

Transportation Improvements Grow Wisconsin's Economy: The Economic Benefits of Transportation Investments

prepared for

**Transportation Development
Association of Wisconsin**

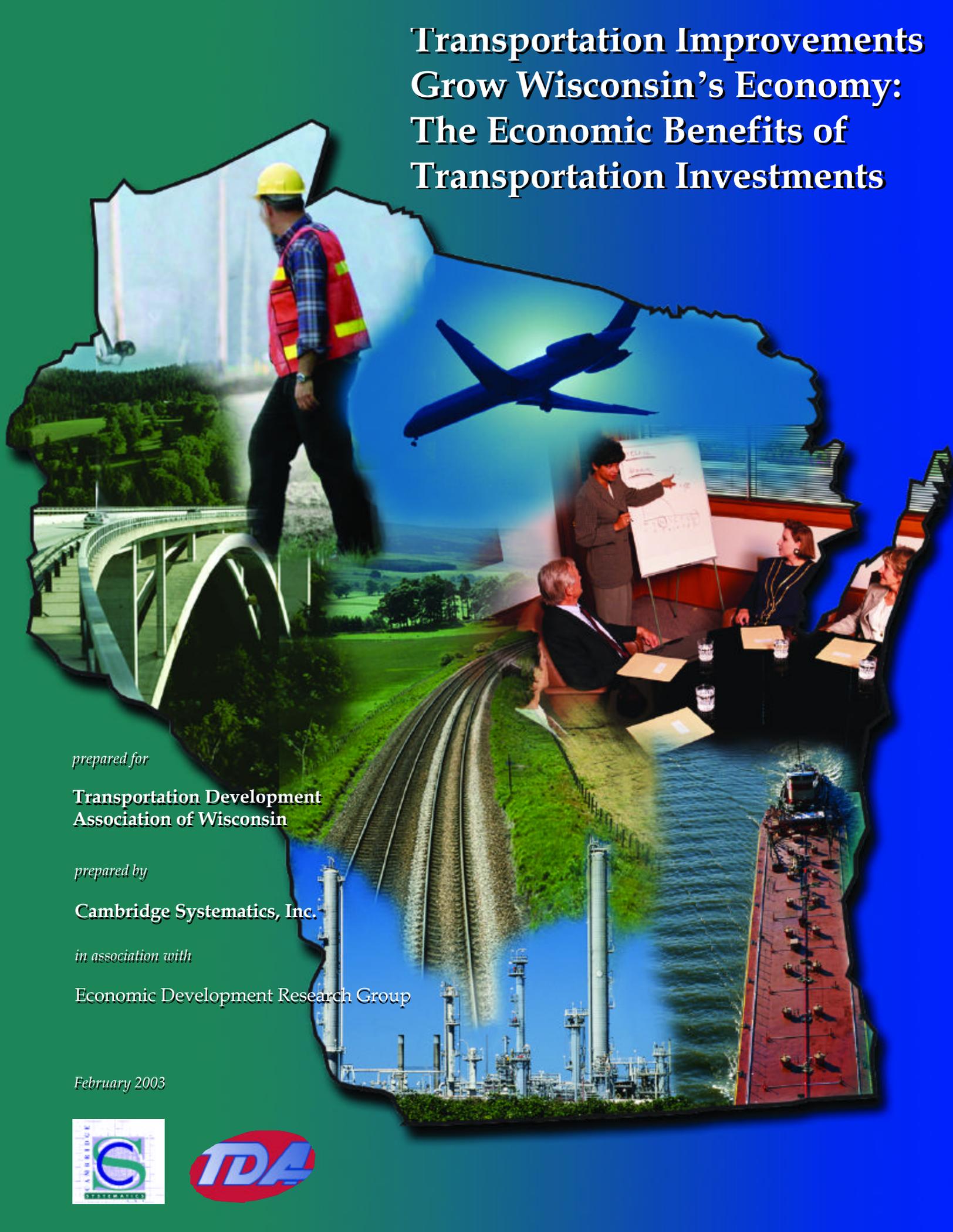
prepared by

Cambridge Systematics, Inc.

in association with

Economic Development Research Group

February 2003



prepared for

Transportation Development Association of Wisconsin

February 2003

final report

Transportation Improvements Grow Wisconsin's Economy: The Economic Benefits of Transportation Investments

list of sponsors

AAA Wisconsin

AFSCME, WI Council 40

American Council of Engineering Companies of WI
CH2M Hill

CN-Wisconsin Central Railroad

Construction Business Group

HNTB Corporation

International Union of Operating Engineers, #139

OMNNI Associates

Short-Elliott-Hendrickson, Inc.

WI Auto and Truck Dealers Association

WI County Highways Association

WI Dells Convention and Visitors Bureau

WI Earth Movers Association

WI Economic Development Association

WI Grocers Association

WI Laborers District Council

WI Tourism Federation

WI Transportation Builders Association

prepared by

Cambridge Systematics, Inc.
150 CambridgePark Drive, Suite 4000
Cambridge, Massachusetts 02140

Table of Contents

Executive Summary	1
Benefits of State Highway System Investment	2
Benefits of Multimodal Investment	3
1.0 Introduction	4
2.0 The Link between Economic Growth and Transportation Investment	9
2.1 Empirical Evidence Links Transportation to Economic Growth.....	11
2.2 How Transportation Investments Reverberate through the Economy	15
2.3 Other Benefits of Transportation Investments.....	19
3.0 Economic Benefits of Investing in the State Trunk Highway System	20
3.1 Analytic Framework	22
3.2 Direct Economic Benefits	25
3.3 Total Macroeconomic Impact of Additional Investment.....	26
3.4 Economic Benefit/Cost Analysis	27
3.5 Highway Construction Impacts	28
4.0 Impacts of Other Modes	30
4.1 Aviation	30
4.2 Transit	33
4.3 Ports, Harbors, and River System	34
4.4 Rail.....	37
5.0 Conclusion	39

List of Tables

1. Highway Investment Scenarios	25
2. Present Value of Direct Highway User Benefits of STH Investment from 2000 through 2020.....	26
3. Economic Benefit/Cost Analysis of Additional STH System Investment.....	28
4. Average Annual Macroeconomic Impact of Highway Construction Expenditures, 2000 through 2020.....	29
5. Wisconsin Waterborne Commerce, 1999 Selected Movements to, from, and within the State	35
6. Summary of Economic Impacts of Wisconsin Great Lakes Ports, Saint Lawrence Seaway System.....	36

List of Figures

1. Population Growth Will Place New Demands on Wisconsin's Transportation System	5
2. Wisconsin Outpaced United States in Manufacturing Growth.....	7
3. Congestion Costs Are Increasing Faster in Milwaukee than in Similar Size Cities.....	8
4. Transportation Accounts for a Significant Share of Wisconsin Jobs	11
5. Economic Size Makes Wisconsin a Player in Global Commerce.....	12
6. Logistics Expenditures and GDP	14
7. Export Growth Drives Demand for Transportation.....	16
8. Business Attraction and Expansion Clusters around Corridor 2020 Highways	17
9. Local and State Roads – Road Mile and Traffic Volume Shares	20
10. Quantitative Analysis Methodology	24
11. Additional Economic Growth in Wisconsin from SHP Investment, 2000 through 2020.....	27
12. Jet Capable Airport Access Contributes Business Attraction and Retention.....	32
13. Transit Ridership and Service in Wisconsin Counties	34
14. Freight Rail Service in Wisconsin.....	37

Executive Summary

The freedom of travel and choices of lifestyle that Wisconsin residents enjoy are made possible by an affordable, safe, and efficient transportation system – a network of roads, ports, rail lines, and airports covering the length and breadth of the State. Manufacturers rely on this network to access markets and to receive supplies. Businesses rely on it to conduct face-to-face meetings with customers and business associates. Employees rely on it to reach jobs, consumers rely on it to reach shopping destinations, and leisure travelers use it to reach recreational and tourist sites. By constantly maintaining and improving its transportation system, Wisconsin enhances the competitiveness of its businesses and economic opportunities for its people.

This study describes the positive economic impacts of transportation investment in Wisconsin through both quantitative and qualitative research. Recent studies show that state and national investments in transportation have measurable benefits to the economy. Specifically, transportation investment:

1. Creates jobs while boosting industry competitiveness and productivity;
2. Enhances household wellbeing;
3. Strengthens local, regional, and state economies;
4. Boosts state tax revenues;
5. Facilitates business and leisure travel;
6. Reduces economic losses associated with crashes; and
7. Reduces economic losses associated with congestion.

As businesses respond to the cost savings and accessibility benefits of transportation investments they become more competitive and the benefits reverberate throughout the entire economy. The direct economic effects of transportation investment include improved access to labor and specialized skills; statewide business attraction, expansion, and retention; reduced logistics costs; and greater tourism activity.

■ Benefits of State Highway System Investment

A benefit/cost analysis revealed the benefits of increasing investment in the Wisconsin State Trunk Highway (STH) System to \$21.9 billion (in 2002 dollars)¹. This is the proposed level of investment identified in the *2020 Wisconsin State Highway Plan*, and is \$5.8 billion above the level needed simply to maintain current performance conditions. When spent over 21 years, and considering the time value of money, this additional \$5.8 billion investment would be worth **\$3.2 billion**. This is the **cost** side of the benefit/cost analysis. Although the study's focus is on the STH System, this is a reflection of data availability and is not meant to diminish the importance of local roads to Wisconsin's economy.²

The direct **benefits** of this additional investment were quantified by estimating savings in operating cost and time savings:

- **\$7.0 billion** for everyday personal trips, such as driving to work, doing errands, or visiting friends; and
- \$1.5 billion by businesspeople and truckers while “on the clock.”

The “on the clock” portion of the benefits (the \$1.5 billion above) would allow Wisconsin businesses to increase output, hire additional workers, and eventually increase Wisconsin residents' disposable personal income by **\$2.7 billion**.

Therefore, the **total benefits** of the additional investment are the sum of the \$7.0 billion for personal trips, plus the \$2.7 billion of benefits (*macroeconomic impacts*), created from greater business efficiencies for a total of **\$9.7 billion**.

The benefits (\$9.7 billion) of additional investment (\$3.2 billion) translate into measurable and significant results. For every dollar of additional investment in the STH System beyond that needed to maintain current conditions, Wisconsin would enjoy three dollars of benefit.

The study also demonstrates that additional highway investment leads to an increase in permanent new jobs. On an average annual basis, 4,800 more jobs would exist in Wisconsin if this additional \$5.8 billion investment were made. This is because highway investment reduces the cost of doing business in Wisconsin, thus

¹ Unless otherwise indicated, all dollars in this report are expressed at 2002 levels.

² A data set currently under development at WisDOT will allow further analysis to be performed in the future for local roads.

allowing businesses to increase output and hire new workers. These employment opportunities are in addition to the new 4,300 jobs that would be supported – on average – through highway construction and routine maintenance.

■ **Benefits of Multimodal Investment**

Businesses require multimodal transportation options to access markets and supplies. Investment in Wisconsin's aviation, transit, ports, and rail systems improves the level of service and quality of infrastructure with measurable economic benefits. Findings from recent studies include:

Aviation. Airports, the Wisconsin aviation industry, and visitors who depend on air travel as their means of entering the state generate over \$2.1 billion in Wisconsin economic activity, including support for over 41,000 jobs with a payroll of over \$770 million for state residents.

Transit. Every \$1.00 invested in proposed transit service adjustments that would better connect welfare recipients to job centers could generate \$1.66 in benefits, mainly in taxpayer savings.

Deepwater Ports. During the 2000 shipping season, the Great Lakes system saved steel mills, utilities, and other key industries located near the Wisconsin ports of Milwaukee, Green Bay, and Superior-Wisconsin/Duluth-Minnesota some \$380 million. In terms of total tonnage moved, the Port of Duluth-Superior ranks 20th in the nation with over 41 million tons shipped in 2000. Additionally, the Ports of Green Bay and Milwaukee handled well over five million tons in 2000.

Rail. In 2000, Wisconsin's freight railroads moved 149 million tons of materials valued at over \$4 billion, including such essential commodities as grain, pulp, lumber, coal, fertilizers, and heavy machinery. The rail industry itself employed over 4,000 Wisconsin residents earning over \$210 million in wages in 2000.

1.0 Introduction

Every day, Wisconsin's transportation system carries workers to their jobs, raw materials and supplies to factories, finished goods to store shelves, farm products to markets, consumers to retailers, and leisure travelers to tourist destinations. Wisconsin's economic health and its ability to remain competitive with other regions of the country depend on the efficient transport of people and goods.

Wisconsin's network of roads and highways, commercial and general aviation airports, seaports, passenger and freight railroads, and public transportation services has evolved over time thanks to continuous investment. Today this system is supported largely by public expenditures on new and improved infrastructure and technology. In Fiscal Year 2001, Wisconsin invested more than \$2 billion in maintaining, improving, and expanding its transportation system.¹ These investments have tangible benefits, ranging from travel time savings for commuters to reduced shipping costs for manufacturers.

Recent transportation spending has not kept pace with demand, however, threatening to limit Wisconsin residents' freedom of travel and choices of consumption. Nearly two-thirds of the current state highway system was built in the 1960s and 1970s, but since then new highway construction has slowed dramatically. Meanwhile, roadway congestion, common today on 17 percent of the state's most critical roadways, is projected to affect almost one-third by 2020.² Traffic delays are a threat to Wisconsin's economic well being. They erode the quality of life for Wisconsin residents, increase transportation costs for existing businesses, and make the State a less attractive place for new businesses to locate.

The goal of this study is not to describe the negative consequences of allowing the transportation system to deteriorate, but to demonstrate how investments in transportation can benefit

¹ Wisconsin Department of Transportation, Office of Policy and Budget, 2000, "Transportation Budget Trends."

² Wisconsin Department of Transportation, Division of Transportation Investment Management, 2000, "Transportation in Wisconsin: A Vision for the 21st Century."

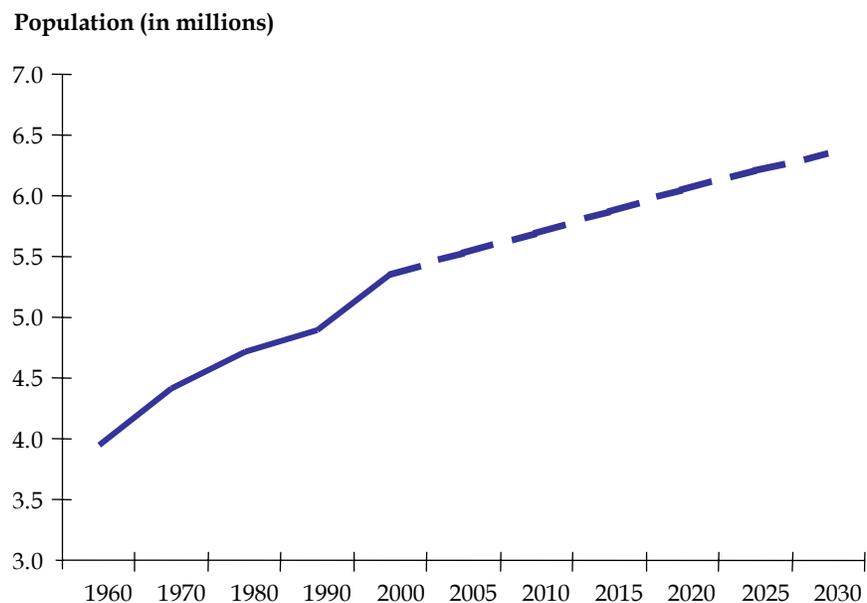
Wisconsin's economy. It first demonstrates the relationship between transportation investment and economic health through reference to national and state-level studies. It then documents a new quantitative analysis of the economic benefits of investment in Wisconsin's State Trunk Highway System. Finally, the report considers the economic benefits of investment in non-highway modes: aviation, transit, freight rail, and water-borne.

Demand for Transportation Is Increasing Faster Than Our Population

While the United States population as a whole grew 37 percent between 1970 and 2000, the number of vehicle-miles traveled (VMT) grew 140 percent, or nearly four times faster.

As anyone who has driven in the Milwaukee area during rush hour can attest, roadway congestion is a serious problem that threatens to undermine the efficiency of Wisconsin's entire transportation network. Simply put, congestion results when investment in transportation infrastructure and services fails to keep pace with demand. But why is demand increasing? One commonly evoked explanation is population growth. Between 1960 and 2000, the population of Wisconsin increased from 3.9 million to 5.4 million, or 36 percent. By 2030, the population is projected to grow by another million, to 6.4 million (see Figure 1).

Figure 1. Population Growth Will Place New Demands on Wisconsin's Transportation System



Source: Wisconsin Department of Administration, "Wisconsin Population Projections, 2000-2030: A Preliminary State-Level Report," May 2002.

Population growth alone cannot explain the growth in traffic on Wisconsin's roadways, however. Rather, there has been a rapid increase in vehicle-miles traveled; in other words, people are taking more frequent and longer trips than ever before.

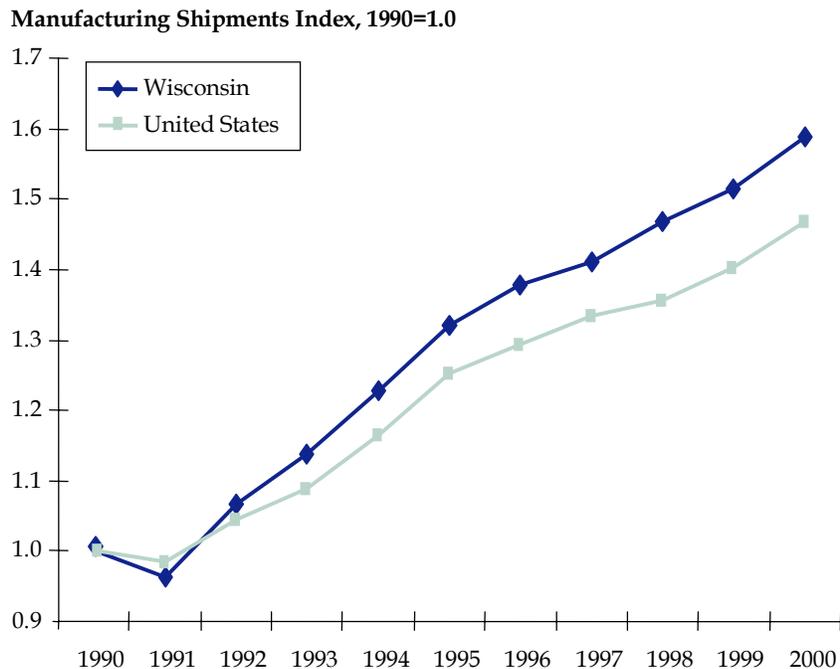
There are six main reasons for the rapid increase in vehicle-miles traveled since the 1970s:

1. The **number of vehicles** on the road has increased dramatically. The total number of private and commercial vehicles registered in Wisconsin has doubled from 2.2 million in 1970 to 4.4 million in 2000. Income growth is one cause of this increase; as disposable incomes rise, people spend more on transportation, especially personal vehicles.
2. **Freight movements** by truck have intensified. Nationwide, between 1975 and 1997, ton-miles of freight moved by truck more than doubled. By 2025 this figure will double again. In 1997, trucks carrying 213 million tons of freight valued at over \$146 billion originated in Wisconsin.³
3. **Strong consumer demand**, coupled with stagnant expansion in the volume of freight rail shipments, explains much of the growth in freight movements by truck. Moreover, the manufacturing sector has transitioned from massive warehouse inventories and large, consolidated shipments to just-in-time manufacturing and smaller, more frequent shipments. As a result, manufacturing has expanded its demand for more frequent and smaller shipments. The manufacturing sector plays a more significant role in the Wisconsin economy than the nation as a whole, and over the last decade the state has out-paced national growth in the value of manufacturing shipments (see Figure 2).
4. **The size of the workforce** has increased. Between 1970 and 2000, the number of workers in Wisconsin rose 78 percent, or more than three times the rate of population growth. Baby boomers and women were largely responsible for this trend. The number of women working outside the home nearly doubled during these years.

³ Bureau of Transportation Statistics. *1997 Commodity Flow Survey*, available at www.bts.gov.

5. The **number of households** has increased, resulting in a greater number of trips for shopping, recreation, and child care purposes. In Wisconsin, between 1970 and 1998, the number of households grew by 49 percent, over twice the rate of population growth.
6. **New residential and commercial development** has occurred primarily in the suburbs, increasing the distance between home, office, and shops. As a result, “reverse commuting” and suburb-to-suburb commuting have become the norm.

Figure 2. Wisconsin Outpaced United States in Manufacturing Growth 1990-2000

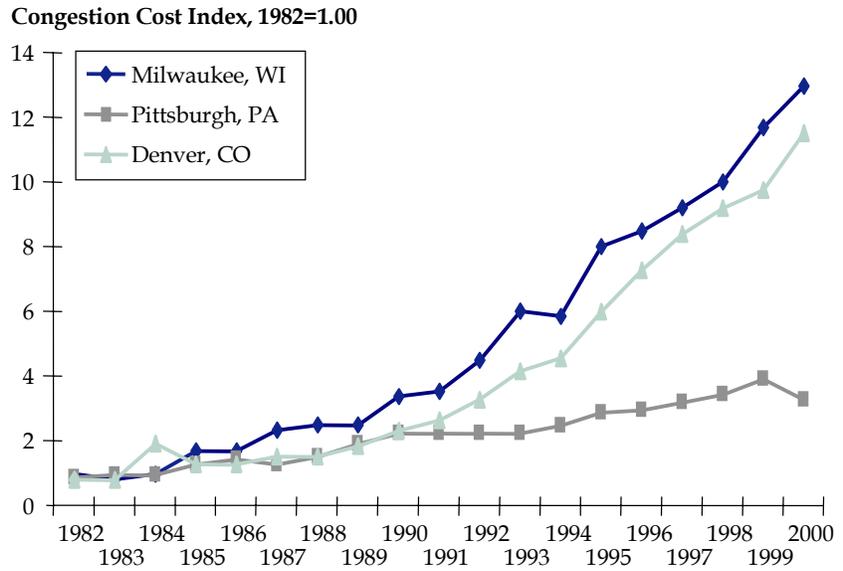


Source: U.S. Census Bureau, Census of Manufactures and Annual Survey of Manufactures.

Between 1982 and 1997, total vehicle miles of travel on the State Trunk Highway System increased by 60 percent, while the system's total lane mileage increased by only 5 percent.
- Wisconsin State Highway Plan 2020

The combination of all these factors is increasing pressure on Wisconsin's roadways. As Figure 3 illustrates, the cost of congestion (composed of extra travel time and wasted fuel) in Milwaukee is increasing faster than similar size cities. Congestion is a direct result of traffic growth outpacing increases in roadway capacity; congestion leads to longer travel time and increased incident delays, eventually raising the overall cost of doing business in Wisconsin.

Figure 3. Congestion Costs Are Increasing Faster in Milwaukee than in Similar Size Cities



Source: Texas Transportation Institute.

Manufacturing paper-making machinery for distribution to a worldwide market is no small task, especially when a single piece of equipment can weigh as much as 170,000 pounds and must be kept at a constant temperature during shipping. A deteriorated bridge or roadway can mean lengthy and costly delays. For one leading Wisconsin manufacturer that ships and receives nearly 24 million pounds of equipment and raw materials every year, the condition of the state's transportation infrastructure is crucial.

2.0 The Link between Economic Growth and Transportation Investment

State and national investments in transportation have measurable benefits to the economy, according to recent studies. The benefits of transportation investments can be grouped into the following eight categories:¹

1. **Transportation Investment Creates Jobs while Boosting Industry Competitiveness and Productivity** - A strong transport network reduces costs of production and distribution. It does so by lowering barriers to mobility, giving the manufacturing, retail, and service sectors better access to varied, specialized, and productive sources of labor; a diverse selection of inventory and raw materials; and a broad customer base. These cost savings allow companies to hire additional workers, raise wages, and spend more on research and development.
2. **Transportation Investment Enhances Household Well-being** - A strong transport network gives households access to a broader range of higher-paying jobs, a wider selection of competitively priced consumer goods and housing options, and a convenient selection of health and human services. Improved roadway design, capacity expansion, and regular maintenance can reduce personal vehicle repair costs, and help lower the accident rate. Efficient public transport networks reduce costs associated with driving and automobile ownership.
3. **Transportation Investment Strengthens Local, Regional, and State Economies** - Transportation spending benefits local, regional, and state economies as well by energizing city centers, breaking the isolation of rural areas, and increasing Wisconsin employment.

¹ Cambridge Systematics, *The Benefits of Transportation Investment: Economic, Environmental, Community and Social, Congestion Reduction*, prepared for the National Cooperative Highway Research Program or the Transportation Research Board (Washington, D.C.: National Research Council, 2002).

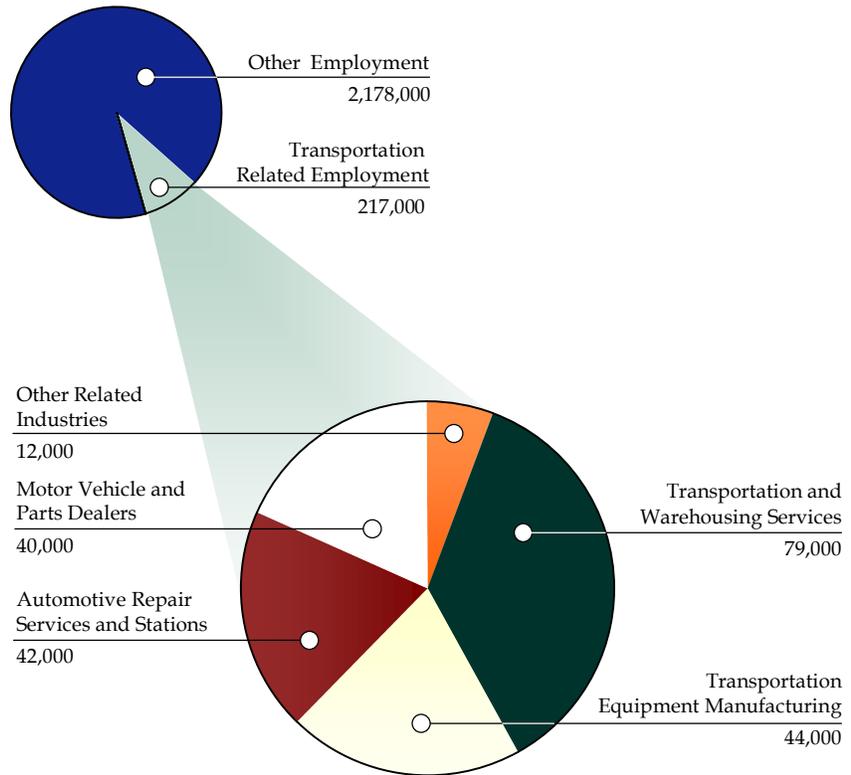
4. **Transportation Investment Boosts State Tax Revenues** – The additional economic activity brought on by highway investment can generate additional tax collections for Wisconsin. Transportation investment reduces the cost of production and distribution for Wisconsin businesses, allowing them to expand and hire additional workers. This additional activity increases state revenue from personal income, sales, motor fuel, and corporate/business taxes.
5. **Transportation Investment Facilitates Business and Leisure Travel** – Both business and leisure travelers depend on Wisconsin's transportation infrastructure for access to activities and destinations such as conferences, trade shows, parks, lake-shore resorts, and everyday business meetings and social events.
6. **Transportation Investment Reduces Economic Losses Associated with Crashes** – Each year, traffic crashes cost \$580 for every American man, woman, and child in lost productivity, property damage, and medical expenses. Investments to improve the safety of Wisconsin's transportation infrastructure can mitigate these losses.²
7. **Transportation Investment Reduces Economic Losses Associated with Congestion** – The costs of time delays and fuel consumption associated with congestion in the nation's largest urban areas reached \$68 billion in 2000. Congestion costs in Milwaukee and Waukesha counties alone totaled \$390 million in 2000.³ Investments that reduce traffic delays benefit businesses and households alike.
8. **Transportation Investment Creates Jobs** – Nearly 220,000 people are employed in for-hire transportation and transportation-related industries in Wisconsin – nine percent of all Wisconsin jobs. This includes some 79,000 people in transportation services, 44,000 in transportation equipment manufacturing, and 94,000 in other industries closely tied to

² National Highway Traffic Administration, *The Economic Cost of Motor Vehicle Crashes* (Washington, D.C.: U.S. Department of Transportation, 1995).

³ David Schrank and Tim Lomax, *The 2001 Urban Mobility Report* (College Station, Texas: Texas Transportation Institute, 2002). Note that Milwaukee and Waukesha counties were the only Wisconsin counties included in the TTI's tabulations.

transportation (see Figure 4). Overall, these transportation jobs pay five percent more than the Wisconsin average.⁴

Figure 4. Transportation Accounts for a Significant Share of Wisconsin Jobs



Source: U.S. Census Bureau, County Business Patterns, 2000.

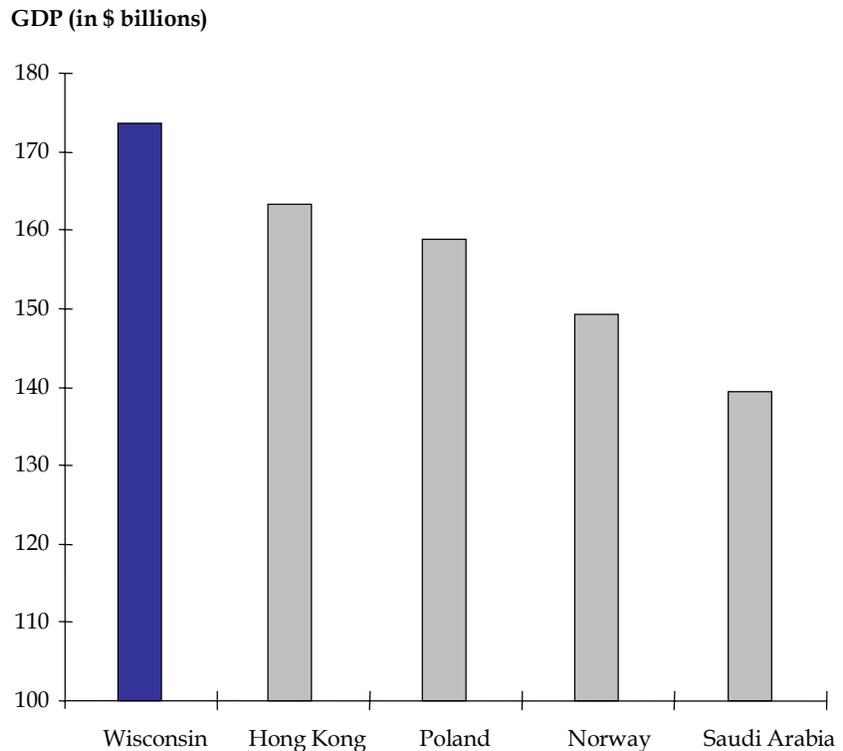
■ 2.1 Empirical Evidence Links Transportation to Economic Growth

Transportation infrastructure and services are vital for supporting the growth of Wisconsin's large economy. Wisconsin's gross state product grew from just over \$100 billion in 1990 to over \$173 billion

⁴ U.S. Census Bureau, 2000 County Business Patterns. "Other industries closely tied to transportation" include motor vehicle and parts dealers and wholesalers, vehicle repair, and highway and street construction. The average transportation related job in Wisconsin paid \$31,576 in 2000 compared to a statewide average for all jobs of \$30,185.

in 2000, an increase of 73 percent.⁵ If Wisconsin were a separate country, it would now have a larger economy than Hong Kong, Poland, Norway, and Saudi Arabia (see Figure 5).

Figure 5. Economic Size Makes Wisconsin a Player in Global Commerce



Source: Bureau of Economic Analysis and World Bank; data are for 2000.

Although the relationship between transportation and economic growth may seem intuitive, demonstrating this relationship in quantitative terms is more complex and has been the subject of significant research, as presented below.

Highway investment spurs productivity. A 1998 study by economist Ishaq Nadiri shows that each dollar invested in the nation's highways generates about 30 cents of production cost savings to businesses *per year* over the life of the improvement

⁵ Gross state product is the value of all goods and services produced in a region, and is commonly used as the basis for comparing the overall economic size of regions, states, and countries.

exceeding the initial investment in four years.⁶ Highway investments are responsible for 25 percent of total productivity growth nationwide, and the annual rate of return for highway investments is approximately 16 percent nationwide. However, benefits such as increased productivity may vary by state and by region. A 1996 study of transportation spending in Florida estimated that transportation investments generate a 35 percent annual rate of return when measured in terms of growth in Florida's gross state product.⁷ The same study found that \$1.00 invested in transportation in Florida produces a return of \$2.86 in user benefits, including \$1.49 in time savings, \$0.83 in vehicle operating cost savings, and \$0.54 in savings from a reduction in crashes. A Maryland study found that investments in the state's highway system were responsible for nearly 10 percent of Maryland's productivity growth between 1982 and 1996.⁸

Section 3.0 of this report documents the economic impact of fully funding the 2020 Wisconsin State Highway Plan. We found that for every \$1.00 invested in the Wisconsin State Trunk Highway System above that needed to maintain current conditions, the return to the Wisconsin economy would be \$3.00.

A cheese processor and packager that handles about five million pounds of cheese each week demands a transportation network that allows fast turn-arounds and minimal delays. With a consumer food product, the condition of the road will affect the quality of the product. The company is particularly sensitive to road condition, winter maintenance, enforcement activities, and fuel prices.

Logistics cost savings increase economic output. Logistics, a combination of administrative, transportation, and inventory-related expenses, represent a significant part of the costs of doing business. Transportation expenditures comprise the largest share of logistics expenditures, equivalent to about eight percent of U.S. gross domestic product (GDP) on an annual basis. By reducing logistics costs, notably those associated with inventory and transportation, businesses can accrue savings that can be reinvested in improved products or production, making them more competitive in the marketplace. Savings may also be redistributed to shareholders, perhaps creating another cycle of productive reinvestment in the economy. Figure 6 demonstrates the importance of logistics spending to the U.S. economy. After dropping steadily as a percent of GDP for the past two decades, logistics expenditures have stalled at about 11 percent of GDP for the past five

⁶ Ishaq Nadiri and Theofanis Mamuneas, *Contribution of Highway Capital to Industry and National Productivity Growth* (Washington, D.C.: U.S. Department of Transportation, Federal Highway Administration, Office of Policy Development, 1998).

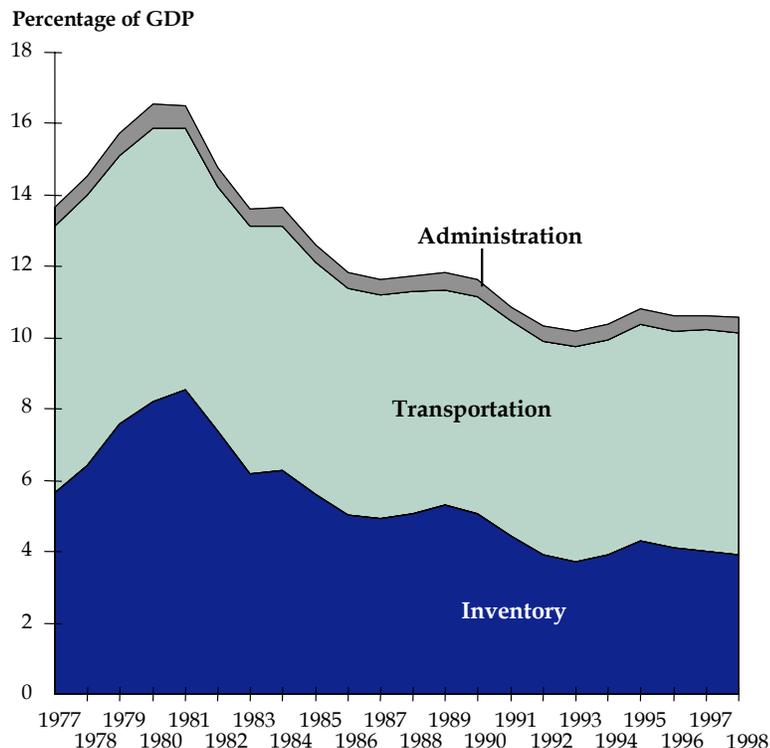
⁷ Center for Urban Transportation Research (CUTR), "Transportation: An Investment in Florida's Future" (Tallahassee: Florida Transportation Commission and Floridians for Better Transportation, 1996).

⁸ RESI Research and Consulting, *The Economic Impacts of Maryland Highway Investment* (Towson [Maryland], 1998).

years. A portion of the past reductions are the result of new processes that lower inventory expenses, such as just-in-time delivery. These new processes and the associated business cost savings they produce rely on an efficient multimodal transportation system, which in turn requires continued investment to meet ever growing demand.

Over the years, heavy investment at the federal, state, and local level has expanded highway capacity and improved intermodal connections, which has allowed companies to realize cost savings through reduced inventory expenses and lower transportation costs. However, transportation investment at all levels of government has stalled in recent years, creating a new challenge – maximizing limited resources. In the 21st century it will be necessary to develop a transportation plan that stretches and allocates limited resources to investments that help ensure that U.S. and Wisconsin businesses remain competitive.

Figure 6. Logistics Expenditures and GDP
After a Long Improvement, Logistics Expenditures Have Stalled at About 11 Percent of GDP



Source: Cass/Prologis 10th Annual State of Logistics Report, 1998.

■ 2.2 How Transportation Investments Reverberate through the Economy

Transportation, the highway network in particular, is critical for a large clothing and accessory catalog company based in Wisconsin. Each year, it receives hundreds of thousands of orders and ships 50 million pounds of products from its warehouses in Dodgeville.

As businesses respond to the cost savings and accessibility benefits of transportation investments they become more competitive and the benefits reverberate throughout the entire economy. Here is how the process works:

1. **Direct economic effects** include a reduction in the direct costs of transportation for the businesses and consumers who use the system. Due to enhanced productivity and increased sales, existing businesses may expand their operations and new businesses may be attracted to the area.
2. **Indirect economic effects** result from an increase in demand for raw materials, supplies, equipment, and services for the newly expanded and relocated businesses.
3. **Induced economic effects** result from the increased consumer spending of workers employed directly or indirectly by affected businesses. Additional business sales, and the associated jobs and income, lead to increased spending on food, clothing, shelter, recreation, travel, education, and other goods and services.

Improvements to the transportation system can benefit transportation system users directly by reducing travel time, reducing vehicle-operating costs, and reducing the costs associated with crashes. A new highway or an improved connection to an intermodal freight facility might enable firms to access a larger pool of suppliers, reducing the costs of raw materials and parts through competitive forces. These direct cost savings can increase business productivity and competitiveness and allow businesses to invest in new capital, including new equipment and technologies, expanded production facilities and additional employees.

How households and workers migrate in response to changes in wages, employment opportunities, costs of living, and availability of amenities can dampen or amplify these three types of effects when measured on a per capita basis. The remainder of this section will discuss benefits in terms of these three types of economic effects, including specific examples of transportation investment benefits.

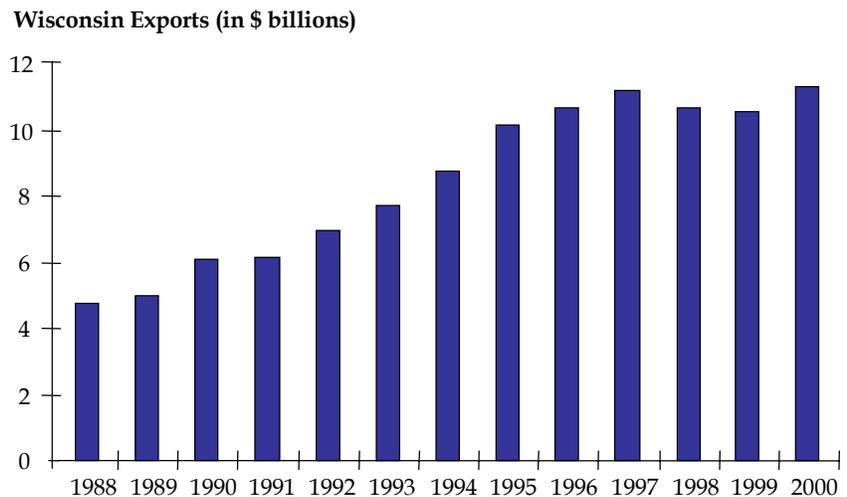
Direct Economic Effects

Access to labor and specialized skills. Transportation system improvements provide businesses with increased access to a larger pool of specialized labor, which can boost productivity and efficiency and enhance the quality of a firm's goods and services. Improvements to the transportation system can also expand the market reach of businesses and allow them to realize economies of scale as their production and distribution costs decrease on a per-unit basis. A recent study of urban congestion found that Chicago businesses could save \$980 million per year if travel times were reduced regionwide by 10 percent.⁹

⁹ Cambridge Systematics, Inc. *Economic Implications of Congestion*, National Cooperative Highway Research Program Project 2-21 (Washington, D.C.: Transportation Research Board, 2001).

Reliability and reduction in logistics costs. Investments that improve travel time reliability allow businesses to: reduce their warehousing and logistics costs; lower expenses by consolidating operations; and expand their range of choices for new plant locations and markets. The spread of just-in-time delivery is directly attributable to the reliability of the transportation system in Wisconsin and the rest of the United States. Business expenditures on inventory-related costs have fallen from about 8.5 percent of U.S. GDP in 1980 to four percent of GDP today (refer to Figure 6, “Logistics Expenditures and GDP”).¹⁰ Low inventory costs along with low distribution costs allow Wisconsin firms to market their products worldwide at competitive prices. Investments in transportation contributed to a 140 percent increase in exports of Wisconsin-made products between 1988 and 2000. In 2000, the state’s exports were valued at \$11.7 billion (see Figure 7). These exports accounted for nearly 225,000 jobs across the State.¹¹

Figure 7. Export Growth Drives Demand for Transportation



A Wisconsin maker of plumbing products, small engines, and generators relies on all modes of transport – rail, road, air, and water – to obtain raw materials and ship its products worldwide. In 1996 alone, the company received 319 million pounds of materials and shipped 367 million pounds of finished goods.

Source: Massachusetts Institute for Social and Economic Research (MISER), “origin of movement” export data series.

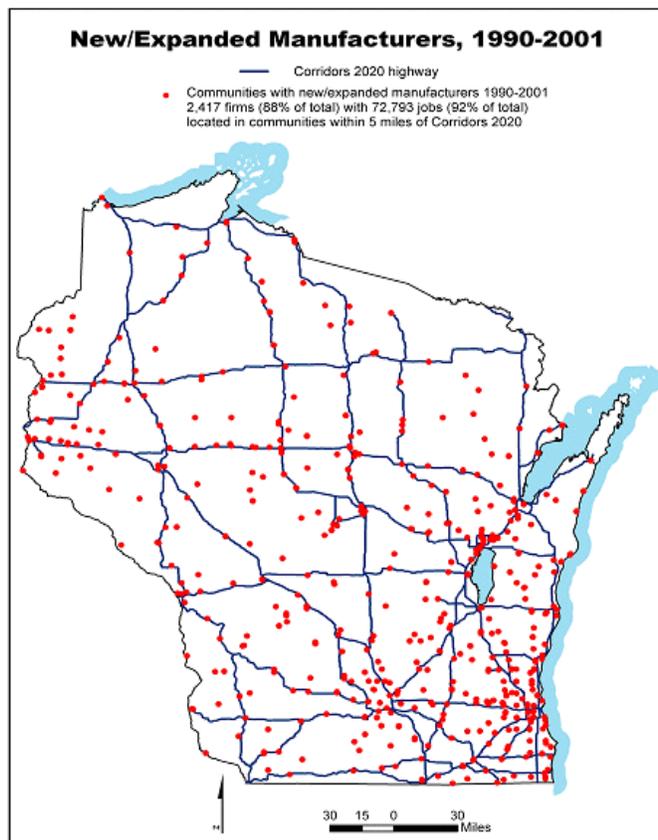
Business attraction and expansion. The competitiveness of a region relative to other areas of the country depends in large part on the quality of its transportation system. Investments in infrastructure can improve the attractiveness of Wisconsin to new

¹⁰Cass/Prologis, *10th Annual State of Logistics Report*, 1998.

¹¹Thomas Hogarty, “The Untold Benefits of Road and Travel,” Consumers’ Research (1999).

businesses, which creates new jobs and tax revenue for the State. Most manufacturers require convenient access to a major highway when scouting locations for new production facilities. Manufacturers need a network of sound local roads, connectors, and the state highway system to reach markets and to ensure the just-in-time delivery of critical supplies and raw materials. In Wisconsin, between 1990 and 2001, 88 percent of all new and expanded manufacturing facilities chose to locate within five miles of a “Corridors 2020” highway, a network of highways linking key economic centers throughout the State (see Figure 8).¹² These new and expanded businesses accounted for 92 percent of the new jobs generated in Wisconsin between 1990 and 2001. Clearly, highway proximity is a key factor impacting location decisions and economic development.

Figure 8. Business Attraction and Expansion Clusters around Corridor 2020 Highways



Source: Wisconsin Department of Transportation.

¹²Wisconsin Department of Transportation.

Non-highway investments can also increase Wisconsin's economic competitiveness. Airport improvements that lead to increased competition and frequent, nonstop commercial air service can help a city attract corporate headquarters and regional offices of national or multi-national firms. Intermodal facilities such as truck-to-rail transfer facilities and seaports allow for the efficient movement of goods, which in turn lowers costs for manufacturers. Efficient highway access to these facilities is vital, as several major intermodal and rail facilities are located in Northern Illinois. For Wisconsin businesses to utilize these cost-effective transportation options without experiencing severe delays or being forced to move closer to them they must have efficient and reliable highway access.

Benefits to the tourism industry. The direct cost of travel also affects business and personal travel decisions. Cost is an important factor in travel decisions, but perceptions about the quality of travel experience to a particular destination can be just as important in the decision process. Areas that appear isolated and inaccessible on a map are less likely to succeed as tourist destinations than areas well served by airports and major highways. Transportation improvements can encourage Wisconsin residents and out-of-state visitors to make more frequent and longer trips to Wisconsin's tourist attractions and recreation areas, which translates to increased spending on goods and services, including meals, lodging, fuel, and souvenirs.

Indirect Economic Effects

Direct transportation cost savings enable businesses to expand their operations and increase production. As firms expand, they require additional inputs from suppliers of raw materials, parts, supplies, equipment, and machinery. These are the "indirect benefits" of transportation investment – the response of suppliers and equipment manufacturers to increase their own output and hire new workers. Thus, firms may realize both direct and indirect benefits as a result of transportation investments.

Delivery services and couriers, logistics firms, printers, and other providers of business services may also benefit indirectly from transportation system improvements. For example, reliable transportation has allowed Internet and mail-order shopping to expand in the United States. While retailers and consumers have benefited directly from lower delivery costs, the firms that carry products to peoples' doorsteps, such as Federal Express, United Parcel Service, and the U.S. Postal Service, have benefited indirectly from an increase in their own sales. All of these benefits are a result of investments in transportation.

Induced Economic Effects

Firms that benefit either directly or indirectly from transportation improvements might hire additional employees, leading to additional consumption of food, clothing, shelter, recreation, travel, education, and other goods and services.

■ 2.3 Other Benefits of Transportation Investments

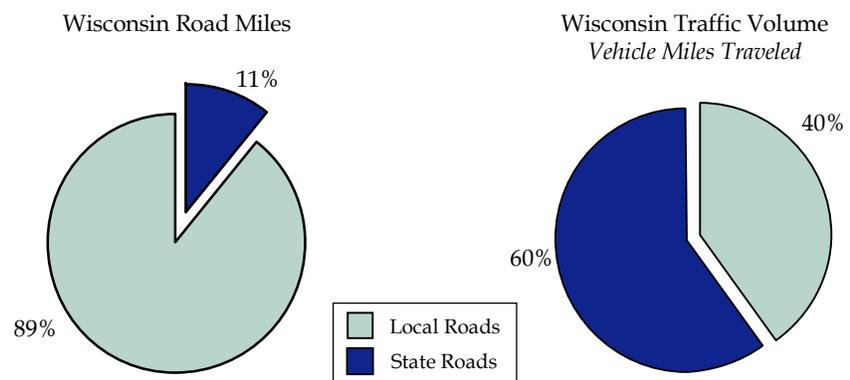
Many attempts have been made to assign dollar values to other types of impacts that are not as easily quantifiable. Aesthetic improvements, such as landscaping a highway median or renovating a transit station, environmental improvements such as converting bus fleets to cleaner-burning fuels, and other transportation investments that make communities more livable and sustainable can enhance the quality of life for residents of Wisconsin. In most cases these types of benefits are not included in economic analyses, due in large part to a lack of public agreement on the valuation of environmental and social factors.¹³

¹³Glen Weisbrod, 1997. "Assessing the Economic Impacts of Transportation Projects. *Transportation Research Circular #477*. Transportation Research Board, Washington, D.C.

3.0 Economic Benefits of Investing in the State Trunk Highway System

The previous sections dealt, for the most part, with general literature and studies that demonstrate the linkage between transportation investment and economic development. In this section, we analyze the economic benefits of increasing future spending on the Wisconsin State Trunk Highway (STH) System. While the STH System is the focus of the analysis, it is just one part of the Wisconsin transportation system. A parallel analysis of the State's vast network of local roadways, following a similar approach as the one used in this study, also would be expected to show significant long-term benefits to the state economy.

Figure 9. Local and State Roads – Road Mile and Traffic Volume Shares



The 11,780-mile STH System represents 11 percent of the roads and streets in Wisconsin, yet it carries 60 percent of all traffic (see Figure 9), 75 percent of all commercial traffic, and significant tourism traffic. The STH System, however, is one component of the statewide roadway network. By serving industries such as agriculture, tourism, and timber, Wisconsin's local roadways form vital links to the STH System, and are critical to many of the state's businesses and communities. In February 2000, the Wisconsin Department of Transportation released a 21-year plan

for the STH System.¹ The plan estimated \$15.3 billion (in 1999 dollars) in federal and state funding over the 21-year period would be needed to match current expenditure levels, but that \$20.4 billion worth of investment would be needed to carry out the plan. The plan includes rehabilitation of existing pavement and bridges, as well as capacity expansion, but does not include routine maintenance, such as signing, striping, and pothole patching, which is paid for by a different budget appropriation. Spending over the last two years has not been at a level adequate to meet the \$20.4 billion objective. This economic impacts analysis estimates the economic benefit of bridging the funding gap between current expenditure levels and the total needs of the State Highway Plan.

The importance of the STH System to the Wisconsin economy made it a desirable platform to quantify the economic benefits of additional highway investment. It is a well-defined system with funding flows that were easily identified. There is reliable data on the condition of the roadways to evaluate the effectiveness of different types of STH improvements. Our focus on the STH System is not meant to ignore the importance of the nearly 100,000 miles of local roads to Wisconsin's economy. WisDOT is presently developing a data set that will allow further analysis to be conducted for the state's local roadway system. As with the STH System, significant economic benefits are also likely to result from increased investments in local roads.

Summary of Findings

An investment of \$5.8 billion (in 2002 dollars) over the level needed to maintain current performance conditions would be needed to fund the improvements in the Wisconsin State Highway Plan 2020.² When spent over 21 years, this additional investment would be worth **\$3.2 billion**. This is the **cost** side of the benefit/cost analysis.

On the **benefits** side, we started with direct benefits to highway users:

- **\$7.0 billion** for everyday personal trips, such as driving to work, doing errands, or visiting friends; and

¹ Wisconsin State Highway Plan 2020, Wisconsin Department of Transportation, 2000.

² According to WisDOT's own models, the funding levels needed to maintain current conditions and performance are higher. Work by the Southeast Wisconsin Regional Planning Commission shows an additional investment of \$6.25 billion would only maintain current levels of service.

- \$1.5 billion for driving by businesspeople and truckers while “on the clock.”

The “on the clock” portion of the benefits allows Wisconsin businesses to increase output, hire additional workers, and eventually increase Wisconsin residents’ disposable personal income by **\$2.7 billion** – capturing the multiplier effect.

The total benefits of the additional investment are the sum of the \$7.0 billion for personal trips, plus the \$2.7 billion of benefits (*macroeconomic impacts*), created from greater business efficiencies for a total of **\$9.7 billion**.

By dividing benefits (\$9.7 billion) by costs (\$3.2 billion), we conclude that for every dollar of additional investment in the STH System beyond that needed to maintain current conditions, Wisconsin would enjoy three dollars of benefit.

The basis for these estimates is provided in the remainder of this section, with complete details in the separately bound Appendix.

■ 3.1 Analytic Framework

Our analysis of how additional WisDOT highway investment ripples through the economy is illustrated in Figure 10. We started by evaluating the most effective way to spend the budgeted dollars using a model called HERS/ST (Highway Economic Requirements System/State Version). HERS/ST is a model developed by the Federal Highway Administration to help analyze the condition and performance of the nation’s highway system and aid Congress in making programmatic choices in spending (hereafter, HER/ST is simply referred to as HERS). We used the version of this program that is designed to evaluate state-level spending choices. HERS tries to optimize the spending of limited dollars by evaluating the benefit/cost ratio of different improvements at a given condition of the highway system.³

User Benefits

One of the factors used by HERS to evaluate projects is the dollar value of “highway user benefits.” These are:

³ WisDOT uses a detailed system to evaluate highway improvement needs and set priorities among specific projects. However, WisDOT’s system did not provide the user benefits information needed to perform the analysis in this report.

- **Travel Time Savings.** Travel time savings reflect the dollar value of the reduction in vehicle-hours of travel directly resulting from increased speeds. This is made possible by reduced traffic congestion accruing from increased highway capacity, improved roadway geometry, and/or improved pavement condition due to increased investment.
- **Vehicle Operating Cost Changes.** Highway investment can significantly improve roadway conditions through re-construction and resurfacing, thereby reducing general wear and tear on vehicles that result from substandard pavement conditions.
- **Safety Effects.** Roadway investments can reduce the accident rate on a highway system by lowering congestion and improving roadway geometry.

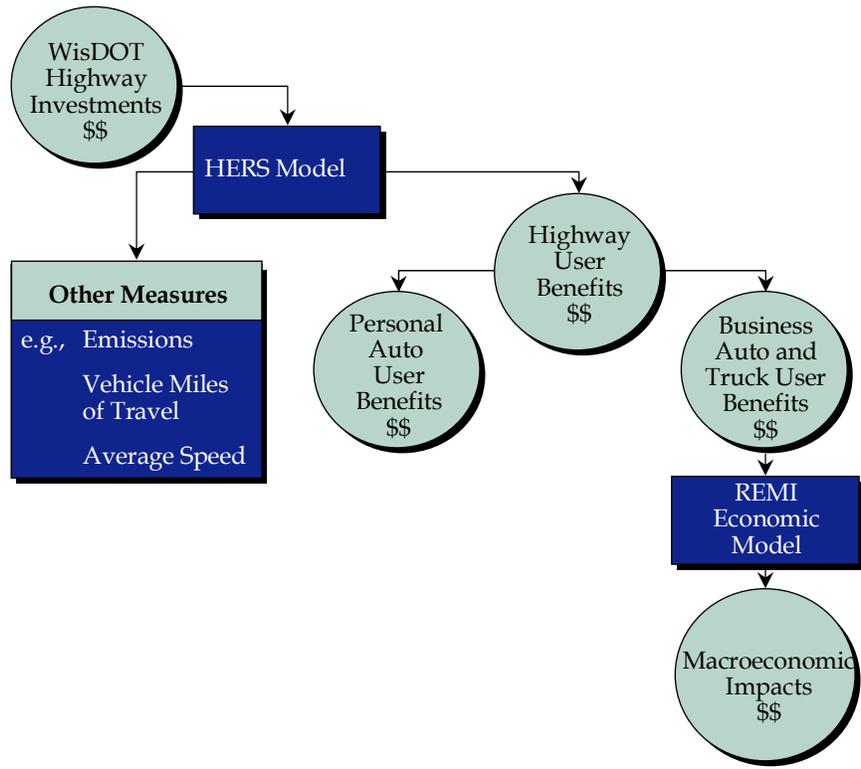
Multiplier Effects

Although all of the user benefits are important, only those benefits that represent cost savings to businesses were considered when we evaluated how cost savings multiply in the economy.⁴ Therefore, only the user benefits that would be realized by trucks and by “on the clock” business travel were extracted from the HERS model and input to an economic simulation of the national economy called REMI (Regional Economic Models, Inc).⁵ The results of the simulation were expressed in terms of increased employment, and personal income.

⁴ Broadly defined, the multiplier effect captures the additional economic activity (i.e., hiring new employees, buying more raw materials, etc.) associated with reduced transportation expenditures.

⁵ The model is calibrated by REMI using data specific to the state of Wisconsin.

Figure 10. Quantitative Analysis Methodology



Highway Investment Levels

The State Highway Plan indicated that the current level of WisDOT spending in 1999 would result in a total expenditure of \$16.4 billion over the 21-year plan period (in 2002 dollars). This is just about the investment level that our analysis of the potential state highway investments using HERS indicated would be adequate to maintain the current conditions of the highway system: \$16.1 billion.⁶ As the following analysis demonstrates, increasing current funding levels and improving travel conditions on the STH System, can have significant economic benefits that would not be realized by simply maintaining current highway conditions.

⁶ All dollars in this analysis are expressed at 2002 levels. Investment levels are presented in billions of 2002\$ to enable comparison with estimates of economic benefits (also in 2002\$). The dollar amounts published in the State Highway Plan were in 1999 dollars, and were: Maintain Current Spending Levels (\$15.3 billion), and State Highway Plan (\$20.9 billion).

Carrying out the State Highway Plan would require a total investment of \$21.9 billion over the 21-year planning period, or \$5.8 billion over the levels required to maintain current conditions (see Table 1). This amounts to an additional investment of \$276 million per year.

Table 1. Highway Investment Scenarios

Scenario Name	Description	Total Investment (Billions of 2002 Dollars)
Maintain Current Conditions	Investment is sufficient to maintain network performance on the STH system (according to the HERS model)	\$16.1
State Highway Plan	Investment identified in WisDOT's State Highway Plan 2020	\$21.9

Source: Cambridge Systematics, Inc. and Wisconsin DOT.

Discounting Future Dollars

Later in this report, we will be comparing the value of the additional highway investment to the value of the benefits received. In order to provide a fair comparison, we discounted (by seven percent, annually) the value of future dollars spent or benefits received back to reflect a present value at 2002 levels. This discounting reflects the time value of money, and is a standard way to address benefit/cost analysis. The present value of the additional \$276 million per year over 21 years – or \$5.8 billion in total – is \$3.2 billion.

■ 3.2 Direct Economic Benefits

We used the HERS model to estimate the user benefits that could be achieved by the additional highway investment described above. We forecast the present value of future user benefits from these higher investment levels at \$8.5 billion, or 2.7 times the \$3.2 billion investment. Most of these benefits (82 percent) are expected to accrue to drivers of personal autos (see Table 2). The remainder of the benefits (18 percent) are expected to be enjoyed by the business community – i.e., trucks or business travelers while “on the clock.”

Table 2. Present Value of Direct Highway User Benefits of STH Investment from 2000 through 2020
Billions of 2002 Dollars

Personal Auto	7.0
Business Auto and Truck	1.5
Total	8.5

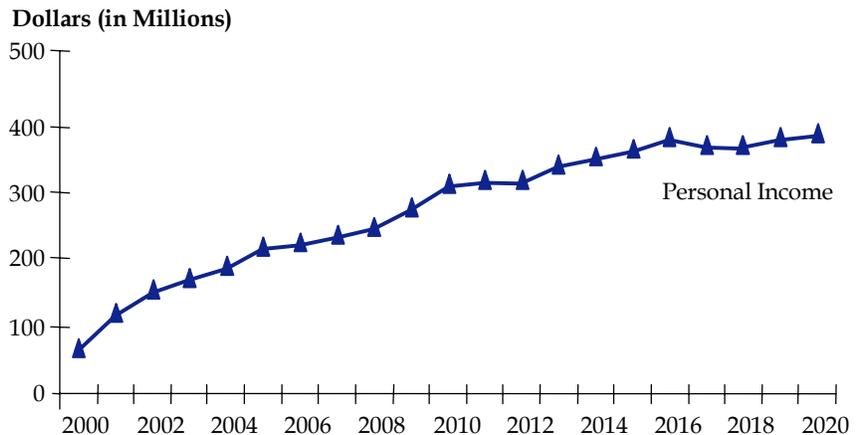
Source: Cambridge Systematics, Inc.

■ 3.3 Total Macroeconomic Impact of Additional Investment

The direct highway user benefits – \$1.5 billion shown in Table 2 – accruing to businesses by additional spending on the STH system will multiply through the economy. Essentially, the \$1.5 billion in highway user benefits reduces the cost of doing business in Wisconsin, generating economic productivity gains for businesses, translating into business expansion, retention, and attraction, which leads to more jobs, higher income, and greater overall economic production. Ultimately, this \$1.5 billion in business cost savings multiplies to \$2.7 billion in increased personal income for Wisconsin residents. The benefits are expected to increase gradually over time, as illustrated in Figure 11, with the average annual increase in personal income in Wisconsin estimated at about \$323 million.

Another effect the additional highway investment is an increase in permanent new jobs. On an average annual basis, we estimate that 4,800 more jobs would exist in Wisconsin if the additional highway investments were made than without the investment.

Figure 11. Additional Economic Growth in Wisconsin from SHP Investment, 2000 through 2020
Annual Economic Benefit of Fully Funding the State Highway Plan



Source: Regional Economic Models Inc., Wisconsin Department of Transportation, and Cambridge Systematics, Inc.

Note: Additional economic growth shown above represents increased economic activity *beyond* the level forecast under simply maintaining current conditions.

■ 3.4 Economic Benefit/Cost Analysis

This additional investment over a 21-year period is expected to result in \$3.00 worth of economic benefits for every \$1.00 invested above the amount needed to maintain current performance conditions on the State Trunk Highway system.

In order to meaningfully compare the costs of investment to their benefits, we added up the discounted present value of the cost and benefit streams over the 21-year analysis period.

On the **cost** side, the \$5.8 billion of additional investment spread over 21 years would have a present value of \$3.2 billion.

The **benefits** to users of personal autos were worth \$7.0 billion, plus \$2.7 billion of additional real disposable personal income (see Table 3), totaling \$9.7 billion.

The benefit/cost ratio of the additional investment is therefore 3.0 (i.e., \$9.7 divided by \$3.2), meaning that for every \$1.00 of investment, there is a return of \$3.00 in benefits.

Table 3. Economic Benefit/Cost Analysis of Additional STH System Investment
(Billions of 2002 Dollars, Cumulative Change – 2000 through 2020)

Benefits	
Present Value of Personal Auto User Benefits	7.0
Present Value of Additional Disposable Personal Income	2.7
Total Discounted Benefits	9.7
Costs	
Present Value of Additional Investment (relative to the Maintain Current Conditions scenario)	3.2
B/C Ratio (Discounted Benefits/Discounted Costs)	3.0

Source: Regional Economic Models Inc., Wisconsin Department of Transportation, and Cambridge Systematics, Inc.

Note: Business auto and truck user benefits – totaling \$1.5 billion – reduce the cost of doing business in Wisconsin. This allows Wisconsin businesses to increase output, hire additional workers, and increase Wisconsin residents' disposable personal income by \$2.7 billion.

■ 3.5 Highway Construction Impacts

Finally, we considered the economic impact of increased highway investment and construction-related activity to build and maintain the system. Additional investment will generate increased economic activity (including the multiplier effect), as local suppliers experience increased demand for their products and new jobs generate additional personal income and spending⁷ (see Table 4).

The average annual impacts of implementing the State Highway Plan include gains in personal income of \$156 million per year. Highway construction expenditures will also support an average of over 4,300 jobs a year that would otherwise not be present in Wisconsin if the expenditures were not made. The average

⁷ While this impact will contribute to economic activity in the state, similarly sized alternative investments would also likely contribute an equal impact (regardless of its benefit to the transportation system).

transportation-related job in Wisconsin paid \$31,576 in 2000 compared to a statewide average for all jobs of \$30,185.⁸

Table 4. Average Annual Macroeconomic Impact of Highway Construction Expenditures, 2000 through 2020

Additional Investment (relative to the maintain current conditions scenario)	\$276 M
Personal Income	\$156 M
Employment	4,300 jobs

Source: Regional Economic Models Inc. and Cambridge Systematics, Inc.

A motorcycle manufacturer with an engine manufacturing facility and worldwide distribution facility in the metropolitan Milwaukee area relies on a mix of air and highway transport to speed shipments to its customers. As one company executive observes, "When you ship \$170 million in parts and accessories each year, you need quality roads and bridges, a solid air transportation program and a complete system that enables a company like ours to quickly turn around its products."

⁸ U.S. Census Bureau, 2000 County Business Patterns.

4.0 Impacts of Other Modes

Businesses require multimodal transportation options to access markets and supplies. The level of service and quality of infrastructure provided by Wisconsin's transportation network will have a strong bearing on the continued competitiveness of the State's businesses. This section describes the importance of Wisconsin's aviation, transit, ports, and rail systems to the overall state economy.

■ 4.1 Aviation

Wisconsin's public use aviation system encompasses:

- Nine airports with scheduled commercial airline passenger service, serving approximately 8 million total passengers annually (four million enplanements);
- Six primary air cargo airports (with contracted feeder services at seven others), handling over 114,000 tons of cargo shipped each year with a value of approximately \$6 billion; and
- 136 total public use airports that serve general aviation, providing facilities for corporate travel, pilot training, and personal/recreational flights. These are home to over 5,000 based aircraft, and serve 2.3 million non-airline operations (takeoffs and landings) per year, representing 5.2 million passengers each year.¹

Airports and the aviation industry in Wisconsin account for \$1 billion of economic activity, supporting over 15,000 jobs with a payroll of \$354 million. Visitors to Wisconsin who depend on air travel as their means of entering the State bring an additional \$900 million of spending on hotels, meals, and other purchases in Wisconsin, supporting over 22,000 additional jobs with a payroll of \$345 million. There are additional multiplier effects on the economy from the re-spending of worker income. In total, this

¹ Source: Wisconsin Department of Transportation, Bureau of Aeronautics, 2002.

aviation activity generates over \$2.1 billion in Wisconsin economic activity, including support for over 41,000 jobs with a payroll of over \$770 million for state residents.²

The above impact numbers do not include the income produced by existing businesses that depend on air cargo shipment, nor the role of airport service as a prerequisite for new firms to locate in Wisconsin. Between 1997 and 2001, 85 percent of all new and expanded manufacturing firms (702 manufacturers with 34,064 employees) located within 15 miles of the state's 49 jet-capable airports (see Figure 12). Wisconsin companies are relying on business aircraft at record levels. In 2001, businesses and manufacturers based in Wisconsin purchased jet and turbo-prop aircraft valued at \$169 million compared to purchases of just \$25 million in 1994. To meet increasing business aviation needs, WisDOT has upgraded six airports in the last three years to accommodate business jet traffic, and seven more upgrades are planned for the near future.

Rock County Airport is a cargo facility serving a cluster of businesses focused primarily on automobile parts and vehicle manufacturing. Benefit/cost analysis was conducted for the \$10 million construction of a new runway to handle larger aircraft. It found benefits including savings in air and ground times associated with aggregating shipments onto larger planes, eliminating refueling stops, eliminating truck trips for transporting other cargo to/from a more distant airport, and reducing production costs for area manufacturers that ship via air freight and depend on it to sustain just-in-time manufacturing processes. The annual benefit was \$4.4 million and the discounted benefit/cost ratio was 5 to 1. The project was approved by the FAA and is currently nearing completion. (Source: Benefit/Cost Analysis for the Rock County Airport Runway Extension, Wisconsin DOT, September 2000.)

The 2020 State Airport System Plan identifies \$1.3 billion of airport improvements needed between 2002 and 2020, including \$606 million for system preservation and \$700 million for improvements to meet changing future needs (capital investments). These include runway pavement and apron/taxiway pavement projects, as well as upgraded instrumentation and terminal-related construction projects. These needs are associated with forecasts of 85 percent growth in airline passengers, 128 percent in tons of cargo, and 13 percent in general aviation operations by 2020.³

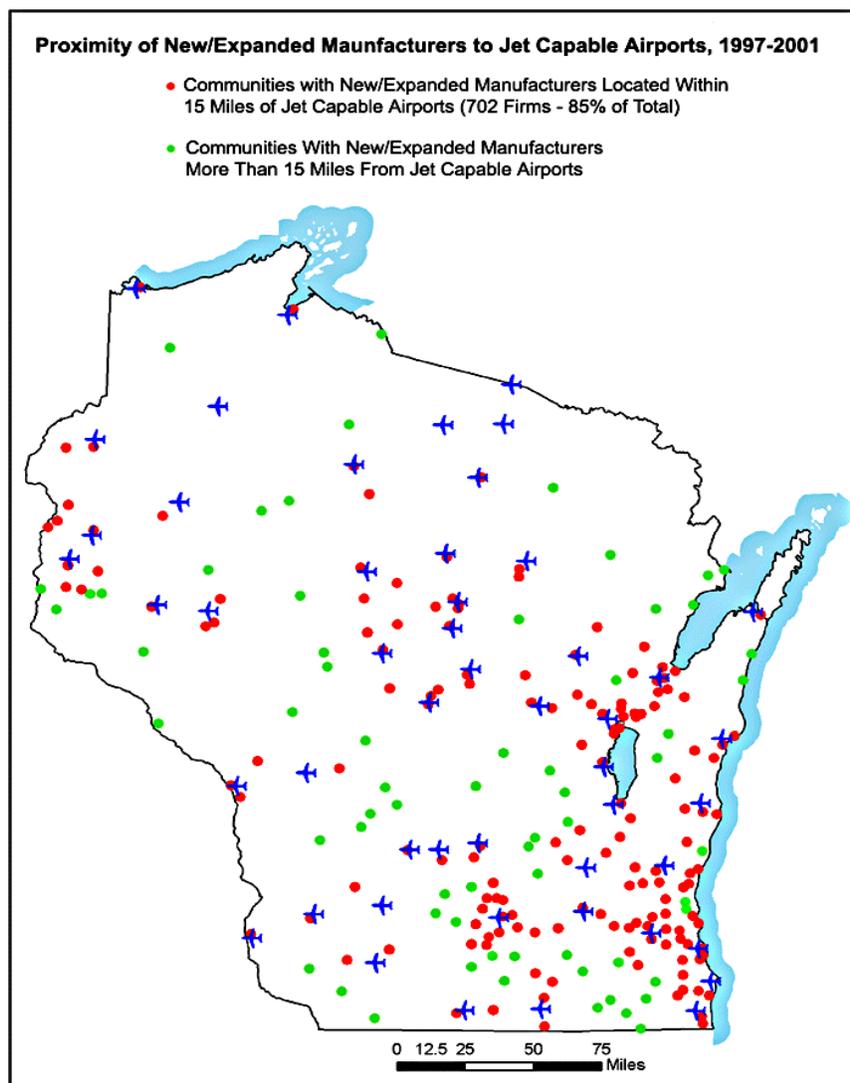
The economic benefit from \$700 million of needed aviation capital investments can be viewed in two ways. One way is to recognize that they are necessary to accommodate forecasted growth and

² Source: *Wisconsin Aviation Impact Study*, Wisconsin Department of Transportation, 1998.

³ Source: *Wisconsin State Airport System Plan 2020*, Wisconsin Department of Transportation, 2000 with updated cost estimates as of 2002.

change of aviation activity, which will lead to corresponding proportional growth in aviation-related economic activity. The other way is to view them as generating benefit/cost ratios historically similar to findings from past airport studies in Wisconsin. These alternative views lead to a finding that the benefit of additional value added in the economy (i.e., income for Wisconsin businesses and residents) is well over \$500 million and quite possibly as large as \$2 billion over 18 years.⁴

Figure 12. Jet Capable Airport Access Contributes Business Attraction and Retention



Source: Economic Development Section, Wisconsin Department of Transportation.

⁴ Calculations by Economic Development Research Group, Inc., 2002. These numbers will be refined as WisDOT later completes an updated study of aviation economic benefits.

There is an additional economic benefit from the \$606 million of needed aviation capital investments for system preservation. Without full investment to maintain all existing airports, some airports would be forced to close and others to scale back their operations. The result would be a decline in the current \$1 billion of economic activity associated with existing airports. In addition, ground transportation time and costs would increase because passengers and cargo would need to travel to more distant airports.

■ 4.2 Transit

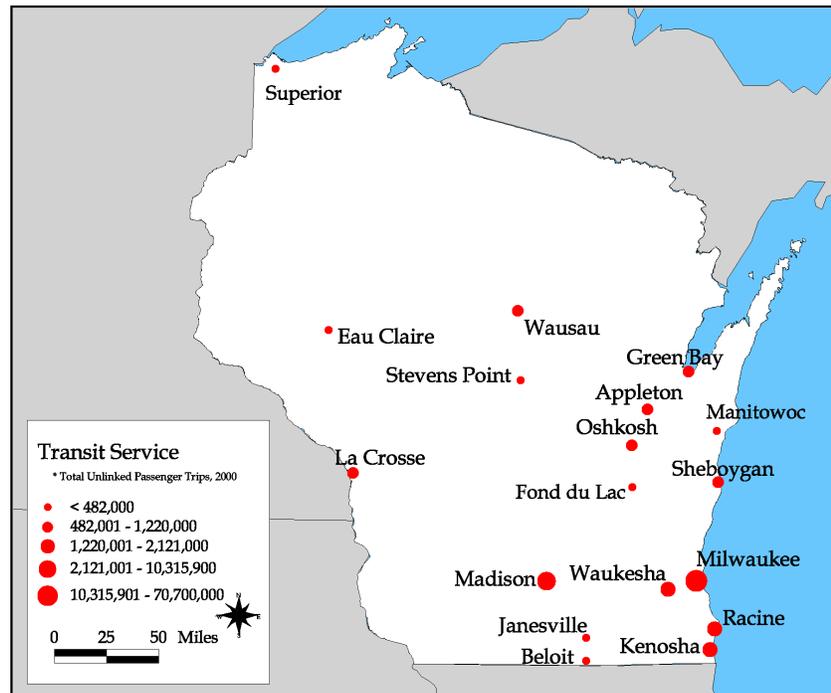
From 1991 to 2000, passenger trips on Wisconsin's transit system increased by 18 percent, from 79.1 million to 93.5 million. Without transit service, a large number of these trips would be made by automobile, thereby exacerbating the problem of roadway congestion, increasing travel times and operating costs for all travelers, and increasing the cost of doing business in the State. In addition to macroeconomic impacts that directly affect the productivity and profitability of business activity, transit investments also result in significant societal benefits. These take the form of increased access to jobs, health care, and other services.

Expanding transit service can help the transportation-disadvantaged gain access to jobs and improve their standard of living. A recent report from the Wisconsin Urban and Rural Transit Association, identified unmet transportation needs and assessed the cost and benefit of providing additional transportation services to meet the needs of Wisconsin welfare recipients.⁵ Three transit service enhancement scenarios were produced that illustrated that public transportation can provide currently unemployed welfare recipients with the mobility they need to obtain and hold jobs. This analysis identified the geographic mismatch between welfare recipients in Milwaukee and potential jobs sites located outside of Milwaukee County (and outside of the range of current transit service). At least one scenario in this study showed the potential to generate a possible return of \$1.66 for every \$1.00 invested in proposed transit service adjustments (that would better connect welfare recipients to job centers, thereby saving taxpayers money). Figure 13 highlights transit ridership and service in Wisconsin counties.

⁵ *Public Transportation, Jobs and Welfare Reform Study*. Prepared for: Wisconsin Urban and Rural Transit Association. Prepared by: BRW, Inc. and Biko Associates. August 1997.

WisDOT intends to complete a study by mid-2003 assessing the economic impact of Wisconsin public transportation services to the education, healthcare, and service (e.g., retail and hospitality) sectors. This study also will help further define public transportation's role as an economic stimulant and the economic, social, and quality of life impacts it has on Wisconsin's communities.

Figure 13. Transit Ridership and Service in Wisconsin Counties



Source: National Transit Database.

Note: Over 40 Wisconsin counties provide shared-ride taxi service.

■ 4.3 Ports, Harbors, and River System

River System

The Upper Mississippi River serves as a key transportation link for Wisconsin businesses moving primary commodities such as grain, coal, cement, steel, aggregate, and asphalt. A recent analysis of Wisconsin waterborne commerce on the Mississippi River showed that over 1.1 million tons of commodities (primarily

grain) were shipped from the State on the river system in 1999.⁶ Wisconsin also received over 2.7 million tons of commodities (primarily coal) by way of the Mississippi. In total, over 3.9 million tons of commodities (the equivalent of 214,000 loaded trucks) were moved to, from, and within Wisconsin by waterway with a value \$314 million (see Table 5). Shippers moving commodities by way of the Upper Mississippi to, from, and within Wisconsin realized savings of almost \$40 million compared to other transportation modes.

**Table 5. Wisconsin Waterborne Commerce, 1999
Selected Movements to, from, and within
the State**

Commodity	Tons	Value (Millions of 1999 Dollars)
Coal	2,136,500	\$86
Petroleum	79,624	\$19
Grain	1,128,968	\$149
Ores/Minerals	114,273	\$2
Iron/Steel	82,162	\$16
Other	331,274	\$30
Total	3,912,040	\$314

Sources: Midwest Area River Coalition from the U.S. Army Corps of Engineers Waterborne Commerce Statistics.

Deepwater Ports

A recent study examined the economic impact of 16 ports throughout eight states bordering the Great Lakes St. Lawrence Seaway System, which included the Wisconsin ports of Milwaukee, Green Bay, and Superior-Wisconsin/Duluth-Minnesota.⁷ As shown in Table 6, over 31,000 jobs with income

⁶ Midwest Area River Coalition, *Wisconsin Waterborne Commerce: Economics and Traffic Profile*, www.marc2000.org, 2000.

⁷ Martin Associates, *Economic Impact Study of the Great Lakes St. Lawrence Seaway System*, (U.S. Saint Lawrence Seaway Development Corporation, 2000).

totaling over \$1.3 billion are attributable to these three ports located along the Great Lakes-St. Lawrence Seaway System.⁸ Additionally, 61 million tons of commodities were shipped by businesses using these three ports generating revenue over \$1 billion.

Table 6. Summary of Economic Impacts of Wisconsin Great Lakes Ports, Saint Lawrence Seaway System
Tonnage in Millions, and Dollars in Millions of 2000 Dollars

	1991	2000	Percent Change
Total Jobs	14,968	31,033	107%
Total Income Impact (Millions of 2002 dollars)	\$642 M	\$1,360 M	112%
Revenue (Millions of 2002 dollars)	\$575 M	\$1,075 M	87%
Tonnage Shipped (Millions)	42 M	61 M	45%

Source: Martin Associates and the U.S. Saint Lawrence Seaway Development Corporation.

A manufacturer of custom designed houseboats and commercial excursion vessels, recently consolidated its operations to one of the state's harbor facilities. The boat builder had three different manufacturing sites, unnecessarily inflating its costs and restricting its ability to expand operations. The business consolidation, to an inland waterway, has reduced transportation costs and improved manufacturing efficiencies.

During the 2000 shipping season, the Great Lakes system provided \$380 million of cost savings to the steel mills, utilities, and other key industries located near the Wisconsin ports of Milwaukee, Green Bay, and Superior-Wisconsin/Duluth-Minnesota. In terms of total tonnage moved, the Port of Duluth-Superior ranks 20th in the nation with over 41 million tons shipped in 2000. Additionally, the Ports of Green Bay and Milwaukee combined to ship well over five million tons in 2000.

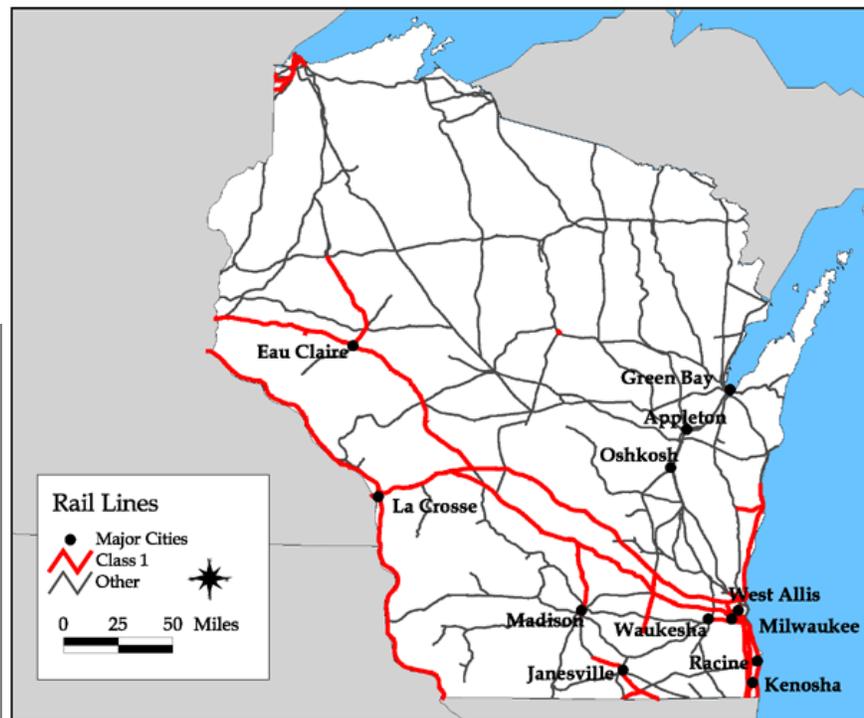
The St. Lawrence Seaway System has grown in importance as a key transportation route for bulk cargoes such as iron ore, coal, stone, and aggregates. It is unlikely that these industries, providing more than 31,000 direct, indirect, and induced jobs, would have initially located in the Wisconsin Great Lakes area without this transportation system and the efficiency and cost savings it generates.

⁸ Total economic impacts were reported for all 16 ports. The economic impact of the three Wisconsin ports was found based on their respective share of total shipped (as proxy for share of economic activity).

■ 4.4 Rail

In 2000, Wisconsin's freight railroads moved 149 million tons of materials valued at over \$4 billion including such essential commodities as grain, pulp, lumber, coal, fertilizers, and heavy machinery.⁹ Freight rail service (see Figure 14) provides an efficient and cost-effective transportation option for Wisconsin businesses moving raw materials and finished products. To help ensure freight rail service remains an efficient and viable transportation option for Wisconsin's businesses continued investment (mostly by private railroads) in the system must be made.

Figure 14. Freight Rail Service in Wisconsin



Rail Service was the first priority of a national farm cooperative for locating a new grain milling and processing plant in southwestern Wisconsin. With financial assistance from the state, a new rail spur was constructed which enabled the cooperative to transport over 100 carloads of wheat per week to its new milling operation. The cooperative has since added more jobs and a new food processing facility that converts the flour milled from the wheat into a variety of pasta products found on the shelves of grocery stores today.

Source: Federal Railroad Administration.

The Wisconsin Department of Transportation (DOT) is currently developing a 20-year State Rail Plan that will provide a policy framework to preserve and enhance the state rail freight system. This includes improving highway access to rail yards and intermodal facilities, an often-overlooked component of freight rail

⁹ *All Aboard – State Rail Plan Newsletter*. Wisconsin Department of Transportation, July 2002. www.dot.state.wi.us.

service.¹⁰ There are a growing number of intermodal facilities operating in Wisconsin with the ability to handle roughly 4,000 over-the-road trailers or containers on a daily basis. It is important that WisDOT is addressing this fast growing segment of the freight market, as a new 1,200-acre intermodal facility is under construction just 45 miles south of the Wisconsin border in Rochelle, Illinois. It is designed to handle 350,000 over-the-road trailers or containers annually, and is likely to have a significant impact on Wisconsin's freight shipping patterns.¹¹

Investment in freight rail service directly benefits highway system users. As truck shipments are diverted to rail, congestion on regional highways is reduced, thereby improving travel times and reducing operating costs on the highway system. Wisconsin rail freight volumes have increased 26 percent from 1991 to 2000. In addition to these benefits, the rail industry itself employed over 4,000 Wisconsin residents earning over \$210 million in wages in 2000.¹²

¹⁰Intermodal facilities are locations where bulk or containerized commodities are transferred from one mode of transportation to another.

¹¹[Http://www.dot.state.wi.us/projects/state/rail2020.htm](http://www.dot.state.wi.us/projects/state/rail2020.htm). Wisconsin State Rail Plan-2020, freight rail issues and options.

¹²Wisconsin Department of Transportation, July 2002.

5.0 Conclusion

Transportation is the cornerstone of Wisconsin's \$173 billion economy. The productivity and connectivity advantages provided by the extensive network of state and local roads, ports, rail lines, airports, and related services has a direct and significant bearing on the competitiveness of Wisconsin's businesses and the overall economic health of the State.

Demands on Wisconsin's transportation system increased significantly during the 1990s as manufacturing, exports, population, and vehicle miles traveled posted sizeable gains. Today, traffic volumes on the state's highway network are at an all time high. Milwaukee, Wisconsin's largest metropolitan area, is frequently plagued by congestion, giving rise to increased driver stress, fuel consumption, air pollution, shipping costs, and vehicle wear and tear.

This analysis specifically demonstrated that improvements to highway pavement conditions and capacity enhancements reduce transportation costs to Wisconsin's businesses. As these costs decline or stay in check, the competitiveness of Wisconsin's businesses improves.

Wisconsin's economy can benefit from an increase in multimodal transportation investment. In the future, Wisconsin businesses will increasingly require multimodal transportation options to access markets and supplies. An efficient and reliable multimodal transportation network that includes an effective state trunk highway and local roadway system is vital to the future growth of Wisconsin's economy.