NEW MEXICO 2040 PLAN

Scenario Analysis Report

Appendix C

prepared for

New Mexico Department of Transportation

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1.0 Introduction

The first step in the scenario analysis is to conduct an assessment of potential future changes that should be considered in transportation planning and decision-making. This document focuses on the following scenario elements:

- **Demographics.** Potential changes in the number and composition of the state's residents.
- **Land Use.** Potential settlement patterns, changing development densities, shifts in use (e.g., between residential and industrial), designation of conservation areas, and constraints on infrastructure (e.g., water and power) and services (e.g., schools and fire stations).
- **Economics.** Potential shifts in the state's economic fabric, including overall prosperity, the rise (and fall) of key employers, and the distribution of wealth.
- **Energy.** Potential changes in fuel types, prices, and vehicle fuel economy—and the turn over rate of the existing fleet.
- **Technology.** The potential introduction and growth of autonomous vehicles, the role of Intelligent Transportation Systems, and evolving information technology options, including telecommuting.
- **Environmental.** The potential for an increase in the severity and frequency of extreme weather events that impact transportation, water constrained planning, pollutant and/or greenhouse gas regulations, and conservation priorities (e.g., fish passage, wildlife crossing, endangered species protection).

For each key element of a scenario planning effort, this document addresses three primary questions:

- How might these potential changes impact traveler choices (e.g., effects on demand, mode choice, and route selection)?
- How might these potential changes impact the transportation system (e.g., effects on capacity and efficiency, structural integrity and safety, and costs)?
- How might transportation needs and priorities change as a result? How should these potential changes be reflected in planning and decision-making today?

2.0 Demographics and Travel Behavior

2.1 Household Travel

The amount and type of household travel varies based on socioeconomic, geographic, ethnic, and generational differences. American household travel patterns have changed over time. According to the National Household Travel Survey (NHTS),[1] between 2001 and 2009, average daily person trips and person miles traveled decreased for the first time. Average daily trips dropped from 4.09 to 3.79 (Table 2.1) and daily person miles traveled dropped from about 40 to 36. Travel to work and for errands decreased most significantly, accounting for much of the decline in total trips. Potential explanations for this decrease in travel include the 2008 recession, changes in technology that influence travel behavior, and the different lifestyle choices of the millennial generation.

Table 2.1 Average Daily Person Trips by Trip Purpose, 1977-2009

Trip Purpose	1977	1983	1990	1995	2001	2009
To or From Work	0.57	0.59	0.62	0.76	0.65	0.59
Family/Personal Errands	0.91	1.02	1.71	1.97	1.79	1.61
School/Church	0.35	0.34	0.35	0.38	0.4	0.36
Social and Recreational	0.71	0.8	1.01	1.07	1.09	1.04
Other	0.38	0.14	0.06	0.12	0.16	0.18
Total	**2.92**	**2.89**	**3.76**	**4.3**	**4.09**	**3.79**

Source: National Household Travel Survey 2009.

Commute and Non-Commute Mode Choice

While travel to work constituted only 16 percent of all trips in the U.S. in 2009 (Table 2.1), these trips typically account for a large share of traffic during the most congested periods of the day. Like the rest of the U.S., in New Mexico driving alone is by far the most common choice for commuting to work (Table 2.2). The mode share of commute trips in New Mexico is similar to that found in rest of the U.S., but with lower rates of carpooling and significantly lower rates of transit. Like the national trend, the rate of carpooling has fallen in New Mexico over the past decade, but

[1] SUMMARY OF TRAVEL TRENDS: 2009 National Household Travel Survey. Federal Highway Administration. U.S. Department of Transportation. 2011.

remains the second most common mode choice. Transit, bicycling to work, and working from home also increased slightly between 2000 and 2010 in New Mexico and in the U.S. as a whole.

Table 2.2 U.S. and NM Mode Share for Commute Trips, 1980 -2010

	United States				New Mexico	
Mode	**1980**	**1990**	**2000**	**2010**	**2000**	**2010**
Drive Alone	64.4%	73.2%	75.7%	76.6%	75.8%	77.7%
Carpool	19.7%	13.4%	12.2%	9.7%	14.8%	12.0%
Transit	6.2%	5.1%	4.6%	4.9%	0.8%	1.0%
Bicycle	0.5%	0.4%	0.4%	0.5%	0.6%	0.7%
Other	1.3%	1.1%	1.0%	1.2%	1.0%	1.2%
Walk	5.6%	3.9%	2.9%	2.8%	2.8%	2.4%
Work at Home	2.3%	3.0%	3.3%	4.3%	4.2%	5.0%

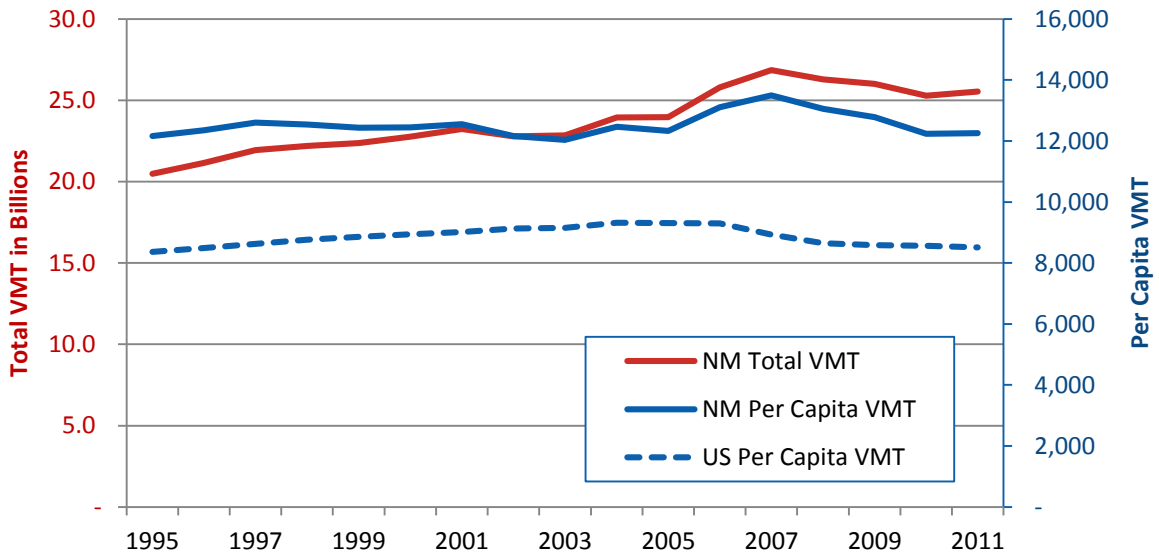
Source: American Community Survey2010 – Cited in Commuting in America, 2013; Census Transportation Planning Package New Mexico Profile.

Vehicle Miles Traveled

There are many factors that influence vehicle miles traveled (VMT) – the distance traveled by automobiles – including population density, income, employment density, and population demographics. Nationally, VMT peaked in 2004, with per capita VMT decreasing almost 9 percent between 2004 and 2013,[2] to near 1996 levels. In New Mexico, per capita VMT peaked in 2007 but remains higher than the national average due to the State's relatively low density and more dispersed population (Figure 2.1).

[2] 2014. Has Motorization in the U.S. Peaked? University of Michigan Transportation Research Institute.

Figure 2.1 NM Total and Per Capita VMT, 1995 -2011



Source: FHWA Highway Statistics, 1995 to 2013.

Traditionally, VMT and economic growth have tracked together.[3] Since 2004, however, the trend lines have diverged, as GDP has increased while VMT and daily person trips both declined. Between 2001 and 2009, average daily vehicle trips per person decreased from 4.09 to 3.79 in New Mexico. The average trip length for vehicle trips remained the same on average, but was lower for errands and shopping.[4] Nationally, vehicles per household peaked at 2.05 in 2006 and have since fallen to 1.93 (in 2012).[5] In New Mexico, in 2012, 5.7 percent of households had no vehicles and 33.5 percent had one available vehicle.[6]

2.2 Demographics

Over the past 25 years, New Mexico has experienced steady growth, increasing from 1.5 to 2.2 million people. Over the next 25 years, New Mexico is projected to experience a similar amount of growth – an additional 650,000 people that would bring the State's population to

[3] 2012. Exploring the Relationship between Travel Demand and Economic Growth. Rand Corporation.

[4] 2009. National Household Travel Survey.

[5] 2014. Has Motorization in the U.S. Peaked? University of Michigan Transportation Research Institute.

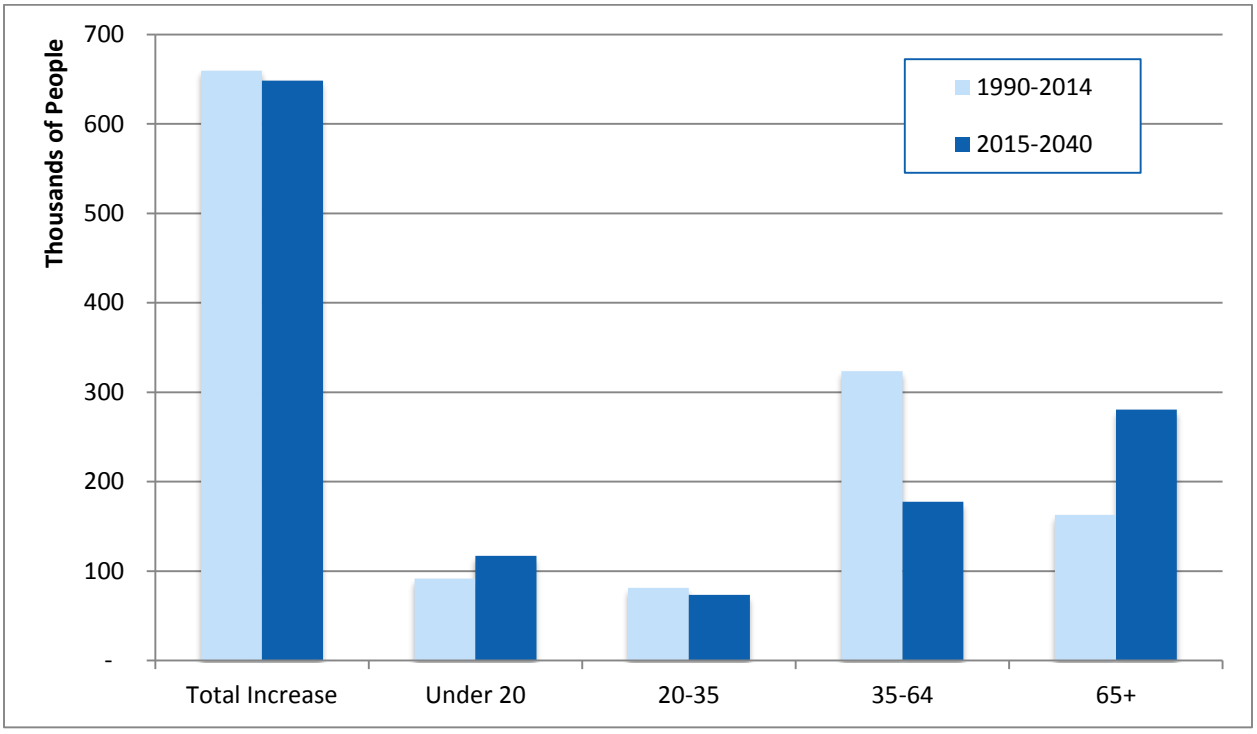
[6] 2012. ACS 2012- 5 year.

2.8 million in 2040.[7] However, the population demographics are projected to change in several key dimensions, detailed below.

Age

Over the last 25 years, the largest part of New Mexico's growth were adults of traditional working age. Over the next 25 years, the largest projected increase is in the over-65 population segment (Figure 2.2).

Figure 2.2 Change in New Mexico Population, 1990-2040



Source: University of New Mexico, GSP, 2014.

Increasingly, persons over 65 are choosing to stay in the workforce longer than before, which has implications for transportation systems. Among this age group, 16 percent are in the workforce, up from 11 percent in 1990. Currently, almost 4 percent of the total workforce comprises workers over the age of 65 and higher rates of older adults in the workforce are expected to continue.[8]

[7] University of New Mexico Bureau of Business and Economic Research, 2014.

[8] Commuting in America. 2013. Brief 3.

Mirroring this nationwide trend, the percent of people over the age of 65 who are in New Mexico's workforce has increased from under 14 percent to over 16 percent in the last 9 years.[9]

Table 2.3 Percent of Persons over Age of 65 in the Workforce, 2005-2013

Year	United States	New Mexico
2013	16.49%	16.43%
2012	16.19%	16.01%
2011	15.84%	15.59%
2010	15.54%	15.32%
2009	15.37%	14.54%
2008	15.04%	14.78%
2007	14.47%	14.05%
2006	14.51%	14.73%
2005	14.71%	13.59%

Source: U.S. Census Bureau. American Community Survey (2005 – 2013).

Table 2.4 New Mexico Population Projection for Age 60 and Older

	2000	2005	2010	2015	2020	2025	2030
United States (#)	45,797,200	49,712,714	56,922,418	65,551,441	75,487,837	84,652,165	91,129,331
New Mexico (#)	283,837	329,715	401,973	486,868	575,267	647,186	682,036
United States (%)	16.3%	16.8%	18.4%	20.3%	22.5%	24.2%	25.1%
New Mexico (%)	15.6%	17.3%	20.3%	23.8%	27.6%	30.7%	32.5%

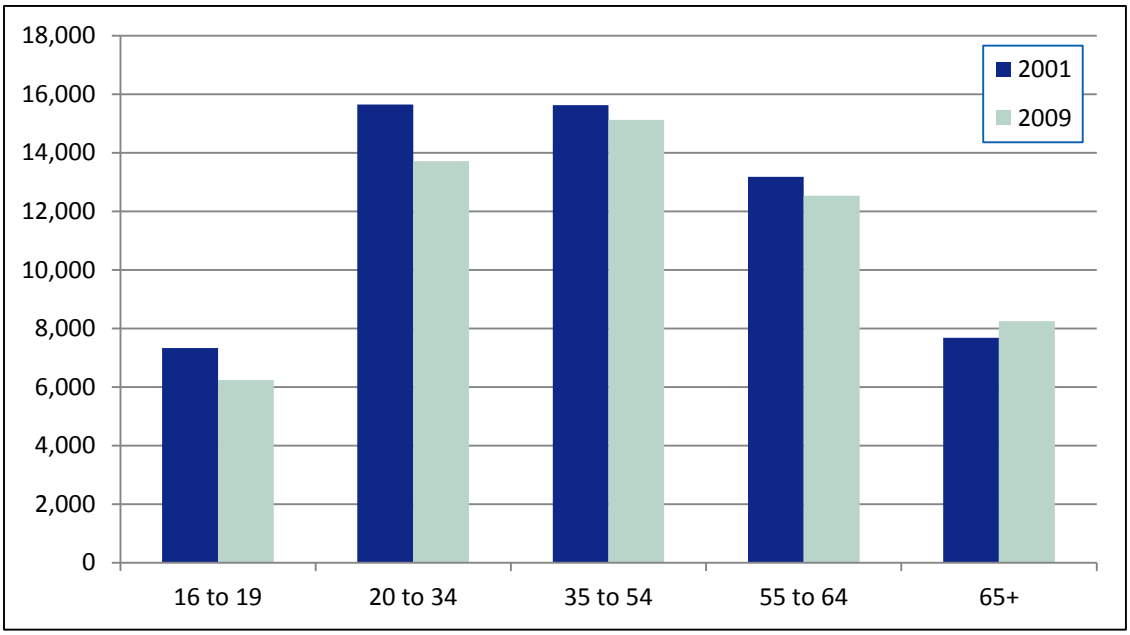
Source: NM Aging and Long-Term Services Department, 2013 based on U.S. Census data.

Age impacts travel behavior. On average, young people make fewer trips, drive fewer miles, and are less likely to travel by single occupancy vehicle (SOV). Nationally, all age groups made fewer trips in 2009 than they did in 2001, but the largest decline in trips were among 16- to 20-year olds, which saw a 15 percent decline, followed by a 9 percent decline for the 21- to 35-year old age group.[10] This decline in trips led to similar declines in VMT for young people. The only age group that saw an increase in VMT was the over-65 age group, for which VMT increased by 7.4 percent (Figure 2.3).

[9] U.S. Census Bureau. American Community Survey (2005 – 2013).

[10] 2009. National Household Travel Survey.

Figure 2.3 Average Annual Per Capita VMT by Age Group, 2001 and 2009



Source: NHTS 2009.

In New Mexico, like the national average, the over-65 age group is also significantly more likely to work from home, which would reduce VMT, but also is much less likely to carpool than other age groups. Figure 2.4 below shows New Mexico's mode share for commute trips by age.

Table 2.5 New Mexico Commute Mode Share by Age Group, 2012

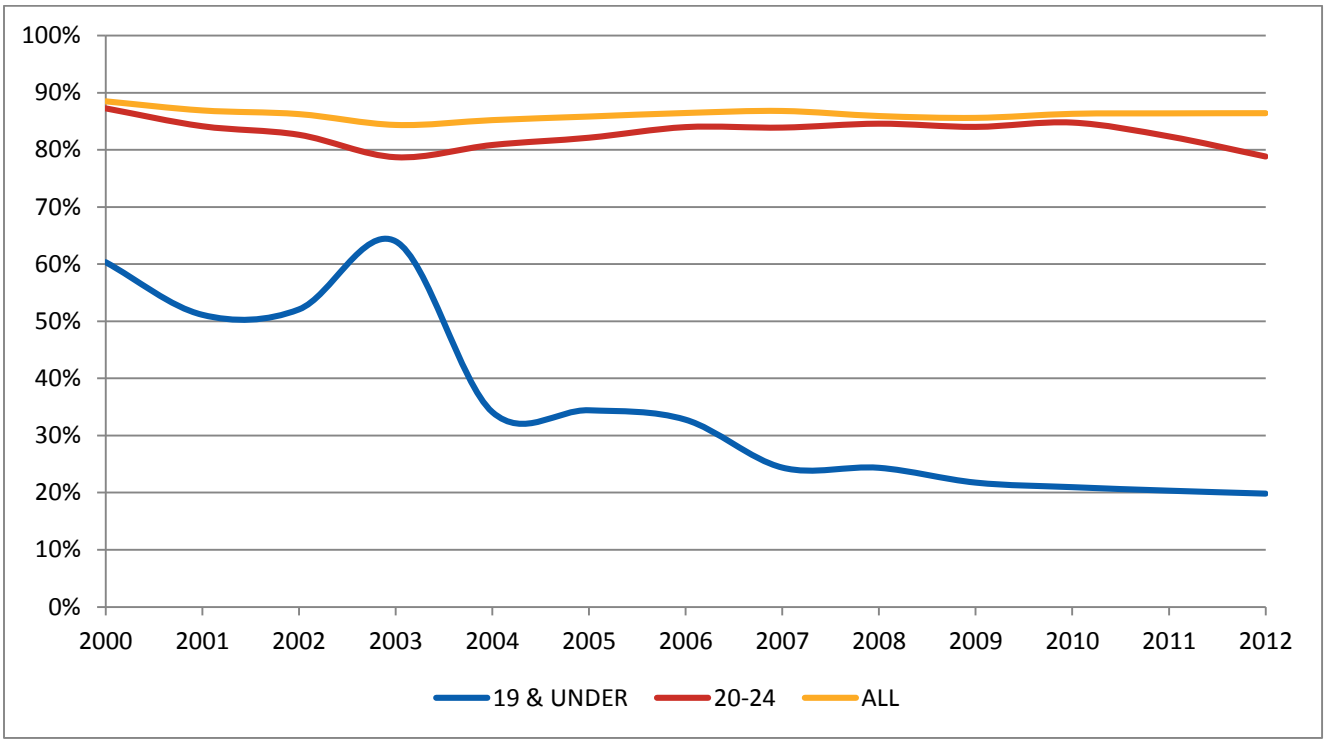
Age Group	Drive Alone	Carpooled	Transit	Walked	Other (Taxi, Motorcycle, and Bicycle)	Worked at Home
All Ages	78.4%	11.3%	1.1%	2.4%	1.9%	4.9%
16 to 24	76.5%	14.0%	1.2%	3.7%	2.5%	2.1%
25 to 44	78.9%	11.8%	1.0%	2.1%	1.9%	4.3%
55 and over	78.1%	8.2%	1.1%	2.2%	1.5%	8.9%

Source: U.S. Census Bureau. American Community Survey 2012.

Note: Different age groupings were provided between the ACS and NHTS data sources.

The proportion of the population with drivers licenses has also changed. Adults of traditional working age (25 to 55) are most likely to have drivers licenses.[11] In New Mexico, rates of licensure for the youngest drivers (under the age of 19) have decreased significantly over the past decade. Declining rates of licensure may be in part a function of increasing licensing requirements (e.g., graduated drivers license requirements that restrict the times and vehicle occupants for teen drivers) and of the recent economic decline. Notably, even young adults (20-24) show a recent dip in the rates of licensure that may impact future travel.

Figure 2.4 New Mexico Young Driver Licensure Rates



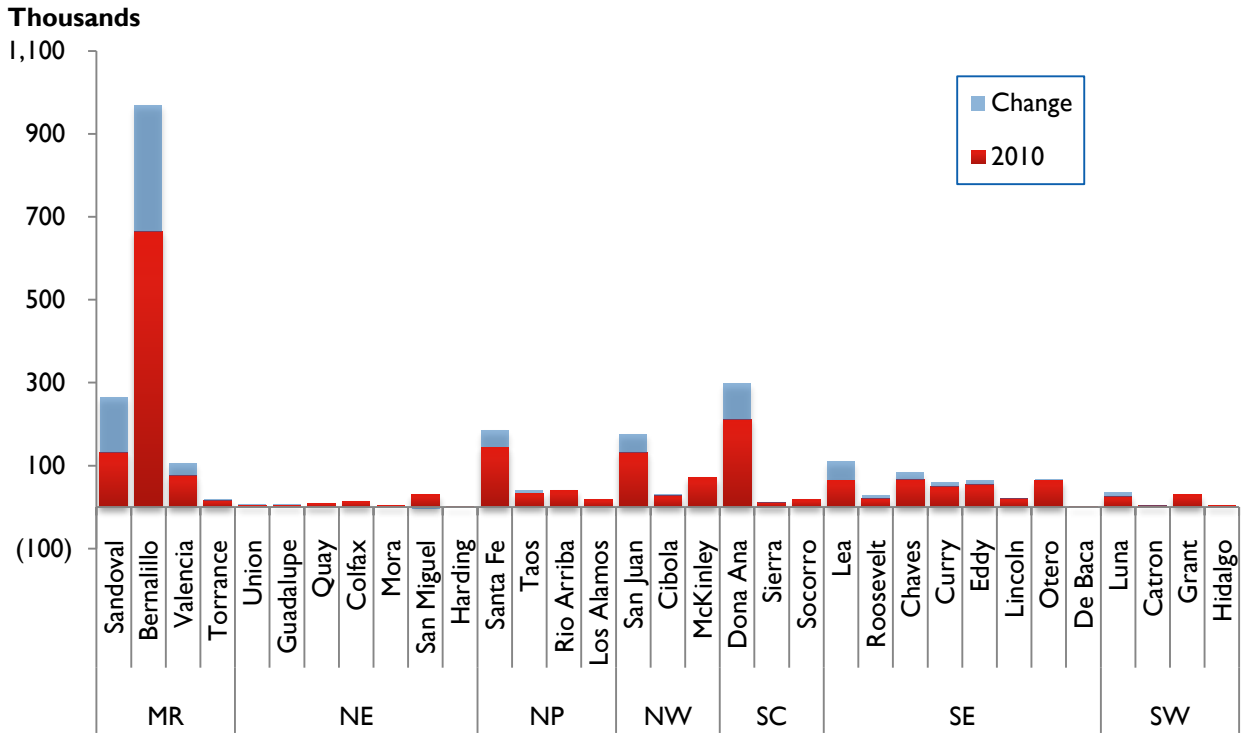
FHWA Highway Statistics, 200 to 2012; U.S. Bureau of the Census, 2000 to 2012

Population Distribution and Location

Over the last century, the population of New Mexico has gradually concentrated in the state's six metropolitan counties (Bernalillo, Dona Ana, Santa Fe, Sandoval, San Juan, and Valencia). The Albuquerque metropolitan area is the largest population center in the state. The trend towards urban concentration is projected to continue, while many of the rural parts of the state (such as Harding, Colfax, Mora, DeBaca, and San Miguel counties in the Northeast and Hidalgo County in the Southwest) are expected to see declines in population (Figure 2.5).

[11] Commuting in America, 2013.

Figure 2.5 Current and Forecasted 2040 Population by County and Region



Note: Counties are organized by severn regional transportation planning organization boundaries (MR = Mid Region, NE = Northeast, NP = Northern Pueblow, SC = South Central, SE = Southeast, SW = Southwest).

Increasing concentration of the population within New Mexico's urban areas will likely lead to changes in travel behaviors and corresponding transportation needs. According to the 2009 NHTS, drivers in urban places drive an average of 9,900 miles annually, whereas drivers who live in more rural areas drive an average of 14,900 miles annually. Suburban drivers travel an average of 12,100 miles and drivers in smaller cities travel 11,700 miles annually, on average.[12]

[12] 2013. Moving off the Road. US PIRG.

Table 2.6 All Trips Transit and Walk Mode Share by MSA Size, 2009

MSA Size	Transit	Walk
Not in MSA	0.1%	7.3%
<250K	0.4%	8.0%
250-500K	0.4%	8.0%
500-999K	1.2%	8.9%
1-3M	1.1%	9.1%
3M+	4.1%	14.2%

Source: NHTS 2009.

Immigration and Ethnicity

The racial and ethnic distribution of New Mexico is substantially different than that of the United States as a whole. One in ten New Mexican residents is of Native American descent, considerably higher than the national average of just over 1 percent.[13] Almost half of the population is of Hispanic or Latino ethnicity, close to three times higher than the U.S. as a whole. The percentage of New Mexicans that identify as African American or Asian American are much smaller than the U.S. as a whole and the percentage that identify as White is somewhat higher.

Table 2.7 New Mexico and United States Racial and Ethnic Makeup, 2012

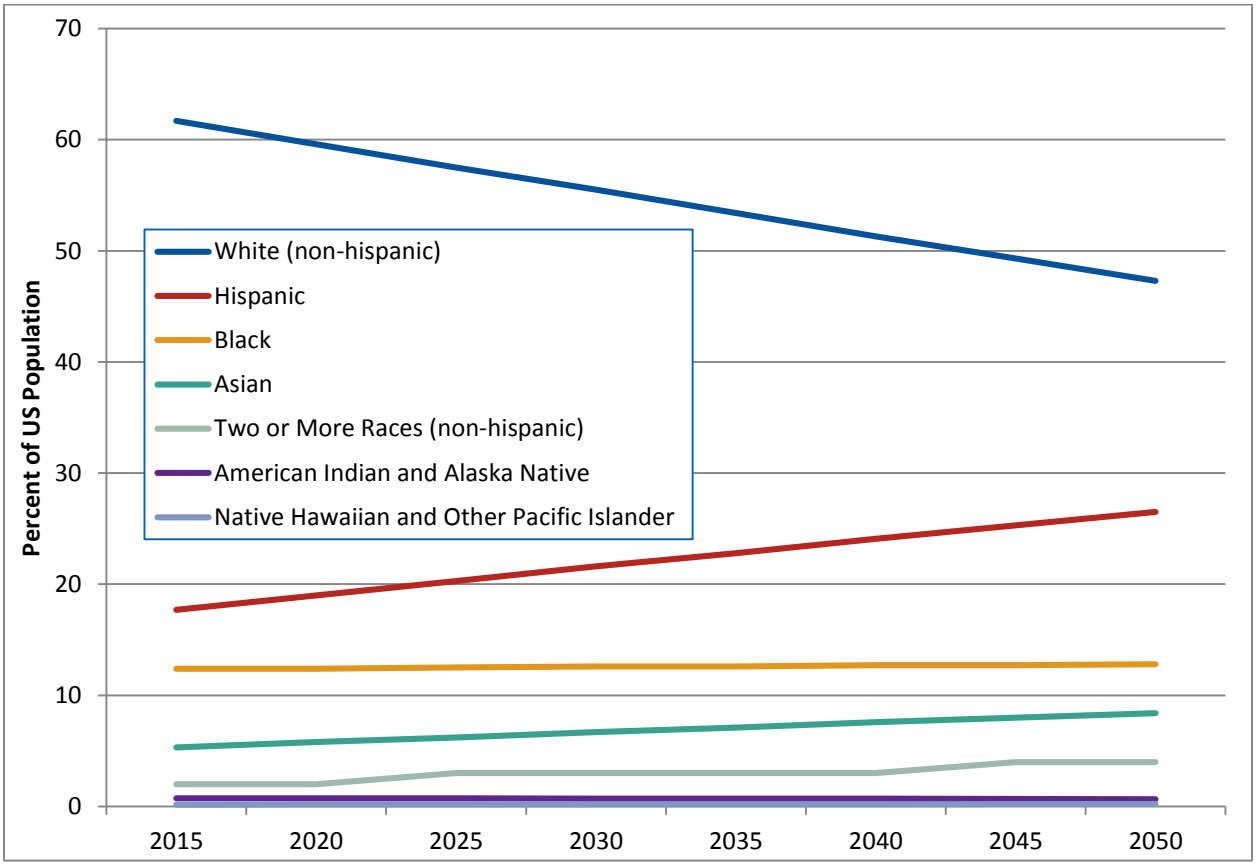
	New Mexico	United States
Race		
White alone	83.2%	77.9%
Black or African American alone	2.4%	13.1%
American Indian and Alaska Native alone	10.2%	1.2%
Asian alone	1.6%	5.1%
Native Hawaiian and Other Pacific Islander alone	0.2%	0.2%
Two or More Races	2.4%	2.4%
Ethnicity		
Hispanic or Latino	47.0%	16.9%
White alone, not Hispanic or Latino	39.8%	63.0%

Source: U.S. Census Bureau.

[13] U.S. Census Bureau. American Community Survey, 2012.

The U.S. is expected to continue to become more diverse over time, with a particular increase in the number of residents identifying as Hispanic relatative to other groups. States like New Mexico, and much of the Southwest, are likely to experience continued changes in the racial and ethnic composition along these lines.

Figure 2.6 Forecasted Racial Composition of U.S. Population, 2010 - 2050



Source: U.S. Census Bureau.

In New Mexico, the share of residents who are foreign born increased from 5 percent in 1990 to 9 percent in 2012.[14] Over 70 percent of New Mexico's foreign born residents are from Mexico.[15] Foreign born workers in the U.S. are 50 percent more likely to walk, nearly twice as likely to carpool, and almost three times as likely to use transit for commuting as those born in the U.S.[16]

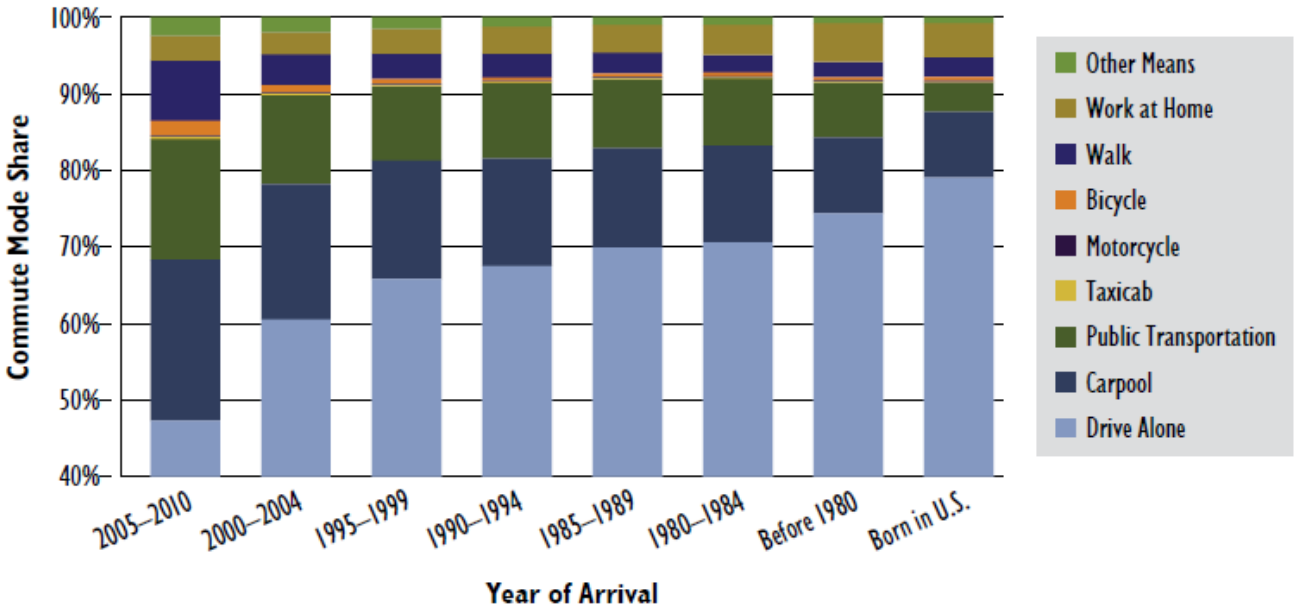
[14] Migration Policy Institute.

[15] Migration Policy Institute.

[16] 2013. Commuting in America.

This may be due to limited automobile access, lower average incomes, and cultural differences.[17] Compared to native born residents, foreign born residents in New Mexico are more likely to carpool to work (15 percent vs 11 percent) and walk to work (3 percent vs 2 percent).

Figure 2.7 Mode Choice of Immigrants by Year of Arrival in U.S.



Source: Commuting in America, 2013.

Reflecting a national trend, in New Mexico there are differences in commute mode choice between racial and ethnic groups (Table 2.8). Residents of Hispanic origin in New Mexico commute alone at a much higher rate than the national average (80 percent vs 68 percent), in part due to the lower transit rates, and in part due to lower rates of carpooling.

Table 2.8 New Mexico Commute Mode Share by Race/Ethnicity

Mode	Asian	African American	Hispanic	Native American	White, Non-Hispanic
Drive Alone	71%	77%	80%	76%	78%
Carpool	15%	11%	13%	12%	10%
Transit	1%	2%	1%	1%	1%
Walked	7%	4%	2%	3%	2%
Taxicab, motorcycle, bicycle, or other means	3%	3%	1%	1%	2%
Worked at home	4%	4%	3%	6%	6%

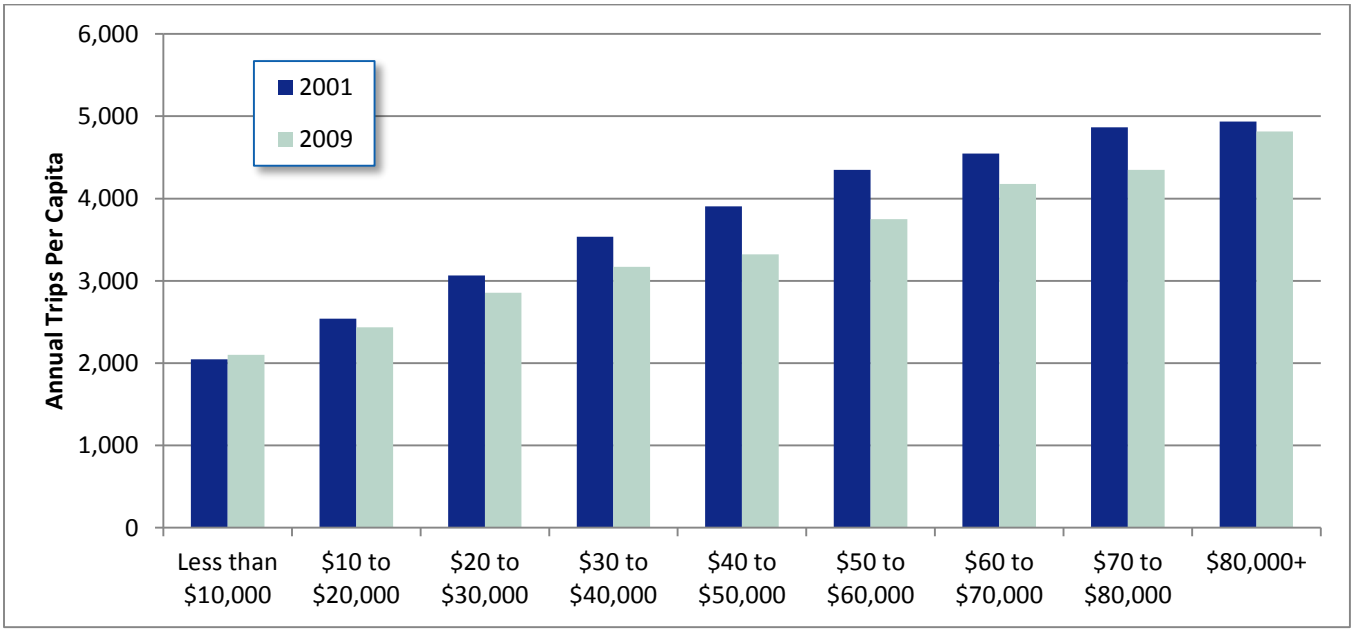
[17] 2011. Auto Motives: Understanding Car Use Behaviors. Chapter 11 - Migrating to Driving.

Income and Poverty

Income and poverty impact travel behavior. Average annual person trips increase with rising household income, though the rate of increase levels off at the highest incomes.[18]

Between 2000 and 2012, the number of people living in poverty in the U.S. grew from 12 to 15 percent of the U.S. population.[19] In 2012 dollars, the U.S. median household income decreased from $55,000 in 2000 to $53,000 in 2012.[20] In New Mexico in 2012, the median income was $45,000 and almost 20 percent of all individuals were living in poverty.[21] The state's per capita income ranks 43rd among the 50 states. Only two of New Mexico's 33 counties (Los Alamos and Sandoval) have average household income rates above the national average, while seven counties (Luna, Dona Ana, Roosevelt, Taos, San Miguel, Cibola, and McKinley) have more than 25 percent of the population living in poverty.[22]

Figure 2.8 National Average Annual Person Trips by Household Income, 2001 -2009



Source: NHTS 2009.

[18] National Household Travel Survey, 2009.

[19] U.S. Census Brief: https://www.census.gov/prod/2013pubs/acsbr12-01.pdf.

[20] ACS 2012; U.S. Census Brief: https://www.census.gov/prod/2013pubs/acsbr12-02.pdf.

[21] ACS 2012.

[22] U.S. Census Bureau. American Community Survey, 2013.

Income remains an important determinant of mode choice, but it is less important today than in the past.[23] Income influences mode choice because wealthier households are more likely to have access to a vehicle, and therefore have the option to drive alone. In the U.S., over 36 percent of people who use public transit for commuting do not have access to a vehicle. However, almost a third of all public transit riders had access to two or more vehicles, indicating that for many transit is a mode of choice. Rates of driving alone to work increase with income until it peaks at 81 percent for workers with $35,000 to $75,000 in household income. Carpooling and walking to work tend to decrease above $35,000 per year and public transit as a commute mode share is highest among lower income and highest income households.[24] Note that higher income households tend to be concentrated in more urbanized areas that are likely to have greater access to transit.

Table 2.9 U.S. Commute Mode Share by Household Income, 2012

Household Income	Drove Alone	Carpool	Transit	Walked	Other	Worked from Home
$0 to $10K	66%	13%	6%	7%	3%	6%
$10K to $15K	70%	12%	6%	4%	2%	5%
$15K to $25K	73%	12%	5%	3%	2%	4%
$25K to $35K	79%	10%	4%	2%	1%	3%
$35K to $50K	81%	9%	4%	2%	1%	3%
$50K to $65K	81%	8%	4%	1%	1%	3%
$65K to $75K	81%	8%	5%	1%	1%	4%
$75K or more	78%	7%	6%	2%	2%	6%

Source: ACS 2012 5-Year. Note: Totals may not equal 100% due to rounding.

2.3 Potential Implications for Planning in New Mexico

By 2040, New Mexico is projected to grow by 650,000 residents, but recent trends and potential future shifts in travel behavior and demographics indicate that highway facility usage may not grow commensurately and may not be distributed identically across the state. Changes in the per capita rate of facility usage due to shifts in demand may have long-term implications for the performance, condition, and funding of New Mexico's roadways.

Over the previous decade, average daily trips and daily person miles traveled have both declined in New Mexico, consistent with national trends. Person miles traveled to work and for errands have decreased most significantly—even as the share of commute trips by car pool, transit, and walking diminished and the share of commuters who drove alone increased from 75.8 percent to 77.7

[23] Commuting in America, 2013. Brief 10.

[24] American Community Survey 2012 – 5 year, U.S. Census Bureau.

percent. The trend toward reduced trips and miles traveled is not fully understood, but a variety of demographic drivers may contribute.

Nationwide, trip reduction was greatest among 16-20 year olds (15 percent), followed by 21-35 year olds (9 percent). Rates of licensure in New Mexico have also fallen among the state's youngest eligible residents. If this trend continues—among these cohorts as they age, among the youngest age cohorts that replace them, or both—it may contribute to further decline in trips and VMT.

At the upper end of the age spectrum, the proportion of the over-65 population segment remaining in the workforce has increased from 11 percent in 1990 to over 16 percent in 2014. Commensurately, VMT growth for this group increased by 7.4 percent between 2001 and 2009 (the only age cohort not associated with VMT decline during this period). In terms of population share, this cohort is projected to grow most significantly over the next 25 years. If the trend toward greater workforce participation among older adults continues it may contribute to an increase in trips—although adults over the age of 55 were also more likely to telecommute (8.9 percent) than any other age group.

In accord with recent trends, already urbanized areas of New Mexico are projected to grow—receiving a relatively greater distribution of overall population growth—while some rural areas are projected to decline in population. Nationally, on an annual basis urban residents drive an average of 5,000 miles fewer than their rural counterparts (2009 NHTS). If projections for statewide population redistribution to more urbanized counties are correct then this phenomenon would likely contribute to a decline in vehicle miles traveled.

The share of foreign-born New Mexicans has increased from 5 percent in 1990 to 9 percent in 2012. Currently, foreign-born residents are much less likely to drive alone than native-born residents. Much of this phenomenon may be attributable to lower average incomes (see below), although a variety of cultural factors—which differ by origin—are likely are also in play. The future growth of foreign-born residents in New Mexico by origin is highly dependent on Federal immigration policies and economic, social, and political factors within countries of emigration. Therefore, the effect of immigration on future travel activity in New Mexico is uncertain.

Travel activity corresponds with income and general economic prosperity, to a degree, although recent GDP growth has not resulted in commensurate increases in trips or vehicle miles traveled. Annual per capita person trips rise significantly as household income increases—from about 2,000 at the lowest rungs of the income ladder (below $10,000/year) to nearly 5,000 at the top (greater than $80,000 year). However the rate of increase declines rapidly in the middle- to upper-income tiers. Commute mode choice is also affected by income. Among the lowest income tier (again, below $10,000/year), 66 percent commute by car alone, whereas the shares for all income brackets exceeding $25,000/year fall within the range of 78 to 81 percent. In New Mexico in 2012, the median income was $45,000 and almost 20 percent of all individuals were living in poverty. Generally, *trip generation is expected to track shifts in income levels in New Mexico*—although demand typically levels off at the higher end of the income range. If the share of New Mexico's households earning $25,000/year or less (current year dollars) shifts, *a correlated change in the percentage of commuters who drive alone would be expected* (e.g., a smaller share below $25,000 would likely increase the rate of driving alone, and vice versa).

Summary: Recent trends toward lower per capita trip generation and miles traveled (particularly among younger age groups) coupled with expected increasing urbanization, could result in decreased VMT in New Mexico. This effect could be partially mitigated by an increase in the over-65 population share and potential changes in work/travel behavior among this cohort. However, social and economic factors, like immigration and income levels, significantly affect travel activity. In particular, shifts in income levels—especially the share of individuals in poverty—could meaningfully influence trip making in the state.

3.0 Economic Changes

The economy in New Mexico has improved over the past few years as it continues to recover from the 2008 recession. The recovery in New Mexico, however, has been slower than most of the rest of the United States. The percent increase in real gross domestic product (GDP) in New Mexico was just 0.2 percent in 2012, tied for the lowest in the country, in contrast to the national average of 2.5 percent. Slow economic growth in New Mexico is partly attributable to a lackluster construction industry, which employs about 10,000 fewer people than it did in 2007.[25] Household income in New Mexico remains low relative to the past decade. In 2012, the median household income in New Mexico was $44,900, which is 1 percent less than 2000 levels and 15 percent less than 2005 levels in inflation adjusted dollars.[26]

The state's official unemployment rate in 2012 was 7.1 percent, up from 3.7 percent in 2007. However, including people who have stopped looking for work and those who are involuntarily underemployed, the rate is twice as high.[27] Outside of government (approximately 184,000 workers), the largest private sector industries in the state include education, healthcare, retail trade, professional and technical services, and tourism and hospitality. Total private sector employment reached 596,000 in 2011, and most major sectors remain below the peak employment levels of 2008. Between 2010 and 2020, New Mexico's economy is projected to add over 136,000 jobs, equaling a growth rate of 15.9 percent,[28] compared to the previous forecast of 8.2 percent for 2008 to 2018.[29] The largest increase in job growth, in both total and percentage terms, is projected to be in the Health Care and Social Assistance industry, with an increase of over 32,000 jobs (greater than 28 percent growth).

New Mexico's Economic Development Department's FY13 Strategic Plan includes an assessment of the strengths, weaknesses, opportunities, and threats (SWOT) facing the state's economy. Strengths include New Mexico's natural resources, high levels of PhDs in the workforce, and low-cost labor, while weaknesses include high poverty rates, gaps in infrastructure, and poor educational attainment at primary and secondary education levels. The Plan highlights energy, technology, and border development as economic opportunities for New Mexico. Threats to economic development include competition from other states with more business-friendly policies, reduced development resources and overdependence on federal resources, and rural population loss.[30]

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[25] University of New Mexico Bureau of Business and Economic Research, 2014.

[26] University of New Mexico Bureau of Business and Economic Research, 2014; U.S. Census Bureau.

[27] University of New Mexico Bureau of Business and Economic Research, 2014.

[28] The projected national growth rate is 14.3 percent for the period between 2010 and 2020.

[29] New Mexico Economic Research and Analysis Bureau, 2012.

[30] 2013. New Mexico Economic Development Department Strategic Plan.

Table 3.1 Private Sector Employment Projections in New Mexico by Industry

Industry	Estimated 2010	Projected 2020	Net Change	Percent Change
Health Care & Social Assistance	115,460	147,890	32,430	28.1%
Mining	18,430	23,220	4,790	26.0%
Educational Services	80,950	101,800	20,850	25.8%
Accommodation & Food Services	79,110	97,910	18,800	23.8%
Administrative & Support Services	41,130	49,900	8,760	21.3%
Retail Trade	89,820	104,840	15,030	16.7%
Transportation & logistics	17,420	20,310	2,890	16.6%
Arts, Entertainment & Recreation	12,660	14,620	1,960	15.5%
Professional & Technical Services	53,980	62,230	8,240	15.3%
Other Services (Except Government)	20,900	23,920	3,020	14.5%
Real Estate & Rental & Leasing	9,690	11,070	1,380	14.2%
Construction	46,360	52,390	6,030	13.0%
Finance & Insurance	21,430	23,640	2,210	10.3%
Utilities	4,370	4,650	270	6.2%
Government	93,360	99,180	5,820	6.2%
Management of Companies	4,960	5,240	280	5.6%
Wholesale Trade	21,900	23,090	1,190	5.4%
Agriculture	10,650	10,790	140	1.3%
Information	14,270	14,310	40	0.3%
Manufacturing	29,030	28,600	-430	-1.5%
Total	**855,300**	**991,600**	**136,300**	**15.9%**

Source: New Mexico Economic Research and Analysis Bureau 2012.

New Mexico's economy relies heavily on government employment and government expenditures. New Mexico receives more dollars from the federal government per dollar of tax paid than any other state, and ranks sixth in per capita federal aid. Federal austerity measures could have dramatic effects on the New Mexico economy.

Transportation and logistics, including the aerospace industry, is an important industry to New Mexico's economy. The rapid growth of export-driven industrial production within the Mexican state of Chihuahua creates an opportunity for development in New Mexico. On the U.S. side of the border, significant developments have strengthened New Mexico's industrial base and capacity to actively trade with Mexico. In particular, the Foxconn electronics manufacturing hub operating just across the border in Jeronimo, near Ciudad Juarez, Mexico has produced significant opportunities for suppliers of components and services in New Mexico. As of 2012, only one quarter of the land

on which the production facility is sited had been built out.[31] In 2014, Union Pacific opened a new $400 million rail yardjust outside of Santa Teresa intended to relieve stress on both its El Paso and Southern California yards. The rail yard is forecasted to have a $48.5 million annual benefit, growing to $77.8 million by 2025.[32]

The aviation and aerospace industries have historically been vitally important for New Mexico's economy. New Mexico is home to more than 100 aviation and aerospace companies that serve both military and civilian needs. Air travel facilitates tourism, business travel, and goods movement, and the aircraft and aerospace manufacturing industries provide direct employment, tax revenues for local governments, and indirect benefits for related industries. In early 2014, the State legislature passed House Bills 14 and 24 granting additional tax benefits to aerospace parts and aircraft manufacturers.[33] Albuquerque International Sunport (ABQ) is the largest airport in the state and a large contributor to the regional and state economies. More than 20,000 jobs are directly or indirectly related to the state's airports and $1.9 billion in annual economic output is attributable to ABQ. However, the aviation industry is highly sensitive to economic conditions. Total passenger enplanements nationwide have increased at a slow but steady rate since 2009, but remain lower than the peak recorded in 2007.[34] In New Mexico, total enplanements at commercial service airports have continued to decline despite the rebounding economy.[35] New Mexico's heavy reliance on the aerospace and aviation industries indicates that the state's economy may be especially sensitive to changes in broader economic conditions nationwide.

3.1 Potential Implications for Planning in New Mexico

Between 2010 and 2020, New Mexico's economy is projected to add over 136,000 jobs (almost 16 percent growth), with the greatest share of that growth in the Health Care and Social Assistance industry. Generally, significant job growth could be expected to contribute to a reduction of poverty and a commensurate increase in trip making. The continued clustering of export-based manufacturing in the Mexican state of Chihuahua creates an opportunity for development in New Mexico, but the associated quantity and quality of jobs over the long term is yet uncertain. Although wage growth was not analyzed specifically, New Mexico is currently an established provider of low-cost labor and has relatively low levels of educational attainment, indicating that at least a portion of expected job growth will be in low-wage industries. Job growth is expected to contribute to increases in travel activity, but increases could be partially mitigated if a large proportion of this growth is in low-wage sectors.

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[31] "Foxconn plant may boost Santa Teresa," 08/01/2012 *El Paso Times*. http://www.elpasotimes.com/ci_21203328/foxconn-plant-may-boost-santa-teresa.

[32] NMDOT Office of International Programs. 2014.

[33] "New Mexico Aviation Tax Exemptions Headed to Governor." National Aviation Business Association. http://www.nbaa.org/admin/taxes/state/nm/20140221-aviation-exemptions.php.

[34] Bureau of Transportation Statistics. United States Department of Transportation. Air Carrier Traffic Statistics: http://www.rita.dot.gov/bts/acts.

[35] Federal Aviation Administration. Passenger Boarding (Enplanement) and All-Cargo Data for U.S. Airports: https://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/.

Government (at all levels) provides over 10 percent of employment in New Mexico, and Federal expenditures are crucial to the New Mexican economy. As a result, New Mexico's economy is particularly sensitive to shifts in Federal revenues (associated with national economic performance and tax policy) and spending policies (both the amount and distribution of Federal spending). Aerospace, a particularly important industry to New Mexico, is also highly dependent on government expenditures and on national travel activity (and therefore the national economy). The affect of future government expenditures and the national economy on travel activity in New Mexico is uncertain.

Summary: Overall job growth in New Mexico would equate to an increase in travel activity, although this effect is muted in lower wage brackets (correlated with significantly less trip making than middle- to upper-income tiers). If job growth in New Mexico is relatively stronger in low-wage sectors, the associated increase in travel activity would be partially mitigated. Given the State's strong reliance on Federal spending, shifts in the national economy and/or in Federal spending policy could significantly influence the state's economy and associated travel activity.

4.0 Energy

The future of energy in transportation is unknown. New Mexico must consider how much fuel may be needed, the potential cost of the fuel, and the possible types of fuel that will be used. Impending changes in fuel economy standards, coupled with shifts in vehicle miles traveled, influence the amount of fuel required. The supply and demand of oil will continue to influence gas prices. Beyond gasoline, changes in technology may create new fuel needs. Although future travel behavior and fuel costs are highly uncertain, future automobiles will achieve better fuel economy—just based on current CAFÉ standards.

It is also likely that hydrogen, natural gas, biofuel, and/or electricpowered vehicles (collectively, alternative fuel vehicles or AVFs) will claim a larger market share as the century progresses. However, gasoline has major advantages over AFVs because it is the incumbent technology (claiming an overwhelming proportion of the current vehicle fleet) with an established fueling infrastructure. Advances in technology (principally hydraulic fracturing or fracking) have reduced the cost of extracting previously uneconomical sources of crude oil. Additionally, increases in fuel economy will further lower per-vehicle fuel demand. These factors, coupled with the barriers to AFV adoption, suggest that petroleum may remain the dominant fuel source through the middle of the 21st century.[36]

4.1 Petroleum Usage

The Environmental Protection Agency (EPA) has mandated the efficiency of the U.S. light-duty vehicle (LDV) fleet since 1975 through Corporate Average Fuel Economy (CAFE) standards and for medium and heavy-duty vehicles (M/HDV) since 2011. In 2009, LDV accounted for 55 percent of transportation-related greenhouse gas emissions and M/HDVs and buses accounted for 21 percent.[37] For LDVs, starting in 2007, a series of increases to the CAFE standards for cars and light trucks was mandated by the Energy Independence and Security Act. The implementation of stricter CAFE standards is expected to lead to a substantial reduction in fuel consumption for the national light duty vehicle fleet. EPA rules announced in April 2010 set higher standards for new vehicles sold from model year 2012 through 2016, requiring incremental improvements in vehicle efficiency each year. The standards finalized in August of 2012 would incrementally raise the corporate average fuel economy to 54.5 MPG in model year 2025.[38] Jointly issued by the EPA and the National Highway Traffic Safety Administration, the 2011 emissions standards for medium and

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[36] 2014. NCHRP Report 750: Strategic Issues Facing Transportation. Volume 5: Preparing State Transportation Agencies for an Uncertain Energy Future.

[37] TRANSPORTATION ENERGY FUTURES SERIES: Potential for Energy Efficiency Improvement Beyond the Light-Duty-Vehicle Sector. National Renewable Energy Laboratory, U.S. Department of Energy. 2013.

[38] Corporate Average Fuel Economy. U.S. Environmental Protection Agency; U.S. Department of Transportation. http://www.nhtsa.gov/fuel-economy/.

and heavy-duty vehicles apply to new vehicles sold between 2014 and 2018.[39] This ruling is expected to reduce diesel fuel consumption for big-rig trucks by 10-23 percent, vocational vehicles (garbarge trucks, school buses, etc) by 6-9 percent, and large pickup trucks/vans by 10-15 percent.[40]

New Mexico has a unique passenger vehicle profile, with a higher percentage of light trucks than the U.S. average. The impact that these standards will have on New Mexico is determined by the makeup of the existing vehicle fleet and future trends in fleet renewal (i.e., the average age and composition of vehicles on the road). Nationwide, auto fleet turnover is slowing down, despite substantial buybacks of older cars. The average age of cars on the road in the United States is at a record high 11.4 years.

4.2 Alternative Fuel Vehicles

Alternative fuel vehicles have increased in popularity over the past two decades (see Figures 4.1 and 4.2 below). Figure 4.1below shows the estimated total alternative fuels consumption by motor vehicles in the United States from 1995-2012. While the consumption of alternative fuels is increasing nationwide, the consumption of all alternative fuels combined is equivalent to less than 5 percent of the gasoline consumed by automobiles.[41] In New Mexico, there are only three public biodiesel stations, eight E85 ethanol stations, 47 propane facilities, and 54 public electric charging stations. As of 2014, there are no hydrogen or LPG refueling stations in New Mexico.[42] One of the largest challenges for AFVs nationwide is the lack of an established refueling infrastructure. Because of this, AFVs traditionally have been more popular as fleet vehicles for which centralized refueling is possible.

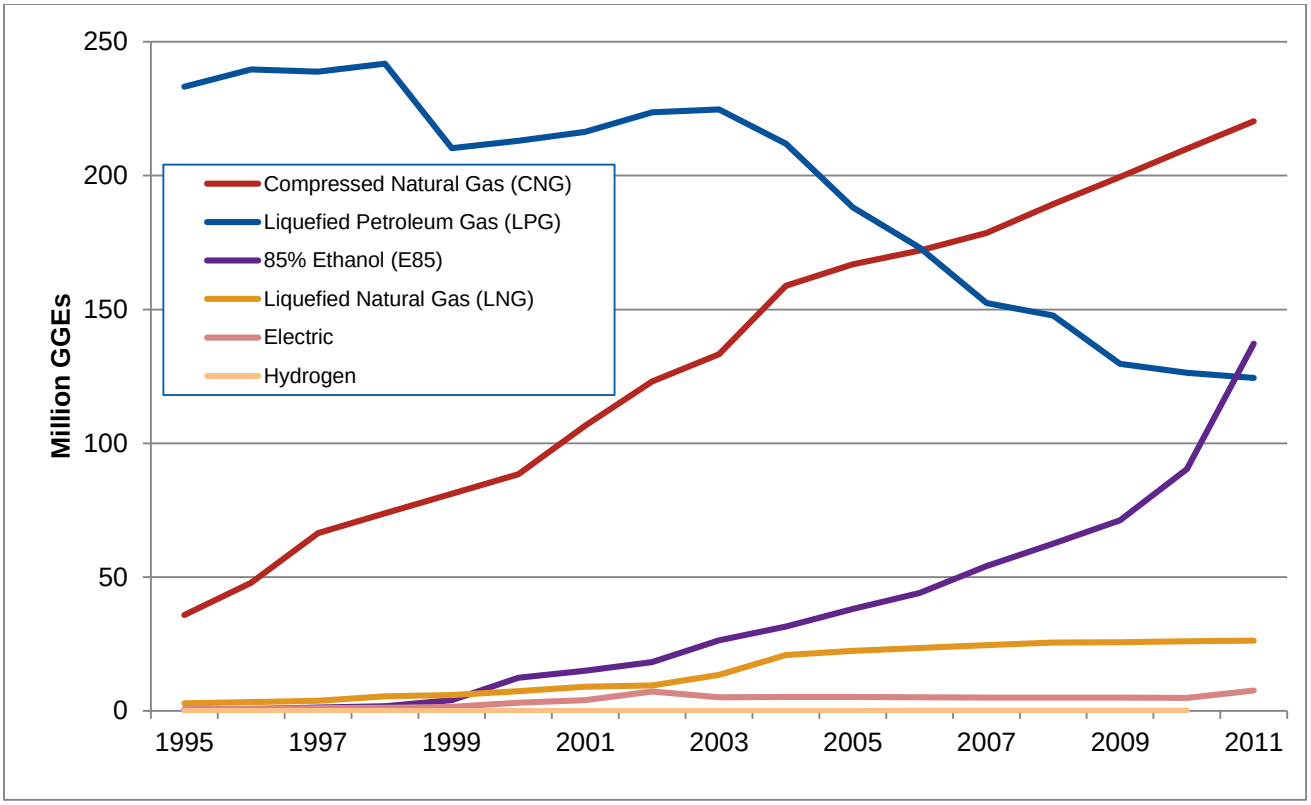
[39] Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles; Final Rule. U.S. Environmental Protection Agency; U.S. Department of Transportation. 2011. http://www.gpo.gov/fdsys/pkg/FR-2011-09-15/pdf/2011-20740.pdf.

[40] Heavy-Duty Vehicle Global Warming Emissions and Fuel Economy Standards. Union of Concerned Scientists, 2013.

[41] Alternative Fuels Data Center – U.S. Dept of Energy.

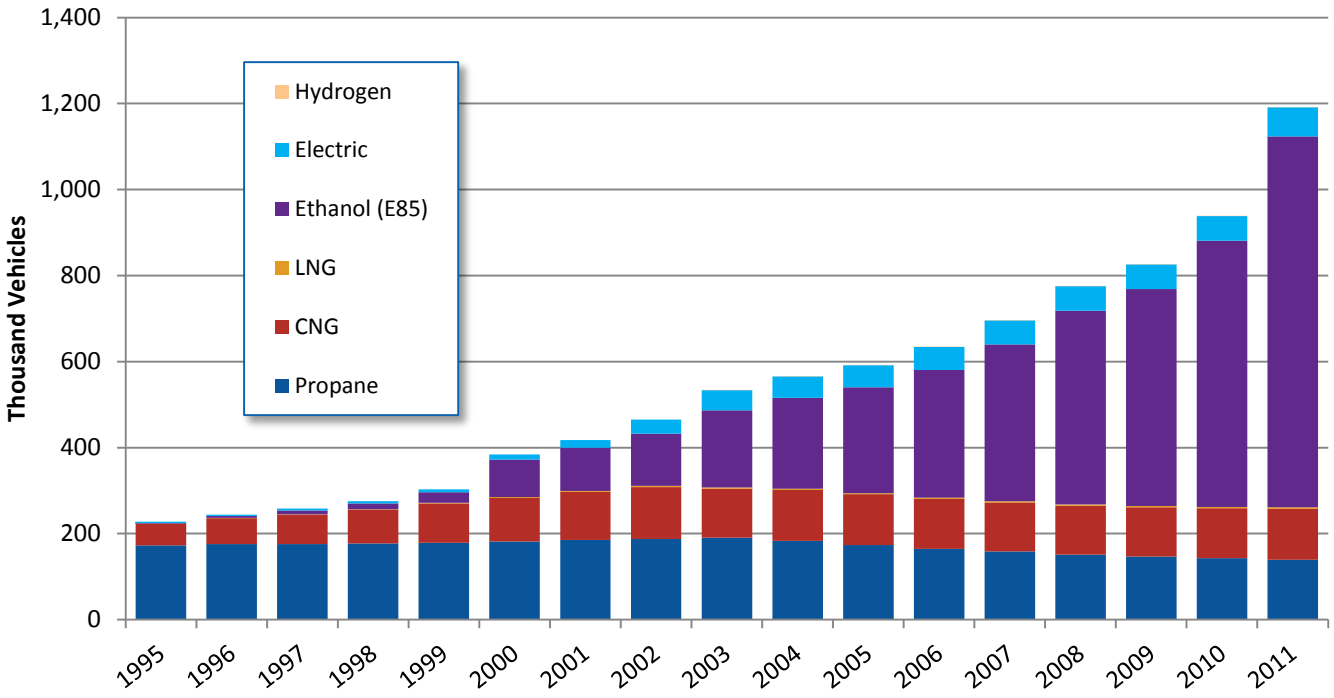
[42] Alternative Fuels Data Center – U.S. Dept of Energy.

Figure 4.1 Estimated Consumption of Alternative Fuels by Vehicles in the U.S.
In Gasoline Gallon Equivalent, GGE



Source: Alternative Fuels Data Center – U.S. Department of Energy, 2014.

Figure 4.2 Alternative Fuel Vehicles in Use, 1995-2011



Source: Alternative Fuels Data Center – U.S. Department of Energy.

4.3 Potential Implications for Planning in New Mexico

Particularly in lower wage sectors, travel activity is affected by the price of fuel. All else being equal, *higher fuel prices lead to shifts away from driving alone among the lower-income tiers, and vice versa*. However, as vehicles become more fuel efficient over time as a result of CAFE standards (54.5 MPG in model year 2025), this effect may diminish. The quantity of petroleum-based fuels consumed also affects the amount of revenue collected through the gas tax, the traditional funding source for public transportation infrastructure (see Revenue section, below). Alternative fuels are currently available, but have not achieved significant market penetration in New Mexico. Some states and metropolitan areas are seeing signifcant adoption of alternative fuel vehicles and, to the extent these vehilces become cost competitive, they are likley to become are larger share of vehicles purchased in New Mexico.

Summary. The price of fuel and the efficiency of the vehicle fleet in New Mexico will affect travel activity and revenue generation in portentially significant ways. While vehicle efficiency is expected to increase dramatically due to Federal regulations, the future price of fuel (and the types of fuel in use) is something for NMDOT staff to continue to monitor. From a revenue perspective, NMDOT needs to watch for a potential tipping point to non-petroleum fuels. If this trend were to accelerate (for example, due to technology or fuel cost), then New Mexico would experience a significant erosion of its revenue base that would need to be addressed;

5.0 Technological Changes

5.1 Autonomous and Connected Vehicles

Autonomous and connected vehicle (A/CV) technology has the potential to drastically change how people and goods move in the future, although even partial implementation may be 20 years off, or more.[43] Autonomous vehicles are those that can operate with a driver, while connected vehicles are able to exchange information with roadside equipment or other vehicles to help avoid collisions. The speed and scale of A/CV adoption remain to be seen, and will be impacted both by the development of economical A/CV technology and infrastructure and the evolution of related policies and regulations.

The implications of significant A/CV market penetration include the potential for a dramatic reduction in collisions, improved system efficiency, and a reduction in energy consumption and emissions due to more efficient operations. Connected vehicles would benefit from the ability to coordinate vehicle opertations, optimizing the space and speed of the vehicles in the network, increasing system efficiency. But installing communication systems on all roadways or in every car is too costly for the short-term broad implementation.

AV technology ranges from the ability to drive without a human to simply automating one or more functions. This technology is not new or limited to experimental vehicles. Major manufacturers have incorporated functions to assist drivers over the past decade, including self parking, crash warning systems, lane keeping systems, and automatic braking technology. All major manufacturers are investigating the technology and commercial production of fully autonomous vehicles are expected between 2020 and 2035.[44] The potential safety benefits are significant. It is estimated that nearly a third of all collisions could be prevented with already available common assisted driver functions: forward collision and lane departure warning systems, blindspot assist, and adaptive headlights. Automatic breaking would reduce the rates even further. When completely autonomous, rates of collisions could plummet due to the large percentage of collisions attributable to alcohol usage and other forms of driver error. In 2012, Google announced their fleet of AVs had driven over 300,000 miles without a collision.

The potential effect of autonomous vehicles on transportation systems and land use is uncertain. A/CVs are expected to increase system efficiency and reduce congestion by maximizing the number of vehicles capable of using the network. As cars become safer, even more gains in system efficiency may be achieved; roughly one quarter of all roadway congestion is due to accidents.[45] However, because AVs are anticipated to enable faster, more efficient travel and free "drivers" to engage in other activities while in transit, they may encourage sprawl and reduce the share of

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[43] RAND Corporation, Autonomous Vehicle Technology: A guide for Policy Makers, 2014.

[44] RAND Corporation, Autonomous Vehicle Technology: A guide for Policy Makers, 2014.

[45] 2014. Rand Corporation. Autonomous Vehicle Technology: A guide for Policy Makers.

other transportation modes, like transit, although they might also facilitate more convenient, efficient urban parking. If A/CVs are able to significatntly reduce collisons, they may enable the production of smaller and lighter vehicles. Smaller vehicle size would bring gains in fuel economy and reductions in GHG emissions.

There remain practical and legal challenges before AVs will become common place on the roadways in New Mexico. For one, there are concerns and uncertainty with regards to liability and regulation. Federal regulations govern vehicles and while state DMVs regulate drivers; however, when the vehicle becomes the driver this distinction becomes less clear. Many states are seeking legislation to better define and govern the adoption of AVs. As of 2015, four states and Washington DC had policies regulating autonomous vehicles and bills in 24 other states had been introduced to define autonomous vehicles and liability, including New Mexico's neighbors Colorado, Arizona, and Texas, which failed to pass the legislation.[46]

5.2 Mobile Applications

According to the National Renewable Energy Laboratory, "behavioral changes may have the effect of reducing travel, shifting travel to more efficient modes, or improving the efficiency of existing travel."[47] NREL considered the role of technologies and mobile applications (apps) in changing travel behaviors, including dynamic ridesharing/carsharing, real-time transit and multimodal information, real-time traffic and parking information, and eco-driving applications. Since the report was issued in 2013, the proliferation and effectiveness of these mobile applications has increased.

Dynamic ridesharing and ride matching (more colloquially, carpooling) applications reduce vehicle miles traveled by matching riders with shared or similar origins and destinations (increasing vehicle occupany and eliminating the need for parallel vehicle trips). Although a variety of intra- and inter-city ridesharing applications exist, the rise of major transportation network companies like Uber and Lyft has significantly expanded options for on-demand/real-time ridesharing and ride matching (with products such as UberPOOL, for example). Particularly in urbanized areas, the continued growth of transportation network companies could lead to (likely modest) *reductions in "drive alone" mode share and a commensurate drop in vehicle miles traveled*. The ease of use of such applications may, however, induce demand in certain cases.

Real-time transit and multimodal information applications (primarily for smart phones) provide up-to-the-minute details on transit options, stations/stops, travel times, connecting services, and fares (sometimes coupled with direct payment options), allowing travelers to make more informed choices and increasing the ease and attractiveness of transit modes. Most major transit agencies now feature one or more informational applications, and third-party vendors (Google, for example)

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[46] Gabriel Weiner and Bryant Walker Smith, Automated Driving: Legislative and Regulatory Action, cyberlaw.stanford.edu/wiki/index.php/Automated_Driving:_Legislative_and_Regulatory_Action.

[47] Porter, C. D.; Brown, A.; DeFlorio, J.; McKenzie, E.; Tao, W.; Vimmerstedt, L. (2013). Transportation Energy Futures Series: Effects of Travel Reduction and Efficient Driving on Transportation: Energy Use and Greenhouse Gas Emissions. 113 pp.; NREL Report No. TP-6A20-55635; DOE/GO-102013-3704.

help travelers find the most efficient route, chain multiple transit options, and compare travel times for multiple modes (driving versus transit versus walking versus bicycling). In instances where transit modes have similar travel times and/or significantly lower costs than driving, real-time information apps should contribute to the reduction of vehicle miles traveled.

Real-time routing information for drivers has been widely available for over a decade, originally exclusively in the form of dashboard Global Positioning Systems, and now available through common mobile mapping applications on most smart phones. Real-time traffic information is now available on both platforms, encouraging drivers to adopt the most efficient routings between origins and destinations (and likely discouraging trips entirely, in limited cases). *More efficient, less congested routings reduce fuel consumption* (they reduce VMT only if the fastest routing is also the shortest). Real-time parking applications—available in some urbanized areas—provide drivers with information on off- and, in some settings, on-street parking availability and prices to *reduce circling for parking spaces, reducing fuel consumption and VMT.*

Eco-driving apps provide real-time feedback to increase the fuel efficiency of driving. Strategies include less hard acceleration, more effective regenerative braking, and lower speeds. Although some apps require the installation of specialized, hardwired sensors, many function solely through GPS and/or the smart phone's accerometer and gyroscope. The widespread use of *eco-driving apps/techniques could (likely modestly) reduce overall vehicle energy consumption*.

5.3 Potential Implications for Planning in New Mexico

The rise of autonomous/connected vehicles may have significant implications for travel behavior, energy consumption, and system utilization. Once A/CVs obtain significant market share, the expectation is for more efficient, safer trips—both of which, according to traditional logic, could induce additional demand. However, by most estimates, the point at which A/CVs attain viability at a systems level is well off—perhaps 20 years or more in the future—and without a strong understanding of the parameters of such a system, the long-term implications on travel are uncertain. It seems likely that these vehicles will be enablers of other desires, much in the way that the automobile was an enabler of other trends, such as the rapid suburbanization that took place starting in the 1950s. Other trends – desire for urban or rural lifestyles – are likely to drive land use changes that A/CVs will facilitate by reducing the cost of distance (by making time more productive), of parking (by reducing the need for on-site parking), of safety features (by reducing the incidence and potentially severity of crashes), and other similar impacts.

The recent dramatic expansion of mobile applications is currently affecting both driving behavior and trip making, especially among younger drivers. In-car GPS has been in widespread use for over a decade, helping drivers navigate more efficiently—particularly with the addition of real time traffic information. Traditional GPS has been joined by a host of mobile phone applications ("apps") to facilitate more efficient routing, but apps also offer expanded real-time traveler information to, for example, encourage multimodal trip making (e.g., transit, walking, or biking), enable more efficient parking, and facilitate dynamic ride sharing (such as UberPOOL). These types of apps could affect mode choice, leading to (likely modest) reductions in driving alone. A complementary suite of apps provides real-time driver feedback to enable more efficient driving (commonly called eco-driving), which, if broadly adopted, would likely marginally reduce fuel demand/use.

Summary: The system-level adoption of autonomous/connected vehicles would have dramatic effects on travel activity and efficiency, but the timing and particulars of even partial implementation are too uncertain to draw strong conclusions related to the transportation future of New Mexico. In the short term, NMDOT will have opportunities to participate in national efforts led by USDOT, the Transportation Resaerch Board (TRB) or others that will be helpful for considering how the transportation system may change. Taking advantage of these opportunities is a critical next step for the NMDOT.

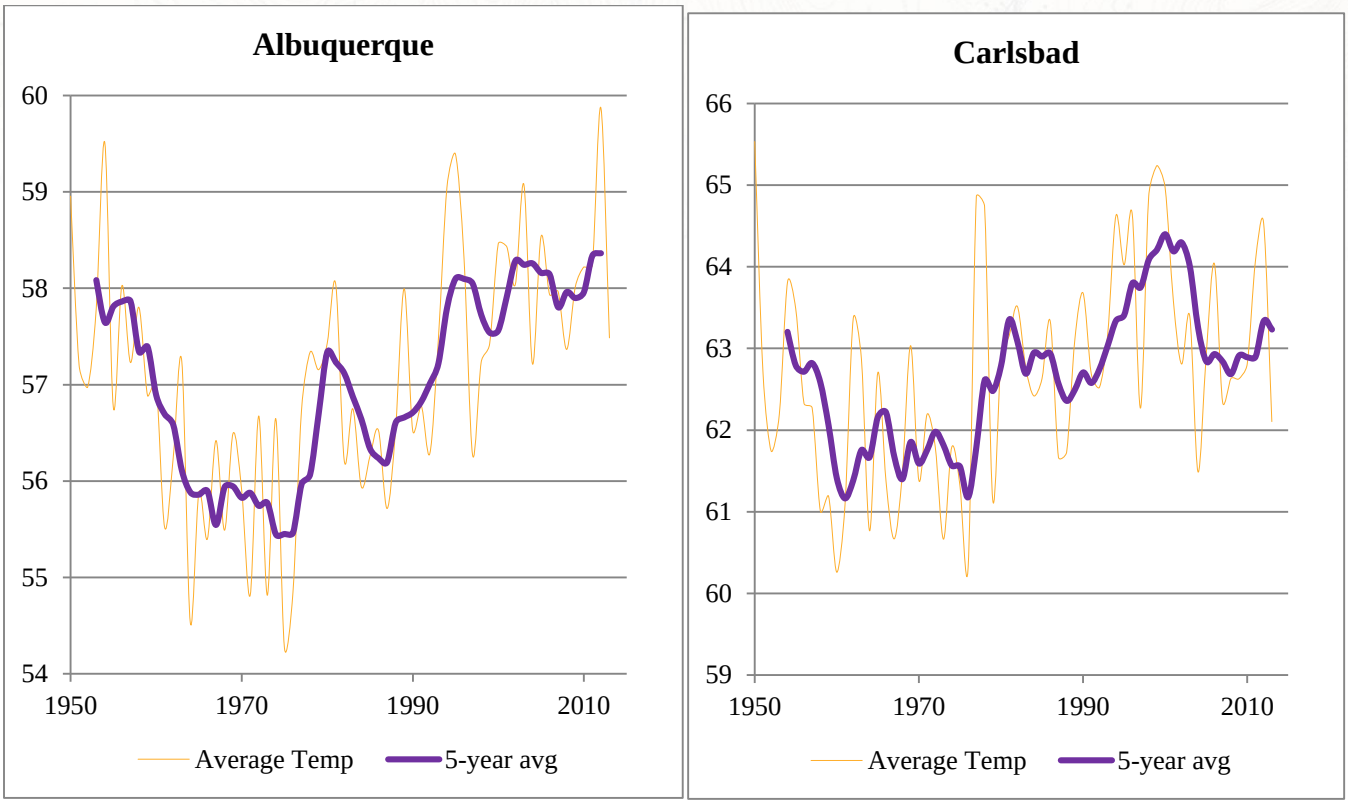
The adoption of mobile apps is likely to continue to strengthen as smart phone use increases, young adopters age, and technologies improve. Over time, this is likely to result in modest reductions in fuel use and in the number of single occupancy vehicle trips. As NMDOT explores expanding its efforts in transportation demand management, considering the technological opportunities will be an important component.

6.0 Environment

6.1 Extreme Weather

Over the coming decades, the Southwest is projected to see increased average temperatures and increased water scarcity.[48] Across the Southwest, researchers project average annual temperatures to increase between 3.5 and 9.5 degrees Fahrenheit (F) by the end of the century. Over the last years, New Mexico has seen significant increases in temperature. Figure 6.1 presents information from two weather stations – one in Albuquerque and the other in Carlsbad – to provide an example of temperature fluctuation over the past 50 years.

Figure 6.1 Change in Annual Average Temperature at Two Climate Stations



[48] 2014. Global Climate Change Impacts in the United States (3rd National Climate Assessment). United States Global Change Research Program.

Temperature extremes and prolonged heat waves increase the premature deterioration of infrastructure.[49] Extreme heat also impacts vehicle operations, increasing the likelihood of engine and tire failure.[50] Greater heat also has detrimental impacts on the aviation industry as hotter temperatures decrease lift, requiring longer runways and increased takeoff speeds for larger aircraft.[51] Heat waves strain the electrical grid, and resulting power losses can impact traffic signals and other electrical and mechanical equipment. The transportation perishable goods may require additional refridgeration, increasing costs.[52] Prolonged droughts exacerbate the risk of wildfires, potentially causing road closures and leading to increased risk of erosion.

Although average annual precipitation is projected to decline across much of the Southwest, the incidence of very heavy rainfall may not decrease correspondingly, and may even increase amid worsening drought conditions.[53] Intense rain events increase the incidence of landslides, culvert and drainage failures, and road washouts, and bridge scour, for example. As the century progresses, New Mexico may experience more frequenct and/or severe operational disruptions, premature deterioration, and asset failures due to extreme weather. Although these risks cannot be avoided entirely, they can be managed through informed planning, asset management, capital investment, and emergency response preparation.

6.2 Water Supply

In 2003, New Mexico adopted its first State Water Plan in 2003. The plan set goals and strategies for preserving the quality and quantity of the state's water resources. The plan recognized that during periods of average water supply, the demand for water in New Mexico would exceed supply if all water rights were permitted. Since adoption, New Mexico has made progress towards the goals outlined in the plan. Priority water basins were identified and policies were put in place to preserve those sources. There have been advances in technology to support the monitoring of underground aquifers and there has been increased coordination with neighboring states on water rights. However, significant challenges remain in ensuring there will be enough fresh water in the future to maintain New Mexico's population and economy.

The State of New Mexico has six river basins – Arkansas-White-Red, Lower Colorado, Upper Colorado, Pecos, Rio Grande, and Texas Gulf – and 15 reservoirs. The majority of the state's population is served from the Rio Grande basin. In general, July and August see the most precipitation compared to other months. Figure 6.2 shows the available water in all reservoirs in August and the average volume across the reservoirs. Figure 6.3 shows the location and relative

[49] NCHRP Report 750. Strategic Issues Facing Transportation, Volume 2. Climate Change, Extreme Weather Events, and the Highway System.

[50] NCHRP Report 750. Strategic Issues Facing Transportation, Volume 2. Climate Change, Extreme Weather Events, and the Highway System.

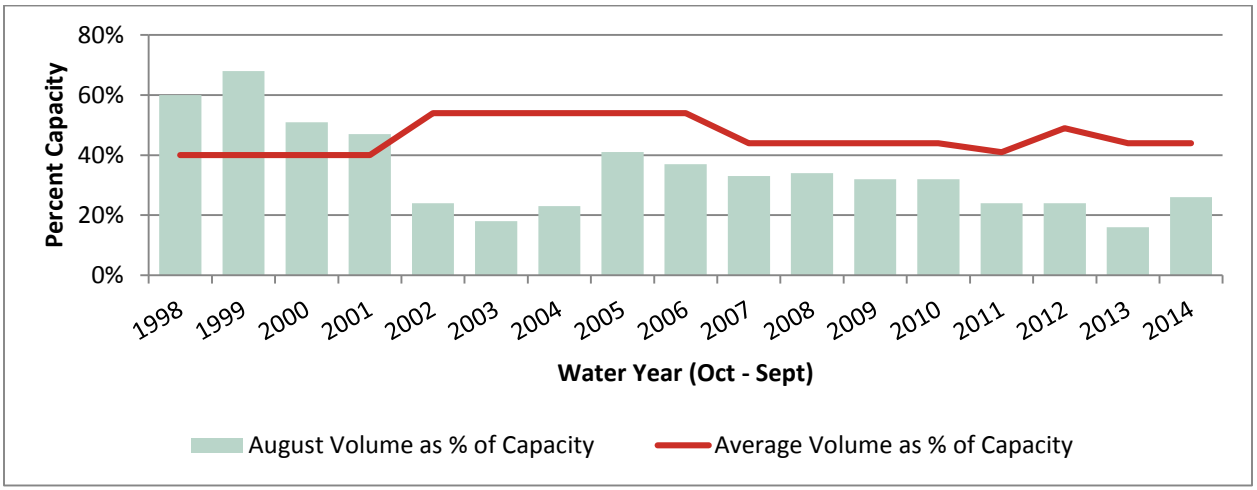
[51] 2009. US Global Climate Change Research Program. Global Climate Change Impacts in the United States.

[52] 2009. US Global Climate Change Research Program. Global Climate Change Impacts in the United States.

[53] 2007. IPCC. Climate Change 2007: Working Group I: The Physical Science Basis.

size of the 15 individual reservoirs in New Mexico. The Rio Grande resevoirs currently sit at 14 percent of available capacity.[54]

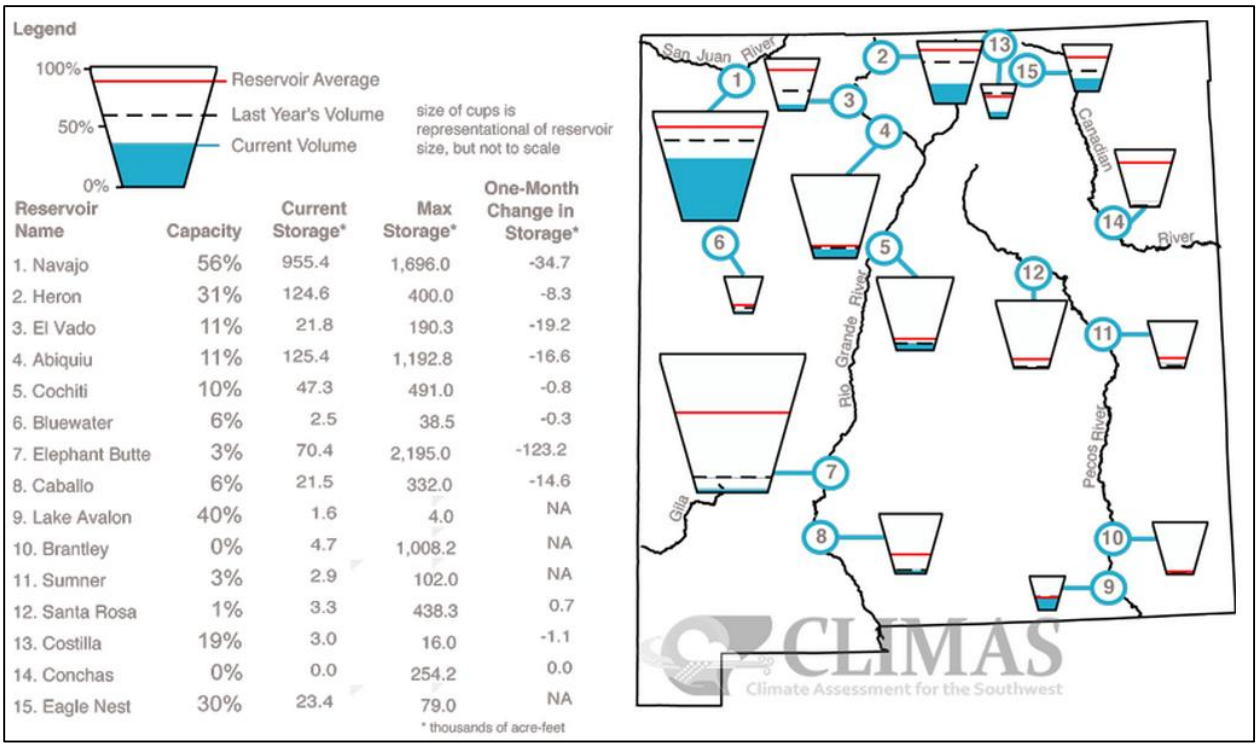
Figure 6.2 New Mexico Water Reservoir Availability as Percent of Capacity, 1998 -2014



Source: Natural Resources Conservation Service – National Water and Climate Center.

[54] USDA Natural Resources Conservation Service, 2015.

Figure 6.3 New Mexico Reservoir Volumes in June 2013 as a Percent of Capacity



Reservoir Name	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Navajo	56%	955.4	1,696.0	-34.7
2. Heron	31%	124.6	400.0	-8.3
3. El Vado	11%	21.8	190.3	-19.2
4. Abiquiu	11%	125.4	1,192.8	-16.6
5. Cochiti	10%	47.3	491.0	-0.8
6. Bluewater	6%	2.5	38.5	-0.3
7. Elephant Butte	3%	70.4	2,195.0	-123.2
8. Caballo	6%	21.5	332.0	-14.6
9. Lake Avalon	40%	1.6	4.0	NA
10. Brantley	0%	4.7	1,008.2	NA
11. Sumner	3%	2.9	102.0	NA
12. Santa Rosa	1%	3.3	438.3	0.7
13. Costilla	19%	3.0	16.0	-1.1
14. Conchas	0%	0.0	254.2	0.0
15. Eagle Nest	30%	23.4	79.0	NA

* thousands of acre-feet

Source: Climate Assessment for the Southwest – based on data from the USDA Natural Resources Conservation Service.

Water is already scarce in New Mexico, and progressively severe drought conditions are projected to further strain resources in the coming decades. According to a federal study developed by the U.S. Bureau of Reclamation and Sandia National Laboratory, growing populations as well as interstate and international water compact obligations will result in the need to prepare for these climate-induced water shortages, particularly in the Rio Grande Basin.[55]

Declining water availability may constrain the extent or distribution of future growth in New Mexico, impacting the need for future transportation investments. Water is also a critical resource for many businesses, including many of extractive industries (mining, oil and gas extraction, and agriculture) that are a significant element of New Mexico's economy. Declining water reserves may impact the growth of these industries and further impact the need for transportation investments.

For transportation planning, ongoing monitoring of long term water forecasts and the potential impact on population and economic growth is important. To the extent that declining water

[55] U.S. Department of the Interior, Bureau of Reclamation, "Managing Water in the West," http://www.usbr.gov/, (accessed April, 2014).

availability has a negative influence on population or economic growth, it could also reduce revenue collection through reduced travel or reduced shipping of goods. These impacts are speculative at this time, making this an important area to monitor without taking any current action.

6.3 Potential Implications for Planning in New Mexico

Over the coming decades, New Mexico is very likely to experience increased average temperatures, extremely hot days, and heat waves. Increased heat may worsen roadway deterioration by causing, for example, pavement deformation, asphalt bleeding, blow ups, and thermal stresses to structurql elements. Increased heat may also reduce paving and construction windows, lead to worker safety concerns, and increase the incidence of vehicle and tire failures—all of which may *entail an increase in expense for NMDOT*. The intensity of future extreme rainfall events may increase in some areas of New Mexico (even amid a general drying trend), which *could contribute to disruptive and/or destructive flooding*. Projections for extreme precipitation are associated with significant uncertainty, however.

Water availability is already a constraint to growth in New Mexico. Higher temperatures (virtually certain) and diminishing average annual rainfall (more likely than not) are projected to contribute to worsening drought conditions, strengthening *impediments to growth in some parts of the state*. Depending on the distribution of these effects on the state's reservoirs, increased *water scarcity could either encourage or discourage greater urbanization, thereby affecting per capita vehicle miles traveled.* Water scarcity could also inhibit the competitiveness of certain industries, particularly agriculture and water-intensive manufacturing businesses. If not replaced, this could result in *travel activity reductions in certain regions*.

Summary: A changing climate could lead to greater maintenance and operations expenditures and more challenging project logistics due to shrinking construction windows. Water scarcity could change land use patterns and population distribution, either strengthening or weakening the trend toward greater urbanization and reduced per capita travel activity. Potential challenges to agriculture and water-intensive manufacturing businesses also could contribute to reductions in travel activity.

7.0 Revenue Estimation

The preceeding sections describe a variety of potential, but often uncertain, future changes that may have significant impacts to the transportation system. To facilitate planning, these findings were distilled into a set of plausible scenarios to guide proposed investments. Three broad scenarios were developed:

- **Baseline.** The baseline scenario follows existing trends, taking into account projected changes to demographics, the economy, technology, and the environment. The other two scenarios are variants of the baseline.

- **Low revenue.** This scenario examines the potential for revenue decline due to some combination of economic decline (e.g., departure of a major employers), limited growth due to reduced water availability, more significant shifts in travel behavior, or other factors.

- **High revenue.** This scenario examines the potential for new revenue due to more extensive use of public private partnerships (PPP), increased fuel taxes, transition to more stable transportation revenue sources (e.g., a vehicle miles traveled fee rather than the gas tax), for example.

The data sources and assumptions used to generate the financial revenue forecasts for transportation investment in the State of New Mexicoo in support of the 2040 New Mexico Transportation Plan included:

- A forecasting timeframe between of 2016-2040 was used, under the assumption that FY 2015 revenues have already been allocated by the State in its current transportation program. Revenue forecasts are presented in five programming tiers: 2016-2020, 2021-2025, 2026-2030, 2031-2035, and 2036-2040.

- The forecasts are based on current State and Federal funding programs projected into the future. Principal Federal sources are the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) programs as administered through(in accordance with the Moving Ahead for Progress in the 21st Century Act (MAP-21). State sources include, the two primary Federal funding sources, and the four major State Road Fund revenue sources the (gasoline tax, special fuel tax, weight-distance tax, and vehicle registrations).

- All revenues are expressed in 2013 dollars.[56]

[56] Funding projections in year-of-expenditure dollars (YOE) were discounted assuming an annual inflation rate of 2.2 percent, based on the average inflation of the West region over the past 12 years. Historical inflation was calculated using historical CPI factors from the Bureau of Labor Statistics from 2001 to 2013: http://www.bls.gov/.

7.1 Summary of Revenues

Table 7.1 summarizes the total revenues estimated to be available for transportation expenditures (including capital, operations, and maintenance) over the life of the transportation plan. The total funding expected to be available from Federal and State sources could fluctuate between $10 billion and $18 billion (2013 dollars) over the 25-year period after debt service obligations.

Table 7.1 Net Revenue Projections
2013 Dollars (billions)

	High Revenue Scenaro	Base Case Scenario	Low Revenue Scenario
2016-2020	$2.83	$2.69	$2.58
2021-2025	$3.03	$2.54	$2.06
2026-2030	$3.64	$2.81	$1.95
2031-2035	$4.05	$2.88	$1.80
2036-2040	$4.32	$2.77	$1.66
Total	**$17.88**	**$13.68**	**$10.04**

Note: Totals may not add up due to rounding.

7.2 Baseline Revenue Methodology and Assumptions

On October 1, 2012, MAP-21 went into effect, replacing the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), passed in 2005. Key provisions of MAP-21 include:

- Continued average annual funding at FY 2012 levels with minor adjustments for inflation;
- Eliminated all earmarks;
- Eliminated most discretionary programs;
- Consolidated SAFETEA-LU funding programs into a much smaller number of broader core programs (Figures 7.1 and 7.2); and
- Slightly increased Federal transit funding.

Highway Funds

Prior to MAP-21, each apportioned program had its own formula for distribution, and the total amount of Federal assistance a State received was the sum of each program allocation.[57] MAP-21 instead provides a total apportionment for each State and then divides that State amount among the programs. MAP-21 required FHWA to divide the total authorized amount among the states in the following manner:

- In FY 2013, states received the same total apportionment as in FY 2012, plus minor adjustments for inflation.
- For FY 2014, $38 billion were available for distribution. Each state received the same funding distribution based on the apportionment received in FY 2012, adjusted to ensure that each state received at least 95 percent of the dollar amount of its contributions to the Highway Account of the Highway Trust Fund.

For the Base case forecast, New Mexico assumed that FHWA apportionments will not increase through 2021.[58] After 2021, apportionments were assumed to grow at an average annual rate of 1.0 percent.[59] NMDOT subtracted the share that has historically been allocated to the Metropolitan Planning and State Planning and Research programs since these funds cannot be used for highway investments. In addition, the forecasted apportionments were reduced by 9 percent, which is the average obligation authority of the State.[60] Total revenues are estimated at $5.97 billion (2013 dollars) for the 2016-2040 period before debt obligation (Table 7.2).

[57] Under SAFETEA-LU each apportioned program was funded by a separate authorization (or takedown) and then distributed among the States based on data such as lane miles, vehicle miles traveled, fatalities data, etc.

[58] Agreed with NMDOT on November 17, 2014.

[59] The Congressional Budget Office (CBO) annual growth forecast of the Highway Trust Fund over the next ten years is slightly less than 1%.

[60] Historical apportionments and obligations between 2001 and 2013 were obtained from the FHWA Highway Statistics database and MAP-21 website. Years 2009 and 2010 were excluded for the "share" calculation purposes due to the disbursement of ARRA funds, considered an outlier, or "one-time" funding source.

Figure 7.1 Consolidation of Highway Formula Programs

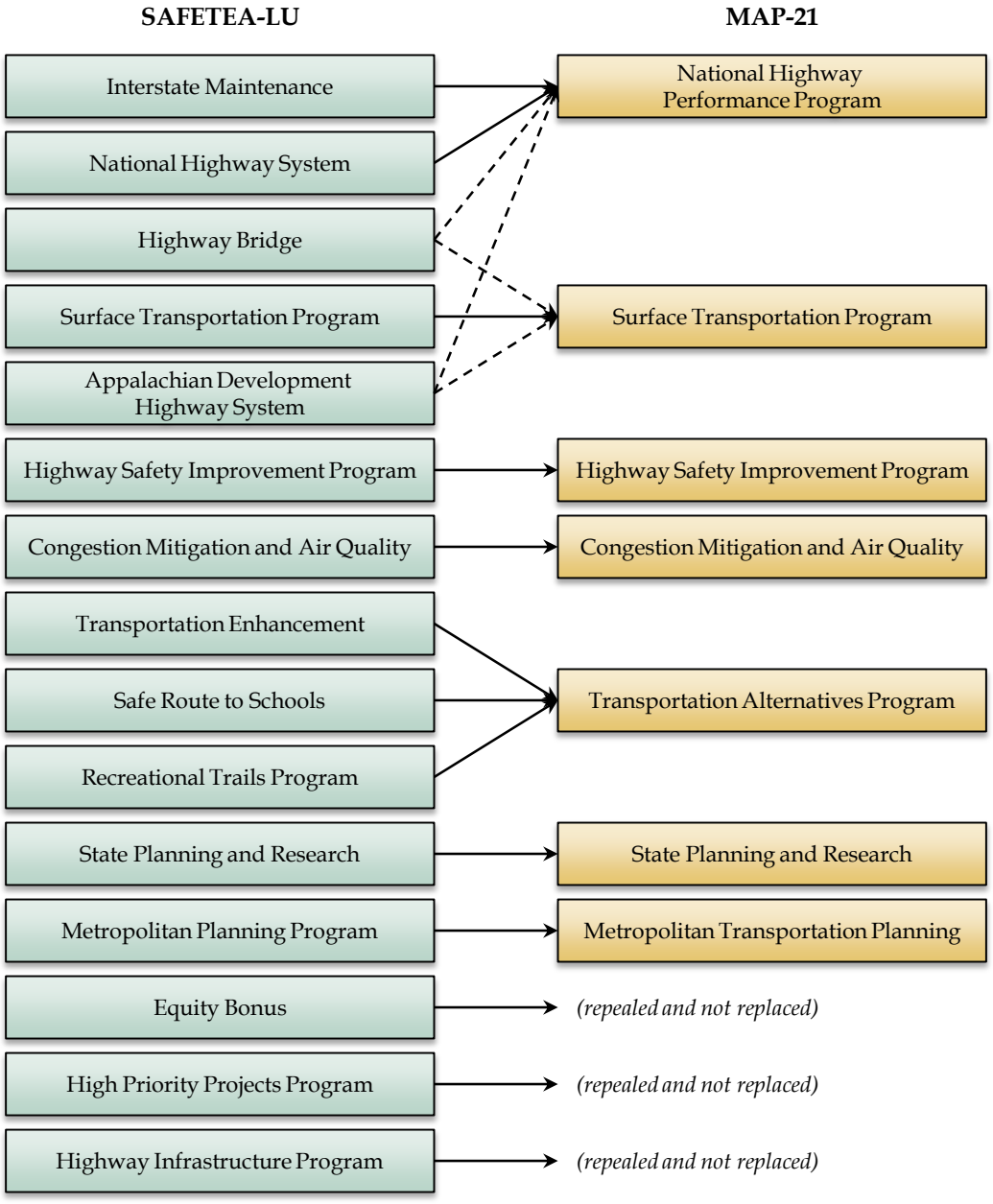


Table 7.2 Projected FHWA Obligations to the State of New Mexico
2013 Dollars (Billions)

Base Case Scenario	
2016-2020	$1.37
2021-2025	$1.25
2026-2030	$1.18
2031-2035	$1.11
2036-2040	$1.04
Total	**$5.97**

Note: Before debt service obligation. Totals may not add up due to rounding.

Federal Transit Administration Revenue

MAP-21 also restructured core transit grant programs (Figure 7.2). The majority of FTA funds are apportioned to states on the basis of legislative formulas. For the most part, these formulas incorporate one or a combination of factors, including: population, population density, low income population, bus revenue vehicle miles, bus passenger miles, fixed guideway revenue vehicle miles, and fixed guideway route miles. The parameters for each of the factors are determined on an annual basis, taking into consideration the operating characteristics of all U.S. transit agencies and the total amount of funding appropriated by Congress. Historically, there has been consistency in most of the factors. However, revenues are based on demographics and transit operating characteristics, which are subject to change over time. Therefore, NMDOT used historical trends to estimate revenues over the duration of the Plan assuming that funding allocation shares will remain relatively constant.

NMDOT first projected FTA appropriations from Congress. FTA appropriations were projected to grow at an average annual rate of 1 percent, consistent with the Congressional Budget Office (CBO) annual growth forecast of the Highway Trust Fund. NMDOT tested different growth factors and determined that it was appropriate to stay within a reasonable range of the historical ratio of allocations to New Mexico as a proportion of total FTA funds (i.e., "New Mexico/Total FTA funds"). Refer to Table 7.3 for annual growth assumptions by program.

Table 7.3 FTA Annual Growth Assumptions

FTA Program	Annual Growth Rate Assumption
Section 5307, Urbanized Area Formula	2.0%
Section 5311, Non-urbanized area formula	1.5%
Section 5310, Enhanced Mobility for Older Adults and People with Disabilities	1.0%
Section 5311(b)(3), RTAP	1.5%
Section 5311(c)(1), Indian Reserve	2.5%
Section 5337, State of Good Repair	1.5%
Section 5339, Bus and Bus Facilities	1.2%

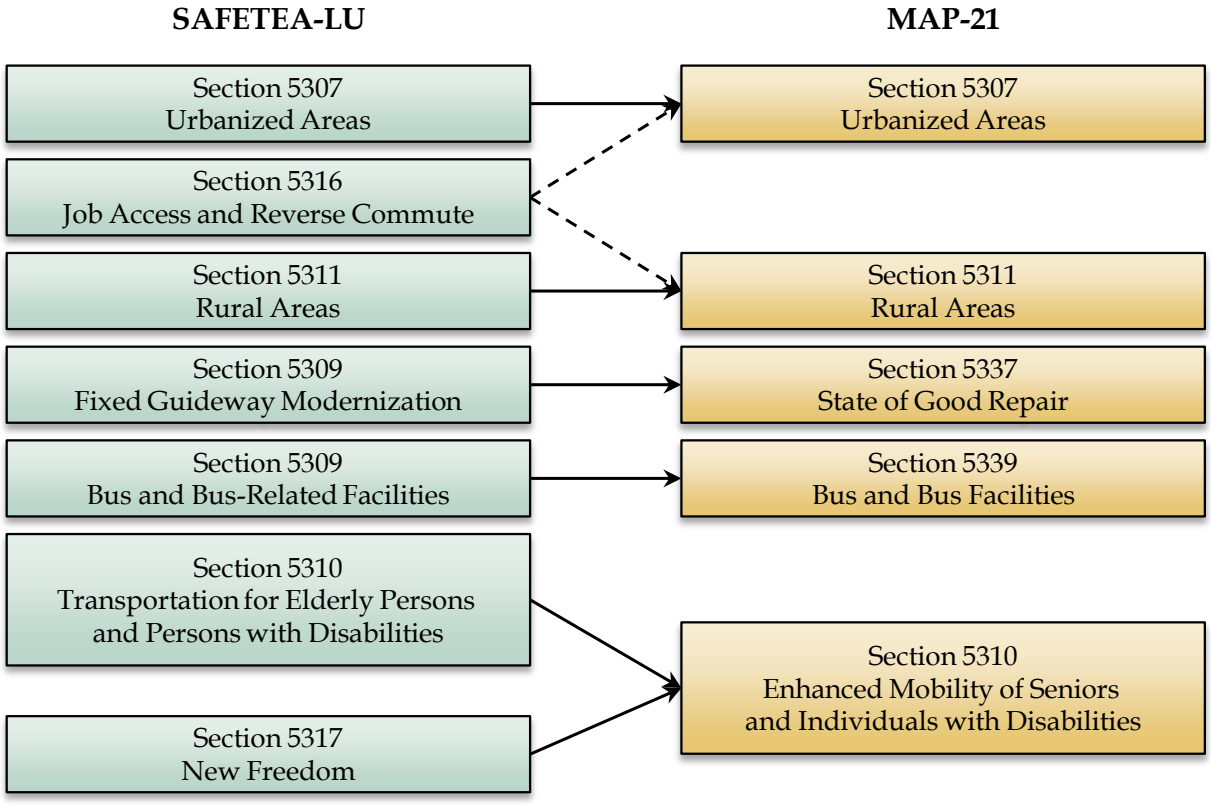
NMDOT assumed that no grants from Section 5309-Fixed Guideway Capital Investment Grants (a.k.a. New Starts) will be awarded to New Mexico during the 2016-2040 period. Total FTA revenues for New Mexico are estimated at $1.05 billion (2013 dollars), as depicted in Table 7.4.

Table 7.4 Projected FTA Apportionments to the State of New Mexico
2013 Dollars (Billions)

Base Case Scenario	
2016-2020	$0.22
2021-2025	$0.22
2026-2030	$0.21
2031-2035	$0.21
2036-2040	$0.20
Total	**$1.05**

Note: Total may not add up due to rounding.

Figure 7.2 Consolidation of Transit Formula Programs



State Sources

Gasoline Tax Revenue

Gasoline tax revenues were determined based on a statewide forecast of gasoline consumption over the plan horizon. The approach to estimating gasoline consumption consisted of:

- ***Step 1 – Historical trend analysis (1990-2013).*** NMDOT conducted a regression analysis of historical gasoline consumption in relation to the following variables:
  - **Population (30-65 years).** Obtained from Census data compiled by the University of New Mexico. This population group was used due to past experience with working aged adults as the best predictor of revenue.
  - **Gas Prices.** Historical gasoline prices for the Gulf Coast region (PADD 3) were obtained from the Energy Information Administration (EIA).
  - **Fuel economy.** Previous analyses conducted by IHS Global Insight for NMDOT provided historical estimates from 1990 to 2006.[61] For the 2007-2013 period, NMDOT adopted the national average published by EIA.
  - **Gasoline Expenditures**. NMDOT used gasoline expenditure estimates for the population between 20 and 84 years of age.
  - **Vehicle-miles traveled (VMT) by passenger vehicles.** NMDOT used the passenger vehicle-miles traveled reported to the FHWA Office of Highway Policy Information. Based on data from the State travel demand model, passenger vehicles account for about 80 percent of total VMT in the State.
- ***Step 2 – Project consumption.*** Gasoline consumption was estimated based on forecasts of the independent variables and the statistical outputs of the regression model.
  - **Population (30-65 years)**, from the demographic forecast developed by the Bureau of Business and Economic Researc (BBER) at the University of New Mexico.
  - **Gas Price.** NMDOT adjusted the national forecast (from the EIA 2014 Annual Energy Outlook, or AEO., maintaining the historical ratio between the Gulf Coast region and the United States as a whole.
  - **Fuel economy.** NMDOT used the national forecast published in the 2014 AEO.
  - **Vehicle-miles traveled.** NMDOT used the VMT forecast from the statewide travel demand model.

For the baseline scenario, NMDOT applied the resulting annual growth rates of gasoline consumption from the regression model to the base year of the short-term revenue forecast developed by NMDOT (i.e., 2018) to develop the long term forecast (2019 to 2040). It was assumed that the tax rate of $0.17 per gallon will not change over the forecasting period.

[61] Forecast from NMDOT provided spreadsheeet to consultant team.

Table 7.5 New Mexico Gasoline Tax Revenue Projections
2013 Dollars (Billions)

Base Case Scenario	
2016-2020	$0.48
2021-2025	$0.43
2026-2030	$0.39
2031-2035	$0.37
2036-2040	$0.37
Total	**$2.04**

Note: Total may not add up due to rounding.

Special Fuel Tax Revenue (diesel)

Special Fuel revenues were determined based on a statewide forecast of diesel consumption over the plan horizon. The approach to estimating diesel consumption consisted of:

- ***Step 1 – Historical trend analysis (1998-2012).*** NMDOT conducted a regression analysis of historical diesel consumption in relation to the following variables:
  - **Diesel Price.** Historical diesel prices were collected from the EIA for the Gulf Coast (PADD3) region.
  - **Fuel economy.** NMDOT adopted the national average published by the EIA.
  - **Truck vehicle-miles traveled.** NMDOT used the heavy-duty vehicle-miles traveled reported to the FHWA Office of Highway Policy Information. Based on data from the state travel demand model, trucks account for about 20 percent of total vehicles miles traveled.
- ***Step 2 – Project consumption.*** Diesel consumption was estimated based on forecasts of the independent variables and the statistical outputs of the regression model.
  - **Diesel Price.** NMDOT adjusted the national forecast developed by the EIA, maintaining the historical ratio between the Gulf Coast region and the United States as a whole.
  - **Fuel economy.** NMDOT adopted the national forecast published in the 2014 Annual Energy Outlook (AEO for freight trucks.
  - **Vehicle-miles traveled.** NMDOT used the VMT forecast from the statewide travel demand model.

NMDOT applied the estimated annual growth rates of diesel consumption from the regression model to the to the base year short-term forecast (i.e., 2018) developed by NMDOT. For the baseline scenario, it wasassumed that the tax rate of $0.21 per gallon will not change over the forecasting period.

Table 7.6 New Mexico Special Fuel Tax Revenue Projections
2013 Dollars (Billions)

Base Case Scenario	
2016-2020	$0.46
2021-2025	$0.47
2026-2030	$0.48
2031-2035	$0.49
2036-2040	$0.50
Total	$2.42

Note: Total may not add up due to rounding.

Weight-Distance Revenue

The approach used for estimating weight-distance revenues was:

- ***Step 1 – Historical trend analysis (1998-2012).*** NMDOT conducted a regression analysis of historical revenues in relation to truck vehicle-miles traveled**.** The DOT used the heavy-duty vehicle-miles traveled reported to the FHWA Office of Highway Policy Information. Based on data from the State travel demand model, trucks account for about 20 percent of vehicles miles traveled.

- ***Step 2 – Project Revenues.*** Weight-Distance tax revenues were estimated from the forecast of heavy-duty vehicle-miles traveled and the statistical outputs of the regression model. For the baseline scenario, NMDOT applied the estimated annual growth rates obtained from the model to the base year short-term forecast (i.e., 2018) developed by NMDOT.

Weight-Distance tax revenues are estimated to total $1.75 billion in 2013 dollars over the life of the Plan (Table 7.7).

Table 7.7 New Mexico Weight-distance Tax Revenue Projections
2013 Dollars (Billions)

Base Case Scenario	
2016-2020	$0.38
2021-2025	$0.37
2026-2030	$0.35
2031-2035	$0.33
2036-2040	$0.32
Total	$1.75

Note: Total may not add up due to rounding.

Vehicle Registration Fee Revenue

The approach to estimating vehicle registration revenues was:

- ***Step 1 – Historical trend analysis (1998-2012).*** NMDOT conducted a regression analysis of historical revenues relative to New Mexico's population (18-80 years old) and the number of registered vehicles**.** Historical population information was obtained from Census data compiled by the University of New Mexico. NMDOT maintains a database on the number of registered vehicles in the state.

- ***Step 2 – Project Revenues.*** Vehicle registration fee revenues were estimated from the forecasts of the independent variables (i.e., population and registered vehicles) and the statistical outputs of the regression model. Population forecasts were developed by the University of New Mexico. To forecast the number of registered vehicles, NMDOT adjusted the national forecast developed by IHS Global Insight in February 2014 to New Mexico using the historical New Mexico- U.S. registered vehicle ratio (i.e., the share of New Mexico to U.S. is approximately 0.7 percent). For the baseline scenario, NMDOT applied the estimated annual growth rates obtained from the model to the base year forecast (i.e., 2018) developed by NMDOT.

Vehicle registration fee revenues are estimated at $1.53 billion in 2013 dollars over the life of the plan (Table 7.8) for the baseline scenario.

Table 7.8 New Mexico Vehicle Registration Fee Revenue Projections
2013 Dollars (Billions)

Base Case Scenario	
2016-2020	$0.35
2021-2025	$0.33
2026-2030	$0.31
2031-2035	$0.28
2036-2040	$0.26
Total	$1.53

Note: Total may not add up due to rounding.

Minor Revenue Sources

For sources that do not represent a substantive component of the State Road Fund ("minor" sources), the project team used historical trends to estimate future revenues. Table 7.9 lists these funding sources and, for the period of FY 2000-2013, summarizes the average share of NMDOT's annual budget. In aggregate, these revenue sources increased at an average annual rate of 1 percent from FY 1999 to 2013. For forecasting purposes, they project team held the annual growth rate of 1 percent constant. Table 7.10 summarizes the projected revenues under the baseline scenario. Approximately $0.44 billion in 2013 dollars is expected over the plan horizon.

Table 7.9 Historical Yield of Minor Revenue Sources of the State Road Fund (FY 2000-2013)

Revenue Source	Average % of Annual Road Fund Revenue
Trip Tax	1.4%
Driver's License Fees	1.2%
Leased Vehicle Gross Receipts	1.8%
Public Regulatory Commission Fees	0.4%
Overweight/Oversize Permits	1.1%
MVD Miscellaneous	0.7%
Penalty Reinstatement Fees	0.1%
Vehicle Transaction Fees	0.3%

Table 7.10 New Mexico Revenue Projections of Minor Revenue Sources
2013 Dollars (Billions)

Base Case Scenario	
2016-2020	$0.10
2021-2025	$0.09
2026-2030	$0.09
2031-2035	$0.08
2036-2040	$0.08
Total	$0.44

Note: Total may not add up due to rounding.

Debt Service Obligation

In addition to Federal and state funds, NMDOT uses bond proceeds to finance its transportation program. The focus of the Department's bond program is to acelerate transportation construction projects while maintaining strong debt service coverage ratios. Outstanding debt service estimates were compiled from the 2014 NMDOT Annual Audited Financial Statements. At June 30, 2014, NMDOT had a total outstanding debt of $1.50 billions (2013 dollars) from FY 2016 to FY 2032 and it is assumed that no additional bonds are issued during the time frame of the plan (Table 7.11). Outstanding bond debt is backed by the Department's anticipated state and FHWA revenue, and a 50/50 split was assumed.

Outstanding debt service has been calculated to refine future projected Federal and state revenues. Debt service obligations are subtracted from gross revenue projections to produce the total constrained revenue forecast.

Table 7.11 Outstanding Transportation Debt Service Payments
2013 Dollars (Billions)

Base Case Scenario	
2016-2020	$0.67
2021-2025	$0.63
2026-2030	$0.20
2031-2035	$0.01
2036-2040	$0
Total	$1.50

Note: Total may not add up due to rounding.

Summary of Revenues – Base Case Scenario

Table 7.12 summarizes the gross revenue estimates for highway and transit transportation expenditures over the life of the transportation plan from the State Road Fund and Federal sources. The net funding (after debt service obligations are considered) expected to be available from the State Road Fund and Federal sources is estimated at $13.7 billion (See Table 7.13).

Table 7.12 Gross Revenue Projections, Financially Constrained Forecast – Base Case Scenario
2013 Dollars (Billions)

			State Road Fund					
	FHWA	FTA	Gasoline	Special Fuel	Weight-Distance	Vehicle Registration Fees	Minor Sources	Total
2016-2020	$1.38	$0.22	$0.48	$0.46	$0.38	$0.35	$0.10	$3.36
2021-2025	$1.26	$0.22	$0.43	$0.47	$0.37	$0.33	$0.09	$3.17
2026-2030	$1.18	$0.21	$0.39	$0.48	$0.35	$0.31	$0.09	$3.01
2031-2035	$1.11	$0.21	$0.37	$0.49	$0.33	$0.28	$0.08	$2.87
2036-2040	$1.04	$0.20	$0.37	$0.50	$0.32	$0.26	$0.08	$2.77
Total	**$5.97**	**$1.05**	**$2.04**	**$2.42**	**$1.75**	**$1.53**	**$0.44**	**$15.20**

Note: Totals may not add up due to rounding.

Table 7.13 Net Revenue Projections, Financially Constrained Forecast – Base Case Scenario
2013 Dollars (Billions)

	FHWA	FTA	State Road Fund	Total
2016-2020	$1.04	$0.22	$1.43	$2.69
2021-2025	$0.94	$0.22	$1.38	$2.54
2026-2030	$1.08	$0.21	$1.52	$2.81
2031-2035	$1.11	$0.21	$1.56	$2.88
2036-2040	$1.04	$0.20	$1.53	$2.77
Total	**$5.21**	**$1.05**	**$7.42**	**$13.68**

7.3 Low Revenue Scenario

The Base case scenario is a conservative forecast that reflects current funding policy and revenue that is reasonably expected to be available over the life of the transportation plan. A low revenue scenario was developed to reflect the potential for revenue decline due to some combination of economic decline (e.g., departure of a major employers), reduced federal funding, more significant shifts in travel behavior, or other factors. The assumptions to develop the Low revenue scenario are described below.

State Road Fund

Gasoline tax revenues

Under the Base case scenario assumed a VMT growth of passenger vehicles of 1.8 percent per year according to the NMDOT travel demand model. Historical data shows that since 2000, the VMT growth has been 1 percent per year. NMDOT estimated the gasoline consumption for this scenario using the same regression model approach described earlier but assumed a VMT growth of 1 percent. NMDOT applied the resulting annual growth rates of gasoline consumption from the regression model to the Base case revenue estimates starting in FY 2016.

Special fuel tax revenues

Under the Base case scenario, trucks VMTs are projected to grow at a rate is 2 percent per year. Historical data (i.e., since 2000) show an approximate growth is 1.1 percent. NMDOT estimated special fuel tax revenues for this scenario using the same regression model described above but assumed a VMT growth of 1 percent. NMDOT applied the estimated annual growth rates of diesel consumption from the regression model to the Base case revenue estimates starting in FY 2016.

Weight Distance tax revenues

NMDOT estimated weight distance tax revenues using the same regression model described above but assumed a trucks VMT growth of 1 percent. NMDOT applied the estimated annual growth rates from the regression model to the Base case revenue estimates starting in FY 2016.

Vehicle Registration Fees

No change from Base case scenario.

Minor sources

No change from Base case scenario.

Table 7.14 State Road Fund, Net Revenue Projections – Low Revenue Scenario

	Base Case Scenario After Debt Service	Low Revenue Scenario After Debt Service
2016-2020	$1.43	$1.39
2021-2025	$1.38	$1.28
2026-2030	$1.52	$1.39
2031-2035	$1.56	$1.40
2036-2040	$1.53	$1.34
Total	**$7.42**	**$6.80**

Note: 2013 dollars, billions. Totals may not add up due to rounding.

FHWA

A Low revenue forecast was developed by forecasting future gasoline revenues deposited to the Highway Trust Fund (HTF). A regression model was developed based on the gasoline tax rate, vehicle miles traveled (VMT), and fuel economy. This scenario assumes that the current motor gasoline tax rate of 18.4 cents per gallon will remain unchanged over the life of the plan.

Other changes included:

- **VMT**. Historical VMTs were obtained from the FHWA Highway Statistics series, table VM-202. Nationally, VMTs grew from 2,796 billion in 2001 to 2,969 billion in 2012, an average annual growth rate of 0.5 percent. NMDOT assumed the same average annual growth rate of 0.5 percent from 2012 to 2040.

- **Fuel Economy**. NMDOT adopted the national forecast for light-duty vehicles published by EIA in the 2014 AEO.

- **Gasoline Tax Rate**. The current Federal gasoline tax rate is 18.4 cents per gallon. NMDOT assumed that this rate will remain constant through 2040.

NMDOT applied the resulting change in annual growth rates from the regression model to the Base case revenue estimate starting in FY 2016.

Table 7.15 FHWA Funds, Net Revenue Projections – Low Revenue Scenario

	Base Case Scenario After Debt Service	Low Scenario After Debt Service
2016-2020	$1.04	$0.99
2021-2025	$0.94	$0.63
2026-2030	$1.08	$0.47
2031-2035	$1.11	$0.35
2036-2040	$1.04	$0.28
Total	**$5.21**	**$2.71**

Note: 2013 dollars, billions. Totals may not add up due to rounding.

FTA

Of the current motor gasoline tax rate of 18.4 cents per gallon, 2.86 cents per gallon are distributed to the Transit Account. Hence, NMDOT applied the same approach used to estimate FHWA funds to the FTA Base case estimates. NMDOT applied the resulting change in annual growth rates from the regression model to the Base case revenue estimates starting in FY 2016.

Table 7.16 FTA Funds, Net Revenue Projections – Low Revenue Scenario

	Base Case Scenario	Low Scenario
2016-2020	$0.22	$0.20
2021-2025	$0.22	$0.15
2026-2030	$0.21	$0.09
2031-2035	$0.21	$0.05
2036-2040	$0.20	$0.04
Total	**$1.05**	**$0.53**

Note: 2013 dollars, billions. Totals may not add up due to rounding.

Summary of Revenues – Low Revenue Scenario

Table 7.17 Net Revenue Projections – Low Revenue Scenario
2013 Dollars (Billions)

	FHWA	FTA	State Road Fund	**Total**
2016-2020	$0.99	$0.20	$1.39	**$2.58**
2021-2025	$0.63	$0.15	$1.28	**$2.06**
2026-2030	$0.47	$0.09	$1.39	**$1.95**
2031-2035	$0.35	$0.05	$1.40	**$1.80**
2036-2040	$0.28	$0.04	$1.34	**$1.66**
Total	**$2.71**	**$0.53**	**$6.80**	**$10.04**

Note: Totals may not add up due to rounding.

7.4 High Revenue Scenario

A High revenue scenario was developed using a more aggressive set of assumptions over the plan horizon. The assumptions are desbribed below.

State Road Fund

Gasoline tax revenues

NMDOT assumed that the current gasoline tax rate of 17 cents per gallon will be indexed to inflation on an annual basis, estimated at 2.2 percent per year. NMDOT applied the resulting annual growth rates from the regression model to the Base case revenue estimate starting in FY 2016.

Special fuel tax revenues

Similarly, NMDOT assumed that the current special fuel tax rate of 21 cents per gallon will be indexed to inflation on an annual basis, estimated at 2.2 percent per year. NMDOT applied the resulting annual growth rates from the regression model to the Base case revenue estimate starting in FY 2016.

Weight Distance tax revenues

NMDOT estimated weight distance tax revenues assuming an annual growth rate of 3 percent per year based on the historical trend (i.e., 1998 to 2013).

Vehicle Registration Fees

No change from Base case scenario.

Minor sources

No change from Base case scenario.

Table 7.18 State Road Fund, Net Revenue Projections – High Revenue Scenario

	Base Case Scenario After Debt Service	High Scenario After Debt Service
2016-2020	$1.43	$1.48
2021-2025	$1.38	$1.55
2026-2030	$1.52	$1.84
2031-2035	$1.56	$2.04
2036-2040	$1.53	$2.18
Total	**$7.42**	**$9.09**

Note: 2013 dollars, billions. Totals may not add up due to rounding.

FHWA

Since its inception in 1956, the Highway Trust Fund (HTF) have increased at an average annual rate of 6 percent.[62] NMDOT applied this growth rate to the 5 year periods totals. This increase would be assumed to come from one of several new revenue sources, potentially including indexing the gas tax to inflation, a new vehicle miles traveled fee, increased used of public private partnerships, or other sources. The revenue forecast is intentiaonally not specific about the source of additional revenue, as developing new revenue source is complex and must be tailored to the specific situation of New Mexico. This analysis is merely intended to indicate the bounds of a reasonoable forecast.

[62] FHWA Highway Statistics, Series 2012, Table FE-210C.

Table 7.19 FHWA Funds, Net Revenue Projections – High Revenue Scenario

	Base Case Scenario After Debt Service	High Scenario After Debt Service
2016-2020	$1.04	$1.12
2021-2025	$0.94	$1.23
2026-2030	$1.08	$1.54
2031-2035	$1.11	$1.73
2036-2040	$1.04	$1.84
Total	**$5.21**	**$7.47**

Note: 2013 dollars, billions. Totals may not add up due to rounding.

FTA

NMDOT applied the same 6 percent growth rate to the 5 year periods to be consistent with the FHWA assumption.

Table 7.20 FTA Funds, Net Revenue Projections – High Revenue Scenario

	Base Case Scenario	High Scenario
2016-2020	$0.22	$0.23
2021-2025	$0.22	$0.25
2026-2030	$0.21	$0.26
2031-2035	$0.21	$0.28
2036-2040	$0.20	$0.30
Total	**$1.05**	**$1.32**

Note: 2013 dollars, billions.

Summary of Revenues – High Revenue Scenario

Table 7.21 Net Revenue Projections – High Case Scenario

	FHWA	FTA	State Road Fund	Total
2016-2020	$1.12	$0.23	$1.48	$2.83
2021-2025	$1.23	$0.25	$1.55	$3.03
2026-2030	$1.54	$0.26	$1.84	$3.64
2031-2035	$1.73	$0.28	$2.04	$4.05
2036-2040	$1.84	$0.30	$2.18	$4.32
Total	**$7.47**	**$1.32**	**$9.09**	**$17.88**

Note: 2013 dollars, billions. Totals may not add up due to rounding.

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