

# CHAPTER 3: Trends

Changes in population, travel patterns, safety concerns, economic trends, and environmental considerations (including land use development patterns) affect the demand for transportation. This chapter provides an overview of key trends and issues that shaped the development of *Connections 2030* and continue to influence transportation decision-making.

The trends and issues that continue to be closely linked to transportation are:

- » Population
- » Travel patterns
- » Transportation safety
- » Economic activity
- » Energy and the environment

## Population

### Summary of population trends

- » Between 2000 and 2030, the state's population is predicted to increase by 19.6 percent.
- » Between 2000 and 2030, Wisconsin's population of people 65 years and older is predicted to increase by 90.2 percent.
- » By 2030, the average household size in Wisconsin is expected to decrease from 2.5 people in 2000 to 2.33 people.



▲ *Figure 3-1: Between 2000 and 2030, it is estimated that Wisconsin's population growth will be second in the Midwest only to Minnesota's growth.*

- » 92 percent of the state's current households own at least one vehicle, and 18 percent own three or more vehicles.

### Population growth

According to the 1970 U.S. Census, Wisconsin had 4.4 million residents. By 2005, Wisconsin's population had increased to 5.87 million. By 2030, it is estimated that the state's population will be 6.35 million – an increase of 45.2 percent from 1970.

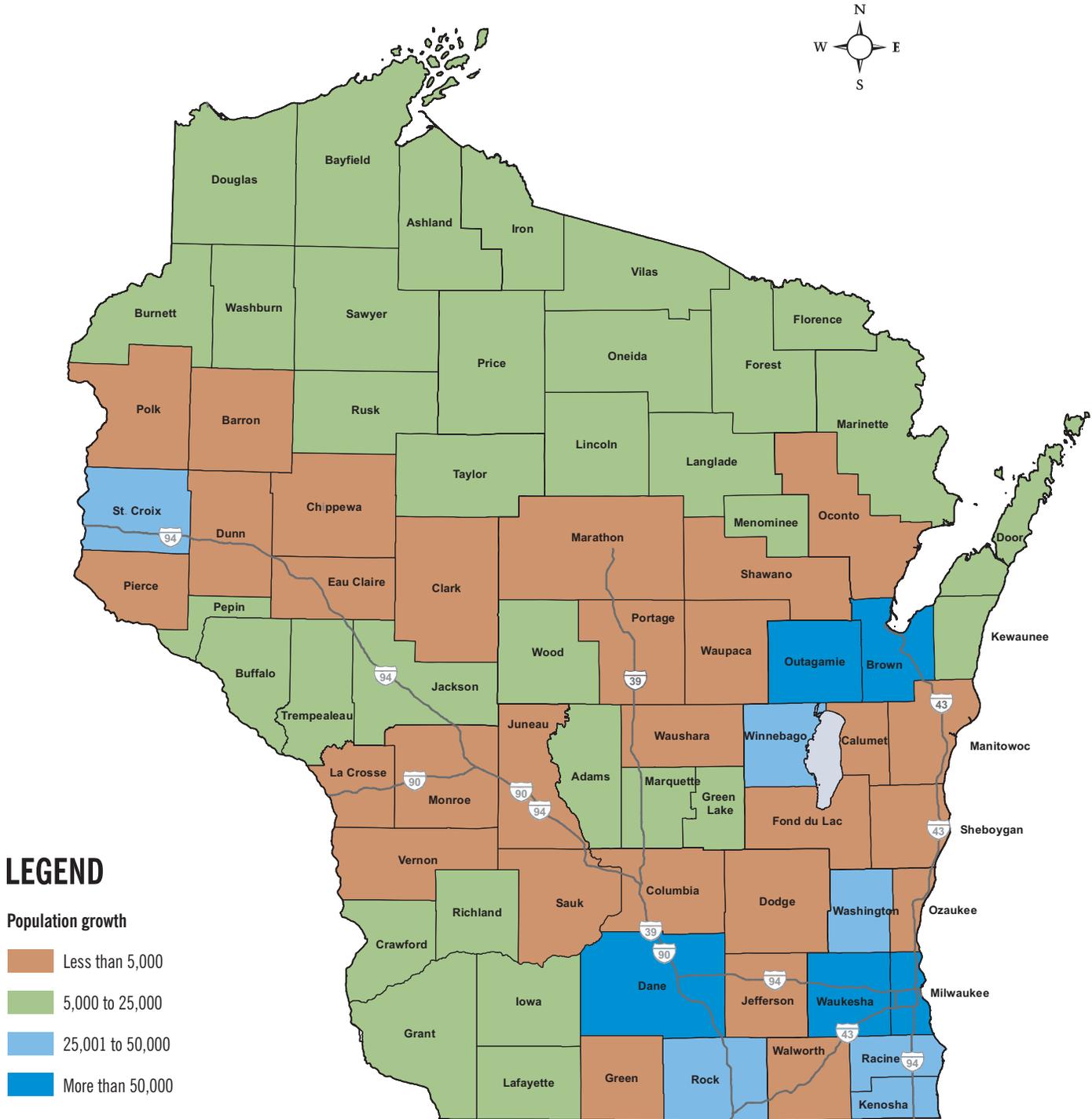
While Wisconsin's net population growth rate will lag behind the fastest growing parts of the country – the South and the West – it is estimated that among the five Upper Midwest states (Wisconsin, Illinois, Iowa, Michigan and Minnesota), Wisconsin's growth (19.6 percent) will be second to Minnesota's 28.2 percent projected growth between 2000 and 2030.

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*ACCORDING TO THE 1970 U.S. CENSUS, Wisconsin had 4.4 million residents. By 2030, it is estimated that the state's population will be 6.35 million – an increase of 45.2 percent from 1970.*

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▲ Map 3-1: Wisconsin total population growth (2000 – 2030)

**Table 3-1: Wisconsin population summary (in thousands)**

Category	1970	1980	1990	2000	2010	2020	2030	Percent change 1970-2000	Percent change 2000-2030
Total population (thousands)	4,417	4,705	4,891	5,363	5,751	6,110	6,415	21.4	19.6
Age 24 and under	2,087	2,000	1,801	1,889	1,915	1,922	2,005	-9.5	6.1
Ages 25 to 44	976	1,252	1,546	1,554	1,493	1,596	1,587	59.2	2.1
Ages 45 to 64	880	888	892	1,190	1,575	1,569	1,486	35.5	24.9
Age 65 and older	472	564	651	702	766	1,022	1,336	48.7	90.2

Source: U.S. Census Bureau; Wisconsin Department of Administration

The majority of this population growth will occur in Brown, Dane, Milwaukee, Outagamie and Waukesha counties. By 2030, notable growth is also projected to occur along the corridor between Madison and Milwaukee, at the Illinois border near Chicago, along the Fox Valley corridor from Green Bay to Oshkosh and near the Minnesota border by Minneapolis/St. Paul (see Map 3-1).

For example, St. Croix County, which is located at the Wisconsin-Minnesota border near the Minneapolis/St. Paul area, has experienced the highest percentage increase in population in the state. The estimated percentage increase for this area was 25.1 percent between 2000 and 2007.<sup>1</sup> It also had the fourth highest increase in total population in Wisconsin during this period. In general, Wisconsin’s northern counties will experience smaller population increases than other parts of the state.

### Age demographic changes

Wisconsin’s age demographics will also change significantly during the next 20 years. Table 3-1 summarizes the total percent change in population by age group. While the number of people in all age groups will increase, the greatest percent increases will occur in the older population groups. Nationally, the number of people age 65 years and older is expected to increase

19.7 percent between 2000 and 2030. In comparison, Wisconsin’s 65 and older population is predicted to increase by 90.2 percent. By the year 2030, 25 percent of drivers in the state will be 65 years or older. In contrast, the 18-to-64 age group will see smaller and more gradual increases during this period.

### Minority population changes

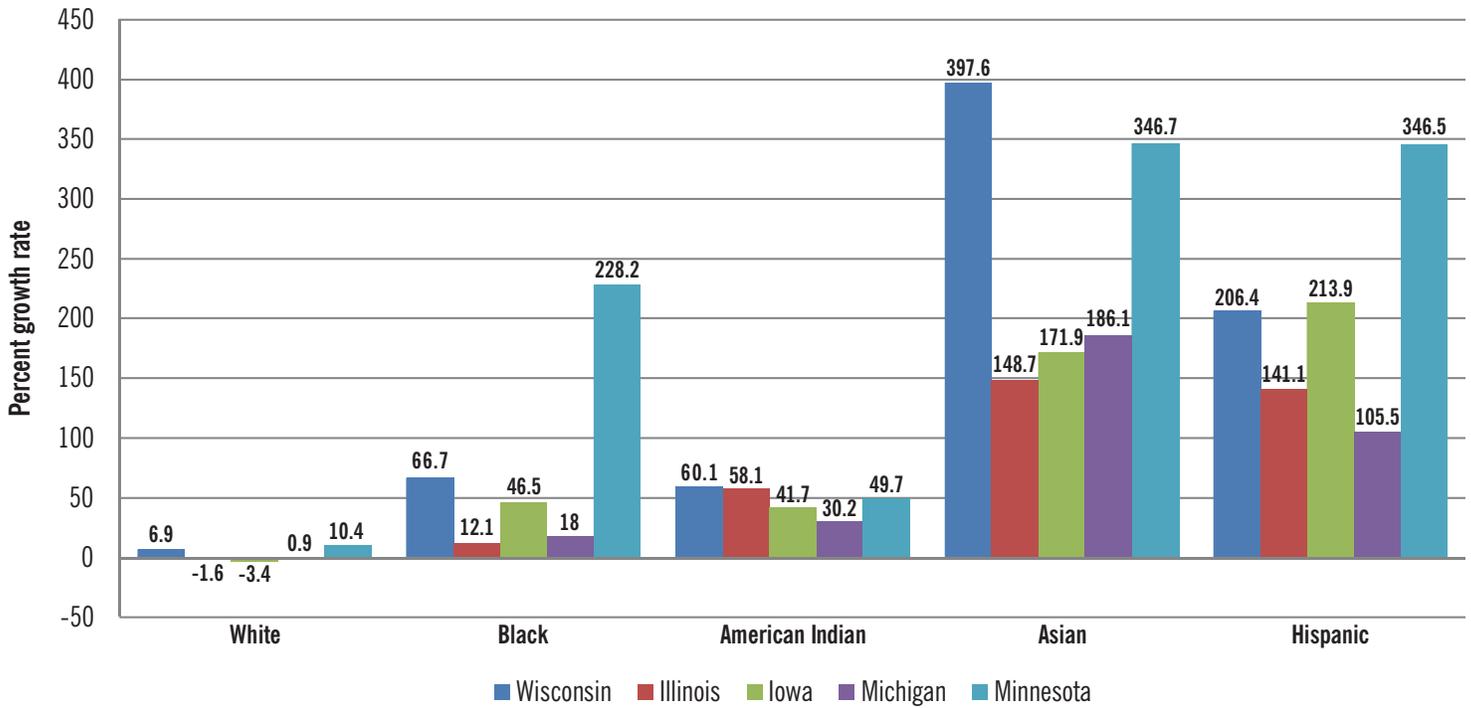
Projections of changes in minority populations through 2030 are not available; however, based on historical trends, Wisconsin’s minority population is also expected to increase. The state’s minority population currently comprises about 13 percent of Wisconsin’s entire population. Over the past two decades, the largest increases have occurred in the Asian/Pacific Islander and Hispanic populations. Figure 3-2 compares Wisconsin’s minority population increase from 1980 to 2000 with the population changes in Illinois, Iowa, Michigan and Minnesota.

U.S. Census data shows that most of Wisconsin’s minority populations are located in and around the state’s urban areas. For example, 90.5 percent of Wisconsin’s total African American population resides in Dane, Kenosha, Milwaukee and Racine counties, with 85 percent of the state’s total African American population located in the cities of Kenosha, Madison, Milwaukee and Racine.

Hispanic populations also tend to live in highly urbanized areas. More than 70 percent of the state’s total Hispanic population resides in Brown, Dane, Kenosha, Milwaukee,

<sup>1</sup> WI Dept. of Admin., Demographic Services, Population Est., Aug. 2007





▲ Figure 3-2: Minority populations increases in Midwestern states (1980-2000)

Racine and Waukesha counties, of which more than half reside in the cities of Kenosha, Madison, Milwaukee and Racine. Almost 75 percent of the state’s Asian/Pacific Islander population resides in Brown, Dane, La Crosse, Marathon, Milwaukee, Outagamie, Sheboygan and Waukesha counties. Almost 60 percent of Asian/Pacific Islanders live within the largest cities in each of those counties. While the largest concentration of Native Americans is in Milwaukee County (more than 6,700), the population is spread across the state, with many Native Americans living in counties with tribal reservations. There has also been scattered population growth for other minority groups in more rural parts of the state.

### Household size

Wisconsin’s average household size (the number of people residing in one household) has steadily decreased over the past several decades. According to the U.S. Census, the average household size in Wisconsin was 2.50 persons in 2000. By 2030, it is expected to decrease to 2.33 persons. This decline in average household size is a national trend largely due to an increase in single heads

of households, individuals waiting longer to marry, and people having fewer children. Even though there will be fewer people per household, the number of households in the state is expected to increase 28 percent from 2000 to 2030 due to population growth.

### Travel patterns

Many complex factors, including job location, fuel costs and land use decisions, influence travel patterns.

#### Summary of travel patterns

- » Between 2007 and 2030, traffic on Wisconsin’s roadways is expected to increase 34 percent.
- » Total vehicle miles traveled<sup>2</sup> (VMT) in the state is estimated to be 80 billion miles in 2030.
- » Truck VMT is expected to increase 64 percent between 2007 and 2030, while personal VMT is forecast to increase 33 percent.

**Table 3-2: Means of transportation to work in Wisconsin, 2000 (percent)**

Race/ethnic group	Drove alone	Carpool	Public transit	Motorcycle	Bicycle	Walk	Other means	Work at home
Wisconsin	79.5	9.9	2.0	0.1	0.4	3.7	0.4	3.9
White	80.7	9.3	1.3	0.1	0.4	3.7	0.4	4.1
African American	61.5	15.9	16.5	—	0.2	3.4	0.7	1.9
American Indian	71.6	16.7	3.4	0.1	0.5	4.5	1.2	2.0
Asians/Pacific Islander	68.1	15.8	5.4	—	0.7	6.9	1.1	1.9
Hispanic	63.4	23.1	5.7	0.1	0.6	4.8	1.0	1.3

Source: 2000 U.S. Census

- » From 1980 to 2006, the total number of roadway miles increased 6 percent.
- » The 2000 U.S. Census revealed the average travel time to work was 20.8 minutes for the 2.7 million people in Wisconsin's workforce.

In 2007, total vehicle miles traveled in Wisconsin was close to 59.5 billion, of which 6.4 billion were commercial (truck) vehicle miles. Total VMT has decreased 1.8 percent since the peak in 2004. Truck VMT, while experiencing a slight decrease in 2005 and 2006, has continued to increase.

Between 1980 and 2007, vehicle miles traveled in Wisconsin increased by 79 percent. By 2030, VMT is projected to be 80 billion miles, a 34 percent increase since 2007. Truck VMT is forecast to increase 64 percent between 2007 and 2030, while personal VMT is forecast to increase 33 percent.

The number of roadway miles in Wisconsin is increasing at a much slower rate when compared to vehicle miles traveled.

From 1980 to 2006, the number of roadway miles increased 6 percent. Today's roadways are carrying higher levels of traffic than in previous years. By 2030,

<sup>2</sup> "Vehicle miles traveled" refers to the total number of miles traveled by every car on Wisconsin's roadways.

8 percent of the state trunk highway network is expected to be congested, compared with 5 percent in 2007.

Congestion problems are most noticeable on highways where traffic volumes exceed the current design capabilities of the highway. Increases in traffic volumes can be attributed to several factors: household size, and job, services and residential locations.

Changes in the size and number of households have direct impacts on the number of trips made per household. As household size decreases or the number of households increases, the number of trips made per household increases.

The locations of residential areas, jobs and other services affect travel choices and can place greater demands on the transportation system. People who do not live in urban areas often must travel to more populated areas for shopping and other activities. As local development becomes more dispersed, more people drive and rely on highways for local trips.

All of these factors contribute to more travel on the state's roadways.

### Commuting patterns

According to the 2000 U.S. Census, the average travel time to work was 20.8 minutes for Wisconsin's 2.7 million person workforce. Table 3-2 shows that the use of different modes for journeys to work varies by



racial and ethnic groups. Minority populations tend to carpool and use public transit more often than white transportation users, who rely heavily on the personal automobile. Asians and Pacific Islanders tend to bike and walk to work more often than any other population group. African Americans tend to use public transit more than other groups when traveling to work.

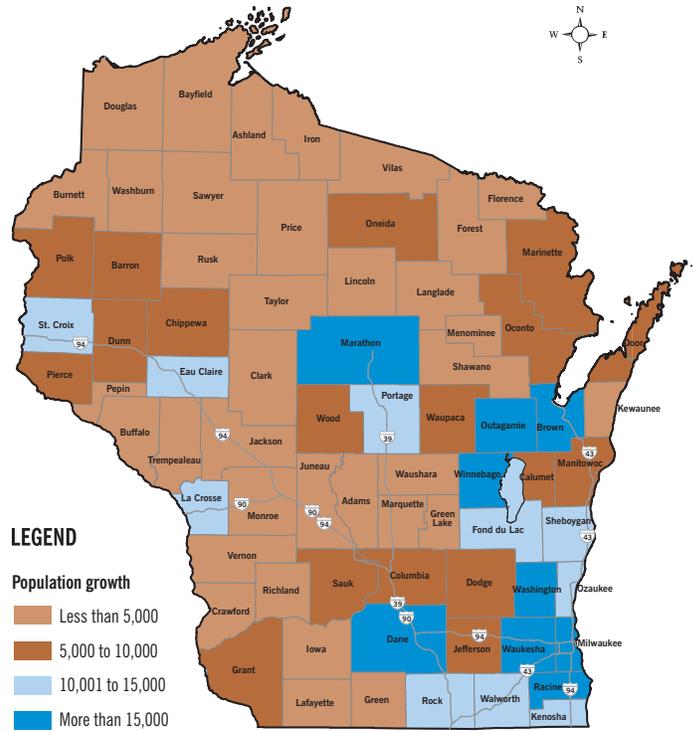
### Drivers 65 years and older

Travel patterns for those age 65 and older may also be very different from those of previous generations. Map 3-2 depicts projected changes in population by age (people age 65 and older) between 2000 to 2030. During this period, the average per-county increase of people age 65 and older will be 8,800. Counties expected to experience a significant increase in the number of people age 65 and older include Marathon, Washington, Dane, Brown, Outagamie, Waukesha, Milwaukee and Racine. Because this age group represents the first generation to have been highly mobile throughout adulthood, they are likely to expect transportation services to meet their changing needs.

### Modal choice

Table 3-3 shows the percentage breakdown of travel modes in Wisconsin according to trip purpose. Personal vehicles, such as cars, vans, and trucks, are the primary mode used across all trip purposes. Transit comprises a greater mode share of school-related, religious, and medical trips than for other trips, while relatively large percentages of social or recreational and school trips are completed by walking.

As the economy and travel patterns have changed, so has the demand for alternative modes of transportation. For example, business and advocacy groups in Southeast Wisconsin have increasingly demonstrated strong support for fixed-guideway transit systems (such as commuter rail, light rail and bus rapid transit), in part because of their desire to attract a variety of skilled workers to the area. Meanwhile, ridership on intercity transportation services has also increased, which indicates demand for convenient and reliable transportation alternatives.



▲ Map 3-2: Wisconsin projected increases for population 65 years and older (2000-2030)

Source: U.S. Census 2000, WI Dept. of Administration

This has been particularly noticeable on Amtrak’s Hiawatha Service, as ridership in 2005, 2006, and 2007 has been the highest since Wisconsin began supporting the service in 1989. This increase in ridership may be the result of several factors, including improved service, road congestion and rising gasoline prices.

### Summary of modal share trends

- » In 2007, more than 81 million unlinked (includes transfers) trips in Wisconsin were completed using public transit.
- » During the past 50 years, intercity bus service has decreased and service to many areas has completely stopped.
- » Ridership for Amtrak’s Hiawatha Service increased 67 percent between 1997 and 2007.

**Table 3-3: Mode use by trip purpose in Wisconsin, 2001 (percent)**

Trip purpose	Personal occupancy vehicle <sup>1</sup>	Public transit	Bicycle	Walk	Other mode <sup>2</sup>
Work commute	94.4	0.6	0.6	4.4	0.1
Work-related	93.6	0.0	0.0	5.0	1.4
School-related	55.5	1.7	1.7	11.3	28.9
Religious	96.5	0.9	0.0	2.6	0.0
Medical/dental	95.7	1.1	0.0	1.1	2.2
Shopping	95.3	0.5	0.3	3.8	0.1
Other family and personal	90.9	0.3	0.7	7.0	1.0
Social/recreation	75.3	0.4	3.9	18.0	2.4
Other	93.3	0.2	0.5	4.7	1.2
All trip purposes	88.3	0.5	1.3	7.4	2.6

Source: 2001 National Household Travel Survey

<sup>1</sup>"Personal occupancy vehicle" includes cars, vans, sport utility vehicles (SUVs), pickup and other trucks, recreation vehicles (RVs) and motorcycles

<sup>2</sup>"Other modes" includes taxis, sail and motorboats, commercial and private aircraft, charter and schoolbuses, intercity buses, and intercity rail

- » Annually, bicycle and pedestrian travel accounts for 8.2 percent of all trips in Wisconsin.
- » In 2007, more than 116 million pounds of cargo moved through Wisconsin's air carrier airports.

## Transit

Wisconsin has 71 public transit systems. They include 23 fixed-route, urban bus systems; six rural fixed-route systems; 43 shared-ride taxi systems and four commuter bus systems. In 2007, more than 81 million unlinked (includes transfers) trips in Wisconsin were completed using transit. According to the 2000 U.S. Census, about 45,000 people in Wisconsin (approximately 1.5 percent of the state's total labor force) use public transit to get to work every day.

Significant increases in transit ridership nationwide in 2007 and the first quarter of 2008, along with recent increases in commuter bus ridership in southeast Wisconsin, have been attributed in part to increases in the price of gas in 2007 and 2008. Demand for transit

between 1976 and 2006 was steady. Transit demand in Wisconsin is expected to grow in the future for reasons including, but not limited to:

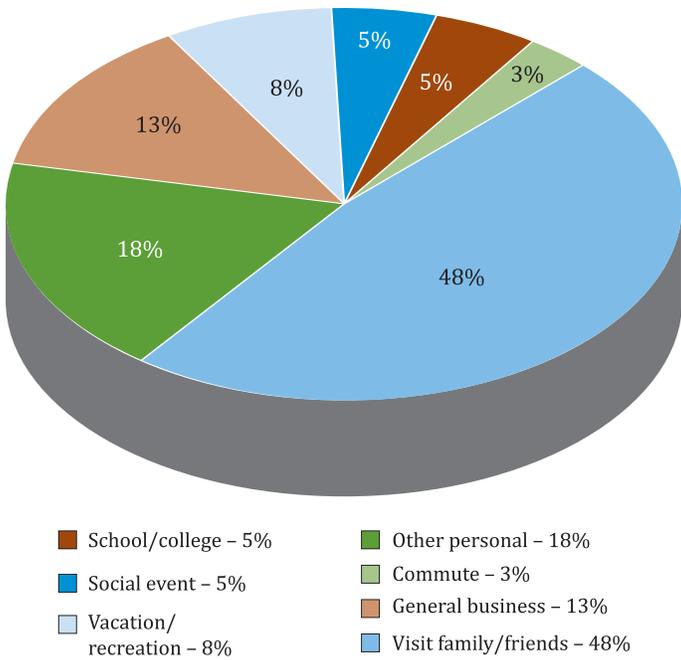
- » Providing alternatives for individuals to commute to and from work
- » Providing transit alternatives to driving a personal vehicle for a growing elderly population
- » Increasing traffic congestion, longer commutes and rising energy prices, which will likely increase demand for alternatives to single-occupant vehicles

In particular, rising gas prices will continue to increase demand for transit.

## Intercity bus

Historically, the intercity bus industry played a significant role in connecting Wisconsin's small, geographically isolated, rural communities to larger urban areas. However, during the past 50 years, intercity bus service in Wisconsin has decreased and service to many areas has stopped completely.





▲ **Figure 3-3: Greyhound bus passenger trip purpose**  
 Source: TEMS: Demand Model Database Report Draft. March 2002

Wisconsin experienced numerous cuts in service and elimination of routes until 2006.

In recent years, there has been renewed interest in intercity bus service both in Wisconsin and nationwide. Nationally, ridership began to increase in 2006. Rising fuel prices, demographic changes, and environmental concerns have led to renewed demand for public transportation. In 2006, Megabus, a discount carrier, entered the Wisconsin market serving Milwaukee, and in 2008 the company expanded service to Madison. In 2007, WisDOT received a Congestion Mitigation Air Quality grant to support additional bus service in the eastern part of the state, which indicates further interest in expanding intercity bus service. A new federal pilot program (the Supplemental Transportation Rural Assistance Program) has added to the momentum and led to implementation of a new service starting in 2008 between Minneapolis, Eau Claire, Wausau, Green Bay, and Milwaukee. Despite these positive developments, major gaps in service remain in Wisconsin, with many areas not receiving daily service.

Currently, eight companies provide intercity bus service in Wisconsin: Van Galder/Coach USA, Greyhound,

Lamers, Indian Trails, Badger Coaches, Jefferson Lines, Megabus, and Wisconsin Coach Lines/Coach USA. The primary purpose of trips taken by Greyhound bus passengers is to visit family and friends (Figure 3-3). These trips account for 48 percent of all Greyhound trips. Ridership on existing services and demand for new service is expected to continue to increase due to rising fuel costs, congestion, changing demographics and environmental concerns.

### Intercity passenger rail

Intercity passenger rail ridership in Wisconsin has grown significantly during the past 10 years. Ridership on Amtrak’s *Hiawatha Service*, which operates between Chicago and Milwaukee, rose from 369,100 in 1997 to a record 617,800 in 2007, a 67 percent increase.

Ridership to and from Wisconsin rail stations on Amtrak’s long-distance *Empire Builder* route, which operates between Chicago and Seattle/Portland, has increased 59 percent, from 59,700 in 2002 to 94,800 in 2007. Several factors have likely contributed to increases in intercity passenger rail ridership:

- » Opportunity to avoid growing highway congestion, especially in the Chicago and Minneapolis/St. Paul metropolitan regions
- » Increasing gasoline prices
- » Continuing cooperation from the host railroads, Canadian Pacific Railway and Metra, which has allowed the *Hiawatha Service* to maintain the best on-time performance of any Amtrak route
- » Continuing efforts by communities, the states of Wisconsin and Illinois, and Amtrak to improve the *Hiawatha Service*, which include:
  - Increasing daily round-trips from six to seven in 2002
  - Constructing a new station at Milwaukee’s General Mitchell International Airport in 2005
  - Replacing the Sturtevant station with a new facility in 2006
  - Redeveloping Milwaukee’s Amtrak depot into the new Milwaukee Intermodal Station in 2007

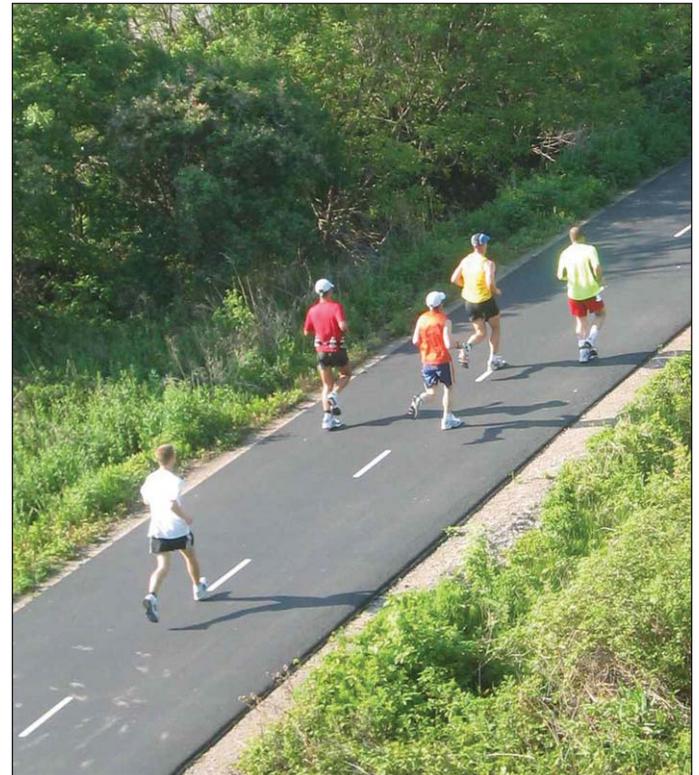
## Bicycle and pedestrian travel

Biking and walking will continue to be vital components of Wisconsin's multimodal transportation system. Bicycle and pedestrian modes currently account for 8.2 percent of all trips in Wisconsin for all 12 months of the year. The bicycle and pedestrian commuting modal share shown in Table 3-2 shows that a relatively low percentage of people use these modes to travel to work (0.4 percent for biking and 3.7 percent for walking). However, the Census data represents the last week of March, which is typically a period not conducive to making non-motorized journeys.

Moreover, just a small percentage of all trips made by bicycle and foot are for commuting purposes. Most of the metropolitan planning organization planning areas in Wisconsin exceed the state average for the percentage of trips made by bicycle and foot.

WisDOT addresses both of these modes in independent state bicycle and pedestrian plans. Both plans call for significant increases in the number of trips by bicycle and foot while reducing the number of crashes that involve pedestrians and cyclists. Crashes have continued to decline over the past decade while the number of walking and bicycling trips have increased; this is likely due to the increasing cost of gasoline. Walking will continue to be important in combination with other trips, especially those made by transit, since nearly every trip by bus starts and ends with a walking trip.

Dedicated funding programs, such as the Transportation Enhancements program, have been important for supporting bicycle and pedestrian projects and they are very popular among Wisconsin communities. However, another key strategy that will continue to foster the provision of bicycle and pedestrian facilities will involve



▲ *Figure 3-4: Bicycle and pedestrian modes currently account for 8.2 percent of all trips in Wisconsin for all 12 months of the year.*

incorporating these facilities as incidental components of larger street and highway projects.

## Aviation

Aviation is a major component of Wisconsin's transportation system. As of 2007, 98 public-use airports comprised the state airport system, with scheduled commercial airline service offered at eight of these airports. These eight airports

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served 5.7 million passengers in 2007, about the same number as in 2006 and 2005. 2005 ended a trend of enplanements increasing every year since 2001, when these airports served 4.4 million passengers. Wisconsin's largest airport is Milwaukee's General Mitchell International Airport, followed by Madison's Dane County Regional Airport. In 2007, almost 70 percent of the state's passengers boarded at General Mitchell.

Air cargo activity in the state has decreased slightly since 2002. In 2007, more than 116 million pounds of cargo moved through Wisconsin's air carrier airports, while in 2006 118 millions pounds of cargo was moved. These years represent decreases, as more than 122 million pounds of cargo were shipped in 2003 and 2004, and more than 128 million pounds were shipped in 2002. Almost 77 percent of the 2007 cargo was loaded or unloaded at General Mitchell.

Wisconsin is directly served by 21 commercial passenger airlines and four cargo airlines. Wisconsin air passengers also use airports in adjoining states, including Chicago's O'Hare airport, Chicago Midway, Minneapolis-St. Paul International Airport, and airports in Dubuque, Iowa; Duluth, Minnesota; and Ironwood, Michigan.

## Transportation safety

### Summary of trends

Transportation safety has been and will continue to be an integral part of WisDOT's mission. WisDOT's commitment to improving transportation safety has been demonstrated by safety records that have remained below national averages from 1991 through 2007 (Figure 3-5). The number of fatalities on state roadways peaked in the late 1960s and early 1970s. After falling throughout the 1970s and 1980s, fatality numbers have slowly risen again since the early 1990s.

As depicted in Figure 3-6, the number of fatalities on state roadways has fluctuated, while the overall number of vehicle miles traveled has steadily increased. The projected growth in traffic volumes over the planning

period will result in more vehicles using the roadways, and potentially more crashes and more fatalities unless additional action is taken. New requirements under the Safe, Accountable, Flexible and Efficient Transportation Equity Act-A Legacy for Users (SAFETEA-LU) further address safety challenges. These include:

- » A new core highway safety improvement program
- » Strategic highway safety planning
- » Targeted safety programs for construction work zones, older drivers and pedestrians

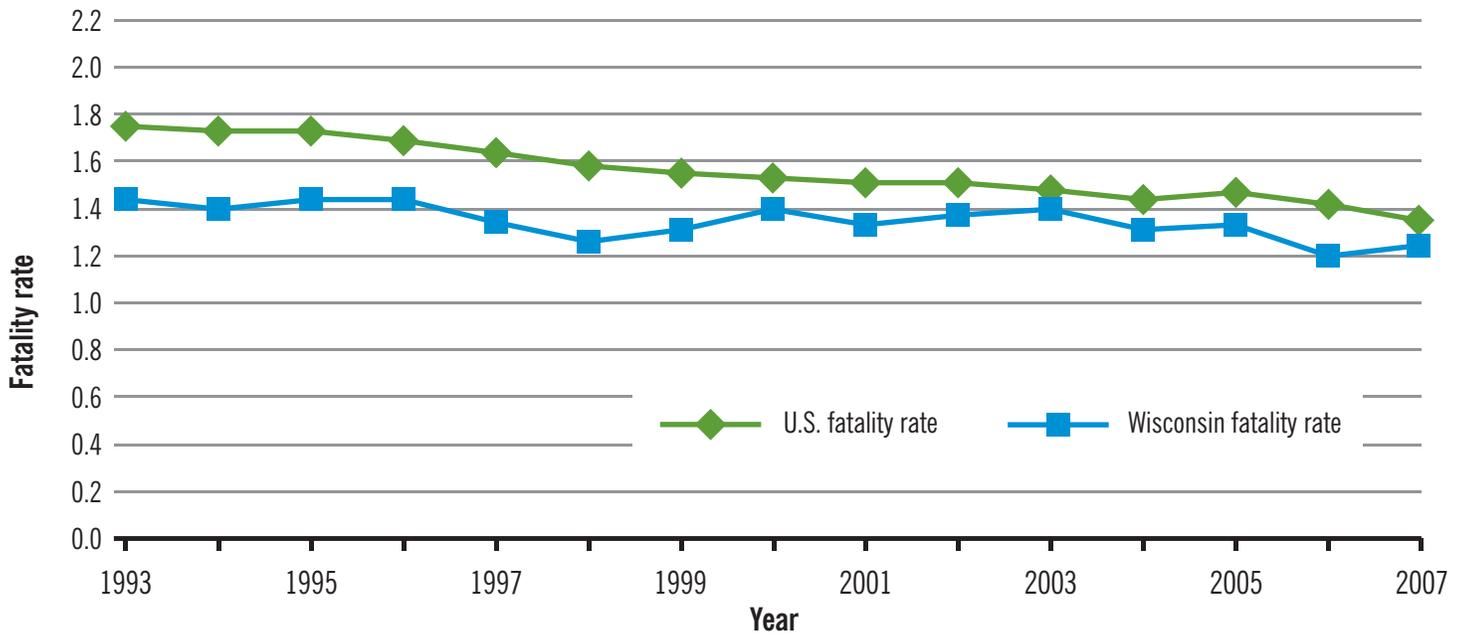
Increased use of technology will also have an impact on transportation safety. Cameras and other detection equipment can locate incidents quickly. Computerized mapping programs allow crash locations to be accurately entered into databases and can improve the comprehensiveness of crash analyses. These technologies, along with others, can be used to identify problem locations that need increased enforcement or improved engineering.

In addition, airbags and other vehicle technology have improved passengers' ability to survive crashes. On-board computers record vehicle data that can be used to help reconstruct incidents. These technologies, along with others, can help identify and improve driver behavior. Driver behavior is the primary cause of crashes for all age groups.

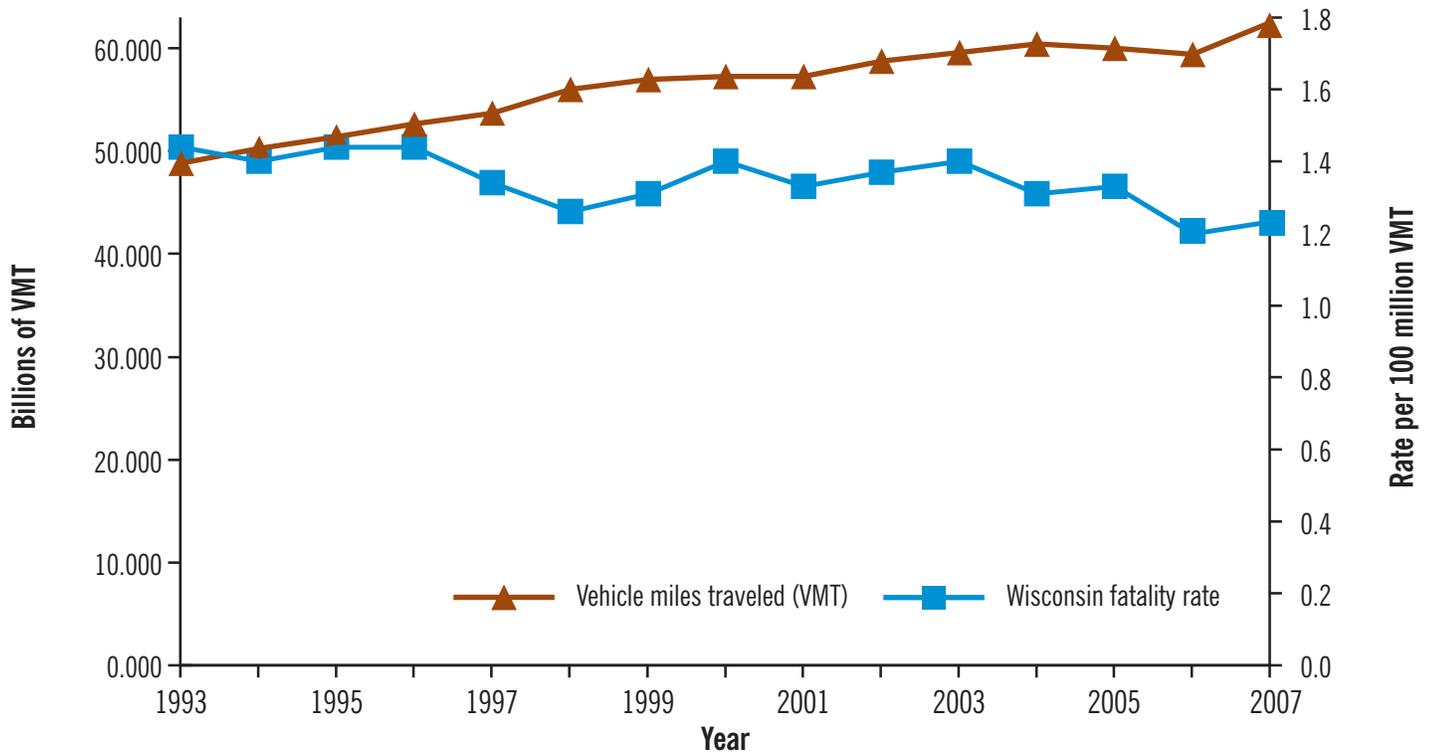
## Economic activity

Transportation and the state's economy are directly connected. The state's transportation system is and will continue to be vital to Wisconsin's economy, and the development of the state's economy will play an important role in guiding investments in the state's transportation system.

The changing demographic characteristics of the state's workforce will also impact future transportation plans by raising new challenges on how to best serve transportation needs. Additionally, travel patterns can be affected by the local or regional



▲ Figure 3-5: Wisconsin fatality rate vs. U.S. fatality rate (1992-2006)



▲ Figure 3-6: Wisconsin fatality rate vs. vehicle miles traveled (1992-2006)



economy, as well as other unpredictable factors. For example, increases in income often lead to increased travel demand. Consumer behavior and demand for more products, competitive pricing and demand for immediate access to goods will also affect the transportation system.

Historically, Wisconsin’s economy was based on forest products, agriculture, and manufacturing industries. Today, with the support of transportation infrastructure and a strong education system, traditionally strong industries like manufacturing remain viable, while other sectors such as service and tourism have emerged.

**Table 3-4: Wisconsin industries with largest percentage output growth, 2005-2030 (\$ billions, 1992 dollars)**

Industry	2005	2030	% growth
Machines and computers (m*)	\$57.3	\$155.5	171
Electric equipment (m)	13.4	35.0	160
Primary metals (m)	4.4	10.7	123
Instruments (m)	5.8	12.7	118
Miscellaneous business services (s)	10.7	20.8	94
Wholesale (o)	16.3	30.8	89
Air transportation (o)	1.3	2.5	86
Automobile repairs and service (s)	3.6	6.6	84
Communications (o)	5.0	9.1	84
Rubber (m)	7.3	13.0	79

\*m=manufacturing s=service o=other

Source: WisDOT and REMI (2002)

**Table 3-5: Wisconsin industries with largest projected output, 2030 (\$ billions, 1992 dollars)**

Industry	2030
Machines and computers (m)	\$155.5
Electric equipment (m)	35.0
Real estate (o)	33.9
Wholesale (o)	30.8
Food (m)	24.5
Medical (s)	23.0
Rest of retail (o)	21.6
Miscellaneous business service (s)	20.8
Paper (m)	20.6
Fabricated metals (m)	17.2

\*m=manufacturing s=service o=other

Source: WisDOT and REMI (2002)

**Table 3-6: Top 10 largest employment sectors, 2005 and 2030**

Employment field	2005	Employment field	2030
Rest of retail* (o)	391,725	Medical (s)	449,521
Medical (s)	282,337	Rest of retail* (o)	361,587
Miscellaneous business services (s)	227,781	Miscellaneous business services (s)	289,858
Eating and drinking (s)	201,482	Eating and drinking (s)	243,109
Construction (o)	168,066	Nonprofit organizations (o)	194,526
Nonprofit organizations (o)	146,830	Miscellaneous professional services (s)	176,375
Wholesale (o)	140,280	Construction (o)	165,680
Miscellaneous professional services (s)	113,266	Machine and computer (m)	138,343
Machine and computer (m)	95,527	Wholesale (o)	127,400
Insurance (o)	80,369	Insurance (o)	108,424

\*“Rest of retail” is defined as any non-food or beverage services. This category includes building materials, hardware, garden supply, mobile home dealers, general merchandise stores, food stores, automotive dealers and gasoline service stations, apparel and accessory stores, home furnishings, equipment stores, miscellaneous retail.

\*m=manufacturing, s=service, o=other

Source: WisDOT and REMI (2002)

## Overall economic conditions

Wisconsin’s economy has long been dependent on traditional manufacturing and service industries, more so than many other states. Tables 3-4, 3-5, 3-6, 3-8, 3-9 and 3-10 illustrate Wisconsin’s current and continued dependence on the manufacturing and service sectors. The tables also show that these sectors are expected to grow considerably by 2030.

In some cases, industries are expected to more than double their output.

## Regional conditions

Table 3-6 shows projected overall economic growth in Wisconsin, by region, through 2015. The Milwaukee area is projected to experience the most economic growth, while many areas of Central and Northwest Wisconsin are expected to experience growth below the statewide average.

## Freight shipping patterns

Wisconsin’s transportation system allows businesses to ship and receive goods both domestically and internationally. The state’s transportation system also supports the “overhead” shipment of goods that simply pass through Wisconsin.

**Table 3-7: Forecast economic growth, 2000-2015**

Region	Approximate % growth
Milwaukee	45.4
La Crosse/Coulee Region	42.2
Eau Claire/Chippewa Valley	42.2
Green Bay/Fox Valley	41.5
Madison	39.5
Rhineland	39.2
Central Wisconsin/Wausau	37.5
Superior	35.3
<b>State of Wisconsin</b>	<b>42.2</b>

Source: WisDOT and REMI (2002)

Domestic, international and overhead shipping are all expected to grow in Wisconsin. To maintain a healthy economy, Wisconsin’s transportation facilities will need to accommodate this growth.

## Wisconsin’s top trading partners

As shown in Table 3-7, Wisconsin businesses received or shipped more than 528 million tons of freight in 2002. This freight was valued at more than \$433 billion. In 2002, 40 percent of the freight by weight shipped from Wisconsin traveled entirely within

**Table 3-8: Top Wisconsin trading partners, 2002 and 2035**

Region	TON (MILLIONS)			Region	VALUE (MILLIONS OF DOLLARS)		
	Year		% change		Year		% change
	2002	2035		2002	2035		
Wisconsin <sup>1</sup>	214.6	332.2	55%	Wisconsin <sup>1</sup>	\$117,877	\$214,683	82%
Illinois	84.0	160.9	92%	Illinois	\$75,116	\$177,734	137%
Minnesota	45.6	105.7	132%	Minnesota	\$32,317	\$81,763	153%
Michigan	29.3	46.4	58%	Michigan	\$22,829	\$56,209	146%
Wyoming	22.5	52.0	131%	Ohio	\$22,528	\$44,625	98%
International	16.7	32.9	97%	International	\$17,881	\$63,983	258%
<b>Total<sup>2</sup></b>	<b>528.6</b>	<b>947.0</b>	<b>79%</b>	<b>Total<sup>2</sup></b>	<b>\$433,643</b>	<b>\$976,755</b>	<b>125%</b>

<sup>1</sup>Trade that occurs entirely within Wisconsin

<sup>2</sup>Includes trade with other U.S. states not listed

Source: Freight Analysis Framework<sup>2,2</sup>, Office of Freight Management and Operations, Federal Highway Administration



**Table 3-9: Top destinations of Wisconsin international exports (millions of dollars)**

Destination	1997	Destination	2007
Canada	\$3,531	Canada	\$5,846
Japan	\$722	Mexico	\$1,891
United Kingdom	\$602	China	\$1,179
Mexico	\$454	United Kingdom	\$723
Germany	\$433	Germany	\$661
France	\$400	Japan	\$655
Australia	\$262	Australia	\$564
Netherlands	\$250	Saudi Arabia	\$476
Hong Kong	\$205	France	\$442
Belgium	\$204	Belgium	\$423
All destinations	\$10,125	All destinations	\$19,186

Source: Wisconsin Department of Commerce

**Table 3-10: Top Wisconsin international export products (millions of dollars)**

Product	1997	Product	2007
Industrial machinery	\$3,314	Industrial machinery	\$6,153
Transportation equipment	\$1,378	Electrical machinery	\$2,746
Instruments	\$1,048	Instruments	\$2,062
Electrical machinery	\$834	Transportation equipment	\$1,738
Paper products	\$453	Paper products	\$832
Plastic products	\$293	Plastic products	\$613
Cereals	\$249	Cereals	\$503
Miscellaneous grain, seed and fruit	\$173	Iron/steel products	\$293
Iron/steel products	\$164	Printed materials	\$261
Printed materials	\$122	Furniture and bedding	\$219
All products	\$10,125	All products	\$19,186

Source: Wisconsin Department of Commerce

the state’s borders, 56 percent was moved between Wisconsin and other U.S. states, and 3 percent traveled between Wisconsin and international markets.

Table 3-8 also shows that Wisconsin’s international trade is generally expected to grow faster than its domestic trade. By 2035, Wisconsin is expected to import and export 33 million tons of goods — valued at \$64 billion — to and from its international trading partners.

Table 3-9 shows the top (based on product value) international destinations of Wisconsin goods in 1997 and 2007. During the 10-year period, Wisconsin’s international exports nearly doubled. While Canada remains Wisconsin’s top international trading partner, the state’s trade with Mexico and China is growing rapidly.

Compared with freight tonnage, the value of freight shipped to and from other U.S. states accounted for a higher percentage of Wisconsin’s total trade:

**Table 3-11: Wisconsin freight shipments by weight, 2002 and 2035 (millions of tons)**

Mode	WITHIN STATE			FROM STATE			TO STATE		
	Year			Year			Year		
	2002	2035	% change	2002	2035	% change	2002	2035	% change
Truck	189.0	301.3	59%	77.2	134.6	74%	90.4	204.4	126%
Rail	5.8	6.1	5%	31.7	56.8	79%	57.5	122.9	114%
Water	3.3	5.2	58%	5.8	5.4	-7%	0.4	1.4	250%
Air, air and truck	< 0.1	< 0.1	0%	< 0.1	< 0.1	0%	< 0.1	0.2	100%
Truck and rail	< 0.1	< 0.1	0%	1.6	2.9	81%	0.3	0.7	133%
Other Intermodal <sup>1</sup>	0.1	0.3	200%	0.6	1.5	150%	1.5	2.1	40%
Pipeline and unknown <sup>2</sup>	16.3	19.3	18%	17.3	18.1	5%	29.6	63.7	115%
<b>Total</b>	<b>214.6</b>	<b>332.2</b>	<b>55%</b>	<b>134.2</b>	<b>219.3</b>	<b>63%</b>	<b>179.8</b>	<b>395.5</b>	<b>120%</b>

<sup>1</sup>Other intermodal shipping includes U.S. Postal Service, courier shipments and all intermodal combinations except air and truck.

<sup>2</sup>Land unknown shipments are combined because data on region-to-region flows by pipeline are statistically uncertain.

Note: Numbers may not add up to the total due to rounding.

Source: Freight Analysis Framework<sup>2,2</sup>, Office of Freight Management and Operations, Federal Highway Administration

**Table 3-12: Wisconsin freight shipments by value, 2002 and 2035 (millions of dollars)**

Mode	WITHIN STATE			FROM STATE			TO STATE		
	Year			Year			Year		
	2002	2035	% change	2002	2035	% change	2002	2035	% change
Truck	\$108,148	\$198,784	84%	\$121,713	\$214,364	76%	\$114,364	\$329,989	189%
Rail	\$344	\$396	15%	\$3,929	\$6,055	54%	\$12,745	\$21,289	67%
Water	\$601	\$1,017	69%	\$774	\$784	1%	\$36	\$153	325%
Air, air and truck	\$46	\$137	198%	\$1,443	\$2,323	61%	\$1,313	\$5,024	283%
Truck and rail	\$127	\$292	130%	\$7,080	\$11,375	61%	\$1,055	\$3,889	269%
Other Intermodal <sup>1</sup>	\$3,543	\$6,211	75%	\$17,202	\$37,144	116%	\$14,432	\$96,492	569%
Pipeline and unknown <sup>2</sup>	\$5,068	\$7,846	55%	\$10,036	\$10,491	5%	\$9,645	\$22,701	135%
<b>Total</b>	<b>\$117,877</b>	<b>\$214,683</b>	<b>82%</b>	<b>\$162,177</b>	<b>\$282,534</b>	<b>74%</b>	<b>\$153,589</b>	<b>\$479,538</b>	<b>212%</b>

<sup>1</sup>Other intermodal shipping includes U.S. Postal Service, courier shipments and all intermodal combinations except air and truck.

<sup>2</sup>Land unknown shipments are combined because data on region-to-region flows by pipeline are statistically uncertain.

Note: Numbers may not add up to the total due to rounding.

Source: Freight Analysis Framework<sup>2,2</sup>, Office of Freight Management and Operations, Federal Highway Administration

- » 68 percent of the total value of products shipped to, from and within Wisconsin came from trade with other U.S. states
- » 27 percent came from trade that occurred entirely within Wisconsin’s borders

- » Four percent came from international trade

Wisconsin’s freight shipments, measured by tonnage and value, are expected to double by 2035. Table 3-10 shows the top products (based on value) exported by Wisconsin firms in 1997 and 2007. Industrial





▲ Map 3-3: Projected 2020 freight rail density

machinery was the top export in both years, accounting for about 32 percent of all exports. Other major exports in 2007 were electrical machinery, instruments, transportation equipment and paper products.

### Overhead freight

A portion of all freight is simply called “overhead freight.” These freight shipments travel through Wisconsin, but neither originate nor terminate in the state. In 2001, approximately 146 million tons of overhead freight moved through Wisconsin.<sup>3</sup> Overhead shipments are expected to grow through 2030, taking up capacity on Wisconsin’s transportation system.

### Freight modal distribution

Tables 3-11 and 3-12 illustrate how and where Wisconsin’s freight was moved in 2002 and how it is expected to move in 2035. While the total amount of

<sup>3</sup>Reebie Associates. Construction and Forecast of Wisconsin Freight Data. February 2002.

freight shipped is forecast to increase for all modes, trucking is expected to remain the dominant mode of freight transportation in the state. Trucking is expected to account for 68 percent of all 2035 freight shipments measured by weight and 76 percent of all 2035 freight shipments measured by value.

With truck traffic expected to double by 2030, major highway corridors serving manufacturing, retail trade and service industries will experience heavy increases in commercial truck traffic. Any increase in vehicle miles traveled on state trunk highways can negatively impact the delivery of goods if no alternatives for shipping exist. In Wisconsin, it is expected that commercial vehicle miles traveled will outpace the growth of total vehicle miles traveled through the year 2030. Some commodities will be moved on a local basis and others will generate more long-haul demand.

Even though trucking is expected to remain the dominant mode of freight transportation, the other modes will also carry increasing amounts of freight and will remain important parts of the overall transportation system. For example, freight trains will continue to carry the majority of coal used by Wisconsin power plants. Wisconsin freight rail traffic (measured by weight) is expected to nearly double by 2035, with much of the traffic concentrated on certain rail lines (Map 3-3).

The Great Lakes shipping fleet will continue to carry heavy bulk products such as coal and grain, as well as large, high-tech products such as wind turbine parts. Finally, airplanes will continue to carry high-value, high-tech items.

### Labor force factors

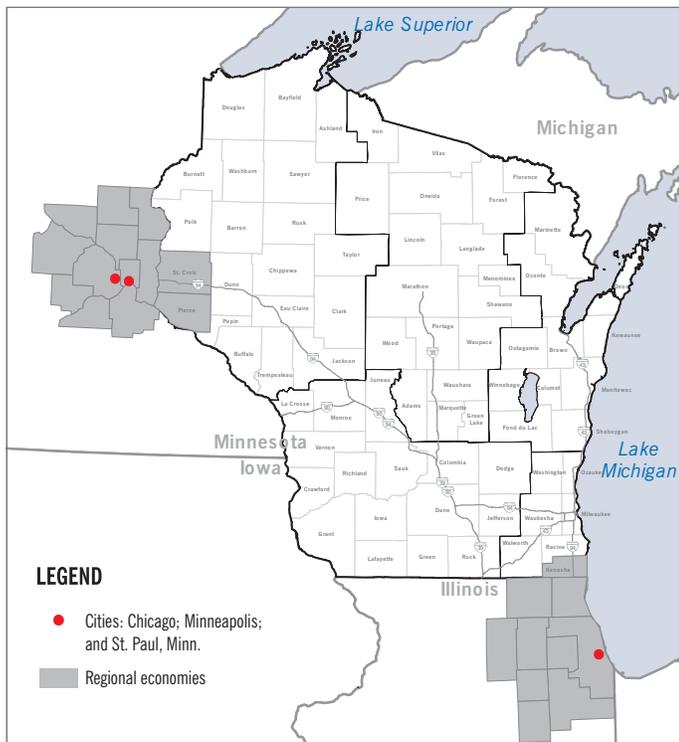
A major factor that may affect the state’s economic growth during the next 30 years will be the economy’s labor demands. While Wisconsin will experience the inevitable rising and falling of economic cycles, demand for workers with specific skills will continue to outpace supply.

Much of the demand for workers will be a result of demographic changes. As the “baby boom” generation

## Travel statistics of Wisconsin's workers

- > 73 percent live and work in the same county
- > 22 percent work outside of the county where they reside
- > 4 percent work out of state

Source: U.S. Census 2000, WI Dept. of Administration



▲ Map 3-4: Proximity of regional economies to Wisconsin

retires, there will be fewer people of working age. In Wisconsin, the number of people turning 65 will surpass the number of people turning 18 in about 2020. This trend is expected to continue for a number of years, increasing the unmet demand for workers in Wisconsin. When approximately equal numbers of people are entering and leaving the workforce, there is little, if any, opportunity for growth. Also, inflation may occur when an economy that is attempting to grow has strong competition for a decreasing number of available workers.

The impact that older workers will have on the labor supply is unknown. Longer life expectancy means people could work longer, but more and more people are investing in 401(k) programs, individual retirement accounts and other personal investment programs with the goal of being able to retire before the traditional retirement age. Depending on the economic environment, this could result in more people leaving the workforce prematurely. Some individuals may decide to return to the workforce after retirement, but because these returning workers

may opt for reduced, flexible or nontraditional work schedules, it is difficult to project the overall impacts on the labor supply.

Meanwhile, access to jobs has become especially important in recent years to carry out Wisconsin's welfare-to-work initiatives. The Job Access and Reverse Commute Program connects low-income workers with jobs through enhanced transportation services. The program funds capital and operating costs of services that provide working families with access to jobs and child care.

## Regional travel patterns and economies

Regional economies span cities, counties and states. These economies link businesses and industries through shared labor pools, and transportation networks provide important connections between these businesses and industries.

Two metropolitan regions outside Wisconsin's borders impact the state's economy and transportation system: the Minneapolis/St. Paul and Chicago metropolitan areas (Map 3-4). These areas generate significant freight traffic and worker flow into and out of Wisconsin. Both metro areas have extensive intermodal terminal networks, which optimize the transfer of freight goods between modes. Because of the state's close proximity to this infrastructure, expanding Wisconsin's intermodal terminal network is economically impractical.



Consequently, heavy truck traffic along the I-94, I-90, I-43 and I-39 corridors is increasing as goods are trucked to, from and through Wisconsin to intermodal terminals in Minnesota, Illinois and elsewhere.

Both neighboring metropolitan areas also influence passenger travel and work patterns in Wisconsin. For example, job growth in the Minneapolis/St. Paul and Chicago urban areas has had a significant impact on travel into and out of Wisconsin. During the past several decades, economic expansion in Minneapolis and St. Paul has contributed to the dramatic growth and development of Wisconsin's St. Croix County. I-94 allows a large number of western Wisconsin workers to access the larger Minnesota job market.

For example, in 2000, almost 15,000 of St. Croix County's working residents commuted to Minnesota for work. This comprised 43 percent of the more than 44,000 Wisconsin workers that commuted to Minnesota. In comparison, fewer than 16,000 Minnesota workers commuted to Wisconsin.

The Wisconsin-Illinois border area experiences similar patterns. The Chicago area is the third largest metropolitan region in the United States. Because of its close proximity to the Wisconsin border, the Chicago area commuter shed is spreading into Wisconsin. More than 41,000 Wisconsin residents work in Illinois, 50 percent of whom live in Kenosha County. In contrast, fewer than 15,000 Illinois residents work in Wisconsin.

A number of workers also travel between Iowa and Wisconsin, and Michigan and Wisconsin. About 2,400 Iowans commute to Wisconsin. In contrast, 4,300 Wisconsin residents commute to Iowa, 66.7 percent of whom reside in Grant County. A higher number of Michigan workers – 7,075 – commute to Wisconsin compared with the approximately 5,400 Wisconsin workers who travel to Michigan. Forty-seven percent of the Wisconsin workers that commute to Michigan reside in Marinette County.

The location of job growth also influences regional travel patterns, and these locations have shifted over time. Many jobs have moved out of the central core of

cities to the urban fringes and suburbs. This creates challenges in connecting urban dwellers, who often rely on public transit, to their suburban workplaces. As a result, reverse commute transit services have become important to some segments of the population.

### 'Megaregions'

Wisconsin is also part of a "megaregion." Megaregions represent a new framework for discussing regional economies and transportation. A megaregion is defined as a network of metropolitan regions connected by commuting, linked economies, environmental systems and geography, infrastructure systems, settlement patterns, and shared culture and history.<sup>4</sup>

According to the 2006 America 2050 report, most of the nation's population and economic expansion is expected to occur in 10 or more emerging megaregions.<sup>5</sup> These megaregions will account for 50 percent of the nation's population growth and 66 percent of its economic growth during the next 45 years. This population and economic growth will increase to more than 70 percent by the middle of the 21st century.<sup>6</sup> The America 2050 document reports "emerging megaregions are becoming the new competitive units in the global economy, characterized by the increasing movement of goods, people and capital among their metro regions."<sup>7</sup>

Wisconsin lies within the Midwest megaregion, which stretches across the Midwest from Minneapolis/St. Paul to Buffalo, N.Y., and includes major Midwestern cities: Milwaukee, Chicago, St. Louis, Detroit, Indianapolis, Cleveland and Pittsburgh (Map 3-5). The Midwest megaregion has many assets, including the Great Lakes, environmental resources, and a strong research and cultural tradition tied to major universities.

Each megaregion faces increased highway congestion, overcrowded airports and seaports, loss of open space, and aging infrastructure. These problems are

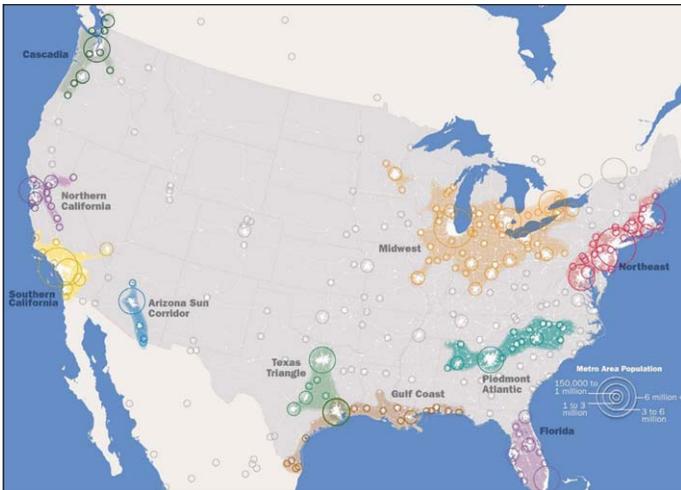
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<sup>4</sup>America 2050. A Prospectus. 2006.

<sup>5</sup>Ibid.

<sup>6</sup>Ibid.

<sup>7</sup>Ibid.



▲ Map 3-5: Ten U.S. emerging megaregions

Source: Regional Plan Association

compounded by population growth and expanding international trade.<sup>8</sup> To accommodate freight transportation, megaregions are connected internally and to the global economy through the national truck and rail networks. In the Midwest megaregion, freight congestion and movement within and through the Chicago area remains a significant challenge, with additional freight infrastructure needed throughout the region. While a transportation network exists to support freight movements, efficient passenger connections within megaregions, including the Midwest megaregion and others, are lacking or nonexistent.

Increased availability of alternative transportation modes will be necessary for each megaregion to stay economically competitive as it faces increased airport and highway congestion, rising fuel costs, and air pollution and global warming concerns. Similar regions in Asia and Europe are investing in high-speed rail systems to link cities across distances of 100 to 500 miles. This investment is seen as key to increasing competitiveness in the global economy, where value is created by time savings, collaboration and innovation. The emerging megaregions in the United States will require expansion of existing passenger networks and the addition of new transportation modes

<sup>8</sup>Ibid.



### Consequences of increasing energy costs

- › Wisconsin citizens and businesses will face higher costs
- › Other transportation modes will face demands to carry more passengers
- › Gas tax revenue growth will slow
- › The state transportation fund's ability to meet future needs will be hindered
- › Wisconsin will need to identify alternative methods for funding improvements to the state's transportation system

to accommodate trips of 100 to 500 miles. The emphasis is likely to be on intercity passenger rail, which has been identified as the mode that can best enable personal mobility and economic interaction across megaregions for distances less than 500 miles. For longer trips, air travel may be more efficient.

## Energy and environment

### Summary of energy trends

- » More than 83 percent of all petroleum used in Wisconsin is consumed by the transportation sector
- » The inflation-adjusted price of regular unleaded gasoline has nearly doubled over the past decade, increasing from \$1.50 per gallon (in



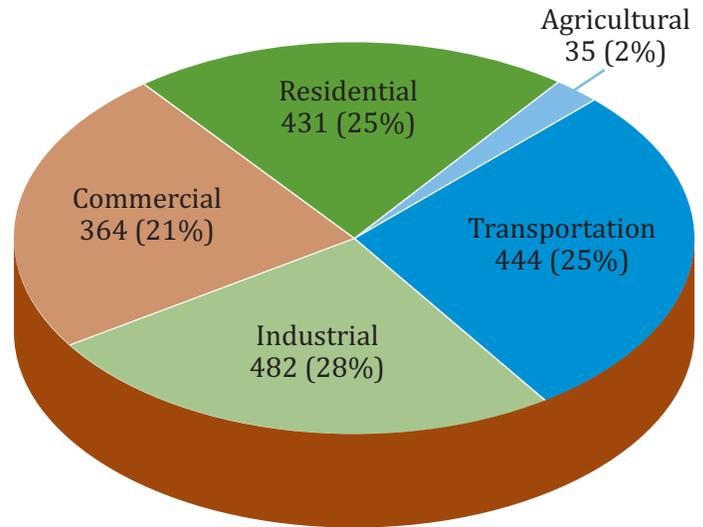
2007 dollars) in 1995 to \$2.87 per gallon in 2007. When adjusted for inflation, the price of regular unleaded gasoline in Wisconsin in 2007 even exceeded the high prices encountered by Wisconsin residents during the energy crisis of the late 1970s and early 1980s.

- » In 2005, higher fuel prices resulted in a 1.3 percent decrease in transportation fuel use, the first decrease since 1990. Vehicle miles traveled also decreased 0.6 percent in 2005, the first decrease since 1980
- » In 2006, a quarter of all energy consumed in Wisconsin was used for transportation
- » Transportation energy use has grown steadily during the past 30 years

### Fuel prices

Wisconsin’s transportation system depends on petroleum and related products. Transportation accounts for 25 percent of the total energy used in Wisconsin (Figure 3-7).

In 2007, petroleum-based fuels, such as gasoline, diesel and jet fuel, accounted for about 97 percent of the energy used by the automobiles, trucks,



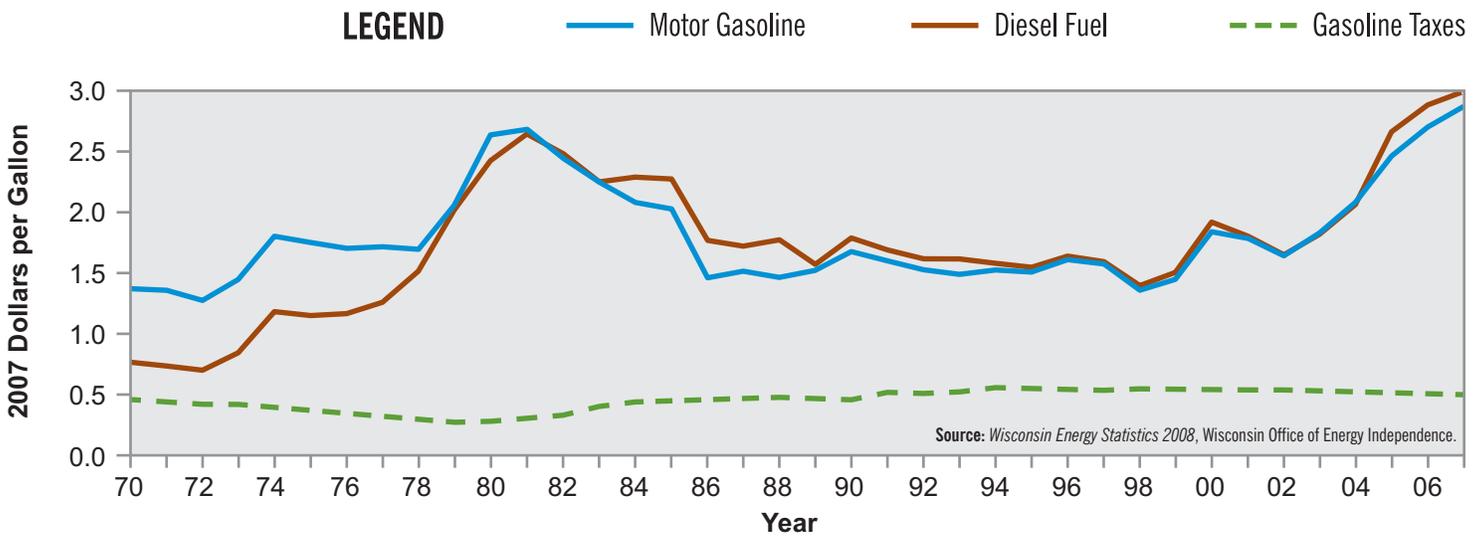
▲ Figure 3-7: Wisconsin energy use (2007) (trillions of Btu and percent of total)

Source: Wisconsin Energy Statistics 2008, Wisconsin Office of Energy Independence

airplanes, trains and ships that move people and goods via Wisconsin’s transportation system.<sup>9</sup> More than 83 percent of all petroleum used in Wisconsin is consumed by the transportation sector.<sup>10</sup>

<sup>9</sup> Wisconsin Energy Statistics 2007. Wisconsin Office of Energy Independence.

<sup>10</sup> Ibid.



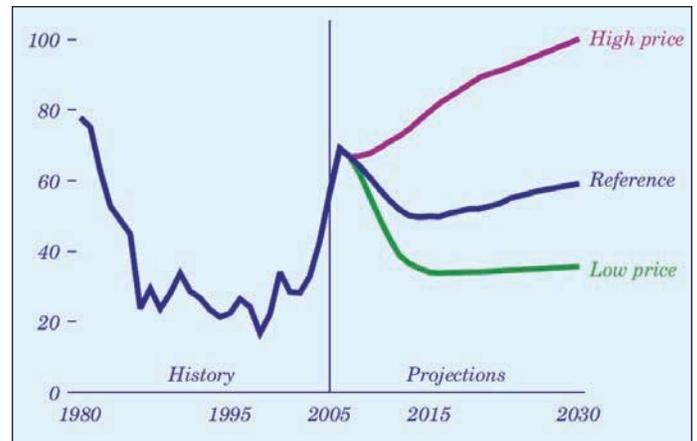
▲ Figure 3-8: Wisconsin motor gasoline and diesel fuel retail prices, 1970-2007

In recent years, the cost of fuel has increased considerably. Figure 3-8 shows changes in fuel prices from 1970 to 2007. As of early 2008, the price of a barrel of oil would need to decrease 65 percent to return to its 2003 price.

The federal government expects upward pressure on petroleum prices to continue at least through 2030. The U.S. Department of Energy's Energy Information Administration (EIA) considers the trends discussed previously to produce projections of world oil production and prices, estimates of supply and other relevant data. The EIA's Annual Energy Outlook 2007 identifies three future scenarios of oil production prices (Figure 3-9). In all three scenarios, the EIA envisions oil prices higher than they have been during much of the past 20 years.

With oil prices well above \$100 per barrel in early 2008, there is growing concern that fuel prices could follow a path similar to the EIA's High Price Scenario. A 2007 U.S. Government Accountability Office review of global oil production studies found production is expected to peak and begin to decline sometime between now and 2040.<sup>11</sup>

If such a peak occurs during the plan period, transportation costs are expected to keep rising. Rising fuel costs may encourage consumers and businesses to use fuel more efficiently, either by driving less or by switching to more fuel-efficient modes of transportation. In 2005, higher fuel prices resulted in a 1.3 percent decrease in transportation fuel use, the first decrease since 1990. Vehicle miles traveled also decreased 0.6 percent in 2005, the first decrease since 1980. These decreases benefit Wisconsin consumers and businesses, as well as the environment. However, from a transportation funding perspective, this reduction in fuel consumption and the resulting decrease in fuel taxes collected means less revenue for Wisconsin's transportation fund. Wisconsin's ability to pay for roadway maintenance, new highway



▲ Figure 3-9: World oil prices in three future scenarios, 1980-2030 (2005 dollars/barrel)

Source: Energy Outlook 2007. Energy Information Administration.

construction and other transportation projects would be reduced. However, efforts to track changes in fuel tax revenue collections and finance projections indicate that the level of transportation funding from fuel taxes will remain relatively unchanged until about 2015. See Chapter 12, *Funding Wisconsin's Transportation System*, for more information.

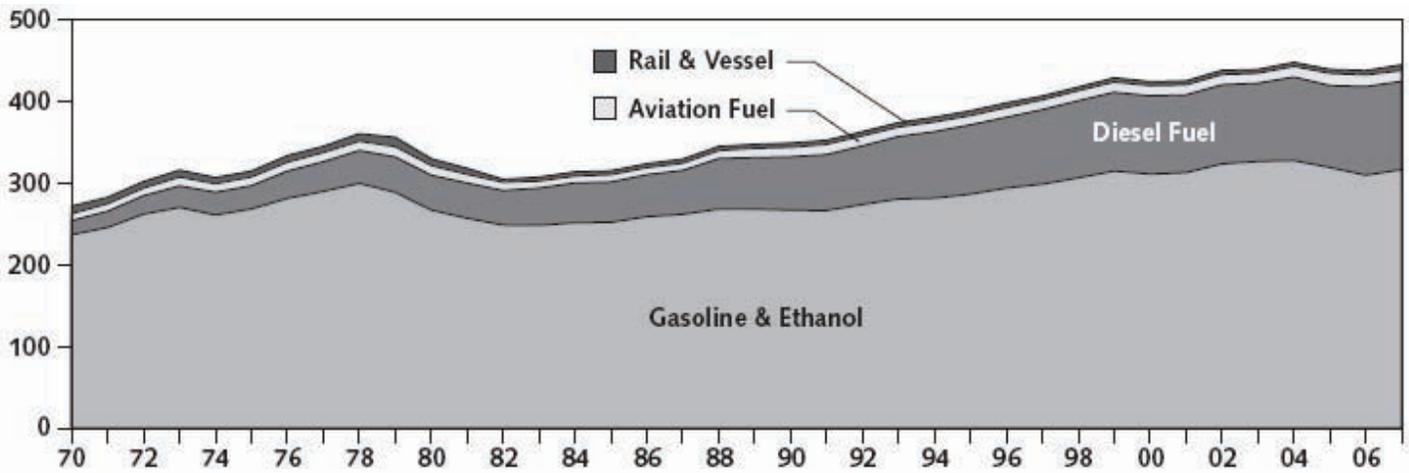
## Transportation alternative fuel use

Most of the transportation sector's energy comes from gasoline and ethanol, but diesel fuel consumption is increasing (Figure 3-10). Interest in alternative fuels such as ethanol and biodiesel also continues to grow. Wisconsin's first large scale ethanol plant began producing fuel in 2001. Ethanol production in Wisconsin increased from 210.4 million gallons in 2006 to 283.8 million gallons in 2007, an increase of over 34 percent. The state's capacity to produce ethanol has been projected to reach nearly 400 million gallons per year by the end of 2008. In the next few years, Wisconsin's ethanol production capacity is expected to reach 877 million gallons per year.<sup>12</sup> Wisconsin's first biodiesel refining facility began operating in 2004 and has produced about two million gallons of biodiesel per year. State biodiesel

<sup>11</sup> *Crude Oil: Uncertainty About Future Oil Supply Makes It Important to Develop a Strategy for Addressing a Peak and Decline in Oil Production*. United States Government Accountability Office. February 2007.

<sup>12</sup> Wisconsin Office of Energy Independence.





▲ Figure 3-10: Wisconsin transportation energy use by type of fuel, 1970-2007 (trillions of Btu)

Source: Wisconsin Energy Statistics 2008, Wisconsin Office of Energy Independence

production is expected to increase to 58 million gallons per year by 2008. By 2010, Wisconsin is expected to have the potential to produce 183 million gallons of biodiesel per year.<sup>13</sup>

### Private and public sector response to rising fuel prices

Both the private and public sectors are responding to higher fuel prices. Major vehicle manufacturers have increased production of more fuel-efficient models, such as gasoline-electric hybrids, flex-fuel vehicles capable of running on fuel that is 85 percent ethanol, and diesel vehicles.

To save fuel, major freight carriers and retail stores have changed their supply chains and vehicles, and they have also passed on fuel surcharges to consumers. Some carriers have made physical changes to the trucks that haul their products, such as making vehicles more aerodynamic to increase fuel efficiency. Others have made the shift from truck to rail for portions of their shipping routes. Still others have reduced the weight or size of packaging in order to get more products into each vehicle at a lighter, fuel-saving weight.

<sup>13</sup> Ibid.

Guided by the 2001 National Energy Policy, the federal government has funded several research and development programs to study traditional and alternative ways of meeting the energy challenges facing the nation.

In the transportation sector, areas of emphasis include renewable fuels, more efficient engines, and new battery technologies that would advance hybrid and electric vehicles. These efforts have increasingly sought to address air quality issues and climate change concerns. Other major federal activities include:

- » The Energy Independence and Security Act, signed in December 2007, will improve fuel economy for cars and light trucks, and it will significantly increase the use of renewable fuels.
- » In 2007, the U.S. Supreme Court ruled that the U.S. EPA can regulate carbon dioxide. As a result, the U.S. EPA will likely issue rules related to carbon dioxide emissions in the near future.
- » The U.S. EPA is considering rulemaking to address greenhouse gas emissions from a variety of sources, including motor vehicles. This rule-making may also require changes to the transportation system's fuel use.

- » Regarding international activities, the Bali Action Plan was ratified at the December 2007 United Nations Climate Change Conference. The plan commits the United States and 180 other nations to negotiating a new climate agreement by the end of 2009, which will go into effect in 2012 when the Kyoto Protocol's first commitment period ends. Such agreements typically have sections that apply to the transportation sector, which contributes to atmospheric pollutants.

Wisconsin is also involved in activities to reduce fuel dependency, such as tying changes in transportation-related greenhouse gas emissions and carbon dioxide to increased fuel efficiency, business development related to the demand for biofuels, and research. Some examples include:

- » **Midwest Greenhouse Gas Reduction Accord:** Wisconsin, eight other Midwest states and Manitoba, Canada, committed to establishing greenhouse gas reduction targets and developing a market-based and multi-sector cap-and-trade mechanism to help achieve those targets. The Midwest Accord joins already existing regional greenhouse gas agreements that cover Western states and the Northeast and encompass almost half of the U.S. population.
- » **State Office of Energy Independence:** Governor Jim Doyle created this office in 2007. Major transportation-related goals include getting 25 percent of the state's transportation fuel from renewable resources by 2025; capturing a 10 percent share of the emerging renewable energy market by 2030; and becoming a national leader in research to make alternative energy more affordable and available.
- » **Governor's Task Force on Global Warming:** This task force, which includes representatives from business and advocacy groups, recommended ways Wisconsin can make substantial progress in stabilizing and reducing its greenhouse gas emissions.

## Environment

WisDOT continues to balance the needs of the state's transportation system with the concerns of



▲ *Figure 3-11: Guided by the 2001 National Energy Policy, the federal government has funded several research and development programs to study traditional and alternative ways of meeting the energy challenges facing the nation.*

stakeholders and potential environmental impacts. With regard to addressing environment issues, four areas are particularly important:

- » Coordination
- » Air quality
- » Climate change
- » Land use



## Coordination

The Safe, Accountable, Flexible, Efficient Transportation Equity Act-A Legacy for Users (SAFETEA-LU) requires increased consideration of environmental issues during the transportation planning process. Specifically, SAFETEA-LU requires transportation agencies to consider environmental mitigation activities in their long-range transportation plans. SAFETEA-LU also requires transportation agencies to consult with environmental resource agencies and tribes to discuss these mitigation measures and to compare the transportation plan to available conservation inventories, maps and databases. This will require transportation agencies, environmental resource agencies and tribes to better coordinate their transportation planning and environmental functions.

## Air quality

A wide variety of pollutants are emitted into the atmosphere by vehicles and other transportation-related sources. Effects of these pollutants include health problems, damage to plants and reduced visibility. Other sources of pollutants, such as industrial activities, stationary sources such as electric utilities and boilers, and solid waste disposal processes, also contribute significantly to air pollution.

The Clean Air Act established National Ambient Air Quality Standards (NAAQS) for several key pollutants. Ten Wisconsin counties are designated as non-attainment areas for the current ozone standard, and more counties may fall into non-attainment status if this standard is changed. The U.S. EPA has designated three Wisconsin counties as non-attainment for the particulate 2.5 standard: Milwaukee, Racine and Waukesha.

There is growing concern about greenhouse gases. In 2007, the U.S. Supreme Court ruled that the U.S. EPA can regulate carbon dioxide. As a result, the U.S. EPA will likely issue rules related to carbon dioxide emissions in the near future.

## Climate change

The burning of fossil fuels and the resulting greenhouse gas emissions, particularly carbon dioxide

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## THE CLEAN AIR ACT ESTABLISHED

*National Ambient Air Quality Standards for several key pollutants. Nine Wisconsin counties are designated as non-attainment areas for the current ozone standard, and more counties may fall into non-attainment status if this standard is changed.*

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(CO<sub>2</sub>) but also methane and nitrous oxide, trap heat in the earth's atmosphere and are the largest contributors to human causes of climate change. CO<sub>2</sub> emissions resulting from transportation sources account for one-third of all carbon dioxide emissions. In Wisconsin, the transportation sector is responsible for 24 percent of greenhouse gas emissions. In general, alternatives to single-occupancy automobiles and trucks such as transit and intercity passenger rail are more fuel-efficient and typically produce fewer carbon emissions per passenger mile.

At the international, national and state levels, efforts to assess the effects of, and solutions to, global warming are becoming high priorities. Nationally, the U.S. Congress is addressing climate change through several proposed bills. Wisconsin has begun to evaluate whether to institute carbon emission cap and trade programs.

In 2007, nine Midwestern states, including Wisconsin, signed the Midwest Regional Greenhouse Gas Reduction Accord to combat global warming by targeting greenhouse gas emissions with carbon trading programs and other initiatives. Twelve Midwestern states signed the 2007 Energy Security and Climate Stewardship Platform for the Midwest, an agreement aimed at reducing dependency on petroleum-based energy sources, particularly foreign oil.

## Alternative land use development models

“Urban sprawl,” or low-density, single-use, car-oriented development on the urban fringes, continues to be the dominant form of development. However, there has been an increase in alternative development models and planning initiatives both nationwide and in Wisconsin. These include movements such as:

- › **“New urbanism,” or traditional neighborhood development:** Refers to creating neighborhoods with a “sense of place” that include a mix of uses, compact development, community gathering and open spaces, and accommodations for transit, walking, biking, and auto travel.
- › **Transit-oriented development:** Refers to high density, mixed use, compact development that is oriented around transit stations and facilities. This type of development enables a higher number of trips to be made by transit or walking, and improves access to transit by ensuring a short walking distance to transit stops for all residents and workers in the development.

In addition, in 2007 the governor established the Governor’s Task Force on Global Warming to examine actions to curb greenhouse gas emissions in Wisconsin, and created the Office of Energy Independence. In July 2008, the Governor’s Task Force on Global Warming presented its findings and recommendations for a state plan to reduce Wisconsin’s contribution to global warming.

At the local level, as of 2007, 720 cities across the United States, including 16 in Wisconsin, signed the U.S. Conference of Mayors Climate Protection Agreement to meet the Kyoto protocol’s greenhouse gas emission reduction targets, in addition to many other local initiatives.

### Land use

During the past several decades, Wisconsin’s dominant pattern of development around metropolitan areas has been scattered and less dense. As populations become more dispersed, services and activities tend to follow.

Moreover, industrial parks, shopping centers and “big box” commercial developments want locations along principal arterials and state highways that provide easy access and visibility. As a result, Wisconsin’s population

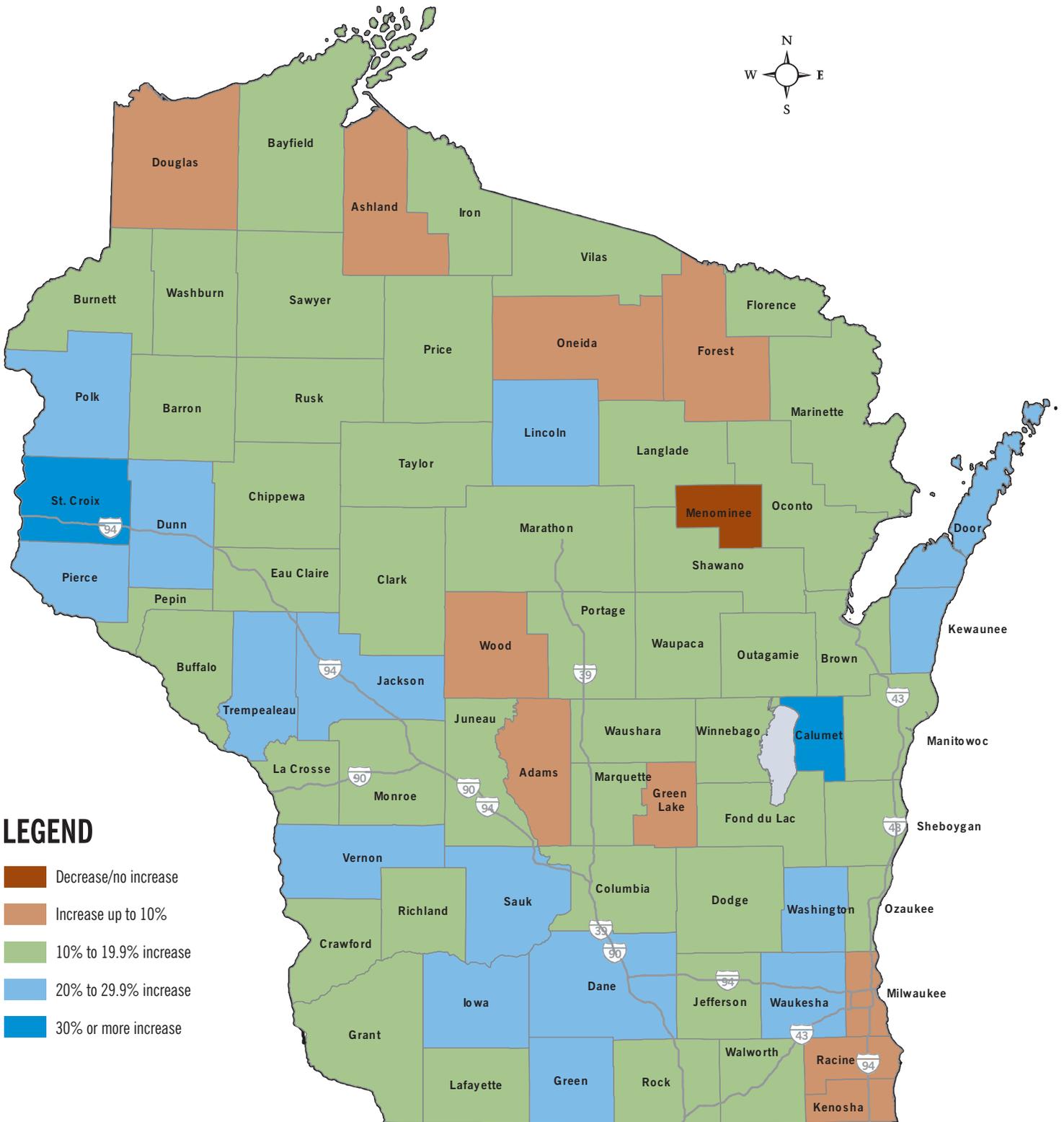
has become increasingly dependent on the automobile. However, as previously mentioned, higher gas prices will likely affect travelers’ decisions and demands for other transportation options (such as transit, rail, and park and ride lots) and increased fuel efficiency. In addition, more dispersed patterns of population and development have resulted in dispersed employment opportunities and housing, increased traffic congestion, and safety concerns along transportation facilities. These impacts exist not only in metropolitan areas, but also statewide.

Along with other initiatives, two land use practices in particular may provide options that can help reduce the number of trips and cars:

- » Compact development and mixed land use may reduce residents’ number of vehicle trips
- » Development that supports multimodal options may help reduce highway traffic

When combined, these practices can reduce traffic congestion, improve mobility and highway safety, and improve the quality of life in a community. These concepts are included in several initiatives, including “new urbanism,” transit-oriented development, and “smart growth.”





▲ Map 3-6: Change in total number of properties between 1991 and 2001 (commercial, manufacturing, residential)

Source: Wisconsin Department of Revenue, Property Tax Master Data Files (1991, 2001)

To improve responses to land use and transportation-related issues, planning legislation that encourages smart growth has been developed at the national and state levels. Smart growth refers to planned development efforts that can enhance the economy, serve the community and protect the environment. In general, smart growth focuses on city centers, older suburbs, and new developments that have central cores, are transit- and pedestrian-friendly, have a mix of housing and commercial uses, and preserve open space and natural resources. Demographic changes, increasing environmental awareness, and fiscal concerns add to this increased interest in smart growth. In response, many communities are turning to smart growth and comprehensive planning.

Smart growth planning processes involve discussions at the community level about how and where new development should be located, and it includes residents in decision-making processes. Smart growth planning also accommodates growth while preserving natural and cultural resources, establishes strong neighborhoods with a range of housing options, and creates a mix of land uses and compact design.

In 1999, Wisconsin enacted the Comprehensive Planning Law (Section 66.1001, Wis. Stats.), also referred to as the “smart growth” law. The law states that if a local government exercises certain land use regulations, those regulations must be consistent with that local government’s comprehensive plan, which must be in place by 2010. While this law does not mandate smart growth as described above, it provides communities with a mechanism to facilitate smart growth.

## Changes in land use

Wisconsin is experiencing significant changes in land use, including loss of agricultural and forest lands and an increase in residentially and commercially developed lands. Changes in land use can have an impact on travel patterns and the transportation system. For example, commuting times become longer as development extends beyond the urban fringe, and the population density of an area affects how viable a transit option may be in that area.

In addition, developments that are adjacent to or near the state highway system typically generate increased demand for access to the highway system. This results in changes to existing traffic flow patterns and a greater potential for conflicts between cars seeking to enter the system and those already on the system.

Development pressures may be analyzed by reviewing the levels of land use conversion that real estate parcels have experienced. Map 3-6 shows the counties in which development pressures may be more intense, as indicated by the percentage of parcels that have been converted to commercial, manufacturing or residential uses (primarily from agriculture uses) during the past decade. Some of the counties with the greatest increase in parcel conversion lie along major transportation corridors, including the state’s *Corridors 2030* routes (see Chapter 5, *Preserve and Maintain Wisconsin’s Transportation System* for more information), which offer many connections for businesses to local, regional, national and international markets.

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## DEVELOPMENTS THAT ARE ADJACENT TO OR NEAR THE STATE HIGHWAY SYSTEM

*typically generate increased demand for access to the highway system. This results in changes to existing traffic flow patterns and a greater potential for conflicts between cars seeking to enter the system and those already on the system.*

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## Trends summary and implications for Wisconsin's transportation system

Based on the trends described in this chapter, Wisconsin's transportation system faces many challenges as the state looks toward the year 2030. These include:

### Population

- » Population increases will place greater demands on the transportation system as more users demand trips
- » Decreasing household sizes, and increasing numbers of households, will result in more trips, which may lead to increased congestion

### Travel patterns

- » The locations of residential areas, jobs, and other services have an impact on travel choices and can place greater demands on the transportation system
- » The baby boom generation is the first generation to have been highly mobile throughout adulthood, and they may have higher expectations for transportation services as they transition from using personal vehicles to other forms of travel

### Modal share

- » Improved services (e.g., travel times, routes), as well as increasing energy costs and roadway congestion, have resulted in increased ridership among other modes

### Transportation safety

- » Projected travel growth will result in increased numbers of incidents unless additional measures are taken; increased incidents will result in higher costs related to property damages and may result in additional fatalities

### Economic activity

- » Providing citizens with adequate transportation to access jobs and services is crucial to

Wisconsin's quality of life and economy; changes in the demographic characteristics of the state's workforce will raise new challenges for meeting these transportation needs

- » Freight shipping is expected to increase; Wisconsin's transportation system needs to adjust to accommodate this growth
- » Major highway corridors are expected to experience heavy increases in commercial truck traffic
- » Increased availability of alternative transportation modes will be necessary for Wisconsin (and the Midwest megaregion) to stay economically competitive

### Energy and the environment

- » Increasing energy costs may result in improved fuel efficiency, and while this benefits businesses and consumers, it could negatively impact Wisconsin's transportation fund
- » Improved coordination between transportation and environmental resource agencies and tribes will improve transportation and environmental planning
- » Dispersed development patterns can result in dispersed jobs and housing, as well as increased traffic congestion and safety concerns

*Connections 2030* helps WisDOT meet these challenges. The plan's themes and policy statements identify actions WisDOT will take to prepare Wisconsin's transportation system for the challenges it will face in the upcoming years. WisDOT will use these challenges as opportunities to improve the state's existing transportation system.