

Vehicle Miles Traveled

Background

Vehicle use, including automobiles, trucks, and motorcycles, in New Jersey is an indirect indicator of vehicle emissions, which contribute to the formation of ozone. Ozone is not emitted directly into the atmosphere. Rather, it is formed by a series of reactions between nitrogen oxides and volatile organic compounds in the presence of sunlight. Ground level ozone is a concern because it can be harmful to breathe and can also harm sensitive vegetation during the growing season.¹ Motor vehicles are the single largest source category of ozone precursor emissions in New Jersey.² In addition, motor vehicles directly emit fine particulates and several air toxic pollutants such as benzene. For additional information on ozone, please see the chapter entitled, "Ozone," in this NJDEP Environmental Trend series (<https://www.nj.gov/dep/dsr/trends/ozone.pdf>).³

Congress passed the Clean Air Act in 1970, giving EPA the authority to regulate pollution from cars and other forms of transportation. Since the passage of the Clean Air Act, new passenger vehicles are 98-99% cleaner for most tailpipe pollutants.⁴ The pollutants that are regulated for transportation include hydrocarbons (HC), carbon monoxide (CO), nitrogen oxides (NOx), and particulates.⁵ Even though vehicles today produce much less pollution per vehicle compared to the 1960s, as of 2018, transportation was still the top contributor of greenhouse gases, accounting for 28% of greenhouse gas emissions on a national scale.⁶ Other factors being equal, increased VMT per capita tends to increase emissions of greenhouse gases and other air pollutants.⁷ To assess greenhouse gas emissions from transportation, the trend in vehicle miles traveled (VMT) and VMT per capita are useful indicators.

VMT is an indicator of vehicle use, accounting for the total miles traveled on roads and highways by motor vehicles in the state. The New Jersey Department of Transportation (DOT) estimates that, in 2018, more than 212 million miles were traveled per day on the state's roadways.⁸ Diesel-fueled VMT makes up a small portion (less than 5%) of total VMT.⁹

The Highway Performance Monitoring System is a national highway information system that includes data on the extent, condition, performance, use, and operating characteristics of the nation's highways. It is used to estimate VMT in order to monitor highway use and aid the Federal Highway Administration in allocating federal transportation funding to individual states.¹⁰ The data are a reasonable

approximation of vehicle travel on New Jersey's roadways. These data do not provide estimates of other important indicators such as number of vehicle trips, the origin and destination of a trip, or the speed the vehicle is traveling during the trip. The number of trips may be more indicative of vehicle emissions than VMT because the emissions from a car are much greater for the first few minutes after start-up, when the catalytic converter is still cold, and the engine is running with a richer mixture (higher gas to air ratio). However, trip data are not readily available. VMT data also do not consider the impacts of improved vehicle emissions control technology or electric vehicles, which have resulted in the reduced emissions of a number of pollutants. The lower emission standards of new vehicles and increased presence of electric vehicles are expected to continue the trend of reduced emissions due to the fleet turnover from older to newer vehicles. However, emissions could eventually level off and increase if VMT continues to rise.



Electric Vehicle Charging Station
(Heather Genievich, 2020)

Status and Trends

Figure 1 shows a steady increase in VMT of 1.5% per year on average from 1991 through 2007, with a noticeable decline after 2007 and an apparent rebound between 2009 and 2018.¹¹ The peak in VMT in 2007 occurred just prior to a global economic downturn in 2008, which coincided with a relative peak in the price of gasoline.¹² In contrast, the amount of public roads in the state (reported as public road miles) has increased at a rate of 0.46% per year on average from 1991 to 2018, but has been relatively flat for the last decade.¹¹

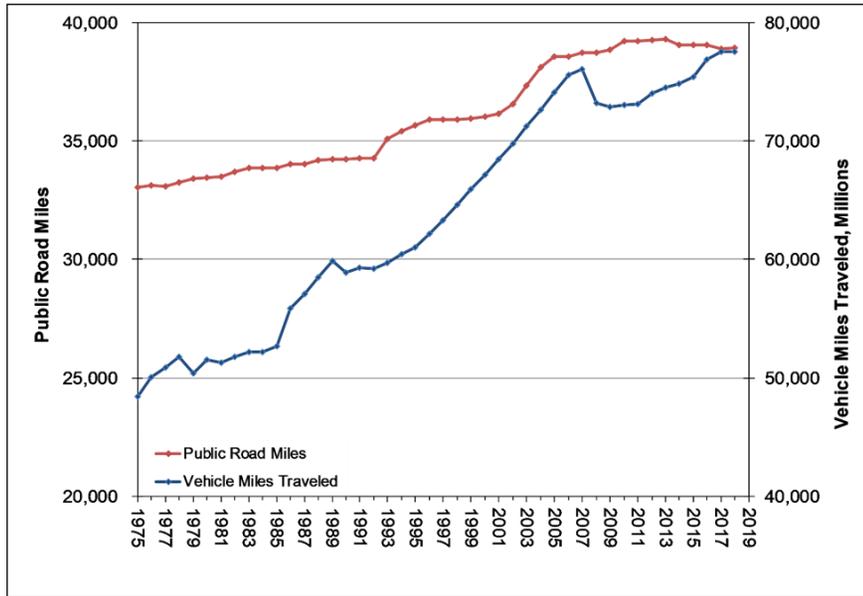


Figure 1. Public road miles and estimated vehicle miles traveled from 1975 to 2019 for New Jersey

The trend of vehicle miles traveled per capita is similar to that of total vehicle miles traveled.¹³ Figure 2 illustrates that the number of VMT per person has been increasing over time, with a statistically significant and increasing linear trend (Kendall Tau P-value ≤ 0.05 for 1975-2018 and for 1991-2018). Compared to public road miles, annual VMT has increased at a greater rate (1% per year on average from 1991-2018). In fact, annual per capita miles traveled has increased by roughly 840 miles per person over the last 20 years (approximately 42 miles per year).

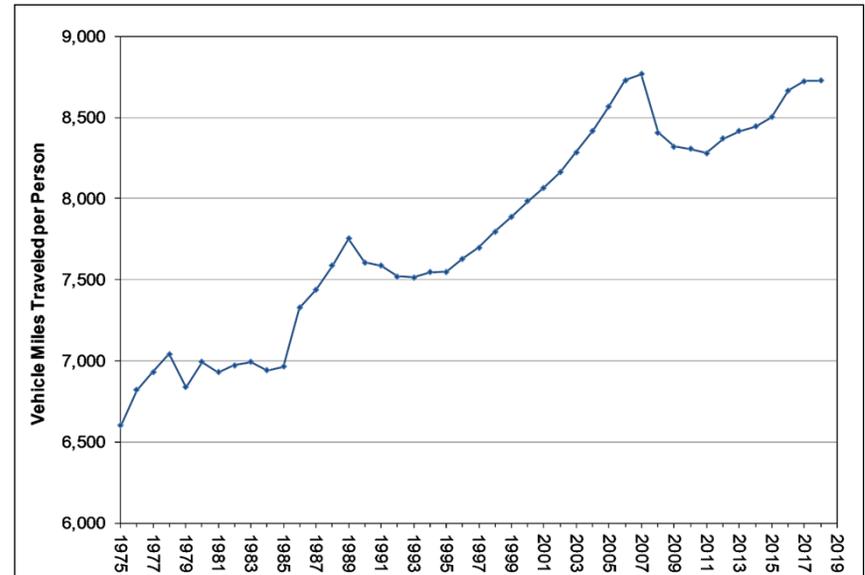


Figure 2. Vehicle miles traveled per person from 1975 to 2019 for New Jersey.

Outlook and Implications

Historic trends indicate that VMT declines associated with rising fuel prices will reverse themselves when fuel prices drop. Other indicators of changing VMT trends include economic growth, affordability of auto travel, sprawl, and access to public transportation

The ratio of VMT to road miles can help explain traffic congestion patterns. However, it has been argued that the solution to congestion is not only to increase road miles, but to design effective congestion management solutions because expanded and new highways may simply generate more traffic.¹⁴ Solutions to congestion include amending patterns of residential and commercial development to facilitate pedestrian and bicycle travel, electronic commerce and telecommuting, as well as adding to and maintaining current roadways.

Addressing congestion is one way to reduce emissions from vehicles by reducing the time spent in transit. An increase in electric vehicles would also further reduce emissions from this sector. P.L. 2019, c.362 sets goals of 330,000 electric vehicles

and 400 fast chargers at 200 locations by 2025. In addition, hotels and multi-unit dwellings (e.g., apartments) must have charging stations, and the state must transition 25% of its light duty fleet to electric by 2025. Additional measures to reduce VMT and associated emissions include utilizing public transportation and carpools and working remotely.

More Information

For more information, visit <https://www.nj.gov/transportation/refdata/roadway/vmt.shtm> or <https://www.fhwa.dot.gov/environment/>.

For more information on U.S. Greenhouse Gas Emissions, visit <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks>.

References

¹United States Environmental Protection Agency, 2018. Basic Information About Ozone. <https://www.epa.gov/ozone-pollution/basic-information-about-ozone#effects>, Accessed 10/2/2018.

²New Jersey Department of Environmental Protection, 2017. New Jersey Air Emission Inventories. <https://www.nj.gov/dep/baqp/inventory.html>, Accessed 5/17/2018.

³New Jersey Department of Environmental Protection, 2016. Ozone Environmental Trend Report. <https://www.nj.gov/dep/dsr/trends/ozone.pdf>, Accessed 10/19/2018.

⁴United States Environmental Protection Agency, 2018. History of Reducing Air Pollution from Transportation in the United States. <https://www.epa.gov/transportation-air-pollution-and-climate-change/accomplishments-and-success-air-pollution-transportation>, Accessed 10/2/2018.

⁵United States Environmental Protection Agency, 2018. Regulatory Information by Topic: Air. <https://www.epa.gov/regulatory-information-topic/regulatory-information-topic-air#transport>, Accessed 10/2/2018.

⁶United States Environmental Protection Agency, 2018. Inventory of U.S. Greenhouse Gas Emissions and Sinks. <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks>, Accessed 07/09/2020.

⁷Currey, Ganson, Miller, and Fesler. (2015) Vehicle-Miles Traveled (VMT) Impacts on the Environment, Human Health, and Fiscal Health. State Smart Transportation Initiative.

⁸New Jersey Department of Transportation, 2020. Daily Vehicle Miles of Travel (1000's). <https://www.nj.gov/transportation/refdata/roadway/vmt.shtm>, Accessed 05/05/2020.

⁹New Jersey Department of Transportation, 2020. Travel Activity by Vehicle Type. <https://www.nj.gov/transportation/refdata/roadway/vmt.shtm>, Accessed 05/05/2020.

¹⁰US Department of Transportation, Federal Highway Administration. Highway Performance Monitoring System (HPMS). <https://www.fhwa.dot.gov/policyinformation/statistics.cfm>, Accessed 4/20/2018.

¹¹New Jersey Department of Transportation, 2020. Public Roadway Mileage and Vehicle Miles Traveled. <https://www.nj.gov/transportation/refdata/roadway/vmt.shtm>, Accessed 05/05/2020. Note 2003 road mileage value was averaged from 2002 and 2004 values. The 2003 value on the NJDOT site is apparently in error.

¹²Statista, 2017. Retail Price of Regular Gasoline in the United States from 1990 to 2017 (in U.S. dollars per gallon). <https://www.statista.com/statistics/204740/retail-price-of-gasoline-in-the-united-states-since-1990/> Accessed 5/3/2018.

¹³New Jersey Department of Labor and Workforce Development, 2020. Annual Estimates of the Population: April 1, 2020 to July 1, 2019. https://nj.gov/labor/lpa/dmograph/est_est_index.html(see file nst-01.xlsx) , Accessed 5/05/2020.

¹⁴New Jersey Department of Transportation, 2011. New Jersey FIT: Future in Transportation – The Congestion Epidemic. <https://www.nj.gov/transportation/works/njit/congestion.shtm>, Accessed 05/11/2020.