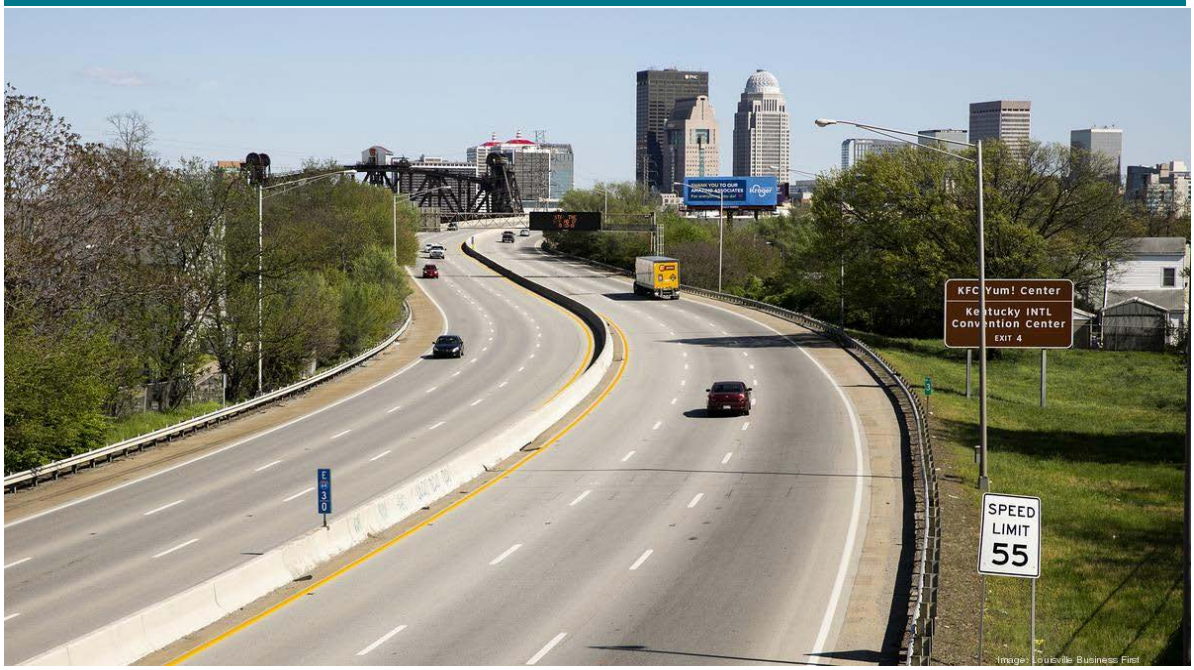
Kentucky Transportation by the Numbers

MEETING THE STATE'S NEED FOR SAFE, SMOOTH AND EFFICIENT MOBILITY



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A National Transportation Research Nonprofit

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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.

KENTUCKY KEY TRANSPORTATION FACTS

THE HIDDEN COSTS OF DEFICIENT ROADS

Driving on Kentucky roads that are deteriorated, congested and that lack some desirable safety features costs Kentucky drivers a total of $4.7 billion each year. TRIP has calculated the cost to the average motorist in the state's largest urban areas in the form of additional vehicle operating costs (VOC) as a result of driving on rough roads, the cost of lost time and wasted fuel due to congestion, and the financial cost of traffic crashes in which the lack of adequate safety features, while not the primary factor, were likely a contributing factor. The chart below details the cost of deficient roads statewide and for the average driver in the state's largest urban areas.

Location	VOC	Congestion	Safety	TOTAL
Bowling Green	$170	$788	$563	$1,521
Lexington	$306	$809	$398	$1,513
Louisville	$586	$868	$430	$1,884
Northern Kentucky	$549	$1,238	$367	$2,154
Owensboro	$627	$344	$419	$1,390
Kentucky Statewide	**$1.3 Billion**	**$1.8 Billion**	**$1.6 Billion**	**$4.7 Billion**

KENTUCKY ROADS PROVIDE A ROUGH RIDE

Due to inadequate state and local funding, more than a quarter of major locally and state-maintained roads and highways in Kentucky are in poor or mediocre condition. Driving on rough roads costs the average Kentucky driver $422 annually in additional vehicle operating costs – a total of $1.3 billion statewide. The chart below details pavement conditions on major roads in the state's largest urban areas and statewide.

Location	Poor	Mediocre	Fair	Good
Bowling Green	2%	11%	15%	72%
Lexington	7%	13%	22%	58%
Louisville	19%	25%	20%	36%
Northern Kentucky	19%	19%	20%	43%
Owensboro	19%	29%	28%	24%
Kentucky Statewide	**7%**	**21%**	**24%**	**48%**

KENTUCKY BRIDGE CONDITIONS

Seven percent of Kentucky's bridges are rated in poor/structurally deficient condition. Bridges that are rated poor/structurally deficient have significant deterioration of the bridge deck, supports or other major components. Sixty-five percent of the state's bridges are rated in fair condition and the remaining 28 percent are in good condition. The chart below details bridge conditions statewide and in the state's largest urban areas.

Location	POOR/STRUCTURALLY DEFICIENT		FAIR		GOOD		TOTAL BRIDGES
	Number	Share	Number	Share	Number	Share	
Bowling Green	17	5%	264	80%	48	15%	329
Lexington	29	4%	516	71%	183	25%	728
Louisville	110	6%	1163	69%	421	25%	1694
Northern Kentucky	38	6%	388	57%	251	37%	677
Owensboro	14	5%	214	76%	55	19%	283
KENTUCKY STATEWIDE	**990**	**7%**	**9,331**	**65%**	**4,089**	**28%**	**14,410**

TRAFFIC CONGESTION IN KENTUCKY CAUSES DELAYS

In 2020, the state's transportation system carried 46.5 billion annual vehicle miles of travel (VMT). Congested roads choke commuting and commerce and cost Kentucky drivers $1.8 billion each year in the form of lost time and wasted fuel. In the most congested urban areas, drivers lose up to $1,238 annually in the loss of 50 hours and the waste of 24 gallons of fuel due to traffic congestion. Due to the Covid-19 pandemic, vehicle travel in Kentucky dropped by as much as 36 percent in April 2020 (as compared to vehicle travel during the same month the previous year), but rebounded to four percent above November 2019 volume by November 2021. The chart below shows the annual number of hours lost to congestion per driver and the average cost per driver of lost time and wasted fuel due to congestion in the state's largest urban areas.

Location	Hours Lost	Congestion Cost	Wasted Fuel in Gallons
Bowling Green	34	$788	17
Lexington	35	$809	17
Louisville	46	$868	19
Northern Kentucky	50	$1,238	24
Owensboro	14	$344	7

KENTUCKY TRAFFIC SAFETY AND FATALITIES

A total of 3,833 people were killed in traffic crashes in Kentucky from 2015-2019, an average of 767 annual fatalities. In 2019, Kentucky had 1.48 traffic fatalities for every 100 million miles traveled, the fourth highest in the U.S. and higher than the national average of 1.11. The fatality rate on Kentucky's non-interstate rural roads is more than two and a half times higher than on all other roads in the state (2.49 fatalities per 100 million vehicle miles of travel vs 0.9). From 2015 to 2019, there were 75 pedestrian and eight bicycle fatalities in Kentucky, 11 percent of the total number of traffic fatalities in the state.

Year	Total Fatalities	Pedestrian Fatalities	Bicycle Fatalities	Share Bike and Ped.
2015	761	67	7	10%
2016	834	81	9	11%
2017	782	83	7	12%
2018	724	73	10	11%
2019	732	73	5	11%
TOTAL	**3,833**	**377**	**38**	**11%**
AVERAGE	**767**	**75**	**8**	**11%**

Traffic crashes imposed a total of $4.9 billion in economic costs in Kentucky in 2019 and traffic crashes in which a lack of adequate roadway safety features, while not the primary factor, were likely a contributing factor imposed $1.6 billion in economic costs. The chart below details the average number of people killed in traffic crashes in the state's largest urban areas between 2015 and 2019, and the cost of traffic crashes per driver.

Location	Avg. Fatalities	Safety Cost
Bowling Green	30	$563
Lexington	68	$398
Louisville	165	$430
Northern Kentucky	50	$367
Owensboro	13	$419

KENTUCKY TRANSPORTATION FUNDING

The level of highway investment in Kentucky is likely to increase as a result of the five-year federal Infrastructure Investment and Jobs Act (IIJA), signed into law in November 2021, which will provide $5.1 billion for road, highway, bridge investment in Kentucky over the next five years, including a 35 percent funding increase in FY 2022.

The additional federal highway funds available in Kentucky will partially offset the significant drop in revenue from Kentucky's variable state motor fuel tax, which, in 2015, dropped from 32.5 cents per gallon to 26 cents per gallon, resulting in a loss of revenue of approximately $1.2 billion since 2015.

Increased federal transportation investment in Kentucky will also be helpful in addressing Kentucky's transportation funding shortfall and in funding five transportation mega-projects. The Kentucky Transportation Cabinet (KYTC) has determined that there is an annual $900 million shortfall in needed highway funding and an annual $157 million shortfall in needed municipal and county road funding.[1] The state will also need to invest a total of $3.3 billion to fund five transportation mega-projects: The Brent Spence bridge, the I-69 Corridor/Henderson Bridge, the Northern Kentucky outer loop, the Mountain Parkway expansion and the completion of the US 460 corridor.

The ability of revenue from Kentucky's motor fuel tax – a critical source of state transportation funds – to keep pace with the state's future transportation needs is likely to erode as a result of increasing vehicle fuel efficiency and the increasing use of electric vehicles. The average fuel efficiency of U.S. passenger vehicles increased from 20 miles per gallon in 2010 to 24.5 miles per gallon in 2020. Average fuel efficiency is expected to increase another 31 percent by 2030, to 32 miles per gallon, and increase 51 percent by 2040, to 37 miles per gallon. The share of electric vehicles of total passenger vehicle sales in the U.S. is expected to increase to five percent by 2023 and to 60 percent by 2040, by which time they will represent approximately 30 percent of the passenger vehicle fleet.

TRANSPORTATION AND ECONOMIC DEVELOPMENT

The health and future growth of Kentucky's economy is riding on its transportation system. Each year, $587 billion in goods are shipped to and from sites in Kentucky, mostly by truck. Increases in passenger and freight movement will place further burdens on the state's already deteriorated and congested surface transportation system. The value of freight shipped to and from sites in Kentucky, when adjusted for inflation, is expected to increase by 114 percent by 2045, and by 65 percent for goods shipped by trucks.

A report by the American Road & Transportation Builders Association found that the design, construction and maintenance of transportation infrastructure in Kentucky supports approximately 47,000 full-time jobs across all sectors of the state economy. These workers earn $1.6 billion annually.

Approximately 907,000 full-time jobs in Kentucky in key industries like tourism, manufacturing, retail sales and agriculture are completely dependent on the state's transportation infrastructure network.

Highway and bridge spending multiplies through the economy by stimulating additional output. A 2021 macroeconomic analysis by IHS Markit found that that every dollar spent on highway and bridge improvements results in $3.4 dollars in combined direct, indirect and induced output from industries throughout the economy, resulting in a multiplier for highway and bridge investment of 3.4

Sources of information for this report include the Federal Highway Administration (FHWA), the Kentucky Transportation Cabinet (KYTC), 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), the American Road & Transportation Builders Association (ARTBA), HIS Markit and the National Highway Traffic Safety Administration (NHTSA). Cover page photo credit: David Golub.

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. Inadequate transportation investment, which will result in deteriorated transportation facilities and diminished access, will negatively affect Kentucky's economic competitiveness and quality of life.

The need for a reliable transportation system in Kentucky has been reinforced during the ongoing response to the coronavirus pandemic, which has placed increased importance on the ability of a region's transportation network to support a reliable supply chain.

To foster 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, and the state's future mobility needs. Sources of information for this report include the Kentucky Transportation Cabinet (KYTC), 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), the American Road & Transportation Builders Association (ARTBA), and the National Highway Traffic Safety Administration (NHTSA).

In addition to statewide data, the TRIP report includes regional data for the Bowling Green, Lexington, Louisville, Northern Kentucky and Owensboro urban areas. An urban area is defined as a region's municipalities and surrounding suburbs for pavement condition and congestion data; bridge and traffic fatality data include a region's major counties.[2]

POPULATION, TRAVEL AND ECONOMIC TRENDS IN KENTUCKY

Kentucky motorists and businesses require a high level of personal and commercial mobility. To foster quality of life and spur continued economic growth, it is 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 was approximately 4.5 million residents in 2020, an 11 percent increase since 2000.[3] Kentucky had approximately three million licensed drivers in 2019.[4] From 2000 to 2020, Kentucky's gross domestic product (GDP), a measure of the state's economic output, increased by 21 percent, when adjusted for inflation.[5] U.S. GDP increased 40 percent during the same period.[6] In 2020, the state's transportation system carried 46.5 billion annual vehicle miles of travel (VMT).[7] Due to the Covid-19 pandemic, vehicle travel in Kentucky dropped by as much as 36 percent in April 2020 (as compared to vehicle travel during the same month the previous year), but rebounded to four percent above November 2019 levels by November 2021.[8]

CONDITION OF KENTUCKY 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 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 ensure the data collected is adequate to provide an accurate assessment of pavement conditions on these roads and highways.

Statewide, 28 percent of Kentucky's major roads are in poor or mediocre condition. Seven percent of Kentucky's major locally and state-maintained roads are in poor condition and 21 percent are in mediocre condition.[9] Twenty-four percent of Kentucky's major roads are in fair condition and the remaining 48 percent are in good condition.[10]

Pavements in poor condition provide a noticeable reduction in ride quality and often have visible signs of deterioration including potholes, cracking or rutting, and frequently have deterioration in the pavement's subbase, which will often require costly reconstruction to address. Pavements in mediocre condition provide intermittent reductions in ride quality and often show signs of pavement deterioration, yet may still be able to avoid the need for reconstruction with immediate preservation work. Roads in fair condition may have some intermittent reduction in ride quality and signs of deterioration, and can be improved with cost-effective roadway preservation treatments. Roads in good condition provide a smooth ride and can be maintained in good condition with ongoing pavement preservation treatments.

Sixteen percent of Kentucky's major locally and state-maintained urban roads and highways have pavements rated in poor condition and 24 percent are in mediocre condition.[11] Twenty-one percent of Kentucky's major urban roads are rated in fair condition and the remaining 39 percent are rated in good condition.[12]

Five percent of Kentucky's major locally and state-maintained rural roads and highways have pavements rated in poor condition and 20 percent are in mediocre condition.[13] Twenty-five percent of Kentucky's major rural roads are rated in fair condition and the remaining 50 percent are rated in good condition.[14] The chart below details pavement conditions on major urban roads in the state's largest urban areas and statewide.[15]

Chart 1. Pavement conditions on major roads in Kentucky's largest urban areas and statewide.

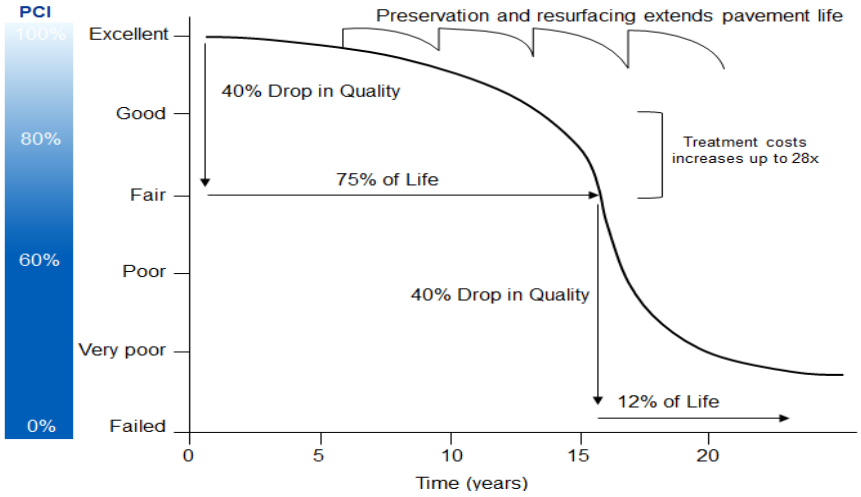
Location	Poor	Mediocre	Fair	Good
Bowling Green	2%	11%	15%	72%
Lexington	7%	13%	22%	58%
Louisville	19%	25%	20%	36%
Northern Kentucky	19%	19%	20%	43%
Owensboro	19%	29%	28%	24%
Kentucky Statewide	**7%**	**21%**	**24%**	**48%**

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

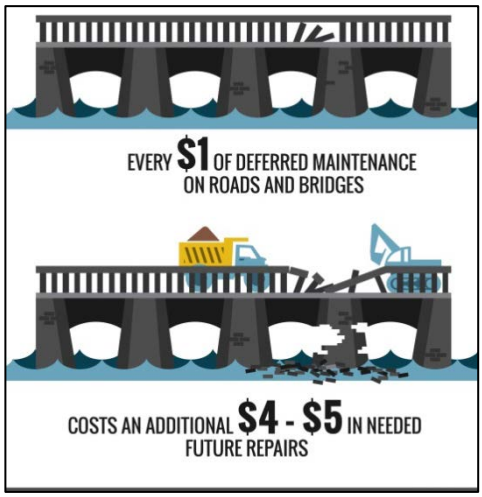
intersections are more prone to deterioration because the slow-moving or standing loads occurring at these sites subject the pavement to higher levels of stress. It is critical that roads are fixed before they require major repairs because reconstructing roads costs approximately four times more than resurfacing them.[16] 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.

Chart 2. Pavement Condition Cycle Time with Treatment and Cost.



Source: North Carolina DOT (2016). 2016 Maintenance Operations and Performance Analysis Report

Long-term repair costs increase significantly when road and bridge maintenance is deferred, as road and bridge deterioration accelerates later in the service life of a transportation facility and requires more costly repairs. A report on maintaining pavements found that every $1 of deferred maintenance on roads and bridges costs an additional $4 to $5 in needed future repairs.[17]



THE COST TO MOTORISTS OF ROADS IN INADEQUATE 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 $1.3 billion annually, an average of $422 per driver statewide.[18] The chart below details additional VOC per motorist in the state's largest urban areas.

Chart 3. Annual vehicle operating costs per motorist and total gallons of fuel wasted annually as a result of driving on deteriorated roads.

Location	VOC
Bowling Green	$170
Lexington	$306
Louisville	$586
Northern Kentucky	$549
Owensboro	$627
Kentucky Statewide	**$1.3 Billion**

Source: TRIP estimates.

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.[19] 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 driving cost estimates and then using the HDM model to estimate the additional VOC paid by drivers as a result of substandard roads.[20] Additional research on the impact of road conditions on fuel consumption by the Texas Transportation Institute (TTI) is also factored into 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.

Seven percent (990 of 14,410) of Kentucky's locally and state-maintained bridges are rated in poor/structurally deficient condition.[21] This includes all bridges that are 20 feet or more in length. A bridge is deemed poor/structurally deficient if there is significant deterioration of the bridge deck, supports or other major components.

Bridges that are poor/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.

Sixty-five percent (9,331 of 14,410) of Kentucky's locally and state-maintained bridges are rated in fair condition.[22] A fair rating indicates that a bridge's structural elements are sound but minor deterioration has occurred to the bridge's deck, substructure or superstructure. The remaining 28 percent (4,089 of 14,410) of the state's bridges are rated in good condition.[23]

The chart below shows the condition of bridges statewide and in Kentucky's largest urban areas.

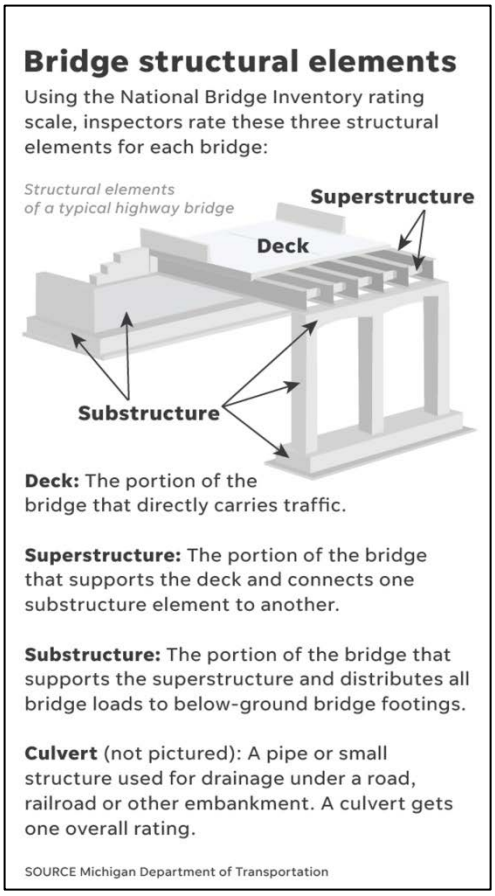


Chart 4. Bridge conditions statewide and in Kentucky's largest urban areas.

Location	POOR/STRUCTURALLY DEFICIENT		FAIR		GOOD		TOTAL BRIDGES
	Number	Share	Number	Share	Number	Share	
Bowling Green	17	5%	264	80%	48	15%	329
Lexington	29	4%	516	71%	183	25%	728
Louisville	110	6%	1163	69%	421	25%	1694
Northern Kentucky	38	6%	388	57%	251	37%	677
Owensboro	14	5%	214	76%	55	19%	283
KENTUCKY STATEWIDE	**990**	**7%**	**9,331**	**65%**	**4,089**	**28%**	**14,410**

Source: TRIP analysis of Federal Highway Administration National Bridge Inventory (2021).

The service life of bridges can be extended by performing routine maintenance such as resurfacing decks, painting surfaces, ensuring 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 3,833 people were killed in Kentucky traffic crashes from 2015 to 2019, an average of 767 fatalities per year.[24] Kentucky's overall traffic fatality rate of 1.48 fatalities per 100 million vehicle miles of travel in 2019 is the fourth highest in the U.S. and higher than the national average of 1.11.[25] The fatality rate on Kentucky's non-interstate rural roads is more than two and a half times higher than on all other roads in the state (2.49 fatalities per 100 million vehicle miles of travel vs 0.90).[26] While Kentucky's rural roads account for only 37 percent of vehicle travel in the state, 62 percent of fatalities occur on Kentucky's rural roads.[27] From 2015 to 2019, there were 377 pedestrian and 38 bicycle fatalities in Kentucky, 11 percent of the total number of traffic fatalities in the state.[28]

Chart 5. Kentucky Traffic Fatalities, 2015-2019.

Year	Total Fatalities	Pedestrian Fatalities	Bicycle Fatalities	Share Bike and Ped.
2015	761	67	7	10%
2016	834	81	9	11%
2017	782	83	7	12%
2018	724	73	10	11%
2019	732	73	5	11%
TOTAL	**3,833**	**377**	**38**	**11%**
AVERAGE	**767**	**75**	**8**	**11%**

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, while not the primary factor, 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.

The chart below details the number of people killed in traffic crashes in the state's largest urban areas between 2015 and 2019, and the cost of traffic crashes per driver.

Chart 6. Average fatalities between 2015 and 2019 and crash cost per driver.

Location	Avg. Fatalities	Safety Cost
Bowling Green	30	$563
Lexington	68	$398
Louisville	165	$430
Northern Kentucky	50	$367
Owensboro	13	$419

Source: TRIP analysis.

Traffic crashes in Kentucky imposed a total of $4.9 billion in economic costs in 2019.[29] TRIP estimates that roadway features, while not the primary factor, were likely a contributing factor in approximately one-third of all fatal traffic crashes, resulting in $1.6 billion in economic costs in Kentucky in 2018.[30] 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.[31]

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 converting intersections to roundabouts; removing or shielding roadside objects; the addition of left-turn lanes at intersections; the signalization of intersections; adding or improving median barriers; improved lighting; adding centerline or shoulder rumble strips; providing appropriate pedestrian and bicycle facilities, including sidewalks and bicycle lanes; providing wider lanes, wider and paved shoulders; upgrading roads from two lanes to four lanes; providing better road and lane markings; and updating rail crossings.

The U.S. has a $146 billion backlog in needed roadway safety improvements, according to a 2017 report from the AAA Foundation for Traffic Safety. The report found implementing these cost-effective and needed roadway safety improvements on U.S. roadways would save approximately 63,700 lives and reduce the number of serious injuries as a result of traffic crashes by approximately 350,000 over 20 years.

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. Increased levels of congestion can also reduce the attractiveness of a location to a company when considering expansion or where to locate a new facility.

Based on TTI methodology, TRIP estimates the total value of lost time and wasted fuel in Kentucky is approximately $1.8 billion a year. The chart below shows the number of hours lost annually for each driver in the state's largest urban areas, the per-driver cost of lost time and wasted fuel due to congestion, and the total amount of additional fuel consumed annually due to traffic congestion and the average amount of fuel per driver wasted annually due to congestion.

Chart 7. Annual hours and fuel lost to congestion and congestion costs per driver.

Location	Hours Lost	Congestion Cost	Wasted Fuel in Gallons
Bowling Green	34	$788	17
Lexington	35	$809	17
Louisville	46	$868	19
Northern Kentucky	50	$1,238	24
Owensboro	14	$344	7

Source: TRIP analysis of Texas Transportation Institute data

TRANSPORTATION AND 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. 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, $587 billion in goods are shipped to and from sites in Kentucky, mostly by truck.[32] Sixty-two percent of the goods shipped annually to and from sites in Kentucky are carried by truck and another 14 percent are carried by courier services or multiple-mode deliveries, which include trucking.[33] The value of freight shipped to and from sites in Kentucky, in inflation-adjusted dollars, is expected to increase 114 percent by 2045 and by 65 percent for goods shipped by trucks.[34]

The ability of the nation's freight transportation system to efficiently and safely accommodate the growing demand for freight movement could be hampered by inadequate transportation capacity, a lack of adequate safety features on some transportation facilities, institutional barriers to enhancing the nation's freight facilities, a lack of adequate funding for needed improvements to the freight network, and a shortage of drivers.

The need to improve the U.S. freight network is occurring at a time when the nation's freight delivery system is being transformed by advances in vehicle autonomy, manufacturing, warehousing and supply chain automation, increasing e-commerce, and the growing logistic networks being developed by Amazon and other retail organizations in response to the demand for a faster and more responsive delivery and logistics cycle.

Investments in transportation improvements in Kentucky play a critical role in the state's economy. A report by the American Road & Transportation Builders Association found that the design, construction and maintenance of transportation infrastructure in Kentucky play a critical role in the state's economy, supporting the equivalent of 46,984 full-time jobs across all sectors of the state economy, earning these workers approximately $1.6 billion annually.[35] These jobs include 23,406 full-time jobs directly involved in transportation infrastructure construction and related activities and 23,578 full-time jobs as a result of spending by employees and companies in the transportation design and construction industry.[36]

Transportation construction in Kentucky annually contributes an estimated $291 million in state and local income, corporate and unemployment insurance taxes and the federal payroll tax. Approximately 907,000 full-time jobs in Kentucky in key industries like tourism, retail sales, agriculture and manufacturing are dependent on the quality, safety and reliability of the state's transportation infrastructure network. These workers earn $34 billion in wages and contribute an estimated $6 billion in state and local income, corporate and unemployment insurance taxes and the federal payroll tax.[37]

Highway and bridge spending multiplies through the economy by stimulating additional output. A 2021 macroeconomic analysis by IHS Markit found that that every dollar spent on highway and bridge improvements results in $3.4 dollars in combined direct, indirect and induced output from industries throughout the economy, resulting in a multiplier for highway and bridge investment of 3.4.[38]

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 access has a significant impact on the competitiveness of a region's economy. Not surprisingly, highway accessibility was ranked the number two site selection factor in the 2021 survey of corporate executives by Area Development Magazine, behind only skilled labor.[39]

TRANSPORTATION FUNDING IN KENTUCKY

Improvements to Kentucky's roads, highways and bridges is funded by local, state and federal governments. 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 (additional revenue is generated by fees on the sale of large trucks, a highway use tax levied on vehicles in excess of 55,000 pounds and a tax on the sale of large truck tires).

The level of highway investment is likely to increase as a result of the five-year federal Infrastructure Investment and Jobs Act (IIJA), signed into law in November 2021, which will provide $5.1 billion for road, highway and bridge investment in Kentucky over the next five years, including a 35 percent funding increase in FY 2022, resulting in approximately an additional $300 million annually in road, highway and bridge funding in Kentucky. [40]

The additional federal highway funds available in Kentucky will partially offset the significant drop in revenue from Kentucky's variable state motor fuel tax, which, in 2015, dropped from 32.5 cents per gallon to 26 cents per gallon, resulting in a loss of revenue of approximately $1.2 billion since 2015.[41]

Increased federal transportation investment in Kentucky will also be helpful in addressing Kentucky's transportation funding shortfall and in funding five transportation mega-projects. The Kentucky Transportation Cabinet (KYTC) has determined that there is an annual $900 million shortfall in needed highway funding and an annual $157 million shortfall in needed municipal and county road funding.[42] The state will also need to fund a total of $3.3 billion for five transportation mega-projects: The Brent Spence bridge, the I-69 Corridor/Henderson Bridge, the Northern Kentucky outer loop, the Mountain Parkway expansion and the completion of the US 460 corridor.[43]

Revenue from Kentucky's motor fuel tax – a critical source of state transportation funding -- is likely to erode as a result of increasing vehicle fuel efficiency and the increasing use of electric vehicles. The average fuel efficiency of U.S. passenger vehicles increased from 20 miles per gallon in 2010 to 24.5 miles per gallon in 2020. Average fuel efficiency is expected to increase another 31 percent by 2030, to 32 miles per gallon, and increase 51 percent by 2040, to 37 miles per gallon.[44] The share of electric vehicles of total passenger vehicle sales in the U.S. is expected to increase to five percent by 2023 and 60 percent by 2040, by which time they will represent approximately 30 percent of the passenger vehicle fleet.[45]

According to the Status of the Nation's Highways, Bridges, and Transit, 23rd Edition, submitted to Congress by the United States Department of Transportation (USDOT) in 2019, the nation faces a $786 billion backlog in needed repairs and improvements to the nation's roads, highways and bridges.[46] This backlog includes $435 billion for highway rehabilitation; $125 billion for bridge rehabilitation; $120 billion for system expansion and $106 billion for system enhancement.[47] The USDOT report found that the nation's current $105 billion investment in roads, highways and bridges by all levels of government should be increased by 29 percent to $136 billion annually to improve the conditions of roads, highways and bridges, relieve traffic congestion and improve traffic safety.[48]

CONCLUSION

Kentucky must work to provide a 21st century network of roads, highways, bridges and transit that can accommodate the mobility demands of a modern society.

The state 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 Kentucky's roads, highways, bridges and transit systems would 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.

The recent approval of the IIJA provides Kentucky with an opportunity to move forward with numerous projects to improve the condition and expand the capacity of Kentucky's roads, highways, bridges and transit systems. But further increases in state and local transportation investment will be required to supplement the federal 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.

# # #

ENDNOTES

[1] Kentucky Infrastructure Coalition (2021). Executive Summary of State Transportation Funding Needs 2021 Legislative Session.
[2] Bridge condition data and safety data for each urban area includes the counties noted: Bowling Green: Allen, Butler, Edmonson and Warren counties; Lexington: Bourbon, Clark, Fayette, Jessamine, Scott and Woodford counties; Louisville: Bullit, Henry, Jefferson, Meade, Oldham, Shelby, Spencer, Trimble, Clark (IN), Floyd (IN), and Harrison (IN) counties; Northern Kentucky: Boone, Bracken, Campbell, Gallatin, Grant, Kenton and Pendleton counties; Owensboro: Daviess County.
[3] U.S. Census Bureau (2020).
[4]Highway Statistics (2018). Federal Highway Administration. DL-1C.
[5] TRIP analysis of Bureau of Economic Analysis data.
[6] Ibid.
[7] U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2020. https://www.fhwa.dot.gov/policyinformation/statistics/2020/
[8] Federal Highway Administration (2021). Traffic Volume Trends. https://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm
[9] Federal Highway Administration (2021). Pavement condition data is for 2020.
[10] Ibid.
[11] Ibid.
[12] Ibid.
[13] Ibid.
[14] Ibid.
[15] Ibid.
[16] Selecting a Preventative Maintenance Treatment for Flexible Pavements. R. Hicks, J. Moulthrop. Transportation Research Board. 1999. Figure 1.
[17] Pavement Maintenance, by David P. Orr, PE Senior Engineer, Cornell Local Roads Program, March 2006.
[18] TRIP calculation.
[19] Highway Development and Management: Volume Seven. Modeling Road User and Environmental Effects in HDM-4. Bennett, C. and Greenwood, I. 2000.
[20] Your Driving Costs. American Automobile Association. 2021. https://newsroom.aaa.com/wp-content/uploads/2021/08/2021-YDC-Brochure-Live.pdf
[21] Federal Highway Administration National Bridge Inventory. 2021.
[22] Ibid.
[23] Ibid
[24] Federal Highway Administration National Highway Traffic Safety Administration, 2014-2018.
[25] TRIP analysis of National Highway Traffic Safety Administration and Federal Highway Administration data (2020). Data is for 2019.
[26] Ibid.
[27] Ibid.
[28] Ibid.
[29] TRIP estimate based on NHTSA report "The Economic and Societal Impact of Motor Vehicle Crashes, 2010 (Revised), 2016. P. 146.
[30] Ibid.

[31] The Economic and Societal Impact of Motor Vehicle Crashes, 2010 (Revised) (2015). National Highway Traffic Safety Administration. P. 1. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812013

[32] TRIP analysis of the Federal Highway Administration's Freight Analysis Framework. (2018). https://faf.ornl.gov/fafweb/

[33] Ibid.

[34] Ibid.

[35] American Road & Transportation Builders Association (2015). The 2015 U.S. Transportation Construction Industry Profile. https://www.transportationcreatesjobs.org/pdf/Economic_Profile.pdf

[36] Ibid.

[37].

[38] IHS Markit (2021). Economic Impacts of Transportation Infrastructure. ARTBA_EIA_IIJA_Report_Sept2021.pdf

[39] Area Development Magazine (2021). 35th Annual Corporate Survey: Effects of Global Pandemic Reflected in Executives Site and Facility Plans _ https://www.areadevelopment.com/corporate-consultants-survey-results/q1-2021/35th-annual-corporate-survey.shtml

[40] American Road & Transportation Builders Association. IIJA Economic Impact: Kentucky. https://www.artba.org/economics/iija-impact/states/?profile=KY

[41] Kentucky Infrastructure Coalition (2020) Kick Start KY.

[42] Kentucky Infrastructure Coalition (2021). Executive Summary of State Transportation Funding Needs 2021 Legislative Session.

[43] Ibid.

[44] KPMG. (2019). Evaluating Sustainable Transportation Funding Options.

[45] BloombergNEF (2019) New Energy Outlook 2019. https://about.bnef.com/new-energy-outlook/

[46] United States Department of Transportation (2015). 2015 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance. Executive Summary, Chapter 8. https://www.fhwa.dot.gov/policy/2015cpr/es.cfm#8h

[47] Ibid.

[48] Ibid.