KENTUCKY FREIGHT PLAN

Prepared for:

KENTUCKY TRANSPORTATION CABINET

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AADTT – Average Annual Daily Truck Traffic

AAR – Association of America Railroads

Able – Achieving a Better Life Experience

ACI-NA – Airports Council International – North America

ADD – Area Development District

AIP – Airport Improvement Program

ATRI – American Transportation Research Institute

BNSF – Burlington Northern Santa Fe

CBP – Customs and Border Protection

CMAQ – Congestion Mitigation and Air Quality Program

CN – Canadian National

CSXT – CSX Transportation

CVG – Cincinnati/Northern Kentucky International Airport

DOC – Department of Commerce

DOT – Department of Transportation

e-commerce – Electronic Commerce

EDA – Economic Development Administration

EIA – Energy Information Administration

EPA – Environmental Protection Agency

FAA – Federal Aviation Administration

FAF – Freight Analysis Framework

FAST Act – Fixing America's Surface Transportation Act

FHWA – Federal Highway Administration

FRA – Federal Railroad Administration

FTA – Federal Transit Administration

FY – Fiscal Year

GA – General Aviation

GDP – Gross Domestic Product

GPS – Global Positioning System

HMT – Harbor Trust Fund

HMTF – Harbor Maintenance Trust Fund

HOS – Hours of Service

HPV – High Productivity Vehicle

HSIP – Highway Safety Improvement Program

IRI – International Roughness Index

ITS – Intelligent Transportation Systems

ITTS – Institute of Trade and Transportation Studies

IVI – Intelligent Vehicle Initiatives

KCED – Kentucky Cabinet for Economic Development

KFP – Kentucky Freight Plan

KRAP – Kentucky Railroad Assistance Program

KRCI – Kentucky Railroad Crossing Improvement

KRS – Kentucky Revised Statute

KSRA – Kentucky Short Line Railroad Assistance

KTC – Kentucky Transportation Center

KTP – Kentucky Truck Plan

KYTC – Kentucky Transportation Cabinet

LAP – Louisville Assembly Plan

LED – Lighting Emitting Diode

LRSTP – Long-Range Statewide Transportation Plan

MAP-21 – Moving Ahead for Progress in the 21st Century Act

MARAD – Maritime Administration

MP – Maintenance Program

MPH – Miles Per Hour

MPO – Metropolitan Planning Organization

MRP – Maintenance Rating Program

MY – Model Year

NAAQS – National Ambient Air Quality Standards

NAFTA – North America Free Trade Agreement

NCFRP – National Cooperative Freight Research Program

NFSP – National Freight Strategic Plan

NHFP – National Highway Freight Program

NHPP – National Highway Performance Program

NHS – National Highway System

NOx – Nitrogen Oxide

NPIAS – National Plan of Integrated Airport Systems

NS – Norfolk Southern

NTSB – National Traffic Safety Board

PAL – Paducah and Louisville Railway, Inc.

PFN – Primary Freight Network

PHMSA – Pipeline and Hazardous Materials Safety Administration

PSC – Public Service Commission

RPC – Regional Planning Commission

RRIF – Railroad Rehabilitation and Improvement Financing

SDF – Louisville International Airport

SHSP – Strategic Highway Safety Plan

SIP – State Implementation Plan

STB – Surface Transportation Board

STIP – Statewide Transportation Improvement Program

STRAHNET – Strategic Highway Network

TEU – 20-Foot Equivalent Unit

TGP – Tennessee Gas Pipeline Company

TIFIA – Transportation Infrastructure Finance and Innovation Act

TIGER – Transportation Investment Generating Economic Recovery

TMMK – Toyota Motor Manufacturing Kentucky

TPIMS – Truck Parking Information and Management System

TZD – Toward Zero Deaths

UP – Union Pacific

UPS – United Parcel Service, Inc.

USACE – U.S. Army Corps of Engineers

USCG – U.S. Coast Guard

USDOT – USDOT

USGS – United States Geological Survey

VMT – Vehicles Miles Traveled

WIM – Weigh-in-motion

WRRDA – Water Resources Reform and Development Act

WTAB – Water Transportation Advisory Board

1 INTRODUCTION

The Kentucky Freight Plan (KFP) is a supplement to the Kentucky Transportation Cabinet's (KYTC) 2014 Long-Range Statewide Transportation Plan (LRSTP). As stated in the LRSTP, "the Cabinet's mission is to provide a safe, efficient, environmentally sound, and fiscally responsible transportation system which promotes economic growth and enhances the quality of life in Kentucky." **Figure 1-1** illustrates the continuous process that KYTC follows by linking the four main areas of planning, design, construction, and operations.

Figure 1-1: KYTC Project Life Cycle

Source: Kentucky Long-Range Statewide Transportation Plan

The vision, which guides the work of the Cabinet in achieving this mission, is "striving to be national leaders in transportation who provide transportation infrastructure and services for the 21st century that deliver new economic opportunities for all Kentuckians." The movement of goods and freight throughout Kentucky is vital for each citizen in the commonwealth, from the dairy farmer to the mineworker to the pharmacist. Each has a need to transport raw materials, manufactured parts, and finished goods and then products to be sold or purchased. KYTC's long-term commitment is to meet or exceed the needs and expectations of the users of Kentucky's transportation system—residents, workers, business owners, and students.

Similarly, the Cabinet's aviation, rail, riverport, and transit plans were created with this intention. Combined with the KFP, these five modal plans provide a more detailed view of the Kentucky transportation system.

The majority of KYTC's transportation funding is comprised of the State Road Fund. Section 230 of the Kentucky Constitution mandates that this funding can only be used on highways. Therefore, KYTC has

no regulatory authority to use the State Road Fund on non-highway related uses. This presents a significant fiscal challenge for KYTC to address the many needs for modes other than highways on the freight transportation system.

The KFP has been developed upon the recommendations of the previous federal transportation bill, the Moving Ahead for Progress in the 21st Century Act (MAP-21). Enacted in 2012, MAP-21 encouraged each state to develop a comprehensive statewide freight plan for guiding state freight transportation investments. In December 2015, the President signed into law the Fixing America's Surface Transportation Act (FAST Act), which includes a number of provisions focused on ensuring the safe, efficient, and reliable movement of freight. KYTC will work to align the KFP when FAST Act federal guidance has been issued for the development state freight plans.

1.1 State Freight Plan Purpose

Every business and resident in Kentucky depends on the freight transportation system of roads, railroads, waterways, airports, and pipelines for the goods they use daily. Each investment in the freight transportation system that increases throughput, improves efficiency, and reduces costs has a direct positive impact on Kentucky's economy. At the same time, freight transportation requires significant expenditures of energy to move large quantities of industrial and consumer goods over long distances. Many agencies and businesses develop policies, investments, and programs to understand and mitigate the risks of freight transportation and to improve environmental quality and safety for all transportation system users.

The KFP has a long-term perspective and is intended to serve the needs of KYTC and its partners to improve freight transportation by accomplishing the following process:

1. Documenting freight assets (Chapter 2)
2. Identifying future needs (Chapter 7)
3. Recommending strategic initiatives (Chapter 8)
4. Devising implementation strategies (Chapter 8)

This plan considers highway, rail, aviation, and waterway needs. The plan also describes the pipeline system but does not provide investment or policy recommendations for it.

1.2 Coordination with State Long-Range Transportation Plan and Other Modal Plans

The KFP integrates the freight-relevant components of Kentucky's long-range statewide transportation plan, aviation plan, rail plan, and riverports plan, as well as studies and initiatives involving Kentucky's freight system. The following subsections highlight Kentucky's modal planning efforts and other initiatives relevant to the development of the KFP.

1.2.1 Kentucky Long-Range Statewide Transportation Plan

The 2014 Kentucky LRSTP describes and assesses the commonwealth's transportation system, including passenger and freight. It provides a basis for the vision for Kentucky's transportation system over the next 20 years.

1.2.2 Kentucky Statewide Transportation Improvement Program and Kentucky Recommended Highway Plan

The Kentucky Statewide Transportation Improvement Program (STIP) contains all federally funded scheduled projects and regionally significant state-funded projects in Kentucky for a 4-year period. KYTC prepares the STIP every 2 years upon approval of KYTC's Highway Plan by the Kentucky General Assembly. The implementation of the STIP is in accordance with federal transportation programs and guidelines and is conducted through the cooperative efforts of the KYTC, Federal Highway Administration (FHWA), and Federal Transit Administration (FTA) to ensure that all federal-aid funding is utilized in accordance with federal guidelines and federal regulations.

Every 2 years, the Kentucky General Assembly approves a transportation budget, which drives the Kentucky Recommended Highway Plan. This plan outlines the scheduled highway project activities for a 6-year period; these projects are subject to the availability of state and federal highway dollars. On an on-going basis, KYTC works with the Area Development Districts (ADDs), Metropolitan Planning Organizations (MPOs), and highway district offices to identify and prioritize projects for future highway plans. KYTC submits the Recommended Highway Plan to the Kentucky Legislature, which then reviews, modifies, and approves the plan as part of the biennial budget process. Immediately upon completion of the state legislative process, KYTC will seek to incorporate the subset of federal projects from the Recommended Highway Plan into the update of the STIP.

1.2.3 Kentucky Statewide Rail Plan

KYTC recognizes the importance of rail as a vital component to the commonwealth's economy, and in 2015, the Cabinet completed the update of the Kentucky Statewide Rail Plan. The vision of the rail plan is to support and work with private rail carriers to provide a safe, reliable, efficient, and effective rail transportation system for the movement of passengers and freight within Kentucky, as well as to connect to domestic and international markets. KYTC recognizes that an effective rail system will help alleviate highway congestion, contribute to economic development, improve public safety, improve energy efficiency, and reduce greenhouse gas emissions. The goals of the 2015 Kentucky Statewide Rail Plan include:

- **Preservation**: Encourage the preservation of the largely privately owned and operated rail system within Kentucky
- **Economic Development**: Support economic development by working to provide roadway connectivity to the national rail system and state intermodal facilities
- **Customer Relationships/Transportation Planning Process**: Strengthen customer relationships with the rail industry through communication, cooperation, and information exchange in the KYTC transportation planning process

- **Safety and Security**: Enhance highway-railroad at-grade crossing safety and reliability to ensure mobility and maintain safe access

1.2.4 Kentucky Riverport Improvement Project

Recognizing that waterways and intermodal riverport facilities play an important role in the Kentucky economy, KYTC completed a report in 2008 entitled Kentucky Riverport Improvement Project. The Kentucky Riverport Improvement Project was initiated to show profiles of the commonwealth's riverports, to define current Kentucky governance, and to investigate what other states have done to capture the benefits of their inland waterway systems. The primary objective of the report was to assist the Cabinet in developing a plan to make Kentucky's riverports more competitive. The results provided KYTC with recommendations to initiate a statewide program to strengthen Kentucky's ability to compete in regional, national, and global markets. One of the recommendations was creating a Water Transportation Advisory Board (WTAB), which advises and makes recommendations to transportation officials and other governmental policymakers concerning matters affecting waterway transportation. In 2010, the Kentucky General Assembly passed legislation to establish the WTAB. The membership and duties of the WTAB are discussed in **Chapter 2**.

1.2.5 Strategic Highway Safety Plan

Kentucky's Strategic Highway Safety Plan (SHSP) was updated in 2015. The SHSP serves as an umbrella guide to increase coordination, communication, and cooperation among federal, state, and local agencies, along with nonprofit organizations and other highway safety advocates for reducing preventable motor vehicle crashes. Toward Zero Deaths (TZD) is a safety strategy adopted by KYTC as a central theme that guided the development of the SHSP. This strategy supports a data-driven approach that targets specific areas for improvements and employs proven countermeasures. TZD leverages an interdisciplinary approach by integrating engineering, enforcement, education, and emergency services strategies.

1.2.6 Airport Improvement Plan

KYTC is currently developing the Kentucky Statewide Aviation System Plan. The purpose of the plan is to determine the current status of all General Aviation (GA) airports across the commonwealth, ultimately assessing the current and future needs of each airport as they pertain to the overall Kentucky Aviation System. Each system airport will be categorized based on its current operational and functional status within the overall Kentucky Aviation System. The study also includes an analysis of the direct economic impacts of GA airports on the state and local economies. The Kentucky Statewide Aviation System Plan is scheduled to be completed in 2017.

1.3 Federal Legislation

Since 2012, more emphasis has been placed on freight in federal transportation legislation. The following subsections discuss key federal legislation that has elevated freight nationally and among state department of transportations (DOTs).

1.3.1 Moving Ahead for Progress in the 21st Century Act

MAP-21 was signed into law on July 6, 2012. This federal act provided a framework for a streamlined and performance-based approach to transportation system development and maintenance. MAP-21 established national surface transportation goal areas and created requirements for the U.S. Department of Transportation (USDOT) to develop national transportation performance measures and to promulgate rules to implement them. Of relevance to the KFP, MAP-21 established a national freight movement and economic vitality goal focused on improving the national freight network, strengthening the ability of rural communities to access national and international trade markets, and supporting regional economic development. To achieve this, the law requires USDOT to develop a National Freight Policy, which includes the following goals:

- **Economic Competitiveness**: Invest in infrastructure improvements and implement operational improvements that strengthen the contribution of the national freight network to the economic competitiveness of the U.S.; reduce congestion; and increase productivity, particularly for domestic industries and businesses that create high-value jobs
- **Safety, Security, Resiliency**: Improve the safety, security, and resilience of freight transportation
- **State of Good Repair**: Improve the state of good repair of the national freight network
- **Advanced Technology**: Use advanced technology to improve the safety and efficiency of the national freight network
- **Performance and Accountability**: Incorporate concepts of performance, innovation, competition, and accountability into the operation and maintenance of the national freight network
- **Economic Efficiency**: Improve the economic efficiency of the national freight network
- **Environmental**: Reduce the environmental impacts of freight movement on the national freight network

MAP-21 also encouraged states to develop freight plans by increasing the federal funding match eligibility on projects included in these plans. To receive the increased federal match, projects must make a demonstrable improvement in freight movement efficiency and be identified in a state's freight plan.

1.3.2 National Freight Strategic Plan

Within MAP-21 legislation, USDOT is required to develop a National Freight Strategic Plan (NFSP). To begin the process, the National Freight Advisory Committee published three overarching recommendations to guide the development of the NFSP. These recommendations were:

1. **Barriers**: An assessment of statutory, regulatory, technological, institutional, financial, and other barriers to improved freight transportation performance (including opportunities for overcoming the barriers)

2. **Best Practices**: To improve the performance of the national freight network

3. **Best Practices**: To mitigate the impacts of freight movement on communities

The draft NFSP was published in October 2015. The plan "aims to describe the freight transportation system and future demands on it; identify major corridors and gateways; assess physical, institutional, and financial barriers to improvement; and specify best practices for enhancing the system."[1] The study identified strategies to address infrastructural, institutional, and financial bottlenecks that hinder the safe and efficient movement of goods.

1.3.3 Fixing America's Surface Transportation Act

On December 4, 2015, the FAST Act was signed into law. This 6-year transportation reauthorization placed a major emphasis on freight investment. In particular, the law created the National Highway Freight Program (NHFP), which is funded at an average of $1.2 billion per year and distributed to states by formula. Kentucky is slated to receive approximately $21 million per year (before post-apportionment set-asides; before penalties; and before sequestration).[2] In addition, a new discretionary program entitled the Nationally Significant Freight and Highway Projects has been established, funded at an average of $900 million per year.

States are now required to develop statewide freight plans, and the FAST Act has removed the enhanced federal funding match for freight projects. In 2016, the USDOT will begin developing federal guidance for state DOTs regarding the implementation of the FAST Act related freight components.

1.4 Plan Development

The KFP was developed in a partnership between KYTC, the Kentucky Transportation Center (KTC), and private sector stakeholders. The plan is designed to tell the Kentucky freight story. The story begins with the development of goals, inventory of the freight system, and current conditions. Current trends and strengths and weaknesses of the system are then analyzed. The document concludes with a series of recommendations for KYTC's future freight planning efforts.

The KFP was not designed to be compliant with MAP-21 and the FAST Act. KYTC will update the KFP when FAST Act federal guidance has been issued for the development of state freight plans.

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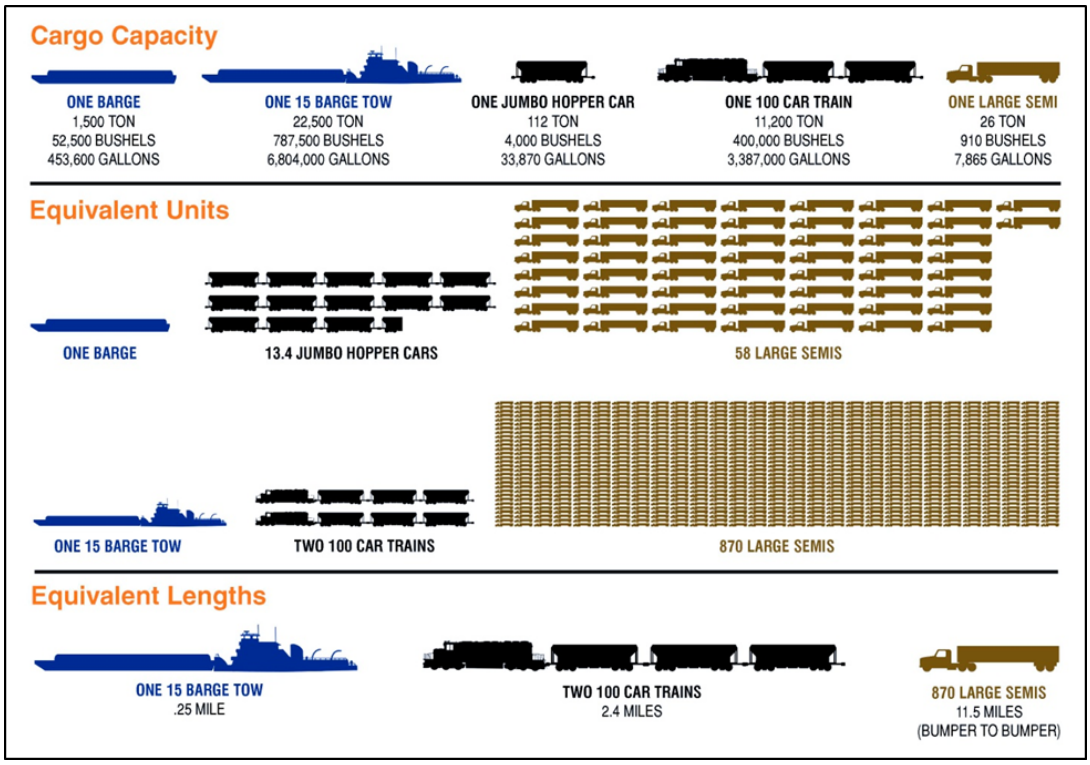
[1] *Federal Highway Administration, National Freight Strategic Plan (Draft), October 2015, Page 5.*
[2] *Federal Highway Administration, Summary of Estimated FY 2016 – FY 2020 Apportionments under the Fixing America's Surface Transportation Act Conference Report Draft as of November 29, 2015.*

2 KENTUCKY FREIGHT SYSTEM

2.1 MULTIMODAL FREIGHT SYSTEM

An efficient, multimodal freight transportation network is essential to the economic well-being of Kentucky. All modes play a role when moving goods, and the choice between modes is frequently related to the location, type of commodity, price of shipment, and connections to other modes. A comparison of modes, as shown in **Figure 2-1** illustrates the cargo carrying capacity by various modes. While modes may vary in terms of capacity, energy, safety, and environmental impacts, each mode serves an important role in the freight delivery system. They must work together to create a connected and resilient freight network.

Figure 2-1: Comparison of Cargo Carrying Capacity by Mode



Source: Kentucky Transportation Cabinet, Freight Modes Book, September 2015, http://transportation.ky.gov/Planning/Documents/2015%20Modes%20Book.pdf

In 2015, KYTC was responsible for owning and maintaining nearly 28,000 miles of the Kentucky roadway system, which connects to railroads, ports, airports, and pipelines in the commonwealth. This connectivity plays an integral part in the supply chain; therefore, it is essential that KYTC invest in ongoing maintenance, operational improvements, and capacity adding projects to move freight efficiently and safely. Although KYTC does not have jurisdiction over other modes, the Cabinet acts as a partner and participant with public and private stakeholders to coordinate investment decisions.

Kentucky's multimodal freight system enables the commonwealth to capitalize on its geographically strategic location. Kentucky is located within 600 miles of over 60 percent of the nation's population, personal income, and manufacturing. Its central location facilitates the distribution of freight to over 30 states.

Highway – The commonwealth is served by 10 interstates and 10 state parkways, including more than 500 miles of the federally designated Primary Highway Freight System.

Rail – Major freight rail networks—including five Class I railroads, one Class II railroad, and 13 Class III railroads—operate across Kentucky.

Water – Kentucky is bordered on three sides by navigable rivers. The Ohio River forms the 660-mile northern border and is the longest of the three border rivers. The Mississippi River forms the western border, and the eastern side of the commonwealth is bordered by the Big Sandy River and Tug Fork. There are over 1,980 miles of U.S. Army Corps of Engineers (USACE) designated navigable waterways in Kentucky.[3]

Air – Kentucky has five commercial airports, including two major shipping hubs that are home to UPS Worldport (Louisville) and DHL Express (Covington). In 2014, the Louisville International Airport was ranked third in the U.S. for annual air freight tonnage shipments.[4] Additionally, Kentucky has 26 other general aviation airports with runway lengths greater than 5,000 feet, making them capable of handling larger cargo planes. This versatile transportation network, further highlighted in the following sections, makes Kentucky a practical location for moving freight locally, regionally, and to all points of the globe.

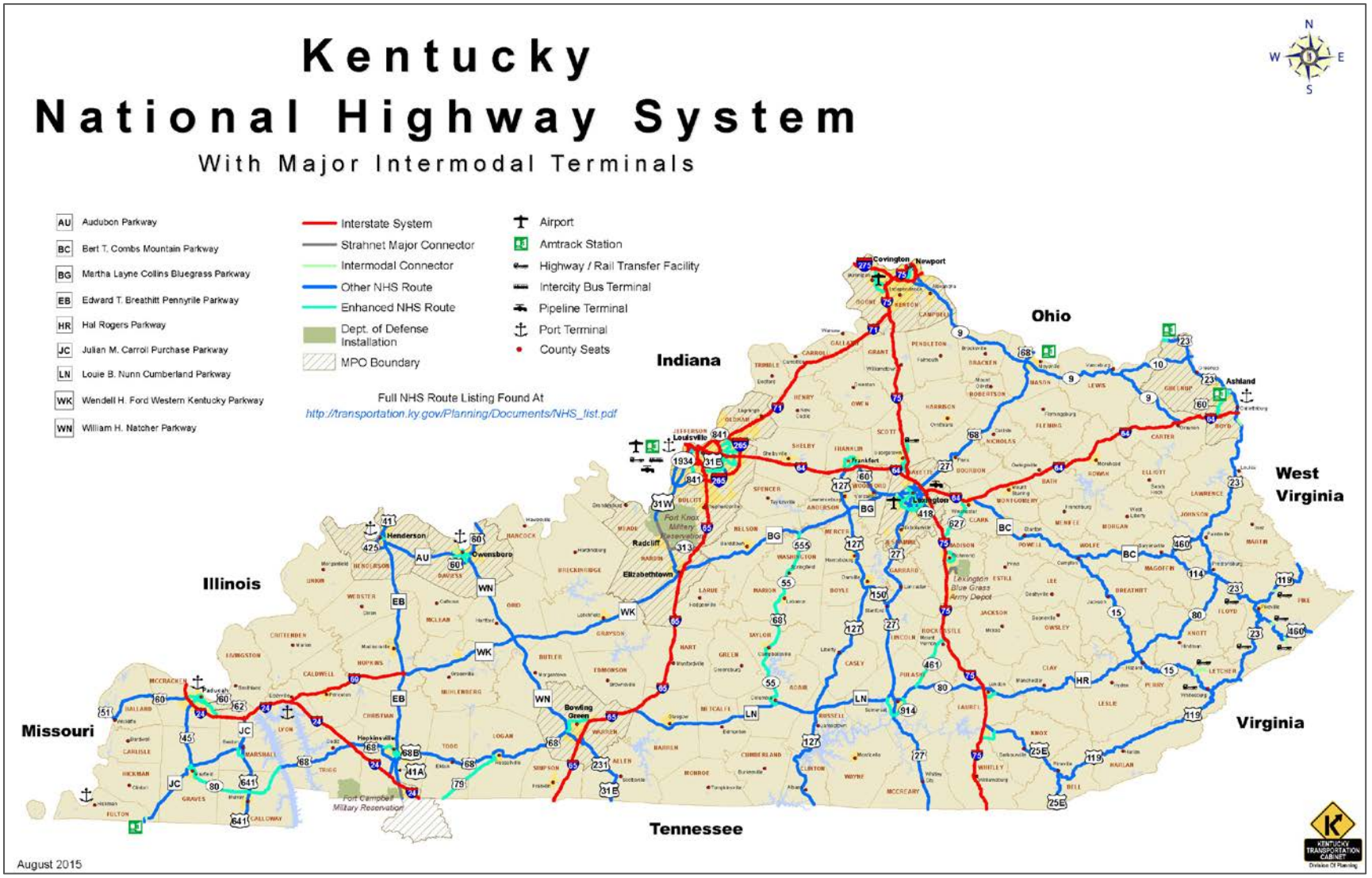
Pipeline – Kentucky's pipeline network is approximately 37,000 total miles. This network plays a critical role in moving oil, natural gas, and other commodities throughout the commonwealth.

2.2 HIGHWAYS

In 2014, Kentucky's highway system was comprised of over 79,000 centerline miles of public roads. KYTC maintains 35 percent of this system, nearly 28,000 miles. The commonwealth has 3,691 miles of federal/state truck network routes, with an average of 14 percent trucks on this network. Kentucky also has over 14,000 bridges, of which approximately 9,000 are state-maintained. According to the Freight Analysis Framework Version 3 (FAF[3]), more than 558,482,900 tons of freight were moved by truck on Kentucky's highways in 2011. **Figure 2-2** illustrates the National Highway System (NHS) in Kentucky.

[3] *Kentucky Transportation Cabinet, 2014 Long-Range Statewide Transportation Plan, 2014.*
[4] *Kentucky Cabinet for Economic Development, Kentucky Economic Development Guide, 2014.*

Figure 2-2: National Highway System



Source: 2015 Kentucky Freight Modes Book, Kentucky Transportation Cabinet

2.2.1 Highway Freight Network

In October 2013, 593 miles of Kentucky's roadways were designated to the Primary Freight Network (PFN) by the USDOT. As shown in **Figure 2-2**, Kentucky's east-west and north-south corridors are critical to the movement of freight at the national level. The factors that contributed to the designation of the PFN include the following (23 U.S.C. Sec. 167 National Freight Policy):

- The origins and destinations of freight movement in the U.S.
- The total freight tonnage and value of freight moved by highways
- The percentage of annual average daily truck traffic (AADTT) in the annual average daily traffic on principal arterials
- The annual average daily truck traffic on principal arterials
- Access to land and maritime ports of entry
- Access to energy exploration, development, installation, or production areas
- Access to population centers
- Network connectivity

KYTC developed a performance-based project selection process for the Kentucky Highway Plan. One of the key components for identifying criteria for the selection process was developing a state highway freight network that represents Kentucky's critical freight corridors. By creating this network, KYTC is able to identify and address freight system mobility issues that exist both presently and in the future. The Cabinet chose a 4-tier structure for the Kentucky Highway Freight Network. The following criteria were used to develop this network:

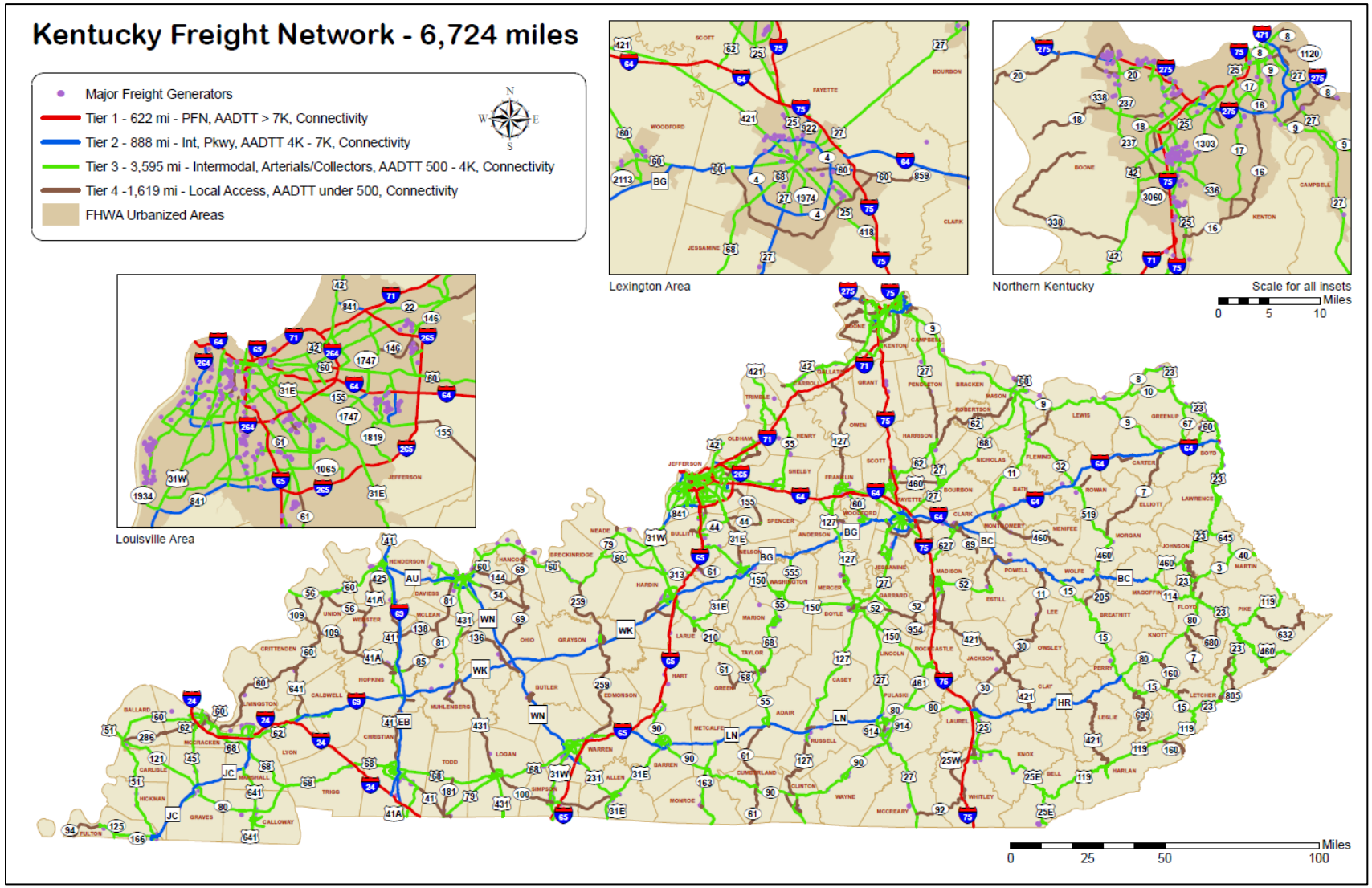
- Tier 1 – National Regional Significance
  - USDOT designated PFN
  - Any segment of road (regardless of functional class) that has 7,000 ≥ AADTT
  - Manual revisions to ensure freight network connectivity to reduce gaps
- Tier 2 – Statewide Significance
  - All remaining segments of interstate or parkway not on the PFN
  - Any segment of road (regardless of functional class) with AADTT of 4,000 to 7,000
  - Manual revisions to ensure freight network connectivity
- Tier 3 – Statewide Regional Significance
  - Intermodal connectors recognized by/filed with the FHWA
  - Arterials and collectors with AADTT of 500 to 4,000
  - Manual revisions to ensure local freight corridor connectivity
- Tier 4 – Local Access Significance
  - Access to major freight generators
  - Local access for freight (first mile, last mile)
  - Manual revisions to ensure network connectivity
  - No more than 50 miles between network access

The process began with a purely data-driven identification of the tiers. Each tier includes manual revisions necessary to ensure connectivity and limit to 50 miles between local Kentucky Highway Freight Network access points.

After the Kentucky Highway Freight Network was determined, KYTC shared the methodology and maps of the network with attendees of the Kentuckians for Better Transportation 2015 Annual Conference, all 12 highway district offices, and each of the commonwealth's MPO and ADD offices for review and comment. The network, made up of 6,724 centerline miles, is shown in **Figure 2-3** with a breakdown of mileage for each tier.

The Kentucky Highway Freight Network is updated on January 1st of each year to reflect changes to the road network.

Figure 2-3: Kentucky Highway Freight Network



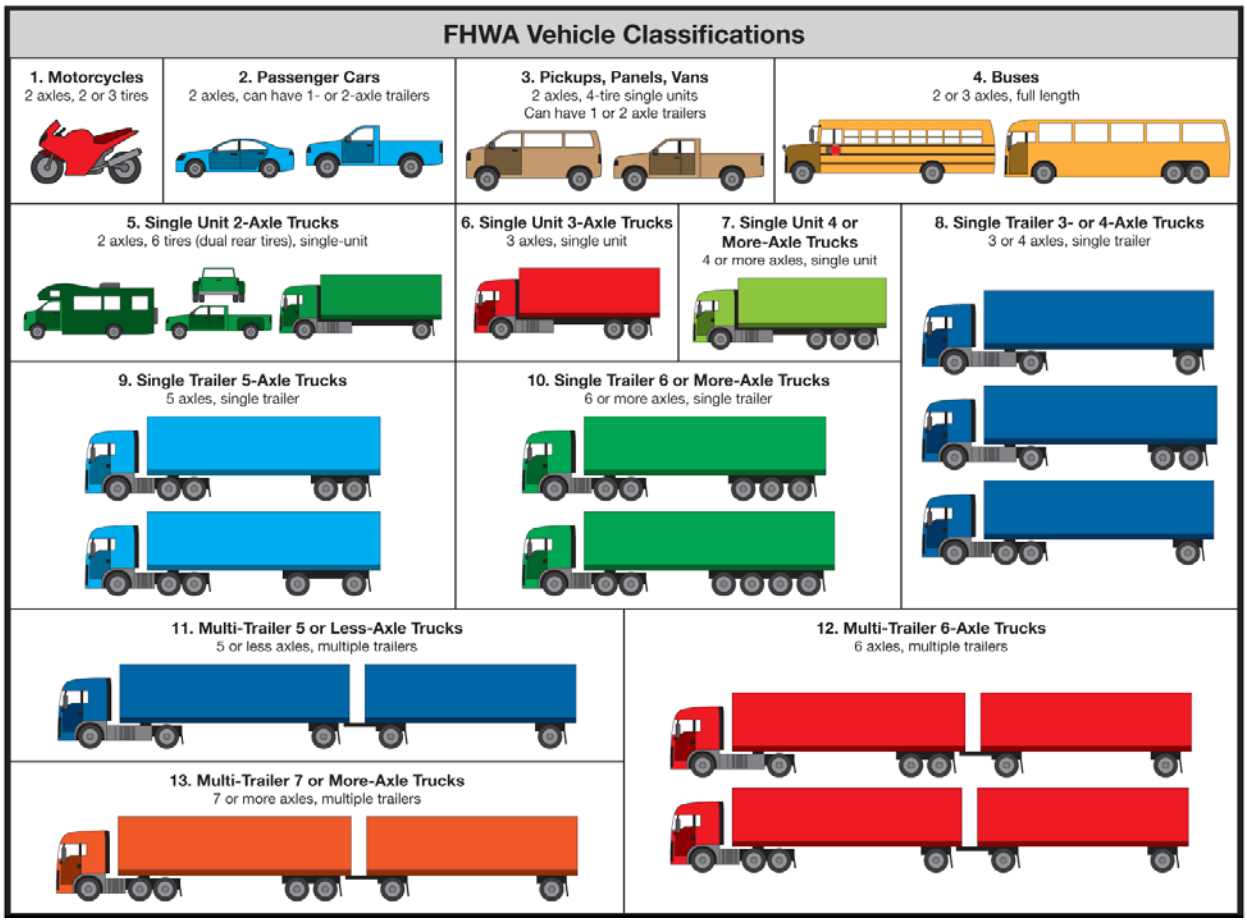
Source: Kentucky Transportation Cabinet, November 2015

2.2.2 Trucks (Commercial Vehicles)

In the purview of the KFP, trucks are regarded as commercial vehicles. Trucking is the predominant mode of freight transportation in Kentucky—trucks serve most markets, from long-distance interstate commerce to the "last mile" of intermodal goods.

The FHWA classification system recognizes nine types of trucks, as shown in **Figure 2-4**. FHWA classes 5 through 7 are medium-duty trucks, while classes 8 through 13 are heavy-duty trucks. Tractor-trailer vehicles combine a tractor with a semitrailer, trailer, or both and have four or more axles (also known as "semis" or "18-wheelers"). Medium-duty trucks typically transport freight through the region, while heavy-duty trucks are for long-hauls across a state or to national destinations.

Figure 2-4: FHWA Vehicle Classification



Source: TxDOT Traffic Recorder Instruction Manual, 2012

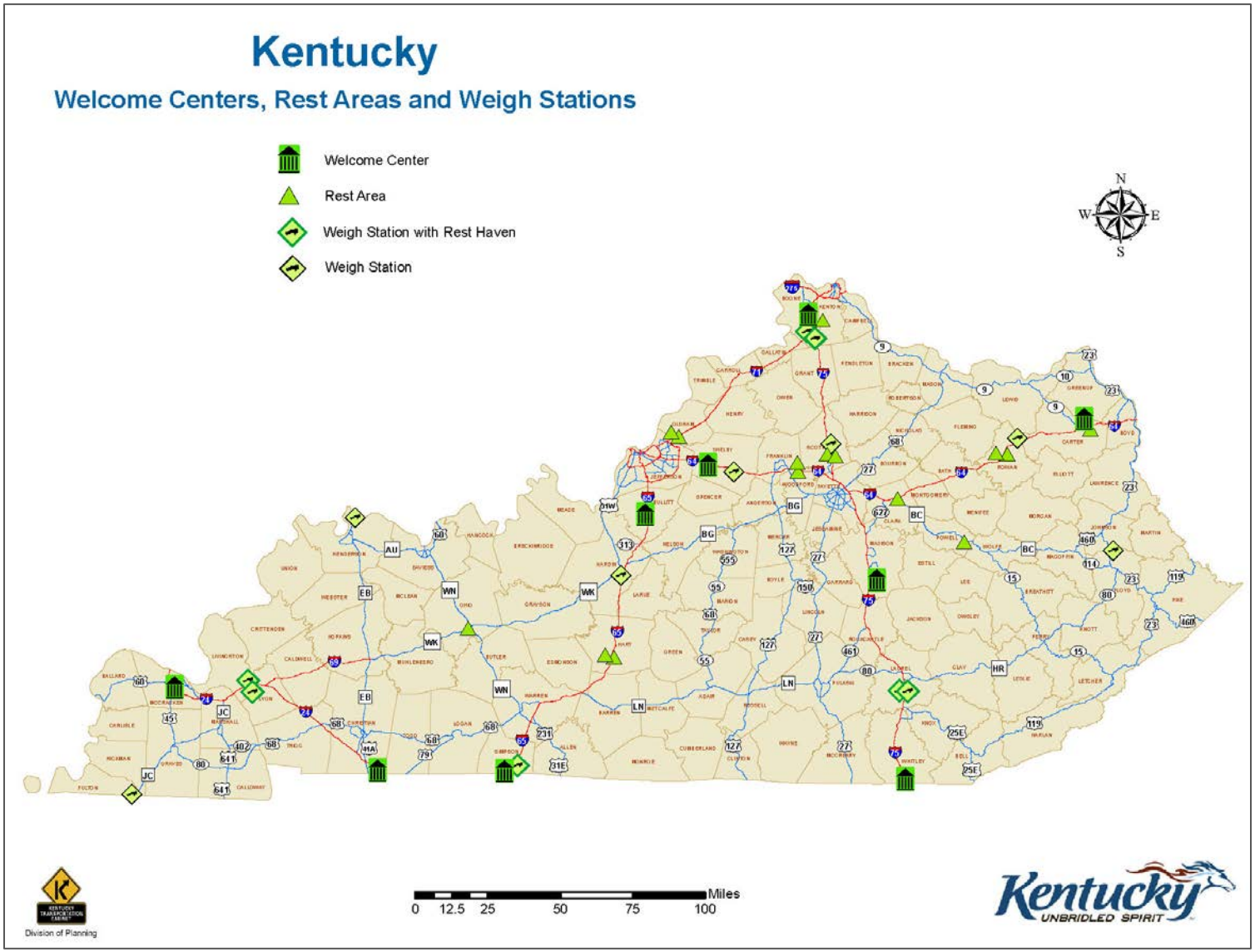
Freight movements by truck in Kentucky rely heavily on the Interstate Highway System. Because trucks perform the initial pickup and delivery for most goods and commodities moved by air, rail, and water, the connector routes between the freight transportation modes are a critical link to facilitate the smooth movement of freight. Often these connectors or "last mile" segments are under local jurisdiction.

As shown in **Figure 2-3** on page 2-6, I-64 and I-24 provide much of the east-west movement for trucks, while I-69, I-75, I-65, and I-71 facilitate north-south truck freight movements. Along these six main interstate highways are 14 static weigh station facilities (see **Figure 2-5**) with six located in pairs at three locations on either side of the highway median. Seven of the weigh stations also have rest havens, which are parking spaces for trucks. These state-controlled sites are needed to ensure compliance with federal and state regulations and laws. Recent technology—including weigh-in-motion (WIM) devices, the Pre-Pass system, enhanced sign lighting, and advanced traveler information—have enhanced the safety and efficiency of freight travel in Kentucky.

Also, along Kentucky's highways are 15 public rest areas with truck parking. Current hours of service (HOS) federal regulations require a truck driver to take 10 consecutive hours off duty after driving a maximum of 11 hours. Therefore, drivers need to find parking facilities that will accommodate long-term rest during a multi-day trip. Since most rest areas along the Interstate Highway System do not accommodate a full 10 hours of undisturbed rest, and drivers may not want to lose time deviating from their route, some truckers illegally park along the side of roads, on rest-area ramps, and in weigh station rest havens that restrict parking to less than 10 hours.[5]

[5] *Federal Highway Administration, Commercial Motor Vehicle Parking Shortage Report, May 2012.*

Figure 2-5: Welcome Centers, Rest Areas, and Weigh Stations



Source: Kentucky Transportation Cabinet, 2015

2.2.3 TIGER Grant for Truck Parking

In 2015, Kentucky and seven other states were awarded a $25 million Federal Transportation Investment Generating Economic Recovery (TIGER) grant by the USDOT for the Regional Truck Parking Information and Management System (TPIMS). The 8-state project will help truckers find up-to-date information on available parking. The TPIMS involves providing existing technology to distribute truck parking capacity and current occupancy information to commercial drivers via smartphone apps, dynamic road signage, websites, and parking facilities. The project will also decrease the number of truckers parking unsafely along shoulders and ramps of interstate highways and help reduce overcrowding at rest areas. The Kansas Department of Transportation is the lead in this multi-state project, working with the seven other states: Indiana, Iowa, Kentucky, Michigan, Minnesota, Ohio, and Wisconsin. Feedback from industry stakeholders will be critical when deploying the TPIMS.

2.3 Inland Waterway Network

Kentucky lies in the heart of the nation at the hub of the nation's inland waterways, as shown in **Figure 2-6**. With the Ohio River, Mississippi River, Big Sandy River, and Tug Fork bordering the commonwealth, this location offers unique advantages for efficient year-round freight transport of bulk materials, agricultural products, chemicals, minerals, metals, wood, manufactured goods, and containerized freight. Kentucky's well-developed terminals and riverports—supported by enterprise zones, warehouse facilities, ports of entry, and foreign trade zones—link with an intermodal transportation system that forms a network with the world. Containing over 1,980 miles of USACE navigable inland waterways **(Table 2-2)**, Kentucky is the linchpin between the Great Lakes, Canada, and Mexico, as well as the deep-draft ports of New Orleans, La. and Mobile, Ala. for shipments overseas.[6]

The Ohio River accounts for over 30 percent of these miles on Kentucky's navigable waterways. Five of the waterways have one or more locks and dams. The USACE owns and/or operates the locks and dams on the Ohio River, Green River, Cumberland River, and Tennessee River. The locks and dams on the Kentucky River are owned and operated by the Kentucky River Authority. The majority of the locks and dams are over 50 years old, and the seven built in the 1930s and 1940s are in need of major rehabilitation or replacement. The Locks and Dams 52 and 53 Replacement Project, known as the Olmsted Locks and Dam, is currently underway to replace two locks and dams on the Ohio River by 2020. These were put into operation in 1928 and 1929, respectively.

The Licking River, which connects to the Ohio River, is a navigable waterway that supports the Ports of Cincinnati and Northern Kentucky. The most northern 7 miles of the Licking River can accommodate moving heavy cargo and barge storage. This segment has no locks or dams and can support commercial development.

[6] *Kentucky Transportation Cabinet. Kentucky Riverport Improvement Project. January 22, 2008.*

Figure 2-6: Inland River System

Source: Kentucky Riverport Improvement Project, 2008

2.3.1 Riverports

Kentucky has 12 public riverports, eight of which are operating ports, and four of which are developing ports. According to the 2008 Kentucky Riverport Improvement Project, each public riverport has unique characteristics, needs, and visions. The ports largely do not compete with one another and each has the ability to stimulate economic development in the surrounding region. Some of the most common commodities handled by the public riverports in Kentucky are coal, fertilizer, grain, sand, aluminum, and steel.[7]

[7] *Kentucky Transportation Cabinet. Kentucky Riverport Improvement Project. January 22, 2008.*

In addition, there are over 100 private riverport terminals in Kentucky. According to the Kentucky Riverport Improvement Project, the commonwealth's private terminals that handle specific commodities such as coal or grain or exclusively serve only one company's barging needs ship over 100 million tons each year, as compared to about 4 million tons handled by the public ports. Coal and non-metallic minerals (sand and gravel, etc.) make up as much as 80 percent of the shipments by the private terminals.[8]

Kentucky's riverports play an important role in facilitating access to the commonwealth's freight transportation system. For example, rail is a vital part of riverport operations for transferring large bulk commodities from one mode to another. The 2014 USACE Port Facility Spreadsheet lists 83 rail-accessed riverport terminals in Kentucky.[9]

Table 2-1 and **Figure 2-7** provide status and locations of Kentucky's public riverports. For a more detailed account of the commonwealth's public riverports, see the Kentucky Riverport Improvement Project at http://transportation.ky.gov/Riverports/Pages/Riverport-Studies.aspx.

Table 2-1: Kentucky Public Riverports

No.	Riverport Name	KYTC District	Riverport Status
1	Hickman-Fulton County Riverport	1	Active
2	Wickliffe-Ballard County Riverport	1	Developing
3	Paducah-McCracken County Riverport	1	Active
4	Marshall County-Calvert City Riverport	1	Developing
5	Eddyville Riverport and Industrial Development	1	Active
6	Henderson County Riverport	2	Active
7	Owensboro Riverport	2	Active
8	Meade County Riverport	4	Active
9	Louisville-Jefferson County Riverport	5	Active
10	Northern Kentucky Riverport[10]	6	Developing
11	Maysville-Mason County Riverport	9	Developing
12	Greenup-Boyd County Riverport	9	Active

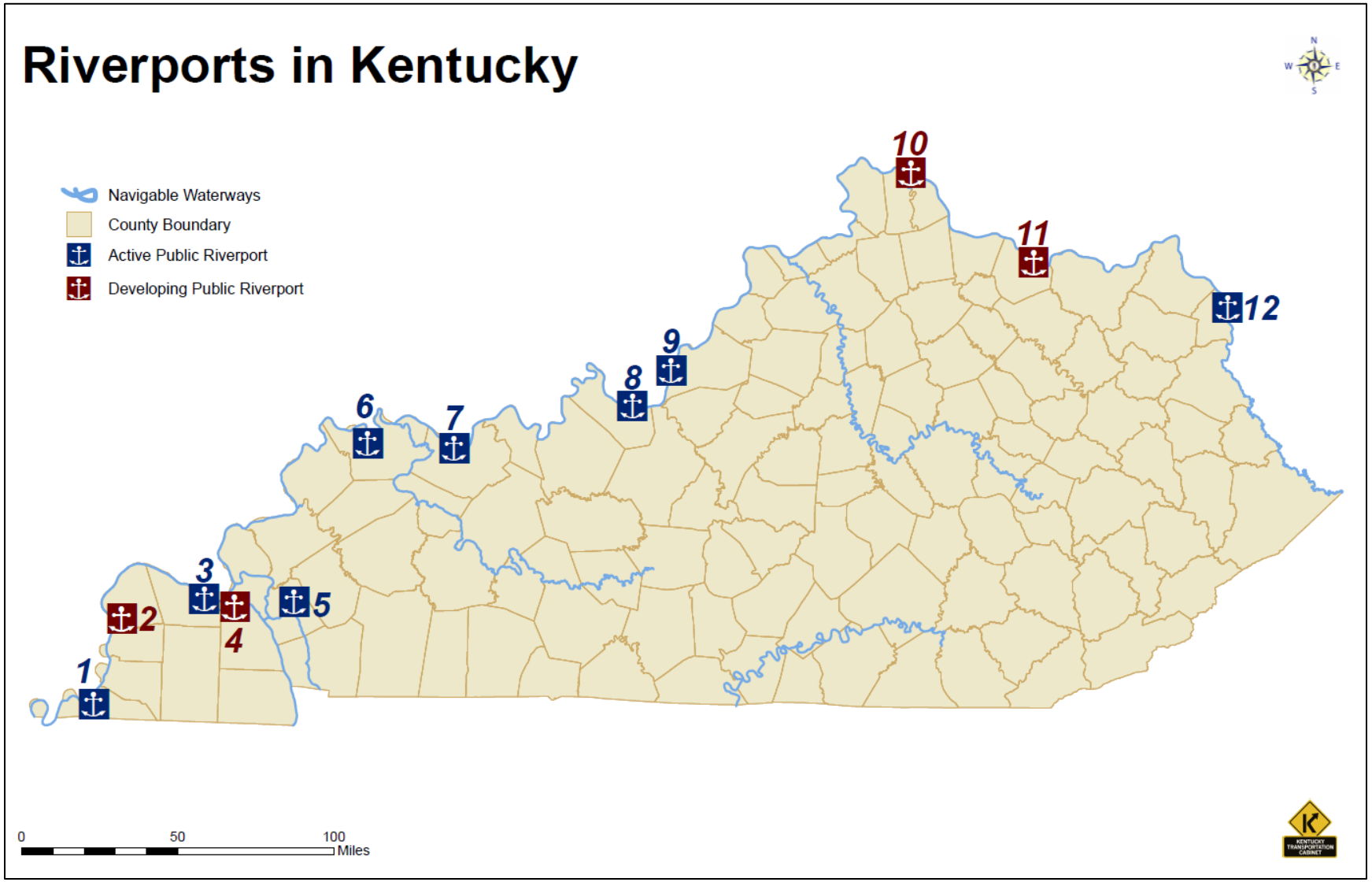
Source: Kentucky Transportation Cabinet, 2015

[8] *Kentucky Transportation Cabinet. Kentucky Riverport Improvement Project. January 22, 2008.*

[9] *Kentucky Transportation Cabinet. 2015 Kentucky Statewide Rail Plan.*

[10] *In a 2012 joint request to the USACE, the Port of Greater Cincinnati Development Authority and the Northern Kentucky Riverport Authority proposed combining the two ports under a single, expanded port boundary. USACE granted the request, thereby redesignating the then 26-mile Port of Greater Cincinnati boundary to a 226.5-mile boundary that includes the Northern Kentucky Riverport, 7 miles of the Licking River, and stretches from Louisville to Huntington. Though the Licking River is used for moving cargo and storing barges, there are no active land-side facilities or properties held by the Northern Kentucky Riverport. Thus, the status remains "developing."*

Figure 2-7: Kentucky Public Riverports



Source: Kentucky Transportation Cabinet, 2015

2.3.2 Inland Waterway Governance

The riverports and inland waterway network in Kentucky are overseen in varying capacities by the USACE, U.S. Coast Guard (USCG), Maritime Administration (MARAD), various port authorities, Kentucky River Authority, and WTAB. A brief description of each entity's role is described below.

2.3.2.1 U.S. Army Corps of Engineers

There are two divisions and four districts of the USACE with operations in Kentucky. The Louisville, Huntington, and Nashville districts, under the Great Lakes & Ohio River Division, and the Memphis District, under the Mississippi Valley Division, own and operate the locks and dams on rivers in Kentucky, and they operate and maintain the commercial inland navigation channels, which includes dredging. Kentucky has over 1,980 miles of USACE designated navigable waterways and the highest total of inland USACE designated navigable waterways for any state in the continental U.S.[11]

The Water Resources Reform and Development Act of 2014 (WRRDA) was signed into law on June 10, 2014. WRRDA is the primary legislation by which Congress authorizes the USACE key civil works missions, including navigation, flood risk management, and environmental restoration. The authorities provided in WRRDA help USACE continue to provide value to the nation in developing and maintaining the nation's waterways and harbors, reducing damages from storm events, and restoring the environment.

2.3.2.2 U.S. Coast Guard

Kentucky is located within the USCG's Eighth Coast Guard District, which covers all or part of 26 states from the Appalachian Mountains and Chattahoochee River in the east, to the Rocky Mountains in the west, and from the U.S.-Mexico border and the Gulf of Mexico to the Canadian border in North Dakota. The Eighth District is responsible for protecting Kentucky's inland navigable waterways to enable safe, secure, and efficient movement of goods.

2.3.2.3 Maritime Administration/Marine Highways

MARAD is the agency within the USDOT focused on waterborne transportation. MARAD's programs promote the use of waterborne transportation and its seamless integration with other segments of the transportation system, as well as the viability of the U.S. merchant marine. MARAD works in many areas involving ships and shipping, shipbuilding, port operations, vessel operations, national security, environment, and safety. The MARAD Inland Waterways Gateway Office in St. Louis is responsible for Kentucky programs.

In 2007, MARAD established the America's Marine Highway Program to reduce landside congestion through the designation of Marine Highway Routes. The Coast Guard and Maritime Transportation Act of 2012 expanded the scope of the program to efforts that generate public benefits by increasing the utilization or efficiency of domestic freight or passenger transportation on Marine Highway Routes between U.S. ports. The three designated Marine Highway Routes that directly serve Kentucky are the following:

- M-55, which includes the Mississippi River corridor along Kentucky's western border

[11] *Kentuckians for Better Transportation. http://www.kbtnet.org/about/waterways. Accessed on February 23, 2016.*

- M-65, which includes the Tennessee River from Paducah to the Tennessee-Tombigbee Waterway
- M-70, which includes the Ohio River corridor forming the commonwealth's northern border, from Ashland to Wickliffe

Designating routes in the Marine Highway System identifies an opportunity to alleviate freight-related congestion on existing parallel land routes, which leads to reduced emissions, energy conservation, increased system resiliency, improved safety, and reduced road maintenance costs.

2.3.2.4 Riverports and Port Authorities

Kentucky Revised Statute (KRS) 65.520 outlines the laws that regulate establishment, powers (further specified in KRS 65.530), and KYTC's oversight of public riverports in Kentucky. According to law, any governmental unit in Kentucky may establish a riverport authority with the KYTC Secretary's approval. Riverport authorities provide oversight on riverport development activities, as well as conduct normal riverport business.

Public riverports are managed by a riverport authority, usually as part of a city or county government, or a joint city-county government partnership. Public riverport authorities are managed by a board of officials, which appoints a riverport director or president. As stated in KRS 65.540, if the authority is established by a city, members of the board are appointed by the mayor of the city. If the authority is established by a county, members of the board are appointed by the county judge/executive with the approval of the fiscal court.

2.3.2.5 Kentucky River Authority

The Kentucky River Authority is an agency that is administratively attached to the Kentucky Finance and Administration Cabinet. Its primary purpose is to operate and maintain the locks and dams on the Kentucky River. These locks and dams were originally built by the USACE.

2.3.2.6 Water Transportation Advisory Board

The WTAB was established by the Kentucky General Assembly in 2010, and it is an advisory board to the executive and legislative branches of government on matters concerning water transportation. This board is composed of seven members who are appointed by the Governor, and they serve terms of 4 years. The WTAB's duties are the following:

1. Advising KYTC, the Cabinet for Economic Development, the Governor's Office, and the General Assembly on matters relating to water transportation
2. Recommending action to enable the Commonwealth to make best use of its waterways and riverports for future economic growth
3. Assisting in defining the duties and functions of positions within state government responsible for water transportation
4. Recommending criteria for setting priorities for funding riverport marketing initiatives under the riverport marketing assistance trust fund established in KRS 154.80-140

5. Evaluating applications submitted by riverports for grants under the riverport marketing assistance trust fund and making recommendations to the granting authority on the disbursement of those funds

6. Recommending criteria for setting priorities for funding riverport improvements under the riverport financial assistance trust fund established in KRS 174.210

7. Evaluating applications submitted by riverports for grants under the riverport financial assistance trust fund and making recommendations to the granting authority on the disbursement of those funds

Table 2-2: Navigable Waterways

River	Length (Miles)	Authority	Description
Ohio	665	Jurisdictional List	Near MP 317 Catlettsburg to 982 between Wickliffe and Cairo
Green	199	Jurisdictional List	MP 108 is at Dam #3 at Rochester on Muhlenberg/Butler/Ohio county line (199 miles is from Mouth to Davis Island)
Tennessee	62	Nav Charts	MP at southern boundary of Calloway County
Cumberland	255		Nav Charts only have from MP 0 at Ohio River to 75 at TN line, not MP 381 to 561 (180 mi) from TN into KY and to eastern extent of Lake Cumberland, Nashville USACE jurisdiction list includes to confluence of Poor Fork and Clover Fork at Harlan, KY. Bureau of Transportation Statistics Waterway File (attributed to the Corps) extends to eastern extent of Lake Cumberland at MP 561 for a total of 255 miles.
Mississippi	63	Nav Charts	905 to 954 and 883 to 897, not 8 miles of loop in TN
Licking	226	Jurisdictional List	MP 7 is approximately east of Fairview and Taylor Mill (226 miles is from mouth to West Liberty)
Big Sandy	27	Jurisdictional List	MP 12 is near the Lawrence County line, near Runyon Rd (27 miles is from Catlettsburg to Louisa, confluence of Tug Fork and Levisa Fork)
Big Sandy - Russell Fork	17	Jurisdictional List	from Millard, KY to the Virginia State Line near Potters Flats, WV
Big Sandy - Tug Fork	58	Jurisdictional List	from Louisa, KY to Williamson, WV
Big Sandy - Levisa Fork	130	Jurisdictional List	from Louisa, KY to Virginia State Line near Toonerville, KY
Kentucky	255	Jurisdictional List	MP 82 is Frankfort dam, no Corps navigation map for KY River (255 miles is from Outh to junction of North and South Forks, Kentucky River)
Salt River	26	Jurisdictional List	From mouth to approximately Floyds Fork
Total	**1983**		

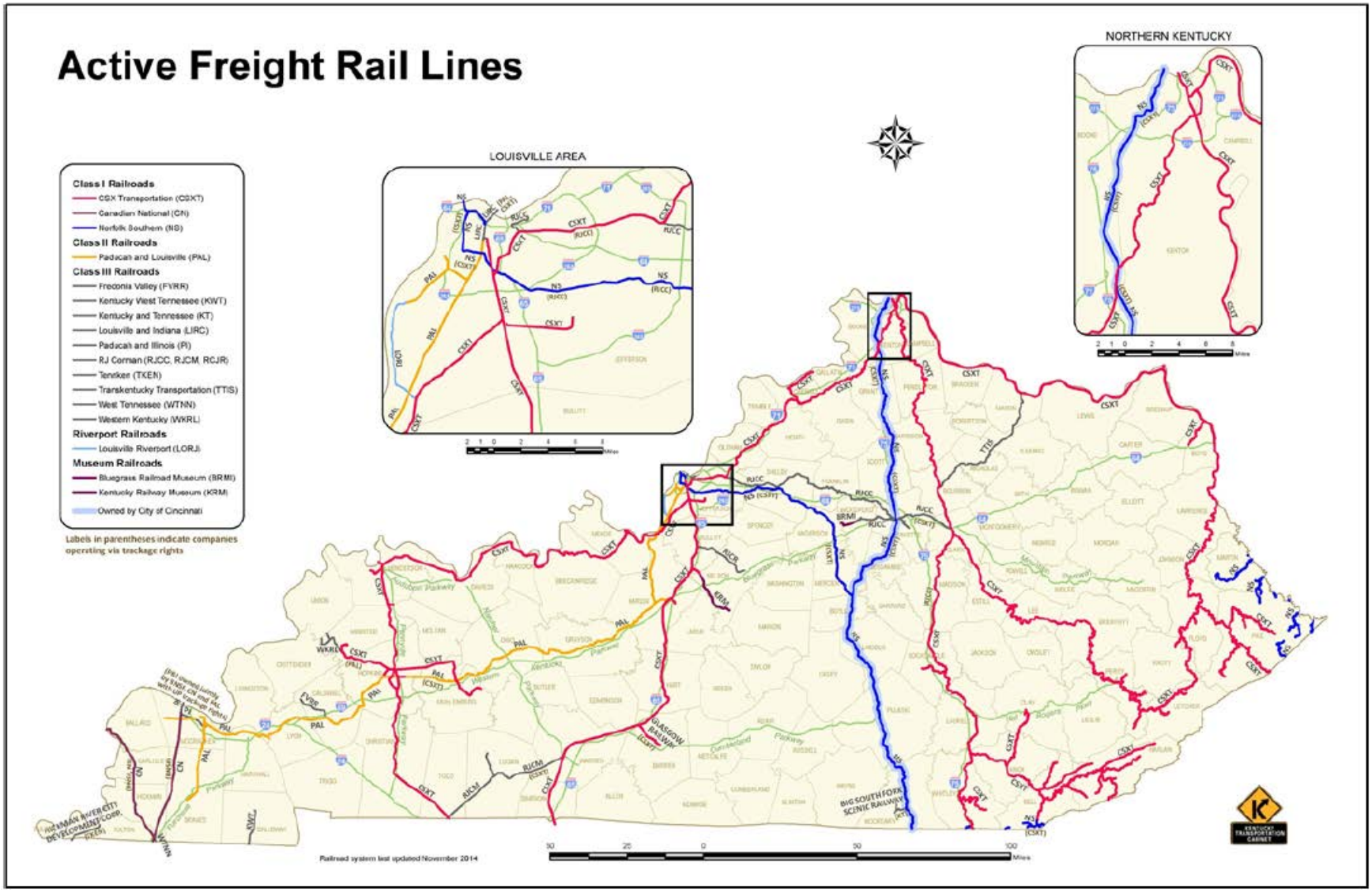
2.4 Rail Network

Kentucky plays an important role in the U.S. rail network. According to the Association of American Railroads (AAR), in 2012 Kentucky ranked seventh among all states for originated tonnage, 12th for originated carloads/units, 11th for total tons carried, and third largest source of coal shipped by rail.

Freight railroads operating within Kentucky through ownership or trackage rights consist of five Class I railroads, one Class II railroad, and 13 Class III railroads (**Figure 2-8**). The Surface Transportation Board (STB) defines a class of railroad based on revenue thresholds adjusted for inflation. For the 2013 year of classification, a Class I railroad is defined as a common carrier having operating revenues of $467 million or more. A Class II railroad, also referred to as a regional railroad, is a common carrier having operating revenues between $37.4 million and $467 million. A common carrier is a person or company that transports goods or passengers on regular routes at set rates. A Class III railroad, also known as a short line railroad, is a carrier with yearly operating revenues under $37.4 million.[12]

[12] *Federal Railroad Administration, Summary of Class II and Class III Railroad Capital Needs and Funding Sources – A Report to Congress, October 2014, Page 2.*

Figure 2-8: Active Freight Rail Lines



Source: 2015 Kentucky Statewide Rail Plan

As seen in **Table 2-2** Kentucky's railroad system includes approximately 3,200 route miles, as of year-end 2014. The five Class I railroads represent approximately 2,300 miles, or about 73 percent of the statewide rail system. These railroads are Burlington Northern Santa Fe (BNSF), Canadian National (CN), CSX Transportation (CSXT), Norfolk Southern (NS), and Union Pacific (UP).

In Kentucky, CSXT is the largest railroad company in terms of mainline route mileage, accounting for 1,685 miles, or 53 percent of the total route miles. The second largest railroad by mileage is NS, operating on 429 route miles, or 13 percent of the statewide rail system. The third largest railroad company by mainline route mileage is the Paducah and Louisville Railway, Inc. (PAL), and this is Kentucky's only Class II (regional) railroad. PAL operates 280 miles of mainline railroad, approximately 9 percent of the statewide rail system.

Table 2-3: Freight Railroad Route Miles Operated in Kentucky (Single Owner)

2013 Mainline Railroad Mileage Reported Owned, Leased or Under Trackage Rights	RR Company Class	Mileage					
		Owned by Self	Owned by Proprietary	Leased	Trackage	Total	% of Total
Burlington Northern Santa Fe	I	13*	0	0	86*	99	3.10%
Canadian National (Illinois Central) (Grand Trunk Corp.)	I	86	12*	0	0	98	3.07%
CSX Transportation	I	1,564	64*	11*	46*	1,685	52.80%
Norfolk Southern	I	154	0	212	63*	429	13.44%
Union Pacific	I	0	0	0	12*	12	0.38%
Paducah & Louisville	II	265	0	0	15*	280	8.77%
Carrollton Railroad	III	15*	0	0	0	15	0.47%
Fredonia Valley Railroad	III	10	0	0	0	10	0.31%
Kentucky and Tennessee Railway	III	0	0	0	8*	8	0.25%
KWT Railway (Ky. West Tn.)	III	12	0	0	0	12	0.38%
Louisville & Indiana Railroad	III	4	0	0	0	4	0.13%
Paducah & Illinois	III	15*	0	0	0	15	0.47%
RJ Corman - Bardstown Line	III	20	0	0	0	20	0.63%
RJ Corman - Central Line	III	114	0	0	0	114	3.57%
RJ Corman - Memphis Line	III	63	0	0	0	63	1.97%
TennKen	III	12	0	0	0	12	0.38%
Transkentucky Transportation	III	50*	0	0	0	50	1.57%
West Tennessee Railroad	III	1	0	0	0	1	0.03%
Western KY Railway	III	16	0	0	0	16	0.50%
Amtrak	Passenger	0	0	0	207*	207	6.49%
Big South Fork Scenic Railroad	Rec.	12	0	0	0	12	0.38%
Bluegrass Railroad Museum	Rec.	6	0	0	0	6	0.19%
Kentucky Railroad Museum	Rec.	23	0	0	0	23	0.72%
Total		**2,455**	**76**	**223**	**437**	**3,191**	**100%**

Source: 2015 Kentucky Statewide Rail Plan

*Notes: *Denotes mileage that may be reported by multiple owners or operators of track.*

Table 2-2 shows only route miles owned, leased, or with trackage rights by railroad companies, as reported to KYTC on the annual reports from all freight railroads. The individual totals may not

accurately represent actual mileage. Multiple railroads own, lease, or have trackage rights on some other sections of track. Some of these railroads operate on trackage rights or through subsidiary railroads.

The Commonwealth of Kentucky does not own or operate any rail assets. When KYTC is considering a location for a new or reconstructed roadway that intersects or lies adjacent to a rail facility, the Cabinet must coordinate its efforts with the railroad company.

Kentucky's rail network is located near intermodal facilities that transfer goods from rail to other freight modes. For example, there are four intermodal facilities in the commonwealth that can transfer containers and/or trailers of cargo from rail to truck. NS operates three facilities, two in Louisville and one in Georgetown, and CSXT opened a facility in Louisville in 2012.[13]

For a more detail information on Kentucky's rail network, see the 2015 Kentucky Statewide Rail Plan at http://transportation.ky.gov/Railroads/Pages/Rail-Plan.aspx.

2.4.1 Rail Governance

The Class 1, II, and III railroads are privately owned. The railroad operations, such as service locations, shipping rates, and schedules, are all controlled by the railroad companies themselves and are regulated by the Federal Railroad Administration (FRA) and STB. Below are brief descriptions for the FRA and STB.

2.4.1.1 Federal Railroad Administration

The FRA is a federal agency within the USDOT that is responsible for ensuring the safety of the U.S. passenger and freight rail operations and infrastructure by promoting safe, efficient, and accessible rail transportation. To carry out this responsibility, FRA promulgates and enforces rail safety regulations, consolidates government support of rail transportation activities, administers financial assistance programs, and conducts research and development in support of improved railroad safety and efficiency and national transportation policy.[14]

2.4.1.2 Surface Transportation Board

The STB is an independent adjudicatory body organizationally housed within the USDOT, and it makes independent rulings regarding certain surface transportation economic regulatory matters. The STB's jurisdiction includes railroad rates and service issues, rail restructuring transactions, labor matters, data collection, abandonments, and operational oversight.[15]

2.5 PIPELINES

Approximately 37,000 miles of pipelines move natural gas, crude oil, refined petroleum products, and highly volatile liquids, flammable liquids, and toxic liquids throughout Kentucky. **Figure 2-9** illustrates the locations of pipelines in Kentucky and **Table 2-3** lists the pipeline mileage by commodity in 2013. Ninety-seven percent of these pipelines transported natural gas, and the miles of natural gas transmission pipelines are among the highest of any state in the Southeast. The remaining pipelines

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[13] *Kentucky Transportation Cabinet, 2015 Kentucky Statewide Rail Plan, 2015.*

[14] *Federal Railroad Administration, https://www.fra.dot.gov/Page/P0002, Accessed on February 11, 2016.*

[15] *Surface Transportation Board, http://www.stb.dot.gov/stb/about/overview.html, Accessed on February 11, 2016.*

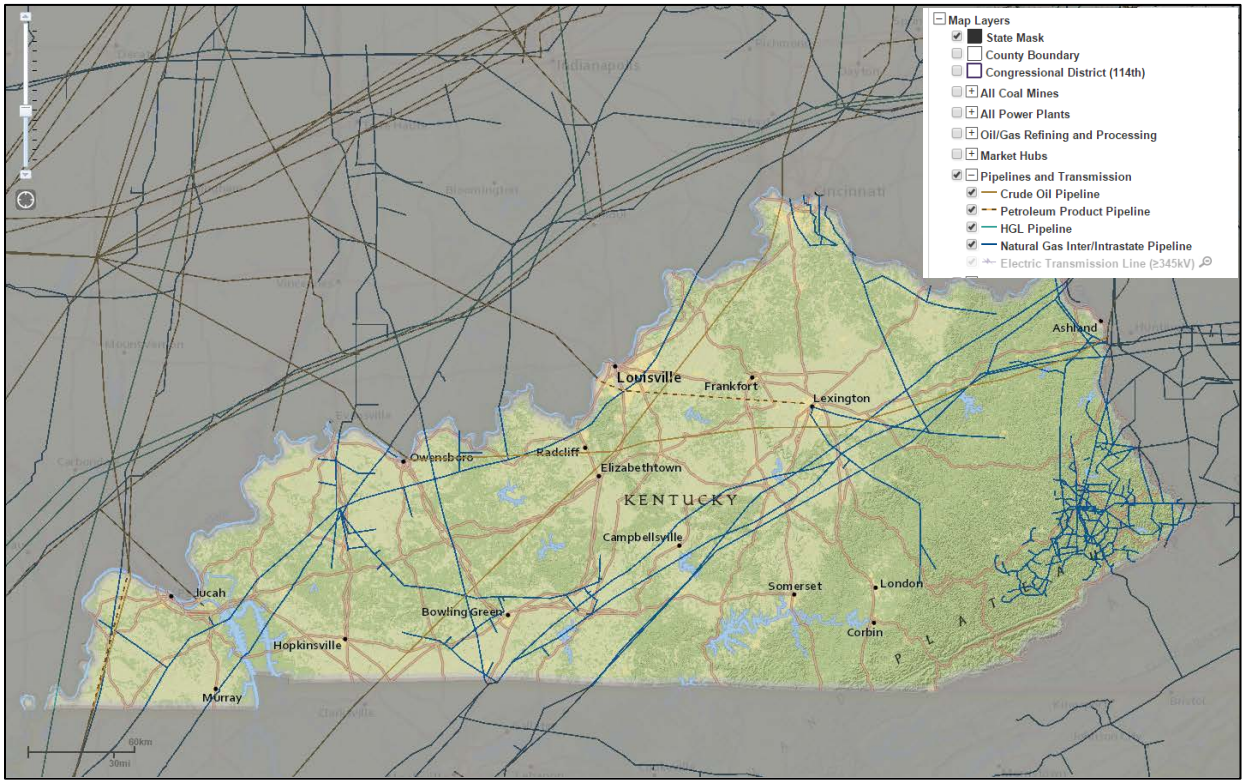
transported hazardous liquids, which are crude oil, refined petroleum products, and highly volatile liquids, flammable liquids, and toxic liquids.

Table 2-4: Kentucky Pipeline Mileage by Commodity, 2013

Commodity	Pipeline Miles
Natural Gas	Transmission: 6,839 miles Gathering: 398 miles Distribution – Mains: 18,176 miles Distribution – Service: 10,679 miles 36,092
Crude Oil	550
Refined Petroleum Products*	92
Highly Volatile Liquids, Flammable Liquids, and Toxic Liquids	274
Total Pipeline Miles	**37,008**

Source: http://www.phmsa.dot.gov/pipeline/library/datastatistics/pipelinemileagefacilities, Accessed on May 28, 2015
*Notes: *Refined petroleum products are obtained by distilling and processing crude oil that are liquid at ambient conditions.*

Figure 2-9: Locations of Pipeline in Kentucky



Source: U.S. Energy Information Administration, State Profile and Energy Estimates, Retrieved November 11, 2015

The pipeline operators—of natural gas transmission, crude oil, refined petroleum products, and highly volatile liquids, flammable liquids, and toxic liquids—in Kentucky for 2013 are shown in **Table 2-4**. Columbia Gas Transmission, LLC; Columbia Gulf, LLC; Tennessee Gas Pipeline Co. (TGP); Texas Eastern Transmission LP (Spectra Energy Corp); and Texas Gas Transmission, LLC accounted for 74 percent of the operators for natural gas pipelines. Marathon Pipe Line, LLC and Mid-Valley Pipeline Co. accounted for nearly 100 percent of the operators for crude oil pipelines. BP Pipeline (North America),

Inc. and Marathon Pipe Line, LLC accounted for 96 percent of the operators for refined petroleum products pipelines. Markwest Ranger Pipeline Company, LLC accounted for 86 percent of the operators for highly volatile liquids, flammable liquids, and toxic liquids pipelines.

Table 2-5: Kentucky Pipeline Mileage for Natural Gas Transmission, Crude Oil, Refined Petroleum Products, and Highly Volatile Liquids, Flammable Liquids, and Toxic Liquids by Operator, 2013

Commodity	Operator Name	Total Miles	% of Total
Natural Gas Transmission	ANR Pipeline Co.	278.1	3.59%
	Apache Gas Transmission	18.0	0.23%
	Atmos Energy Corporation - Atmos Gathering Company, LLC	3.4	0.04%
	Atmos Energy Corporation - Atmos Pipeline And Storage, LLC	40.2	0.52%
	Atmos Energy Corporation - KY/Mid-States (Kentucky)	207.0	2.67%
	Big Sandy Pipeline, LLC	67.2	0.87%
	Breitburn Operating LP	8.0	0.10%
	Century Aluminum	13.0	0.17%
	Chesapeake Appalachia, LLC	1.9	0.02%
	Columbia Gas Of Kentucky, Inc.	57.9	0.75%
	Columbia Gas Transmission, LLC	583.0	7.52%
	Columbia Gulf Transmission, LLC	716.0	9.23%
	Continuum Midstream, LLC	0.6	0.01%
	Delta Natural Gas Co., Inc.	146.0	1.88%
	Duke Energy Kentucky	53.1	0.68%
	East Kentucky Power Corporation	6.7	0.09%
	Elizabethtown Natural Gas	2.2	0.03%
	EQT Midstream	30.2	0.39%
	Indiana Gas Co., Inc.	27.7	0.36%
	Jefferson Gas, LLC	44.0	0.57%
	K O Transmission Co.	51.5	0.66%
	K. Petroleum, Inc.	0.1	0.00%
	Kentucky Utilities Co.	11.0	0.14%
	Louisville Gas & Electric Co.	371.9	4.80%
	Magnum Hunter Production, Inc.	1.0	0.01%
	Midwestern Gas Transmission Co.	94.4	1.22%
	Monument Chemical Kentucky, LLC	58.0	0.75%
	Natural Gas Of Kentucky, Inc.	24.0	0.31%
	Orbit Gas Transmission, Inc.	7.3	0.09%
	Paducah Power System	16.0	0.21%
	Riverside Generating Co., LLC	9.2	0.12%
	Somerset Gas Service	53.8	0.69%
	Tennessee Gas Pipeline Co.	1,613.8	20.81%
	Texas Eastern Transmission LP (Spectra Energy Corp)	692.3	8.93%
	Texas Gas Transmission, LLC	1,423.7	18.36%
	Trunkline Gas Co.	103.2	1.33%
	Vinland Energy Operations	0.1	0.00%
	Westlake PVC Corporation	3.2	0.04%

Commodity	Operator Name	Total Miles	% of Total
Crude Oil	Countrymark Refining And Logistics, LLC	0.5	0.01%
	Marathon Pipe Line, LLC	320.5	4.13%
	Mid - Valley Pipeline Co.	229.0	2.95%
Refined Petroleum Products	BP Oil Pipeline Co.	1.0	0.01%
	BP Pipeline (North America), Inc.	97.0	1.25%
	Enterprise Products Operating, LLC	9.4	0.12%
	Marathon Pipe Line, LLC	166.8	2.15%
HVL Flam Toxic	Duke Energy Kentucky - Liquid	2.9	0.04%
	Enterprise Products Operating, LLC	9.9	0.13%
	Marathon Pipe Line, LLC	0.2	0.00%
	Markwest Ranger Pipeline Company, LLC	78.7	1.01%
	Total Pipeline Mileage	**7,754.6**	**100%**

Source: http://www.phmsa.dot.gov/pipeline/library/datastatistics/pipelinemileagefacilities, Accessed on May 28, 2015

The U.S. Energy Information Administration (EIA) maintains a database that provides information on the size and location of natural gas pipeline projects announced or under construction. In April 2015, one future expansion project, called the Broad Run Expansion Project, was announced in Kentucky, to be operated by TGP.[16] The anticipated in-service date is November 2017.[17]

Kentucky's pipeline network connects to roadways at truck/pipeline terminals where commodities are transferred from pipelines to trucks for further transport on the Kentucky Freight Network. FHWA classifies public roads leading to major intermodal facilities as NHS intermodal connectors, and they account for less than 1 percent of the NHS mileage. In Kentucky, three NHS intermodal connectors provide access to pipeline terminals: Bells Lane Petroleum/Chemical Pipeline in Louisville, Campground Road Petroleum Pipeline in Louisville, and Louisville/Ashland Oil/Chevron Distribution Center in Lexington.[18]

2.5.1 Pipeline Governance

Much like railroads, pipelines are privately owned. They are regulated at the federal level by the Pipeline and Hazardous Materials Safety Administration (PHMSA), while at the state level, Kentucky Public Service Commission (PSC) regulates the pipelines. Below are brief descriptions for the PHMSA and Kentucky PSC.

2.5.1.1 Pipeline and Hazardous Materials Safety Administration

The PHMSA is organizationally housed in the USDOT and has regulatory responsibility for hazardous liquid and gas pipeline transport in the U.S. Federal regulations include minimum standards for safety in design, construction, inspection, testing, operation, and maintenance of pipelines. States are certified by

[16] *U.S. Energy Information Administration. http://www.eia.gov/naturalgas/data.cfm#pipelines, Accessed May 28, 2015.*
[17] *http://news.kindermorgan.com/press-release/all/tennessee-gas-pipeline-announces-successful-open-season, Accessed on May 28, 2015.*
[18] *Federal Highway Administration, http://www.fhwa.dot.gov/planning/national_highway_system/intermodal_connectors/kentucky.cfm, Accessed on May 28, 2015.*

PHMSA to inspect and enforce pipeline safety regulations for intrastate pipeline operators. In Kentucky, the Pipeline Safety Branch of the Kentucky PSC performs this inspection and enforcement.[19]

2.5.1.2 Kentucky Public Service Commission

In 1970, the Kentucky General Assembly selected the Kentucky PSC as the state agency to enforce federal and state pipeline safety laws and regulations for intrastate natural gas transmission pipelines. The Kentucky PSC has jurisdiction over 32 intrastate pipeline operators. The cost of Kentucky's state pipeline safety program is federally reimbursed by up to 80 percent.[20]

2.6 Air Cargo

Fifty-eight public use airports are located throughout Kentucky providing commuter, private passenger, and/or cargo services. Kentucky's primary air cargo handling airports are Louisville International Airport and Cincinnati/Northern Kentucky International Airport. According to the Airports Council International – North America (ACI-NA), both airports were ranked in the top 15 in North America and top 50 in the world in terms of total air cargo tonnage in 2013 (**Table 2-5**).[21] The Federal Aviation Administration (FAA) ranked the two airports in the top 10 of cargo services airports in the U.S. in terms of landed weight for 2013 (Louisville International Airport at 3rd and Cincinnati/North Kentucky International Airport at 8th).[22] While the FAA maintains a database for air cargo landings within the U.S., ACI-NA's database accounts for worldwide air cargo activity.

Table 2-6: Kentucky Air Cargo Airports, 2009 and 2013 Cargo Tonnage and Rank

ID	Airport Name	2009 Total Cargo Tonnage*	2013 Total Cargo Tonnage*	2009-2013 CAGR**	North American Rank 2013	Global Rank 2013
SDF	Louisville International Airport	1,949,528	2,216,079	3.26%	3rd	7th
CVG	Cincinnati/Northern Kentucky International Airport	133,125	590,630	45.13%	12th	40th

*Note: *Total Cargo – loaded and unloaded freight and mail in metric tons. **CAGR=Compound Annual Growth Rate. Source: Airports Council International – North America (ACI-NA)*

In 2013, Louisville International Airport and Cincinnati/Northern Kentucky International Airport handled over 2.8 million tons of total air cargo, representing an increase of 7.74 percent annually since 2009. The majority of the total tonnage handled during this time period occurred at Louisville International Airport. However, the Cincinnati/Northern Kentucky International Airport experienced the fastest growth by total tonnage at 45.13 percent annually.

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[19] *Pipeline and Hazardous Materials Safety Administration. http://primis.phmsa.dot.gov/comm/StatePages/Kentucky.htm, Accessed on May 28, 2015.*

[20] *Kentucky Public Service Commission. http://www.psc.state.ky.us/Home/PipelineSafety. Accessed on May 28, 2015.*

[21] *Airports Council International – North America, http://www.aci-na.org/content/airport-traffic-reports, Accessed on June 4, 2015.*

[22] *Federal Aviation Administration, http://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/previous_years/#2013, Accessed on February 16, 2016.*

2.6.1 Louisville International Airport

Louisville International Airport (SDF) is the primary commercial airport serving the Louisville metropolitan area and attracts travelers from central portions of Kentucky and southern Indiana. It is the busiest airport in Kentucky regarding annual air cargo tonnage, and it is home to Worldport, the worldwide hub of United Parcel Service, Inc. (UPS). In 2013, 2.2 million tons of freight and mail were handled through this airport. Air cargo carriers benefit from several of Louisville International Airport's competitive advantages, such as central location in the U.S., direct access to the Interstate Highway System via I-65 and I-264, and three runways.

2.6.1.1 United Parcel Service Worldport

In 2002, UPS opened Worldport at Louisville International Airport as its international air express hub and the home base of its air cargo operations. In April 2010, UPS completed a $1 billion expansion that increased sorting capacity by 37 percent to 416,000 packages per hour. The Worldport is now 5.2 million square feet with 155 miles of conveyor belts to sort packages.

More than 150 companies have cited Worldport as a reason for moving their business facilities and operations to Louisville. The mega-hub is also less than 2 miles from UPS's largest Supply Chain Solutions campus in the world.[23]

2.6.2 Cincinnati/Northern Kentucky International Airport

The Cincinnati/Northern Kentucky International Airport (CVG) is the primary commercial airport serving the Cincinnati metropolitan area. It is the second busiest airport in Kentucky for annual air cargo tonnage and serves as one of DHL's three global hubs. In 2013, 590,630 tons of freight and mail were handled through this airport.

The Cincinnati/Northern Kentucky International Airport is located on approximately 7,000 acres in the City of Hebron. The airport consists of three parallel runways and one crosswind runway, and each runway is served by at least one parallel taxiway. Direct access to the Interstate Highway System via I-75 and I-275 is one of the major benefits of this airport for air cargo carriers.

2.6.2.1 DHL

Since 2009, DHL has invested nearly $300 million in upgrading its operations at the airport to establish a "super hub," one of only three worldwide and the only one in the U.S. DHL's other global "super hubs" are located in Hong Kong and Leipzig, Germany. About 92 percent of the company's volume in the U.S. moves through CVG. Currently ranked as the ninth largest cargo airport in North America, CVG experienced an 11.3 percent increase in cargo tonnage for year-end 2015.[24]

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[23] *Louisville Regional Airport Authority. http://www.flylouisville.com/about-the-airport/, Accessed on July 2, 2015.*

[24] *http://www.northernkentuckyusa.com/newsroom/2015/05/28/dhl-express-plans-108-million-expansion-in-northern-kentucky.aspx, Accessed on July 2, 2015.*

2.6.3 Aviation Governance

Kentucky public airports are governed by regional airport authorities or local boards. A local board is established by any urban-county government, city, county, or city and county acting jointly, or any combination of two or more cities, counties, or both.[25] Airports are regulated by the U.S. Customs and Border Protection (CBP) and the FAA at the federal level, and by the Kentucky Department of Aviation at the state level. Below are brief descriptions for the CBP, FAA, and Kentucky Department of Aviation.

2.6.3.1 U.S. Customs and Border Protection

The CBP is the largest law enforcement agency of the U.S. Department of Homeland Security. The agency's primary mission is to oversee U.S. borders, ports, and other points of entry to protect the public from terrorist threats and illegal trade and traffic. Regarding aviation, CBP has regulatory authority to limit the locations where a private aircraft entering the U.S. from a foreign area may land. Louisville International Airport, Cincinnati/Northern Kentucky International Airport, and Lexington Blue Grass Airport are the airports in Kentucky designated for CBP inspection services.[26]

2.6.3.2 Federal Aviation Administration

The FAA is the operating mode of the USDOT responsible for the safety of civil aviation. The FAA's major roles include:

- Regulating civil aviation to promote safety
- Encouraging and developing civil aeronautics, including new aviation technology
- Developing and operating a system of air traffic control and navigation for both civil and military aircraft
- Researching and developing the National Airspace System and civil aeronautics
- Developing and carrying out programs to control aircraft noise and other environmental effects of civil aviation
- Regulating U.S. commercial space transportation

In the pursuit of safety, the FAA issues rules and sets standards for both aeronautical equipment and people working in the aviation field.[27]

2.6.3.3 Kentucky Department of Aviation

The Kentucky Department of Aviation is one of the KYTC departments that provides support and service to the 62 public airports, 83 private runways, and 54 heliports within Kentucky. This department administers state and federal funding for airport maintenance and capital improvement projects.[28]

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[25] *Kentucky Legislature, http://www.lrc.ky.gov/statutes/statute.aspx?id=44638, Accessed on February 16, 2016.*

[26] *U.S. Customs and Border Protection, http://www.cbp.gov/sites/default/files/documents/20140327%20Airports%20where%20CBP%20Inspection%20Services%20are%20Normally%20Available.doc.pdf, Accessed on February 16, 2016.*

[27] *Federal Aviation Administration, https://www.faa.gov, Accessed on February 16, 2016.*

[28] *http://kentucky.gov/government/Pages/AgencyProfile.aspx?AgencyTitle=Aviation,+Department+of, Access on February 16, 2016.*

3 GOALS AND PERFORMANCE MEASURES

The KFP serves as an independent document that supports the implementation of the commonwealth's LRSTP. The KFP's goals are consistent with the LRSTP's goals and objectives and the goals of the National Freight Policy. In addition to the goals, the KFP identifies a set of objectives and performance measures that articulate KYTC's freight investment priorities to help define freight system investment needs and identify the desired future performance of the system.

3.1 2014 LONG-RANGE STATEWIDE TRANSPORTATION PLAN GOALS

In 2013-2014, KYTC undertook a significant effort to engage Kentuckians to develop an overall transportation vision and goals for Kentucky's future. Through input from the public and focus groups, the LRSTP identified the following vision for Kentucky's future transportation system:

A well-maintained, multimodal transportation system that delivers safe and reliable trips which improve Kentucky's quality of life.

To support this vision, two unique sets of goals were established: project goals and process goals. Project goals are used to measure the effectiveness of proposed system improvements. Process goals set performance standards for methods and practices to be used to deliver improvements and to maintain the system. These goals were established for both passenger and freight transportation, and they are shown in **Table 3-1**. Therefore, the KFP has adopted these same goals. This will reinforce the long-term viability and implementation of the LRSTP and KFP as they support Kentucky's transportation vision.

Table 3-1: LRSTP and KFP Project and Process Goals

Project Goals
Providing a safe and secure system
Maintaining and improving existing infrastructure on a continual basis
Ensuring dependable, effective and efficient facilities
Improving local, regional and global connectivity and access
Including all appropriate modes of transportation within a fully-integrated system
Process Goals
Dependable access to markets, jobs and resources
Consideration of human and natural resources
Efficient and flexible use of available resources
Transparent decision-making processes

3.2 Alignment with National Freight Policy Goals

The KFP goals were established after reviewing the National Freight Policy goals from MAP-21. By focusing on these national goals, the KFP can be used to serve as a framework for future (federally required) performance measure development.

Goals in the National Freight Policy established in 23 U.S.C. 167

1. Improving the contribution of the freight transportation system to economic efficiency, productivity, and competitiveness
2. Reducing congestion on the freight transportation system
3. Improving the safety, security, and resilience of the freight transportation system
4. Improving the state of good repair of the freight transportation system
5. Using advanced technology, performance management, innovation, competition, and accountability in operating and maintaining the freight transportation system
6. Reducing adverse environmental and community impacts of the freight transportation system

Table 3-2 demonstrates the alignment of Kentucky's LRSTP and KFP goals with the National Freight Policy goals.

Table 3-2: Alignment of KFP Goals with National Freight Policy Goals

KFP Goals	National Freight Policy Goals						
	Economic Competitiveness	Safety, Security, Resiliency	State of Good Repair	Advanced Technology	Performance & Accountability	Economic Efficiency	Environmental
Project Goals							
Providing a safe and secure system		X		X			
Maintaining and improving existing infrastructure on a continual basis	X	X	X		X		
Ensuring dependable, effective and efficient facilities	X	X	X		X	X	
Improving local, regional, and global connectivity and access	X				X	X	X
Including all appropriate modes of transportation within a fully-integrated system	X	X	X		X	X	X
Process Goals							
Dependable access to markets, jobs, and resources	X	X				X	
Consideration of human and natural resources		X					X
Efficient and flexible use of available resources		X		X	X	X	X
Transparent decision-making processes					X		

3.3 Objectives and Performance Measures

The KFP identifies a set of objectives that articulate KYTC's freight goals, help define freight system investment needs, and identify the desired future performance of the freight network. Specifically, performance measures can be used to quantifiably assess freight infrastructure investment. In addition, performance measures can be used to increase communication with the general public, freight stakeholders, and elected officials. Internal to KYTC, performance measures can serve three specific purposes:

PLANNING: Performance measures can be used as a tool to evaluate proposed projects and scenarios to gauge their effectiveness in achieving the KFP's goals. These high-level metrics can create an evaluation of alternatives.

IMPLEMENTATION: Performance measures can be used as a tool to emphasize KFP goals within the policy development, budgeting, programming, and project selection processes. For example, the measures might assist decision-makers in the project selection process by providing metrics about their potential effectiveness.

ACCOUNTABILITY: Performance measures can be used as a tool to facilitate tracking and reporting KYTC's progress in achieving the KFP's goals to support accountability for plan implementation and results.

Performance measures are a tool to achieve the plan, not a grade. They must be applied to something within KYTC's control—otherwise a performance measure has no value and only presents a risk of KYTC being held accountable for results it cannot influence. The potential performance measures listed below are tied to quantitative information where available. They are intended to guide future investment decisions and can also be used to assess the progress of the KFP's implementation. A guiding principal in developing performance measures is that they utilize existing performance data and leverage current (or planned) data collection activities.

In addition to the performance measures, indicators are identified. Indicators are important data points to monitor the status of the freight system; however, they are outside of the control of KYTC. The performance measures and indicators will be further defined in forthcoming planning activities by KYTC. Additionally, the FHWA continues to develop national management standards for the NHS, which encompasses a large portion of Kentucky's freight transportation system. The KFP goals, objectives, performance measures, and indicators are listed in **Table 3-3**. Each measure is designed to track progress towards a pre-determined target.

Table 3-3: KFP Goals, Objectives, Performance Measures, and Indicators

Goal 1: Providing a safe and secure system	
Objectives	**Performance Measures**
▪ Reduce rates of crashes, injuries, and fatalities involving freight-carrying vehicles on the highway network ▪ Provide adequate truck parking availability	▪ Commercial vehicle crash rate ▪ Grade crossing crash/incident rate
	Indicators
	▪ Number of public truck parking spaces ▪ Railroad incidents/near-misses ▪ Inland waterway crashes/incidents ▪ Aviation crashes/incidents ▪ Change in tonnage/value/miles ▪ Resiliency - recovery
Goal 2: Maintaining and improving existing infrastructure on a continual basis; Ensuring dependable, effective and efficient facilities	
Objectives	**Performance Measures**
▪ Keep Kentucky's state highway pavement, bridges, and highway-related assets in good condition ▪ Assist modal partners in achieving state-of-good repair for aviation, riverports, rail, and navigable waterway infrastructure ▪ Maintain a program of public, highway-rail at-grade crossing evaluations	▪ Percent of structurally deficient bridges on freight network ▪ Percent of freight network meeting pavement condition targets ▪ Number of weight-restricted bridges on the freight network ▪ Number of vertical restrictions on the freight network ▪ Congestion of the freight network (level of service or volume/capacity) ▪ Reliability (buffer index/planning index)
	Indicators
	▪ Percent of publically-owned airports meeting the commonwealth's standards ▪ Rate of dredging ▪ Condition of locks and dams
Goal 3: Improving local, regional and global connectivity and access; Including all appropriate modes of transportation within a fully-integrated system; Dependable access to markets, jobs and resources	
Objectives	**Performance Measures**
▪ Improve the efficiency of freight transportation and the capacity of freight-related infrastructure throughout Kentucky ▪ Improve freight network access ▪ Address bottlenecks on the freight network ▪ Improve access to freight generators, including energy activity areas and freight-related businesses	▪ Congestion on intermodal connectors and roads leading to major energy/manufacturing centers ▪ Pavement and bridge ratings on intermodal connectors and roads leading to major energy/manufacturing centers ▪ Reliability on intermodal connectors

Goal 4: Consideration of human and natural resources	
Objectives	**Performance Measures**
▪ Reduce the environmental impacts of building, maintaining, and operating Kentucky's transportation system	▪ MPO air quality ratings
	Indicators
	▪ Number of freight crashes that require environmental cleanup ▪ Change in freight ton-miles ▪ Change in freight tonnage movement by mode
Goal 5: Efficient and flexible use of available resources; Transparent decision-making processes	
Objectives	**Indicators**
▪ Minimize congestion on the freight network ▪ Minimize the time the freight network suffers interruption from an incident	▪ The percentage of miles on freight network in an uncongested condition ▪ Hours of downtime on freight network resulting from incidents

4 CURRENT CONDITIONS

The efficient, reliable, and safe movement of freight depends on a transportation system that is properly maintained and in good physical condition. The condition of the transportation system in Kentucky is the result of a variety of factors such as transportation funding availability, including the private sector's investments, system demand, economic conditions, and the quality and timing of operations and maintenance.

This chapter describes the current condition of the Kentucky freight system by mode – highways, waterways, rail, pipelines, and airports. The condition includes the state of the freight infrastructure, system performance, and/or safety.

4.1 HIGHWAYS

Kentucky has an extensive highway network of interstates and major highways that support 275 million tons of truck-borne freight annually. This includes two of the nation's busiest north-south interstate corridors (I-75 and I-65), connecting industries across North America from Canada to Mexico. Kentucky also contains a large portion of I-64, which is a major east-west corridor stretching from Norfolk, Va. to St. Louis, Mo.[29]

4.1.1 Congestion/Bottlenecks

Freight bottlenecks occur at physical locations (usually bridges, interchanges, railroad crossings, lane reductions, etc.) where the free flow of goods is disrupted. There are two general types of freight bottlenecks:

- **Recurring:** Peak hour congestion that occurs each day along a segment of highway
- **Non-recurring:** Unpredictable bottlenecks that are likely to occur at specific locations, such as construction zones, crashes, extreme weather conditions, etc.

In 2005, FHWA completed a report called an "An Initial Assessment of Freight Bottlenecks on Highways." The study revealed that freight bottlenecks cause upwards of 243 million truck hours of delay annually. The direct cost of the bottlenecks were approximately $8 billion (2005 $) annually.

4.1.1.1 Congestion/Bottleneck Reports

The American Transportation Research Institute (ATRI) and FHWA have partnered since 2002 to collect and process truck Global Positioning System (GPS) probe data to analyze freight movement and bottlenecks in the U.S. Since then, ATRI has published an annual list of the 100 worst freight bottlenecks. In 2015, the report listed I-65 at I-64/I-71 interchange (Louisville) as the fourth worst freight bottleneck in the country. Less than a mile north of the Kentucky and Ohio state line is the I-71 and I-75 interchange (Cincinnati), and this interchange is listed as the seventh worst freight bottleneck.[30]

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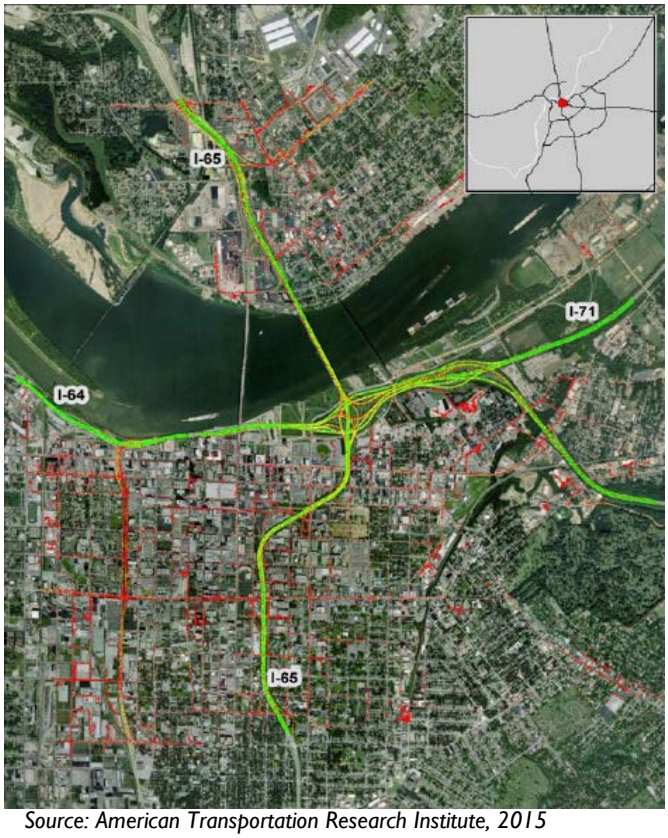
[29] *http://www.thinkkentucky.com/kyedc/pdfs/kytrannw.pdf, Accessed on March 16, 2016.*

[30] *ATRI, Congestion Impact Analysis of Freight-Significant Highway Locations, 2015*

Although in Ohio, this bottleneck has significant implications for northern Kentucky freight. Both interchanges are shown in **Figure 4-1**.

Figure 4-1: ATRI Freight Bottlenecks

I-65 at I-64/I-71 Interchange (Louisville)



I-71 at I-75 Interchange (Cincinnati)

Source: American Transportation Research Institute, 2015

In 2015, the American Highway Users Alliance published their "Unclogging America's Arteries 2015" report that detailed passenger and freight bottlenecks. This report identified the nation's top 50 bottlenecks, along with other zones of congestion in the U.S. Among the other zones of congestion they evaluated were I-64 at I-65 between N. Preston Street and N. Clay Street (North of Louisville Slugger Field) and I-65 at US 150, both in Louisville. I-64 at I-65 between N. Preston Street and N. Clay Street has estimated delays of 102,700 hours annually, while I-65 at US 150 has estimated delays of 241,540 hours annually.

The issue of staging trucks for supply and distribution/delivery logistics is a critical issue in Kentucky's manufacturing and agriculture areas. Drivers are using interstate ramps, commercial/retail parking lots, and other areas to park and wait for their time to report to distribution hub locations for loading and unloading. This is creating safety concerns on interstates, conflicts with passenger vehicles, increased congestion at intersections adjacent to truck parking areas, and increased emissions and noise from idling trucks to local communities.

4.1.2 State of Good Repair

Kentucky's roads and bridges receive several condition-based ratings assigned by KYTC that can aid in determining the quality of service being provided to the general public. Maintaining the existing system to a state of good repair is a priority for KYTC.

4.1.2.1 Maintenance Rating Program (MRP) Report

The first rating criterion comes from the Maintenance Rating Program (MRP) Report, which is an annual survey of roads conducted by the KYTC Division of Maintenance. This rating is based on a 100-point scale, with a target score of 80.

Between 300 and 400 roadway segments, 500 feet in length, are randomly selected in each KYTC district among four road categories: (1) interstates, (2) other NHS roads, (3) state primary and secondary roads, and (4) rural secondary roads.[31] Grades are assigned in several categories, including rideability, potholes, striping, and guide signs. An overall weighted score is assigned to each type of road in each of the 12 highway districts and statewide. Statewide maintenance ratings for year 2015 by roadway type are shown in **Table 4-1**. The average grades for each roadway type are over the targeted score of 80.

Table 4-1: FY 2015 KYTC Maintenance Statewide Scores

Classification	Score	Grade
Interstates	90.5	A
National Highway System	91.0	A
State Primary and Secondary	84.0	B
Rural Secondary	80.6	B
All Roads	**83.7**	**B**

Source: 2015 Kentucky Transportation Cabinet, Maintenance Rating Program Report

4.1.2.2 Pavement Conditions

Measures of pavement condition can also provide some insight into service quality. KYTC rates pavement conditions in the commonwealth by classifying pavements in good, fair, or poor condition. The scale used to determine what constitutes good, fair, or poor condition is adjusted based on traffic volume. Thus, routes with higher volumes are expected to be maintained in better condition than routes with lower traffic volumes. Statewide pavement conditions from 2013 are presented in **Table 4-2**.

Table 4-2: Statewide Pavement Conditions by State Primary Road System, 2013

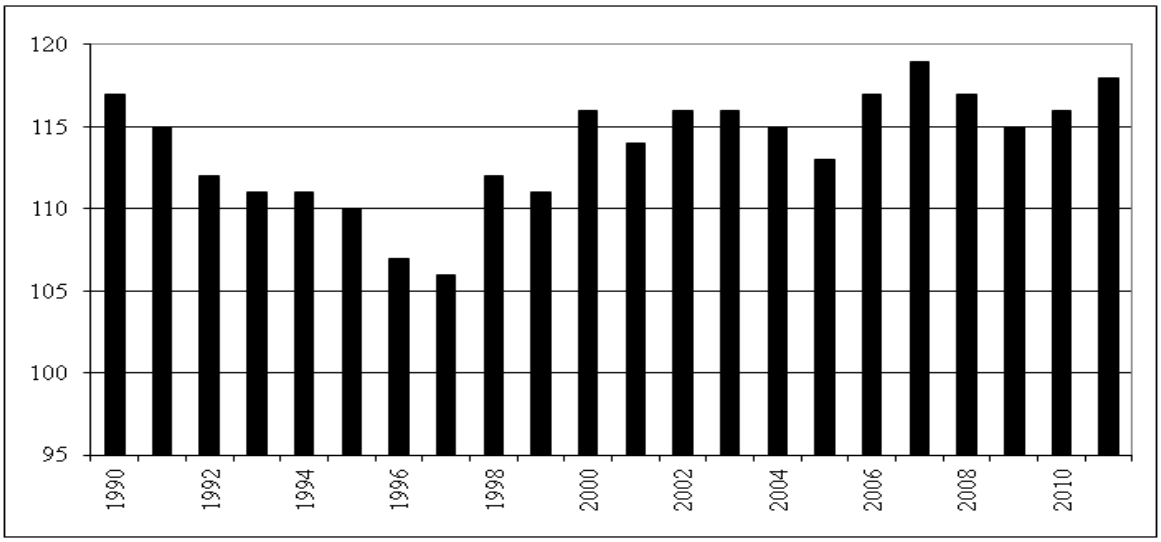
System	Centerline Miles	% Good	% Fair	% Poor
Interstates	801	54%	27%	19%
Parkways	619	48%	26%	26%
State Primary, Secondary, and Supplemental	13,376	60%	12%	28%
Rural Secondary	12,763	53%	38%	9%
All Routes	**27,559**	**57%**	**25%**	**19%**

Source: 2014 Kentucky Transportation Cabinet, Long Range State Transportation Plan

[31] *Kentucky Transportation Cabinet, 2015 Maintenance Rating Program Report*

Pavement is also graded using the International Roughness Index (IRI), which measures the roughness of pavements. This index provides rideability scores. Lower scores are indicative of improvement in this measure. A pavement score greater than 170 is considered an unacceptable ride quality. Statewide scores for all roads are presented in **Figure 4-2**.

Figure 4-2: Statewide Rideability Scores

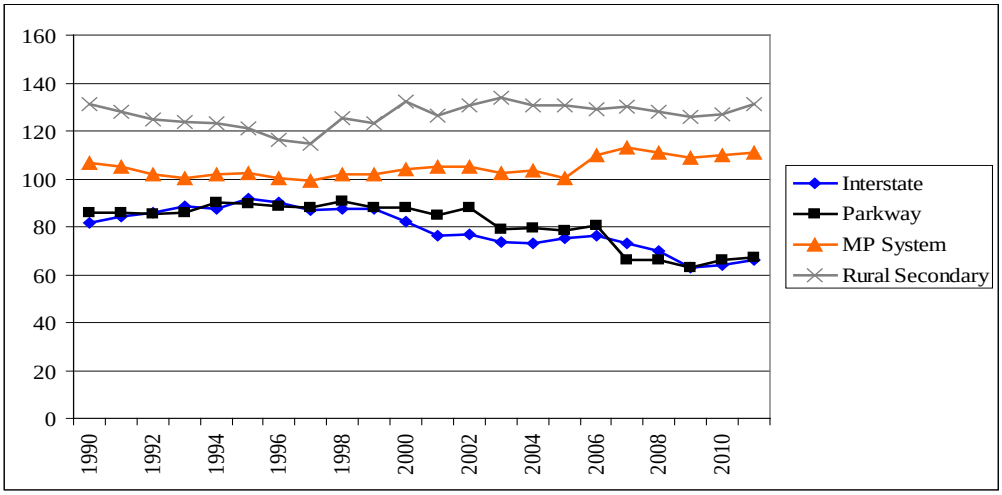


Source: Kentucky Transportation Cabinet

The figure indicates that scores improved from 1990 through 1997, then fell behind in later years, although there is variability between improvements and declines. Rideability recorded its worst measure in 2007, which was followed by 2 years of improvement until 2009.

Rideability scores by road type—including interstate, parkway, maintenance program (MP), and rural secondary—are presented in **Figure 4-3**. Again, lower scores are good in this measure. As seen in the MRP scores, rural secondary roads fared the worst in terms of rideability as well, while interstates and parkways were rated the best.

Figure 4-3: Statewide Rideability Scores by Road Type

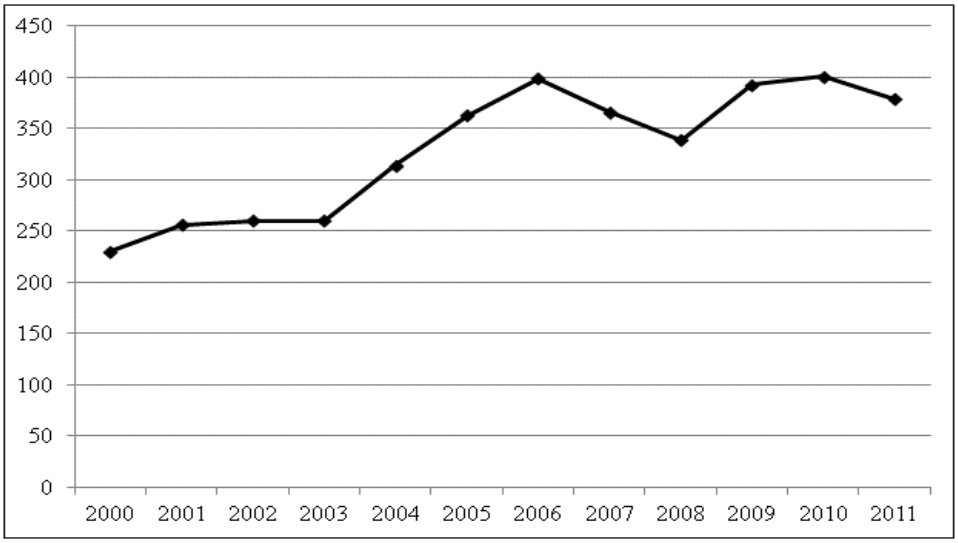


Source: Kentucky Transportation Cabinet

4.1.2.3 Bridge Rating

Kentucky's bridges are also rated annually by KYTC. The number of structurally deficient state maintained bridges is displayed in **Figure 4-4**. The figure shows an increase in the number of structurally deficient bridges from 230 in 2000 to 379 in 2011. The number of structurally deficient bridges did decrease from 2006 through 2008, as well as 2010 to 2011.

Figure 4-4: Number of Structurally-Deficient State Maintained Bridges

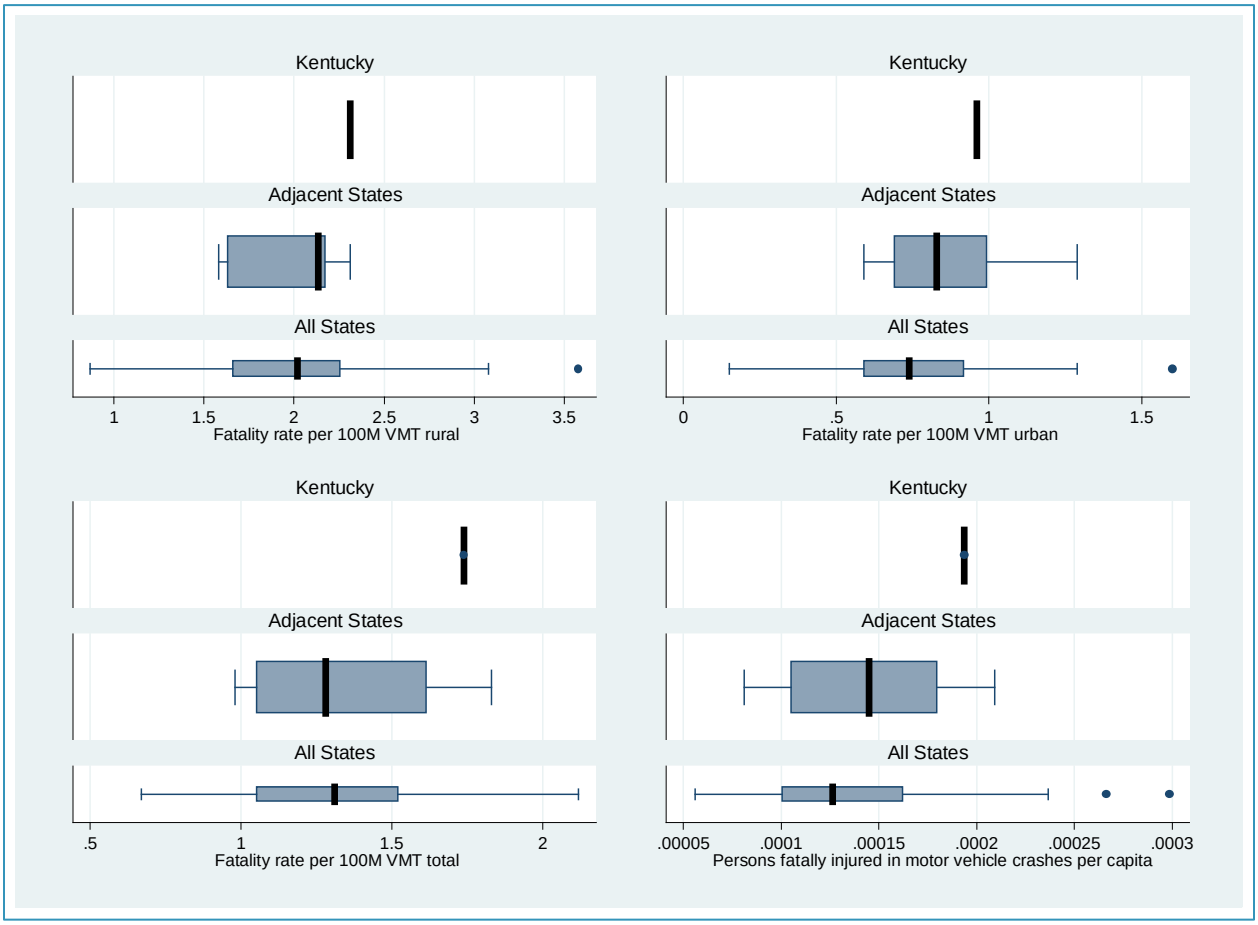


Source: Kentucky Transportation Cabinet

4.1.3 Highway Safety

Kentucky currently ranks high, as compared to other states, for both fatality rate per million vehicle miles traveled (VMT) and number of persons fatally injured in crashes per capita. In fact, both measures are in the top 75 percent for all states. **Figure 4-5** illustrates the crash fatality rates for Kentucky, adjacent states, and the U.S.

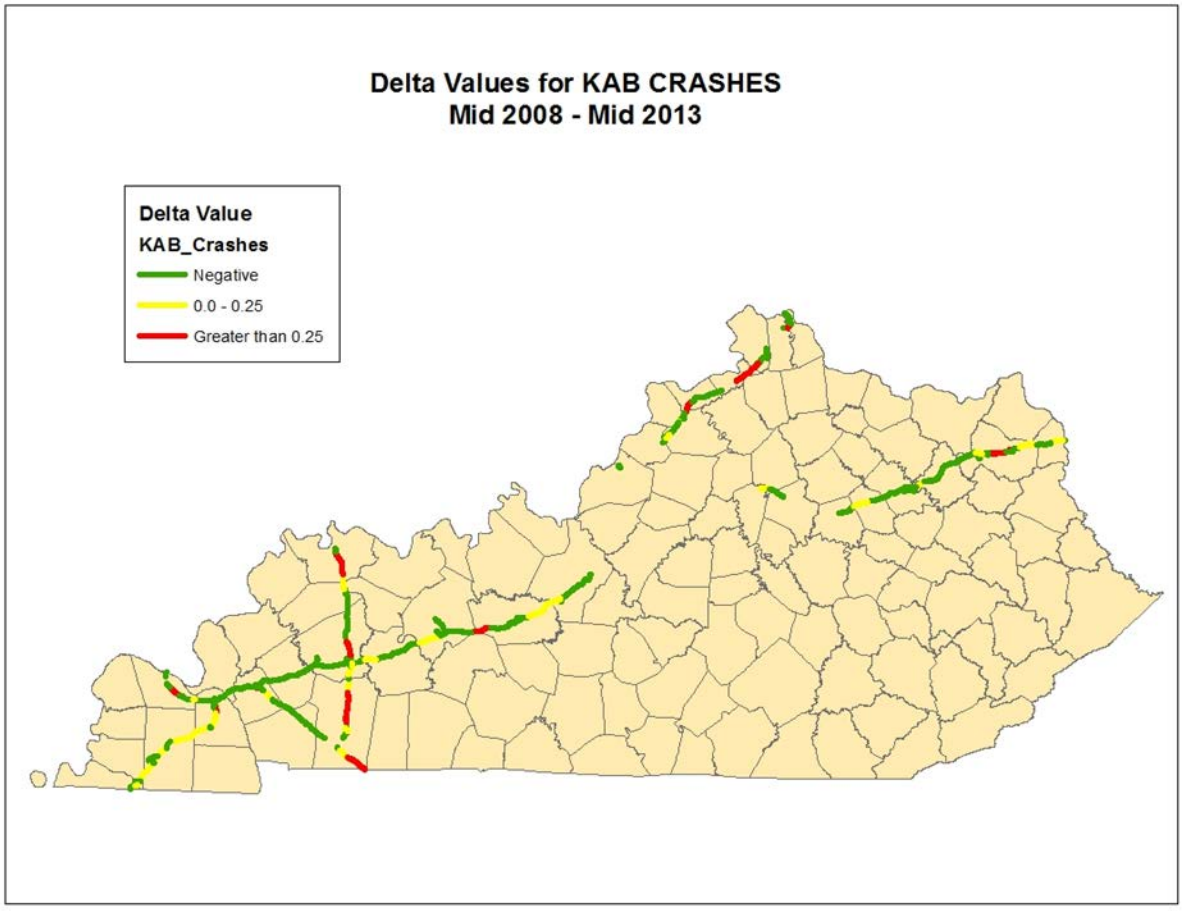
Figure 4-5: Fatality Rate Comparison – All Vehicles



Source: Kentucky Transportation Cabinet

Figure 4-6 illustrates commercial vehicle crashes with serious injury for a number of Kentucky interstates and U.S. highways from 2008 to 2013. This data helps to identify critical crash locations along Kentucky's roadway network. This figure uses KAB, an injury scale developed by the National Safety Council to measure the observed injury severity for any person involved, as determined by law enforcement at the scene of the crash. The acronym is derived from Fatal (K), Incapacitating Injury (A), and Non-Incapacitating Injury (B). A negative KAB means a reduction of overall crash severity, while a KAB of greater than 25 percent is a significant increase in overall crash severity. As illustrated in **Figure 4-6**, there are multiple sections of I-71, I-69, and US 41 with a KAB of greater than 25 percent.

Figure 4-6: Commercial Vehicle Crash Severity



Source: Kentucky Transportation Cabinet

4.2 Inland Waterways

With over 1,980 miles of commercially navigable waterways and 12 public port authorities, Kentucky also provides efficient year-round waterborne commerce. The Ohio River forms Kentucky's entire northern border and is a major tributary of the Mississippi River System, providing connectivity as far as Pittsburgh, Pa., Minneapolis, Minn., and Tulsa, Okla. Western Kentucky sits at the confluence of the Ohio and Mississippi rivers, marking the nominal transition between the Upper and Lower Mississippi River. The entire inland waterway system provides a waterway link to Canada via the Great Lakes and to Mexican and South American markets via the deepwater ports of New Orleans, La. and Mobile, Ala. Kentucky also connects the Ohio River to numerous southern cities such as Nashville, Tenn. via the Cumberland River; Knoxville and Chattanooga, Tenn. via the Tennessee River; and Mobile, Ala. via the Tennessee-Tombigbee Waterway.[32]

[32] *http://www.thinkkentucky.com/kyedc/pdfs/kytrannw.pdf*

4.2.1 Waterway Conditions

The lock and dam system was designed to control the river levels to maintain a minimum channel on the rivers for more reliable navigation. For instance, the Ohio River requires a minimum depth of 9 feet. Five navigable rivers in Kentucky have one or more locks and dams, as shown in **Table 4-3**. The USACE has jurisdiction over all these locks and dams except for those on the Kentucky River, which are owned and maintained by the Kentucky River Authority.

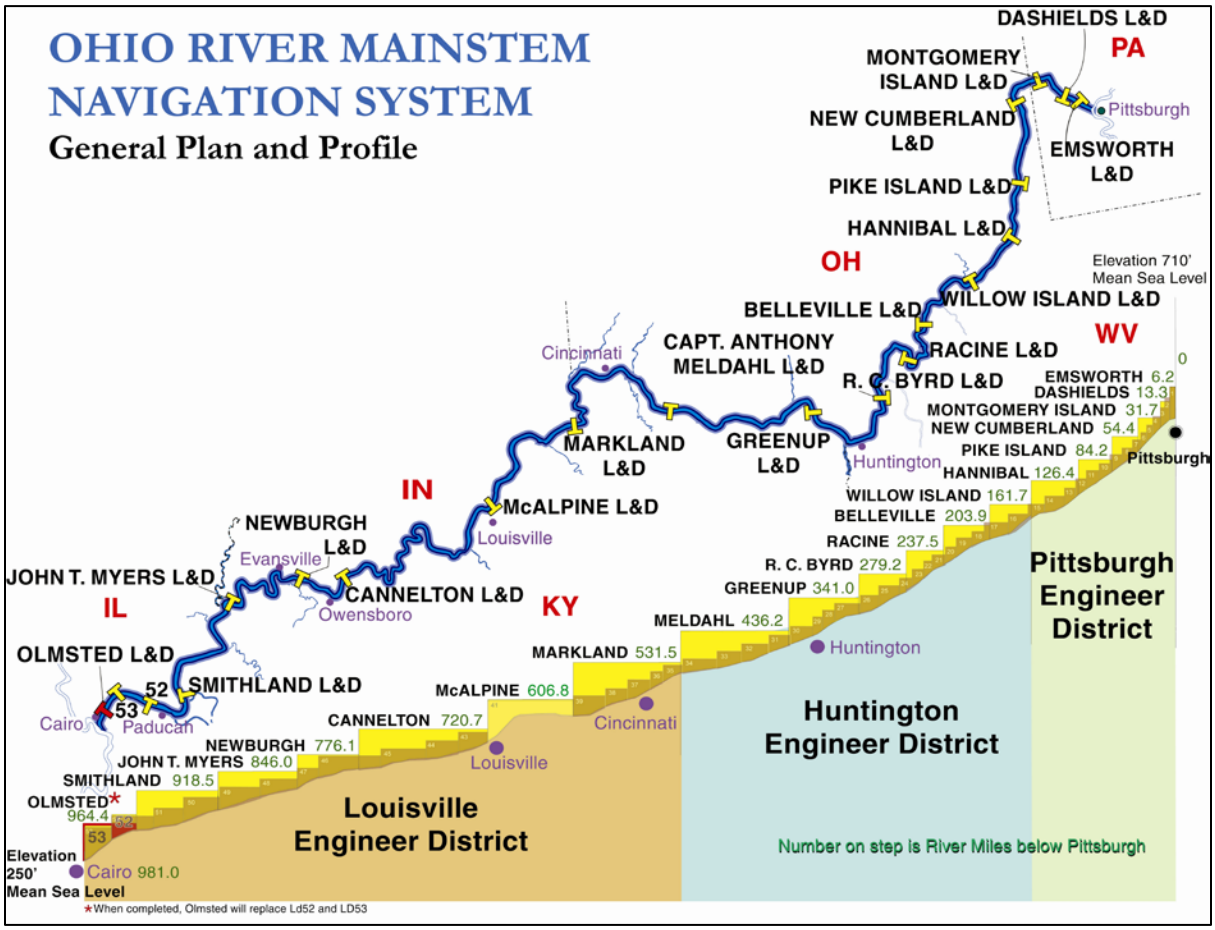
Table 4-3: Kentucky Locks and Dams

River	No. of Locks and Dams*
Ohio	10
Kentucky	4
Green	2
Cumberland	1
Tennessee	1
Total	18

Source: 2015 Kentucky Modes Book, Kentucky Transportation Cabinet
*Notes: *The locks and dams that are open.*

The locks and dams on the Ohio River are illustrated on **Figure 4-7**. Eight of the locks and dams in Kentucky are operated by the USACE Louisville District and the remaining two locks and dams are operated by the USACE Huntington District. The majority of these locks and dams were constructed in the 1950s and 1960s. The Locks and Dams 52 and 53 Replacement Project, known as the Olmsted Locks and Dams, is currently underway to replace two locks that were put into operation in 1928 and 1929 respectively. This project is located on the Ohio River at mile marker 964. The project was authorized in 1988 and is scheduled to be operational by 2020. The purpose is to improve the reliability and efficiency of barge traffic.

Figure 4-7: Ohio River Locks and Dams



Source: U.S. Army Corps of Engineers

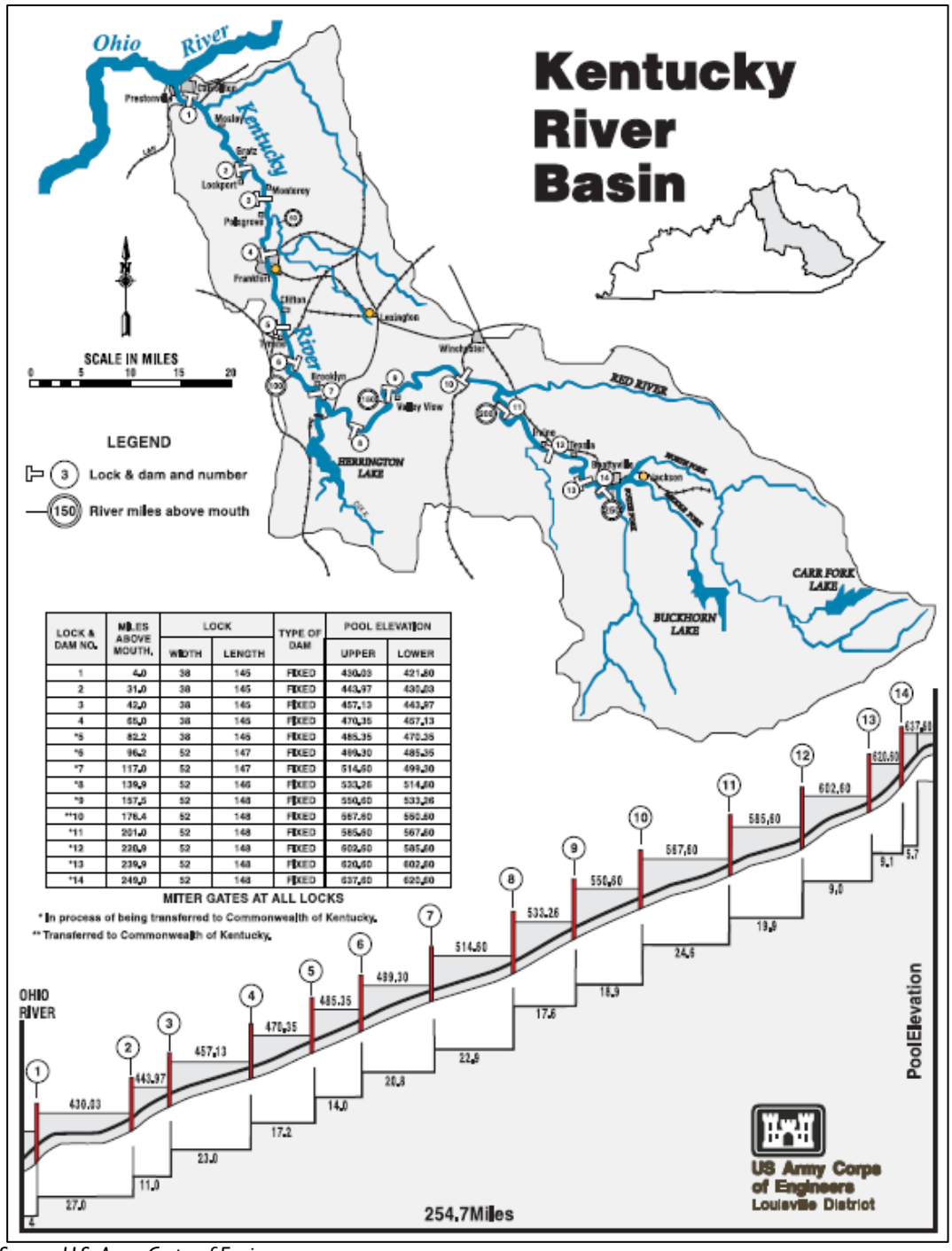
The USACE Louisville District operates the two locks and dams on the Green River. The Green River Locks and Dam No. 1 is located near Henderson. The Green River Locks and Dam No. 2 is located near Calhoun. Both locks and dams were constructed in the 1950s.

The only Cumberland River lock and dam in Kentucky is operated by the USACE Nashville District. Constructed in the 1960s, this lock and dam is located near Grand Rivers.

The USACE Nashville District also operates the only Tennessee River lock and dam in Kentucky. This lock and dam is located 20 miles east of Paducah.

Figure 4-8 shows the locks and dams on the Kentucky River. Although there are a total of 14 locks and dams, locks and dams 1 through 4 are the only ones open for operation. All the locks and dams were originally owned by the USACE, but have been transferred over to the Kentucky River Authority. Locks and dams 1 through 4 were originally constructed in the 1830s and 1840s. In 1882, the dams were rebuilt, and since then they have been maintained through repairs and some reconstruction.

Figure 4-8: Kentucky River Locks and Dams



LOCK & DAM NO.	MILES ABOVE MOUTH,	LOCK		TYPE OF DAM	POOL ELEVATION	
		WIDTH	LENGTH		UPPER	LOWER
1	4.0	38	145	FIXED	430.03	421.60
2	31.0	38	145	FIXED	443.97	430.03
3	42.0	38	145	FIXED	457.13	443.97
4	55.0	38	145	FIXED	470.35	457.13
*5	82.2	38	145	FIXED	485.35	470.35
*6	96.2	52	147	FIXED	499.30	485.35
*7	117.0	52	147	FIXED	514.60	499.30
*8	139.9	52	148	FIXED	533.26	514.60
*9	157.5	52	148	FIXED	550.60	533.26
**10	178.4	52	148	FIXED	567.60	550.60
*11	201.0	52	148	FIXED	585.60	567.60
*12	220.9	52	148	FIXED	602.60	585.60
*13	239.9	52	148	FIXED	620.60	602.60
*14	249.0	52	148	FIXED	637.60	620.60

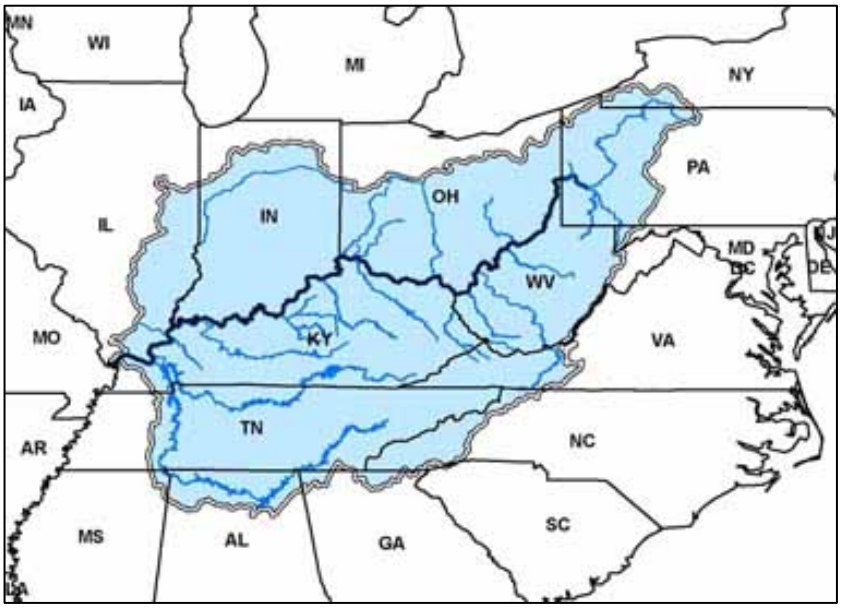
Source: U.S. Army Corps of Engineers

The majority of the locks and dams on the rivers in Kentucky are over 50 years old. Those constructed in the 1930s and 1940s are in need of major rehabilitation or replacement.

4.2.2 Waterway Performance

Vast quantities of agricultural and industrial commodities are shipped through Kentucky's waterways. For example, from 2000 to 2010, barges on the Ohio River carried a yearly average of 234 million short tons of commodities on all navigable rivers within the basin. The Ohio River Basin is shown in **Figure 4-9**. Coal, petroleum products, aggregates, agricultural products, construction raw materials, and chemicals are some of the predominant commodities carried by barge on the Ohio River. The Ohio River locks have the ability to handle forecasted levels of coal and grain exports; however, the age of the lock and dam infrastructure affects reliability, which in turn has an effect on the competitiveness of coal and grain exports.[33]

Figure 4-9: Ohio River Basin



Source: The Ohio River - All things fishing on the Ohio River, TheOhioRiver.com

4.2.3 Waterway Safety

The responsibility for marine incident safety investigations is shared between the National Traffic Safety Board (NTSB) and the USCG. Therefore, a comprehensive picture of marine incidents is difficult to obtain. The adoption of double hulled barges and the infrequent interaction with other modes allows for fewer incidents.

4.2.4 Riverport Conditions and Performance

In 2008, KYTC completed the Kentucky Riverport Improvement Project, which included a synopsis of information for 11 of the 12 Kentucky public riverports. This synopsis discussed the existing conditions for each of these ports, such as location, site, facilities, and services offered. The Kentucky Riverport

[33] *http://www.lrd.usace.army.mil/Portals/73/docs/Navigation/PCXIN/Inland_Waterways_and_Export_Opportunities-FINAL_2013-01-03.pdf*

Improvement Project is located at *http://transportation.ky.gov/Riverports/Pages/Riverport-Studies.aspx* and includes a detailed account for the public riverports.

Kentucky's inland ports and terminals provide direct access to the agricultural markets of the Midwestern and North Central states, the industrial and consumer markets of the Northeast, and the distribution networks of the South. Of Kentucky's eight operating public riverports, Paducah is considered a national hub for river shipping, as it is home to numerous barge companies, including Ingram Barge and Crounse Corporation, two of the largest barge operators in the U.S., which serve customers nationwide.[34]

4.3 Freight Rail

Kentucky's approximately 3,200 miles of railroad track carry a myriad of freight and provide connectivity to all points in the U.S. Class I track makes up approximately 2,300 miles of Kentucky's rail system and represents the most heavily traveled rail lines by revenue. Kentucky is traversed by CSXT's Chicago, IL to Nashville, Tenn. and Detroit, Mich. to Atlanta, Ga. mainlines, by NS's Cincinnati, Ohio to Atlanta, Ga. and New Orleans, La. mainlines, and by CN's Chicago, IL to New Orleans, La. mainline. The Class I railroads are complemented by a network of regional and short line railroads that provide in-state connectivity. The Paducah & Louisville Railway is one example, providing east-west service in Kentucky and connecting with six other carriers at three locations within the state.

4.3.1 Track Condition Ratings

Track condition ratings set restrictions on rail operation speeds and weight capacity. Rail facilities in Kentucky are owned by private companies. Consequently, information on specific privately owned track conditions are not shared with the Cabinet.

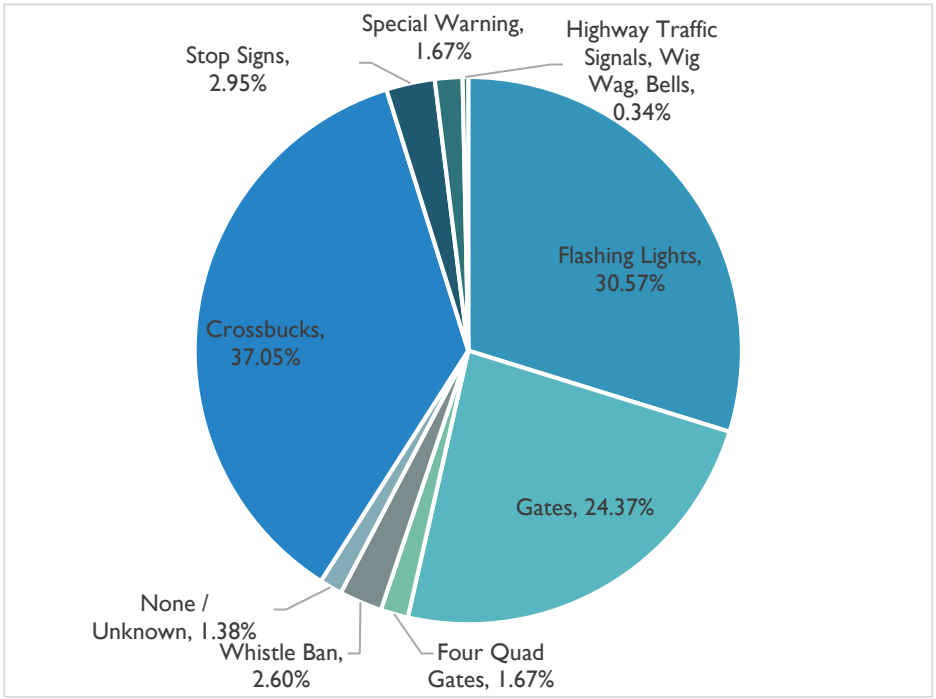
4.3.2 Rail Safety

According to the FRA Office of Safety, there are 4,707 highway-rail at-grade crossings operating in Kentucky, including 2,293 public and 2,414 private crossings. This is equivalent to more than 1.1 crossings per route-mile of track. KYTC's records of public highway-rail at-grade crossings, which are usually more current than the FRA's, indicate 2,088 public crossings in Kentucky.

According to KYTC data, just over 1 percent of the public highway-rail at-grade crossings in Kentucky have either no warning devices or the type of protection is unknown. **Figure 4-10** shows the distribution of public highway-rail at-grade crossings types by warning devices in Kentucky in 2013.

[34] *http://www.thinkkentucky.com/kyedc/pdfs/kytrannw.pdf*

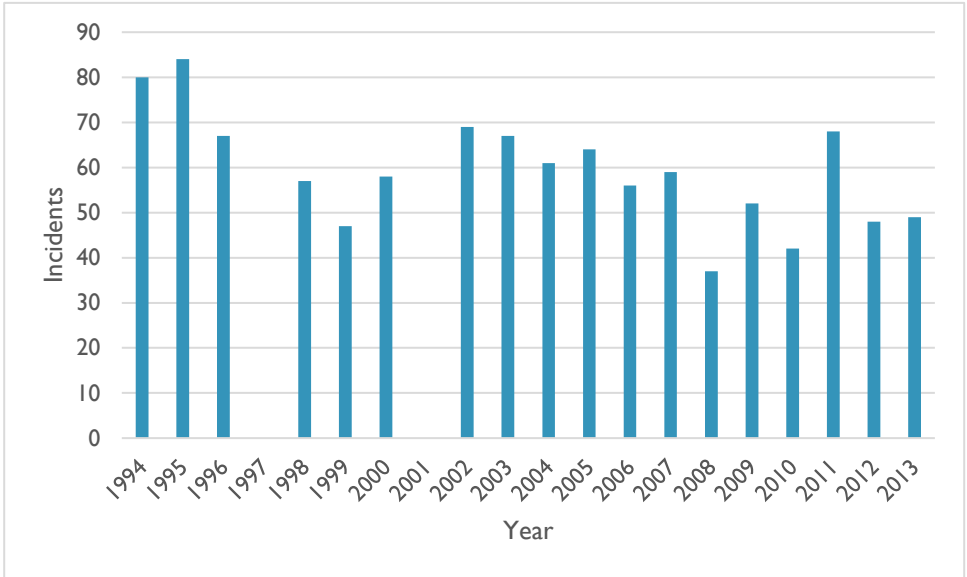
Figure 4-10: Kentucky Highway-Rail At-Grade Crossings by Warning Device, 2013



Source: Kentucky Transportation Cabinet Division of Right of Way and Utilities, Rail Safety Branch, 2013

Highway-rail at-grade crossing accidents have decreased overall in Kentucky since 1994. **Figure 4-11** shows the highway-rail at-grade crossing accidents from 1994 to 2013. A total of 49 highway-rail at-grade crossing accidents occurred in Kentucky in 2013, compared to 80 in 1994.

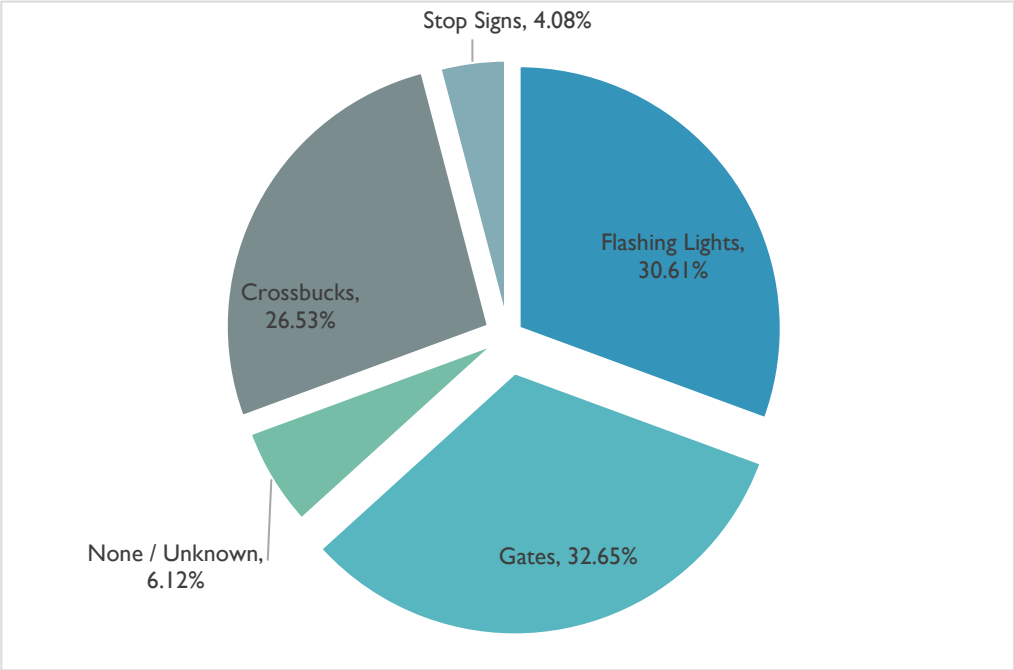
Figure 4-11: Kentucky Highway-Rail At-Grade Crossing Crashes, 1994-2013



Source: Federal Railroad Administration Office of Safety, 2014. Note: No data was available for 1997 or 2001

Figure 4-12 shows Kentucky public highway-rail at-grade crossing accidents for 2013 by warning devices. Crossbucks, flashing lights, stop signs, and gates account for nearly 94 percent of crossings at which accidents occurred. Crossings without warning devices or unknown account for the remaining 6 percent of accidents.

Figure 4-12: Kentucky Highway-Rail Crossing Accidents by Warning Device, 2013



Source: Federal Railroad Administration Office of Safety, 2014

FRA maintains statistics on the number of fatalities and injuries at highway-rail at-grade crossings and pedestrian trespass locations. In 2013, Kentucky was in the top 20 in the U.S. for both fatalities (15th) and injuries (tied for 18th) at highway-rail at-grade crossing facilities. However, the commonwealth has seen a steady decrease in fatalities since 2010, while the trend of injury accidents has remained stable. **Table 4-4** shows the fatality and injury accidents from 2008 to 2013.

Table 4-4: Injury and Fatality Highway-Rail At-Grade Accidents, 2008-2013

Year	Fatalities	Injuries
2008	4	17
2009	1	22
2010	10	23
2011	7	29
2012	5	24
2013	5	23

Source: Federal Railroad Administration Office of Safety, 2013

4.4 PIPELINE

Approximately 37,000 miles of pipelines move natural gas, crude oil, refined petroleum products, and highly volatile liquids, flammable liquids, and toxic liquids throughout Kentucky. The commonwealth has two oil refineries that had a combined operating capacity in 2014 of approximately 247,500 barrels per calendar day. Most of Kentucky's natural gas comes from the Big Sandy field located in the eastern part of the commonwealth, which is the largest natural gas field in the Appalachian Basin.

4.4.1 Pipeline Conditions

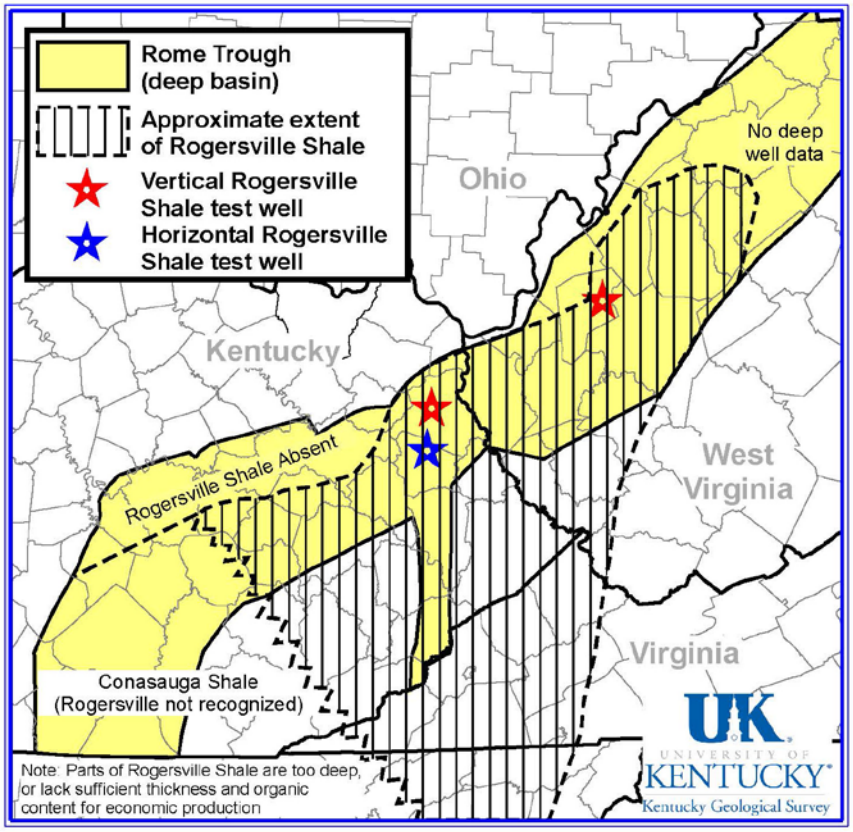
In Kentucky, 97 percent of the pipelines transport natural gas. The total miles of natural gas transmission pipelines are among the highest of any state in the Southeast.

According to the EIA, the TGP is planning the Broad Run Expansion project to expand transportation capacity of natural gas on its existing system. This project includes the construction of a new compressor station in Madison County and the modification of two compressor stations in Powell and Boyd counties. The anticipated in-service date is November 2017.[35]

The Rogerville Shale, which covers eastern Kentucky and parts of West Virginia, Ohio, Maryland, Pennsylvania, and New York, is a potential energy source of oil and gas (**Figure 4-13**). Testing and exploration is currently underway to determine its supply and the viability to safely access these resources. If the Rogerville Shale becomes a usable energy source, this would result in future expansion of pipelines in Kentucky.

[35] *http://www.kindermorgan.com/content/docs/Broad_Run_FactSheet.pdf, Accessed on March 18, 2016.*

Figure 4-13: Rogerville Shale

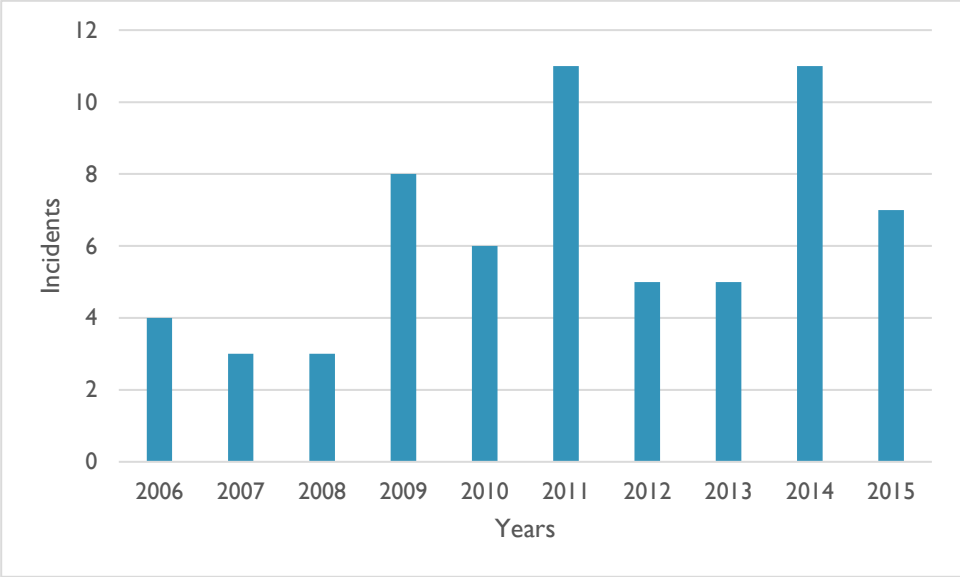


Source: University of Kentucky

4.4.2 Pipeline Safety

Pipelines are considered the safest method for transporting energy products. However, when pipeline incidents occur, they can present considerable risks to the public and the environment. The USDOT's PHMSA is responsible for documenting and investigating pipeline incidents and accidents. **Figure 4-14** shows the pipeline incidents, including spills, injuries, and fatalities in Kentucky over the last 10 years. Most of these years experienced less than 10 incidents per year.

Figure 4-14: Kentucky Pipeline Incidents, 2006-2015



Source: Pipeline and Hazardous Materials Safety Administration, 2016

4.5 Air Cargo

Rounding out the five modes of transportation, Kentucky is also home to two major air cargo hubs operated by integrated express carriers DHL and UPS. DHL operates its North American hub at Cincinnati/Northern Kentucky International Airport in Hebron, while UPS operates 'Worldport' hub at Louisville International Airport. These hubs serve as sorting facilities that handle significant volumes of air cargo throughput, a small fraction of which originates in or is destined for Kentucky.

4.5.1 Airport Conditions

A variety of factors, including runway lengths, can impact air cargo service. Runway lengths determine the size of aircraft that can land at an airport. Cargo planes for domestic operations typically require a runway length of 8,000 feet, while international operations usually require a runway of 10,000 feet. As shown in **Table 4-5**, Cincinnati/Northern Kentucky International Airport and Louisville International Airport can handle cargo planes for both domestic and international operations.

Table 4-5: Kentucky Top Cargo Airports

Airport Name	Number of Runways	Longest Runway Length (feet)
Cincinnati/Northern Kentucky International Airport	4	12,000
Louisville International Airport	3	11,887

Source: Federal Aviation Administration, 2016

Other factors that can impact air cargo service include:

- **Runway Strength:** A heavy all-cargo jet requires a runway, taxiway, and ramp with sufficient load bearing capacity to handle its weight.

- **Ramp Area:** A sufficient amount of ramp area is necessary to park one or more aircraft and to provide space for equipment loading, cargo staging, and truck access.
- **Available Facilities or Land for Development:** Handling large amounts of specialized air cargo may require additional on-airport facilities. Land adjacent to runways and taxiways may be necessary to attract aviation-related air cargo shippers seeking to construct a cargo ramp, sort center, maintenance hangar, or factory.

As mentioned in **Chapter 2**, Cincinnati/Northern Kentucky International Airport and Louisville International Airport were ranked in the top 15 in North America and top 50 in the world in terms of total air cargo tonnage in 2013. Louisville International Airport handled over 2.2 million tons of total air cargo, with a North American ranking of third and world ranking of seventh. Over half a million tons of total air cargo was handled at Cincinnati/Northern Kentucky International with a North American ranking of 12th and world ranking of 40th.

The performance of air traffic control and pilots is perhaps the most critical factor in the capacity of an airport. During the busy periods of an airport, air traffic controllers have to manage the traffic demand, balancing arrivals and departures to ensure efficient operation. For example, if the spacing between aircraft on final approach is not delivered consistently, then larger gaps will lead to increased delays and lower runway throughput.[36]

4.5.2 Air Cargo Safety

The NTSB has the primary role of investigating every civil aviation accident in the U.S., and the FAA also provides input. Safety data for air cargo is difficult to differentiate from other commercial/passenger incidents for two reasons. First, a large portion of air cargo is transported in commercial passenger aircrafts rather than in dedicated air cargo freighters. Second, the NTSB does not differentiate between a passenger/commercial aircraft and a dedicated air cargo freighter.

[36] *http://nats.aero/blog/2013/08/airport-capacity-more-than-just-tarmac-and-terminals/, Accessed March 18, 2016.*

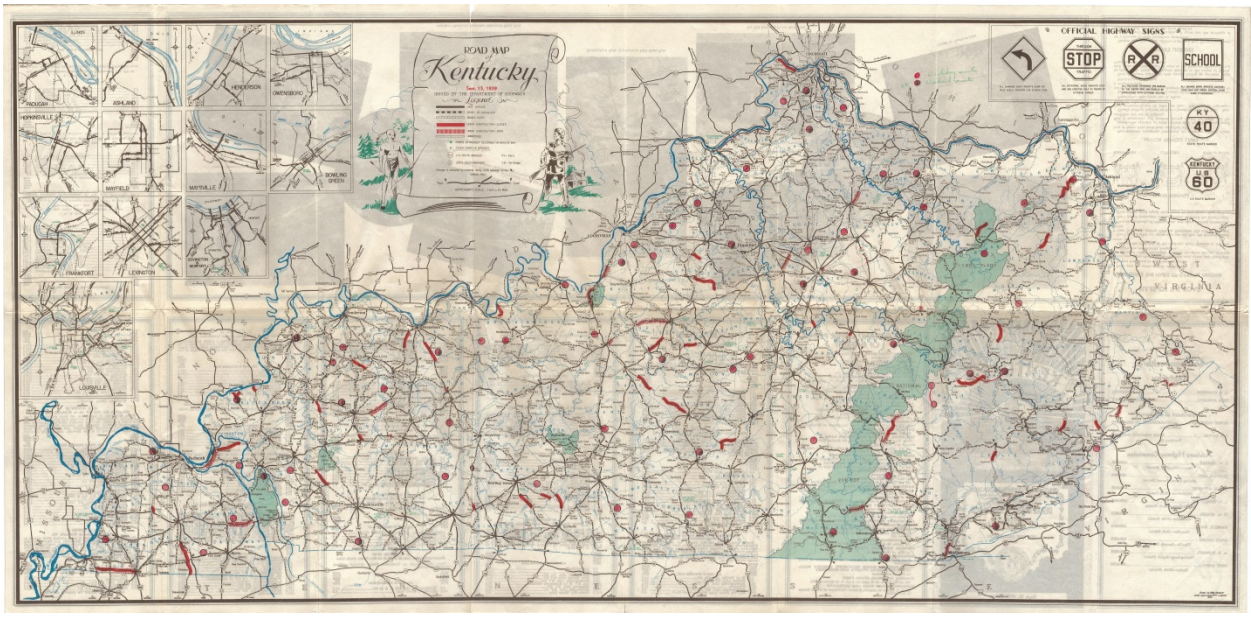
5 Key Industries and Supply Chains

Kentucky's major industries and their respective supply chains are vital drivers of Kentucky's economy. Supply chains are the pathways on which raw materials and production component parts move from their original sources to a production facility, warehouse, retail outlet, and end consumer. Kentucky industries rely on an efficient freight transportation system to meet these needs. This analysis will identify infrastructure crucial to Kentucky's economic future, including critical intermodal connectivity points. Often, these points are where most efficiency is gained or lost during transport. The analysis comprising this chapter was constructed using existing information and expertise including the KTC/KYTC Freight Generator Database, Freight Analysis Framework (FAF), and analysis completed by the Institute of Trade and Transportation Studies (ITTS).

5.1 History

Kentucky's economy has always been closely intertwined with its freight transportation system, beginning with the steamboat in the 1800s. While this provided many opportunities for riverside settlements, it left inland towns largely unconnected. During the Industrial Revolution, short line railroads began to connect many of these smaller communities, which provided major economic development opportunities for Kentucky. The success of the railroads allowed for the rapid expansion of the coal industry. **Figure 5-1** illustrates Kentucky's roadway system in 1939.

Figure 5-1: 1939 Kentucky Road Map



Source: Kentucky Transportation Cabinet, http://transportation.ky.gov/Planning/Pages/Historical-Maps.aspx

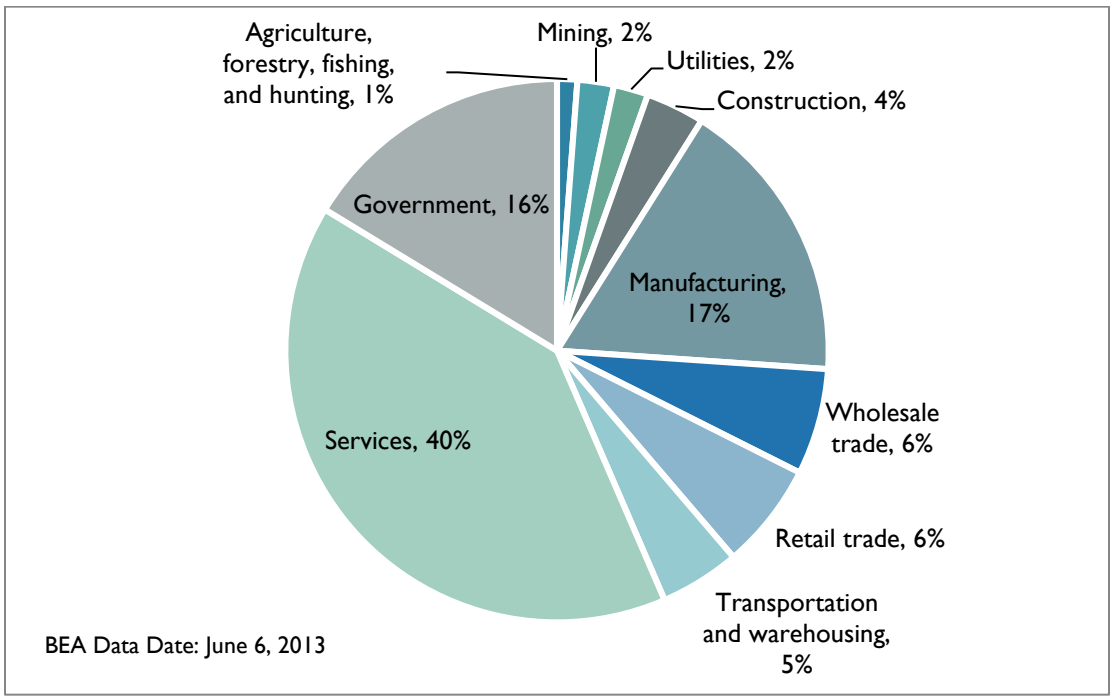
A century later, Kentucky is strategically located less than one-and-a-half day's truck drive from most of the nation's eastern and central manufacturing centers. While Kentucky's geography provides many

economic advantages, it also presents challenges with mountainous terrain, karst areas, and areas prone to flooding.

The commonwealth's industries, which have shifted in recent decades, are key players in freight transportation. In the 1990s, manufacturing became Kentucky's major industry. Key manufacturing industries include chemical and automotive. In present day, major employment generators are in the transportation equipment and automotive parts industries. In 2011, the services sector (which includes healthcare) exceeded manufacturing as a largest share of the overall Kentucky economy. In terms of employees, UPS has been Kentucky's largest employer since 2005, when it expanded its Louisville air cargo hub.

Figure 5-2 illustrates the industry share of Kentucky's economy by gross domestic product (GDP). Although coal is one of the top commodities transported by weight, mining only accounts for 2 percent of the total economic activity (in terms of GDP). According to FAF, coal accounted for 37 percent of the freight tonnage moved in Kentucky in 2007.

Figure 5-2: 2012 Industry Share of the Kentucky Economy (GDP)[37]



Source: Bureau of Economic Analysis, 2013

[37] *Bureau of Economic Analysis, 2012 State Gross Domestic Project by NAICS Code, 2013.*

5.2 Transportation Framework for Supply Chain Decisions

The factors utilized by site selectors when strategically locating new developments include the availability and capacity of the freight transportation system to move raw materials, manufacturing materials, and finished goods along the supply chain. For example, the location of a manufacturing or distribution center will be (in part) based on the presence of current or expected transportation infrastructure to meet these supply chain needs. An overall understanding of the role transportation plays in supply chain decision-making will support KYTC's planning efforts and strategic investment in the freight system.

As part of a National Cooperative Freight Research Program (NCFRP, Report #14) project, supply chain managers developed an overall framework for the selection of various routes and modes to carry freight throughout the product development process (**Table 5-1**). The criteria is balanced against the specific needs of the supply chain, and the best route, mode, or combination of modes is selected.

Table 5-1: Criteria for Analyzing Transportation in Supply Chain Decisions[38]

Criteria	Definition
Time	The time required for the movement of materials within the supply chain. This normally includes moving raw materials to production and then through a distribution network to the ultimate customer.
Network Reliability	The degree of predictability that the stated transportation time will be adhered to during shipping. Reliability is very different than predictable delays such as rush hour congestion. Unlike recurring congestion, this is measurement of risk that the shipment will be impeded by an unexpected delay.
Cost	The cost of transportation cannot produce or hinder the overall price competitiveness of the final product. Cost, along with time and reliability, provides the three major factors of the framework.
Capacity	Evaluation of the selected route/mode(s) capacity to move additional product if necessary.
Safety	The ability of a route/mode(s) to provide a level of confidence that shipped goods will be delivered in good condition.
Availability	Overall availability and accessibility of the route/mode(s). Companies must ensure that shipments are available to both the shipper and the receiver. They also must ensure that if a supply chain manager wishes to ship more goods, there would be available means to transport.

Kentucky's freight system is reliant on Kentucky's productivity and freight movements to maintain the quality of life for its residents. In 2011, researchers at ITTS identified that Kentucky both produces and consumes more freight than the national and Southeast averages (**Figure 5-3**). Overall, Kentucky is a net exporter of freight.[39]

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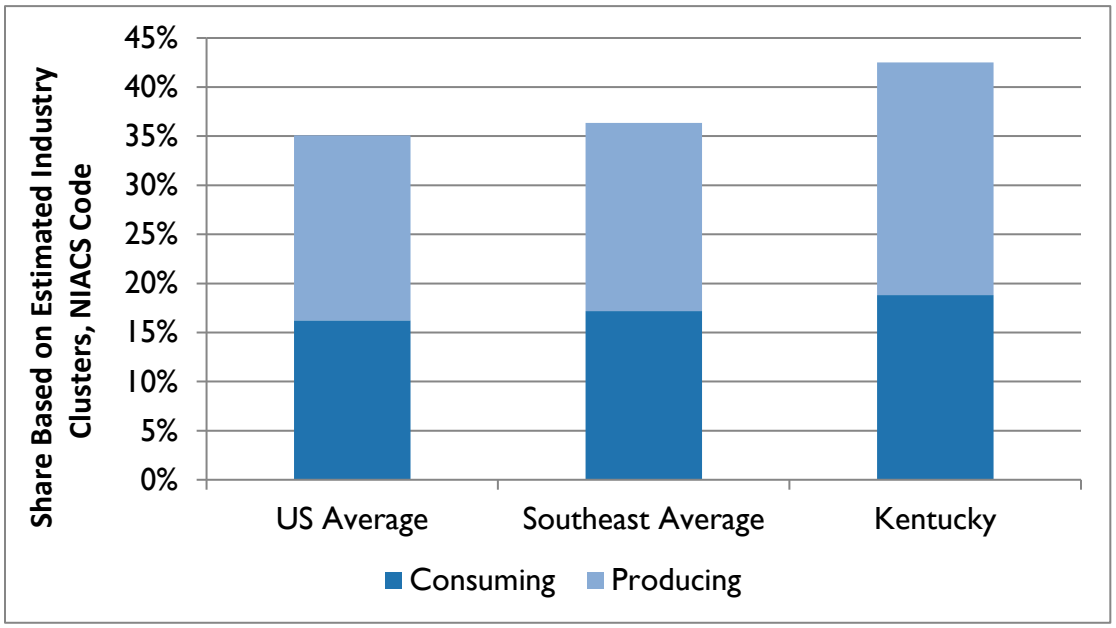
[38] *Rhodes, Suzann. NCFRP Report 14: Guidebook for Understanding Urban Goods Movement, 2012, Pages 6-16.*

[39] *Lambert, Bruce. Transportation Industries and Jobs, Institute for Trade and Transportation Studies, 2011, Slide 4.*

Figure 5-3: Comparison of Freight Dependency, 2011



Source: ITTS, Analysis Date: 2011

5.3 Kentucky Freight Corridors

The data driven identification of key corridors for Kentucky's freight system is needed to guide policy and investment decisions that impact the largest and most important freight users in the commonwealth. This identification was completed utilizing the KYTC Freight Generator Database and FAF.

> *The Freight Analysis Framework (FAF) integrates data from a variety of sources to create a comprehensive picture of freight movement among states and major metropolitan areas by all modes of transportation. With data from the 2007 Commodity Flow Survey and additional sources, FAF version 3 (FAF3) provides estimates for tonnage, value, and domestic ton-miles by region of origin and destination, commodity type, and mode for 2007, and forecasts through 2040. Also included are state-to-state flows for these years plus 1997 and 2002, summary statistics, and flows by truck assigned to the highway network for 2007 and 2040.*[40]

5.3.1 Exports

In 2010, the commonwealth created the Kentucky Export Initiative[41] with the goal to increase international exports, which will ultimately lead to job growth. Since its creation, exports have grown from just over $19 billion in 2010 to exceed $22 billion, outpacing all previous years' exportation levels. These activities have created over 150,000 jobs. In 2013, Kentucky ranked second in the nation for export growth (11.3 percent). **Table 5-2** demonstrates the top nine international export categories for Kentucky in terms of weight and value.

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[40] *Federal Highway Administration, Freight Analysis Framework, http://faf.ornl.gov/fafweb/*

[41] *Governor Beshear Press Release, Governor Beshear Announces Launch of Kentucky Export Initiative, December 3, 2010, http://migration.kentucky.gov/newsroom/governor/20101203exportinitiative.htm.*

Table 5-2: Kentucky International Exports, 2007[42]

	Ranked by Weight	Kilotons
1	Mining/Metals	1,628.35
2	Agriculture/Ag Products	983.33
3	Machinery	820.23
4	Petro/Chemical	739.33
5	Wood/Paper Products	392.12
6	Electronics	86.63
7	Other Manufacturing	70.76
8	Other Assoc. Freight	56.67
9	Precision Instruments	9.77

Source: FHWA FAF

	Ranked by Value (2007 Dollars)	Millions $
1	Machinery	$ 7,270.87
2	Electronics	$ 2,229.27
3	Petro/Chemical	$ 2,141.02
4	Mining/Metals	$ 1,954.38
5	Precision Instruments	$ 1,097.99
6	Other Manufacturing	$ 811.89
7	Agriculture/Ag Products	$ 763.35
8	Wood/Paper Products	$ 450.40
9	Other Assoc. Freight	$ 176.48

Source: FHWA FAF

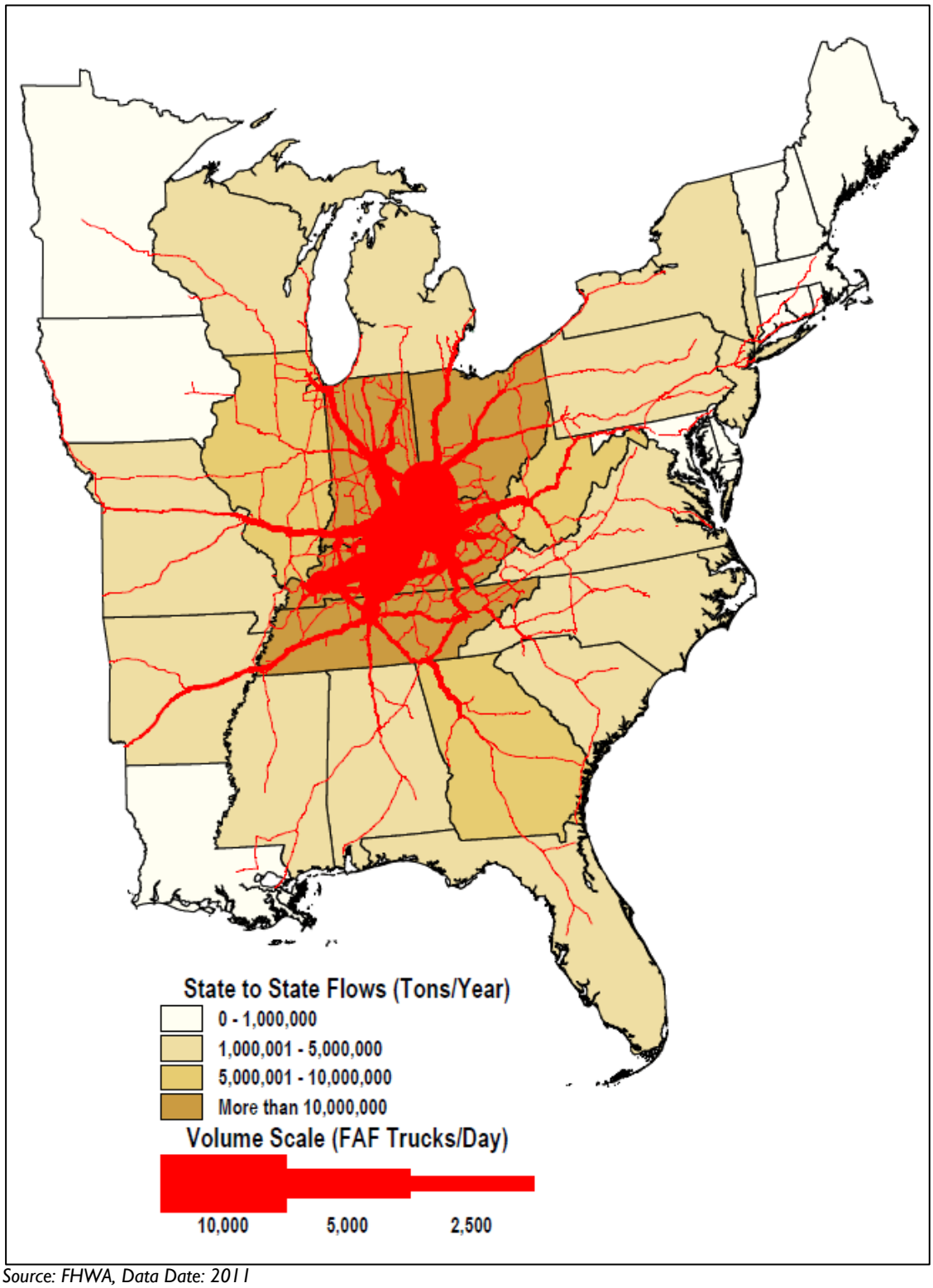
While the various exports are transported by air, truck, water, and rail, this document focuses on the exports on the highway network. These intermodal links are critical to the rapidly growing export market in Kentucky. According to the FAF network analysis and illustrated in **Figure 5-4**, I-75, I-71, I-64, and I-69 are critical highway links for Kentucky exports to Canada and Mexico.

5.3.2 National Flows

Kentucky serves as a major junction for the nation's freight network. As such, FHWA predicts significant growth through 2040. **Figures 5-4 and 5-5** demonstrate base year flows (2007) and forecasted flows in 2040. It is important to recognize the multijurisdictional nature of freight. Freight that travels in Kentucky travels throughout the eastern half of the U.S. and has key linkages to ports on the west coast. In 2040, freight volumes increase on these major corridors but also extend to reach smaller markets.

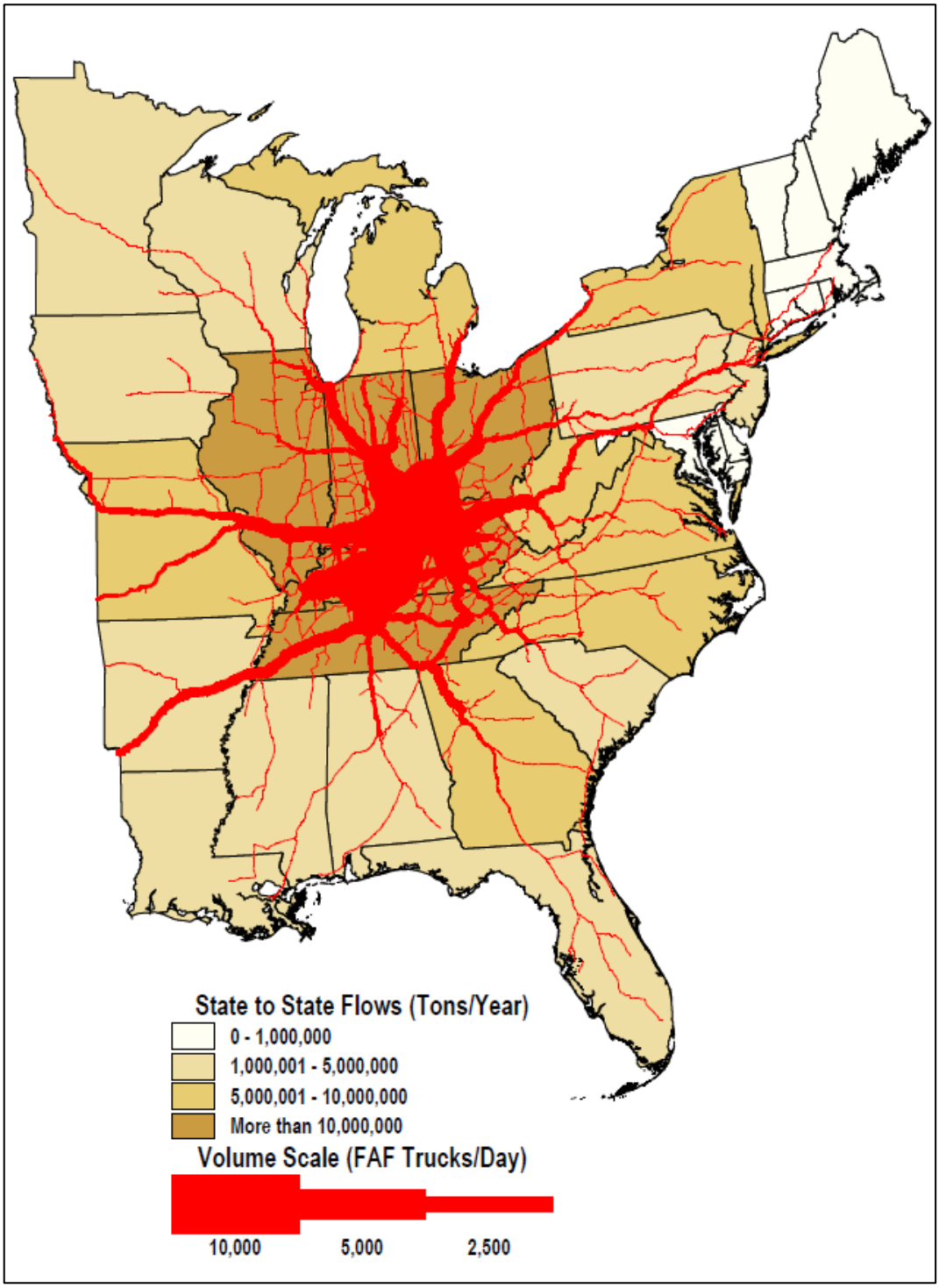
[42] *Federal Highway Administration, Freight Analysis Framework Version 3.4, 2013, http://faf.ornl.gov/fafweb/Extraction4.aspx*

Figure 5-4: Major Flows by Truck To, From, and Within Kentucky, 2007



Source: FHWA, Data Date: 2011

Figure 5-5: Major Flows by Truck To, From, and Within Kentucky, 2040

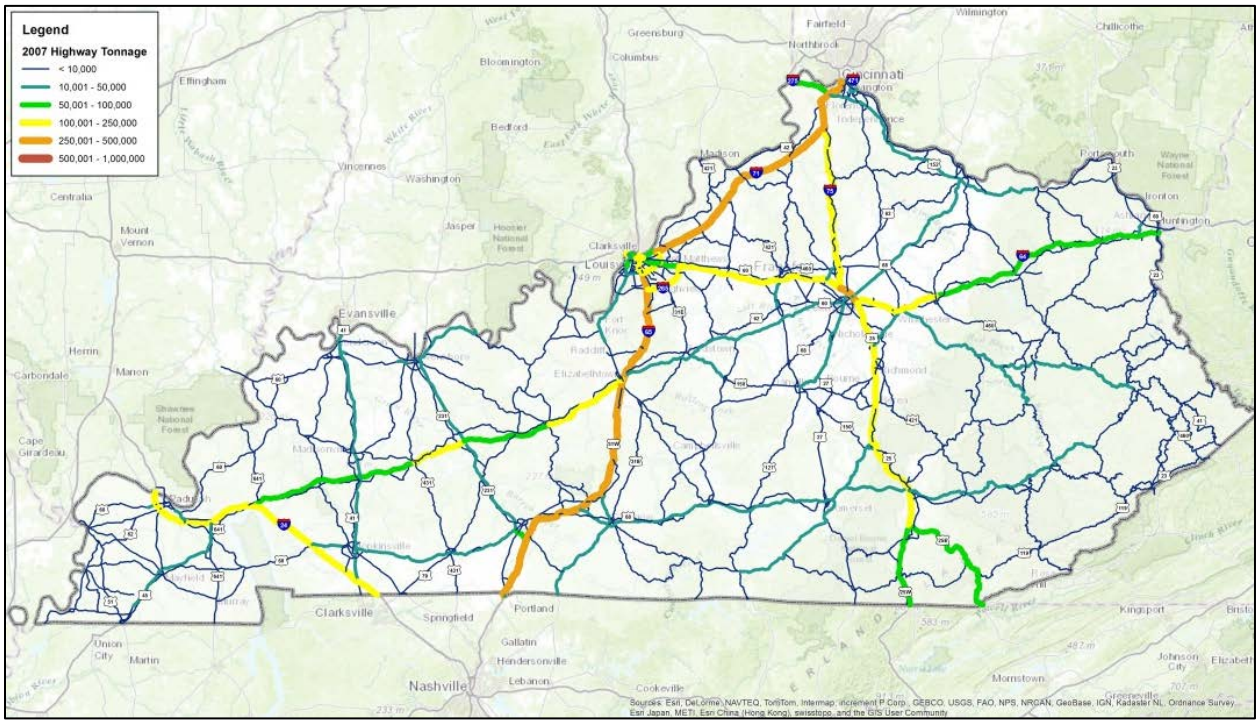


Source: FHWA, Data Date: 2011

5.3.3 Statewide Flows

While national analysis is important to understand how the bigger freight picture works, statewide analysis is particularly important to KYTC's planning process. The routes identified as critical freight corridors are within KYTC's span of control and are a known part of the planning process. **Figures 5-6 and 5-7** demonstrate the base flow year (2007) and forecasted flow in 2040.

Figure 5-6: Kentucky FAF Freight Tonnage, 2007

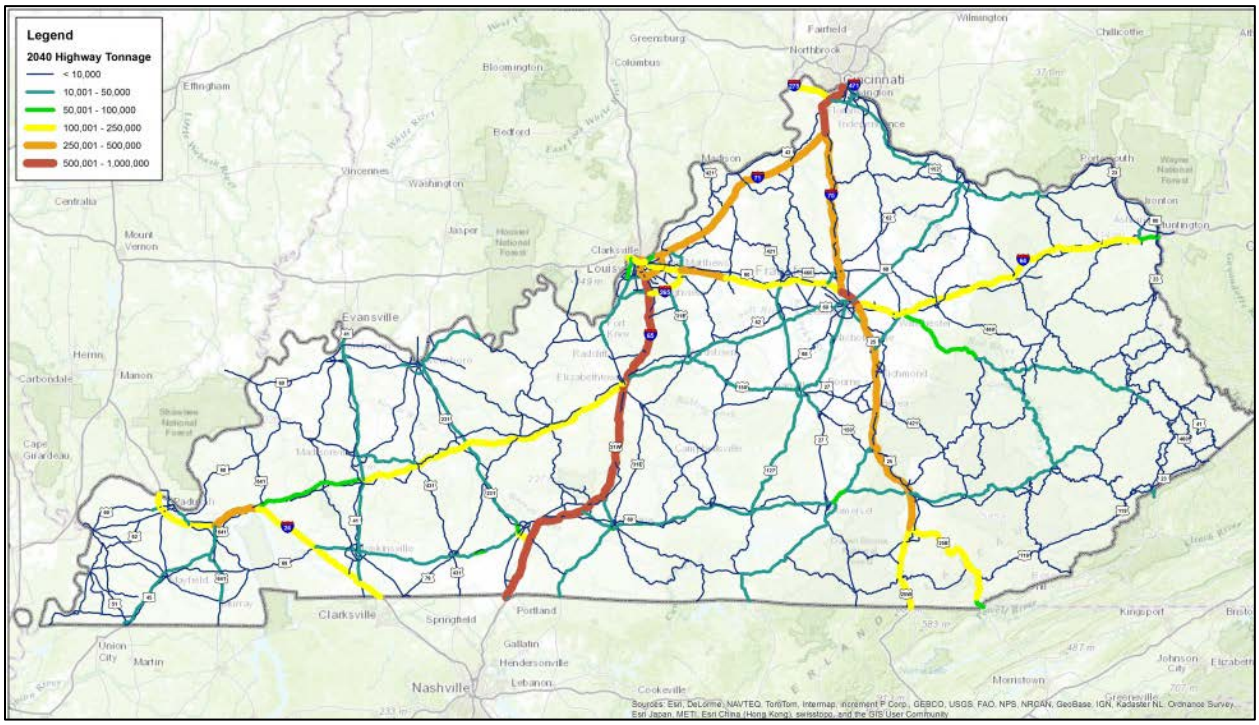


Source: FHWA, Data Date: 2013

The 2040 freight forecast uncovers significant freight challenges for many roads throughout the commonwealth. In particular, significant growth takes place on I-71/75 between the Brent Spence Bridge and the I-71/75 split (**Figure 5-7**). This corridor is particularly crucial for Kentucky's exports to Canada. Additionally, I-65 and I-64 see substantial growth. However, I-65 and I-75 see the highest tonnage on Kentucky's interstate highways. In addition, the impact of I-69 is not yet known and the full impact may be several years away, as adjacent states complete their segments of I-69.

Freight growth is not limited to the Interstate Highway System. Significant growth takes place on the NHS and some principle arterials, reflecting economic growth in rural areas of Kentucky. This is important because, to maintain the supply chain and economic growth throughout the commonwealth, freight investment in Kentucky must be balanced between heavy volume interstate highways and NHS highways that service local freight generators.

Figure 5-7: Kentucky FAF Freight Tonnage, 2040

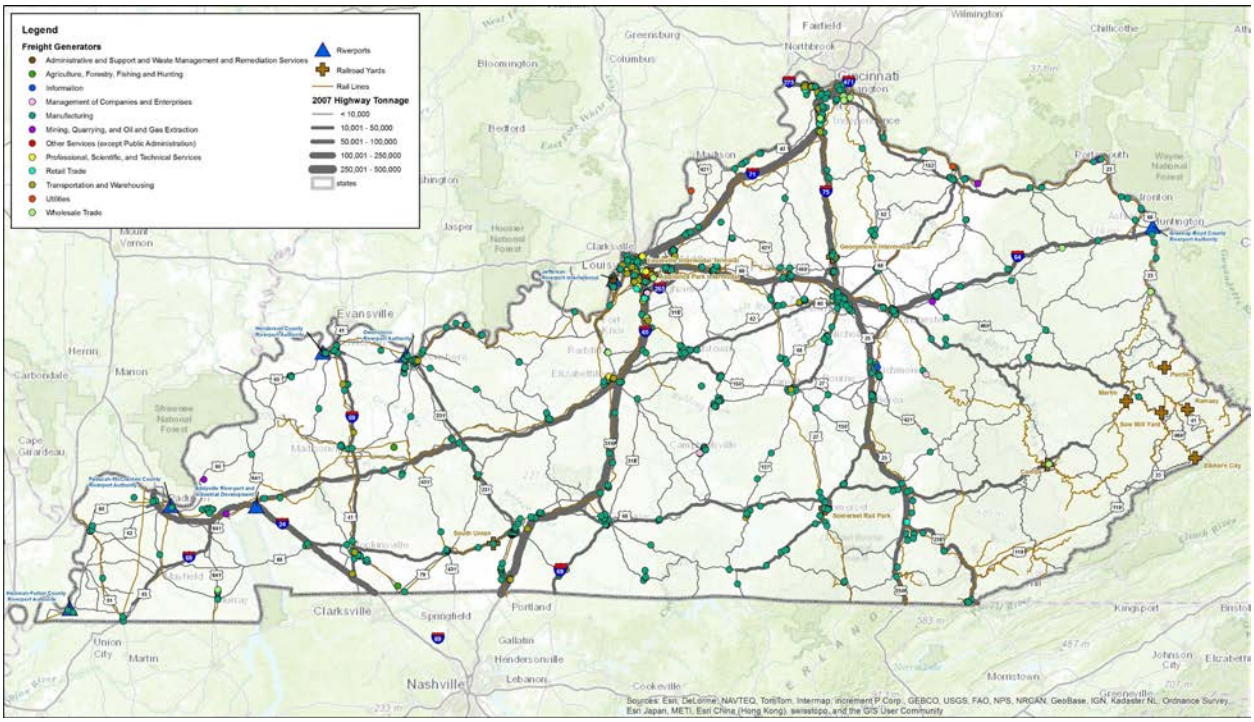


Source: FHWA, Data Date: 2013

5.3.4 Kentucky Supply Chain

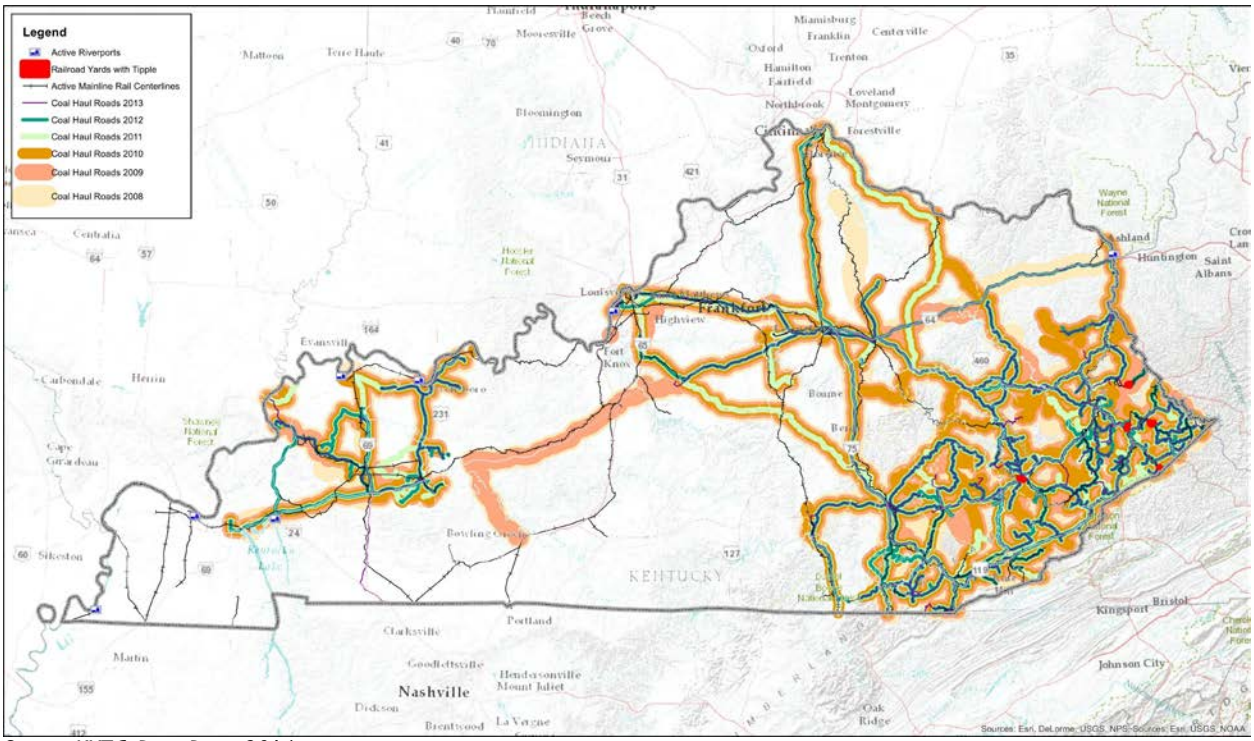
To retain and attract new economic development opportunities, one needs to understand how the supply chain and transportation system interact throughout Kentucky. Supply chains are the pathways that raw materials and production component parts move from their original sources to a production facility, warehouse, retail outlet, and the end consumer. There are significant data limitations when evaluating private companies' supply chains; simply stated, the chains are often proprietary information. However, KYTC and KTC have developed a robust freight generator database that, when used in combination with statewide FAF freight flows, can begin to give transportation planners a look into the relationship between freight generators and the highway network. This analysis is illustrated in **Figure 5-8**. Similarly, roads used for coal mining and key coal multimodal resources are in **Figure 5-9**.

Figure 5-8: Kentucky Freight Generators and Highway Tonnage



Source: FHWA Data Date: 2013, KYTC Trip Generator Data: 2014

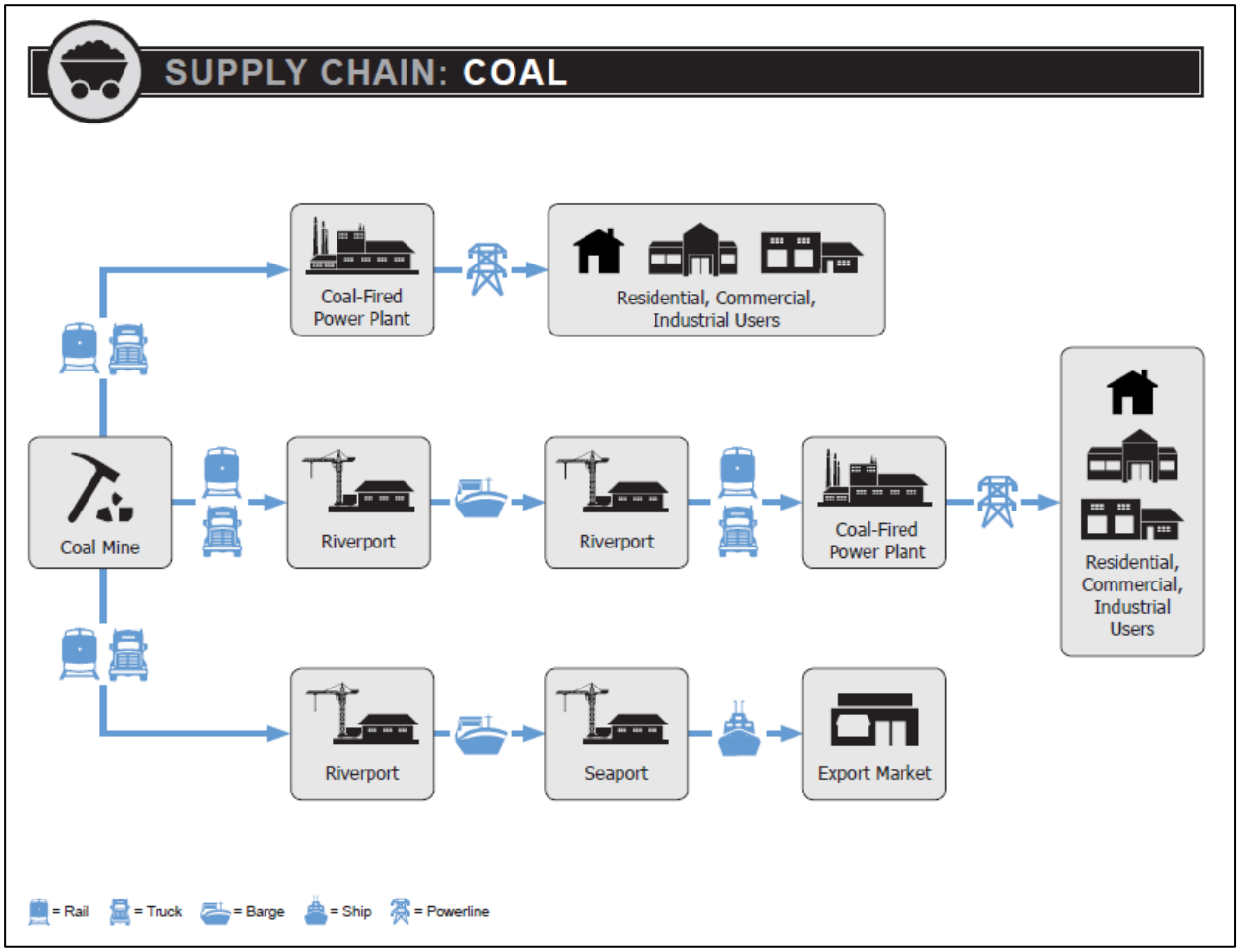
Figure 5-9: Kentucky Coal Highway Tonnage and Key Multimodal Resources



Source: KYTC, Data Date: 2014

As illustrated in **Figure 5-10**, the coal supply chain involves different modes of transportation to move this natural resource from the coal mines to coal-fired power plants and the export market. Kentucky's multimodal freight network plays a critical role in this supply chain, as shown in **Figure 5-9**. This figure depicts the various highways where coal was hauled in the state in 2014.

Figure 5-10: Kentucky Coal Industry Supply Chain



An overall understanding of the role transportation plays in supply chain decision-making will help to support KYTC's planning efforts and strategic investment in the freight system. As competition continues to grow to attract and retain business, these concepts will help Kentucky compete in the global marketplace.

5.3.5 Critical Connections and the First/Last Mile

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 important to Kentucky's economic future. Although KYTC is constitutionally limited on gas tax allocation and funding of modes other than roadways, it is important to maintain the important connectivity points with other modes of transportation. The connection points are where most efficiency is gained or lost during freight travel. In Kentucky, these

connection points are airports, rail, truck distribution centers, pipelines, and port facilities. The roads leading up to major connectivity points are designated NHS intermodal connectors by FHWA and KYTC. Kentucky's intermodal connectors are listed in **Table 5-3** and are updated biannually.

Intermodal connectors are often maintained by different entities and fall through the cracks in the planning and programming process. Investment in connectors is often in competition with other high-profile projects for ever decreasing transportation funding. Intermodal connectors often suffer geometric issues, pavement lifecycle, and other challenges that create inefficiencies and reliability issues for freight users.

Table 5-3: Freight NHS Intermodal Connectors[43]

FACILITY	TYPE	CONNECTOR DESCRIPTION
Bells Lane Petroleum/Chemical Pipeline	Truck/Pipeline Terminal	KY 2056 from I-264 W to the Louisville-Ohio River Floodwall
Bells Lane Petroleum/Chemical Port	Port Terminal	KY 2056 - Louisville-Ohio Floodwall to I-264
Campground Rd Petroleum Pipeline	Truck/Pipeline Terminal	Campground Rd (Cane Run to Ralph), Kramers Ln (Cane Run to Campground), Ralph Ave (Cane Run to Campground Rd)
Campground Rd Petroleum Port	Port Terminal	Same as above
Cincinnati/N KY International Airport	Airport	KY 212 from I-275 S to the Airport Roadway System
Clark Elkhorn Coal Tipple	Truck/Rail Facility	KY 1441 (US 460 to Clark Elkhorn Tipple #1 Ent), KY 1789 (US 460 to KY 1441)
Golden Oak Mining CO.	Truck/Rail Facility	KY 7 (KY 15 to KY 931), KY 931 (KY 7 to Facility)
Ivel Coal Tipple	Truck/Rail Facility	County Rd 1020 - US 23 to Facility
Lexington Bluegrass Field	Airport	FS 8550 - US 60 to Facility
Louisville International Airport	Airport	Grade Ln (I-264 to UPS Feedor Truck Entrance), FS 8879 (I-264 to Facility)
Louisville/Ashland Oil/Chevron Dist. Center	Truck/Pipeline Terminal	KY 1681 - KY 4 Interchange to Facility
McCoy Elkhorn Coal Corp	Truck/Rail Facility	KY 194 - US 119 to Facility
Norfolk Southern Intermodal - Georgetown	Truck/Rail Facility	KY 620 - Facility to I-75 Interchange
Norfolk Southern Intermodal - Louisville	Truck/Rail Facility	Newburg Rd (I-264 to Bishop), Bishop Ln (Newburg to Jennings), Jennings Ln (Bishop to Facility)
Owensboro Riverport	Port Terminal	KY 331 (US 60 to Harbor Rd), Harbor Rd (KY 331 to Facility)
Praise Dock Coal Tipple	Truck/Rail Facility	KY 80 from US 460 to Facility
Truck to Barge Coal Dock Cluster, Boyd County	Port Terminal	KY 757 from US 23 near Lockwood to 2.3 Miles North

[43] *Federal Highway Administration, National Highway System: Intermodal Connectors, June 18, 2012, http://www.fhwa.dot.gov/planning/national_highway_system/intermodal_connectors/kentucky.cfm*

5.4 Kentucky Military Installations

The U.S. military has a significant presence in Kentucky. Military installations require efficient and reliable access to the freight transportation system for national defense purposes. The U.S. military depends on the Kentucky freight system to move cargo to not only support the installations, but also to deploy personnel and equipment for national defense. To meet this critical need, the Strategic Highway Network (STRAHNET) and the Strategic Rail Network (STRACNET) were developed by the Department of Defense (DoD) in coordination with FHWA.[44] The STRAHNET and STRACNET are networks of highways and rail lines, respectively, which provides the U.S. military access, continuity and emergency capabilities for defense purposes.

The state's military installations serve as major freight generators, consumer markets and need connectivity to the freight transportation system. At Fort Campbell, the U.S. Army has its highest concentration of rotary-winged aircraft and its fifth largest concentration of soldiers in the U.S., approximately 30,000. The 101st Airborne Division (Air Assault) is renowned for its unique warfighting capabilities and storied history. Fort Knox is home to a wide diversity of Army units, to include combat, logistics, combat-support, operations and administrative. Other key installations include the Blue Grass Army Depot and the Wendell H. Ford Regional Training Center (Kentucky National Guard). Also the Kentucky National Guard has numerous Army and Air Guard units domiciled throughout the state including the 123rd Airlift Wing based in Louisville. Diverse and complex supply chains are necessary to efficiently and reliably provide logistics support to these military sites. Enormous amounts of fuel, food, ammunition, maintenance, equipment & materials, and medical supplies are critical to maintaining these units in a combat-ready posture. Transportation infrastructure to include highways, rail, inland waterways and air are critical to supporting these supply chains and to support deployment of units.

[44] https://www.fhwa.dot.gov/policy/2004cpr/chap18.cfm

6 Trends and Challenges

Economic changes can impact the freight system positively or negatively depending on the efficiency and adaptability of the transportation network. This chapter summarizes the internal and external economic trends and challenges related to the movement of goods on the Commonwealth's freight network.

6.1 Internal Trends and Challenges

Until the 20th century, agriculture was Kentucky's main economic activity. While farming remains important to the commonwealth's economy, as a result of abundant coal and hydroelectric power, manufacturing grew in importance after the 1930s. In 2015, Kentucky's leading economic activity was service industries, followed by manufacturing. The energy, automotive, and agriculture trends and challenges in Kentucky and how they affect freight transportation are discussed below.

6.1.1 Energy

According to the EIA, Kentucky is a leading coal-producing state, ranking third in 2013 with an output of 80 million short tons of coal, accounting for 8.2 percent of the total U.S. coal production. Approximately 60 percent of Kentucky's coal comes from underground mines in Kentucky's eastern Appalachian counties and in western Kentucky. The rest of the coal comes from surface mines. For electricity generation, coal-burning plants produce approximately 91 percent of Kentucky's electric power. However, many coal-fired generation plants on the Ohio River are anticipated to convert to natural gas over the next decade. Hydroelectric utilities, such as the Barkley and Kentucky dams, produce almost 4 percent of the electric power, followed by natural gas at 3 percent.

Significant coal production shifts, geographically or by volume, continue to have a dramatic impact on the Kentucky Freight Network. For example, roads that currently serve coal mining operations could continue to see heavy truck traffic, or if projections are correct, the same roads could see a dramatic decrease in heavy-haul traffic. Similarly, the inland waterway system carries a significant amount of Kentucky coal to customers throughout the Mississippi and Ohio River valleys. This excess capacity could provide opportunities to innovate and explore container-on-barge in the Midwest.

6.1.1.1 Coal Production Shifts

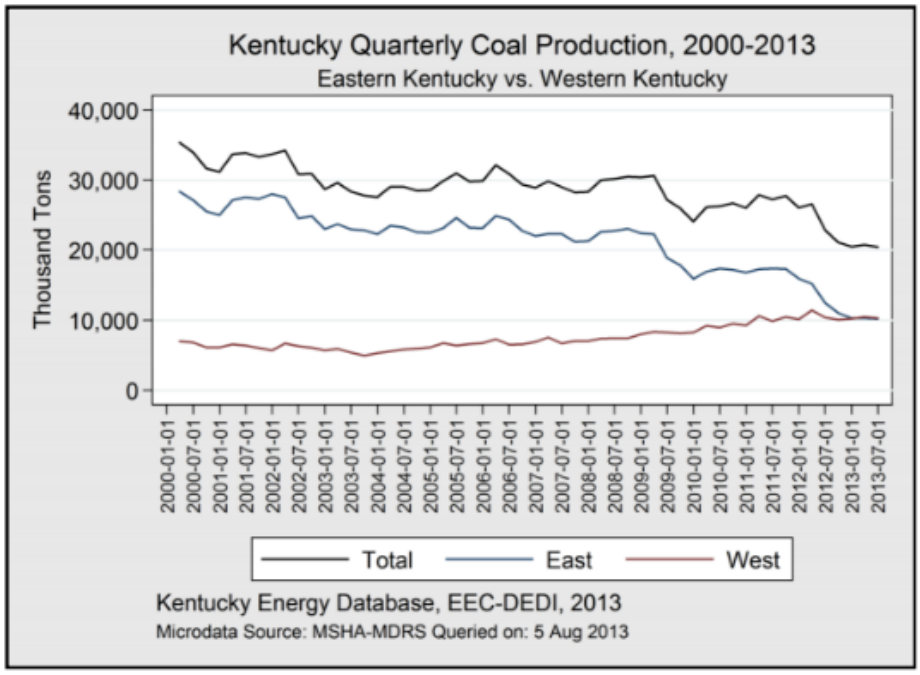
Historically, Kentucky is a net exporter of energy; however, with decreasing coal production and stagnant energy demand, Kentucky's position as an energy exporter has been declining since 1990.

Kentucky is the only coal exporting state with two distinct geologic basins: the Central Appalachian Basin of eastern Kentucky and the Illinois Basin of western Kentucky. Coal mining of some form has existed in these basins for at least 220 years. Historically, eastern Kentucky has been the primary coal producing region of the commonwealth, but in recent years the two regions have been trending in opposite directions. Eastern Kentucky coal has a higher heat content and lower sulfur content, so it burns hotter and cleaner than western Kentucky coal. However, western Kentucky coal is now

relatively less expensive by delivered price. The difference is a result of several factors, including transportation costs, ease of access, and mining techniques employed.[45]

Figure 6-1 illustrates the change in total statewide coal production alongside subtotals for eastern and western Kentucky from 2000 to 2013. In 2013, western Kentucky overtook eastern Kentucky in total coal production, generating 51 percent of Kentucky's 80.6 million tons of coal.

Figure 6-1: Kentucky Coal Production from 2000-2013

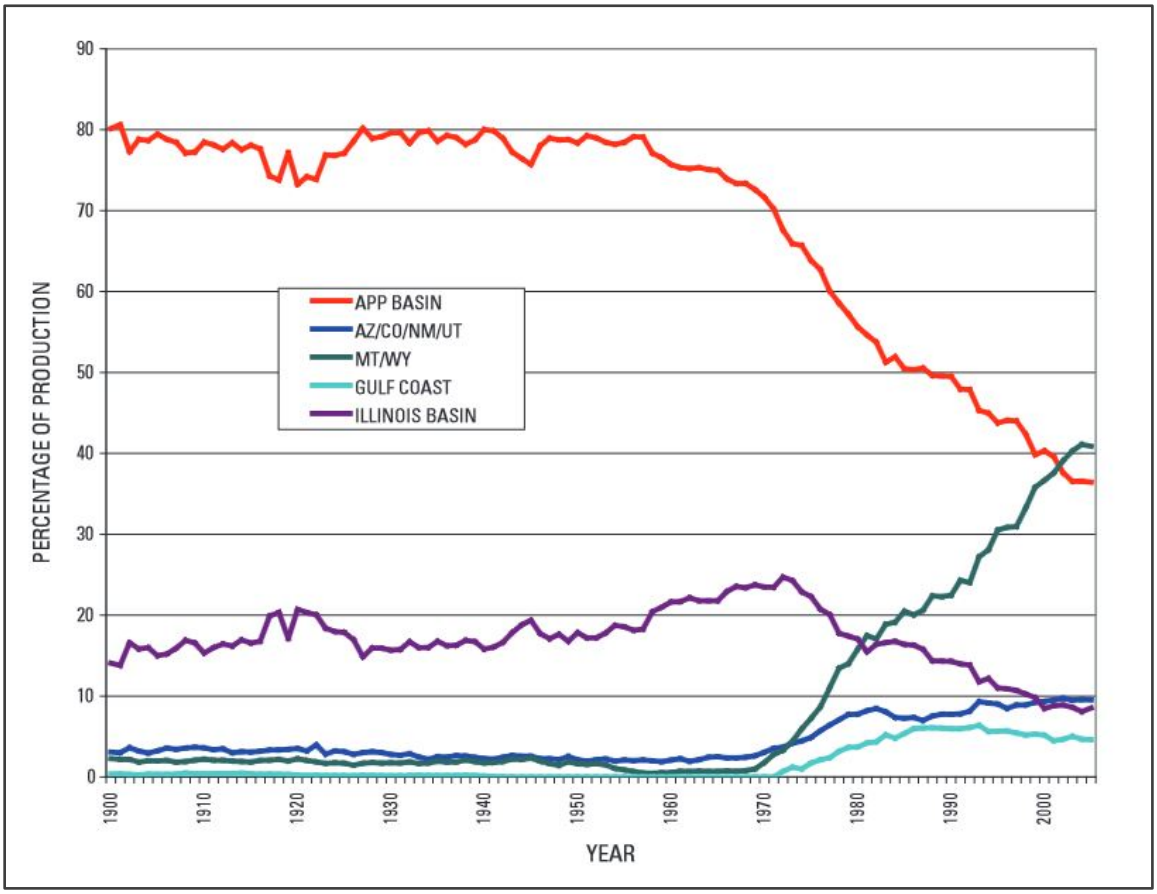


Source: Appalachian Voices, Appalachian Coal Losing Another Customer: Eastern Kentucky as a Case Study, October 24, 2013, http://appvoices.org/2013/10/24/eastern-kentucky-as-a-case-study/

The decline in eastern Kentucky coal production is representative of the larger decline in Appalachian Basin coal. **Figure 6-2** depicts this decline in comparison to competing coal reserves as a percentage of total U.S. coal production.

[45] *https://energy.ky.gov/Programs/Data%20Analysis%20%20Electricity%20Model/KEP_2014.pdf*

Figure 6-2: Historic Coal Production by Geologic Basin



Source: The National Coal Resource Assessment Overview, Chapter H Production and Depletion of Appalachian and Illinois Basin Coal Resources, 2009, http://pubs.usgs.gov/pp/1625f/downloads/ChapterH.pdf

As shown in **Figure 6-2**, eastern Kentucky is included in the Appalachian Basin line (red), while western Kentucky is included in the Illinois Basin line (purple). Kentucky's decline in coal production coincides with the rise of Powder River Basin coal from Montana and Wyoming (dark green line). The ongoing boom in shale gas also played a factor in hastening the decline of Appalachian Basin coal.

As the remaining coal in eastern Kentucky becomes more expensive to mine, coal companies are competing against cheaper fuels including western Kentucky coal, natural gas, energy efficiency, and some renewable sources.[46] The EIA's Annual Energy Outlook projects that Central Appalachian coal production will sharply drop from 2012 to 2020.[47] A recent United States Geological Survey (USGS) Coal Resource Assessment states that annual coal production from the Appalachian Basin will enter a period of irreversible decline over the next several decades.[48]

More than 91 percent of electricity produced in Kentucky is coal-generated. By comparison, coal generates only 39 percent of electricity in the U.S. Natural gas-generated electricity is growing but still

[46] *https://www.kftc.org/campaigns/appalachian-transition/coal-production-and-employment-trends*
[47] *http://www.eia.gov/forecasts/aeo/er/*
[48] *http://pubs.usgs.gov/pp/1625f/*

marginal in Kentucky. Coal has historically been the cheapest and most stable energy source, since it can easily be stockpiled and used when needed, unlike natural gas and renewables. The cost of natural gas has decreased significantly in recent years but is still more expensive than coal. Despite its precipitous decline, coal is expected to remain a major component of Kentucky's energy profile for the foreseeable future.[49]

6.1.1.2 Power Plant Conversions – Coal to Natural Gas

Across the U.S., 27 gigawatts of coal-fired power plant capacity has been retired or is set to be retired by 2017. In Kentucky, more than 40 power plants with 17 gigawatts of electric generating capacity are expected to remain online through 2020. Approximately 5.4 gigawatts of coal-fired generating capacity has recently been retired or will be retired by 2020. Of the approximate 16.8 gigawatts of total capacity expected to be online in 2020, approximately 65 percent are coal-fired, 30 percent are natural gas-fired, 4.8 percent are hydro power, and 0.4 percent are biomass units.[50]

Factors influencing this trend of retiring older, less efficient coal-fired power generators include slowing growth in electricity demand, shifts in relative fuel prices, increasing availability of high-efficiency natural gas combined-cycle power plants, and environmental compliance costs.[51] Most coal generators in Kentucky were constructed between the mid-1950s and 2010, and several have been retrofitted with environmental controls to meet air quality emissions standards. However, many others need further upgrades, as standards have become more stringent.

Since coal has encompassed a large percentage of commodities being moved across Kentucky, the trend of power plant conversions has significant implications on the way freight moves throughout Kentucky's freight system.

6.1.1.3 Kentucky Coal Movement Out of State

Foreign coal remains a small part of total U.S. coal consumption, but Central Appalachian coal is especially vulnerable to the competition as it loses market share to natural gas and coal from elsewhere in the U.S.[52]

In 2013, 39 percent of Kentucky coal stayed in state, while 60 percent was exported out of state. The remaining 1 percent was shipped overseas, representing a new high in Kentucky coal foreign exports. Eastern Kentucky coal was sold mostly to southeastern U.S. states (Georgia being the largest consumer), while western Kentucky coal (59 percent) was mostly used in state. Kentucky remains the single largest user of Kentucky coal, increasing its consumption as other states decreased consumption.

Table 6-1 provides 2012 freight transportation statistics for coal in Kentucky.

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[49] *http://energy.ky.gov/Pages/CoalFacts.aspx*

[50] *https://energy.ky.gov/Programs/Data%20Analysis%20%20Electricity%20Model/KEP_2014.pdf*

[51] *http://www.eia.gov/todayinenergy/detail.cfm?id=7290*

[52] *http://www.mcclatchydc.com/2014/09/22/240660/kentucky-is-hit-hard-as-its-coal.html*

Table 6-1: Freight Statistics – Coal

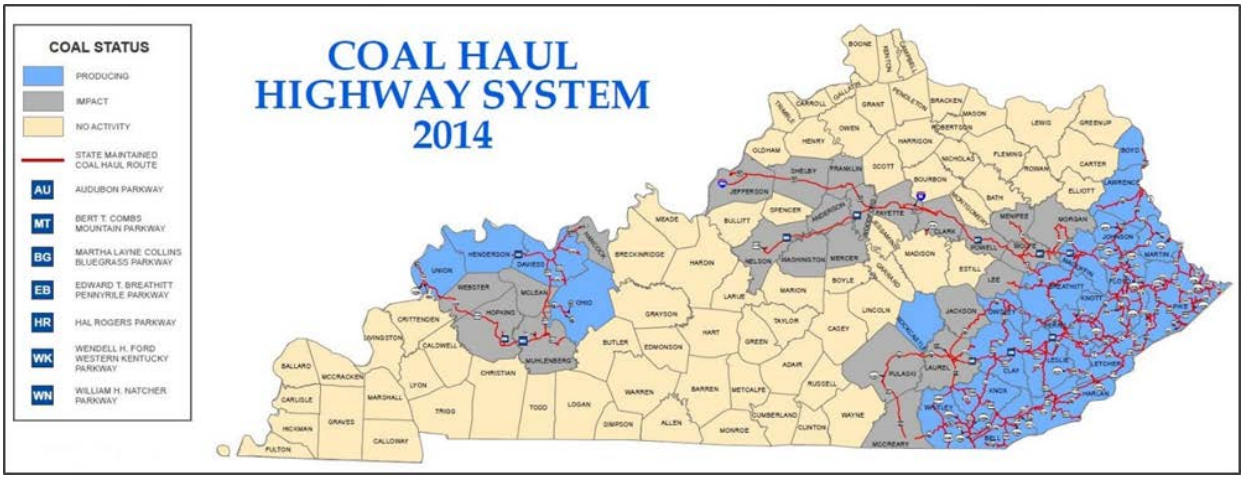
Freight Commodity: Coal	Ton-Miles (millions)			Commodity Ton-Miles Share		Commodity Value Share	
	2007	2012	Change	2007	2012	2007	2012
Within Kentucky	6,862	7,307	6%	31%	32%	1%	2%
From Kentucky	76,189	82,728	9%	59%	59%	4%	4%
To Kentucky	32,832	36,877	12%	36%	37%	0%	0%

Source: Freight Analysis Framework Summary Statistics, 2012

In 2012, coal was the top ranking commodity transported within, from, and to Kentucky by ton-miles. However, by commodity value, coal ranks 7th as an export from Kentucky, and it is ranked outside the top 10 commodities by value as a shipment within and to Kentucky.[53]

Due to the production of coal on the eastern and western portions of the state, significant volumes of coal are shipped on Kentucky's roadways. **Figure 6-3** illustrates the major coal producing counties in Kentucky, the highways on which coal is transported, and the counties included in the road transport of coal.

Figure 6-3: 2014 Kentucky Coal Haul Highway System



Source: http://transportation.ky.gov/Planning/Pages/Coal-Haul.aspx, 2014

In terms of tonnage, commodity transport consists largely of coal on the Ohio River (56 percent in 2010) and the Tennessee-Tombigbee Waterway (69 percent 2010).[54] Railroads are also integral for the delivery of coal from mines to power plants. The Paducah & Louisville Railway annually transports approximately 12 million tons of coal to river terminals located on the Tennessee River, where hopper cars of coal are delivered by rail to an intermodal facility for transloading to truck and delivery to final destinations.

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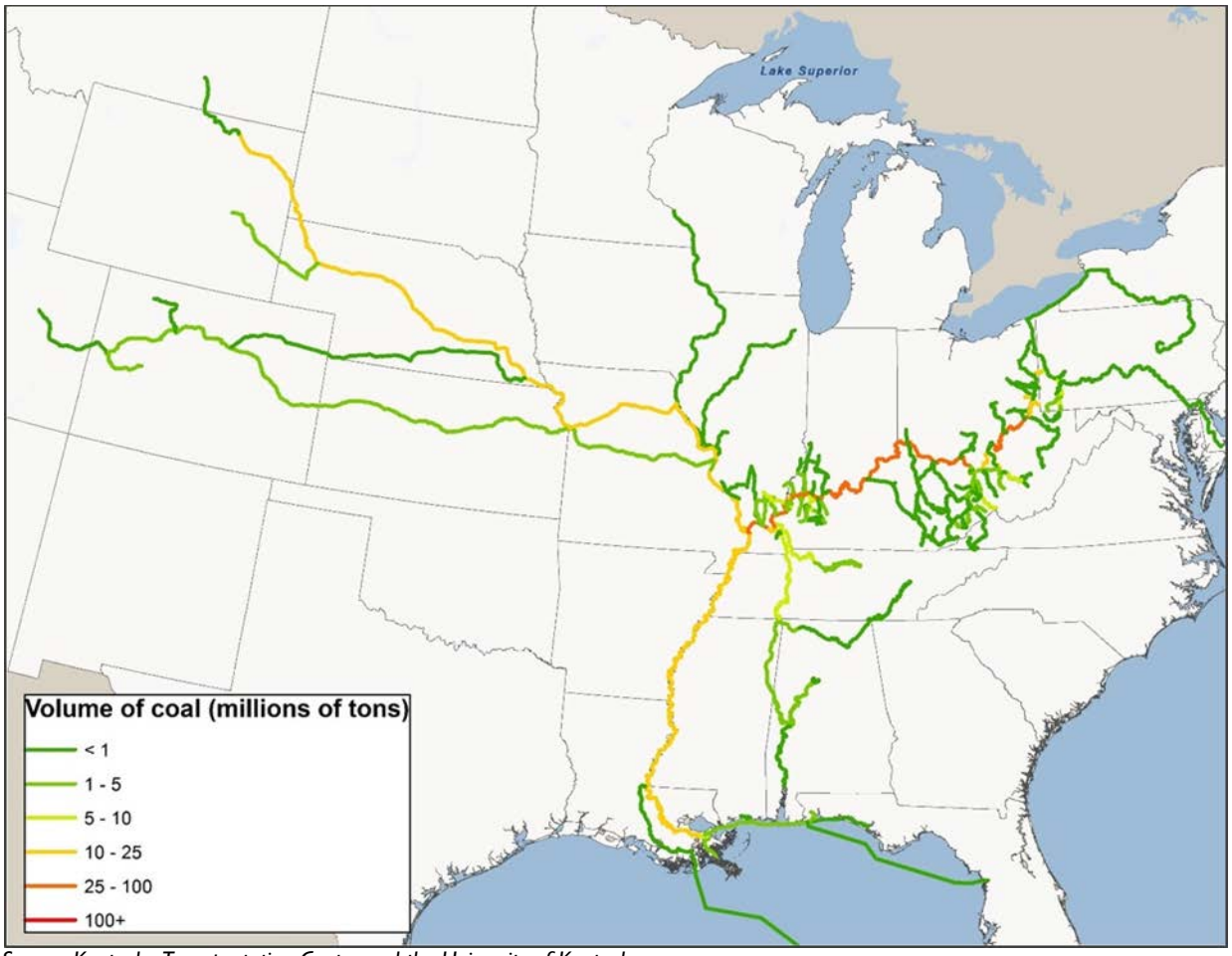
[53] http://faf.ornl.gov/fafweb/FUT.aspx

[54] http://www.lrd.usace.army.mil/Portals/73/docs/Navigation/PCXIN/Inland_Waterways_and_Export_Opportunities-FINAL_2013-01-03.pdf

Figure 6-4 illustrates the full intermodal routes of coal shipments on the Ohio River.

Figure 6-4: Full Intermodal Routes of Coal Shipped on the Ohio River



Source: Kentucky Transportation Center and the University of Kentucky

6.1.2 Automotive

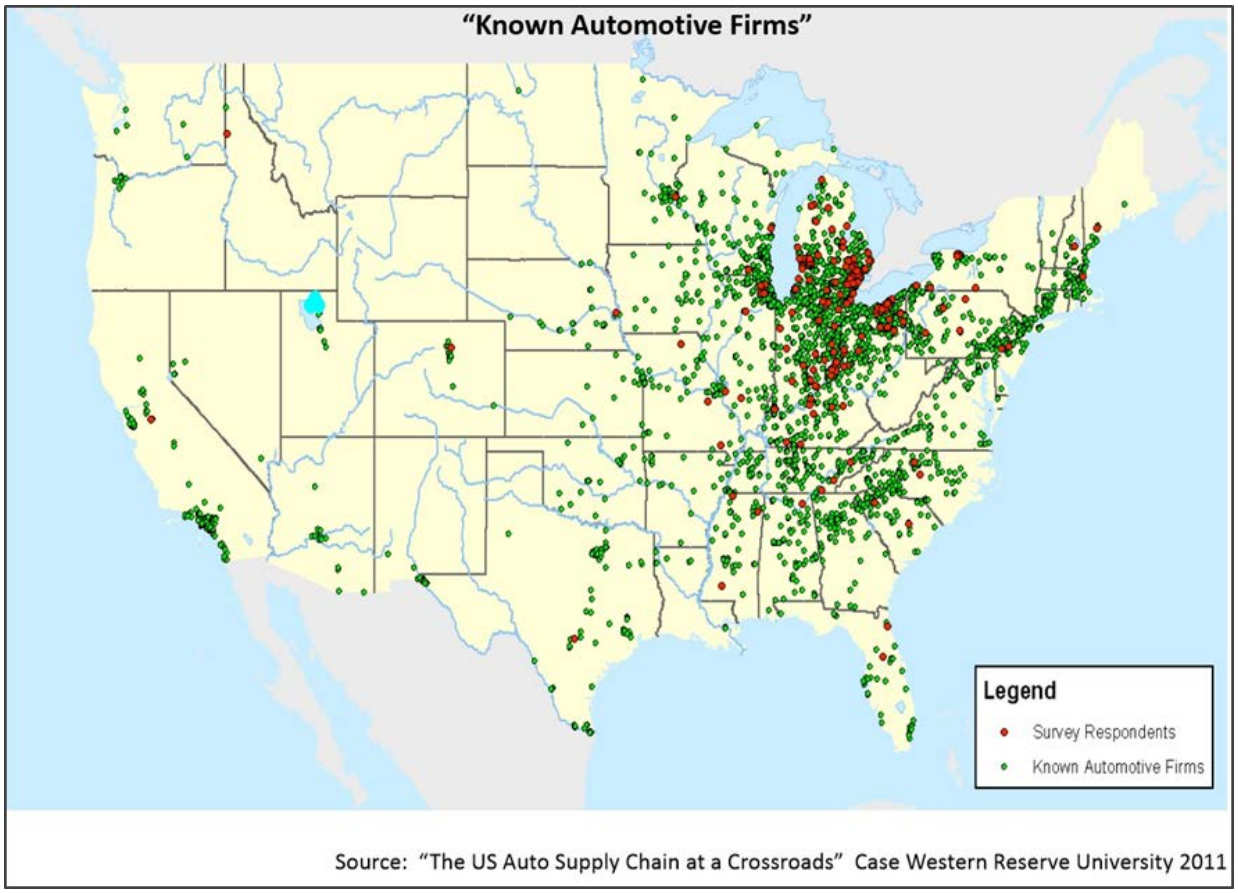
Kentucky is a major player in the auto industry, with four assembly plants and over 450 parts suppliers located in-state. In 2013, Kentucky manufactured over 1.2 million automobiles, which accounted for 11.2 percent of total U.S. auto production, ranking Kentucky third overall (behind Michigan and Ohio) in auto production by state. More specifically, Kentucky ranks third in car manufacturing and second for light trucks. Automotive-related industries represent 2.36 percent of total state GDP, or $908 motor vehicle GDP per capita. The success of Kentucky's automobile industry can be primarily attributed to its geographic location along the north-south rail and highway distribution corridors, which are tapped into North America Free Trade Agreement (NAFTA) flows.[55]

Nationally, a concentration of automotive manufacturing exists along a multistate north-south corridor, roughly following the paths of I-65 and I-75, both of which transect Kentucky and parallel NS and CSXT rail lines. The northern half of auto manufacturing largely consists of domestic manufacturers (Ford, GM,

[55] *http://midamericafreight.org/wp-content/uploads/Lambert_AutoIndustryInTheSoutheast.pdf*

and Chrysler), while the southern half consists of foreign manufacturers (Nissan, Toyota, BMW, Mercedes-Benz, and Volkswagen). Scattered throughout the U.S. are thousands of parts suppliers and manufacturers who are integrated into the automotive supply chain that extends from Canada to Mexico. **Figure 6-5** is a map of motor vehicle-related firms throughout the U.S.

Figure 6-5: Automotive Industry in the U.S.



Source: Case Western Reserve University, 2011

Louisville is home to two Ford assembly plants: the Kentucky Truck Plant (KTP) and the Louisville Assembly Plant (LAP). The KTP assembles Ford F-Series Super Duty trucks, the Ford Expedition, and the Lincoln Navigator. The Louisville Assembly Plant assembles the Ford Escape and Lincoln MKC, but also has the capability to simultaneously produce the company's Focus, Fiesta, and Fusion models to meet demand.[56]

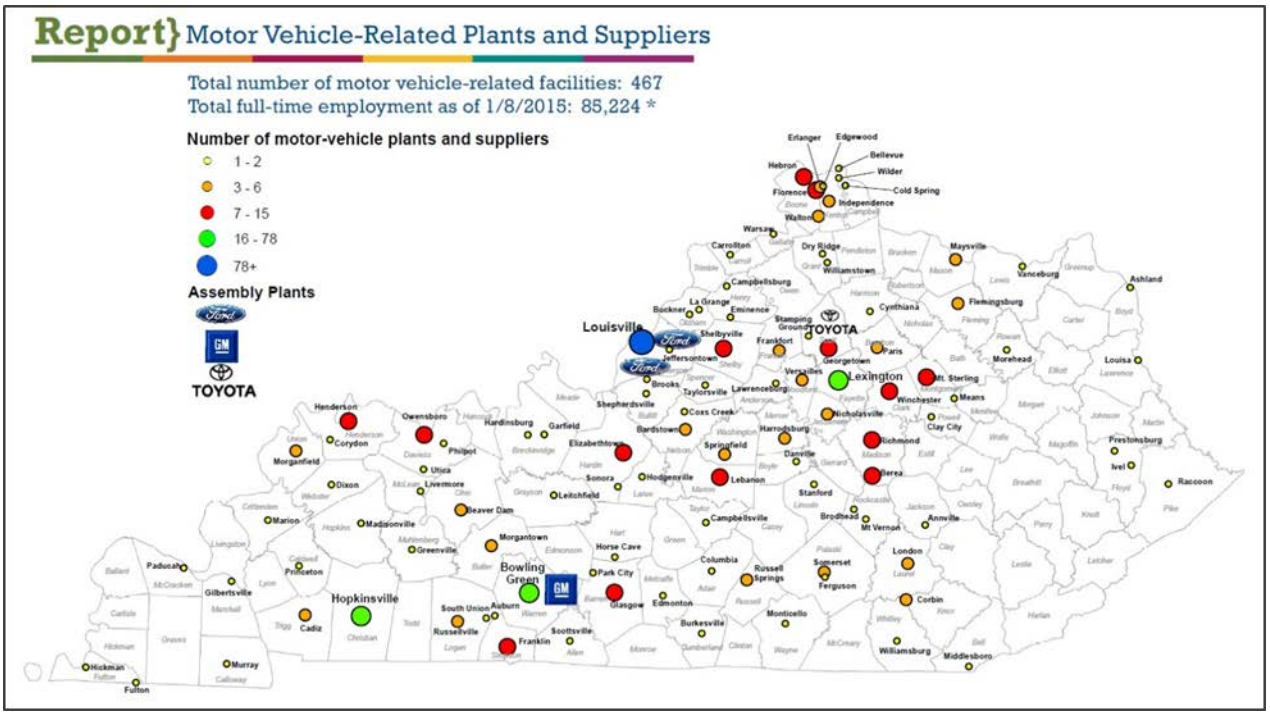
Toyota opened its first assembly plant outside of Japan in 1988 in Georgetown, and today Toyota Motor Manufacturing Kentucky (TMMK) is the company's largest production plant outside of Japan. TMMK has two vehicle production lines and a powertrain, engine, and axle facility. The plant currently assembles the Camry, Camry Hybrid, Avalon, Venza, and Lexus ES 350—becoming the first plant outside of Japan to assemble a Lexus model. TMMK is the only U.S. plant to export Camrys outside of North America. Starting in 2015, TMMK is producing 50,000 Lexus vehicles per year, bringing TMMK's total production

[56] *http://businessclimate.com/kentucky-economic-development/auto-companies-accelerate-investment-kentucky*

capacity to 550,000. TMMK utilizes more than 350 suppliers across the U.S., including approximately 100 in Kentucky.[57] [58]

Lastly, Bowling Green has been the exclusive production home of Chevrolet's high-performance Corvette since 1981.[59] **Figure 6-6** illustrates the automotive-related plants and suppliers in Kentucky.

Figure 6-6: Automotive Industry in Kentucky



Source: Kentucky Cabinet for Economic Development, 2015

Motor vehicles are transported by truck on car carrier trailers, by rail on 'autorack' rail cars, or by sea on car carrier ships. Autoracks have two or three decks and can carry up to 20 vehicles, but the average is around 12 vehicles. Domestically assembled vehicles are transported from assembly plant to dealership either by truck or a combination of truck and rail depending on distance to destination. Costs rise substantially for car carrier truck routes that are more than a few hundred miles. Generally, after vehicles are transported by rail, trucks carry the vehicles for the final leg from the railhead to the dealership, which is typically up to 75 miles. The average rail journey for a new car in the U.S. is approximately 1,300 miles. Automakers, which generate 8 to 9 percent of total rail freight, have little leverage with railroads, since there are no cost-effective alternatives to shipping vehicles via rail. Vehicles assembled overseas arrive into coastal ports and are accepted into the existing domestic transport system.[60] [61]

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[57] *http://www.thinkkentucky.com/kyedc/pdfs/kyautoquickfacts.pdf*

[58] *http://businessclimate.com/kentucky-economic-development/toyota-selects-kentucky-lexus-es-350-production*

[59] *http://businessclimate.com/kentucky-economic-development/auto-companies-accelerate-investment-kentucky*

[60] *http://www.autonews.com/article/20120612/oem01/120619973/rail-car-shortage-hampers-auto-shipments*

[61] *https://www.aar.org/Pages/Freight-Rail-Traffic-Data.aspx#annualrailtraffic*

From Kentucky, motor vehicle rail shipments are typically transported from the assembly plant to a regional rail yard, where the rail cars are organized and shipped out to a railhead near their destination market. Toyota in Georgetown and Ford's two Louisville plants are major drivers of rail freight in Kentucky.[62] **Table 6-2** provides freight transportation statistics for motorized vehicles in Kentucky in 2012.

Table 6-2: Freight Statistics – Motorized Vehicles

Freight Commodity: Motorized Vehicles	Ton-Miles (millions)			Commodity Ton-Miles Share		Commodity Value Share	
	2007	2012	Change	2007	2012	2007	2012
Within Kentucky	176	184	5%	1%	1%	21%	22%
From Kentucky	4,628	4,904	6%	4%	4%	26%	25%
To Kentucky	2,144	2,314	8%	2%	2%	12%	12%

Source: Freight Analysis Framework Summary Statistics, 2012

In 2012, motorized vehicles were the fourth ranked commodity transported from Kentucky and the eighth ranked commodity to Kentucky by ton-miles; however, vehicles do not rank inside the top 10 commodities shipped within Kentucky by ton-miles. By value, motor vehicles rank as the top commodity shipped within, from, and to Kentucky.

Continued growth of Kentucky's automotive industry, represented by the growth in commodity ton-miles and commodity value share, will put increased pressure on the freight transportation system in Kentucky, particularly on the rail and highway systems, which bear the brunt of movement of motor vehicles.

6.1.3 Agriculture

Agriculture is geographically dispersed due to its reliance on land. It cannot simply locate near its customers, especially since more and more of those customers are global. Agricultural production depends on a complete transportation system that includes all major modes of transportation (truck, rail, barge, aircraft, and ocean vessel), with their complementary and competitive roles in transporting farm goods. Due to its cyclical nature during annual periods of growth in volume, agriculture, in turn, puts pressure on the transportation system. Many agricultural commodities are perishable, seasonal, and of relatively low value, making efficient and appropriate transportation challenging but critical.

Kentucky remains one of the nation's major agricultural states. Kentucky ranks second among states, after North Carolina, in the production of tobacco. The Commonwealth's other major cash crops are corn, soybeans, and hay. Kentucky's farmers also raise livestock, mostly cattle and horses. The breeding and selling of thoroughbred horses is Kentucky's most valuable source of livestock income. Most of the thoroughbred horses come from the bluegrass pastures located near Lexington.

Agricultural trends in Kentucky are consistent with the trend of population migration out of rural areas and into more urban and suburban settings. Kentucky's rural population share decreased from 69 percent in 1930 to 41 percent in 2010. Increased agricultural efficiency and automation have resulted in

[62] *http://www.lanereport.com/32260/2014/06/freight-rail-still-on-a-roll/*

increased output that, when coupled with advancements in transportation technology, have enabled population growth to occur far from food production.

Between 1950 and 2010, the average farm size in the U.S. increased from 213 acres to 418 acres, while Kentucky's average farm size increased from 86 acres to 163 acres (or by 90 percent) over the same period. Kentucky has 63 percent fewer farms and 29 percent fewer total farm acres in 2010 versus 1950, but over the same period, production volume increased by 283 percent.[63]

The current composition of Kentucky crop production consists primarily of corn, soybeans, and wheat. In 2013, corn accounted for 13 percent of all Kentucky farm revenue ($6 billion), which was a decrease from 18 percent in 2012. Kentucky's production of grains and soybeans provided a net increase of 134 million bushels between 1950 and 2010.[64] In general, crop production in the eastern half of Kentucky has been decreasing while the remainder of the commonwealth has seen an increase in production.

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. As with most commodities, trucks are often the first and last mode in the transport of agricultural products. Inland waterways are plentiful in Kentucky, with access to the Ohio, Tennessee, Green, and Cumberland rivers; however, inland waterway shipments of grain are much smaller than shipments of coal and aggregates.[65]

Table 6-3 provides freight transportation statistics for all agriculture-related commodities in Kentucky in 2012. The table combines data from the following commodities: live animals/fish, cereal grains, other farm goods, animal feed, meat/seafood, milled grain products, and tobacco products.

Table 6-3: Freight Statistics – Agriculture (All Farm Goods)

Freight Commodity: All Farm Goods	Ton-Miles (millions)			Commodity Ton-Miles Share		Commodity Value Share	
	2007	2012	Change	2007	2012	2007	2012
Within Kentucky	1,796	1,922	7%	8%	8%	6%	6%
From Kentucky	9,166	9,838	7%	7%	7%	5%	5%
To Kentucky	3,015	3,141	4%	3%	3%	4%	4%

Source: Freight Analysis Framework Summary Statistics, 2012

Of all agricultural freight in Kentucky, cereal grains comprise the vast majority of shipments. To provide additional perspective, **Table 6-4** below outlines the freight transportation statistics for cereal grains in 2012.

[63] *Soy Transportation Coalition, http://www.soytransportation.org/RuralInfrastructure/KentuckyProfile.pdf*
[64] *http://www.soytransportation.org/RuralInfrastructure/KentuckyProfile.pdf*
[65] *http://www.kentucky.com/2013/12/05/2970927_kentucky-agriculture-forecast.html?rh=1*

Table 6-4: Freight Statistics – Agriculture (Cereal Grains)

Freight Commodity: Cereal Grains	Ton-Miles (millions)			Commodity Ton-Miles Share		Commodity Value Share	
	2007	2012	Change	2007	2012	2007	2012
Within Kentucky	1,228	1,301	6%	6%	6%	1%	1%
From Kentucky	5,941	6,357	7%	5%	5%	1%	1%
To Kentucky	594	628	6%	1%	1%	0%	0%

Source: Freight Analysis Framework Summary Statistics, 2012

6.2 External Trends and Challenges

6.2.1 Panama Canal

The Panama Canal, completed in 1914, created one of the most important trade routes in the world, linking the Atlantic and Pacific oceans. After nearly a century, the canal is undergoing a $5.25 billion expansion to increase capacity and accommodate larger ships. The expanded canal with new locks will allow for deeper, longer, and wider "New Panamax" vessels, doubling existing throughput capacity from 5,000 20-foot equivalent units (TEU) on current vessels to (potentially) 13,000 TEU. The expansion, scheduled to be completed in 2016, should reduce delays and shipper costs and will likely have some impact on future freight flows. The timing and scale of the impacts on Kentucky freight flows are unknown, but it is anticipated that there will be some change in the demands on transportation networks, service, and operations. These impacts may result in needed improvements to ports, railroads, and interstate highways in western Kentucky.

6.2.2 Near-shoring

Some of the world's largest companies have joined a steady stream of smaller companies in a concept known as near-shoring—returning operations to nearby countries. More U.S. businesses are opting to return manufacturing processes to North America from overseas in response to reduced cost advantages of manufacturing in low-cost countries as well as changes in supply chains. An expectation of faster and more direct delivery of goods by the consumer and supply chains becoming more complex—with too many individuals and components—are driving U.S. businesses to start strategizing for near-shoring. Near-shoring allows businesses to streamline their distribution processes so that they are leaner, more efficient, and more collaborative. However, increased investment in freight transportation infrastructure in the U.S., as well as Kentucky, will be needed to improve these supply chains.

6.2.3 Environmental Policy Changes

6.2.3.1 U.S. Clean Power Plan

In August 2015, the U.S. Environmental Protection Agency (EPA) announced the final Clean Power Plan to reduce carbon pollution from power plants, the nation's largest source of power, while maintaining energy reliability and affordability. The EPA also issued final Carbon Pollution Standards for new, modified, and reconstructed power plants and proposed a federal plan and model rule to assist states in

implementing the Clean Power Plan. If the Clean Power Plan is implemented, it could mean potentially less demand for Kentucky coal and thus less use of primary highway routes to ship coal.[66]

6.2.3.2 Alternative Energy Resources

According to the EIA, renewable energy sources and natural gas accounted for 8 percent of the transportation sector's total energy demand in 2015. Forecasts indicate that the consumption of petroleum and diesel fuel in the U.S. may level off over the next 20 to 25 years, as motor vehicles become more fuel-efficient and as renewable sources account for a larger share of the total energy supply for transportation.

In 2015, the EPA proposed rulemaking that would require manufacturers of heavy-duty trucks to increase fuel efficiency by 40 percent over 2010 standards. Current heavy-duty truck fleets average around 6 miles of travel per gallon of diesel fuel. As heavy-duty trucks become more fuel-efficient, Kentucky will likely generate less funding from the state fuel tax.

6.2.3.3 Air Quality and Regulation

The U.S. Clean Air Act regulates areas that do not meet standards for criteria pollutants under the National Ambient Air Quality Standards (NAAQS). In nonattainment areas, federal law requires state and local governments to develop and implement plans for bringing these areas back into compliance. These areas operate under 'maintenance' state implementation plans (SIPs), which often have provisions affecting the transportation network.

As they relate to freight, project delays only prolong bottlenecks for truckers (who carry goods to other parts of the system). Air quality regulation under the Clean Air Act is yet another factor driving environmental improvements in truck emissions and fuel use.

Additionally, the EPA is adopting more stringent exhaust emission standards for large marine diesel engines; the overall strategy includes adjusting Clean Air Act standards and implementing international standards. By 2030, the measures are expected to reduce annual nitrogen oxide (NOx) emissions in the U.S. by approximately 1.2 million tons and particulate matter emissions by 143,000 tons.[67] As trucking companies are required to retrofit exhaust systems or purchase new compliant trucks to meet more stringent requirements, the associated costs will mean higher operating expenses for shippers, which in turn will lead to higher costs to transport goods.

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[66] *U.S. EPA website, http://www.epa.gov/cleanpowerplan/fact-sheet-overview-clean-power-plan, Accessed December 30, 2015*

[67] *U.S. EPA Office of Transportation and Air Quality. "EPA Finalizes More Stringent Standards for Control of Emissions from New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder." Available at http://www.epa.gov/nonroad/marine/ci/420f09068.pdf*

6.2.4 New Technology

6.2.4.1 Dedicated Freight Infrastructure

As freight volumes have increased across the U.S. during the past several decades, concepts for dedicated freight infrastructure—like autonomous freight vehicles and dedicated truck lanes—increasingly have entered the transportation discussion.

Dedicated truck lanes physically separate commercial vehicles from passenger vehicles or mixed traffic flows. In recent years, states including California, Florida, Georgia, Indiana, Missouri, Ohio, and Texas have examined dedicated truck lane concepts. Separating vehicle streams introduces a new level of complexity in highway design (e.g., on-/off-ramps) and operations (dealing with incidents or breakdowns). To date, there are no dedicated truck lanes in Kentucky, and those that do exist elsewhere tend to be relatively short routes serving ports or key border crossings. Benefits associated with dedicated truck lanes include significant safety gains, the potential of adopting high productivity vehicle (HPV) configurations, and the possibility of advanced technologies such as Intelligent Vehicle Initiatives (IVI) and the autonomous truck or self-driving truck.

6.2.4.2 E-Commerce and Drone Delivery

Electronic commerce (e-commerce) is the use of electronic devices and technologies to conduct commerce, or trade, including buying products on the internet and electronic banking. E-commerce has increased from 0.6 percent of total retail activity in 1999 to 6.7 percent in the fourth quarter of 2014.[68] To compete, traditional retailers such as Wal-Mart, Target, Lowes, and Home Depot have implemented new strategies like 'buy on-line, pick up in store" and have established more local distribution centers to create expedited supply chains. E-retailers like Amazon and eBay have constructed a series of centralized distribution centers. This rapid e-commerce requires fast, on-time delivery, which is sensitive to distance and congestion, among other factors. A result of this trend is a higher number of delivery vehicles entering into residential neighborhoods. As residential deliveries increase, a potential concern is an increase in related congestion and wear and tear to the local road network.

One emerging potential alternative strategy for home delivery uses unmanned aircraft, also known as drones. A drone is defined as an unmanned aircraft or ship guided autonomously or by remote control. While drones help relieve congestion and traffic on the local road network caused by e-commerce delivery vehicles, they present their own set of challenges, particularly in how their use is governed and in avoiding over-crowded air space. In February 2015, the FAA released proposed rules governing the use of drones for commercial purposes.

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[68] *U.S. Census Bureau, Quarterly Retail E-Commerce Sales 4th Quarter 2014, http://www.census.gov/retail/mrts/www/data/pdf/ec_current.pdf*

7 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 chapters, this chapter:

- 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 chapter have been considered in developing the policy and strategy recommendations in **Chapter 8** and will help to make implementation of the outcomes more successful.

7.1 Commonalities

The previous chapters 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 chapters 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.

7.1.1 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/condition.

7.1.1.1 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: the KTP and the LAP. 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.[69] The location of these assembly plants has led to over 440 automotive suppliers locating in Kentucky.

Kentucky is also home to two major air cargo hubs operated by integrated express carriers DHL and UPS. DHL operates its North American hub at Cincinnati/Northern Kentucky International Airport, while UPS operates its Worldport hub at Louisville International Airport. 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 location of DHL and UPS in Kentucky has 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.

7.1.1.2 Connectivity

Kentucky has good connectivity across the commonwealth. Ten interstates, two east-west (I-24 and I-64) and three north-south (I-65, I-71, and I-75), and a parkway system serve the state. I-69 corridor is proposed to traverse Kentucky from Indiana to Tennessee, but the completion for this stretch of interstate is dependent on available funding. In addition to key highway connections, Kentucky is also well-connected by water and rail, having over 1,980 designated navigable inland waterway miles (USACE) and 3,200 route miles of rail track. Its freight rail network includes railroads that run east-west and north-south across the state.

Kentucky not only has good connectivity across the commonwealth itself, 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.[70] The commonwealth's entire inland waterway system provides a waterway link to Canada via the Great Lakes and to Mexican and South American markets via the deepwater ports of New Orleans, La. and Mobile, Ala. 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.

7.1.1.3 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

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[69] *Williams, Betsy. "Auto Companies Accelerate Investment in Kentucky". April 23, 2002. Accessed on March 22, 2016.* http://businessclimate.com/kentucky-economic-development/auto-companies-accelerate-investment-kentucky

[70] http://www.thinkkentucky.com/kyedc/pdfs/kytrannw.pdf

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 May 2015, 15 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.[71] Kentucky is doing this by utilizing a variable-rate fuel tax. The state's current tax rates for fiscal year (FY) 2015 stand at about $0.246 per gallon of gasoline and about $0.28 per gallon of diesel and other fuels. These rates have risen over the past several years as wholesale prices have continued to increase but started falling as the wholesale price fell beginning in January 2014.

Kentucky's federal highway program will be largely matched with "toll revenue credits" through FY 2020. Toll revenue credits are attributed to Kentucky by federal highway law, in accordance with calculations that consider past levels of state fund investment, such as state-sponsored toll roads, in the federal highway system. The credits do not generate cash and cannot be accounted for as such; however, they do permit KYTC the flexibility to use 100 percent federal funding on federal-aid projects. By doing so, KYTC can allocate more of its own state funding for state-funded projects.

Kentucky made available $1.6 million per year in grant funding from FY 2011 through FY 2016 to short line railroads to help fund track improvements and at-grade highway-rail crossing reconstructions in the commonwealth. While this is a non-recurring funding source, another $3.2 million was included in the transportation budget for FY 2017 and FY 2018 to make additional rail safety improvements. In recent years, the state has provided 80 percent of the funding with the railroads making up the remaining 20 percent.

Kentucky made available $500,000 per year in grant funding from FY 2013 through FY 2016 to operating 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. While this is a non-recurring funding source, another $1 million was included in the transportation budget for FY 2017 through FY 2018.

7.1.1.4 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

[71] *http://www.itep.org/pdf/gastaxincreases0515.pdf*

materials, agricultural products, chemicals, minerals, metals, manufactured goods, wood, and containerized freight.

7.1.1.5 System Capacity

The size of Kentucky's transportation system is a strength. There is a well-connected system for handling highway freight traffic. Kentucky has significant rail infrastructure with five Class I railroads, one Class II railroad, and 13 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.[72] 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 transportation system, future improvements are being made in the Jackson Purchase Region of the commonwealth to further strengthen the system. Improvements are being made to what has been designated as I-69. This system of roadways is expected to accommodate additional trucking volumes and connect the Hickman Riverports with the Interstate Highway System.

7.1.1.6 System Operations/Condition

According to 2012 data from FHWA, Kentucky has the ninth best roads in the country, with only 9.7 percent of all federal-aid highway miles in poor or mediocre condition. The MRP Report, which is an annual survey of roads conducted by the KYTC Division of Maintenance, indicates scores improved from 1999 to 2007 but have been up and down since. The target grade has been surpassed in 5 of the last 6 years. This indicates a marked improvement from earlier data—Kentucky did not meet its target goal from 1999 through 2006. Interstates and NHS roads have consistently had the best ratings, being over the KYTC target grade for each of the past 13 years.

7.1.2 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.

7.1.2.1 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.[73] Nationwide, competition from cheap foreign coal, coal regulations, and rail

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[72] *http://www.thinkkentucky.com/kyedc/pdfs/kytrannw.pdf*

[73] *http://www.coalage.com/features/3129-coal-transportation-costs-could-hinder-resurgence-of-coal-generation.html#.VOJ3ZC5d6uT*

capacity constraints are making imports more attractive than domestic coal, especially to East Coast power plants.

7.1.2.2 Connectivity

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 locks and dams constructed in the 1930's and 1940s are aging and are in need of major rehabilitation or replacement.

The timing for I-69 completion in other states is uncertain. The connectivity of I-69 across the U.S. between Michigan and Texas depends on the incomplete sections of the corridor.

7.1.2.3 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. Kentucky has traditionally been a donor state from the perspective of the federal fuel tax. Therefore, Kentucky receives a smaller share of funding from the Federal Highway Trust Fund than they paid into it.

The federal gasoline tax has not been increased since 1993, and it is not indexed to inflation. The inflation rate from 1993 until 2015 was 64 percent.[74] The buying power of the federal gasoline tax has significantly reduced over the years.

As shown in **Figure 7-1**, 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. These standards will require new light-duty vehicles to average approximately 49 miles per gallon in vehicle model year (MY) 2025, versus their current compliance estimate of about 33 miles per gallon in MY 2012.[75] 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.

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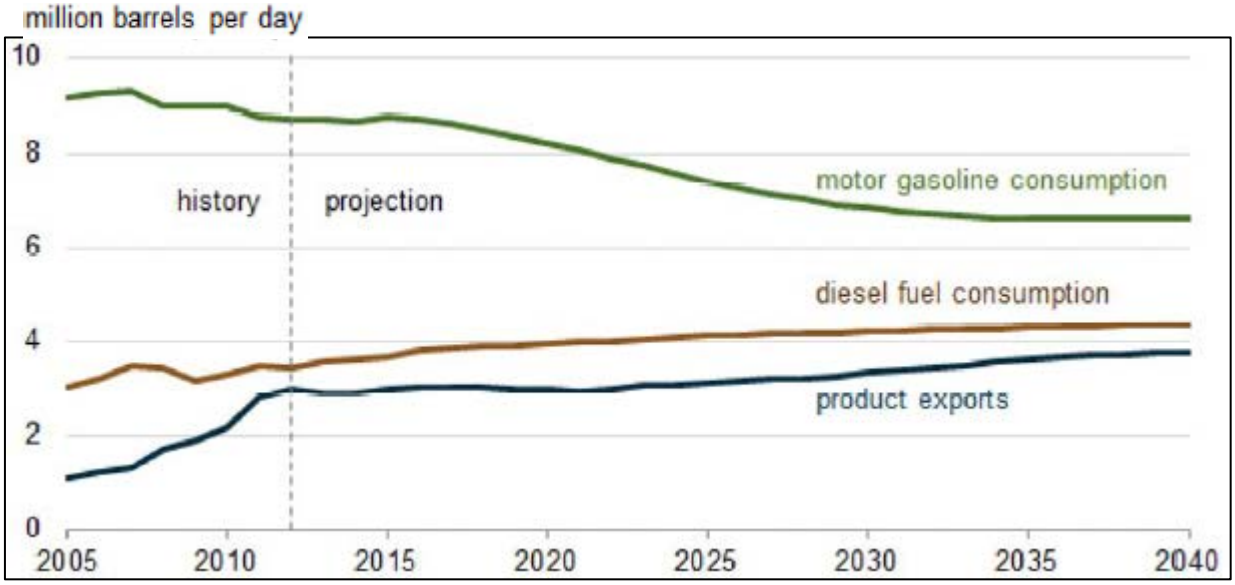
[74] *US Inflation Calculator. http://www.usinflationcalculator.com. Accessed on March 24, 2016.*

[75] *Mallik, Arup. U.S. Energy Information Administration. "Fuel Economy Standards Drive Down Projected Gasoline Use; Diesel Use, Product Exports Use". June 26, 2014.*

Figure 7-1: U.S. Motor Gasoline and Diesel Fuel Consumption and Product Exports (2005-40)



Source: U.S. Energy Information Administration, Annual Energy Outlook 2014

7.1.2.4 Location

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

7.1.2.5 System Capacity

A number of 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.[76]

There are also challenges facing the capacity of the Kentucky highway system. FAF flow analysis shows significant projected growth in freight volumes between 2007 and 2040. 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 5-7** in **Chapter 5**. 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.

7.1.2.6 System Operations/Condition

According to Kentucky's MRP Report, rural secondary roads did not meet the target MRP score in any of the years studied. The average grade for rural secondary roads from 1999 to 2012 was slightly under 74. 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 connections, which are often maintained by several different entities. Investment in

[76] *http://www.nado.org/wp-content/uploads/2012/03/panama.pdf*

connectors is frequently in competition for ever decreasing transportation funding with other high-profile projects.

The National Bridge Inventory lists the I-71/I-75 Brent Spence Bridge between Northern Kentucky and Cincinnati as "functionally obsolete" due to concerns with capacity, sight distance, and safety. 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).

Other modes of transportation, including rail and waterways, also are facing operational challenges. The commonwealth does not own rail assets and 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 and less reliable lock and dam system and the breakdown of the container recycling circuit. Because containers are not currently shipped down the Ohio River, containers being shipped up the Ohio River would stockpile. Kentucky's involvement in the movement of Post-Panamax freight remains uncertain unless commitments to infrastructure investment are made.[77] Post-Panamax container ships are vessels that have a capacity range of 4,000 TEU to 15,000 TEU.

7.2 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:

- 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 2008 Kentucky Riverport Improvement Project report. 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.
- 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 the majority of coal coming from western Kentucky in the future.
- Prepare western Kentucky for the flow of Post-Panamax freight, including developing coordinated plans of action and improvements to ports, railroads, and interstate highways.

[77] *http://docs.pianc.us/smart11/docs/wed/trackd/SMART%20RIVER_Brock_Final.pdf*

- Improve the commercial vehicle crash rates with serious injury 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.
- Improve key highway bottlenecks, such as the I-65 at I-64/I-71 interchange in Louisville and the I-71 and I-75 interchange (Cincinnati). Although the I-71 and I-75 interchange is located in Ohio, this bottleneck has significant implications for northern Kentucky freight.
- 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.
- 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 heavy-volume interstate highways and 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.
- 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.
- The routes identified as critical freight corridors are within KYTC's span of control and should become a known part of the planning process.
- 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.
- Seek opportunities to incorporate Intelligent Transportation Systems (ITS), Information Technology (IT), and other new technologies into freight transportation planning and freight projects.

8 POLICY AND STRATEGIC RECOMMENDATIONS

The overarching recommendation of the KFP is to focus on improving transportation infrastructure that is most beneficial to freight movement. Proposed program and policy recommendations to guide this overall freight strategy were developed with the KFP goals in mind and are discussed in this chapter. A program is the organization of a funding initiative targeted at achieving certain outcomes, often with its own set of funding requirements, process requirements, and organizational structure. A policy is an institutional direction, initiative, or directive that focuses on particular issues directly impacting the freight community. A few freight-related projects identified from KYTC's 2016 Recommended Highway Plan are included as potential freight projects to consider.

This chapter begins with descriptions of the various freight-related funding programs available. These programs are important to assist with funding freight projects, which will move goods safely and efficiently in Kentucky.

8.1 FUNDING PROGRAMS FOR FREIGHT-RELATED PROJECTS

Funding multimodal freight projects can be difficult due to funding restrictions at the state and federal levels. For example, the Kentucky Road Fund is constitutionally mandated to be used only on highways. The purpose and use of public funds is defined by legislative bodies through the budgeting process, while environmental, labor, and procurement laws affect processes and expenditures for all aspects of transportation projects from planning through maintenance. Federal and state funding programs for freight-related projects are summarized below.

8.1.1 Key Federal Freight Funding and Financing Provisions

Various federal grant/loan opportunities are available for freight-related projects, and each of the programs has its own unique requirements. A majority of the funding for freight-related improvements is administered through the USDOT, with additional funding from non-USDOT sources. The federal transportation infrastructure funding and financing programs are discussed in this section.

8.1.1.1 National Highway Performance Program

The National Highway Performance Program (NHPP) guides activities related to the condition and performance of the NHS and provides funding for the construction of new facilities on the NHS. It ensures that investments of federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in a state's asset management plan for the NHS.[78] Under MAP-21, routes eligible for NHPP funding include:

- The interstate system

[78] *U.S. Department of Transportation, FHWA, retrieved July 26, 2014 from https://www.fhwa.dot.gov/map21/factsheets/freight.cfm*

- All principal arterials (including those not previously designated as part of the NHS) and border crossings on those routes
- Intermodal connectors – highways that provide motor vehicle access between the NHS and major intermodal transportation facilities
- Strategic Highway Network (STRAHNET) – the network of highways important to U.S. strategic defense
- STRAHNET connectors to major military installations

8.1.1.2 Surface Transportation Program

The Surface Transportation Program provides flexible funding for projects on any federal-aid highway, on bridges on any public roads, and on bridge and tunnel inspection and inspector training.[79] Eligible freight projects also include bridge clearance increases to accommodate double-stack freight trains, capital costs of advanced truck stop electrification systems, freight transfer yards, and truck parking facilities.

8.1.1.3 Congestion Mitigation and Air Quality Program

The Congestion Mitigation and Air Quality Program (CMAQ) program is continued in MAP-21 to provide a flexible funding source to state and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act.[80] CMAQ money supports transportation projects that reduce mobile source emissions in areas designated by the U.S. EPA as nonattainment or maintenance of national ambient air quality standards. Eligible activities include those related to rail intermodal freight transportation improvements. To be eligible for funding, the project must reduce emissions of criteria pollutants for which the area is in non-attainment.[81] CMAQ funding is administered jointly by the FHWA and FTA and is allocated among the states based on the severity of their air quality status.

8.1.1.4 Highway Safety Improvement Program

The Highway Safety Improvement Program (HSIP) supports projects that improve the safety of road infrastructure. These projects could add capacity; improve alignment or operations, such as intersections and curves; or make road improvements, such as signing, pavement markings, or adding rumble strips.

8.1.1.5 The Transportation Infrastructure Finance and Innovation Act

The Transportation Infrastructure Finance and Innovation Act (TIFIA) program provides federal credit assistance in the form of direct loans, loan guarantees, and standby lines of credit to finance surface transportation projects of national and regional significance. The goal of TIFIA financing is to leverage federal resources and stimulate private capital investment in transportation infrastructure. TIFIA financing is available for large-scale public or private transportation projects. The program is aimed at large projects with a minimum value of approximately $50 million. The maximum TIFIA-financed portion is 33 percent and is administered by the USDOT's TIFIA Joint Program Office.

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[79] *U.S. Department of Transportation, FHWA, retrieved July 26, 2014 from https://www.fhwa.dot.gov/map21/factsheets/freight.cfm*

[80] *Ibid*

[81] *The criteria pollutants are nitrogen dioxide, lead, carbon monoxide, ozone, particulate matter and sulfur dioxide.*

8.1.1.6 Railway-Highways Crossing (Section 130) Program

Funds to improve rail-highway crossings are set-aside from the federal HSIP apportionment. The program provides funds for the elimination of hazards at railway-highway crossings and is apportioned to states by formula.[82]

8.1.1.7 Federal Rail Safety Improvement Act of 2008

The Federal Rail Safety Improvement Act primarily addresses rail safety through regulations. It also authorizes grants for investing in rail technology, railroad safety infrastructure, rail grade crossing improvements, and education, subject to annual appropriations. Provisions under this act are administered by the FRA.

8.1.1.8 Rail Line Relocation and Improvement Capital Grant Program

Under this program, a state (or political subdivision such as a parish) is eligible for a grant from FRA for any construction project that improves the route or structure of a rail line and involves a lateral or vertical relocation of a portion of rail line or mitigates the adverse effects of rail traffic on safety, motor vehicle traffic flow, community quality of life, or economic development.

8.1.1.9 Railroad Rehabilitation and Improvement Financing Program

The Railroad Rehabilitation and Improvement Financing (RRIF) program provides direct federal loans and loan guarantees to finance the development of railroad infrastructure.[83] Under this program, established in 1998, the FRA provides up to $35 billion in direct loans and loan guarantees, with $7 billion reserved for Class I railroad projects. The loans can be used to refinance outstanding infrastructure debt. The program also helps to finance project investments directly, up to the total cost of the project. State and local governments, government-sponsored authorities, corporations, railroads, and others can participate in the program.

8.1.1.10 Transportation Investment Generating Economic Recovery Discretionary Grants

The TIGER Discretionary Grant program provides a unique opportunity for USDOT to invest in road, rail, transit, and port projects that have the potential to achieve critical national objectives. Since 2009, Congress has dedicated more than $4.1 billion for six rounds to fund projects that have a significant impact on the nation, a region, or a metropolitan area.[84]

8.1.1.11 U.S. Army Corps of Engineers Harbor Maintenance Trust Fund

The USACE is responsible for maintaining federal navigation channels. Under the Harbor Maintenance Trust Fund (HMTF), the principal legislative vehicle for guiding the USACE Civil Works Program under the 2014 WRRDA, expenditures will increase each year until 2025, when 100 percent of available funds will be directed towards operations and maintenance activities. The HMTF is funded by a harbor maintenance tax (HMT) on imported and domestic waterborne cargo and cruise passengers. This fund is used to cover the USACE's cost of dredging channels, maintaining jetties and breakwaters, and operating

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[82] *U.S. Department of Transportation, FHWA, retrieved August 14, 2014 from http://safety.fhwa.dot.gov/xings/*

[83] *U.S. Department of Transportation, FRA, retrieved August 14, 2014 from http://www.fra.dot.gov/Page/P0128*

[84] *U.S. Department of Transportation, retrieved 8/14/14 from http://www.dot.gov/tiger*

locks along the coasts and in the Great Lakes. The HMTF may be drawn on only with an appropriation by Congress.

8.1.1.12 Inland Waterways Users Trust Fund for Locks and Dams

The Inland Waterways Fuel Tax and Trust Fund were established by the Water Resources Development Act of 1986. The act established a federal marine fuel tax of $0.20 per gallon to support 50 percent of the cost of inland waterway infrastructure development and rehabilitation. The tax generates approximately $85 million annually. The Trust Fund balance began to decline in 2003 when increasing amounts were used to modernize the inland waterway system. This continued until 2009 when the Trust Fund balance was exhausted, limiting the amount of spending to the annual tax revenues available. There is now a substantial backlog of authorized projects, and the limited funding available has been spread over a list of projects, which has extended the construction time for each project. The 2014 WRRDA directs the Secretary of the Army to conduct a study to report on potential revenue sources for the Inland Waterway Trust Fund. With the passing of the Achieving a Better Life Experience (Able) Act, as of April 1, 2015 the Inland Waterway Trust Fund tax was increased to $0.29 per gallon.

8.1.1.13 Federal Aviation Administration Airport Improvement Program

The Airport Improvement Program (AIP) is administered by the FAA and provides grants for planning and developing public-use airports that are included in the National Plan of Integrated Airport Systems (NPIAS). For large and medium primary hub airports, the grant covers 75 percent of eligible costs (or 80 percent for noise program implementation). For small primary, reliever, and general aviation airports, the grant covers a range of 90 to 95 percent of eligible costs, based on statutory requirements. Eligible projects include improvements related to enhancing airport safety, capacity, security, and environmental concerns. In general, sponsors can use AIP funds on most airfield capital improvements or repairs and, in some specific situations, for terminals, hangars, and non-aviation development. Kentucky airports received a total of approximately $245 million of AIP funding from 2010 to 2014.

8.1.1.14 Department of Commerce

The U.S. Department of Commerce (DOC) administers federal funding for grants and cooperative agreements in the form of discretionary and nondiscretionary funds. The grants most germane to freight are administered by the Economic Development Administration (EDA). The EDA provides public works funds for distressed communities to revitalize, expand, and upgrade their physical infrastructure to attract new industry, encourage business expansion, diversify local economies, and generate or retain long-term, private sector jobs, and investment.[85]

8.1.2 State Transportation Funding Programs/Sources

The state highway fund is constitutionally mandated, to be used only on highways. However, the Kentucky General Fund provides the mechanism for state funding for rail projects on a competitive basis with other statewide needs. Recent rail funding initiatives include the Kentucky Short Line Railroad Assistance (KSRA) Fund and Kentucky Railroad Crossing Improvement (KRCI) Fund. The following subsections describe state based transportation funding programs and sources available for transportation projects.

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[85] *http://www.eda.gov/programs.htm*

8.1.2.1 Kentucky Road Fund

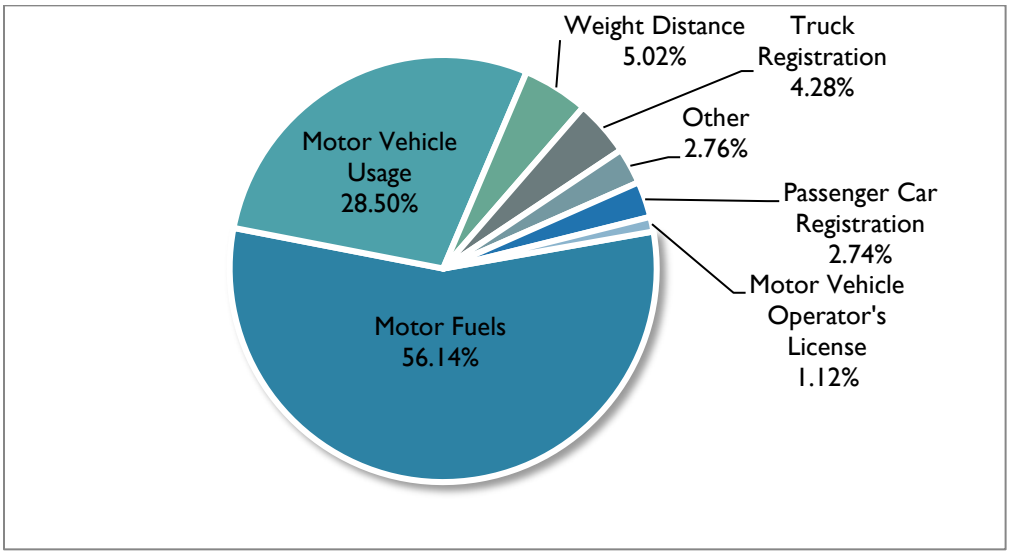
The Kentucky Road Fund is funded through four revenue sources: fuel taxes, usage taxes, registration fees, and licensing fees. Approximately 60 percent comes from state taxes on motor vehicle fuels as shown in **Figure 8-1**. Kentucky uses a percentage tax rate based on the wholesale cost of fuel, with 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. Current tax rates for FY 2015 stand at about $0.246 per gallon of gasoline and about $0.28 per gallon of diesel and other fuels. These rates have risen over the past several years as wholesale prices have continued to increase but started falling as the wholesale price fell beginning in January 2014.

Kentucky Constitution, Section 230: *Money not to be drawn from Treasury unless appropriated – Annual publication of accounts – Certain revenues usable only for highway purposes.*

No money shall be drawn from the State Treasury, except in pursuance of appropriations made by law; and a regular statement and account of the receipts and expenditures of all public money shall be published annually. No money derived from excise or license taxation relating to gasoline and other motor fuels, and no moneys derived from fees, excise or license taxation relating to registration, operation, or use of vehicles on public highways shall be expended for other than the cost of administration, statutory refunds and adjustments, payment of highway obligations, costs for construction, reconstruction, rights-of-way, maintenance and repair of public highways and bridges, and expense of enforcing state traffic and motor vehicle laws.

The vehicle sales tax, also called a usage tax, makes up about 25 percent of annual revenue. Registration and licensing fees paid by commercial trucking companies generate approximately 10 percent of fund revenues, with the remaining 5 percent from vehicle and driver licensing and other fees.

Figure 8-1: Sources of Revenue for State Road Fund



Source: Kentucky's Long-Range Transportation Plan 2014-2035

One of the greatest challenges confronting KYTC is managing public expectations with limited funding available to meet the commonwealth's highway needs. Highway maintenance costs are far from routine

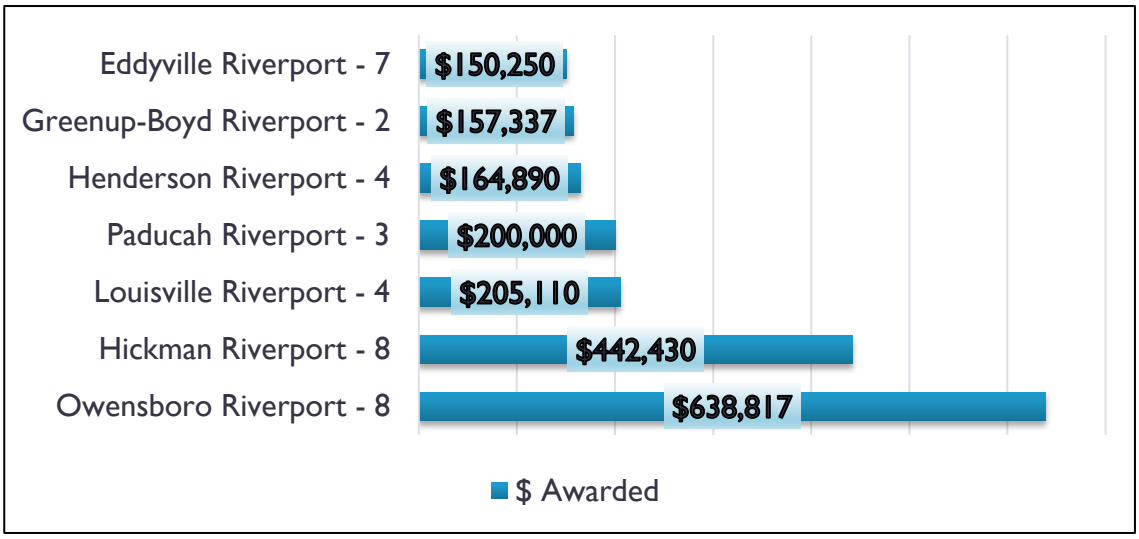
when a major bridge can cost $200 million to replace, a mile of interstate highway can cost $5 to $10 million to repair, and overall identified highway needs throughout Kentucky total more than $50 billion. In the face of these overwhelming basic needs, KYTC's Recommended Highway Plan is predicated upon a number of assumptions about the revenue stream that is expected for future state and federal highway construction programs administered by the Cabinet.

Kentucky's federal highway program will be largely matched with toll revenue credits through FY 2020. These credits are attributed to Kentucky by federal highway law in accordance with calculations that consider past levels of state fund investments (such as state-sponsored toll roads) in the federal highway system. Toll revenue credits do not generate cash and cannot be counted as real cash when used as a match. However, the credits allow KYTC the flexibility to use 100 percent federal funding on federal-aid projects. This provides KYTC the option to allocate more of its own funding for state projects under complete state control and oversight.

8.1.2.2 Kentucky Riverport Improvement

In 2012, the Kentucky General Assembly appropriated $500,000 in dollar-for-dollar matching funds in FYs 2013 and 2014 for the Riverport Improvement Program. The purpose of this program is to improve public riverports within Kentucky, with improvements limited to dredging and maintenance of access. This enactment has continued through FY 2018. These funds are made available to public riverports, and specific projects as recommended to the KYTC Secretary by the WTAB. This board advises state agencies, the Governor's Office, and General Assembly concerning matters affecting waterways. The General Assembly has appropriated this funding for riverport improvement grants and has tasked the WTAB with prioritizing the funds for optimum utilization. **Figure 8-2** shows the number of riverport improvement grants and total state grant funding awarded to each riverport listed from FY 2013 to FY 2016.

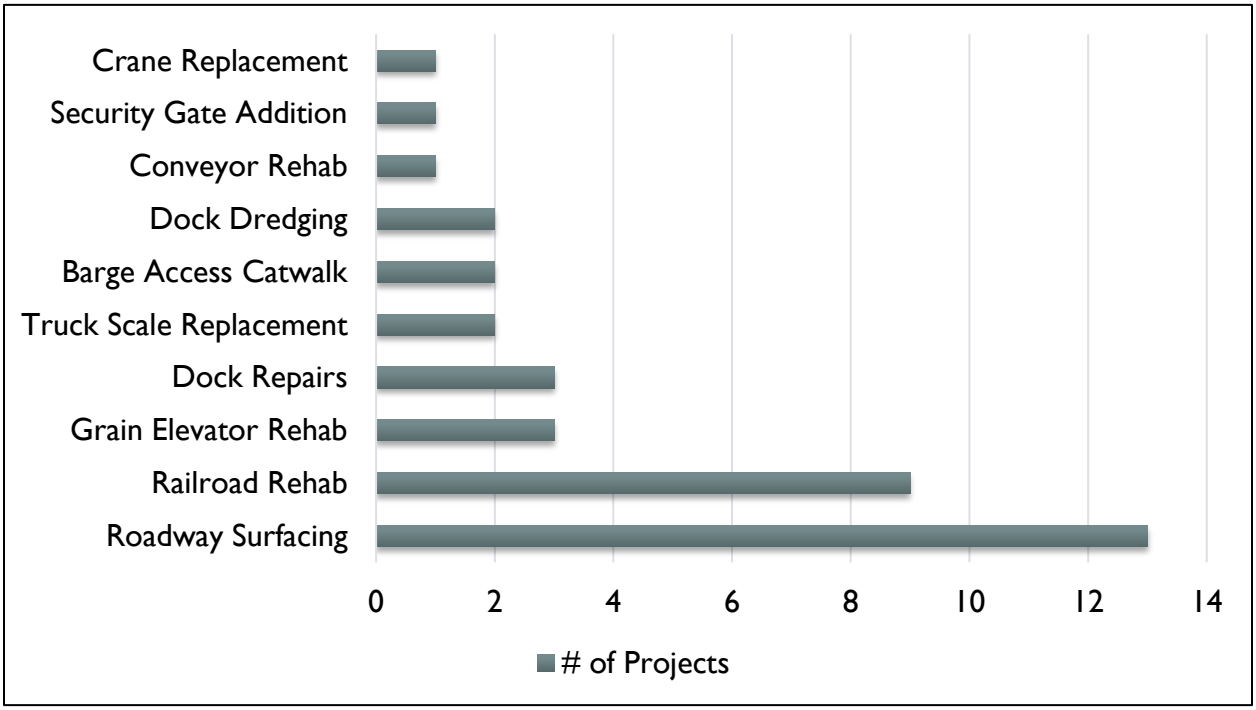
Figure 8-2: FY 2013 to FY 2016 Riverport Improvement Grants



Source: Kentucky Transportation Cabinet, 2016

A summary of all project types of the awarded riverport improvement grants are shown in **Figure 8-3**. Over half of the projects types involved railroad rehabilitation and roadway surfacing.

Figure 8-3: Summary of all Kentucky Riverport Improvement Project Types



Source: Kentucky Transportation Cabinet, 2016

8.1.2.3 Kentucky Railroad Crossing Improvement Fund

In October 2013, the commonwealth announced that $3.2 million in grants would be made available through FY 2014 to short line railroads to help fund safety improvements at highway-rail at-grade crossings in Kentucky. The grants, all of which required a dollar-for-dollar match from the applicants, were funded through the KRCI Program, administered by KYTC.

While this is a non-recurring funding source, another $3.2 million ($1.6 million per year) was entered into the Transportation Budgets by the Kentucky Legislature for FY 2015 through FY 2018 to make additional rail safety improvements. These funds have been restricted to public safety improvements to at-grade crossings, railroad bridge overpasses, and railroad crossing safety equipment. Unlike the FY 2013-2014 grants, which required a 50 percent local match, the FY 2015-2016 funding was available with an 80 percent state share and 20 percent local match.

8.1.2.4 Kentucky Railroad Assistance Program

In addition to state grant funding, Kentucky makes certain tax credits available to companies and railroads that invest in rail-related projects. These are administered by and made available through the Kentucky Railroad Assistance Program (KRAP), and the three main programs under KRAP are the following: Economic Development Tax Credit, Nonrefundable Tax Credit for Railroad Improvement (50% tax credit), and Nonrefundable Tax Credit for Railroad Expansion or Upgrade to Accommodate Transportation of Fossil Energy Resources or Biomass Resources (25% tax credit).[86]

[86] *http://transportation.ky.gov/Railroads/Pages/Railroad-Assistance-Funds.aspx*

8.1.2.5 Freight Enhancement Loan Fund

The Kentucky Highlands Freight Enhancement Loan Fund primarily is used to provide lines of credit to finance operating costs for transportation-related businesses in the Kentucky Highlands service area. In addition, the Kentucky Highlands may use fund proceeds to provide fully-collateralized equipment financing for eligible borrowers. The origin of the fund is through the FY 2004 Omnibus Appropriations Act. It passed through FHWA and is administered by KYTC.

8.2 Program Recommendations

Maintain and improve the designated highway Kentucky Freight Network to ensure the efficiency and connectivity of the freight transportation system. The proposed freight network is identified in **Chapter 2**. Kentucky needs to further evaluate alternative funding and financing sources to ensure the Kentucky Freight System is preserved and maintained and critical high priority improvements are implemented.

Develop a freight project prioritization framework to help decision-makers prioritize future freight investments. Under the FAST Act, states are directed to identify short-term freight projects in a statewide plan. The FAST Act establishes two new dedicated freight programs and funding sources, intended to address freight needs that produce public benefits. A freight project prioritization framework would allow KYTC to evaluate and prioritize key multimodal freight projects using both quantitative and qualitative data and analysis.

Implement and refine performance measures to track implementation progress. KYTC should continue to expand its performance measures and indicators while considering the incorporation of future data into a prioritization process. KYTC should work with its modal offices to identify other freight data needed to support the prioritization process.

Develop a process to identify, monitor, and restore the condition of roadways that support the agriculture and energy industries. The agriculture and energy industries depend on the state and rural roadway system to transport supplies and products to barges, to elevators, and to processing facilities. While these two industries are lumped together in this strategy, they have very different needs. The agriculture industry needs a network that can handle seasonal surges in tonnage, while the energy industry requires consistent and reliable routes daily. Developing a process to monitor, maintain, and improve this system will ensure that the economy continues to thrive and investments are made wisely.

Ensure freight representation and participation by the private sector in the state and MPO planning process. The FAST Act encourages the formation of a State Freight Advisory Committee with private and public sector freight representatives. KYTC should form a Freight Advisory Committee to help guide implementation of the KFP. This group can provide valuable input, and engaging the private sector in public sector planning efforts will require value on both sides. The public sector seeks valuable insight into the operational aspects and system needs of the private sector. The private sector expects that their input will be used to make decisions and to assist their business' operations.

Support collaboration between KYTC and the Kentucky Cabinet for Economic Development (KCED) in identifying transportation needs, issues, and impacts and in recruiting industry and business to locate in Kentucky. The responsibility of KYTC is to provide

a safe, efficient, and reliable transportation system, while KCED is responsible for maintaining and attracting new business to the commonwealth. There is a strong incentive for collaboration between these two cabinets because each can improve the efforts of the other. The two can work together to identify clusters of targeted industries within the Commonwealth and the transportation issues facing each industry sector. KYTC should work with KCED, MPOs, Regional Planning Commissions (RPCs), and regional economic development agencies to develop and fund projects that will address the transportation needs of these industry clusters.

Support the multi-state coordination of freight infrastructure improvements. Freight movement transcends jurisdictional boundaries, and it is a global supply chain system that produces and delivers goods to their destination. Because a majority of freight originating in Kentucky is destined for locations outside of Kentucky, the commonwealth has a keen interest in coordinating freight infrastructure improvement with its neighbors. The FAST Act requires that plans consider multijurisdictional issues related to freight movement. Coordination across states in planning and selecting improvements can leverage political support into funding support.

Update freight modal and system plans on a regular basis. Modal plans provide excellent information and insight into the operations, conditions, and performance of the freight system. The KFP was informed by a few modal plans recently produced by KYTC. Keeping that information current can be a challenging task, but failing to update the plans can require that decisions be made with old and sometimes dated information. To provide decision-makers with the information they need for sound decision-making, these plans should incorporate updated data and be reexamined regularly. This will ensure their relevance and provide the critical freight system information for better planning and decision-making.

8.3 Policy Recommendations

Goal 1: Providing a safe and secure system

- Encourage participation of freight stakeholders in the development of future KYTC safety plans
- Work with legislators and the railroads to maintain and expand the KYTC Highway/Rail Crossing Safety Program
- Partner with the Division of Commercial Vehicle Enforcement, Kentucky State Police on initiatives to re-designate truck routes, truck parking, and WIM technology improvements
- Capitalize on the multistate TIGER grant to identify and expand truck parking locations

Goal 2: Maintaining and improving existing infrastructure on a continual basis; ensuring dependable, effective, and efficient facilities

- Focus investment in corridors that exhibit a strong correlation between truck vehicle miles traveled and substandard pavement and bridge ratings on the Tier 1, 2, and 3 highway freight network
- Mitigate disruptions along critical freight corridors by proactively analyzing bridge inspection reports for unfavorable trends; pay particular attention to corridors without recognized route redundancy
- Develop a plan for weigh station maintenance and safety precautions

- Continue to work with the railroads to identify opportunities and solve unique rail infrastructure challenges around Kentucky
- Continue to work with the riverports to identify opportunities and solve unique riverport infrastructure challenges around Kentucky

Goal 3: Improving local, regional, and global connectivity and access; including all appropriate modes of transportation within a fully-integrated system; dependable access to markets, jobs, and resources

- Update the NHS's Functional Classification
- Partner with local governments and private partners to proactively manage the condition of intermodal connectors and connectivity points
- Develop a program to educate local officials on the importance of intermodal connectors and work with local officials to mitigate negative impacts of the projected increase in truck traffic volumes
- Identify and close any first or last mile gaps near major manufacturing hubs and multimodal connectivity points
- Work to identify and improve highway connectivity with other modes

Goal 4: Consideration of human and natural resources

- Support the use of CMAQ funds towards freight-related transportation projects that reduce emissions. Projects include truck idle reduction technology, such as a truck stop electrification and GENSET technology to power train locomotives
- Proactively protect KYTC assets from potential freight-related incidents; identify potential barriers restricting freight movements, plan work zones, and detours to handle freight vehicles, etc.
- Improve and expand Intelligent Transportation Systems (ITS) technology along key corridors to increase efficiency and reliability

Goal 5: Efficient and flexible use of available resources; transparent decision-making processes

- Integrate freight into the KYTC data driven decision-making process
- Elicit private sector input to the decision-making process through the creation of a Freight Advisory Committee

8.4 Freight Transportation Projects

8.4.1 Highway

KYTC's 2016 Recommended Highway Plan discusses four highway mega-projects. A mega-project is a project that will cost near, or in excess of, $1 billion and are listed in **Table 8-1**.

Table 8-1: Kentucky Mega-Projects

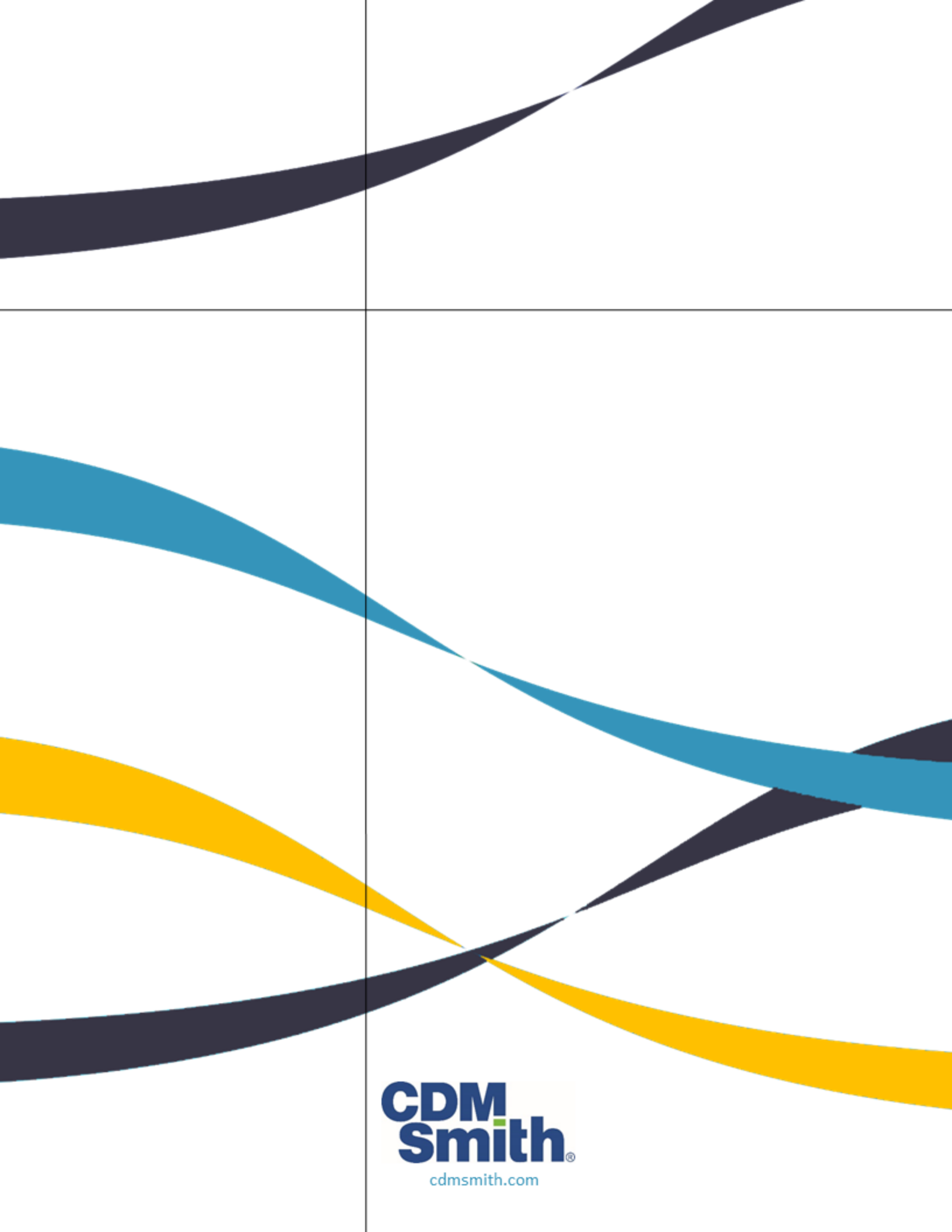
Mega-Project
The Louisville Bridges
Interstate 71/75 Brent Spence Bridge
Proposed Interstate 69
Planned Improvements on I-64, 65, 71, 75

Source: KYTC 2016 Recommended Highway Plan

8.5 Next Steps

The KFP is KYTC's first comprehensive transportation plan that focuses on freight in the state. This plan documents freight assets, identifies future needs, and recommends an overall freight strategy comprised of programs and policies. The KFP was created with the intention of guiding the work of the Cabinet in achieving its visions, "striving to be national leaders in transportation who provide transportation infrastructure and services for the 21st century that deliver new economic opportunities for all Kentuckians."

The next step is important. It must respond to the regulations set forth in new federal transportation legislation (the FAST Act) and communicate—to both the private sector and the general public—Kentucky's commitment to supporting economic development and addressing freight transportation needs.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