

# ***KENTUCKY TRANSPORTATION BY THE NUMBERS:***

Meeting the State's Need for Safe, Smooth and  
Efficient Mobility

**FEBRUARY 2017**



*Founded in 1971, TRIP® of Washington, DC, is a nonprofit organization that researches, evaluates and distributes economic and technical data on surface transportation issues. TRIP is sponsored by insurance companies, equipment manufacturers, distributors and suppliers; businesses involved in highway and transit engineering and construction; labor unions; and organizations concerned with efficient and safe surface transportation*

## Ten Key Transportation Numbers in Kentucky

<b>\$4 billion</b>	Driving on roads that are in poor or mediocre condition, congested or lack adequate safety features costs Kentucky motorists a total of \$4 billion annually in the form of additional vehicle operating costs (VOC), congestion-related delays and traffic crashes.
<b>\$805 – Bowling Green \$1,285 - Lexington \$1,899 - Louisville \$1,694 – N. Kentucky \$1,065- Owensboro</b>	TRIP has calculated the cost to the average motorist in Kentucky’s largest urban areas in the form of additional VOC, congestion-related delays and traffic crashes. Driving on roads that are in poor or mediocre condition, congested or lack adequate safety features costs the average Bowling Green driver \$805 annually; \$1,285 in the Lexington area; \$1,899 in the Louisville area; \$1,694 in the Northern Kentucky area and \$1,065 in the Owensboro area.
<b>3,538 708</b>	A total of 3,538 people were killed in Kentucky traffic crashes from 2011 to 2015, an average of 708 fatalities annually. After decreasing steadily from 2010 to 2013, the number of fatalities rose each year from 2013 to 2015.
<b>1.56 4th</b>	Kentucky’s roads and highways have a fatality rate of 1.56 fatalities per 100 million vehicle miles of travel, the fourth highest in the U.S. and significantly higher than the national average of 1.13.
<b>7 % - Bowling Green 23 % - Lexington 48 % - Louisville 45 % - N. Kentucky 32 % - Owensboro</b>	Seven percent of major state and locally maintained roads and highways in the Bowling Green urban area have pavements in poor or mediocre condition and 23, 48, 45 and 32 percent, respectively in the Lexington, Louisville, Northern Kentucky and Owensboro urban areas.
<b>16%</b>	Statewide, 16 percent of Kentucky’s major urban roads are in poor condition.
<b>\$502 Billion</b>	Annually, \$502 billion in goods are shipped to and from sites in Kentucky, mostly by truck.
<b>1/12</b>	Approximately one-in-twelve (8 percent) of Kentucky’s locally or state-maintained bridges are rated structurally deficient because they have significant deterioration.
<b>14 hours-Bowling Green 27 hours-Lexington 43 hours-Louisville 41 hours-N. Kentucky 13 hours – Owensboro</b>	Congestion is robbing Kentucky drivers of time and money. The average driver in Bowling Green loses 14 hours annually to congestion, while drivers in Lexington lose 27 hours each year. Louisville drivers spend an average of 43 hours each year stuck in traffic, while Northern Kentucky drivers lose 41 hours annually. Owensboro drivers lose an average of 13 hours annually.
<b>\$1.00 = \$5.20</b>	The Federal Highway Administration estimates that each dollar spent on road, highway and bridge improvements results in an average benefit of \$5.20 in the form of reduced vehicle maintenance costs, reduced delays, reduced fuel consumption, improved safety and reduced emissions.

## Executive Summary

Nine years after the nation suffered a significant economic downturn, Kentucky's economy continues to rebound. The rate of economic growth in Kentucky, which will be greatly impacted by the reliability and condition of the state's transportation system, continues to have a significant impact on quality of life in the Bluegrass State.

An efficient, safe and well-maintained transportation system provides economic and social benefits by affording individuals access to employment, housing, healthcare, education, goods and services, recreation, entertainment, family, and social activities. It also provides businesses with access to suppliers, markets and employees, all critical to a business' level of productivity and ability to expand. Reduced accessibility and mobility - as a result of traffic congestion, a lack of adequate capacity, or deteriorated roads, highways, bridges and transit facilities - diminishes a region's quality of life by reducing economic productivity and limiting opportunities for economic, health or social transactions and activities.

With an economy based largely on agriculture, manufacturing, tourism and natural resource extraction, the quality of Kentucky's transportation system plays a vital role in the state's economic growth and quality of life.

In this report, TRIP looks at the top transportation numbers in Kentucky as the state addresses its need to modernize and maintain its system of roads, highways, bridges and transit.

In December 2015 the president signed into law a long-term federal surface transportation program that includes modest funding increases and allows state and local governments to plan and finance projects with greater certainty through 2020. The [Fixing America's Surface Transportation Act \(FAST Act\)](#) provides approximately \$305 billion for surface transportation with highway and transit funding slated to increase by approximately 15 and 18 percent, respectively, over the five-year duration of the program. While the modest funding increase and certainty provided by the FAST Act are a step in the right direction, the funding falls far short of the level needed to improve conditions and meet the nation's mobility needs and fails to deliver a sustainable, long-term source of revenue for the federal Highway Trust Fund.

## **COST OF KENTUCKY ROADS THAT ARE DETERIORATED, CONGESTED AND LACK SOME SAFETY FEATURES**

**Driving on Kentucky’s transportation system costs motorists a total of \$4 billion every year in the form of additional vehicle operating costs (VOC), congestion-related delays and traffic crashes.**

- Driving on rough roads costs Kentucky motorists a total of \$1 billion annually in extra vehicle operating costs. Costs include accelerated vehicle depreciation, additional repair costs, and increased fuel consumption and tire wear.
- Based on a national estimate that roadway design is likely a contributing factor in approximately one-third of serious and fatal traffic crashes, TRIP estimates that the economic costs of serious and fatal traffic crashes in Kentucky in which roadway design was likely a contributing factor is \$1.4 billion each year in the form of lost household and workplace productivity, insurance and other financial costs.
- Traffic congestion costs Kentucky residents a total of \$1.6 billion each year in the form of lost time and wasted fuel.
- The chart below details the average cost per driver in the state’s largest urban areas as well as statewide.

	<b>VOC</b>	<b>Safety</b>	<b>Congestion</b>	<b>Total</b>
<b>Bowling Green</b>	\$85	\$395	\$325	\$805
<b>Lexington</b>	\$278	\$351	\$656	\$1,285
<b>Louisville</b>	\$519	\$332	\$1,048	\$1,899
<b>Northern Kentucky</b>	\$495	\$210	\$989	\$1,694
<b>Owensboro</b>	\$368	\$362	\$335	\$1,065
<b>STATEWIDE TOTAL</b>	<b>\$1 Billion</b>	<b>\$1.4 Billion</b>	<b>\$1.6 Billion</b>	<b>\$4 Billion</b>

## **POPULATION AND ECONOMIC GROWTH IN KENTUCKY**

**The rate of population and economic growth in Kentucky have resulted in increased demands on the state’s major roads and highways, leading to increased wear and tear on the transportation system.**

- Kentucky’s population reached approximately 4.4 million residents in 2015, a nine percent increase since 2000.
- Kentucky had 3 million licensed drivers in 2015.
- Vehicle miles traveled (VMT) in Kentucky increased from 46.8 billion VMT in 2000 to 48.3 billion VMT in 2015.

## **KENTUCKY ROAD CONDITIONS**

**A lack of adequate state and local funding has resulted in 16 percent of major state and locally maintained urban roads and highways in Kentucky having pavement surfaces in poor condition, providing a rough ride and costing motorists in the form of additional vehicle operating costs.**

- The pavement data in this report, which is for all arterial and collector roads and highways, is provided by the Federal Highway Administration (FHWA), based on data submitted annually by the Kentucky Transportation Cabinet (KYTC) on the condition of major state and locally maintained roads and highways.
- Pavement data for Interstate highways and other principal arterials is collected for all system mileage, whereas pavement data for minor arterial and all collector roads and highways is based on sampling portions of roadways as prescribed by FHWA to insure that the data collected is adequate to provide an accurate assessment of pavement conditions on these roads and highways.
- Sixteen percent of Kentucky’s major urban locally and state-maintained roads are in poor condition, while 44 percent are in mediocre or fair condition. The remaining 40 percent are in good condition.
- The chart below details the share of major roads in poor, mediocre, fair and good condition in the state’s largest urban areas.

	<b>Poor</b>	<b>Mediocre</b>	<b>Fair</b>	<b>Good</b>
<b>Bowling Green</b>	2%	5%	8%	85%
<b>Lexington</b>	10%	13%	15%	61%
<b>Louisville</b>	22%	26%	19%	34%
<b>Northern Kentucky</b>	23%	22%	12%	43%
<b>Owensboro</b>	15%	17%	18%	50%

- Roads rated in mediocre to poor condition may show signs of deterioration, including rutting, cracks and potholes. In some cases, these roads can be resurfaced, but often are too deteriorated and must be reconstructed.
- Driving on rough roads costs Kentucky motorists a total of \$1 billion annually in extra vehicle operating costs. Costs include accelerated vehicle depreciation, additional repair costs, and increased fuel consumption and tire wear.

## **KENTUCKY BRIDGE CONDITIONS**

**Approximately one-out-of-twelve locally and state-maintained bridges in Kentucky show significant deterioration. This includes all bridges that are 20 feet or more in length.**

- Eight percent of Kentucky’s bridges are structurally deficient. A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Structurally deficient bridges are often posted for lower weight or closed to traffic, restricting or redirecting large vehicles, including commercial trucks and emergency services vehicles.
- The chart below indicates the share of bridges which are structurally deficient statewide and in Kentucky’s largest urban areas.

	<b>Structurally Deficient</b>	<b>Bridges Str. Deficient</b>	<b>Total Bridges</b>
<b>Bowling Green</b>	2%	2	99
<b>Lexington</b>	4%	26	717
<b>Louisville</b>	9%	54	629
<b>Northern Kentucky</b>	6%	24	399
<b>Owensboro</b>	4%	21	538
<b>STATEWIDE TOTAL</b>	8%	1,157	14,265

## **HIGHWAY SAFETY AND FATALITY RATES IN KENTUCKY**

**The traffic fatality rate on Kentucky’s roads is the fourth highest in the nation. Improving safety features on Kentucky’s roads and highways would likely result in a decrease in the state’s traffic fatalities and serious crashes. Nationally, it is estimated that roadway features are likely a contributing factor in approximately one-third of all fatal and serious traffic crashes.**

- A total of 3,538 people were killed in Kentucky traffic crashes from 2011 to 2015, an average of 708 fatalities per year. After decreasing steadily from 2010 to 2013, the number of fatalities rose each year from 2013 to 2015.
- Kentucky’s overall traffic fatality rate of 1.56 fatalities per 100 million vehicle miles of travel in 2015 was the fourth highest in the U.S. and significantly higher than the national average of 1.13.
- In the Bowling Green urban area, an average of 16 people were killed in traffic crashes over the last three years, while an average of 58 people were killed in traffic crashes in the Lexington urban area during that time. An average of 84 people were killed in crashes in the Louisville area over the last three years, while in Northern Kentucky, there was an average of 27 annual traffic fatalities over the last three years, while an average of 14 people were killed in traffic crashes in the Owensboro urban area during that time.

- Traffic crashes in Kentucky imposed a total of \$4.2 billion in economic costs in 2014. Based on a national estimate that roadway design is likely a contributing factor in approximately one-third of serious and fatal traffic crashes, TRIP estimates that the economic costs of serious and fatal traffic crashes in Kentucky in which roadway design was likely a contributing factor is \$1.4 billion each year in the form of lost household and workplace productivity, insurance and other financial costs.
- According to a [2015 National Highway Traffic Safety Administration \(NHTSA\) report](#), the economic costs of traffic crashes includes work and household productivity losses, property damage, medical costs, rehabilitation costs, legal and court costs, congestion costs and emergency services.
- Roadway features that impact safety include the number of lanes, lane widths, lighting, lane markings, rumble strips, shoulders, guard rails, other shielding devices, median barriers and intersection design. The cost of serious crashes includes lost productivity, lost earnings, medical costs and emergency services.
- Several factors are associated with vehicle crashes that result in fatalities, including driver behavior, vehicle characteristics and roadway features. TRIP estimates that roadway features are likely a contributing factor in approximately one-third of fatal traffic crashes.
- Where appropriate, highway improvements can reduce traffic fatalities and crashes while improving traffic flow to help relieve congestion. Such improvements include removing or shielding obstacles; adding or improving medians; improved lighting; adding rumble strips, wider lanes, wider and paved shoulders; upgrading roads from two lanes to four lanes; and better road markings and traffic signals.
- Investments in rural traffic safety have been found to result in significant reductions in serious traffic crashes. A 2012 report by the [Texas Transportation Institute \(TTI\)](#) found that improvements completed recently by the Texas Department of Transportation that widened lanes, improved shoulders and made other safety improvements on 1,159 miles of rural state roadways resulted in 133 fewer fatalities on these roads in the first three years after the improvements were completed (as compared to the three years prior). TTI estimates that the improvements on these roads are likely to save 880 lives over 20 years.

## **KENTUCKY TRAFFIC CONGESTION**

**Increasing levels of traffic congestion cause significant delays in Kentucky, particularly in its larger urban areas, choking commuting and commerce. Traffic congestion robs commuters of time and money and imposes increased costs on businesses, shippers and manufacturers, which are often passed along to the consumer.**

- Based on [Texas Transportation Institute \(TTI\)](#) estimates, the value of lost time and wasted fuel in Kentucky is approximately \$1.6 billion per year.

- The chart below details what congestion costs the average driver in the state’s largest urban areas in the form of lost time and wasted fuel and the number of hours lost annually to congestion.

	<b>Congestion Cost</b>	<b>Hours Lost</b>
<b>Bowling Green</b>	\$325	14 Hours
<b>Lexington</b>	\$656	27 Hours
<b>Louisville</b>	\$1,048	43 Hours
<b>Northern Kentucky</b>	\$989	41 Hours
<b>Owensboro</b>	\$335	13 Hours

- Increasing levels of congestion add significant costs to consumers, transportation companies, manufacturers, distributors and wholesalers and can reduce the attractiveness of a location to a company when considering expansion or where to locate a new facility. Congestion costs can also increase overall operating costs for trucking and shipping companies, leading to revenue losses, lower pay for drivers and employees, and higher consumer costs.

## **TRANSPORTATION FUNDING IN KENTUCKY**

**Investment in Kentucky’s roads, highways and bridges is funded by local, state and federal governments. The five-year federal surface transportation program includes modest funding increases and provides states with greater funding certainty, but falls far short of providing the level of funding needed to meet the nation’s highway and transit needs. The bill does not include a long-term and sustainable revenue source.**

- The ability of state and local governments to make needed improvements to Kentucky’s transportation system to improve conditions, enhance economic development opportunities and to improve safety is constrained by the level of available federal, state and local transportation funding.
- Signed into law in December 2015, the [Fixing America’s Surface Transportation Act \(FAST Act\)](#), provides modest increases in federal highway and transit spending, allows states greater long-term funding certainty and streamlines the federal project approval process. But the FAST Act does not provide adequate funding to meet the nation’s need for highway and transit improvements and does not include a long-term and sustainable funding source.
- The five-year, \$305 billion FAST Act will provide approximately a 15 percent boost in national highway funding and an 18 percent boost in national transit funding over the duration of the program, which expires in 2020.

- In addition to federal motor fuel tax revenues, the FAST Act will also be funded by \$70 billion in U.S. general funds, which will rely on offsets from several unrelated federal programs including the Strategic Petroleum Reserve, the Federal Reserve and U.S. Customs.
- According to the [2015 AASHTO Transportation Bottom Line Report](#), a significant boost in investment in the nation's roads, highways, bridges and public transit systems is needed to improve their condition and to meet the nation's transportation needs.
- AASHTO's report found that based on an annual one percent increase in VMT annual investment in the nation's roads, highways and bridges needs to increase 36 percent, from \$88 billion to \$120 billion, to improve conditions and meet the nation's mobility needs, based on an annual one percent rate of vehicle travel growth. Investment in the nation's public transit system needs to increase from \$17 billion to \$43 billion.
- The Bottom Line Report found that if the national rate of vehicle travel increased by 1.4 percent per year, the needed annual investment in the nation's roads, highways and bridges would need to increase by 64 percent to \$144 billion. If vehicle travel grows by 1.6 percent annually the needed annual investment in the nation's roads, highways and bridges would need to increase by 77 percent to \$156 billion.

## **TRANSPORTATION AND ECONOMIC GROWTH IN KENTUCKY**

**The efficiency of Kentucky's transportation system, particularly its highways, is critical to the health of the state's economy. Businesses rely on an efficient and dependable transportation system to move products and services. A key component in business efficiency and success is the level and ease of access to customers, markets, materials and workers.**

- Annually, \$502 billion in goods are shipped to and from sites in Kentucky, mostly by truck.
- Seventy-six percent of the goods shipped annually to and from sites in Kentucky are carried by trucks and another 13 percent are carried by courier services or multiple mode deliveries, which include trucking.
- Increasingly, companies are looking at the quality of a region's transportation system when deciding where to re-locate or expand. Regions with congested or poorly maintained roads may see businesses relocate to areas with a smoother, more efficient and more modern transportation system.
- Highway accessibility was ranked the number two site selection factor behind only the availability of skilled labor in a 2015 survey of corporate executives by [Area Development Magazine](#).

- The [Federal Highway Administration](#) estimates that each dollar spent on road, highway and bridge improvements results in an average benefit of \$5.20 in the form of reduced vehicle maintenance costs, reduced delays, reduced fuel consumption, improved safety, reduced road and bridge maintenance costs and reduced emissions as a result of improved traffic flow.

*Sources of information for this report include the Federal Highway Administration (FHWA), the American Association of State Highway and Transportation Officials (AASHTO), the Bureau of Transportation Statistics (BTS), the U.S. Census Bureau, the Texas Transportation Institute (TTI) and the National Highway Traffic Safety Administration (NHTSA).*

## **Introduction**

Kentucky's roads, highways and bridges form vital transportation links for the state's residents, visitors and businesses, providing daily access to homes, jobs, shopping, natural resources and recreation. Modernizing Kentucky's transportation system is critical to quality of life and economic competitiveness in the Bluegrass State.

Supporting quality of life and a robust economy in Kentucky requires that the state provide a safe, efficient and well-maintained transportation system. A lack of adequate state and local transportation investment, which will result in deteriorated transportation facilities and diminished access, will negatively affect economic competitiveness and quality of life in Kentucky.

To accommodate population and economic growth, maintain its level of economic competitiveness and achieve further economic growth, Kentucky will need to maintain and modernize its roads, highways and bridges by improving the physical condition of its transportation network and enhancing the system's ability to provide efficient, reliable and safe mobility for residents, visitors and businesses. Making needed improvements to Kentucky's roads, highways, bridges and transit systems could also provide a significant boost to the state's economy by creating jobs in the short term and stimulating long-term economic growth as a result of enhanced mobility and access.

This report examines the condition, use and safety of Kentucky's roads, highways and bridges, funding needs, and the future mobility needs of the state. Sources of information for this report include the Federal Highway Administration (FHWA), the American Association of State Highway and Transportation Officials (AASHTO), the Bureau of Transportation Statistics (BTS), the U.S. Census Bureau, the Texas Transportation Institute (TTI), and the National Highway Traffic Safety Administration (NHTSA).

## **Population, Travel and Economic Trends in Kentucky**

Kentucky residents and businesses require a high level of personal and commercial mobility. Population increases and economic growth in the state have resulted in an increase in the demand for mobility as well as an increase in vehicle miles of travel (VMT). To foster quality of life and spur continued economic growth in Kentucky, it will be critical that the state provide a safe and modern transportation system that can accommodate future growth in population, tourism, business, recreation and vehicle travel.

Kentucky's population grew to approximately 4.4 million residents in 2015, a nine percent increase since 2000.<sup>1</sup> Kentucky had 3 million licensed drivers in 2015.<sup>2</sup>

From 2000 to 2015, annual VMT in Kentucky increased from 46.8 billion miles traveled annually to 48.3 billion miles traveled annually.<sup>3</sup>

### **Condition of Kentucky's Roads**

The life cycle of Kentucky's roads is greatly affected by the state and local governments' ability to perform timely maintenance and upgrades to ensure that road and highway surfaces last as long as possible.

The pavement data in this report, which is for all arterial and collector roads and highways, is provided by the Federal Highway Administration (FHWA), based on data submitted annually by the Kentucky Transportation Cabinet (KYTC) on the condition of major state and locally maintained roads and highways. Pavement data for Interstate highways and other principal arterials is collected for all system mileage, whereas pavement data for minor arterial

and all collector roads and highways is based on sampling portions of roadways as prescribed by FHWA to insure that the data collected is adequate to provide an accurate assessment of pavement conditions on these roads and highways.

Sixteen percent of Kentucky’s major urban locally and state-maintained roads are in in poor condition, while 44 percent are in mediocre or fair condition.<sup>4</sup> The remaining 40 percent are in good condition.<sup>5</sup>

The chart below details the share of major roads in poor, mediocre, fair and good condition in Kentucky’s largest urban areas.

**Chart 1. Pavement conditions on major roads in Kentucky’s largest urban areas.**

	Poor	Mediocre	Fair	Good
<b>Bowling Green</b>	2%	5%	8%	85%
<b>Lexington</b>	10%	13%	15%	61%
<b>Louisville</b>	22%	26%	19%	34%
<b>Northern Kentucky</b>	23%	22%	12%	43%
<b>Owensboro</b>	15%	17%	18%	50%

**Source. TRIP analysis of Federal Highway Administration data.**

Pavement failure is caused by a combination of traffic, moisture and climate. Moisture often works its way into road surfaces and the materials that form the road’s foundation. Road surfaces at intersections are even more prone to deterioration because the slow-moving or standing loads occurring at these sites subject the pavement to higher levels of stress. It is critical that roads are fixed before they require major repairs because reconstructing roads costs approximately four times more than resurfacing them.<sup>6</sup> As roads and highways continue to age, they will reach a point of deterioration where routine paving and maintenance will not be adequate to keep pavement surfaces in good condition and costly reconstruction of the roadway and its underlying surfaces will become necessary.

## The Costs to Motorists of Roads in Deteriorated Condition

TRIP has calculated the additional cost to motorists of driving on roads in poor, mediocre or fair condition. When roads are in poor, mediocre or fair condition – which may include potholes, rutting or rough surfaces – the cost to operate and maintain a vehicle increases. These additional vehicle operating costs (VOC) include accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption and increased tire wear. TRIP estimates that additional VOC borne by Kentucky motorists as a result of deteriorated road conditions is \$1 billion annually, or \$338 per driver.<sup>7</sup> The costs are typically higher in the state’s largest urban areas. The chart below details the annual VOC per driver in the state’s largest urban areas.

**Chart 2. Average annual vehicle operating cost per driver.**

	<b>VOC</b>
<b>Bowling Green</b>	\$85
<b>Lexington</b>	\$278
<b>Louisville</b>	\$519
<b>Northern Kentucky</b>	\$495
<b>Owensboro</b>	\$368
<b>STATEWIDE TOTAL</b>	<b>\$1 Billion</b>

**Source: TRIP.**

Additional vehicle operating costs have been calculated in the Highway Development and Management Model (HDM), which is recognized by the U.S. Department of Transportation and more than 100 other countries as the definitive analysis of the impact of road conditions on vehicle operating costs. The HDM report is based on numerous studies that have measured the impact of various factors, including road conditions, on vehicle operating costs.<sup>8</sup>

The HDM study found that road deterioration increases ownership, repair, fuel and tire costs. The report found that deteriorated roads accelerate the pace of depreciation of vehicles and the need for repairs because the stress on the vehicle increases in proportion to the level of

roughness of the pavement surface. Similarly, tire wear and fuel consumption increase as roads deteriorate since there is less efficient transfer of power to the drive train and additional friction between the road and the tires.

TRIP's additional VOC estimate is based on taking the average number of miles driven annually by a motorist, calculating current VOC based on AAA's 2015 VOC and then using the HDM model to estimate the additional VOC paid by drivers as a result of substandard roads.<sup>9</sup> Additional research on the impact of road conditions on fuel consumption by the Texas Transportation Institute (TTI) is also factored in to TRIP's vehicle operating cost methodology.

## **Bridge Conditions in Kentucky**

Kentucky's bridges form key links in the state's highway system, providing communities and individuals access to employment, schools, shopping and medical facilities, and facilitating commerce and access for emergency vehicles.

Eight percent of Kentucky's locally and state maintained bridges are rated as structurally deficient.<sup>10</sup> A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Bridges that are structurally deficient may be posted for lower weight limits or closed if their condition warrants such action. Deteriorated bridges can have a significant impact on daily life. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid posted bridges. Redirected trips also lengthen travel time, waste fuel and reduce the efficiency of the local economy.

The chart below details the share of bridges statewide and in Kentucky's largest urban areas that are rated structurally deficient.

**Chart 3. Kentucky bridge conditions.**

	<b>Structurally Deficient</b>	<b>Bridges Str. Deficient</b>	<b>Total Bridges</b>
<b>Bowling Green</b>	2%	2	99
<b>Lexington</b>	4%	26	717
<b>Louisville</b>	9%	54	629
<b>Northern Kentucky</b>	6%	24	399
<b>Owensboro</b>	4%	21	538
<b>STATEWIDE TOTAL</b>	8%	1,157	14,265

Source: National Bridge Inventory, Federal Highway Administration. 2015.

The service life of bridges can be extended by performing routine maintenance such as resurfacing decks, painting surfaces, insuring that a facility has good drainage and replacing deteriorating components. But, most bridges will eventually require more costly reconstruction or major rehabilitation to remain operable.

### **Traffic Safety in Kentucky**

A total of 3,538 people were killed in Kentucky traffic crashes from 2011 to 2015, an average of 708 fatalities per year.<sup>11</sup> After decreasing steadily from 2010 to 2013, the number of fatalities rose each year from 2013 to 2015.<sup>12</sup>

**Chart 4. Traffic Fatalities in Kentucky from 2011 – 2015.**

<i>Year</i>	<i>Fatalities</i>
2011	721
2012	746
2013	638
2014	672
2015	761
<b>Total</b>	<b>3,538</b>

Source: National Highway Traffic Safety Administration.

Three major factors are associated with fatal vehicle crashes: driver behavior, vehicle characteristics and roadway features. It is estimated that roadway features are likely a contributing factor in approximately one-third of fatal traffic crashes. Roadway features that impact safety include the number of lanes, lane widths, lighting, lane markings, rumble strips, shoulders, guard rails, other shielding devices, median barriers and intersection design.

Kentucky's overall traffic fatality rate of 1.56 fatalities per 100 million vehicle miles of travel in 2015 is the fourth highest in the U.S. and significantly higher than the national average of 1.13.<sup>13</sup>

In the Bowling Green urban area, an average of 16 people were killed in traffic crashes over the last three years, while an average of 58 people were killed in traffic crashes in the Lexington urban area during that time.<sup>14</sup> An average of 84 people were killed in crashes in the Louisville area over the last three years, while in Northern Kentucky, there was an average of 27 annual traffic fatalities over the last three years, while an average of 14 people were killed in traffic crashes in the Owensboro urban area during that time.<sup>15</sup>

Traffic crashes in Kentucky imposed \$4.2 billion in economic costs in 2014.<sup>16</sup> Based on a national estimate that roadway design is likely a contributing factor in approximately one-third of serious and fatal traffic crashes, TRIP estimates that the economic costs of serious and fatal traffic crashes in Kentucky in which roadway design was likely a contributing factor is \$1.4 billion each year in the form of lost household and workplace productivity, insurance and other financial costs.<sup>17</sup>

According to a [2015 National Highway Traffic Safety Administration \(NHTSA\) report](#), the economic costs of traffic crashes includes work and household productivity losses, property damage, medical costs, rehabilitation costs, legal and court costs, congestion costs and emergency services.<sup>18</sup>

Improving safety on Kentucky's roadways can be achieved through further improvements in vehicle safety; improvements in driver, pedestrian, and bicyclist behavior; and a variety of improvements in roadway safety features.

The severity of serious traffic crashes could be reduced through roadway improvements, where appropriate, such as adding turn lanes, removing or shielding obstacles, adding or improving medians, widening lanes, widening and paving shoulders, improving intersection layout, and providing better road markings and upgrading or installing traffic signals. Roads with poor geometry, with insufficient clear distances, without turn lanes, lacking or having narrow shoulders for the posted speed limits, or poorly laid out intersections or interchanges, pose greater risks to motorists, pedestrians and bicyclists.

Investments in rural traffic safety have been found to result in significant reductions in serious traffic crashes. A [2012 report by TTI](#) found that improvements completed recently by TxDOT that widened lanes, improved shoulders and made other safety improvements on 1,159 miles of rural state roadways resulted in 133 fewer fatalities on these roads in the first three years after the improvements were completed (as compared to the three years prior).<sup>19</sup> TTI estimates that the improvements on these roads are likely to save 880 lives over 20 years.<sup>20</sup>

## **Traffic Congestion in Kentucky**

Increasing levels of traffic congestion cause significant delays in Kentucky, particularly in its larger urban areas, choking commuting and commerce. Traffic congestion robs commuters of time and money and imposes increased costs on businesses, shippers and manufacturers, which are often passed along to the consumer.

Based on TTI methodology, TRIP estimates the value of lost time and wasted fuel in Kentucky is approximately \$1.6 billion per year. The chart below details the annual congestion cost – in the form of lost time and wasted fuel – and hours lost to congestion for the average driver in Kentucky’s largest urban areas.

**Chart 5. Annual cost in lost time and wasted fuel and annual hours lost due to congestion.**

	<b>Congestion Cost</b>	<b>Hours Lost</b>
<b>Bowling Green</b>	\$325	14 Hours
<b>Lexington</b>	\$656	27 Hours
<b>Louisville</b>	\$1,048	43 Hours
<b>Northern Kentucky</b>	\$989	41 Hours
<b>Owensboro</b>	\$335	13 Hours

**Source: Texas Transportation Institute Urban Mobility Report.**

Increasing levels of congestion add significant costs to consumers, transportation companies, manufacturers, distributors and wholesalers. Increased levels of congestion can reduce the attractiveness of a location to a company when considering expansion or where to locate a new facility. Congestion costs can also increase overall operating costs for trucking and shipping companies, leading to revenue losses, lower pay for employees, and higher consumer costs.

## **Transportation Funding**

Investment in Kentucky’s roads, highways and bridges is funded by local, state and federal governments. A lack of sufficient funding at all levels will make it difficult to adequately maintain and improve the state’s existing transportation system. The ability of state and municipal agencies to make needed improvements to Kentucky’s transportation system is severely constrained by a lack of adequate funding at the local, state and federal level.

The federal government is a critical source of funding for Kentucky's roads, highways, bridges and transit systems and provides a significant return in road and bridge funding based on the revenue generated in the state by the federal motor fuel tax.

Most federal funds for highway and transit improvements in Kentucky are provided by federal highway user fees, largely an 18.4 cents-per-gallon tax on gasoline and a 24.4 cents-per-gallon tax on diesel fuel. Since 2008 revenue into the federal Highway Trust Fund has been insufficient to support legislatively set funding levels so Congress has transferred approximately \$53 billion in general funds and an additional \$2 billion from a related trust fund into the federal Highway Trust Fund.<sup>21</sup>

Signed into law in December 2015, the [Fixing America's Surface Transportation Act \(FAST Act\)](#), provides modest increases in federal highway and transit spending. The five-year bill also provides states with greater funding certainty and streamlines the federal project approval process. But, the FAST Act does not provide adequate funding to meet the nation's need for highway and transit improvements and does not include a long-term and sustainable funding source.

The five-year, \$305 billion FAST Act will provide approximately a 15 percent boost in highway funding and an 18 percent boost in transit funding over the duration of the program, which expires in 2020.<sup>22</sup> In addition to federal motor fuel tax revenues, the FAST Act will also be funded by \$70 billion in U.S. general funds, which will rely on offsets from several unrelated federal programs including the Strategic Petroleum Reserve, the Federal Reserve and U.S. Customs.

According to the [2015 AASHTO Transportation Bottom Line Report](#), a significant boost in investment in the nation's roads, highways, bridges and public transit systems is needed to improve their condition and to meet the nation's transportation needs. The AASHTO report

found that based on an annual 1 percent increase in VMT that annual investment in the nation's roads, highways and bridges needs to increase by 36 percent, from \$88 billion to \$120 billion to improve conditions and meet the nation's mobility needs.<sup>23</sup> Investment in the nation's public transit system needs to increase from \$17 billion to \$43 billion.<sup>24</sup>

The [2015 AASHTO Transportation Bottom Line Report](#) found that if the rate of vehicle travel increased by 1.4 percent per year, the needed annual investment in the nation's roads, highways and bridges would need to increase by 64 percent, to \$144 billion. If vehicle travel grows by 1.6 percent annually the needed annual investment in the nation's roads, highways and bridges would need to increase by 77 percent, to \$156 billion.<sup>25</sup>

## **Importance of Transportation to Economic Growth**

Today's culture of business demands that an area have well-maintained and efficient roads, highways and bridges if it is to remain economically competitive. Global communications and the impact of free trade in North America and elsewhere have resulted in a significant increase in freight movement, making the quality of a region's transportation system a key component in a business's ability to compete locally, nationally and internationally.

Businesses have responded to improved communications and the need to cut costs with a variety of innovations including just-in-time delivery, increased small package delivery, demand-side inventory management and e-commerce. The result of these changes has been a significant improvement in logistics efficiency as firms move from a push-style distribution system, which relies on large-scale warehousing of materials, to a pull-style distribution system, which relies on smaller, more strategic movement of goods. These improvements have made mobile inventories the norm, resulting in the nation's trucks literally becoming rolling warehouses.

Highways are vitally important to continued economic development in Kentucky, particularly to the state's manufacturing, agriculture and tourism industries. As the economy expands, creating more jobs and increasing consumer confidence, the demand for consumer and business products grows. In turn, manufacturers ship greater quantities of goods to market to meet this demand, a process that adds to truck traffic on the state's highways and major arterial roads.

Every year, \$502 billion in goods are shipped to and from sites in Kentucky, mostly by trucks.<sup>26</sup> Seventy-six percent of the goods shipped annually to and from sites in Kentucky are carried by trucks and another 13 percent are carried by courier services or multiple-mode deliveries, which include trucking.<sup>27</sup>

The cost of road and bridge improvements are more than offset by the reduction of user costs associated with driving on rough roads, the improvement in business productivity, the reduction in delays and the improvement in traffic safety. The [Federal Highway Administration estimates](#) that each dollar spent on road, highway and bridge improvements results in an average benefit of \$5.20 in the form of reduced vehicle maintenance costs, reduced delays, reduced fuel consumption, improved safety, reduced road and bridge maintenance costs and reduced emissions as a result of improved traffic flow.<sup>28</sup>

Local, regional and state economic performance is improved when a region's surface transportation system is expanded or repaired. This improvement comes as a result of the initial job creation and increased employment created over the long-term because of improved access, reduced transport costs and improved safety.

Increasingly, companies are looking at the quality of a region's transportation system when deciding where to re-locate or expand. Regions with congested or poorly maintained roads may see businesses relocate to areas with a smoother, more efficient and more modern

transportation system. In fact, highway accessibility was ranked the number two site selection factor behind only the availability of skilled labor in a 2015 survey of corporate executives by [Area Development Magazine](#).<sup>29</sup>

## **Conclusion**

As Kentucky works to build and enhance a thriving, growing and dynamic state, it will be critical that it is able to address the state's most significant transportation issues by providing a 21<sup>st</sup> century network of roads, highways, bridges and transit that can accommodate the mobility demands of a modern society.

Kentucky will need to modernize its surface transportation system by improving the physical condition of its transportation network and enhancing the system's ability to provide efficient, safe and reliable mobility for residents, visitors and businesses. Making needed improvements to the state's roads, highways, bridges and transit systems could provide a significant boost to the economy by creating jobs in the short term and stimulating long-term economic growth as a result of enhanced mobility and access.

While the modest funding increase provided by the FAST Act will be helpful, numerous projects to improve the condition and expand the capacity of Kentucky's roads, highways, bridges and transit systems will not be able to proceed without a substantial boost in state or local transportation funding. If Kentucky is unable to complete needed transportation projects it will hamper the state's ability to improve the condition and efficiency of its transportation system or enhance economic development opportunities and quality of life.

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## Endnotes

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<sup>1</sup> U.S. Census Bureau (2016).

<sup>2</sup> Highway Statistics (2015). Federal Highway Administration. DL-1C

<sup>3</sup> U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2000 and 2015 and Federal Highway Administration Traffic Volume Trends report.

<sup>4</sup> Federal Highway Administration. Highway Statistics 2014..

<sup>5</sup> Ibid.

<sup>6</sup> Selecting a Preventative Maintenance Treatment for Flexible Pavements. R. Hicks, J. Moulthrop. Transportation Research Board. 1999. Figure 1.

<sup>7</sup> TRIP calculation.

<sup>8</sup> Highway Development and Management: Volume Seven. Modeling Road User and Environmental Effects in HDM-4. Bennett, C. and Greenwood, I. 2000.

<sup>9</sup> Your Driving Costs. American Automobile Association. 2015.

<sup>10</sup> Federal Highway Administration National Bridge Inventory, 2016.

<sup>11</sup> Federal Highway Administration National Highway Traffic Safety Administration, 2011-2015.

<sup>12</sup> Ibid.

<sup>13</sup> TRIP analysis of National Highway Traffic Safety Administration and Federal Highway Administration data (2016).

<sup>14</sup> Ibid.

<sup>15</sup> Ibid.

<sup>16</sup> TRIP estimate based on NHTSA report “The Economic and Societal Impact Of Motor Vehicle Crashes, 2010 (Revised), 2015. P. 146.

<sup>17</sup> Ibid.

<sup>18</sup> The Economic and Societal Impact Of Motor Vehicle Crashes, 2010 (Revised) (2015). National Highway Traffic Safety Administration. P. 1.

<sup>19</sup> Adding Highway Shoulders, Width, Reduce Crash Numbers and Save Lives (August 9, 2012). Texas Transportation Institute.

<sup>20</sup> Ibid.

<sup>21</sup> “Surface Transportation Reauthorization and the Solvency of the Highway Trust Fund,” presentation by Jim Tymon, American Association of State Highway and Transportation Officials (2014).

<sup>22</sup> 2015 “Fixing America’s Surface Transportation Act.” (2015) American Road and Transportation Builders Association. <http://www.artba.org/newsline/wp-content/uploads/2015/12/ANALYSIS-FINAL.pdf>

<sup>23</sup> 2015 AASHTO Bottom Line Report (2014) AASHTO. P. 2.

<sup>24</sup> Ibid.

<sup>25</sup> Ibid.

<sup>26</sup> TRIP analysis of Bureau of Transportation Statistics, U.S. Department of Transportation. 2012 Commodity Flow Survey, State Summaries.

<sup>27</sup> Ibid.

<sup>28</sup> FHWA estimate based on its analysis of 2006 data. For more information on FHWA’s cost-benefit analysis of highway investment, see the 2008 Status of the Nation’s Highways, Bridges, and Transit: Conditions and Performance.

<sup>29</sup> Area Development Magazine (2016). 30th Annual Survey of Corporate Executives: Availability of Skilled Labor New Top Priority. <http://www.areadevelopment.com/Corporate-Consultants-Survey-Results/Q1-2016/corporate-executive-site-selection-facility-plans-441729.shtml>