Vehicle use 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. Motor vehicles are the single largest source category of ozone precursor emissions in New Jersey. 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.

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. The pollutants that are regulated for transportation include hydrocarbons (HC), carbon monoxide (CO), nitrogen oxides (NOx), and particulates. Even though vehicles today produce much less pollution per vehicle compared to the 1960s, as of 2016, transportation was still the top contributor of greenhouse gases, accounting for 28% of greenhouse gas emissions on a national scale. Increased VMT per capita increases emissions of greenhouse gases and other air pollutants. To assess greenhouse gas emissions from transportation, the trend in vehicle miles traveled (VMT) can be used as a surrogate.

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 2016, more than 210 million miles were traveled per day on the state’s roadways. Diesel-fueled VMT makes up a small portion (less than 10%) of total VMT. 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. These estimates are used to monitor highway use and aid the Federal Highway Administration in allocating federal transportation funding to individual states. 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 has 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.
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 2017. 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. In contrast, the amount of public roads in the state (reported as public road miles) has increased at a steady rate of 0.47% per year on average from 1991 to 2017. The trend of vehicle miles traveled per capita (Figure 2) is similar to that of total vehicle miles traveled. 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 1975-2017; Kendall Tau P-value ≤ 0.05 for 1991-2017). Compared to public road miles, annual vehicle miles traveled per capita has increased at a greater rate (1% per year on average from 1991-2017). In fact, annual per capita miles traveled has increased by roughly 900 miles per person over the last 20 years (approximately 45 miles per year).

Outlook and Implications

Historic trends indicate that VMT declines that are 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.

Even with the recent declines, the ratio of VMT to road miles remains relatively high compared to earlier years. This higher ratio of VMT to road miles explains why traffic congestion has appeared to become more of a problem. 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. 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. To further reduce emissions from transportation, increases in engine efficiency and emission reduction technology should be implemented. Additional measures to reduce VMT and associated emissions include utilizing public transportation and carpools. Further, electric vehicles have zero tailpipe emissions, and any emissions from power production at the power plant are typically less than those for gasoline cars.\(^8\)

More Information

For more information, visit [www.nj.gov/transportation/refdata/roadway/vmt.shtm](http://www.nj.gov/transportation/refdata/roadway/vmt.shtm) or [www.fhwa.dot.gov/environment](http://www.fhwa.dot.gov/environment)

References