would represent a 1.29 percent increase in rural arterial highway in Nebraska. For the period 2019-33, this expansion would:
 - o Add \$1.2 billion to the state's GDP, discounted to 2015 dollars, via expanded economic development.
 - o Annually support an additional 1,858 Nebraska jobs and 4,221 in state population.

Between 2019 and 2032, the expansion would add \$1.2 billion to the state's GDP via expanded economic development, and support an addition of 1,858 jobs per year to the state's economy.

III. Impact of Highway Construction Spending

- It is assumed that \$145 million will be spent on the widening of 43 miles of Highway 81 over a two-year period, 2017-18.
- Direct and spillover economic activity generated from Highway 81 widening for the two-year construction period include:⁴
 - o \$195.4 million addition to the overall Nebraska economy.
 - o \$64.2 million in wages and salaries.
 - o \$8.7 million in self-employment income.
 - o 722 jobs on average for the two-year period.
 - o \$5.3 million in state and local tax collections in the form of:
 - \$1.5 million in sales taxes.
 - \$1.3 million in personal income taxes.
 - \$0.2 million in corporate income taxes.
 - \$1.6 million in personal property taxes.
 - \$0.8 million in other taxes and fees.
- The impacts of Highway 81 widening are spread across 355 of Nebraska's 432 industries. The industries experiencing the greatest impacts will be:
 - o \$121.4 million in sales for the construction industry.
 - o \$7.0 million in sales for architecture firms.
 - o \$3.3 million in sales for the wholesale trade industry.
 - o \$2.8 million in revenue for offices of physicians, dentists, and other health practitioners.
 - o \$2.6 million in revenue for the food services industry.
 - o \$40.5 million in revenue across the state's remaining industries.

Direct and spillover economic activity generated from Highway 81 widening for the two-year construction period is \$195.4 million.

⁴All impacts are adjusted to 2015 dollars.

Executive Summary

IV. Impact of Highway 81 Widening on Accidents

- The Federal Highway Administration estimated that conversion of a 2-lane highway to a 4-lane divided highway reduced vehicle crashes between 40 and 60 percent.
- The Nebraska Department of Roads reports the accident rate on rural 2-lane sections are 22.9 percent greater than the accident rate for 4-lane rural expressway sections.
- Accidents per average daily traffic volume on the 2-lane portion of Highway 81 proposed for conversion were: 12.2 percent higher than other 2-lane portions of Highway 81 not slated for conversion.
- For 2019, it is estimated that the proposed expansion of Highway 81 will add \$1.9 million in value to the Nebraska economy due to reduced accidents.
- Over the first 15 years of operation, it is estimated that the proposed expansion of Highway 81 will create \$20.7 million in value (2015 dollars) to the Nebraska economy resulting from the reduction in the number of accidents.

V. Impact of Highway 81 Widening on Commute Times

- Average commute times per worker, and percent of workers living and working in same county for the counties planned for Highway 81 expansion in 2011 were:⁵
 - o Butler County, 19.5 minutes commute; 61.0 percent of workers live and work in Butler County.
 - o Platte County, 15.5 minutes commute; 88.3 percent of workers live and work in Platte County.
 - o Polk County, 18.9 minutes commute; 56.5 percent of workers live and work in Polk County.
 - o York County, 12.9 minutes commute; 87.8 percent of workers live and work in York County.
 - o Total savings in salary per year from decreased commute times for workers utilizing Highway 81 from York to Columbus would be approximately \$1.4 million for 2019.
- It is estimated that widening Highway 81 will:
 - o reduce average commute time by 10.9 minutes for 1,639 daily commuters.
 - o result in \$1.2 million in annual savings with impacts of \$15.0 million for 15 years of operation, reduced to present value, due to reduced commute times expected, based on average 2013 Nebraska salary.

The Federal Highway Administration estimated that conversion of a 2-lane highway to a 4-lane divided highway reduced vehicle crashes between 40 and 60 percent.

⁵Commute times are average one-way travel to work from 2006-2010 U.S. Census surveys. For more information on sampling and estimation methods, confidentiality protection, and sampling and nonsampling errors, see www.census.gov/acs/www/Downloads/data_documentation/Accuracy/MultiyearAC-SAccuracyofData2010.pdf.

Executive Summary

VI. Alternative Funding Methodologies for Expanding Highway 81

- Due to current historically low interest rates, it is estimated that delaying Highway 81 expansion by two years would result in an increase of \$10.8 million in additional interest costs.
- Delaying construction of the Highway 81 expansion from 2017 to 2019 will cost the state an estimated \$161.1 million.
- State and local governments are enacting alternatives to the traditional fuel taxes to fund highway and road construction.
 - o Some states, such as Washington, have enacted a per vehicle tax for electric and hybrid vehicles.
 - o States are considering the use of GPS technology to tax per mile driven as an alternative method of funding highways and roads.
- Public-private partnerships (PPPs) are increasingly allowing states to finance needed transportation projects when other revenue sources are lacking.
 - o PPPs enable the states to finance and build highways to meet a pressing need more quickly.
 - o By 2013, thirty-three states had enacted laws that enable transportation departments to use public-private partnerships for highway projects.
- Recommended funding options:
 - o Nebraska enact PPP-enabling legislation.
 - o Nebraska take immediate action to shore up funds for highway construction.
 - o Nebraska Unicameral should pass highway bond-enabling legislation.
 - Given that current interest rates are at historic lows, it is recommended that Nebraska issue bonds to pay for the Highway 81 expansion.
 - Use a portion of LB 84 (Build Nebraska Act)⁶ revenue to pay interest and principal on the highway bonds or,
Implement a system of pass-through tolls to pay interest and principal on the highway bonds.

Delaying construction of the Highway 81 expansion from 2017 to 2019 will cost the state an estimated \$161.1 million.

⁶http://nebraskalegislature.gov/bills/view_bill.php?DocumentID=11707.

Executive Summary

VII. Summary of Economic Impacts, 2017-2033.

Table EX1.1: Summary of economic impacts of Highway 81 widening (2015 dollars)

| Description of impact | Reference | 2017-18 | 2019-33 |
|---|-----------|-----------------|-----------------|
| Monetized Benefits | | | |
| Highway construction | | | |
| Sales or output | Table 3.2 | \$195,399,981 | |
| Jobs (average per year) | Table 3.2 | 722 | |
| Wages & salaries | Table 3.2 | \$64,194,881 | |
| Self-employment income | Table 3.2 | \$8,749,896 | |
| Added sales from accident reductions | Table 4.6 | | \$20,677,236 |
| Added wages & salaries from reduced commute times | Table 5.3 | | \$15,034,827 |
| Added economic development from expansion | | | |
| GDP | Table 2.2 | | \$3,387,248,451 |
| Jobs supported each year | | | 1,858 |
| Population increase (assuming all new jobs go to non-Nebraskans) | | | 4,221 |
| Monetized Costs | | | |
| Reduced wages & salaries from increase in commute times during construction | Table 5.4 | (\$2,565,271) | |
| Increase in yearly highway maintenance costs | | | (\$9,239,247) |
| Cost of highway construction | | (\$145 million) | |

Source: Goss & Associates

VIII. Net benefits of beginning Highway 81 construction in 2017 versus 2019 or 2024.

- Delaying the widening of Highway 81 by two years would result in a loss in net benefits of \$161.1 million to the Nebraska economy.
- Delaying the widening of Highway 81 to 2024 (the NDOR timeline) would result in a loss in net benefits of \$499.9 million to the state economy.
- Details of the losses are listed in Table EX1.2:

Table EX1.2: Net benefits of beginning Highway 81 construction in 2017 versus 2019 or 2024 (in millions of 2015 \$\$s)

| | Economic Development | Accidents | Commute times | Construction impact | Bond funding | Cost of project | Total | Net loss in Benefits |
|------------------------------|----------------------|-----------|---------------|---------------------|--------------|-----------------|-----------|----------------------|
| Begin 2017 | \$3,387.2 | \$20.7 | \$15.0 | \$195.4 | -\$52.3 | -\$145.0 | \$3,421.1 | |
| Begin 2019 | \$3,235.7 | \$19.9 | \$14.4 | \$200.4 | -\$61.7 | -\$148.7 | \$3,259.9 | \$161.1 |
| Current NDOR timeline (2024) | \$2,885.7 | \$17.9 | \$13.0 | \$217.8 | -\$51.7 | -\$161.6 | \$2,921.2 | \$499.9 |

Source: Goss & Associates

Section 1 - Nebraska's Highway 81 4-lane Expansion: A Bird's Eye View

Introduction

In recent years, states have allocated fewer resources for transportation projects at the state and local levels. As a result, state departments of transportation and other public works organizations should be more selective in identifying transportation projects where limited resources can produce the greatest returns.

To combat the lack of activity at the state and local level, the U.S. Congress passed a \$305 billion Federal Highway Bill in the final quarter of 2015. Senator Sherrod Brown, D-Ohio, who sat on the conference committee that produced the final bill, acknowledged the significant problems in the bill.⁷

By failing to provide a reliable funding source for the spending, Congress likely increased the overall costs to the taxpayer and negatively affected state and local economic growth. By tapping into unrelated bank funding, Congress insured future funding brawls between banking interests and highway advocates. Furthermore by failing to take advantage of current historically low interest rates, Congress increased the costs to taxpayers as future interest rates rise back to their historic averages.

Acknowledging and discussing funding issues, this study will evaluate the potential economic impacts for the widening of a 43-mile stretch of Highway 81. One of the important objectives of this study is to heighten awareness among the public of the benefits and economic needs of expanding Highway 81 in Nebraska.

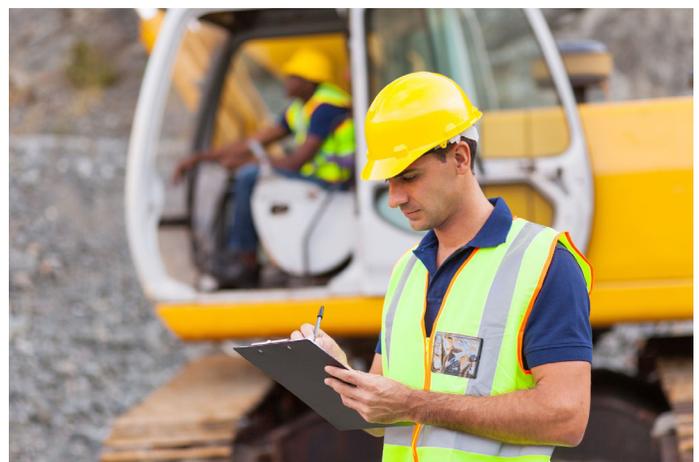
The segment of the highway addressed is the 43-mile stretch between Columbus and York that is currently 2-lane. While NDOR has detailed the costs of approximately \$145 million, an examination is needed to estimate both the economic and non-economic benefits of the expansion not only to residents and businesses in the counties traversed by the expansion, but to the entire state.

And contrary to 2015 Congressional action, this study will recommend a funding methodology that provides a greater degree of certainty, saves Nebraska taxpayer dollars, and enhances Nebraska economic development.

4 Lanes and Growth

NDOR first identified the need for an expressway system in 1969. The more extensive original plan was refined in 1988 down to a 602 mile system. This system included the Highway 81 expansion which amounts to 43 miles between York and 7 miles south of Columbus, Nebraska.

The purpose of the expansion is to: (1) connect urban centers with a population of 15,000 or more to the Interstate System, (2) add those routes which have an average daily traffic of 500 or more heavy commercial vehicles, and (3) add additional segments for 4-lane continuity.



⁷<http://www.daytondailynews.com/news/news/national-govt-politics/no-quick-fix-in-highway-bill/npgrL/>.

It has been concluded that Interstate 80 was an important factor in the economic development of Nebraska. The correlation between growth and 4 lanes seemed so evident that the legislature mandated the construction of at least one additional four-lane highway (State of Nebraska 1988). The main purpose of the legislation was to provide an economic initiative for the region served by the new highway.

Table 1.1 attests to the economic importance of 4-lane access to businesses, workers, shoppers and

tourists. I-80 county growth has been significantly higher than non-I-80 county growth. Furthermore, future growth is expected to be substantially higher for I-80 counties than for non-I-80 counties.

Commuting patterns listed in Tables 1.2 and 1.3 also point to the economic importance of 4 lanes and detail commuting patterns for I-80 counties and Highway 81 counties.

Table 1.1: Impact of highway access on population growth, 1990-2030

| | I-80 Counties (median) | Non-I-80 Counties (median) | Highway 81 Counties (median) |
|--------------------------------------|---------------------------|----------------------------------|------------------------------------|
| Population growth 1990-2010 | 11.6% | -9.9% | -3.4% |
| Projected population growth, 2010-15 | 2.9% | -3.5% | -0.3% |
| Projected population growth, 2015-20 | 2.9% | -3.1% | -0.3% |
| Projected population growth, 2020-25 | 2.6% | -3.1% | -0.4% |
| Projected population growth, 2025-30 | 2.0% | -3.4% | -0.5% |

Goss & Associates calculations based on U.S. Census data

Table 1.2: Commuting for I-80 counties, 2006-2010

| County | 2006-10 Population | Percent of daytime population change due to commuting | Percent of workers who lived and worked in same area | Employment- residence ratio |
|-------------------|-----------------------|---|--|--------------------------------|
| Douglas | 524,697 | 10.2% | 86.9% | 1.20 |
| Buffalo | 46,885 | 2.3% | 89.5% | 1.04 |
| Cass | 25,222 | -26.2% | 33.6% | 0.48 |
| Cheyenne | 10,022 | 8.7% | 95.8% | 1.16 |
| Dawson | 24,256 | -0.1% | 87.1% | 1.00 |
| Deuel | 1,952 | -9.9% | 56.6% | 0.81 |
| Hall | 59,431 | 7.7% | 92.2% | 1.15 |
| Hamilton | 9,090 | -7.8% | 60.9% | 0.84 |
| Keith | 8,247 | -2.3% | 84.4% | 0.95 |
| Kimball | 3,779 | 0.0% | 83.5% | 1.00 |
| Lancaster | 289,873 | 2.8% | 93.8% | 1.05 |
| Lincoln | 36,128 | 2.4% | 96.2% | 1.05 |
| Sarpy | 162,728 | -15.1% | 40.8% | 0.71 |
| Seward | 16,824 | -11.2% | 59.6% | 0.77 |
| York | 13,762 | 7.5% | 87.8% | 1.15 |
| Median (I-80) | 24,256 | 0.0% | 86.9% | 1.00 |
| Median (non-I-80) | 5,416 | -5.9% | 71.1% | 0.88 |
| Median Highway 81 | 11,048 | -2.0% | 72.2% | 0.96 |

Source: U.S. Census Bureau, 2006-2010 American Community Survey 5-year estimates

| Table 1.3: Commuting for Highway 81 counties, 2009-13 | | | | |
|---|----------------------|---|--|----------------------------|
| County | 2009-2013 Population | Percent of daytime population change due to commuting | Percent of workers who lived and worked in same area | Employment-residence ratio |
| Butler | 8,334 | -10.9% | 61.0% | 0.78 |
| Platte | 32,350 | 6.9% | 88.3% | 1.13 |
| Polk | 5,342 | -16.8% | 56.5% | 0.67 |
| York | 13,762 | 7.5% | 87.8% | 1.15 |

Source: U.S. Census Bureau, 2009-2013 American Community Survey 5-year estimates

Data in Tables 1.2 and 1.3 indicate several important outcomes. First, the employment to residence ratio for I-80 counties is substantially higher than that for the Highway 81 counties of Butler and Polk. Furthermore, the percent of workers who lived and worked in the same county for I-80 counties was significantly higher than that of the Highway 81 counties of Butler and Polk. In other words, I-80 access has stimulated business growth in I-80 counties enabling residents to work closer to home.

The Evidence from Other Highway Projects

U.S. On the other hand, in a national study Chandra and Thompson (2000) concluded that on the whole, economic activity remains unchanged. They showed that counties on the path of the highway experience increased economic activity, but adjacent counties see economic activity being drawn away.⁸ Specifically in counties where a highway directly passes, earnings in the manufacturing, retail trade, services, communication, and public utilities industries increase. They see that “regional highway investments aid the nationally oriented manufacturing industry, but lead to the reallocation of economic activity in more regionally oriented industries.”⁹

California. To safely accommodate the increasing number of motorists traveling between Napa and Solano Counties, Caltrans is working with the Napa County Transportation and Planning Agency (NCTPA) and the Solano Transportation Authority (STA) to widen a 5.8-mile stretch of State

⁸Leong et al, (2014).

⁹Chandra, A. and Thompson, E., (2000), p. 487.

Route 12 through Jameson Canyon Road from a two-lane highway to a four-lane highway.

The project extends from Highway Route 12 from the Highway 29 and Highway 12 junction in Napa County, to Red Top Road and Highway 12 in Solano County.

The expansion will also add a concrete median along the project route. Once completed, the project is expected to improve safety and travel times throughout the region. The widening project includes two construction packages, The Napa County contract and the Solano County contract. The project is funded by the Corridor Mobility Improvement Account (CMIA), the State Transportation Improvement Program (STIP), and Proposition 1B. The entire project will cost approximately \$115 million.

The benefits of widening depend heavily on the current industrial concentrations and the potential for concentration. Industries with substantial projected increases in employment opportunities due to highway improvements include:¹⁰

- Primary metals.
- Electric equipment.
- Paper and printing.
- Eating and drinking establishments.
- Retail trade.
- Business and professional services.
- Medical care services.

¹⁰“Do New Highways Attract Businesses?” Daniel J. Hodge, Glen Weisbrod, and Arno Hart. Transportation Research Record, paper no. 03-414B.

North Dakota. It was concluded that the lack of a four-lane highway hurt efforts to bring new retail and restaurant opportunities to the northwestern area of North Dakota. As a result, the North Dakota Department of Transportation will be expanding US Highway 85 to a four-lane roadway from the west edge of Watford City to US Highway 2 east of Williston. The department has spent approximately \$300 million building the 42 miles of four-lane highway over the past three years. The landmark project represents a significant investment by the state of North Dakota to complete a vital link in meeting the region's growing transportation needs.

Wisconsin. A Wisconsin case study, which analyzed the expansion of Highway 29 to 4 lanes, highlighted several positive results from a survey of community leaders, business owners, and property assessors in regard to community economic impacts. Survey participants noted improved travel times, better access to the freeway, and improved safety. Planning efforts for commercial development were accelerated, and employment prospects improved.

Specifically, employment along the corridor exceeded statewide growth by 3.0 percentage points (8.7 percent to 11.7 percent). The highway also affected income levels. Estimates suggest a benefit of \$1.4 billion by 2020 for statewide disposable income.¹¹

Highway 29's impact on business was also evaluated. However, retail stores indicated that the impact was mixed. They found that the expanded highway brought more customers to their locations, but the highway also created a landscape of greater competition, particularly from stores in larger nearby cities.

From 1995 to 2003, the number of businesses along the highway increased by 55 percent (10,464 to 16,256). From 1990 to 2001, 6,269 jobs were created as a result of development and expansion of 151 manufacturing plants in the vicinity of the highway's path.¹²

¹¹Leong, D., Lichtman, L., Marcos, F., Michelson, K., and Russell, R., "Economic and Land Use Impacts of Wisconsin State Trunk Highway 29", Final Report, Projects 0092-02-17 and 0092-03-06, Wisconsin DOT, July 2014.

¹²Leong et al, (2014).

The Need and Potential for Highway 81 Counties

Carlino and Mills (1987) found that greater interstate highway density was associated with higher levels of manufacturing employment and total employment overall.

In a 2014 survey, Site Selection Magazine found that manufacturing executives and industry consultants named "highway accessibility" as the No. 1 location factor, leapfrogging business concerns about "availability of skilled labor."

Industries with substantial projected increases in employment opportunities due to highway improvements are more concentrated in the four Highway 81 counties.

As presented in Table 1.4, Highway 81 counties have 1,738.9 manufacturing employees per 100 miles of highway compared to the rest of Nebraska's 883.6 manufacturing employees per 100 miles of highway. Likewise per 100 miles of highway, Highway 81 counties have 30.4 manufacturing firms while the rest of the state has 17.4 manufacturing firms.

Furthermore, as shown in Table 1.4, the most highway-sensitive industry in the U.S., machinery manufacturing, has a heavy concentration in the four Highway 81 counties. According to the latest data from the U.S. Census Bureau's County Business Patterns, per 100 miles of highway, the four county Highway 81 area had 225.0 machinery manufacturing employees, and the rest of the state had a much lower 100.2 machinery manufacturing employees.

Not surprisingly, the Highway 81 counties also had a much higher concentration of machinery manufacturing firms per 100 highway miles with 5.1 compared to the rest of the state at 1.8.

The agriculture industry also demands extensive, high-quality highways and roads. As shown in Table 1.5, farm output per highway mile is higher among Highway 81 counties than other counties in the state. Per highway mile:

- Number of farms: Highway 81 counties had 7.2 farms compared to the rest of Nebraska's 4.9.
- Number of cattle: Highway 81 counties had 708.0 head compared to the rest of Nebraska's 638.0 head.
- Cropland in acres: Highway 81 counties had 3,046.0 acres compared to the rest of Nebraska's 1,842.0.

Table 1.4: Industrial concentration, Highway 81 counties compared to rest of Nebraska, 2012

| | Highway 81 counties | | Rest of Nebraska | |
|-------------------------|------------------------------------|--------------------------------|------------------------------------|--------------------------------|
| | Employees per 100 miles of highway | Firms per 100 miles of highway | Employees per 100 miles of highway | Firms per 100 miles of highway |
| Manufacturing | 1,738.9 | 30.4 | 883.6 | 17.4 |
| Machinery manufacturing | 225.0 | 5.1 | 100.2 | 1.8 |

Source: County Business Patterns, U.S. Census Bureau

Table 1.5: Agriculture concentration, Highway 81 counties compared to rest of Nebraska, 2012

| Median | Highway 81 counties per highway mile | Rest of Nebraska |
|------------------|--------------------------------------|------------------|
| Number of farms | 7.2 | 4.9 |
| Number of cattle | 708.0 | 638.0 |
| Cropland | 3,046.0 | 1,842.0 |

Source: Census of Agriculture (2012)

Summary

This section has demonstrated the need for the Highway 81 Expansion. The four-county area has a concentration of industries that experience significant benefits from improved highway access.

Industries with substantial projected increases in employment opportunities due to highway improvements are more concentrated in the four Highway 81 counties.

Section 2 - The Impact of Highway 81 Widening on Economic Development

Introduction

The current Highway 81 configuration limits economic growth, especially for certain industries. Currently, heavy truck traffic is 148.0 percent higher on the 2-lane portion of Highway 81 slated for expansion in comparison to the 2-lane portion of highway remaining the same. Additionally, heavy truck traffic on the two lanes proposed for expansion is 32.0 percent higher than on 4-lane portions of Highway 81.

Failure to expand Highway 81 could thus result in two negative outcomes for the Nebraska economy. First, due to the current heavy and burdensome traffic loads in the four counties, some businesses using Highway 81 at this time, particularly manufacturers, could relocate. Second, the failure to widen Highway 81 is likely to limit the ability to recruit new firms to the area.

...the failure to widen Highway 81 is likely to limit the ability to recruit new firms to the area.

Not only does current configuration of Highway 81 limit growth, that constraint is likely to grow significantly.

Impact of Rural Highway Expansion on Economic Development

In 2008, Mulatu Wubleh from East Carolina University outlined an assessment of how much an investment in the Highway 17 improvement project could impact the growth of the eastern North Carolina economy. Significant impacts were found: total economic output was \$5.5 billion; total earnings was \$1 billion; and the overall employment impact was the creation of 20,489 jobs.¹³ These numbers indicate a multiplier effect, where direct investment leads to indirect effects, further leading to induced effects.

¹³Wubleh (2008) p. 7.

Impact of Highway 81 on Economic Development

In order to investigate the future impact of the proposed expansion, the present study will examine Nebraska highway construction from 1987 to 2012. Table 2.1 lists the percentage growth in miles of various categories of Nebraska highways.

The objective of the statistical analysis is to link the changes listed in Table 2.1 to growth. In order to estimate the impact of adding 43 miles of Rural Main Artery highway surface, a Cobb-Douglas production function was estimated. The Cobb-Douglas form was developed and tested against statistical evidence by Charles Cobb and Paul Douglas.¹⁴

The Cobb–Douglas production function is a particular functional form of the production function, widely used to represent the technological relationship between the amounts of two or more inputs, physical capital and labor, and the amount of output, or GDP, that can be produced by those inputs.

Table 2.1: Change in highway mileage by category, 1987-2012

| Category | Mnemonic | Percent change in Nebraska miles, 1987-2012 |
|-------------------|------------|---|
| Interstate | Interstate | 0.2% |
| Rural Main Artery | RuralMain | -13.1% |
| Rural Local | RuralLocal | 0.6% |
| Urban Express | UrbanEx | 918.9% |
| Urban Local | UrbanLoc | 30.1% |

Source: U.S. Census Bureau

¹⁴Cobb, C. W.; Douglas, P. H. (1928). "A Theory of Production". *American Economic Review* 18 (Supplement): 139–165.

In addition to capital and labor as inputs, the present study will add the number of miles of Nebraska highway by category as listed in Table 2.1. This formulation allows one to estimate the impact of adding 43 miles of rural arterial highway as proposed for Highway 81. Equation 2.1 specifies the theoretical model to be estimated with Nebraska economic data from 1987 to 2012.

Regression results from the estimation of Equation (2.1) are contained in Appendix B Table B.1. As listed in Table C.1, the model is able to explain 99% of the variation in Nebraska gross domestic product (GDP) over the period 1987 to 2012. Alternatively, one could assert that the model has a one percent error, or unexplained variation in Nebraska GDP.

$$\text{Ln (GDP)} = \text{Ln(A)} + \beta_1 \text{Ln (Interstate)} + \beta_2 \text{Ln(RuralMain)} + \beta_3 \text{Ln(UrbanEX)} + \beta_4 \text{Ln(UrbanLoc)} + \beta_5 \text{Ln(Labor)} + \beta_6 \text{Ln(capital)} \quad \text{Equation (2.1)}$$

Also, data from Appendix C show that the elasticity of RuralMain mileage is 0.21. This means that for a one percent increase in rural arterial mileage, Nebraska GDP expands by 0.21 percent. The proposed expansion in Highway 81 represents a 1.4 percent increase in RuralMain which translates into a 0.29 percent increase in Nebraska GDP.¹⁵

Table 2.2 contains estimated increases in Nebraska GDP by year discounted to present, or 2015 values due to Highway 81 expansion.¹⁶ As presented, over the course of 15 years of operations, the expansion in Highway 81 would increase GDP by a total of \$3.4 billion discounted to 2015 dollars. This result stems from the increased likelihood of new manufacturers moving to areas along Highway 81, the reduced probability of firms leaving the area, and to the expansion of firms already located along Highway 81. This estimated increase in state GDP would annually support 1,858 Nebraska jobs. Assuming all net new jobs go to non-Nebraskans, this would result in a population increase for Nebraska of 4,221.

Table 2.2: The economic development impact of the Highway 81 expansion

| Year | Discount factor | Return | Discounted Return |
|--------------|-----------------|------------------------|------------------------|
| 2019 | 1.20 | \$317,209,118 | \$263,771,050 |
| 2020 | 1.26 | \$324,663,433 | \$257,801,363 |
| 2021 | 1.32 | \$332,292,923 | \$251,966,783 |
| 2022 | 1.38 | \$340,101,703 | \$246,264,251 |
| 2023 | 1.45 | \$348,093,988 | \$240,690,780 |
| 2024 | 1.51 | \$356,274,088 | \$235,243,448 |
| 2025 | 1.59 | \$364,646,419 | \$229,919,400 |
| 2026 | 1.66 | \$373,215,496 | \$224,715,846 |
| 2027 | 1.74 | \$381,985,945 | \$219,630,060 |
| 2028 | 1.82 | \$390,962,496 | \$214,659,376 |
| 2029 | 1.91 | \$400,149,993 | \$209,801,188 |
| 2030 | 2.00 | \$409,553,393 | \$205,052,952 |
| 2031 | 2.09 | \$419,177,771 | \$200,412,178 |
| 2032 | 2.19 | \$429,028,318 | \$195,876,434 |
| 2033 | 2.29 | \$439,110,350 | \$191,443,343 |
| Total | | \$5,626,465,433 | \$3,387,248,451 |

Source: Goss & Associates estimates based on regression analysis

¹⁵Elasticity (E) = % change in GDP / % change in RuralMain mileage; 0.21 = % Change in GDP / 0.014; Thus, % Change in GDP = (0.21 * 0.014) = 0.29

¹⁶Estimates in Table 2.2 assume that yearly maintenance is equal to yearly depreciation..

Summary

Historically, Nebraska's overall economic activity, as measured by GDP, has been positively influenced by miles of rural arterial highways. Based on this past relationship, the expansion of Highway 81 is expected to produce a discounted impact of almost \$3.4 billion over the first 15 years of operations.

Several potential caveats to this conclusion are: 1) Areas surrounding Highway 81 may cannibalize economic activity from other areas of the state. 2) The impact or elasticity of Highway 81 has a margin of error. The estimates contained in Table 2.2 use the mid-point of the estimate. Thus, the actual impact could be greater or smaller than that listed in Table 2.2.



Section 3 - The Impact of Highway 81 Construction Spending

Introduction

Infrastructure spending in Nebraska, just as in other states, is an important part of the economy. Such revenues from external sources are a direct economic impact used in this study's input-output model of the economy. The direct economic impact therefore represents the first round of Highway 81 construction spending.

The direct or initial round of spending is followed by additional economic activity in the economy due to the "multiplier" impact. For example, construction company purchases of goods and services support other local businesses outside construction such as retail trade purchases from wholesale trade firms. These impacts are assumed temporary and are in addition to that estimated in Section 2.

Furthermore, businesses throughout the area are supported when construction company employees spend their paychecks. This additional economic activity is a portion of the multiplier impact. The total economic impact is the sum of direct, indirect and induced impacts. The full multiplier impact (indirect and induced) resulting from the direct economic impact is estimated utilizing the IMPLAN model.

Figure 3.1 depicts examples of the flow of funds into and out of Nebraska. As indicated, the total impact is the sum of direct (**green arrows**), indirect (**blue arrows**) and induced (**red arrows**) impacts minus leakages (**gray arrows**). Leakages represent highway spending outside of the state. Input-output multiplier systems are used to estimate impacts in Figure 3.1 by industry.

Direct economic impacts. Highway construction spending has direct economic effects on the local economy through expenditures for goods and services and employee salaries. The most obvious direct expenditures are wages paid to workers employed by highway construction firms.

In addition, expenditures by business visitors to support highway construction have direct impacts on the region, affecting primarily the accommodations industry. Direct economic impacts are color coded **green** in Figure 3.1.

Indirect Economic Impacts. Highway spending also produces indirect economic effects on the area economy. Architecture and engineering company purchases at area wholesale firms, for example, generate indirect effects by increasing: (a) the number of firms drawn to the community; (b) the volume of deposits in local financial institutions and; (c) economic development. Examples of indirect economic impacts are color coded **blue** in Figure 3.1.

Induced Economic Impacts. Induced impacts in the region occur as the initial spending feeds back to industries in the region when workers in the area purchase additional output from local firms in a second round of spending. That is, highway spending increases overall income and population, which produces another round of increased spending adding to sales, earnings and jobs for the area. Examples of induced economic impacts are color coded **red** in Figure 3.1.

The above-described methodology is used to calculate the aggregate economic impact of Highway 81 construction spending on Nebraska for 2017 and 2018.¹⁷

¹⁷The Nebraska Department of Roads provided an initial estimate of 2-3 years for expansion of the 43 miles of Highway 81. It will be assumed in this study that the expansion will be completed by the end of 2018.

Total Impacts of Highway Construction

Table 3.1 lists the first round, or direct spending, related to the expansion of Highway 81. Table 3.2 lists total impacts generated from the initial spending listed in Table 3.1. Wages and salaries include the total payroll costs (including benefits) of workers who are paid by employers, as well as benefits such as health/life insurance, retirement payments, and non-cash compensation. Sales or output represents the value of total production.

Table 3.1: 2017 and 2018 direct spending associated with construction of Highway 81 (in 2017 and 2018 dollars)

| IMPLAN industry # | IMPLAN industry description | 2017 | 2018 | Total |
|-------------------|--|--------------|--------------|---------------|
| 36 | Construction of non-residential structures | \$72,500,000 | \$72,500,000 | \$145,000,000 |

Source: 4 Lanes 4 Nebraska

Table 3.2: Estimated impact of Highway 81 expansion in 2017 and 2018 (2015 dollars)

| | 2017 | 2018 | 2017-18 |
|-----------------------------|--------------|--------------|---------------|
| Total impact (output/sales) | \$99,952,550 | \$95,447,431 | \$195,399,981 |
| Wages & salaries | \$32,837,475 | \$31,357,406 | \$64,194,881 |
| Self-employment income | \$4,475,816 | \$4,274,080 | \$8,749,896 |
| Jobs (average per year) | 772 | 772 | 772 |
| State & local taxes | \$2,719,424 | \$2,596,853 | \$5,316,277 |

Source: Goss & Associates estimate from IMPLAN model

Maintenance Costs

Based on historical Nebraska highway maintenance spending, it is estimated that an additional \$615,950 will be demanded per year to be spent on the maintenance of the 43 miles of Highway 81 expansion. Over 15 years, this will require \$9,239,247 in spending in 2015 dollars.

Impacts by Industry of Highway Construction

Table 3.3 lists impacts by industry. Of course, the major beneficiary industries are those in which there will be direct highway spending. However, the remainder of the industries listed in Table 3.3 received no direct highway spending. More than 355 of Nebraska's 432 industries will experience increases in revenues as a result of Highway 81 construction activity.

As presented, Nebraska's food services will benefit from Highway 81 spending even though there are no Highway 81 dollars spent directly in this industry. According to estimates, the spending will support \$47.0 thousand in self-employment income, \$816 thousand in wages and salaries, \$2.6 million in sales, and 28.0 jobs for the food services industry. For 2017 and 2018, Highway 81 spending will support \$1.6 million in self-employment income, \$267 thousand in wages and salaries, \$2.8 million in revenues, and an average of 10.5 jobs for offices of physicians, dentists, and other health practitioners.

Table 3.3: Impact of 2017 and 2018 Highway 81 spending on Nebraska by industry (2015 dollars)²⁹

| Industry | Total sales 2017-18 | Total wages, salaries 2017-18 | Total self- employment income 2017-18 | Average jobs 2017-18 |
|---|------------------------|-------------------------------------|--|----------------------------|
| Construction- new non-residential structures | \$121,370,507 | \$36,778,250 | \$5,125,052 | 433.0 |
| Architectural, engineering, and related services | \$7,020,793 | \$3,911,002 | \$590,321 | 28.5 |
| Wholesale trade businesses | \$3,288,348 | \$1,791,594 | \$256,054 | 13.5 |
| Offices of physicians, dentists, and other health practitioners | \$2,782,624 | \$1,601,491 | \$266,817 | 10.5 |
| Food services | \$2,588,295 | \$816,360 | \$46,899 | 28.0 |
| Private hospitals | \$2,491,183 | \$1,093,002 | ** | 10.0 |
| Nondepository credit intermediation | \$2,408,581 | \$1,138,229 | \$123,659 | 9.5 |
| Insurance carriers | \$1,942,337 | \$394,029 | ** | ** |
| Retail stores-motor vehicles & parts | \$1,891,633 | ** | \$53,245 | 10.0 |
| Transport by truck | \$1,859,074 | \$794,972 | \$140,345 | 8.0 |
| Automobile repair | \$1,369,035 | \$671,206 | \$239,623 | 9.0 |
| Ready-mix concrete manufacturing | \$1,289,459 | ** | ** | ** |
| Telecommunications | \$1,280,452 | ** | ** | ** |
| Legal services | \$1,270,670 | \$585,140 | \$119,618 | ** |
| Business headquarters | \$1,032,397 | \$507,145 | ** | ** |
| Retail stores | \$1,024,215 | \$561,684 | \$51,831 | 6.0 |
| All other industries | \$40,490,377 | \$13,550,776 | \$1,736,432 | 206.0 |
| Total all industries | \$195,399,981 | \$64,194,881 | \$8,749,896 | 772.0 |

** Not among top industries impacted

Source: Goss & Associates estimates from IMPLAN Input-Output Multiplier

¹⁸Due to rounding, column details do not sum to column totals.

Other Impacts of Highway Construction

Table 3.4 lists the estimated impact of 2017 and 2018 Highway 81 spending on state and local tax collections. While the Nebraska Department of Roads does not pay sales taxes, property taxes or corporate income taxes, its independent contractors and their employees do pay state and local taxes.

Furthermore, many companies that receive indirect highway spending pay corporate taxes.

It is estimated that Highway 81 construction will generate more than \$5.3 million in state and local Nebraska taxes for the two years of construction, with approximately \$2.7 million in 2017 and \$2.6 million in 2018.

Moreover, a large share of property taxes created will continue beyond the construction period.

Table 3.4: Impact of Highway 81 on state and local tax collections, 2017-18 (2015 dollars)

| | 2017 | 2018 | 2017-18 |
|------------------------|--------------------|--------------------|--------------------|
| Personal income taxes | \$642,237 | \$613,289 | \$1,255,526 |
| Corporate income taxes | \$92,603 | \$88,429 | \$181,032 |
| Sales taxes | \$753,006 | \$719,066 | \$1,472,071 |
| Property taxes | \$813,446 | \$776,781 | \$1,590,227 |
| Other taxes & fees | \$418,134 | \$399,287 | \$817,421 |
| Total | \$2,719,424 | \$2,596,853 | \$5,316,277 |

Source: Goss & Associates from IMPLAN Multiplier System

Suppose total Highway 81 direct spending exceeds or falls short of that in Table 3.1, what are the changes in impacts? Table 3.5 lists estimated impacts for each additional \$1,000,000 in highway spending. It is assumed that the additional spending is not produced by reduced spending at other establishments and organizations in the area or higher taxes on local population. In terms

of spillover, or indirect plus induced impacts, data indicate that for Nebraska, each \$1,000,000 of highway funding generates another \$623,100 in revenue or sales across other industries. Additionally, each \$1,000,000 in highway spending produces \$540,645 in salaries, wages and self-employment income, with 5.9 jobs supported.

Table 3.5: Direct, Indirect and Induced Impacts of \$1,000,000 highway spending (2015 dollars)

| Impact Type | Direct Effect | Indirect Effect | Induced Effect | Total Effect |
|---|---------------|-----------------|----------------|--------------|
| Output | \$1,000,000 | \$287,229 | \$335,872 | \$1,623,100 |
| Salaries wages & self-employment income | \$309,744 | \$115,655 | \$115,246 | \$540,645 |
| Average year-round jobs | 3.3 | 1.1 | 1.5 | 5.9 |

Source: Goss & Associates from IMPLAN Multiplier System

Summary

The preceding analyses indicate that construction of the Highway 81 expansion will have a significant and positive economic impact on the state. This impact does not consider the negative impact if funding this expansion is via higher taxes on Nebraska citizens. To the degree that the expansion is funded by higher taxes on non-Nebraskans, by funds drawn from reserves, or by federal highway support, there will be no offsetting negative impacts.

Section 4 - The Impact of Highway 81 Widening on Accidents

Introduction

Slower economic growth and fiscal austerity have encouraged government officials to turn away from new highway construction and embrace the conversion of 2-lane highways to 4-lane highways. One of the goals of this conversion is the reduction of vehicle accidents.

The Federal Highway Administration examined crash data from the states of California, Michigan, North Carolina and Washington to determine the impact of the conversion of 2-lane highways to

4-lane highways on accidents.¹⁹ The findings of the researchers are contained in Table 4.1. As listed, federal accident data indicate that widening from 2-lane to 4-lane cuts crashes per mile from 40 percent to 60 percent.

Statewide data, listed in Table 4.2, highlights the lower accident rate on rural expressways compared to rural 2-lane roads. The Nebraska Department of Roads reports the accident rate on rural 2-lane sections is 12.9 percent greater than the accident rate for 4-lane rural expressway sections.

Table 4.1: The impact of roadway expansion from 2-lane to 4-lane

| Type of expansion | Change in crashes per mile |
|----------------------------|----------------------------|
| 2-lane to 4-lane undivided | -20% to 0% |
| 2-lane to 4-lane divided | -60% to -40% |

Source: Federal Highway Administration

Table 4.2: Nebraska's statewide rural accident rates (2012 to 2014)

| Roadway Type | Accident rate |
|----------------|---------------|
| 4-lane section | 0.519 |
| 2-lane section | 0.638 |

Source: Nebraska Department of Roads

¹⁹Council, F. and Stewart, R., Safety Effects of the Conversion of Rural Two-Lane Roadways to Four-Lane Roadways," Federal Highway Administration, U.S. Department of Transportation, McLean, VA.

In Table 4.3, data from 2012 show the variation in traffic intensity across Highway 81. As indicated, the daily average of traffic intensity for the 43.0 miles of 2-lane highway to be converted was 3,881 for all vehicles, and 560 for heavy trucks. For the portion of Highway 81 that will remain 2-lane, the average overall traffic count was 3,974 and was 708 for heavy trucks.

Data in Table 4.3 indicate that the portion to be converted experienced a 12.2 percent higher accident rate per mile than the 2-lanes that will not be converted.

Table 4.3: Accidents for 2-Lane sections of Highway 81 (August 2012 to July 2015)

| Portion | Mileage | Daily traffic count | | Accidents | |
|-------------------------|---------|---------------------|--------------|-----------|----------|
| | | All vehicles | Heavy trucks | Total | Per Mile |
| 2-lanes to be converted | 43.0 | 3,881 | 560 | 63 | 1.65 |
| Remaining 2-lanes | 51.7 | 3,974 | 708 | 76 | 1.47 |

Source: Nebraska Department of Roads

According to the National Highway Traffic Safety Administration (NHTSA, 2014), and shown in Table 4.4, there were 32,999 people killed, 3.9 million injured, and 24 million vehicles were damaged in motor vehicle crashes in the United States in 2010. NHTSA estimated the economic costs associated with these accidents was \$242 billion. Included in these losses are lost productivity, medical costs, legal and court costs, emergency service costs (EMS), insurance administration costs, traffic congestion costs, property damage, and workplace losses. NHTSA estimated the total cost to society, economic costs plus quality of life costs, was \$836 billion; the estimated cost per accident was \$61,471.

Table 4.4: Summary of NHTSA crash study, 2010

| | Totals | Per crash |
|--|-------------------|-----------|
| Number of motor vehicle crashes in 2010 | 13,600,000 | |
| Number of injured individuals | 3,900,000 | 0.287 |
| Cost borne by society | \$164,700,000,000 | \$12,110 |
| Cost borne by businesses and individuals | \$77,300,000,000 | \$5,684 |
| Total cost of crashes | \$242,000,000,000 | \$17,794 |
| Discounted cost per fatality | \$1,400,000 | |
| Societal harm from vehicle crashes (economic + lost quality of life = cost per crash) | \$836,000,000,000 | \$61,471 |

Source: National Highway Traffic Safety Administration (NHTSA)

Using a three percent discount rate, the NHTSA estimated that each vehicle fatality resulted in an average discounted lifetime cost of \$1.4 million.²⁰

Using accident cost data from Table 4.4, Highway 81 accident savings are estimated and presented in Table 4.5. Table 4.6 provides the economic impact for the first 15 years of widened highway using NHTSA data listed in Table 4.4.²¹ As presented, the 43.0 miles of widening of Highway 81 will produce \$20.7 million in discounted savings due to accident reduction.

Table 4.5: Yearly savings from the reduction in accidents from widening Highway 81

| | Source | |
|---|----------------------------------|-------------|
| Miles converted to 4-lane (Highway 81) | 4 Lanes 4 Nebraska proposal | 43.0 |
| Accident reductions per mile per year | Regression analysis (appendix C) | 0.65 |
| Cost per accident | NHTSA (Table 4.4) | \$61,471 |
| Total yearly savings (2015 dollars) | (43.0*0.65*\$61,471) | \$1,718,114 |
| Total savings in 2019 | | \$1,904,483 |
| Total yearly savings in 2019 (2015 dollars) | | \$1,583,647 |

Source: Goss & Associates

Table 4.6: Economic impact of widening Highway 81 on accidents, 2019-2023

| Year | Gross Impact | Discount Rate | Discounted Impact |
|--------------|---------------------|---------------|---------------------|
| 2019 | \$1,904,483 | 1.20 | \$1,583,647 |
| 2020 | \$1,954,152 | 1.26 | \$1,551,709 |
| 2021 | \$2,005,116 | 1.32 | \$1,520,414 |
| 2022 | \$2,057,410 | 1.38 | \$1,489,750 |
| 2023 | \$2,111,067 | 1.45 | \$1,459,705 |
| 2024 | \$2,166,124 | 1.51 | \$1,430,266 |
| 2025 | \$2,222,617 | 1.59 | \$1,401,420 |
| 2026 | \$2,280,583 | 1.66 | \$1,373,156 |
| 2027 | \$2,340,061 | 1.74 | \$1,345,462 |
| 2028 | \$2,401,090 | 1.82 | \$1,318,327 |
| 2029 | \$2,463,711 | 1.91 | \$1,291,739 |
| 2030 | \$2,527,965 | 2.00 | \$1,265,687 |
| 2031 | \$2,593,894 | 2.09 | \$1,240,161 |
| 2032 | \$2,661,543 | 2.19 | \$1,215,150 |
| 2033 | \$2,730,956 | 2.29 | \$1,190,642 |
| Total | \$34,420,773 | | \$20,677,236 |

Source: Goss & Associates

²⁰The Economic and Societal Impact of Motor Vehicle Crashes, 2010," National Highway Traffic Safety Administration, DOT HS 812 013, May 2014. <http://www-nrd.nhtsa.dot.gov/Pubs/812013.pdf>.

²¹The estimates use the same discount rate as used throughout this study of 4.7%. Wage growth of 2.61% is also used to grow average yearly wages.

Section 5 - The Impact of Highway 81 Widening on Commute Times

Overview of commute time analysis:

Impacts on commute time:

Trucking

- Shortened delivery trips to large metropolitan areas, e.g. Denver and Omaha.
- Increased driving speed, shortened trips.
- Shorter trips and ease of delivery resulting in lower freight charges to truck companies, saving manufacturers money on delivery fees.
- Companies that produce perishable items see improved reliability measures due to shorter travel times and ease of delivery.

Service Sector Impact:

- Repair shops and agricultural businesses will find faster travel times beneficial to reaching customers sooner.
- Improved access for customers.

Commuting Workers Impact:

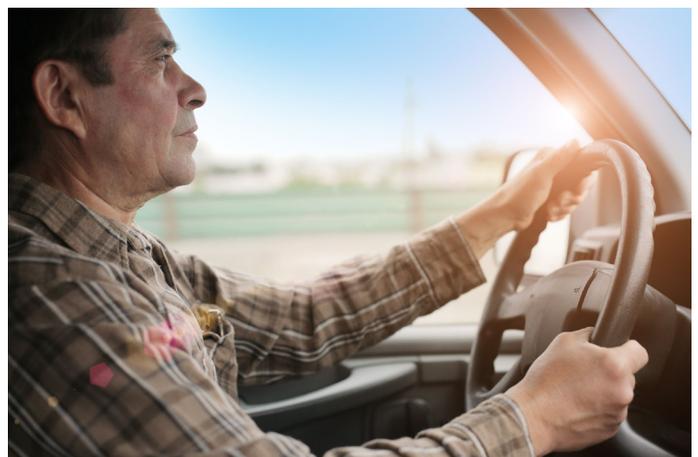
- Employees will get to jobs faster and more safely.
- Some commuters will take the 4-lane highway for its safety benefits over a shorter-distance route.

This commute time analysis was performed using the present day environment, taking into account only the expansion of Highway 81 from two lanes to four lanes. The actual future economic benefit, based on commute time savings particularly, will be dependent on the broader effects of an expanded highway in the region, which could spur increases in traffic volume and the number of workers utilizing Highway 81 for their daily commute.

In the analysis that follows, the average commute times were calculated for all workers in the four counties identified. This includes both workers who stay near home and workers who travel long distances for their daily commute. In addition, an estimate was made to determine the number of commuters that utilize Highway 81 in their journey to work, but do not work in the conversion counties.

Among the four counties analyzed, commuting patterns show that 81.6 percent of workers live and work in the same county, whereas 18.4 percent commute to a different county or state from that in which they live. The four counties contain 30,406 total workers, which consists of 24,826 workers that live and work in the same county and 5,580 workers that commute out-of-county. Approximately, 1,639 commuters utilize the 43 miles of Highway 81 from York to Columbus in their journey to work.

Potentially, the proposed highway expansion section would directly benefit approximately 1,639 workers with shorter commute times. Goss & Associates estimates a 10.9 minute time savings (10 minutes and 54 seconds) from the average daily commute time to and from work.



It is also estimated that the proposed expansion of Highway 81 will provide a total savings of \$1,384,787 in salary per year among workers that utilize Highway 81 from York to Columbus for 2019. This per year figure equates to a net present value of \$15,034,827 over a 15-year time period with a discount rate of 4.7 percent and an annual wage increase of 2.0 percent. Estimates by county are presented in Table 5.2.

Methodologies to determine savings in commutes times:

1. Using Google Maps we determined the current time a driver takes in traveling the 43 miles to be converted to 4-lanes from York County to Butler County.
2. The routes that utilized the proposed expanded Highway 81 section were identified from the most probable routes taken by commuters. Mileage traveled on that section was then determined.
3. On the routes that utilized the expansion section of Highway 81, the difference in time savings was calculated using a speed increase of 7.5 miles per hour.
4. Salary savings estimations were calculated using the Nebraska mean hourly wage of \$19.47 (annual: \$40,488), multiplied by the total annual commuting time saved while traveling on the proposed Highway 81 expansion section.
5. Net present value of the salary savings due to the highway expansion's effect on commuting times was calculated using a discount rate of 4.7 percent over a time period of 15 years.
6. A 15-year time frame provides a conservative estimate that takes into account the uncertainty of sustained commute time benefits in the future. Several factors could affect commute times in the future, such as increased traffic volume from growth in economic development spurred by the highway's increased capacity, thereby possibly reducing the potential salary savings due to decreased commute times.²²

Tables 5.1 and 5.2 list estimated savings for the four counties. Table 5.3 shows the impact of Highway 81 on the reduction of commute time.

Table 5.1: Total time savings from proposed Highway 81 expansion

| County | Total commute time savings per year (minutes) | Total commute time savings per year (hours) |
|--------------|---|---|
| Butler | 1,283,924 | 21,399 |
| Platte | 1,919,375 | 31,990 |
| Polk | 442,732 | 7,379 |
| York | 442,732 | 7,379 |
| Total | 4,268,460 | 71,141 |

Source: Goss & Associates

²²Based on Nebraska's median 2013 earnings of \$40,210 or \$19.33 per hour (U.S. Bureau of Labor Statistics).

Table 5.2: Salary savings from decreased commute times

| County | Salary savings 2019 | NPV (discount rate = 4.7%; time period = 15 yrs.) |
|-------------------------|---------------------|---|
| Butler | \$258,539 | \$2,806,991 |
| Platte | \$228,967 | \$2,485,929 |
| Polk | \$389,498 | \$4,228,832 |
| York | \$179,118 | \$1,944,712 |
| Other Nebraska counties | \$328,665 | \$3,568,364 |
| Total | \$1,384,787 | \$15,034,827 |

Source: Goss & Associates

Table 5.3: Impact of Highway 81 on the reduction in commute time

| Year | Gross impact | Discounted impact |
|--------------------------------|---------------------|---------------------|
| 2019 | \$1,384,787 | \$1,151,501 |
| 2020 | \$1,420,902 | \$1,128,278 |
| 2021 | \$1,457,960 | \$1,105,523 |
| 2022 | \$1,495,983 | \$1,083,227 |
| 2023 | \$1,534,999 | \$1,061,380 |
| 2024 | \$1,575,032 | \$1,039,974 |
| 2025 | \$1,616,109 | \$1,019,000 |
| 2026 | \$1,658,257 | \$998,449 |
| 2027 | \$1,701,505 | \$978,312 |
| 2028 | \$1,745,880 | \$958,582 |
| 2029 | \$1,791,413 | \$939,249 |
| 2030 | \$1,838,133 | \$920,306 |
| 2031 | \$1,886,072 | \$901,746 |
| 2032 | \$1,935,261 | \$883,559 |
| 2033 | \$1,985,732 | \$865,740 |
| Total discounted impact | \$25,028,023 | \$15,034,827 |

Source: Goss & Associates

Of course, during construction, commute times are expected to rise. Table 5.4 details those economic costs. It is assumed that due to construction, average speeds are reduced by 7.5 mile per hour. This increase in commute times is estimated to cost approximately \$2.9 million and \$2.6 million in 2015 dollars.

Table 5.4: Estimated costs of increase in commute times due to construction

| Year | Salary Savings Growth at 2.0% | NPV at 4.7% Discount Rate |
|--------------|-------------------------------|---------------------------|
| 2017 | \$1,420,902 | \$1,295,702 |
| 2018 | \$1,457,960 | \$1,269,570 |
| Total | \$2,878,862 | \$2,565,271 |

Source: Goss & Associates

Figures 5.1 through 5.4 summarize commuting patterns (journey-to-work) for all four Highway 81 counties.

Figure 5.1: Commuting patterns for Butler County workers, 2006-2010

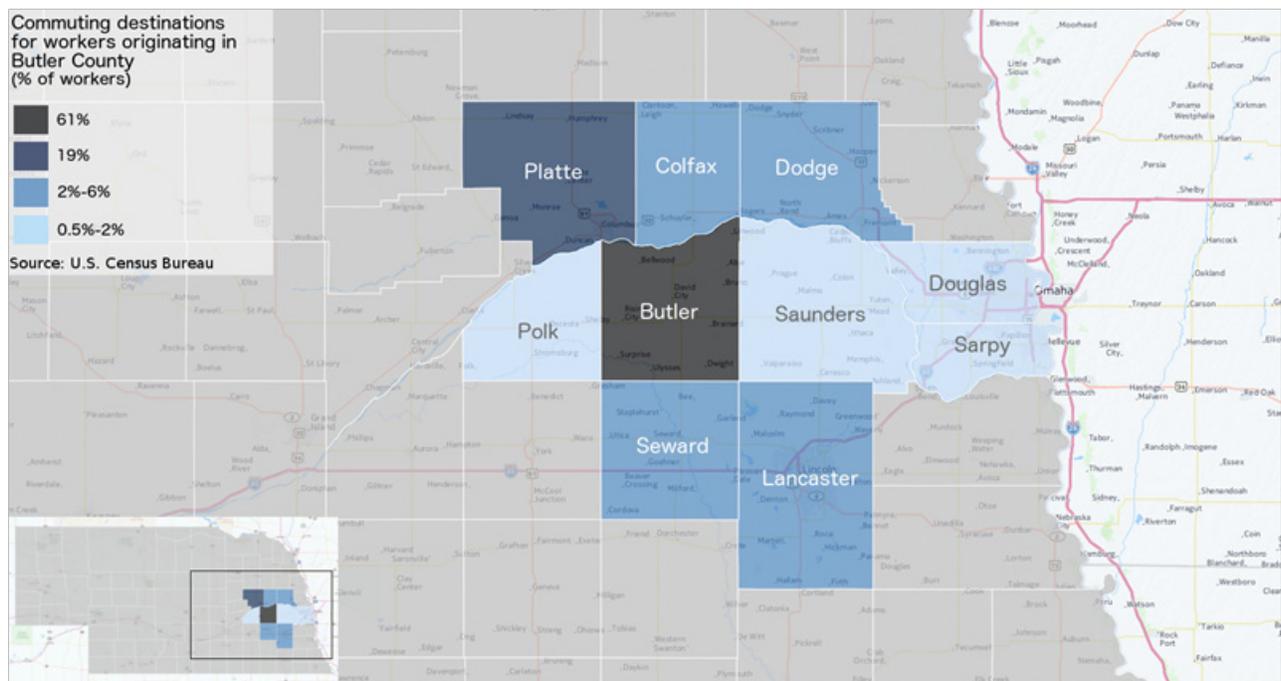


Figure 5.2: Commuting patterns of Platte County workers, 2006-10

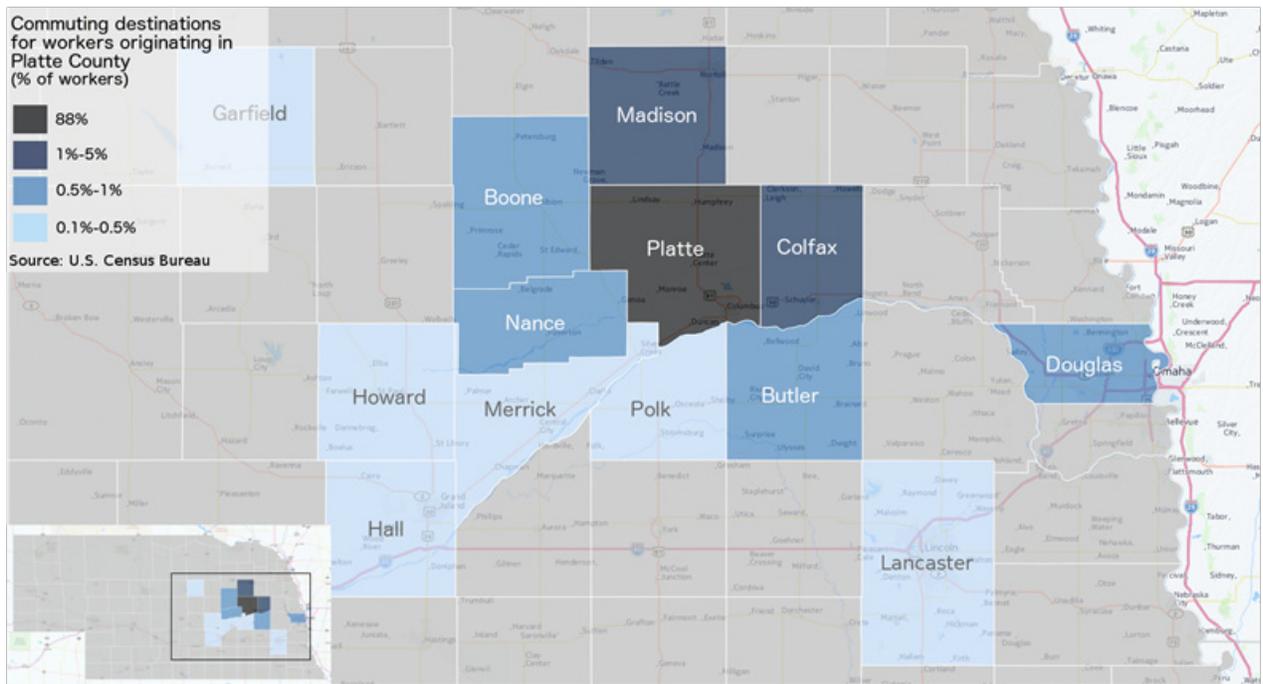


Figure 5.3: Commuting patterns of Polk County workers, 2006-10

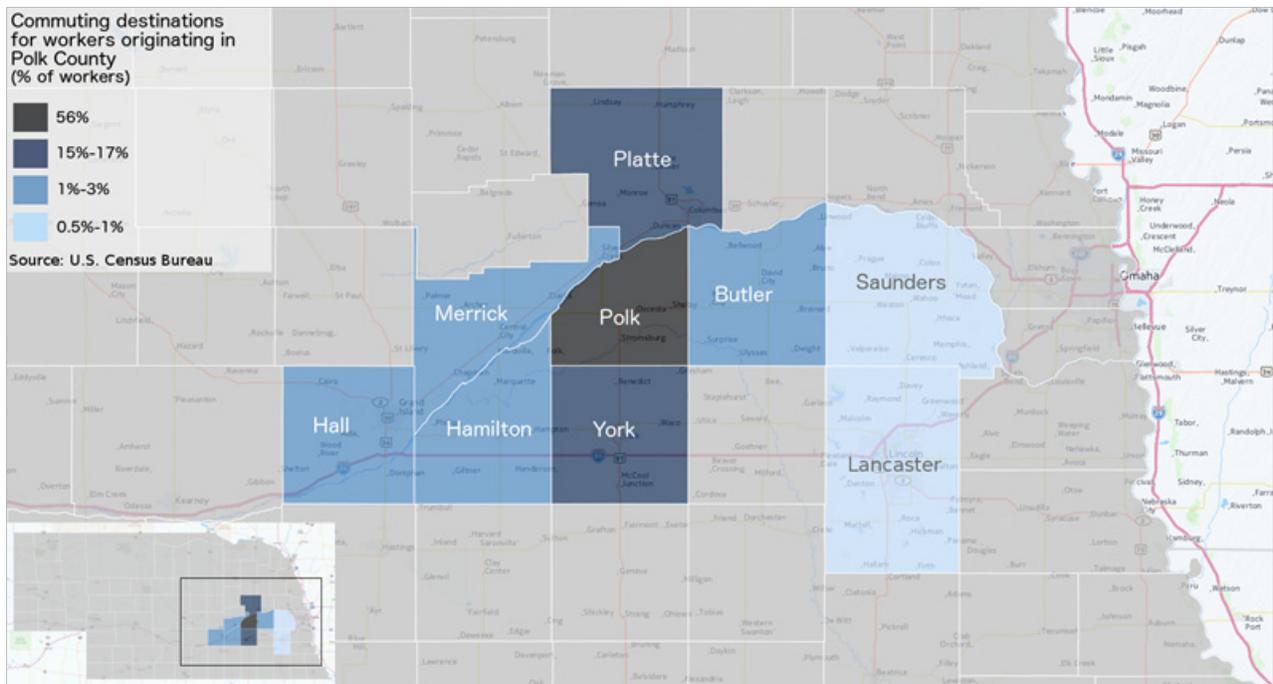
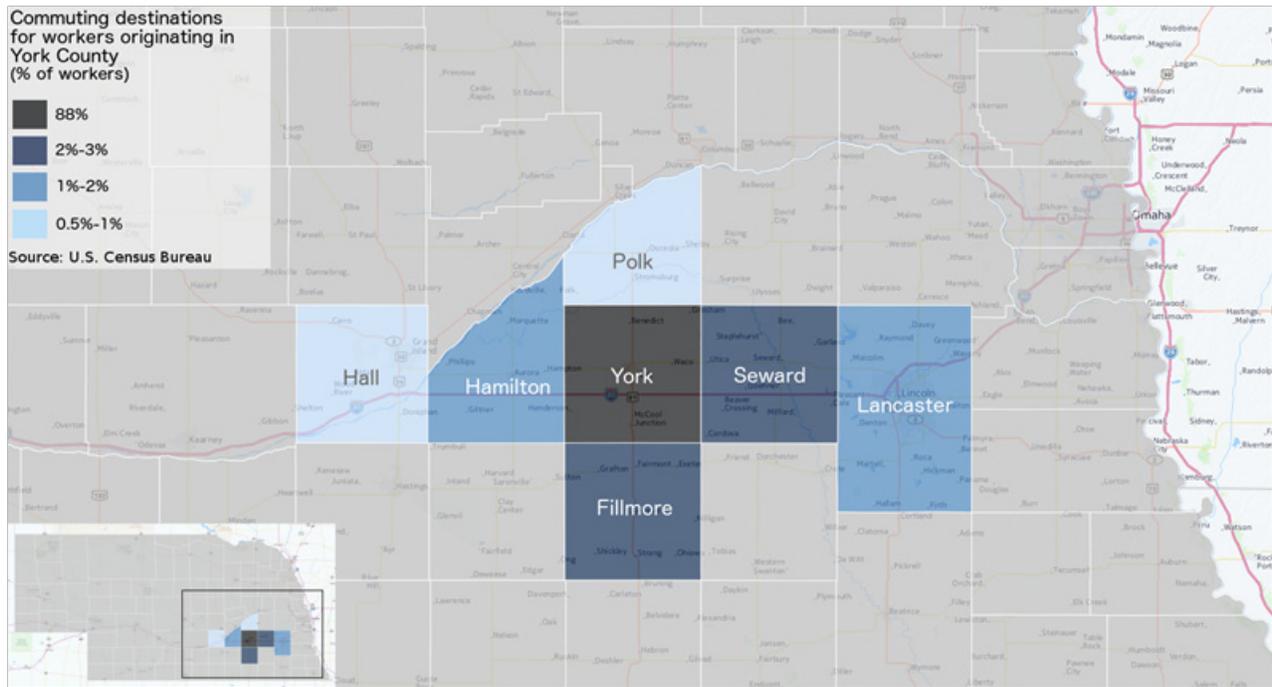


Figure 5.4: Commuting patterns of York County workers, 2006-10



Summary

This section investigated the monetary impacts of the Highway 81 expansion on commute times. For 2019 it is estimated that the widening would produce an impact of \$1.4 million (\$1.2 million in 2015 dollars). For the 15 years of operations, approximately \$15.0 million would be generated due to reduced commute times.

Section 6 - Alternative Highway Funding Strategies

Overview

State highway funding has become a challenging problem as states face budget shortfalls while increasingly needing transportation infrastructure investment. With the U.S. Highway Trust Fund facing solvency issues,²³ states are unable to rely on Congress for transportation revenue, forcing state legislators to find new sources of highway funding.²⁴

Figure 6.1 shows that Nebraska, the U.S. and the region, as a percent of GDP, are spending less on highways in 2012 than was spent in 2007.

Over the past few years, state legislators have embraced funding strategies that involve both old and new sources of funds. Gas taxes, bonds, and general fund sources continue to be the most popular sources of revenue, but new innovative solutions, which utilize vehicle fees, user fees, and public-private partnerships, are beginning to fill budgetary gaps.

It is common to see states use a blend of both new sources of revenue and a reallocation of existing funds toward transportation-specific projects. Gas tax changes and new fees are delivering additional sources of funds that could provide a more sustainable source of revenue in the fuel-efficient future. Figure 6.2 illustrates fuel tax collections as a percent of GDP for 2007 to 2013.²⁵

Adjustments to Gas Taxes. Several states have made adjustments to gas taxes. In Wyoming, a 10 cent increase in gas tax is estimated to generate \$70 million in extra revenue that will specifically benefit highways. In New Hampshire, a four cent gas tax increase will be allocated to bridge repair

²³<http://www.dot.gov/highway-trust-fund-ticker>.

²⁴The Highway Trust Fund receives money from the federal gas tax (18.3 cents per gallon of gasoline; 24.4 cents per gallon of diesel). The Fund is comprised of three accounts, one of which is the Highway Account which funds road construction. Less driving and better fuel efficiency has led to solvency issues, which have plagued the fund over the last few years.

²⁵Region includes Nebraska and its six border states Colorado, Iowa, Kansas, Missouri, South Dakota and Wyoming.

projects in a two-year time frame.²⁶ It is common to see gas tax legislation pass successfully when additional revenues are directed toward specific projects over a set amount of time.

Virginia is taking a different approach to gas taxes by eliminating them entirely. In 2013 the state enacted a bill that removed the per gallon gas tax and replaced it with an increase in sales tax, while also adding a 3.5 percent tax on wholesale gas transactions.²⁷

The rationale for eliminating per gallon gas taxes, and increasing other sources of revenue, stems from the fact that cars are becoming more fuel efficient and people are driving less overall, using fewer gallons of fuel.

State planners are suggesting that per gallon gas taxes will become a less sustainable source of transportation funding in the future, especially with the Obama Administration's increased efficiency standards.²⁸ People are also driving less, with statistics showing a leveling off of miles traveled since the recession in 2008.²⁹

State planners are suggesting that per gallon gas taxes will become a less sustainable source of transportation funding in the future.

Table 6.1 lists examples of state legislation to increase transportation funding.

²⁶<http://t4america.org/maps-tools/state-transportation-funding/>.

²⁷<http://t4america.org/maps-tools/state-transportation-funding/>.

²⁸The Obama Administration has introduced new standards that require 54.5 mpg for cars and light trucks by 2025. (<http://www.whitehouse.gov/the-press-office/2012/08/28/obama-administration-finalizes-historic-545-mpg-fuel-efficiency-standard>).

²⁹Duntzik, T., Baxandall, Phineas. <http://uspig.org/sites/pig/files/reports/A%20New%20Direction%20vUS.pdf>.

Figure 6.1: Highway spending as percent of GDP, 2007-13

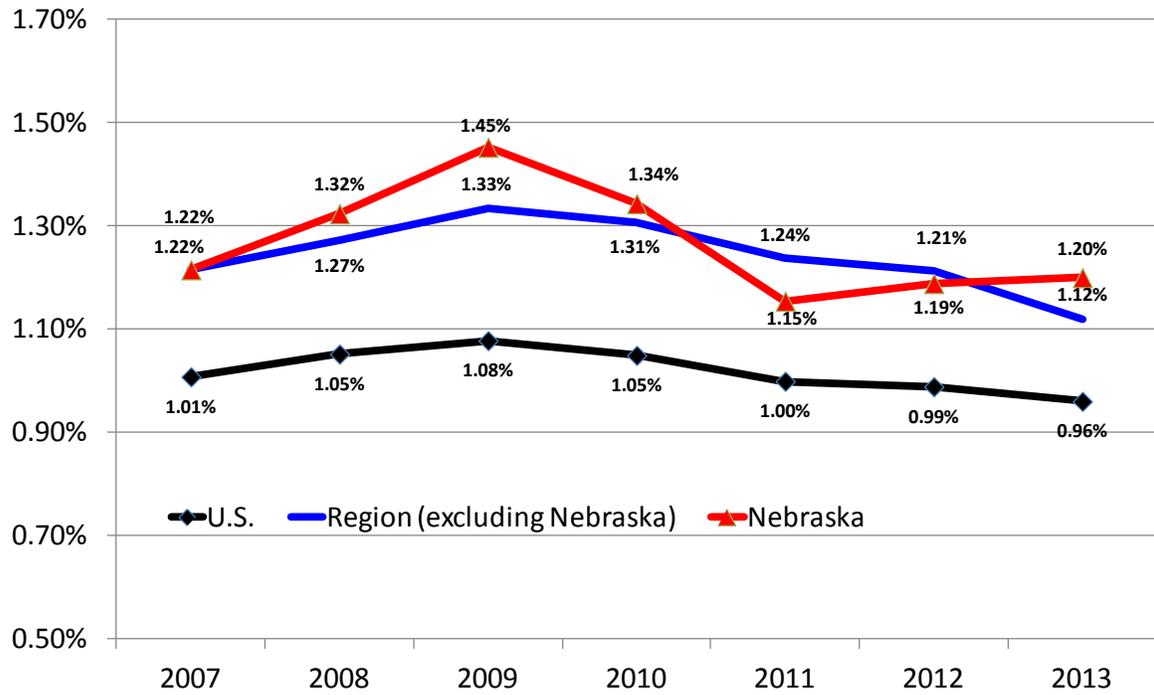


Figure 6.2: Fuel tax collections as percent of GDP, 2007-13

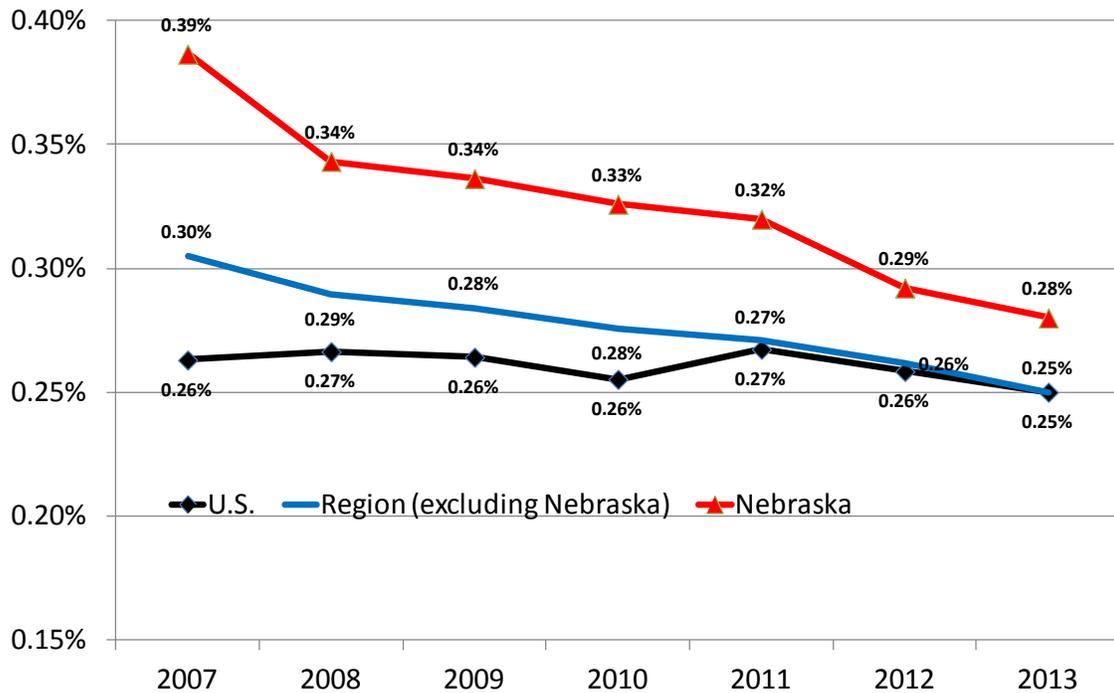


Table 6.1: Examples of 2013 - 2015 state legislation to increase transportation funding

Alabama: HB 514 authorizes counties to use funds from the state's 4-cent excise gas tax on vegetation management on county rights of way. Previously, such funds could only be used on resurfacing, restoring and rehabilitating paved roads and bridges or on replacing bridges. HB 514 was a priority bill for the Association of County Commissioners of Alabama. Effective August 1, 2013.

Colorado: HB 1110 enacted a new \$30 fee on electric vehicles and made other changes to the process of collecting taxes and fees from electric and natural gas vehicles, resulting in additional Highway Users Tax Fund monies for state and local governments. Signed into law on May 15, 2013.

Indiana: HB 1001 appropriated 1% of state sales tax and 20% of sales tax on gasoline to state and local roads, and also eliminates gas tax diversions to state police. These changes will result in roughly \$65 million in additional annual funding for county roads. Signed into law on May 8, 2013.

Iowa: In February 2015, Iowa approved a 10 cent per gallon increase in the state's gasoline tax to cover an annual shortfall of \$215 million for transportation funding. The state's fiscal estimating agency indicated the increase will result in \$204 million in new revenue for 2016, the first full fiscal year of implementation, with the revenue declining each year thereafter due to decreased fuel consumption, until reaching \$195 million by 2020.

Minnesota: Chapter 117 gives all counties the option to levy a \$10 per vehicle wheelage tax. Previously, only 5 counties were authorized to levy a \$5 per vehicle tax. Funds from this tax can only be used for "highway purposes." 47 of Minnesota's 87 counties have signed on to levy the tax. Signed into law.

Oklahoma: HB 1080 would apportion 5% of funds from motor vehicle fees to county bridge and road improvement over the course of two years. Both chambers passed the bill, but conferees were unable to agree and the measure is being held in conference until the legislative session resumption in 2014. HB 1080 is an agenda bill for the Association of County Commissioners of Oklahoma. Held in conference.

Texas: SB 1747 amended the Transportation Code to allow counties to designate County Energy Transportation Reinvestment Zones (CETRZ) in order to promote transportation infrastructure projects in areas affected by oil and gas exploration and production activities. The bill would allow counties to use revenue from taxes designated to a CETRZ to finance certain transportation projects. Signed into law on June 14, 2013.

Sources: http://www.naco.org/legislation/Documents/Notable-Bills+Trends_StateLegislatures-2013.pdf; <http://www.kcrg.com/subject/news/iowa-officials-set-plans-for-new-transportation-funds-from-gas-tax-20150310#EliC5B4vELX2sFmp.99>

Vehicle Fees. With efficiency considerations in mind, states are looking toward vehicle fees for additional revenue, and, in some cases, are introducing new fees on fuel efficient cars. Vehicle fees ensure a predictable revenue source to offset the reduction in gas tax revenue.

States that have already introduced additional fees specifically on fuel efficient vehicles include Colorado, Nebraska, North Carolina, and Washington. Several other states are looking to add similar legislation as well. These fees ensure a predictable source of transportation revenue to offset the declining gas tax revenue in the future. Wisconsin is considering the electric vehicle fee for 2016,³⁰ while the state of Washington has added a \$100 fee to electric car owners.³¹

Fees on electric and hybrid cars could potentially be politically contentious revenue sources. A protest was held at the Virginia Capitol Building because the fees would be added to cars already purchased.³² The new electric vehicle fee was signed into law by Virginia Governor Bob McDonnell in 2013. However, in 2014, new Virginia Governor Terry McAuliffe repealed it.³³

Vehicle Miles Traveled (VMT) Fees. Interest in a tax or fee based on vehicle miles traveled is also gaining momentum as a possible solution for revenue shortfalls.³⁴

VMT fees are based on distance traveled using tracking devices installed in cars. New initiatives in Oregon are set to begin in mid 2015, with 5,000 volunteer drivers enrolled in a pilot program in which they pay 1.5 cents per mile and are issued a gas tax credit.³⁵ Illinois has implemented a limited VMT fee on trucks.³⁶

The VMT fee is calculated using a GPS device to track the roads driven on and calculate distances. The efficiency and accuracy of such a

³⁰<http://www.jsonline.com/business/wisconsin-would-join-electric-car-tax-trend-b99392257z1-282962321.html>.

³¹http://seattletimes.com/html/localnews/2019981088_electric-cars25.html.

³²http://www.huffingtonpost.com/2013/02/20/virginia-hybrid-fees_n_2727142.html.

³³<http://www.usatoday.com/story/money/cars/2013/04/28/hybrid-taxes-gas-tax-highway-funding/2110297/>.

³⁴http://www.fhwa.dot.gov/ipd/revenue/road_pricing/defined/vmt.aspx.

³⁵<http://www.nlc.org/media-center/news-search/oregon%E2%80%99s-vmt-pilot-to-begin-its-third-phase-road-usage-charge-program-update>.

³⁶<http://www.cyberdriveillinois.com/departments/vehicles/cft/fees.html>

Vehicle fees ensure a predictable revenue source to offset the reduction in gas tax revenue.

system is well-regarded, but concerns of privacy, particularly because of the GPS tracking capabilities, must be reconciled before large-scale adoption can be achieved.³⁷

Highway Bonds. In 2014, a Nebraska bonding bill fell short of passage by three votes, leaving Nebraska and Wyoming as the only two states that currently do not allow bonding for highway construction. However, bonding remains a viable resource in terms of expediting important roads projects, and as such, should be an option when considering funding strategies.

Public Private Partnerships

Public-private partnerships (PPPs) are increasingly allowing states to finance needed transportation projects where other revenue sources are lacking. PPPs enable the capacity to finance and build highways to meet a pressing need, rather than wait for funds to accumulate over several years through traditional state funding sources.

According to the Colorado Department of Transportation, their US-36 highway project is being completed two decades earlier because of a PPP arrangement.³⁸ In states that do not enter into PPP agreements, legislation is currently focused on authorizing state departments to seek out these partnerships within an efficient framework that protects the interests of the citizens.

According to the Colorado Department of Transportation, their US-36 highway project is being completed two decades earlier because of a PPP arrangement.

³⁷<http://www.citylab.com/tech/2011/11/are-road-use-fees-just-too-creepy-to-work/506/>.

³⁸<https://www.codot.gov/projects/US36ExpressLanes/update-on-us-36-public-private-partnership-understanding-the-facts>.

For example, Arizona enacted HB 2396 which granted the Department of Transportation the ability to pursue a wider range of more immediate projects. Maryland's legislature enacted formal guidelines for the use of PPPs, making the process more efficient and transparent for potential partners. Florida modified its current rules on PPPs, allowing broader use for projects, while implementing safeguards to protect public interests.³⁹

The benefits of PPPs can vary, but structurally they provide efficiencies in project initiation and project management. PPPs can be initiated more quickly compared to the pay-as-you-go model used with traditional state financing. Pay-as-you-go models wait until enough funds are generated from gas taxes or other allocated sources of funds before the project can be initiated.⁴⁰

The benefits of PPP projects vary with the type and scale of the project, but according to the Federal Highway Administration, overall cost savings have materialized through properly-aligned incentives and greater efficiencies from more expertise and better management.⁴¹

PPPs can be initiated more quickly compared to the pay-as-you-go model used with traditional state financing.

Funding sources can vary depending on the type of PPP project. One interesting source has been highway tolls, which have been used to finance the debt of PPP projects with various degrees of success. The Colorado US-36 project is utilizing modern toll systems that allow traffic to flow continuously.⁴² The expanded highway will reduce the bus trip between Boulder and Denver by about 24 minutes – even during the peak morning commute – compared to 52 minutes using

³⁹Reed (2014) Reed, J., "The Growing Use of Transportation Public-Private Partnerships", National Conference of State Legislators, May 2014.

⁴⁰Ybarra and Gilroy (2009).

⁴¹"Report to Congress on Public-Private Partnerships", United States Department of Transportation, Dec. 2004.

⁴²<https://www.codot.gov/projects/US36ExpressLanes/update-on-us-36-public-private-partnership-understanding-the-facts>
<https://www.codot.gov/projects/US36ExpressLanes>.

the general purpose lanes before project construction began.⁴³

In Colorado's PPP, the tolls collected are distributed to the following obligations, in this order of priority:

1. Maintaining and operating the highway.
2. Paying off bonds and other project debts.
3. Returning equity to the private partner.
4. Earning return-on-equity for the private partner.
5. Any additional revenues are split between Colorado Department of Transportation and the private partner for re-investment in the US-36 corridor.

In 2009, to expedite the availability of highway construction funds, Colorado legislators passed a bill that gave the Colorado Department of Transportation (CDOT) the ability to pursue PPP deals. The bill also created the High Performance Transportation Enterprise, which is a division of the CDOT responsible for seeking out PPPs and managing proposals.⁴⁴ A PPP was pursued to expedite the project in an environment of insufficient funds.

The PPP consists of an agreement among the CDOT, the High-Performance Transportation Enterprise, and Plenary Roads Denver, the private partner, which is a consortium of six firms involved in the construction, architecture, and finance industries. Plenary Roads Denver has agreed to construct express lanes, reconstruct general purpose lanes, cover maintenance of the highway, and operate the toll roads, generating revenue to the private firm over a 50-year contract period.⁴⁵

To obtain the contract, Plenary Roads Denver competed in a two-stage bidding process that involved input from local governments and other stakeholders.⁴⁶

⁴³<http://flatironbike.com/2014/02/14/us-36-for-whom-the-road-tolls/>.

⁴⁴<http://mountaintownnews.net/2014/02/08/colorado-public-private-partnership-in-spotlight/>.

⁴⁵<https://www.codot.gov/news/2013-news-releases/04-2013/cdot-and-hpte-select-concessionaire-to-complete-the-us-36-express-lanes-project>.

⁴⁶<https://www.codot.gov/projects/US36ExpressLanes/update-on-us-36-public-private-partnership-understanding-the-facts>.

The process included opportunities for public input, a proposal evaluation process by the High-Performance Transportation Enterprise, and a vetting process by the Colorado Transportation Commission, which directs the CDOT on projects and expenditures. In February 2014, the Colorado Transportation Commission voted to officially approve the Highway U.S. 36 PPP agreement with Plenary Roads Denver.⁴⁷

The popularity of PPPs is rising among states. In 2006, 23 states had constructed the legislative framework that allowed for transportation-related PPPs. By 2013 thirty-three states had enacted laws that enable transportation departments to use public-private partnerships for highway projects, up from 29 states in 2010.⁴⁸ It is estimated that about \$30 billion has been committed to PPP projects in the last five years.⁴⁹

Nebraska is one of only 17 states that do not enable these financial arrangements. This issue, however, has been discussed among interested parties, and economic development groups have recommended enabling legislation. According to the Platte Institute for Economic Research, there are ample opportunities to utilize public-private partnerships in Nebraska. This organization has recommended that the state consider this financing option for several of the large projects that could potentially be underfunded.

There have been several recent developments regarding the use of PPPs in transportation projects throughout a variety of states. Projects vary in scope, structure, and financing. An article from the Kennedy School of Government highlights that PPPs are increasingly being used by states to fund infrastructure projects. Specifically after the financial crisis, PPP deals have been used for new-build projects (i.e. greenfield projects), rather than deals involving existing assets (i.e. brownfield projects such as adding tolls). For new-build projects, “the primary value of the P3 model comes not from monetizing an asset, but rather from delivering a needed project more effectively and quickly.”⁵⁰

⁴⁷<http://www.thedenverchannel.com/news/local-news/colorado-transportation-commission-votes-on-us-36-concessionaire-contract-with-plenary-roads02202014>.

⁴⁸Rall (2014)

⁴⁹Reed (2014) Reed, J., “The Growing Use of Transportation Public-Private Partnerships”, National Conference of State Legislators, May 2014.

⁵⁰<http://harvardkennedyschoolreview.com/us-infrastructure-public-private-partnerships-ready-for-takeoff/>.

http://www.denverpost.com/guestcommentary/ci_27692339/

Gov. Hickenlooper issued an executive order outlining an even more transparent process for public-private partnerships in the state of Colorado, giving the public further reassurance in the processes and outcomes.⁵¹

Additionally, legislators in Colorado introduced bonding legislation to finance highway projects.⁵² In May of this year, North Carolina’s Department of Transportation finalized funding with a private developer to construct the I-77 express lanes project. It is the first highway public-private partnership project in the state.⁵³ The Governor’s office of Arkansas hosted a retreat to discuss and promote best practices in the state for the use of PPPs.⁵⁴

It is estimated that about \$30 billion has been committed to PPP projects in the last five years.

A white paper from the Treasury Department details the use of PPPs. Table 6.2 from the paper lists PPP deals in the U.S. from April 2012 to April 2015. The Pennsylvania Bridges Project and the Southern Ohio Veterans Highway are recent transportation projects that have been agreed to in 2015.⁵⁵

facts-about-colorado-highway-funding..

⁵¹http://www.denverpost.com/guestcommentary/ci_27692339/facts-about-colorado-highway-funding.

⁵²<http://www.bizjournals.com/denver/news/2015/04/21/3-5-billion-highway-funding-bill-introduced-in.html>.

⁵³<http://www.infrainsightblog.com/2015/05/articles/ppps/north-carolina-achieves-financial-close-on-states-first-highway-public-private-partnership/>..

⁵⁴<http://www.nga.org/cms/home/nga-center-for-best-practices/meeting--webcast-materials/page-eet-meetings-webcasts/col2-content/main-content-list/arkansas-state-planning-retreat.html>.

⁵⁵<https://www.treasury.gov/connect/blog/Documents/Treasury%20Infrastructure%20White%20Paper%20042215.pdf>.

Table 6.2: U.S. PPP Deals, April 2012-April 2015

| Project | Sector | Financial Close | Amount (\$mil.) | Incentive Structure ¹⁵ |
|--|-----------|-----------------|-----------------|-----------------------------------|
| Midtown Tunnel | Transport | 2012 | 2,100 | Revenue-sharing |
| Presidio Parkway Doyle Drive Concession | Transport | 2012 | 362 | Availability payments |
| I-95 HOV/HOT Lanes | Transport | 2012 | 923 | Revenue-sharing |
| I-95 North, SR 406 to SR 44, | Transport | 2012 | 118 | Availability payments |
| SR 98 Extension - Duval County | Transport | 2012 | 95 | Availability payments |
| Maryland I-95 Travel Plazas Redevelopment | Transport | 2012 | 56 | Revenue-sharing |
| I-75 Expansion | Transport | 2012 | 72 | Availability payments |
| Rialto Water System | Water | 2012 | 172 | Revenue-sharing |
| Bayonne Water & Wastewater Concession | Water | 2012 | 173 | Revenue-sharing |
| Carlsbad Seawater Desalination Plant | Water | 2012 | 903 | Availability payments |
| Ohio River Bridges Project - East End Crossing | Transport | 2013 | 763 | Availability payments |
| North Tarrant Expressway Segments 3A, 3B | Transport | 2013 | 1,350 | Revenue-sharing |
| Goethals Bridge | Transport | 2013 | 1500 | Availability payments |
| Georgia Northwest Corridor (NWC) | Transport | 2013 | 840 | Basic user fees |
| US 36 | Transport | 2014 | 120 | Revenue-sharing |
| I-69 | Transport | 2014 | 370 | Availability payments |
| I-4 Ultimate | Transport | 2014 | 2300 | Availability payments |
| SH 183 - Dallas-Fort Worth (Gap Financing) | Transport | 2014 | 848 | Revenue-sharing |
| Pennsylvania Bridges Project | Transport | 2015 | 900 | Availability payments |
| Southern Ohio Veterans Highway | Transport | 2015 | 553 | Availability payments |

Sources: InfraDeals and project descriptions from state departments of transportation and concession agreements.

Ohio's first PPP for a highway project was announced in May of this year. It is a \$1.2 billion project spanning 35 years to construct 16 miles of the Southern Ohio Veterans Memorial Highway.⁵⁶ The project uses an availability payments model, "where the public sponsor makes periodic payments to the concessionaire on condition that the facility meets defined performance specifications"⁵⁷. Ohio previously had not allowed for the use of PPPs for highway funding, making the project the first of its kind for the state.

Public-private partnerships (PPPs) can refer to a number of different arrangements, but overall, it means that more control and risk is transferred from the public sector to the private entity.⁵⁸ The process of executing public-private partnerships starts with the state government passing legislation that enables public agencies to enter into agreements with private entities.⁵⁹

The legislation passed usually consists of the creation of some type of PPP board that directs the procedures for how public departments request transportation projects and how a private company can submit proposals for the approval process.

For example, the Pennsylvania legislature in 2012 established a specific PPP board to oversee the approval process.⁶⁰ In 2009, California's legislature established an advisory commission to advise PPP projects, and gave an existing transportation commission the power to oversee the approval process.⁶¹

Also, usually included as part of PPP legislation is a process for private entities to submit unsolicited proposals, which can be a source of innovative ideas.⁶²

⁵⁶<http://www.dispatch.com/content/stories/local/2015/05/25/states-share-rises-to-1-2b-over-35-years.html>.

⁵⁷https://www.fhwa.dot.gov/ipd/fact_sheets/p3_paymentmechanisms.aspx.

⁵⁸<https://www.cbo.gov/publication/42685>.

⁵⁹<http://votesmart.org/bill/15555/41242#.VMeyhf7F-KU>; <http://>

www.ncsl.org/documents/transportation/PPPTOOLKIT.pdf.

⁶⁰<http://votesmart.org/bill/15555/41242#.VMeyhf7F-KU>.

⁶¹http://www.dot.ca.gov/p3/documents/prog_guide_final_draft_for_posting.pdf.

⁶²Mallett, W., "Public-Private Partnerships in Highway and Transit Infrastructure Provision," CRS Report for Congress, July 2008. http://assets.opencrs.com/rpts/RL34567_20080709.pdf.

Key participants in a PPP project include state legislators, public sector executive agencies, private sector companies, and other public officials.⁶³ State legislators are responsible for enabling the legal environment and sometimes are involved in the approval process. A public sector executive agency is usually a department of transportation or a toll authority which direct the projects.

Generally, the steps involved in development and delivery of PPP projects involve a process for identifying opportunities, a screening process, a solicitation process, and a process involving the evaluation and approval of submitted proposals, whether solicited or unsolicited. For example, in 2013, Maryland legislators passed a bill that established a public-private partnership program that specifically outlines this process, which is to be executed by the Maryland Department of Transportation.⁶⁴

In 2012, the state of Pennsylvania enacted PPP enabling legislation.⁶⁵ In the coming year the state plans to utilize this legislation to initiate the replacement of 558 structurally deficient bridges.⁶⁶ The project's total cost is \$1.2 billion which includes an \$899 million contract with a design-build partner. A majority of the project's funding (\$721.5 million) will come from private activity bond proceeds. HDR, Inc. is the lead designer of the project. It was reported that healthy competition led to a deal that should result in cost savings for the state.⁶⁷

In contrast to the traditional method of developing a transportation project, where the government identifies a need for a project, plans its development by giving out contracts, uses funds from tax revenue, and then takes final ownership of the project, a PPP arrangement can involve the private sector in any or all steps of the development process.⁶⁸

⁶³<http://www.ncsl.org/documents/transportation/PPPTOOLKIT.pdf>.

⁶⁴<http://purplelinemd.com/images/p3/references/MDOT%20Regs%20on%20P3.pdf>.

⁶⁵<http://pahighwayinfo.org/2012/07/public-private-partnership-legislation-set-to-become-law/>.

⁶⁶https://www.fhwa.dot.gov/ipd/project_profiles/pa_rapid_bridge.aspx.

⁶⁷<http://www.bondbuyer.com/news/regionalnews/pennsylvania-sets-precedent-with-p3-deal-for-bridges-1071772-1.html>.

⁶⁸Mallett, 2008.

In the past, under the traditional method, the private sector has indeed been involved in nearly all construction of road transportation projects, but under a PPP arrangement, the private sector can enter into contractual agreements in a greater role, whether it be the road's operation, maintenance, or financing.⁶⁹ PPPs are also unique in the sense that the private sector can receive revenue from a transportation facility in exchange for taking on the construction, maintenance, or operation of the project, and its accompanying risks.⁷⁰

Colorado Highway 36 PPP. The Colorado Highway U.S. 36 project provides a good illustration of a public-private partnership highway expansion project. The project gained momentum with the completion of an environmental impact study in late 2009 that recommended improvements to the U.S. 36 corridor between Denver and Boulder.

Innovative Revenue Sources. For PPPs, the revenue source is vital to a private entity's willingness to invest in a transportation project. Since Highway 81 is an existing route, adding traditional tolls would not be feasible. Instead, a project's revenue source could depend on either "availability payments" or "pass-through tolls".

Since Highway 81 is an existing route, adding **traditional** tolls would not be feasible. Instead, a project's revenue source could depend on either "availability payments" or "pass-through tolls".

⁶⁹http://reason.org/files/reason_nebraska_transportation_ppp_2009.pdf.

⁷⁰"Using Public-Private Partnerships to Carry Out Highway Projects", CBO, Jan. 2012, <https://www.cbo.gov/publication/42685>.

Availability payments compensate a private concessionaire based on particular project milestones and/or performance benchmarks. For example, a milestone would be the completion of a project before a deadline or, as an operator, a performance benchmark such as the number of lane closures and safety incidents recorded during a set amount of time. Availability payments are starting to be used in the U.S., but are more common in Canada and Europe.⁷¹

Pass-through tolls would be the most feasible option for Highway 81, particularly if operational duties stay with the state agency. Pass-through tolls consist of per-vehicle or per-vehicle-mile fees that are not paid by drivers directly, but, instead, are paid by the state or local authority to the private entity that agreed to finance, build, or operate the highway within the PPP agreement. Pass-through tolls are not very common in the U.S., but have been used by the Texas Department of Transportation (TxDOT).

Pass-through tolls would be the most feasible option for Highway 81, particularly if operational duties stay with the state agency.

In 2003 and 2005, the state of Texas passed legislation that gave the TxDOT the authority to use pass-through tolls. To take advantage of this method of funding, the TxDOT has a special pass-through financing program, which has specific application guidelines for proposals wanting to use pass-through financing.

El Paso's Highway Spur 601 project is an example where the TxDOT compensates a private contractor based on a fixed dollar amount per vehicle which takes a 7.4-mile segment of upgraded highway.⁷² The cost of the project was \$321 million

over a period of 15 years. It was a design-build-finance contract, with highway operations staying with the local authorities.

The private entity, J.D. Abrams, received direct payments from the TxDOT of \$55 million to cover construction, design, and utility relocation costs, \$213 million from bond proceeds executed through a conduit bond issuer (Camino Real Regional Mobility Authority), and \$7.9 million per year from pass-through toll payments.⁷³

Figures 6.3 and 6.4 depict PPP structure and process flow. Table 6.2 provides more details on PPPs.

Funding Source Breakdown⁷⁴

Figure 6.5 profiles the change in the source of funds for highway construction and maintenance. As presented, funding for highways via general funds has grown.

Figures 6.6 and 6.7 show the source of local highway funding. As presented, Nebraska local spending depends much more heavily on spending supported by the general fund.

Among the 133 cases that Ohlms (2014) compiled, most localities use a blend of financing options influenced by what Ohlms calls the enabling factors of each locality. If, for instance, a locality had a high growth rate, in terms of population (which leads to higher tax revenue), the locality could rely on more bond financing.

Nebraska Road Funding Characteristics⁷⁵

- 50 - 70% of Nebraska roads are owned by the counties.
- Nebraska has a fixed and variable rate gas tax. The variable rate is adjusted based on the average wholesale price of gasoline.
- Nebraska limits the amount of property tax a county can generate, capping the property tax rate.
- Nebraska does not authorize its counties to access a local option gas tax.

⁷¹http://www.transportation-finance.org/funding_financing/financing/other_finance_mechanisms/availability_payments.aspx.

⁷²http://www.transportation-finance.org/funding_financing/financing/other_finance_mechanisms/pass_through_tolls.aspx.

⁷³Innovative Finance in Action: El Paso, Texas Inner Loop Spur 601", Minnesota Department of Transportation, Oct. 2009.

⁷⁴Ohlms (2014), p. 15

⁷⁵Istrate et al. (2014).

Figure 6.3: PPP Process Structure

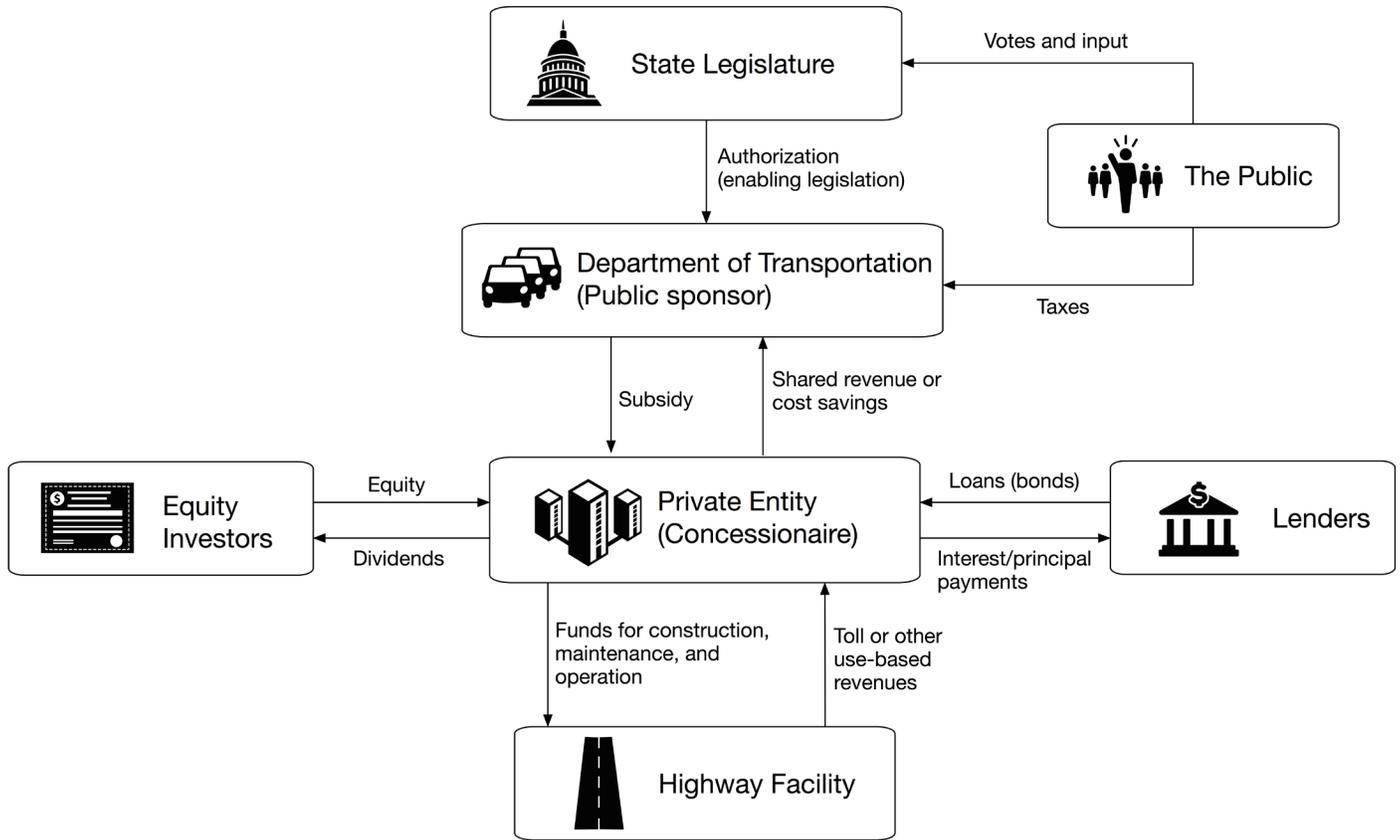


Figure 6.4: PPP Process flow

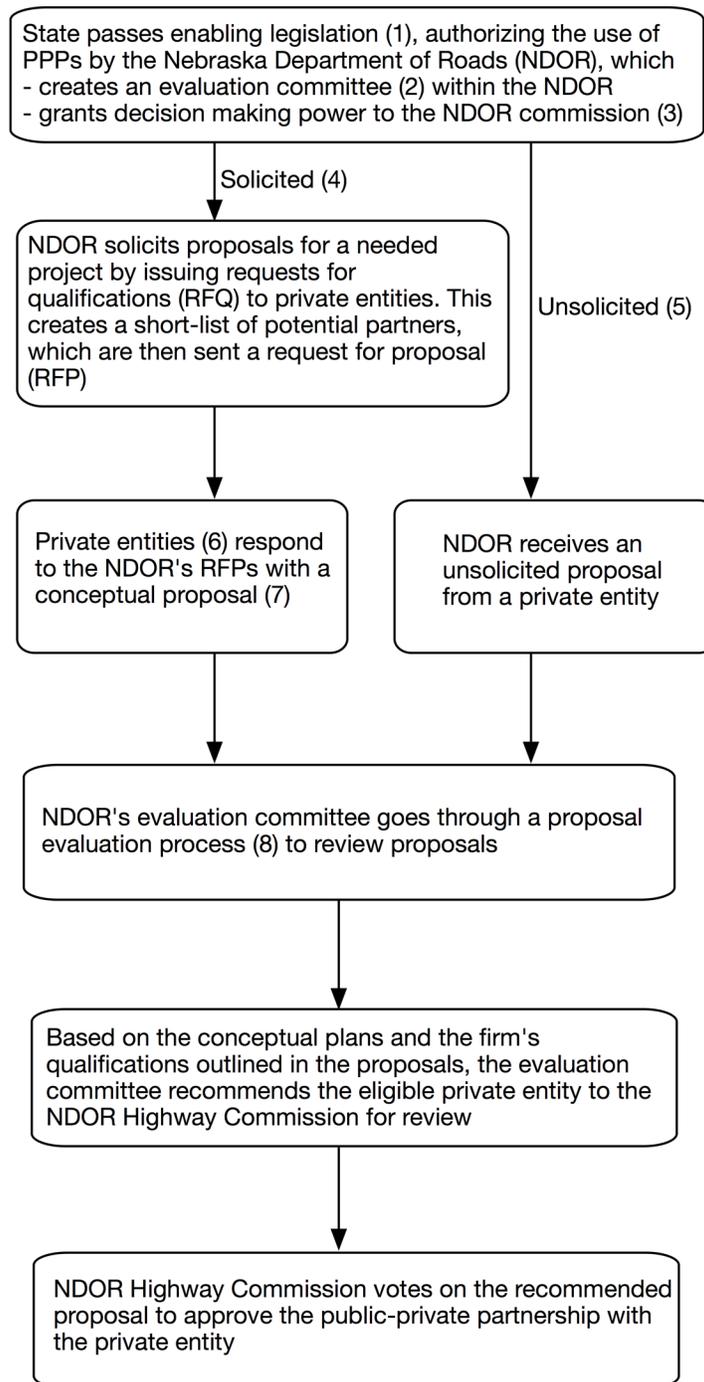


Table 6.2: PPP Process Definitions, Examples, and Explanations

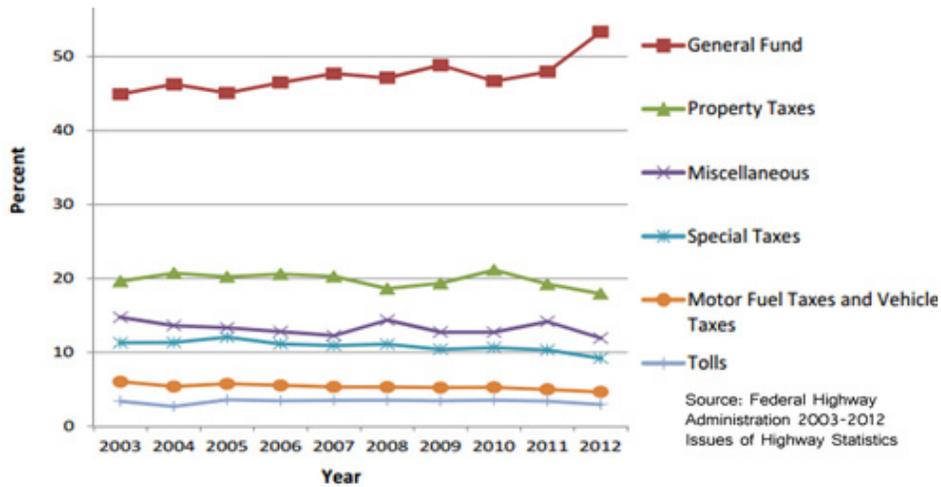
| |
|--|
| 1. Enabling Legislation: Legislation that enables Public-Private Partnerships usually means that the state government is granting authority to the state's department of transportation to enter into agreement with private entities. Decision making power is usually given to the transportation department's commission, which governs the state's department of transportation. Enabling legislation also outlines the process requesting solicited proposals and accepting unsolicited proposals. For example, legislation in Georgia gave the Georgia Department of Transportation (GDOT) a process to evaluate unsolicited proposals and the power to solicit proposals from private entities. In 2004, Florida legislators gave their DOT the ability to enter into PPPs and receive both solicited and unsolicited proposals. |
| 2. Evaluation Committee: The evaluation committee (also called an advisory group or board) is a group of professionals formed by the department of transportation that reviews proposals and recommends companies to the commission. The committee comprises of individuals with expertise in several domains related to transportation project execution: construction, engineering, legal, business affairs, and finance. The committee is usually organized by the state's department of transportation. Texas uses a recommendation committee, which has four subcommittees: Legal/Administrative, Financial, Management, and Development that do the in-depth evaluation. |
| 3. Transportation Commission: The transportation commission is a group of people, usually appointed by the governor, that govern a state's department of transportation. In PPP negotiations, the commission holds the decision making power, which was granted by state legislature. At the Nebraska Department of Roads, this group is referred to as the Highway Commission. ⁷⁶ |
| 4. Solicited Proposal: A solicited proposal in a proposal that was submitted as a response to a request from the department of transportation. If a department of transportation has a need for a project, they will send out a Request for Qualifications (RFQ) followed by a Request for Proposal (RFP) to qualifying firms. |
| 5. Unsolicited Proposal: An unsolicited proposal is submitted by a firm that wishes to suggest a transportation project to the department of transportation. This proposal will be conceptual in nature and will also outline the firm's qualifications. In Florida, when an unsolicited proposal is received, the department of transportation publishes a notice in the newspaper indicating that they will accept other proposals. Unsolicited proposals in Florida require payment of a \$50,000 fee. ⁷⁷ |
| 6. Private Entity: A private entity can be a single company or a consortium of companies acting as a group that submit proposals to take on transportation projects. Private entities are usually construction, architectural, engineering, and financing companies. In Colorado, for the U.S. Highway 36 PPP, the private entity was called Plenary Roads Denver, a consortium of six firms involved in the construction, architecture, and finance industries. |
| 7. Conceptual Proposal: A conceptual proposal details the plans and objectives of the transportation project. Additionally, the vision of the partnership and the qualifications of the participating firms are outlined. |

⁷⁶<http://www.transportation.nebraska.gov/admin/hwycomm.htm>.

⁷⁷CUI, Q., Lindly, J., Evaluation of Public Private Partnership Proposals. <http://utca.eng.ua.edu/files/2011/08/08402-Final-Report-6-2-10.pdf>.

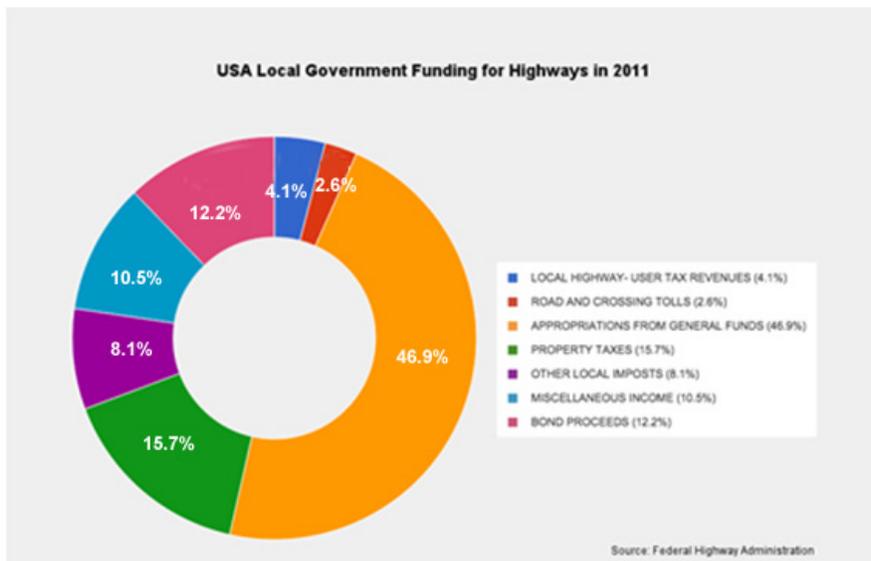
⁷⁸Florida Bill HB 985, <http://www.myfloridahouse.gov/Sections/Bills/billsdetail.aspx?BillId=35864>.

Figure 6.5 Local government funding sources for highway projects in the United States, 2002-2012



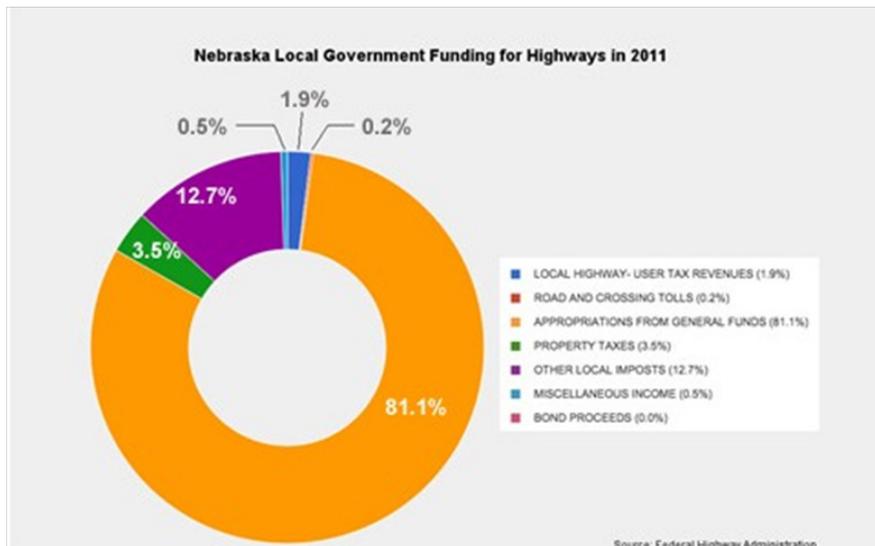
Source: Federal Highway Administration: <https://www.fhwa.dot.gov/policyinformation/statistics/2012/lgf1.cfm>

Figure 6.6: Nebraska local government funding of highway, 2011



Source: Federal Highway Administration: <https://www.fhwa.dot.gov/policyinformation/statistics/2012/lgf1.cfm>

Figure 6.7: Nebraska local government funding of highway, 2011



Source: Federal Highway Administration: <https://www.fhwa.dot.gov/policyinformation/statistics/2012/lgf1.cfm>

Costs of Delaying Highway 81 Expansion

Delaying the widening of Highway 81 by two years would result in a loss in net benefits of \$161.1 million to the Nebraska economy, while delaying the widening of Highway 81 to 2024 (the NDOR timeline) would result in a loss in net benefits of \$499.9 million to the state economy. Details of the losses are listed in Table 6.3:

| | Economic Development | Accidents | Commute times | Construction impact | Bond funding | Cost of project | Total | Net loss in Benefits |
|------------------------------|----------------------|-----------|---------------|---------------------|--------------|-----------------|-----------|----------------------|
| Begin 2017 | \$3,387.2 | \$20.7 | \$15.0 | \$195.4 | -\$52.3 | -\$145.0 | \$3,421.1 | |
| Begin 2019 | \$3,235.7 | \$19.9 | \$14.4 | \$200.4 | -\$61.7 | -\$148.7 | \$3,259.9 | \$161.1 |
| Current NDOR timeline (2024) | \$2,885.7 | \$17.9 | \$13.0 | \$217.8 | -\$51.7 | -\$161.6 | \$2,921.2 | \$499.9 |

Source: Goss & Associates

Summary

Goss & Associates, as does the Platte Institute, recommends that the State of Nebraska move forward with PPP-enabling legislation as well as PPP implementation to fund highway construction.

- Funding options include:
 - o Nebraska enact PPP-enabling legislation (recommended).
 - o Nebraska take immediate action to shore up funds for highway construction.
 - o Nebraska Unicameral should pass highway bond-enabling legislation.
 - Given that current interest rates are at historic lows, it is recommended that Nebraska issue bonds to pay for the Highway 81 expansion.
 - Use a portion of LB 84 (Build Nebraska Act)⁷⁹ revenue to pay interest and principal on the highway bonds or,
 - Implement a system of pass-through tolls to pay interest and principal on the highway bonds.



⁷⁹http://nebraskalegislature.gov/bills/view_bill.php?DocumentID=11707.

Appendix A - 4 Lanes 4 Nebraska Board of Directors and Overview

4 Lanes 4 Nebraska promotes state infrastructure projects, focusing on opportunities in business and economic development; promotion of safety resulting in reduced accidents and deaths; and increased convenience and commute times for workers and residents.

One area of significant interest for the coalition is Highway 81, which connects Nebraska to Kansas and South Dakota. Despite Nebraska's transportation policy to connect every major community to an interstate system using 4-lane highways, the 43-mile section of the highway between York and Columbus has yet to be widened. The board of directors commissioned this study to quantify the benefits of the proposed expansion. The 4 Lanes 4 Nebraska board of directors includes the following Nebraska business leaders:

Dirk Petersen, Nucor Steel

Dick Robinson, Norfolk Iron & Metal

Jeff Scherer, Smeal Fire Apparatus

J.D. Alexander, Alexander Cattle and Farms

Nadine Hagedorn, Citizens State Bank of West Point

Dennis Baumert, Scribner Grain

Appendix B - The Impact of Highway 81 on Economic Development

Table C.1: Impact of Nebraska road mileage on economic development, 1987-2012

| SUMMARY OUTPUT | | | | | |
|-----------------------|--------------|--------|---------|-----------|----------------|
| Regression Statistics | | | | | |
| Multiple R | 1.00 | | | | |
| R Square | 0.99 | | | | |
| Adjusted R Square | 0.99 | | | | |
| Standard Error | 0.01 | | | | |
| Observations | 33 | | | | |
| ANOVA | ANOVA | | | | |
| | df | SS | MS | F | Significance F |
| Regression | 7 | 2.61 | 0.373 | 2525.52 | 5.42E-34 |
| Residual | 25 | 0.0037 | 0.00 | | |
| Total | 32 | 2.62 | | | |
| | Coefficients | tStat | P-value | Lower 95% | Upper 95% |
| Intercept | -11.75* | -2.31 | 0.029 | -22.23 | -1.27 |
| Interstate | 0.03 | 0.13 | 0.900 | -0.42 | 0.47 |
| Rural Main (arterial) | 0.21* | 2.08 | 0.048 | 0.00 | 0.41 |
| Other Rural | 0.92 | 1.44 | 0.161 | -0.39 | 2.24 |
| Freeways | -0.33 | -1.82 | 0.081 | -0.70 | 0.04 |
| Other Urban | 0.67* | 2.59 | 0.016 | 0.14 | 1.20 |
| Labor | 0.27* | 3.60 | 0.001 | 0.12 | 0.43 |
| Capital | 0.77* | 5.55 | 0.000 | 0.49 | 1.06 |

"*" indicates that coefficient is statistically significant at the 95% level of confidence

Source: Goss & Associates estimated Cobb-Douglas production function

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Appendix D - Researchers' Biographies

Ernie Goss is the Jack MacAllister Chair in Regional Economics at Creighton University and is the initial director for Creighton's Institute for Economic Inquiry. He is also principal of the Goss Institute in Denver, Colo. Goss received his Ph.D. in economics from The University of Tennessee in 1983 and is a former faculty research fellow at NASA's Marshall Space Flight Center. He was a visiting scholar with the Congressional Budget Office for 2003-2004, and has testified before the U.S. Congress, the Kansas Legislature, and the Nebraska Legislature. In the fall of 2005, the Nebraska Attorney General appointed Goss to head a task force examining gasoline pricing in the state.

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

He is editor of Economic Trends, an economics newsletter published monthly with more than 11,000 subscribers, produces a monthly business conditions index for the nine-state Mid-American region, and conducts a survey of bank CEOs in 10 U.S. states. Survey and index results are cited each month in approximately 100 newspapers; citations have included the New York Times, Wall Street Journal, Investors Business Daily, The Christian Science Monitor, Chicago Sun Times, and other national and regional newspapers and magazines. Each month 75-100 radio stations carry his Regional Economic Report.

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Scott Strain is a senior research economist at Goss & Associates. He has worked as an economist and statistician for more than 20 years providing forecasts and analysis across a wide-range of industries. Scott served as an industry economist, working in new product development regarding both quantitative and qualitative research. Scott was Senior Director of Research for an economic development agency, providing economic impact and tax incentive analysis to both private businesses and government entities. He served on the business advisory committee that worked with Nebraska state senators and the director of the state's Economic Development Department to develop the Nebraska Advantage Act – a comprehensive package of business incentives that has helped to add more than \$6 billion in new capital investment and over 13,000 new jobs in the state of Nebraska since the Act's inception in 2006.

Jeffrey Milewski is a senior research economist at Goss & Associates. He received his master's degree in political economy from the London School of Economics and Political Science in 2013. He completed his bachelor's degree at Creighton University in 2007, having studied economics and finance. Milewski also has experience working in finance and as an entrepreneur. Recently, he has co-authored impact studies on a range of topics such as property-casualty insurance, highway expansion, cost/benefit analysis, and national sporting events.