Florida Department of Transportation Research

Autonomous Vehicle (AV) and Alternative Fuel Vehicle (AFV) Florida Market Penetration Rate and VMT Assessment Study

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Current Situation

Automated vehicles (AVs) are the subject of much research, and the push to bring automated vehicles to the road is unprecedented. Theoretically, AVs have great potential to relieve traffic congestion, free up parking, improve safety, and increase mobility options for many people. Several factors, such as reduced need for a personal car, suggest that AVs will significantly reduce gasoline and diesel fuel use and the taxes that help fund state transportation departments. The AV is not entirely responsible for this situation: as alternative fuel vehicles (AFVs) like all-electric and gas-electric hybrids have become more popular, they too have begun to reduce fuel tax revenues. This is forcing states to rethink transportation funding mechanisms, considering, for example, taxing vehicle miles traveled (VMT). Understanding the timeline and extent of fuel tax revenue decreases is important for policy makers in the Florida Department of Transportation (FDOT) and in state government overall.

The acceptance of alternative fuel vehicles is shown by the presence of charging stations at places of work and businesses.

Research Objectives

University of South Florida researchers conducted a comprehensive market penetration analysis of autonomous and alternative fuel vehicles and their potential impacts on Florida's vehicle miles of travel and fuel tax revenues.

Project Activities

The researchers reviewed recent literature for national market penetration forecasts and analysis of national trends, deriving state-level AFV and AV market penetration rates and VMT forecasts for state funding periods from 2017-18 to 2047-48. The projections considered high, medium, and low market penetration rates and VMT for autonomous and alternative fuel technologies and accounted for Florida-specific economic and socio-demographic conditions.

The VMT projections were used to assess the impact on Florida transportation revenues. Projected VMT were converted into forecasted gallons of gasoline and diesel motor fuel not consumed as a result of plug-in electric vehicles substituting for internal combustion engine vehicles. The estimated gallons were then applied to the various federal, state, and local motor fuel tax rates to calculate lost revenues, adjusting for non-taxable fuel use (public entities) and various administrative fees, refunds, and non-transportation diversions.

Analysis showed that adoption of AFVs and AVs at all levels of expected market penetration will result in substantial tax revenue losses, particularly after 2030. However, regarding how AVs will change the ways that people and goods move, the analysis showed a high variability and uncertainty, as in the early years of many other technologies. Therefore, during the transition phase, transportation investment decisions may not match future needs without a more complete understanding of the long-term effects of AFVs and AVs on Florida transportation.

Project Benefits

This project will help policy makers and decision makers address potential budget shortfalls in fuel tax revenues as alternative fuels displace gasoline and diesel fuel in vehicles in Florida.

For more information, please see www.fdot.gov/research/.