

8. Freight System Needs

Kentucky has an integrated multimodal freight system that facilitates the efficient, reliable, and safe movement of freight. The challenge to KYTC will be to maintain, operate, and expand the system to meet current and future needs.

To help KYTC plan and invest more effectively and create a transportation system that is well-prepared for the future, it is important to thoroughly assess needs for freight movement and forecast future freight demands. Using the information presented in the previous four sections, this section:

- Identifies the strengths and weaknesses of the existing freight transportation system
- Identifies the future needs of the freight transportation system

The purpose of identifying the needs of Kentucky's freight system is to better inform the decision-making process. The needs discussed in this section have been considered in developing the policy and strategy recommendations in *Section 9* which will help to make implementation of the outcomes more successful.

8.1. Commonalities

The previous sections presented information on various aspects related to the Kentucky freight transportation system: existing inventory, goals and performance measures, current conditions, and future trends and challenges. While the content of each of the previous sections varied, commonalities regarding the freight transportation system could be gleaned from each. This section presents those commonalities and identifies them as a strength or weakness of the Kentucky freight transportation system.

8.1.1. Strengths

A review of the commonwealth's competitive advantages and critical challenges helps identify the strengths of the Kentucky freight system. The strengths are discussed below, grouped into six categories: business climate, connectivity, funding, location, system capacity, and system operations/conditions.

8.1.1.1 Business Climate

Kentucky's current economy is comprised of business sectors that rely on transportation to move raw materials, components, and finished goods. Kentucky is a major player in the auto industry with four assembly plants. Louisville is home to two Ford assembly plants. In Georgetown, Toyota opened its first assembly plant outside of Japan in 1988, the TMMK. Lastly, Bowling Green has been the exclusive production home of Chevrolet's high-performance flagship Corvette since 1981.⁷⁸ The location of these assembly plants has led to over 440 automotive suppliers locating in Kentucky.

Ford announced in 2021 its plan of building a new dedicated electric vehicle battery manufacturing complex in Kentucky, creating 5,000 new jobs in the Hardin County area. In addition, Envision AESC is

⁷⁸ Williams, Betsy (2002). "Auto Companies Accelerate Investment in Kentucky". <http://businessclimate.com/kentucky-economic-development/auto-companies-accelerate-investment-kentucky>. Accessed on March 22, 2016.

investing \$2 billion to build a new Gigafactory in Bowling Green, Warren County, producing battery cells and modules to power the next generation EVs, also creating 2,000 high-value jobs in the region.

Kentucky is also home to two major air cargo hubs. Amazon Air and DHL operate their North American hub at Cincinnati/Northern Kentucky International Airport (CVG), while UPS operates its WorldPort hub at Louisville Muhammad Ali International Airport (SDF). The new Amazon hub at CVG Airport also plays a big role in air cargo growth in the region. Kentucky benefits not only from the direct economic activity that the hubs provide, but also from the growth in the warehousing and distribution industry spurred by the presence of these hubs. Like the auto assembly plants, the locations of air cargo hubs have led to hundreds of other companies locating near these hubs. This has created a friendly business climate for future growth in these sectors and provides support for a robust and reliable freight transportation system throughout Kentucky.

8.1.1.2 Connectivity

Kentucky's highway system is well-connected throughout the state. Accessibility to interstates and parkways has improved for many communities. Investments in converting sections of parkways in the western region as part of the I-69 corridor are well underway, with many sections already complete. In addition to key highway connections, the commonwealth is also well-connected by a network of waterways and railways.

Kentucky not only has good internal connectivity, but is also well-connected to other regions of the U.S. Two of the nation's busiest north-south interstate corridors (I-75 and I-65) run through Kentucky and connect industries across North America from Canada to Mexico. Kentucky also is home to major portions of I-64, which is a major east-west corridor stretching from Norfolk, VA to St. Louis, MO. The commonwealth's entire inland waterway system (see *Section 4.2*) provides a waterway link to Canada via the Great Lakes and to Mexican and South American markets via the deep-water ports of New Orleans, LA and Mobile, AL. In addition, Kentucky's inland ports and terminals provide direct access to the agricultural markets of the Midwestern and North Central states, to the industrial and consumer markets of the Northeast, and to the distribution networks of the South.

8.1.1.3 Funding

Approximately, 60 percent of the Kentucky Road Fund comes from state motor vehicle fuel taxes, and KYTC is constitutionally limited to using fuel tax revenue to fund roadway projects. The Kentucky Road Fund is supplemented by a vehicle sales tax, also called a usage tax, which typically yields about 25 percent of annual revenue. Registration and licensing fees paid by commercial trucking companies generate 10 percent of revenues, with the remaining 5 percent from vehicle and driver licensing and other fees.

As in most states, the majority of the Kentucky Road Fund is funded through taxes on motor vehicle fuels. However, unlike most states, Kentucky uses a percentage tax rate based on the wholesale cost of fuel, with a per gallon statutory floor of \$0.246 per gallon. This amount includes a \$0.064 fixed component plus a variable component, which is based on the average wholesale prices of gas. The rate cannot increase by more than 10 percent of the variable rate established at the close of the previous fiscal year. As of February 2020, 23 states including Kentucky have instituted a variable component to their fuel tax. These states have seen their fuel tax rate rise sometime in the last 2 years, while among the 31 states levying a fixed-rate fuel tax, the average length of time since the last fuel tax increase is 16 years. If the fuel tax is going to provide an adequate amount of revenue to fund transportation, the tax

rate needs to be periodically adjusted to at least keep pace with the growth rate in the cost of infrastructure maintenance and construction.⁷⁹ Kentucky is doing this by utilizing a variable-rate fuel tax. The state's current tax rates for fiscal year (FY) 2022 stand at about \$0.246 per gallon of gasoline and about \$0.216 per gallon of diesel and other fuels. These rates have remained unchanged since July 2015.

Traditionally, KYTC used toll credits as the state's federal funding match. However, as of FY 2023, the toll credits have been exhausted. These toll credits were attributed to Kentucky by federal highway law in accordance with calculations that considered past levels of state fund investments (such as state-sponsored toll roads) in the federal highway system. Toll credits did not generate cash and did not provide spendable cash. They did, however, permit KYTC the flexibility to use 100 percent federal funding on federal-aid projects.

Funding made possible through the IIJA provides \$22.4 million for grade crossings safety and separations. Projects funded under these programs require a 10 percent match. In fiscal years 2021 and 2022, Kentucky has designated \$1,600,000 in funds for the public safety and service improvements of railroads. This is done through funding at-grade rail crossing improvements through the Kentucky Rail Crossing Improvement (KRCI) program. Applicants can apply to the program for grants covering up to 80% of project costs.

Kentucky made available \$500,000 per year in grant funding since FY 2013 to active public riverports for dredging and maintenance of access. Since this program began, it has employed a 50/50 match funding requirement. However, due to the relatively small amount of funding, some riverports have provided much more than 50 percent funding to ensure project completion. This state funding level has remained consistent through FY 2023 and FY 2024. Another \$1 million was included in the transportation budget for FY 2017 through FY 2018.

8.1.1.4 Location

Kentucky's strategic location facilitates the distribution of goods and materials to a massive industrial and consumer market. Kentucky is at the center of a 34-state distribution area in the eastern U.S. Kentucky's borders are within a day's truck drive or within 600 miles of over 60 percent of the nation's population, personal income, and manufacturing business establishments. In addition, Kentucky is an attractive location for air cargo hubs due to its generally temperate weather and short travel times. From the UPS Louisville hub, approximately 75 percent of the U.S. population is reachable within a 2-hour flight, and a 4-hour flight allows for access to 95 percent of the U.S. population.

Kentucky also lies at the hub of the nation's inland waterways. Positioned advantageously on both the Ohio and Mississippi rivers, its location offers unique advantages for efficient freight transport of bulk materials, agricultural products, chemicals, minerals, metals, manufactured goods, wood, and containerized freight.

8.1.1.5 System Capacity

The size of Kentucky's multimodal transportation system is a strength. There is a well-connected highway system for handling truck freight traffic. Kentucky has significant rail infrastructure with five

⁷⁹ Institute on Taxation and Economic Policy (2015). *How Long Has It Been Since Your State Raised Its Gas Tax?* <http://www.itep.org/pdf/gastaxincreases0515.pdf>. Accessed April 2022.

Class I railroads, one Class II railroad, and 9 Class III railroads to move freight across the state. Rail transportation in Kentucky is increasingly intermodal, providing numerous transloading opportunities between train, truck, and barge. The commonwealth has nine USACE designated commercially navigable waterways, including the Mississippi River and the Ohio River. There are five commercial airports in Kentucky, including two major cargo airports (Louisville International Airport and Cincinnati/Northern Kentucky International Airport), providing Kentucky the third ranking in the nation in total air cargo shipments. There are also 26 other regional airports with runway lengths greater than 5,000 feet, making them capable of handling air cargo shipments.

In addition to Kentucky having a strong existing multimodal transportation system, future improvements (like I-69) are being made in the Jackson Purchase Region (far western part of the State) of the commonwealth to further strengthen the system. In November 2020, KYTC published a planning study to evaluate improvements to increase capacity and improve traffic operations along I-65 between Lebanon and Louisville.⁸⁰

8.1.1.6 System Operations/Condition

According to 2020 data from BTS, Kentucky ranked seventh for best road quality in the country, with only 8 percent of all federal-aid highway miles in poor or mediocre condition.⁸¹ The Maintenance Condition of Kentucky Highways Report (MRP), which is an annual survey of roads conducted by the KYTC Division of Maintenance, indicates scores improved from 2010 to 2020 but have been up and down since. The target grade has been surpassed in the past 10 years. Interstates and NHS roads have consistently had the best ratings, being over the KYTC target grade for each of the past 10 years.⁸²

8.1.2. Weaknesses

A review of Kentucky's competitive advantages and critical challenges helps identify the weaknesses in the freight system. The weaknesses are discussed below, grouped into six categories: business climate, connectivity, funding, location, system capacity, and system operations/condition.

8.1.2.1 Business Climate

Historically, Kentucky is a net exporter of energy; however, with decreasing coal production and stagnant energy demand, Kentucky's position as an energy exporter has been declining since 1990. The average delivered cost of coal from Central Appalachia was highest among all coal producing regions due to the cost of production.⁸³ Nationwide, competition from cheap foreign coal, coal regulations, and rail capacity constraints are making imports more attractive than domestic coal, especially to East Coast power plants.

8.1.2.2 Connectivity

⁸⁰ Kentucky Transportation Cabinet. Bullitt/Jefferson Counties: I-65 Conceptual Improvements Study – Project 05-550.00. <https://transportation.ky.gov/DistrictFive/Pages/I-65-Conceptual-Improvements-Study.aspx>. Accessed November 2021.

⁸¹ Bureau of Transportation Statistics. Kentucky Transportation by the Numbers. <https://www.bts.dot.gov/sites/bts.dot.gov/files/states2020/Kentucky.pdf>. Accessed November 2021.

⁸² Kentucky Transportation Cabinet – Division of Maintenance Operations & Pavement Management Branch. FY 2020 Maintenance Conditions of Kentucky Highways. <https://transportation.ky.gov/Maintenance/Documents/Annual-Reports/MRP-FY20-Statewide.pdf>. Accessed November 2021.

⁸³ Coal Age (2013). *Coal Transportation Costs Could Hinder Resurgence of Coal Generation*. <https://www.coalage.com/features/coal-transportation-costs-could-hinder-resurgence-of-coal-generation/>. accessed April 2022.

Navigable rivers in Kentucky depend on the lock and dam system. For instance, the purpose of the Ohio River's locks and dams is to maintain a minimum depth of 9 feet for commercial navigation. The old Olmsted Locks and Dams that were constructed in the 1930's and 1940's have been demolished and replaced with a new Olmsted Lock and Dam. The completion of this project took an extremely long time, during which no other improvement projects could be addressed. The completion of this project will eliminate bottlenecks that resulted from the antiquated locks, ease the passage of larger commercial vessels, and increase connectivity between Kentucky and other states on the Ohio River.

The new I-69 corridor is currently under development in multiple states. The full corridor will provide connectivity across the United States between Michigan and Texas. With the forthcoming completion of the corridor in Indiana (and corresponding river bridge), complete connectivity depends on the incomplete sections of the corridor in the South.

8.1.2.3 Funding

While having a variable-rate fuel tax is a strength for Kentucky, it should be noted that relying heavily on the fuel tax to fund the Kentucky Road Fund could be a disadvantage if revenues aren't adequate to fund transportation. Revenues fluctuate depending on the price of the gasoline and fuel consumption rates. Revenue planning may be difficult because of price uncertainties, especially if an unexpected drop in fuel prices was to occur. In addition to the state fuel tax, a federal fuel tax (18.4 cents per gallon on gasoline and 24.4 cents per gallon of diesel fuel) is collected for the Federal Highway Trust Fund.

The federal gasoline tax has not been increased since 1993, and it is not indexed to inflation. The inflation rate from 1993 until 2020 was 79.1 percent.⁸⁴ The buying power of the federal gasoline tax has significantly reduced over the years.

As shown in **Figure 8-1**, U.S. motor gasoline consumption has declined since 2010. Drivers of this reduction include more fuel-efficient vehicles and electric/hybrid vehicles. Motor gasoline consumption is projected to further decline through 2040, and one of the primary contributing factors is more stringent fuel economy standards. In August 2021, USDOT proposed improved fuel economy standards for Manufacture Years (MY) 2024 – 2026 passenger cars and light trucks. The new standards would increase fuel efficiency 8% annually for model years 2024-2026 and increase the estimated fleetwide average by 12 miles per gallon for model year 2026, relative to model year 2021.⁸⁵ Decreasing motor gasoline consumption will likely reduce the fuel tax revenues at federal and state levels if there are minimal or no increases in the fuel tax rate or additional funding resources are not identified.

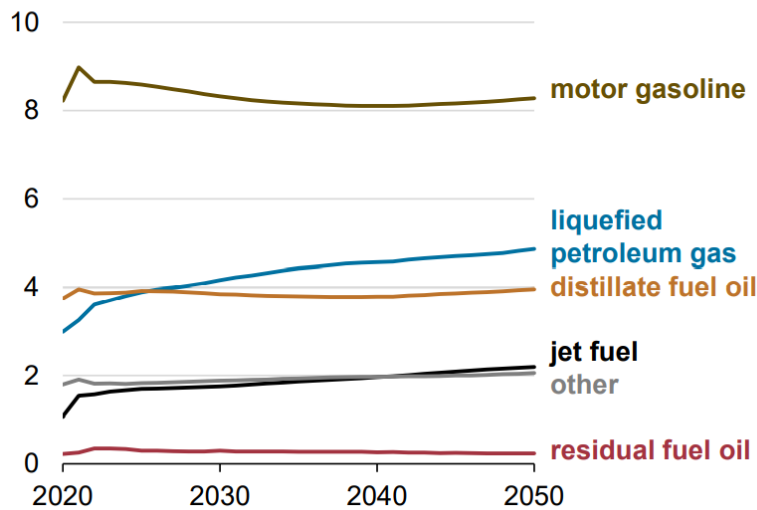
Figure 8-1. U.S. Motor Gasoline and Diesel Fuel Consumption and Product Exports (2020-2050)

⁸⁴ US Inflation Calculator. <http://www.usinflationcalculator.com>. Accessed November 2021.

⁸⁵ National Highway Traffic Safety Administration (2021). *USDOT Proposes Improved Fuel Economy Standards for MY 2024-2026 Passenger Cars and Light Trucks*. <https://www.nhtsa.gov/press-releases/fuel-economy-standards-2024-2026-proposal>. Accessed November 2021.

Petroleum and other liquids consumption by fuel type AEO2021 Reference case

million barrels per day



Source: U.S. Energy Information Administration, *Annual Energy Outlook 2021*.

8.1.2.4 Location

While Kentucky's geography provides many economic advantages, it also presents challenges with mountainous terrain, areas prone to flooding, and air quality issues.

8.1.2.5 System Capacity

Several inactive short line railroads in the Paducah area tie into the Paducah & Louisville Railway, which connects with the CN and CSXT railroads. Improvements on these inactive short line railroad corridors must be a key initiative of KYTC's freight partners.⁸⁶

There are also challenges facing the capacity of the Kentucky highway system. FAF flow analysis shows significant projected growth in freight volumes between 2017 and 2050. Significant growth takes place on I-71/I-75 between the Brent Spence Bridge and the I-71/I-75 split, as shown in **Figure 4-1** in the *Section 4*. I-75 is a direct link to Canadian ports of entry, so this corridor is particularly crucial for Kentucky's exports to Canada. Additionally, I-65 and I-64 are projected to experience substantial freight growth.

8.1.2.6 System Operations/Condition

According to Kentucky's MRP Report, rural secondary roads did not meet the target MRP score from 2010 through 2014, then began improving starting in 2015 with ups and downs through 2021, meeting the target MRP for most of the studied years, and dipping right below it for some of them. In addition, the percentages of pavements in good condition and fair condition have been trending downward and the number of structurally deficient bridges has been increasing. These factors indicate a weakness in the operations on the roadway system. This is especially true for intermodal connectors and last mile

⁸⁶ National Association of Development Organizations (2012), *Freight Transportation and Economic Development: Planning for the Panama Canal Expansion*, <http://www.nado.org/wp-content/uploads/2012/03/panama.pdf>, Accessed November 2021.

connections, which are often maintained by several different entities. Investment in connectors is frequently in competition for ever decreasing transportation funding with other high-profile projects.

I-71/I-75 Brent Spence Bridge between Northern Kentucky and Cincinnati has significant capacity, sight distance, and safety challenges. These concerns have led its replacement project to be considered a high priority for the KYTC, the Ohio Department of Transportation, and the Ohio-Kentucky-Indiana Regional Council of Governments (OKI). As a major freight facility, the Brent Spence Bridge is listed in *Section 10*.

Other modes of transportation, including rail and waterways, also are facing operational challenges. The commonwealth does not own rail assets; therefore, service locations, investments, and shipping rates and schedules are all controlled by the railroad companies themselves. Also, the freight rail reorganization bypasses large sections of the Ohio River Basin, limiting inland connectivity. Potential exists for the creation of a container-on-barge terminal on a waterway in the western part of Kentucky; however, the challenges include an aging lock and dam system, the unreliability of the waterways system, and the breakdown of the container recycling circuit.

8.2. Future Needs

As freight volumes grow, the ability of the multimodal freight system to be resilient and responsive to the freight community's needs will be increasingly critical to Kentucky's economic future. Freight network needs were identified through an analysis of the strengths and challenges of the Kentucky freight system. The following needs have been identified:

- **Economic Development:** Initiate a commonwealth-wide program to impact Kentucky's ability to compete in regional, national, and global markets for many years to come, based on the recommendations in the 2022 Kentucky Riverports, Highway & Rail Freight Study. One of the recommendations is to conduct a detailed, comprehensive study of the economic impacts of water transportation to better understand the importance of the commonwealth's ports and waterways to its economy and quality of life.
- **Safety:** Support and work with private rail carriers to provide a safe, reliable, efficient, and effective rail transportation system for the movement of freight within the commonwealth, as well as connect Kentucky to domestic and international markets. An example is preservation of the eastern Kentucky rail lines despite declining coal production.
- **Multimodal:** Prepare western Kentucky for the ever-changing flow of freight, including developing coordinated plans of action and improvements to ports, railroads, and interstate highways.
- **Safety:** Improve the commercial vehicle crash rates on Kentucky interstates and U.S. highways that have a KAB of greater than 25 percent. This includes multiple sections of I-71, I-69, and US 41.
- **Mobility/Reliability:** Improve key highway bottlenecks, such as the Brent Spence bridge, causing significant implications for northern Kentucky freight.
- **Redundancy/Resiliency:** Build resiliency and redundancy into the freight transportation system to protect current and future investments and to maintain safe operational capabilities during and after extreme weather events or earthquakes. Adaptation of vulnerable freight transportation infrastructure and facilities will require policy changes and investment.

- **Supply Chain:** The ability of KYTC and its partners to understand current and potential future supply chain needs is crucial to making optimal investments in future freight infrastructure. Freight investment in Kentucky must be balanced between high-volume interstate highways, U.S. highways, and last mile connectors that serve more local freight generators, which are critical to maintaining the supply chain and economic growth throughout the commonwealth.
- **Capacity:** Improve the capacity and operations of the rural freight system. Kentucky's agricultural producers rely heavily on rural infrastructure to transport farm products, as crops are moved from production regions by truck, rail, or barge to elevators and processing facilities.
- **Mobility:** The routes identified as critical freight corridors are within KYTC's span of control and should become a known part of the planning process.
- **Air Cargo:** Continue working with the FAA to lengthen additional GA airport runways to 5,000 linear feet. Having at least a 5,000-linear-foot runway opens an airport to more business aviation and thus enhances a community's economic potential.
- **Technology Integration:** Seek opportunities to incorporate and expand Intelligent Transportation Systems (ITS), Information Technology (IT), and other new technologies into freight transportation planning and freight projects.
- **Environmental Impact:** The amount of freight moving through Kentucky is anticipated to continue to increase, without intervention the emissions from this movement will also continue to increase. There is a need for enhanced efficiency across all modes of freight movement to reduce these environmental impacts including climate change, air pollution, stormwater runoff, and wildlife habitat preservation.