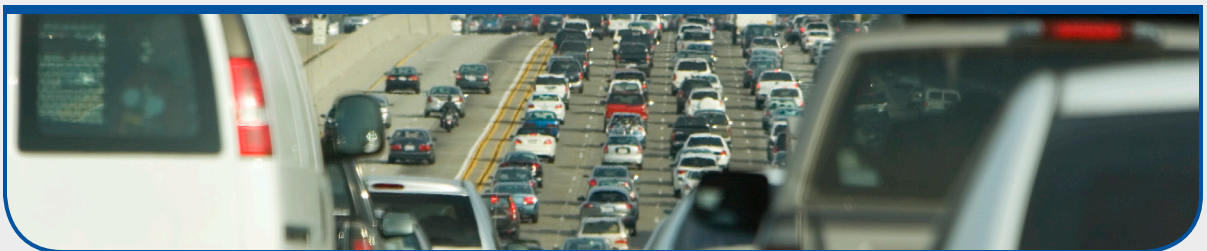


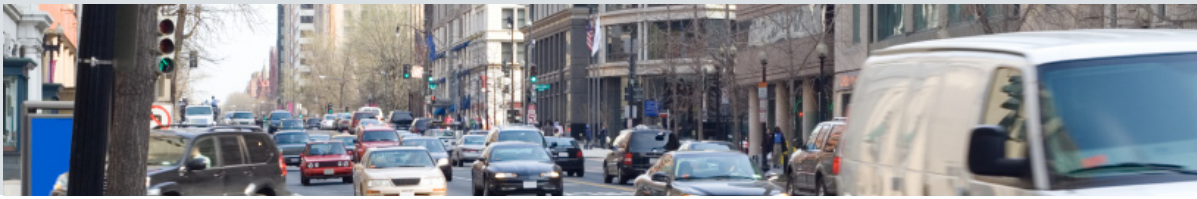
Chapter 2

What Are the Future Demands on the Surface Transportation System?

Travel is integral to the economy and our quality of life. It gets us to work and to play, to worship and to school, to shopping and to health care, to weddings and to funerals. The average American spends more than 75 minutes per day in travel. Every product in our homes, on our dinner tables, and at our workplaces depends on transportation. Transportation is the lifeblood of tourism; it is fundamental to agriculture, forestry, and mining; indispensable to manufacturers; and critical to the military, healthcare, and education sectors. It is an important element of virtually every sector of the economy and every aspect of people's lives. Mobility has become an important part of our basic freedoms and expands our opportunities.

This chapter focuses on economic and demographic factors that drive the demand for passenger and freight travel on the Nation's surface transportation system, both at the present and in the coming decades. The impact of growing demands on surface transportation performance and investment needs, alternative mechanisms to finance that investment, the potential impact of new technologies, and recommended policies to address imbalances between transportation supply and demand and to mitigate the impact of the surface transportation system on the environment are covered in subsequent chapters.





Current Use of the System

Exhibit 2-1 shows data on passenger travel in the United States using different surface transportation modes. Autos and light trucks are the dominant form of passenger transportation in the U.S., accounting for over 96 percent of the 4.5 trillion passenger miles traveled in 2005. Despite its relatively low overall market share, public transportation plays a critical role in providing high-capacity transportation service into dense urban cores and in providing basic mobility to those without access to private autos.

Most surface passenger travel occurs within cities. Almost 60 percent of highway vehicle-miles traveled (VMT) are in urbanized areas over 50,000 in population, and 32 percent occurs in major urbanized areas with populations over 1 million. Public transit use is more concentrated in large cities; urbanized areas with populations over 1 million account for 89 percent of transit passenger miles.

Exhibit 2-1. Passenger miles by mode

	Passenger Miles in 2005 (billions)	Percent
Total	4,540.3	100.0%
Auto ¹	4,366.2	96.2%
Public Transit	47.1	1.0%
Intercity Passenger Rail	5.5	0.1%
Intercity Bus ²	17.1	0.4%
Other Bus ³	104.4	2.3%

¹ Includes light trucks

² Scheduled service only; 2004 data

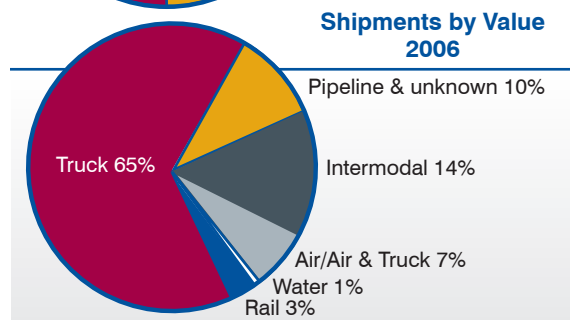
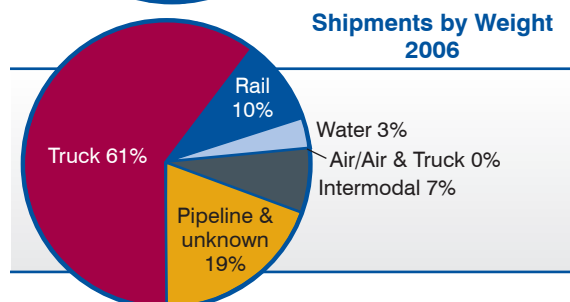
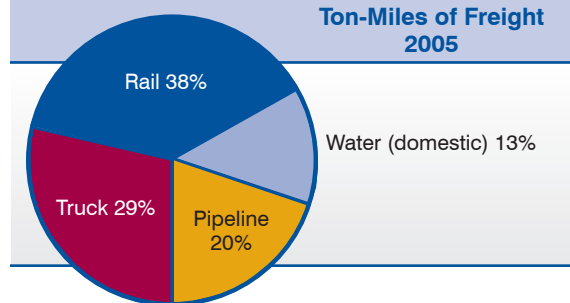
³ Includes charters, shuttles, tour buses, and school buses

Table shows passenger miles traveled by mode. Over 96 percent of passenger travel on the surface transportation system in the U.S. is in private autos, while public transportation plays a key role in certain markets.

Sources: *Highway Statistics*; National Transit Database; Federal Railroad Administration; American Bus Association

Exhibit 2-2 shows the distribution of freight movement in the U.S. by different modes, as measured by distance, weight, and total value of shipments. Trucks account for the majority

Exhibit 2-2. Freight movement by different modes



This exhibit identifies shares of freight movement by mode measured in terms of ton-miles, weight, and value. Trucks are the dominant mode of freight transportation in the U.S., as measured by the total weight or total value of shipments. Railroads are the largest mode in terms of ton-miles, reflecting the longer average haul distances for products carried by rail.

Source: BTS, *National Transportation Statistics 2006*; FHWA, *Freight Facts and Figures 2007*



of freight movement by weight and value (and almost all local deliveries), while rail accounts for the largest share of total ton-miles, reflecting the longer average haul of rail shipments.

Given the great contribution of the surface transportation system to the strength of the U.S. economy at the national, State, and local level, and the importance it has assumed as a factor in the quality of life in the U.S., we can expect many aspects of passenger travel—except its total volume—to remain relatively constant over the next several decades. Interactions for economic and social benefit that are supported by the existing surface transportation system are likely to continue as long as it remains reliable, efficient, and safe. The specialization of various kinds of labor and production in specific geographic locations is likely to continue as long as the services and goods are delivered quickly and economically to the consumers who want them, whatever the distance separating producers from end users.

Critical Factors Influencing Future Passenger Travel Demand

Travel behavior in the U.S. has changed significantly in the past 60 years, with the emergence of auto and air travel as dominant forms of passenger transportation. Changes in the economy and technology have helped drive a redistribution of people and jobs, with continued movement from rural areas to cities and from concentrated central cities to dispersed suburban locations. The specialization of labor, the growth in influence of national and regional retail chains,

“With the projected population growth and the expected trip generation growth, [residents of Atlanta] can reasonably expect that commute times will double even more quickly than our population...Our quality of life and economic competitiveness are suffering.” – *Wayne Shackelford, Senior Vice President of Gresham Smith Partners, at the Commission’s Atlanta field hearing.*

the dramatic growth in labor force participation by women, and the growth and maturation of the baby boom generation have all influenced travel behavior in the late 20th Century and in this first decade of the 21st. The shift toward a service and information economy, dramatic advances in communications and computerization, and globalization of the economy are other significant factors that we all must incorporate into our thinking about what lies ahead in the next 50 years.

Travel demand growth has outpaced population growth and has undergone a pronounced shift toward faster, more flexible means of travel increasingly dominated by single occupant vehicles (SOVs). Highway travel growth over the past quarter-century can be attributed to both population growth and changes in travel behavior, including increases in trip making (trip frequency), increases in trip length, and changes in mode choice.

In projecting future passenger travel demand, one must evaluate the extent to which the trends that have accompanied rapid VMT growth over the past half-century might continue or be replaced with new trends that will impact VMT.



Several factors that contributed to VMT growth in the past do not appear to be as significant in the future. For instance, the growth in vehicle ownership per household may not be as significant, as there is near saturation of vehicle availability for the able-bodied adult population. While income growth may result in some increases in vehicle availability, the magnitude of the potential for new vehicle ownership is modest. Women entered the workforce in large numbers in recent decades, and the resulting shift in travel behavior cannot be duplicated in the future to the same degree. In addition, the maturation of the baby boom generation from children (who do not make single-occupant auto trips) to a highly mobile adult population with high labor force participation has placed upward pressure on travel demand. However, as this cohort leaves the labor force, it will have less effect on travel growth.

Similarly, mode shifts away from alternative modes such as biking, walking, transit, and multi-occupant vehicles to SOV travel cannot have as significant an impact on VMT growth in the future, simply because it is mathematically impossible for the proportionate use of these modes to drop as much as they have in the past. Thus, any continued decline in the travel share of alternative modes would likely be modest at most. Indeed, in some recent years transit use has grown at a faster rate than VMT, for the first time in decades.

Future Population Growth

The most basic factor influencing the demand for passenger transportation is projected population growth. Between 1950 and 2000, the total population of the U.S. grew from 150 million to 281 million, reaching 300 million in 2007. Based on these trends, the Census Bureau projects the total U.S. population to reach 364 million

by 2030 and 420 million by 2050, an increase of roughly 50 percent over 50 years. Adding 120 million new Americans between now and 2050 will by itself create significant demands on our transportation system.

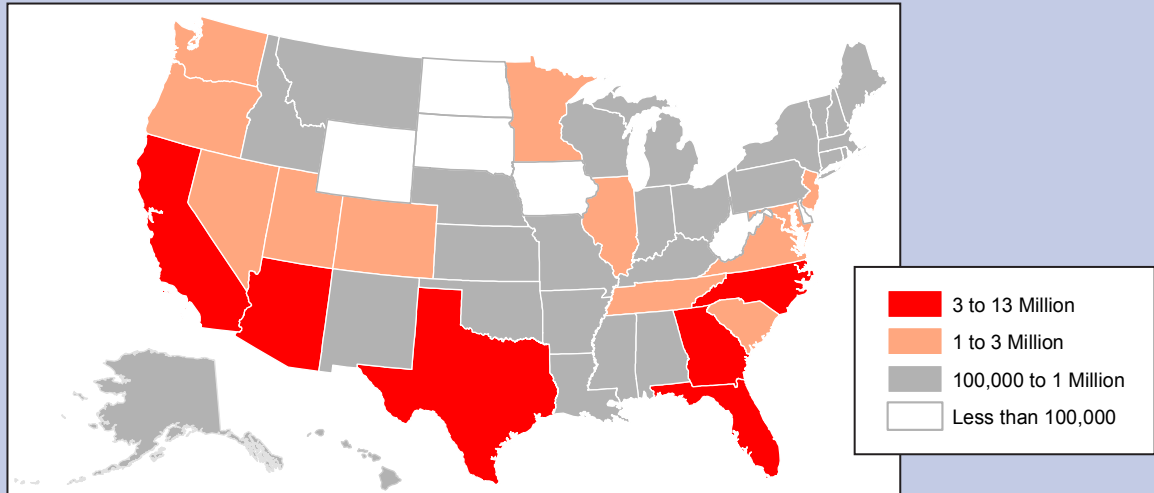
As fertility rates in the U.S. have stabilized, national population growth has largely become a function of immigration. Immigration rates themselves are primarily a function of relative economic conditions and government policies. While such considerations are beyond the scope of this report, it is clear that future immigration rates to the U.S. will have a significant impact on our population totals and thus our transportation system.

Regional migration and urban development patterns will also play a significant role. The last 50 years have seen a significant shift in the population of the U.S. to the South and West, a trend that is expected to continue. According to the Census Bureau, over 60 percent of total population growth between 2000 and 2030 is projected to occur in just six states, all of them located in the Sunbelt as shown in Exhibit 2-3. To the extent that future growth is concentrated in areas that do not have significant existing capacity in their transportation infrastructure, this will place additional burdens on the system.





Exhibit 2-3. Projected population growth by state, 2000–2030



This map shows that over 60 percent of the population growth in the U.S. between 2000 and 2030 is projected to be concentrated in just six states: Florida, California, Texas, Arizona, North Carolina, and Georgia.

Source: Census Bureau

Income Growth

Americans are becoming more prosperous, which also has significant implications for future travel growth. Historical trends have shown that increases in real income have contributed significantly to increasing travel demand, particularly on highways. Real income growth has contributed to a shift from shared ride and transit to solo driver trips, increases in trip length from residential suburbs to dispersed workplace and recreation locations, and increases in trips for activities such as dining out and organized school or social activities. Real income has contributed to more consumption of products and services, which has led to an increase in service and commercial trips and deliveries as consumers spend less personal time on household functions, shopping, and other errands.

The key question for future travel demand in the U.S. is whether this relationship between income and travel growth is likely to continue.

Competing demands for other expenditures, such as health care and other social priorities, could affect travel demand in the future. Changes in preferences for housing and travel modes among higher-income households could also limit the impact of income growth. One might reasonably speculate that, at some level of income, travel demand will reach a peak, and higher income will no longer lead to increased travel demand. These must remain gray areas in the Commission's analysis; historical trends do not provide any basis for identifying a level at which increases in travel with growing real income will moderate, nor does the Commission have any basis for assuming that future Americans will have significantly different travel behavior preferences from those of today. In fact, several Commissioners believe that the development of Internet shopping has accelerated the demand for transportation, as people want to be able to order and receive goods at any time, not just during an organized trip to a store or mall.



Land Use

Roughly 60 percent of the population of the U.S. lives in large metropolitan areas over 1 million, and another 20 percent live in smaller metropolitan areas. Current and future land use patterns within these cities will have a significant impact on both the amount of travel within cities and the form that that travel takes.

Suburbanization has been an ongoing trend for more than a century, both in the U.S. and abroad, ever since the development of motorized transport enabled the separation of residences from workplace locations. Over the last half-century, suburbanization has been linked to the growth of automobiles as the dominant form of transportation in urban areas. Cities have evolved to a point where suburbs are now the dominant location of residential, employment, and retail activities. Urban travel patterns and networks have shifted from predominantly radial travel between residential areas and central business districts to more complex travel in multiple directions across cities. While more recent trends include the reemergence of downtown as diverse activity centers with retail and cultural activities and increased residential development, we have also seen the continuing dispersion of employment away from high-rise downtown locations and the emergence of downtown-like centers for suburban communities.

Whether urban or suburban, however, the majority of economic activity is occurring within a metropolitan context. In many cases, nearby metropolitan areas are growing together, both physically and economically. A growing literature is referring to the largest of these metropolitan concentrations as “megaregions,” which are depicted in Exhibit 2-4.

Extensive research has focused on the extent to which urban land use and urban design considerations can influence travel. There

is a consensus that various land use choices, including density, mix of uses, contiguity of development, scale of activities (the size and market area for facilities such as schools, churches, hospitals, stores, etc.), urban design features, and transportation and land use configuration all influence travel behavior. Although the magnitude of the impact and the political and market acceptance of initiatives to leverage these aspects of development so as to minimize VMT and travel demand in the future remain in dispute, the choices made in these areas in the future can significantly improve the attractiveness of alternatives to solo driving.

As shown in Exhibit 2-5, research on household travel behavior has found that more densely developed areas tend to have a lower level of VMT relative to their populations. In dense areas, for example, people often choose to walk rather than drive to available shopping. If this relationship holds in the future, the concentration of new population growth in higher-density areas has the potential to moderate travel demand growth.

A number of factors will affect any trends toward increasing urban development densities in the future, including stabilization in household sizes, consumer reactions to increasing energy costs and land prices, consumer choice of independence from the automobile, national economic growth generated by and concentrated in large urban areas, and government policies to promote dense development. On the other hand, real income growth, ubiquitous transportation and communications networks, an aging population less tied to workplace access in their housing location decisions (and anxious to avoid the congestion of large cities), and the high costs of living in dense urban areas may counterbalance the motivations for increased population density.

Historically, high-density population concentrations have been associated with low and

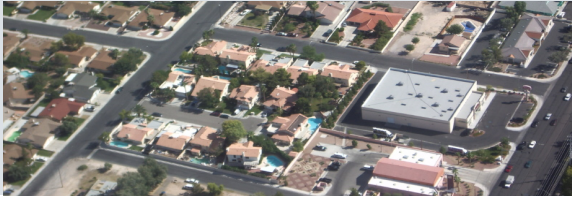
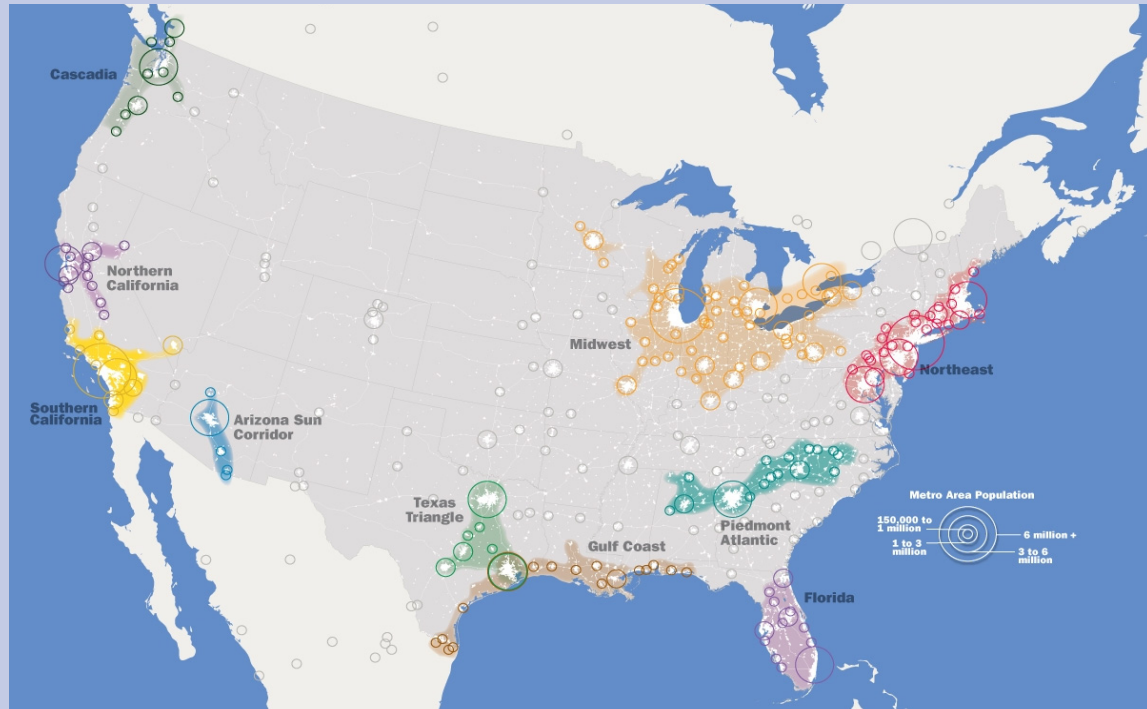


Exhibit 2-4. Emerging megaregions in the U.S.



Economic activity in the U.S. is becoming increasingly concentrated in closely linked groups of metropolitan areas, referred to as “megaregions.”

Source: Regional Plan Association

moderate income households. However, recent high-density residential construction has been targeted to higher income household segments. The key question for future travel demand is whether the travel behavior of such households will tend toward those typical of other high-density

residents or those typical of the high income population. Recent experience from the siting of such developments in mixed-use neighborhoods with high-quality transit access, however, would seem to indicate that increases in transit usage and walking would be expected to continue.

Exhibit 2-5. Impact of population density on per capita VMT

Population Density (per sq. mile)	Under 500	500-2,000	2,000-4,000	4,000-10,000	Over 10,000
Change in per capita VMT (relative to areas under 500 persons/sq. mile)	-	-11.6%	-17.7%	-28.6%	-56.8%

This table reflects that, as population density increases, the amount of highway travel per person decreases.

Source: Commission analysis of National Household Travel Survey data



Demographic Considerations

Demographic characteristics, including the age and gender distribution of the population and the share that is foreign-born, are known to strongly influence travel behavior. Young people are dependent on adults to provide vehicle mobility. At the age of drivers license attainment, travel levels increase, peaking in the middle-age working years when persons have both the economic resources to travel and work and family responsibilities that often involve extensive travel. As children move away and adults enter their senior years, travel generally declines and changes in nature. The need for work travel diminishes, material item consumption generally slows, and health or stamina issues may begin to moderate travel levels. Travel typically declines significantly for those beyond 80 years of age.

As the baby boom cohort reaches retirement age, one might expect some moderation in travel demand. While this trend may reduce pressures on travel demand growth, it is not likely to be significant enough in the realm of all of the factors that influence travel demand to have a pronounced effect. Senior baby boomers are anticipated to continue to have high levels of mobility, as indicated by the very high licensure rates among females (relative to previous generations), their high mobility lifestyles, the dispersion of their siblings and offspring, and their generally healthy physical condition and economic status. In addition, the dominant influence of the baby boom generation has been dampened by strong immigrant population growth over the past few decades, resulting in the baby boom cohorts comprising a far smaller share of the total population than they have in the past. The change in the shape of the population age profile has the composite effect of reducing the demand for travel a few percentage points relative to when

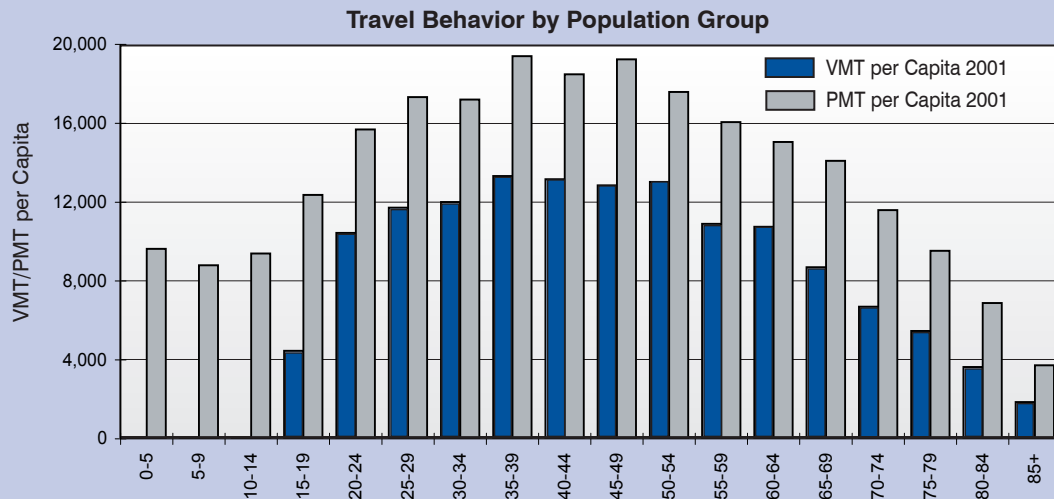
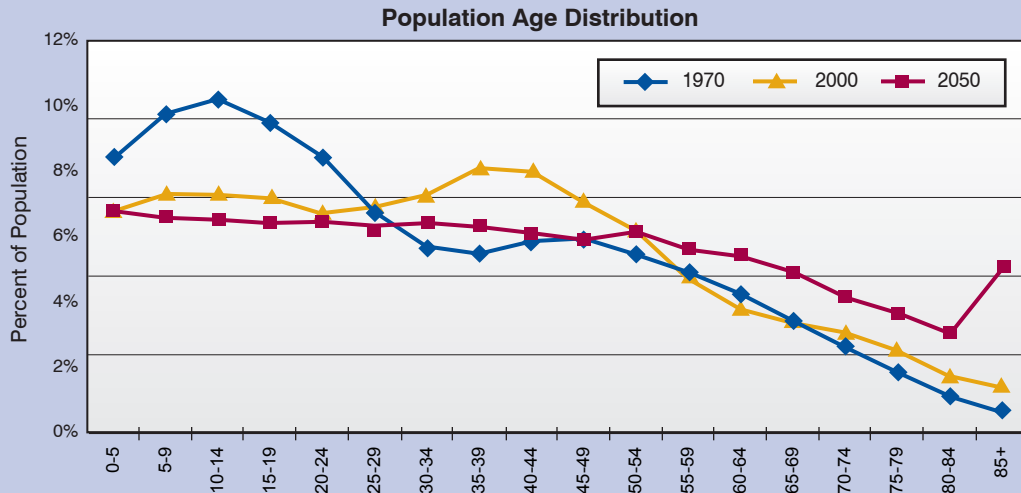
the baby boomer age cohort was moving toward their peak travel years. Exhibit 2-6 overlays the population age profile on a graphic of travel levels as a function of age.

Immigration also influences travel demand, both in terms of location decisions and travel tendencies. Research has shown a marked difference in travel behavior between the domestic population and immigrants. In particular, recent immigrants are far more likely to use transit or carpool, and their rates of auto ownership are much lower, resulting in relatively more modest travel demands for this segment of the population. Over time, however, foreign-born individuals tend to assimilate such that their travel behavior becomes more similar to the domestic population. In addition, the travel demand impacts of future immigrants will be dependent on the nature of that immigrant population. Often, immigrants are young working adults who, if economically successful, become active consumers of travel. The educational and economic backgrounds of future immigrants as well as their choices of settlement locations will likely influence their travel demand impact, as shown in Exhibit 2-7. Some decades from now, the future immigrant population may well be entering this country from places with mobility levels and expectations far higher than is the case for many of today's immigrants.





Exhibit 2-6. Population age distribution and travel behavior in the U.S.

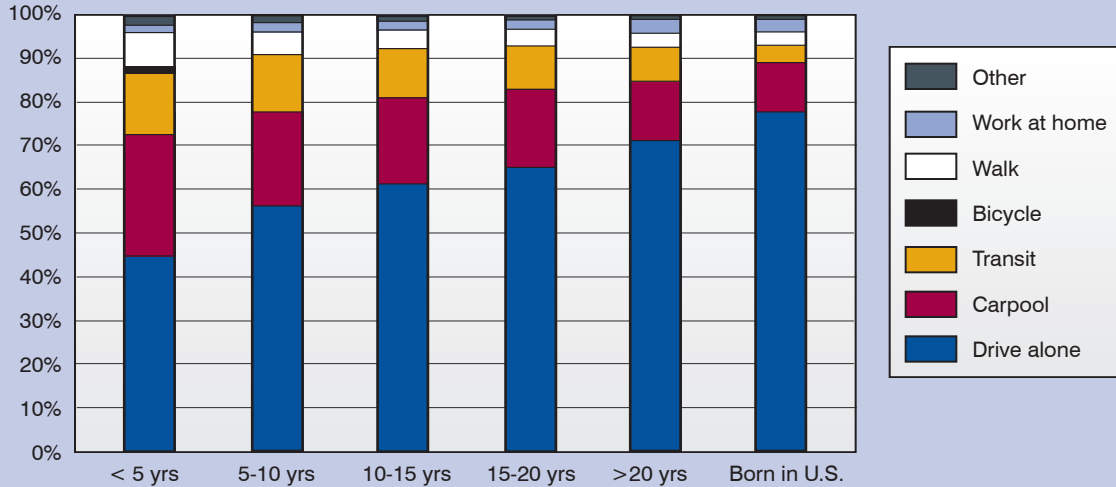


The line chart identifies changes in population age distribution, while the bar chart highlights differences in travel behavior by age group. From 1970 to 2000, the population profile of the U.S. shifted significantly from children toward adults in their peak driving and travel years, as the baby boom generation entered the work force. Over the next several decades, the population is expected to shift toward older adults, who tend to engage in less driving (measured by vehicle miles traveled, or VMT) and overall travel (measured by person miles traveled, or PMT), dampening the effect of future population growth on travel demand.

Source: Commission analysis of National Household Travel Survey and Census data



Exhibit 2-7. Immigrant travel behavior mode use by years in the U.S.



This chart shows that recent immigrants are much less likely to drive alone to get to work, and much more likely to carpool or use transit than are those born in the U.S. However, the longer immigrants remain in the country, the more their travel behavior becomes similar to that of the native-born population.

Source: 2000 U.S. Census

Critical Factors Influencing Future Demand for Freight Movement

The demand for the movement of goods and materials is largely a function of economic activity. As the economy grows, more goods will be produced and consumed, requiring the transportation of raw materials to manufacturing plants, parts to assembly plants, and finished goods to markets and consumers.

One trend changing the relationship between economic growth and transportation demand is growth in the services sector of the U.S. economy. Over the last 50 years, the goods-producing industries' share of total gross domestic product (GDP) has fallen by nearly half. Increasingly, information technology and globalization are

“We have a transportation infrastructure of more than 100 million square feet in industrial space tailored to the big box industrial market. Memphis is providing a vital role in our Nation’s economy in global trade...but more must be done to keep the demands of our Nation and our growing trade.” – *John Moore, President and CEO of the Memphis Regional Chamber, at the Commission’s Memphis field hearing.*



accelerating the shift within the U.S. economy toward service industries, which has a dampening impact on VMT and freight tonnage growth. According to forecasts by Global Insight, Inc., economic output in the U.S. is projected to grow by 150 percent over the next 30 years, while the total freight movement (measured by ton-miles) is projected to increase by 92 percent over that same period.

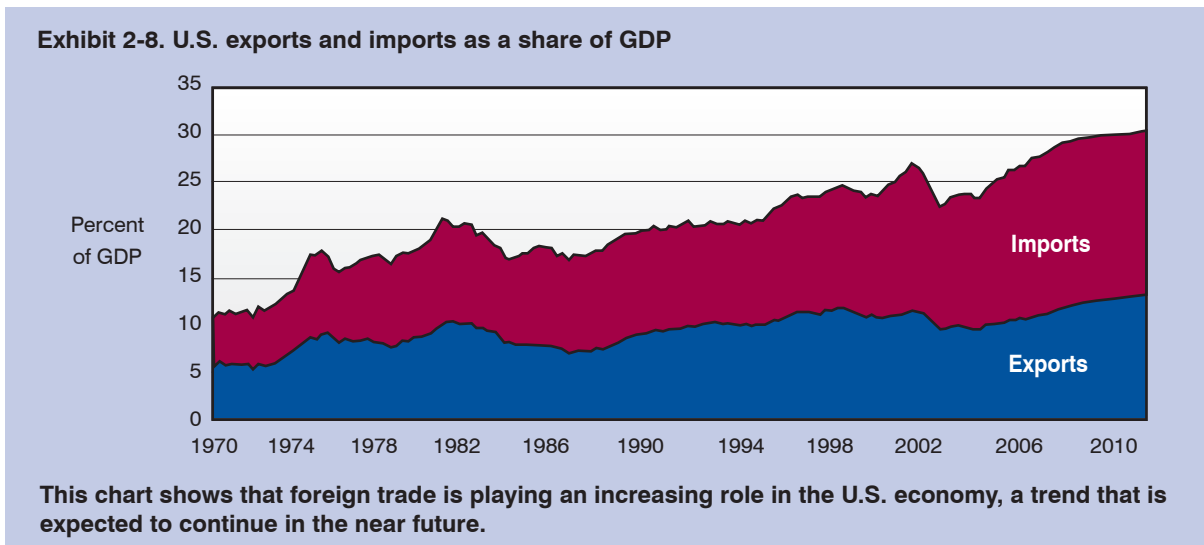
Although total freight movement is linked to overall economic growth, changes in the structure of the economy will affect the type of freight that is transported and the routes and modes that are used to deliver freight to its destination. Efficiency improvements in different sectors of the freight transportation industry will also play an important role. These changes include increasing international trade, growth rates in different sectors and commodities, and changes in manufacturing and business practices.

International Trade

The economy of the United States is linked to that of the rest of the world through international

trade, a tie that continues to grow stronger. Since 1970 the import share of GDP has tripled, while the export share has doubled, as shown in Exhibit 2-8. The opening of global markets for many products has expanded opportunities for U.S. producers to sell their products overseas, while U.S. consumers and businesses have been able to take advantage of lower production costs available overseas, importing products and components at low prices. The upward trend in foreign trade's share of the economy is projected to continue, linking an increasing amount of business activity and freight movement to international trade.

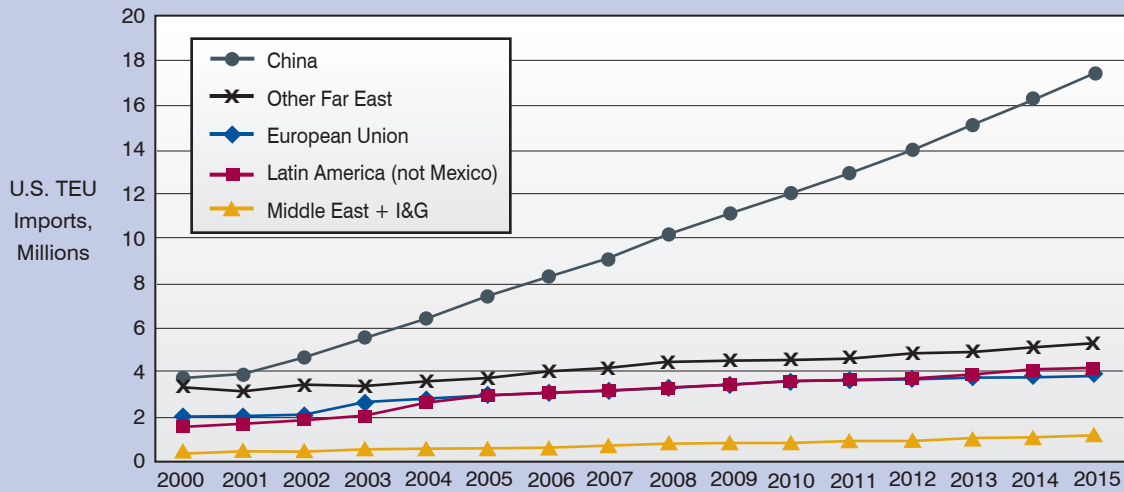
The pattern of foreign trade with the U.S. is moving away from the traditional trading partners in Western Europe, as trade with Canada, Mexico, and East Asia grows more rapidly. Trade with oil-producing countries has also increased as oil imports comprise an increasing share of total fuel consumption in the U.S. The distribution of trade in bulk resource commodities such as oil, coal, and grain is following developments in production and consumption among our trade partners. The continued liberalization of trade through bilateral



Sources: Bureau of Economic Analysis (2006); Global Insight, Inc., forecast to 2010



Exhibit 2-9. Projected growth in container imports to the U.S. merchandise trade by export region, 2000–2015



This chart shows that containerized imports have grown dramatically in recent years, particularly from China. The growing dominance of China in the containerized trade is expected to continue in the future.

Sources: Global Insight World Trade Service

and multilateral agreements will further expand trade opportunities for the U.S.

As a result of this growing importance of international trade in the U.S. economy, international merchandise trade (especially from Asia) is growing faster than overall freight transportation, as shown in Exhibit 2-9. An increasing share of the domestic freight system is also serving international trade shipments. This is placing increasing pressure on international gateways (including seaports, airports, and land border crossings) and the surface transportation infrastructure feeding into and leading out of those gateways. The geography of the international freight transportation gateways is tied to the historical development of the country, with many cities having grown up around seaports. While this provided many advantages over 100 years ago, and does so today, it also provides challenges to operations sharing dense

urban areas with many neighbors and competing land uses.

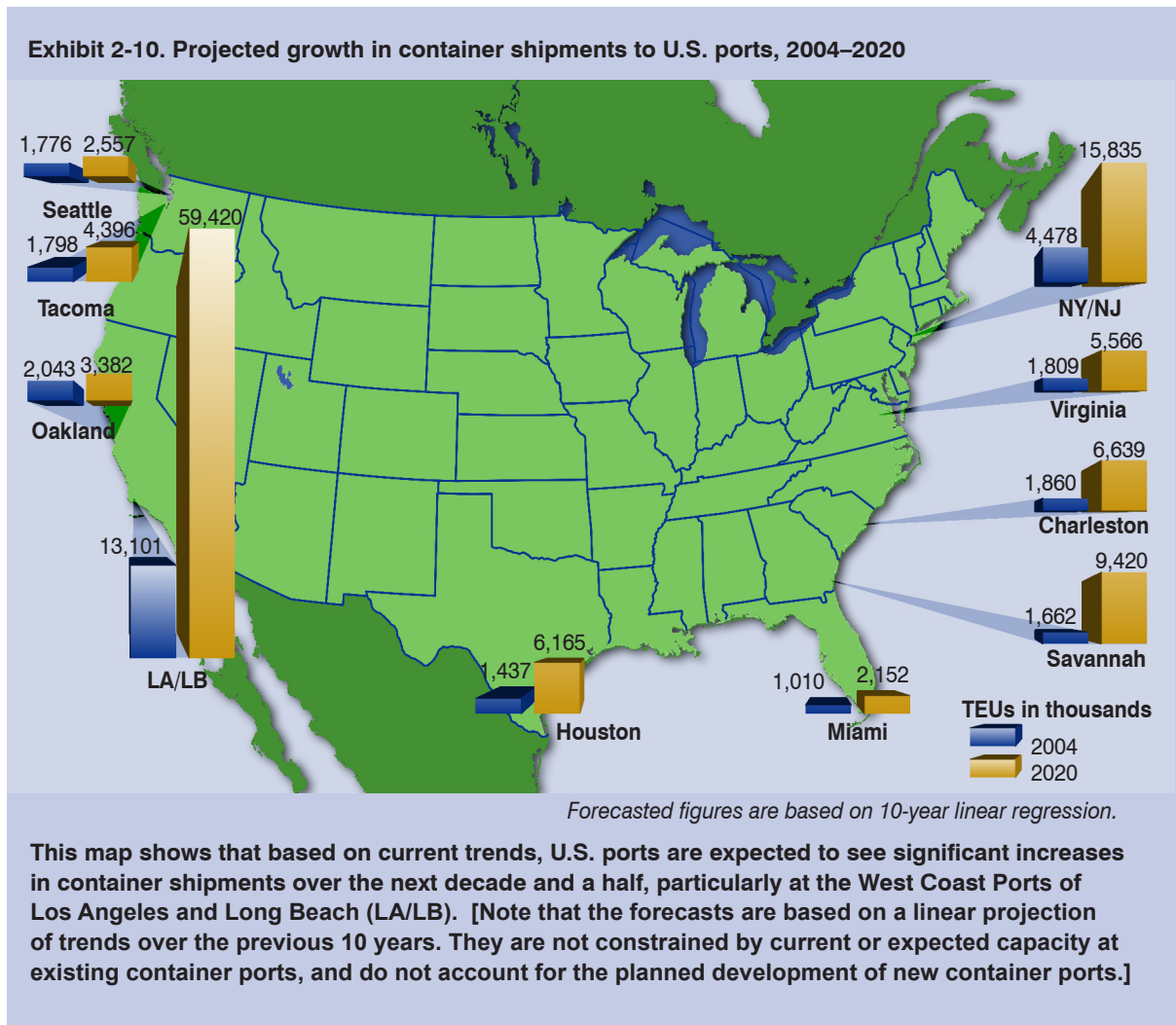
Changing trade patterns also have implications for the regional impacts of foreign trade. Imports through West Coast ports are predicted to grow by 183 percent by 2035, while imports through the remaining ports are projected to grow at 48 percent. This reflects both the continued domination of Asian trade, and the ability of West Coast logistics to handle this extraordinary volume of freight. Other factors that could affect the distribution of foreign trade between West and East Coast (and Gulf) ports include the planned expansion of the Panama Canal, which is projected to divert significant flows from Pacific U.S. ports to Atlantic and Gulf ports; the long-projected shift of Asian cargo to Suez routings, and hence the shift of Far Eastern trade to East Coast ports (though this is progressing more slowly than originally anticipated); and potential increases in



the use of Canadian and Mexican ports for U.S.-bound cargo, which could shift more trade to rail and truck crossings at borders with our NAFTA neighbors. No matter where foreign commodities enter the U.S., however, this burgeoning growth in international trade will place strains on an already overcrowded domestic port, road, and rail network. Exhibit 2-10 shows the projected growth in container shipments at key U.S. ports through 2020.

Commodities and Freight Movement

“Freight” is a broad term used to characterize transported commodities; however, the products themselves vary tremendously in weight, value, time sensitivity, and average length of haul. Specific physical characteristics often determine the particular mode of transportation: heavy bulk commodities with long average hauls over 750 miles are typically moved by rail or water;



Source: USDOT



The year 2006 marked the golden anniversary of two major milestones in the development of the U.S. transportation system. The Federal-Aid Highway Act of 1956 authorized the Interstate Highway System, creating a coast-to-coast network of limited access highways for both trucks and passenger cars. Perhaps less well-known, but equally significant to the freight industry, was the first cargo container shipment in April 1956 from Newark to Houston aboard Malcolm McLean's SS *Ideal-X* (shown above), an innovation that would revolutionize commerce worldwide.

liquid and gaseous fuels are transported by pipelines; and higher-value goods and those with short hauls and diverse destinations are typically transported by truck. Trucks are also dominant in “last mile” freight movements and local deliveries, even for products transported by air, water, or rail for the major portion of their journey.

Because economic growth is rarely uniform across all sectors of the economy, the mix of commodities being transported is likely to change over time. As this mix changes, so would the modal split of overall freight traffic. Economic forecasts indicate that higher growth in the future is generally expected for commodities that also have a relatively high truck market share. As a result, absent other factors, the share of freight traffic carried by truck would be projected to continue to increase in the future.

Operational Efficiency Improvements

Freight transportation in the U.S. will continue to be significantly affected in the coming decades by improvements in efficiency among freight carriers. Productivity in the freight transportation sector is affected by several factors, including technology, labor rules, and government regulations.

Perhaps the most significant change in freight transportation over the last 50 years has been the growth of containerized shipping. Containers have dramatically reduced the costs of handling freight at ports, and have made possible the seamless transfer of freight between ships, railcars, and trucks. Further efficiency gains are being achieved through the increased use of double-stacked containers on railcars (which has been limited in some cases by bridge and tunnel clearances). Containerization is also creating opportunities for and placing demands on freight distribution infrastructure, particularly the need for new facilities to handle the transfer of containers between different modes. The siting of such facilities in densely developed urban areas has proven to be a major challenge.

Productivity is also significantly affected by changes in labor rules and government regulations. Labor productivity in freight transportation has increased significantly, a result of both technological factors and changes in work rules. Government regulation also has a significant impact, through both labor regulations and limitations on carrier operations, such as truck size and weight regulations. Future changes to such regulations could have either positive or negative impacts on freight transportation productivity. To the extent that such changes affect one mode relatively more than another, the modal mix of freight could also be affected.

Changes in Business Practices

Changing business practices will continue to affect freight transportation in the future. Perhaps most significant among such practices in recent decades has been the increasing adoption of just-in-time (JIT) manufacturing and construction, in which inventory stocks are kept at a minimum and inputs are delivered immediately prior to their



use. Such a structure demands speed for most goods and reliability for all, placing a premium on these qualities of freight transportation. For many products, JIT requires greater numbers of vehicles hauling smaller, more valuable payloads shorter distances to meet market demands. While such practices can reduce logistics costs overall, they can also lead to a loss in efficiency in the freight transportation sector by limiting the ability of carriers to take advantages of economies of scale or forcing the use of less efficient forms of transportation.

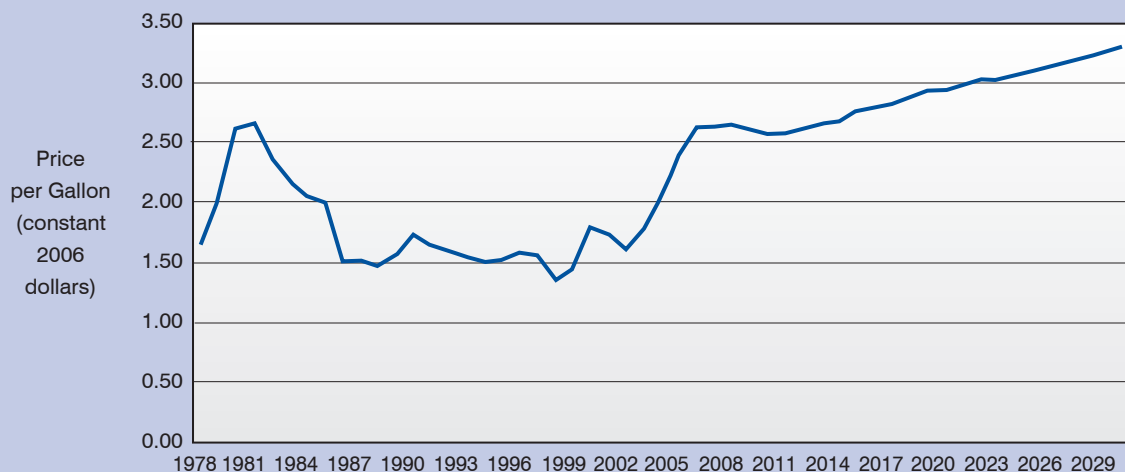
While JIT is typically considered to be an aspect of manufacturing and construction, it is also showing up in the demands of service industries. For example, office product suppliers have found that workers (perhaps encouraged by the ease of online ordering) are placing increasingly small orders with the expectation of minimal delivery times, which has required an increase in the required number of distribution centers and delivery vehicles to serve that market.

User Costs and Transportation Demand

The preceding discussion has focused on economic and demographic trends expected to affect the base level of demand for transportation in the U.S. in future years. These trends reflect external factors that are essentially independent of the performance of the transportation system itself. Like any other product or service, however, the level of system use will also depend on the costs that users of the transportation system bear. This includes both direct costs (such as for motor fuel, vehicle purchase and maintenance, and tolls and fares) and indirect costs (such as travel time, waiting time, and the risk of personal injury). These costs can affect the level of travel demand, the time period in which that travel occurs, and the choice of travel mode for both passengers and shippers.

Transportation system user costs can be affected by many factors. Fuel prices, as shown in Exhibit 2-11, may be affected by both market

Exhibit 2-11. Gasoline prices in the U.S., 1978–2030



This chart shows that after peaking in the early 1980s, gasoline prices (adjusted for inflation) fell to much lower levels for the next two decades. However, fuel prices have recently rebounded to historically high levels, and are expected to continue to increase in the future.

Sources: Energy Information Administration, *Annual Energy Review 2006*, *Annual Energy Outlook 2007* (High Price Forecast)

conditions and government energy and taxation policies. Government policies and subsidies can also affect the direct costs that users face for tolls, fares, and tariffs. The operational performance of different modes also plays a significant role, affecting users' expectations of travel times and system reliability, which in turn affects choices about where, when, and how to travel. The use of the transportation system in the future will thus be affected by the level of investment in transportation infrastructure; choices of financing mechanisms; and other transportation, energy, and environmental policies. These topics will be discussed in the following chapters.

Forecasts of Future Travel Demand

Forecasts of travel demand include the implicit and highly important presumption that the relative relationship between supply and demand will be comparable to that which exists today. Transportation technologies, petroleum availability, economic conditions, immigration policies, health care conditions and longevity, electronic communications, energy production and storage, and propulsion technology breakthroughs are among the key factors that may influence the ultimate level of travel 30 to 50 years in the future. Phenomena such as climate change and dramatic changes in petroleum-based fuel availability or cost are among the factors that may potentially cause significant changes in the Nation's ability to continue to have low-cost travel as we know it today. Unanticipated changes also may arise. If conditions result in meaningful changes in travel cost or speed, one can expect changes to forecasts of future travel.

The demographic and economic trends described in this chapter have important implications for the



TRAVEL DEMAND FORECASTS USED IN THIS REPORT

The investment analyses used in this report relied on baseline forecasts of future passenger and freight travel. Freight forecasts were based on FHWA's Freight Analysis Framework (FAF), while passenger travel was based on custom forecasts developed specifically for this Commission. Chapter 4 includes more information on the development of these investment analyses.

The FAF forecasts extend through 2035, and are based on the economic inputs cited earlier in this chapter. The forecasts assume that the modal mix of each commodity type will remain constant into the future; thus, differential rates of growth among modes are assumed to solely result from different rates of commodity growth. These forecasts project average annual tonnage growth rates of 2.1 percent for trucking, 1.9 percent for rail shipments, and 1.2 percent for waterborne transportation. These tonnage estimates are further developed to project the growth in truck travel, resulting in an estimated growth rate of 2.5 percent per year in truck VMT over that time period.

The Commission passenger travel forecasts take into account the demographic and economic factors cited earlier in this chapter, as well as regional differences. The projected average annual growth rates for passenger VMT under these forecasts are 1.82 percent through 2035 and 1.72 percent through 2055. Volume III of this report will include more information on the development of these projections.

Baseline travel forecasts for public transit use were based on projections made by transportation planning organizations in metropolitan areas. The investment analyses for intercity passenger rail were not based on travel demand forecasts.



future of the surface transportation system in the U.S. A growing, increasingly wealthy population will continue to demand increasing levels of goods and services, and will rely on that system to access those services and to bring those products and services to them. Absent significant changes in investment, technology, or policy, increasing levels of transportation system use could also bring increasing congestion, worsening safety, and increased use of scarce energy resources. Rising congestion and pollution levels could also feed back into the economy, limiting future economic growth and diminishing the quality of life for all Americans.

Many of these forces affecting the future demand for travel (such as population and demographics) are effectively beyond the control of transportation policy makers, and will need to be dealt with in formulating future policies and strategies. However, there are also many opportunities and avenues for policy makers to influence the level, timing, and form that travel demand will take in the future through decisions about land use, taxation and pricing, and investment. The following chapters will explore these opportunities in greater depth.



