



## ROADS



AN AERIAL SHOT OVER A WESTERN PENNSYLVANIA INTERSTATE IN LATE AUTUMN. ©:ORLOWSKI DESIGNS LLC

# ROADS

## EXECUTIVE SUMMARY

In 2013, Act 89 provided significant improvement funding increases, resulting in 2,600 projects that are currently in progress or have been completed. Although these funds have contributed to the advancement of reconstruction, rehabilitation, new roadway, and intersection improvement projects, there is a significant roadway backlog that still requires attention, as seen by 43% of PennDOT owned roadways having a fair or poor pavement surface. For motorists statewide, traffic congestion results in over \$3.7 billion per year in lost time and wasted fuel, and deficient roadway conditions cost the average motorist over \$500 in operating and maintenance outlays. In FY 2019, Act 89 funding will hit its maximum funding level and plateau. Thus, as Pennsylvania's roadway infrastructure ages, needs for increased capacity rise, and fuel economy increases, the funding gap will grow unless additional or alternative funding sources are identified.

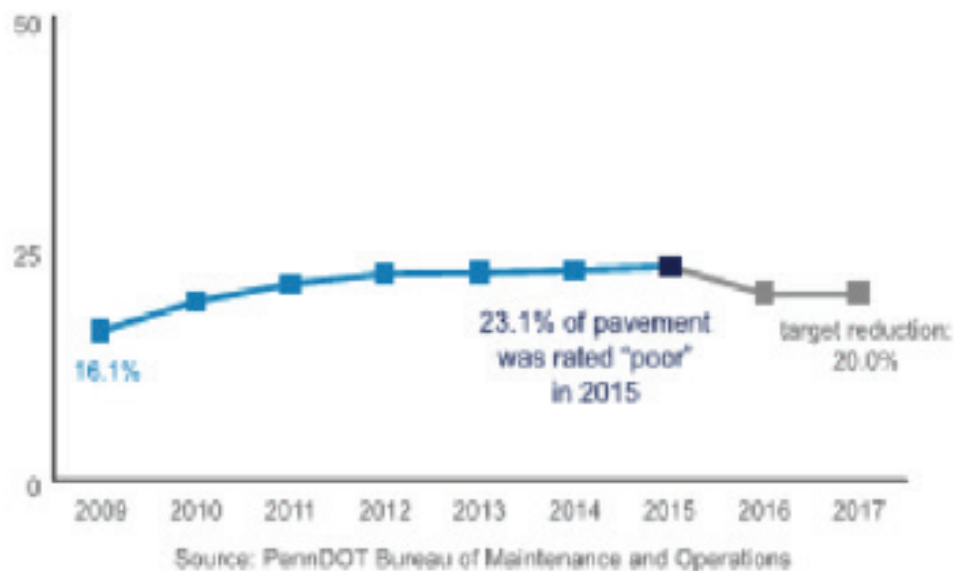
## BACKGROUND

There are over 120,000 miles of roadway in the Pennsylvania highway system. The Commonwealth's 8.8 million drivers travel nearly 100 billion miles on these roads every year. Approximately one-third of the total (41,000 miles) is state-owned and maintained, the fifth-largest state highway system in the nation. This includes 1,855 miles of Interstate Highways. The state network has most of the higher-volume roadways and inter-jurisdictional routes in the Commonwealth. In late 2013, the Act 89 Transportation Plan became a law which included uncapping the wholesale oil company franchise tax to increase available funding for transportation. The funds raised as a result of Act 89 are used for maintenance and capital projects for highway and bridges, multimodal facilities as well as the state police budget.

## CONDITION

In 2011, over 8,500 miles (21.2%) of the State Highway network had pavements rated as "poor" condition and needed rehabilitation or reconstruction. In 2015 this amount grew to over 10,000 miles (23.1%), as shown in Figure 1.

**FIGURE 1. PERCENTAGE OF ROADWAYS STATEWIDE WITH PAVEMENT SMOOTHNESS RATING OF "POOR"**



In 2017 the pavement, as based on the International Roughness Index, shows that 57% of state-maintained roadways are in "excellent" or "good" condition.

Approximately 60% of Pennsylvania's interstate system is over 40 years old and needs reconstruction. Figure 2 illustrates the fluctuation of total miles reconstructed, which falls considerably short of the 68 miles of reconstruction needed annually to improve the system. However, the influence of the increased funding is seen by the uptick of reconstruction in the years following the passing of Act 89.

**FIGURE 2. MILES OF INTERSTATE RECONSTRUCTED**  
Actual funded vs. need



Source: PennDOT Bureau of Fiscal Management

Truck traffic accounts for over 34% of the travel on Pennsylvania interstates, more than double the national average. Since trucks weigh more than passenger cars, they inflict higher levels of damage on roads. With truck traffic increasing, particularly in the home delivery area with on-line shopping becoming more popular, it is anticipated that roads will need to be built with higher cost, more durable materials or will need more frequent restoration and maintenance activity in the future.

Act 89 has facilitated the advancement and acceleration of over 2,600 capital projects that have been recently completed or are currently in progress. This, in addition to more intensive maintenance-type efforts and surface treatment projects, addressed many of the priority safety and mobility issues and conditions, allowing this Report Card's grade to increase over the 2014 grade (D-).

On the 540 miles of the Pennsylvania Turnpike Commission's network, a major reconstruction program has been underway for the past two decades to improve the older segments and widen many sections to 3 lanes in each direction. The program has completed the reconstruction of 140 miles of the roadway to date, with 38 miles finished since 2014.

## CAPACITY

In the major urban areas in the Commonwealth, traffic congestion is a daily occurrence and it affects both pavement condition and mobility. This costs the average commuter over four weeks of time and a month's worth of fuel annually. Statewide congestion is estimated to cost drivers over \$3.7 billion per year in lost time and wasted fuel. On the busy section of I-76 in the Philadelphia area alone, in 2017, there were a combined 3 million hours of delay with an associated \$73 million in lost productivity.

Given PennDOT's backlog of maintenance, the majority of its program is directed to improving its existing facilities. For many years, PennDOT's policy was to not increase roadway capacity. With limited funds, results of urban sprawl, and environmental challenges, PennDOT has turned to alternative means to provide increased capacity than traditional means of adding lanes.

PennDOT is now in the preliminary stages of teaming up with transit agencies to use technology to encourage drivers to switch to public transportation in congested roadway areas. Additionally, innovative methods to increase roadway capacity are being explored. This is covered in the Resilience and Innovation section below. PennDOT continues to require land developers to make improvements to roadways, which may include adding lanes and signalized intersections/roundabouts if the anticipated amount of traffic warrants such improvements.

## FUNDING

Pennsylvania's elected representatives took a bold move with the passage of Act 89 despite the backlash that could have resulted from the increased taxes and fees. As previously noted, the increased funding as a result of Act 89 facilitated the advancement of over 2,600 projects since its passage.

Act 89 also allowed counties to charge a \$5 vehicle registration fee with the funds going to local transportation projects. Twenty-two counties are participating in this program. Montgomery County, for example, receives \$3 million each year through this revenue source and allocates \$1 million toward local matching funding for municipalities to participate in the Green Light Go program for improvements to traffic signals.

Act 89 funding will hit its maximum funding level and plateau by FY 2019. As PennDOT's infrastructure ages, needs for increased capacity rise, and fuel economy increases, the funding gap will resume. By 2020, this is estimated to be \$7.2 billion. The continued funding gap will result in higher percentages of pavement surfaces in the fair/poor category. Additionally, PennDOT and a number of municipalities across the state leverage the available capital funding for major improvements to match federal transportation programs.

Federal policies for continuation of transportation programs at this level are not set at this time and infrastructure discussions at the federal level have not occurred as of this report, thus there is some anxiety and uncertainty on whether federal dollars will be available at previous levels for highway projects in the future.

Act 89 was beneficial to raise funds for state-owned roads and it provides counties with an opportunity to raise additional funds through registration fee increases and opportunities to receive grants for local improvements. However local municipalities that own and maintain roads have not been able to utilize increased funds from Act 89 for routine maintenance purposes. For example, Philadelphia's road maintenance budget has remained at nearly the same level for the past four years.

In 2016, to increase the amount of funding available for transportation efforts, administrative action was proposed to cap the expenditures from the Motor License Fund going toward the Pennsylvania State Police budget. Although action was proposed, no formal action was taken, causing the funds directed into the police budget to be determined by the annual budgeting process. Lowering the cap would direct more resources toward Act 89's Decade of Investment projects to be completed by 2028.

## FUTURE NEED

Roadways will continue to age beyond their design service life and deteriorate, thus the previously-mentioned gap between needs and resources will continue to widen. Given improved fuel economy and increasing popularity of electric vehicles, reliance on any fuel-based taxes for continued revenue should be examined. One method available to properly assess all road users equally for highway travel and ensure that needed funding is available to fund future improvement efforts is a Vehicle Miles Traveled (VMT) tax. This will recognize continued improvement in vehicle fuel economy and an increased number of alternative-fuel vehicles. While this has been implemented on an experimental basis in several areas, Pennsylvania has not taken any direct steps on this, other than consideration as part of its involvement in the I-95 Coalition, which is advocating this.

While future transportation dollars will be limited, improvements could be formally proposed by PennDOT to stretch resources further such as life-cycle cost analysis methods, to properly evaluate and determine the total cost of projects, and the expanded use of cost-benefit analysis principles in the evaluation and prioritization of projects to address needs on a more objective basis.

## PUBLIC SAFETY

Statewide traffic fatality rates have remained stable over the last five years with a slightly downward trend. For 2016, Pennsylvania's 1.18 fatalities per 100 million miles of travel is still slightly above the national average of 1.16. Safety has been a top priority of agencies and should continue to be a strong reason to address infrastructure deficiencies. A movement that is gaining traction in the transportation community is the concept of Vision Zero which aims to eliminate all traffic fatalities. As of January 2018, Bethlehem and Philadelphia have become Vision Zero Cities formally setting goals while other cities such as Harrisburg and Pittsburgh are considering it.

## RESILIENCE AND INNOVATION

Advances in roadway design, construction, maintenance, and management technologies and techniques are constantly being developed and employed to extend the useful lives of facilities. The use of 3D engineered models for more accurate and efficient planning and construction are being undertaken. Automated management systems will help with asset management and permit reviews. New materials and technology are also helping roads become more sustainable and resilient, such as the use of warm-mix asphalt, which requires less energy to produce and install.

The use of highway shoulders on a part-time basis, mainly on expressway/freeway facilities ("hard shoulder running"), is being explored to allow capacity expansion on several interstates. It allows part-time (usually peak-hour) use of the emergency shoulder/pull-off lanes for traffic and is an alternative to expensive widening. Other measures include adaptive traffic signal technology, variable lane assignment measures and coordination with transit agencies to encourage drivers to switch to public transportation in congested roadway areas. These will require investments in new technology and some physical changes and additions, such as signing, traffic observation cameras and detection equipment, but will result in enhanced traffic movement with relatively minimal cost.

The use of creative and non-traditional project delivery methods is increasing. Public-private partnerships (P3) have additionally been utilized to allow private capital and investment with public dollars to maximize project benefits and coverage. Several such efforts have been utilized for bridge projects to accelerate replacement and reduce the backlog of deficient structures, but a similar approach has not yet been formalized for highway improvement projects in Pennsylvania.

As the private and educational sectors are working to advance connected and autonomous vehicle (CAV) technology, primarily in Pittsburgh, PennDOT and the Pennsylvania Turnpike are also in the early phases to test and prepare the state for this technology. In 2018, PennDOT announced their partnership with Penn State to begin planning and designing a Pennsylvania Safety, Training and Research (PennSTART) facility.



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## RECOMMENDATIONS TO RAISE THE GRADE

- Establish stable sources of dedicated transportation funding including the highway trust fund and an increase in the federal gas tax as Act 89 will plateau in FY 2019.
- Encourage the use of life-cycle cost analysis methods to properly evaluate and determine the total cost of projects.
- Encourage the expanded use of cost-benefit analysis principles in the evaluation and prioritization of projects.
- Utilize innovative and creative project delivery strategies and methods to stretch existing dollars further.
- Advocate for additional research and development funding to further explore new materials and technology.



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