Appendix T:
Plan of Action

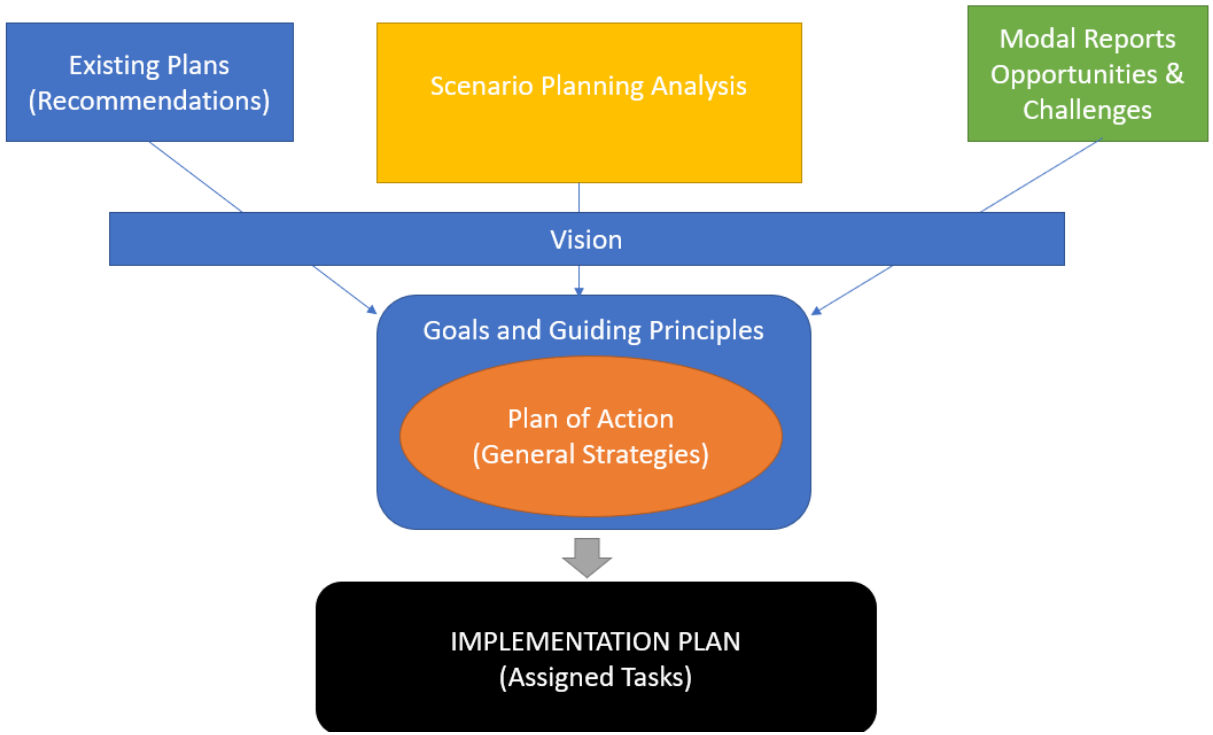
Kentucky's Long-Range
Transportation Vision

INTRODUCTION

The following Kentucky Transportation Cabinet (KYTC) Plan of Action has been developed in response to the outcomes of the scenario planning process. To help KYTC better prepare for the impacts of the alternative futures on the transportation system, the Plan of Action includes recommendations on policies, policy changes, investment strategies, new programs, changes to program structure, and organizational changes.

KYTC established a vision for a viable, reliable, and resilient multimodal transportation system to provide access and mobility for all users for the safe movement of people and goods. In order to reach this vision, KYTC developed goals, objectives, and guiding principles. Using recommendations made in existing plans, analysis from the scenario planning workshop, and opportunities and challenges detailed in modal reports, this Plan of Action provides recommendations that will help KYTC take actionable steps towards achieving its vision. Lastly, this Plan of Action will be used to develop the final Implementation Plan.

Figure 1: Implementation Plan Development



The following sections summarize the three primary sources of information used in developing the Plan of Action (Existing Plans, Scenario Analysis, and Modal Reports), as well as the KYTC vision, goals, objectives, and guiding principles, which are the lenses through which information from these three sources are filtered before being included in the Plan of Action. Finally, the Plan of Action describes the recommendations, linking each to the objectives that it advances.

EXISTING PLANS

Existing plans inform recommendations for the Plan of Action, which synthesizes and updates their relevant and still applicable recommendations. A complete list of reviewed plans can be found in Subappendix A. Ultimately four plans (the 2015 *Kentucky Statewide Rail Plan*, the 2017 *Kentucky Freight Plan*, the 2020 *Rural Conservation Survey*, and the *Kentucky Riverports Highway & Rail Freight Study*) contained recommendations that were relevant to a statewide multimodal planning and were recent enough to still be largely valid. Select relevant recommendations from these studies were used to develop new recommendations for the Plan of Action or to expand on recommendations derived from other sources. These plans and their effects on the Plan of Action are summarized below.

2015 KENTUCKY STATEWIDE RAIL PLAN

The 2015 *Kentucky Statewide Rail Plan* (KYSRP) defines goals, system strategies, and policies to improve the Kentucky rail transportation network and operations while conforming to the goals established in the 2006 *KYTC Strategic Plan* and Kentucky's 2014 *Long-Range Statewide Transportation Plan* (LRSTP). The KYSRP makes the following recommendations, which most directly influenced this Plan of Action:

- Encourage the preservation of the largely privately owned and operated rail system within Kentucky.
- Support economic development by working to provide roadway connectivity to the state and national rail systems and intermodal facilities.
- Strengthen customer relationships with the rail industry through communication, cooperation, and information exchange in the KYTC planning process.
- Enhance highway-railroad at-grade crossing safety and reliability to ensure mobility and access.

2017 KENTUCKY FREIGHT PLAN

The 2017 *Kentucky Freight Plan* (KFP) supplements KYTC's 2014 *Long-Range Statewide Transportation Plan* (LRSTP) and focuses on highway, rail, aviation, and waterway needs. The KFP has a long-term perspective and is intended to serve the needs of KYTC and its partners to improve freight transportation by documenting freight assets, identifying future needs, recommending strategic initiatives, and devising implementation strategies.

The 2017 KFP makes the following program recommendations:

- Maintain and improve the designated highway Kentucky Freight Network to ensure the efficiency and connectivity of the freight transportation system
- Develop a freight project prioritization framework to help decision-makers prioritize future freight investments

- Implement and refine performance measures to track implementation progress
- Develop a process to identify, monitor, and restore the condition of roadways that support the agriculture and energy industries
- Ensure freight representation and participation by the private sector in the state and MPO planning process,
- Support collaboration between KYTC and the Kentucky Cabinet for Economic Development (KCED)
- Support the multi-state coordination of freight infrastructure improvements
- Regularly update freight modal and system plans

The 2017 KFP makes the following policy recommendations:

- Freight stakeholders to participate 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 weigh-in-motion (WIM) technology improvements
- Capitalize on the multistate Transportation Investment Generating Economic Recovery (TIGER) grant to identify and expand truck parking locations
- Focus investment in corridors that exhibit a strong correlation between truck vehicle miles traveled and substandard pavement and bridge ratings on the highway freight network
- Mitigate disruptions along critical freight corridors
- Develop a plan for weigh station maintenance and safety precautions
- Continue to work with the railroads and riverports to identify opportunities and solve unique rail and riverport infrastructure challenges
- 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
- Identify and improve highway connectivity with other modes
- Support the use of Congestion Mitigation and Air Quality (CMAQ) funds on freight-related transportation projects that reduce emissions
- Proactively protect KYTC assets from potential freight-related incidents, improve and expand intelligent transportation systems (ITS) technology along key corridors
- 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

2020 RURAL CONSULTATION SURVEY

In accordance with 23 CFR 450.210(a) and 23 CFR 450.210(b), all states are required to consult with and consider the concerns of non-metropolitan officials when making transportation decisions in their statewide transportation planning and programming processes, to regularly evaluate the effectiveness of the consultation process and any suggested modifications, and to report these findings. To meet this requirement, KYTC developed a 25-question survey that focused on the Area Development District (ADD) Regional Transportation Planning Program, transportation issues, project priorities, the ADD transportation planner's performance and availability, and KYTC's programming processes.

KYTC solicited comments and suggestions from 536 Regional Transportation Committee members, including mayors, judge executives, and other local officials in non-metropolitan counties and urban areas, from October 15, 2020, to January 31, 2021. Of those solicited committee members, KYTC received 180 responses across 85 counties. The following plan of action was developed from those responses:

- KYTC will offer training opportunities on project funding and appropriation in order to ensure the ADD planner is aware of the location and limitations of relevant transportation data.
- KYTC will continue developing a methodology to better inform local officials and add transparency to the project selection process on a statewide basis.
- KYTC will encourage the ADDs to schedule meetings outside the ADD office and successive meetings (i.e., Water Board immediately followed by Regional Transportation Committee) to reduce in-person travel expectations, where appropriate and possible. This may include but not be limited to site visits, one-on-one city/county-level meetings, and virtual meetings where appropriate.
- KYTC will work with the ADDs to (1) maintain an orientation packet for new Regional Transportation Committee members, (2) develop a standard ADD project status report for each Highway District Office, (3) increase Regional Transportation Committee participation, (4) develop regular meeting schedules and notification procedures, (5) discuss and respond to ADD-specific survey results from the Rural Consultation Survey, and (6) communicate regional transportation topics with the Kentucky League of Cities, Kentucky Association of Counties, Executive Directors of the Area Development Districts, and the Kentucky Council of Area Development Districts.

KENTUCKY RIVERPORTS HIGHWAY & RAIL FREIGHT STUDY

The *Kentucky Riverports, Highway & Rail Freight* study is an economic development plan to leverage the Ohio River corridor grow and retain businesses in Kentucky. The study recommends improvements to the current freight network to create efficiencies and strengthen the network. The *Kentucky Riverports, Highway & Rail Freight* study examines the breadth and depth of Kentucky's multi-modal freight infrastructure, recommends a priority list of improvements based on potential return, identifies potential partnerships and funding sources, and communicates overall strengths with businesses who have a need for these services. In particular, this study investigates planning and port leadership's understanding of current market conditions, models and market data, engagement of the Kentucky business and economic development community, and a strategy for investing in and leveraging long-term freight transportation infrastructure. From these survey results, the study team developed the following recommendations:

- Frame issues of riverport hinterland market in state economic & infrastructure policy.
- Support resolutions for intergovernmental and inter-state collaboration.

- Assess grant programs, development priorities, workforce and funding priorities to facilitate Kentucky's participation in the riverport hinterland compact.
- Use the study to seek funding from the U.S. Economic Development Administration (EDA) or other national funding partners.
- Involve state and regional entities.
- Focus on the riverport hinterland as a top priority.
- Initiation study creates concept of operations & funding sources.
- Recruit core waterway clients.
- Review capacity & modernization needs in ongoing fashion.
- Establish multi-state funding.
- Make business intelligence available.

The *Kentucky Riverports, Highway & Rail Freight* study and the other existing plans offer insights into recommendations emerging from detailed study or a particular mode or topic. These recommendations were considered in developing the LRSTP recommendations.

SCENARIO PLANNING ANALYSIS

Even when extensive research, analysis, and modeling are used to forecast the long-term future, unpredictable events can dramatically change existing trends in travel demand, technology, transportation resources, population, severe weather, energy costs, regulations, and funding. Scenario planning examines multiple plausible futures and helps prepare for the unpredictable by identifying threats or opportunities that the scenario presents and developing strategies and policies to respond to them. Some policies and strategies are specific to only some scenarios, whereas others are the same across all the futures. KYTC can benefit from adopting strategies that apply across multiple scenarios, since they are relevant no matter what future occurs, and cataloging strategies that apply in specific scenarios in case that particular scenario arises in the future.

In the 2022-2045 LRSTP, KYTC examined 12 plausible scenarios to identify risks, explore potential outcomes, prepare responses, and stress-test the Kentucky transportation system. Subject matter experts explored these 12 scenarios and provided feedback to KYTC. Based on this feedback, KYTC condensed the 12 alternative future scenarios into four final scenarios that combine their most relevant elements. The following bullets summarize these scenarios.

- **Survival Mode:** This scenario describes a difficult future where several negative trends converge, making life harder for transportation system users. Severe weather frequently disrupts the transportation system, the prospect of international armed conflicts limits transportation spending, and high energy prices are not fully compensated by technological advances. In this scenario, the economy and population grow slowly.
- **Live, Work, Local:** This scenario is characterized by an emphasis on living and working locally, which creates a high reliance on local non-automotive transportation and requires KYTC to closely examine its transportation infrastructure and services. In this scenario, there is moderate growth and technological change.

- **Global Market Growth:** This high-growth scenario is characterized by rapid adoption of new transportation technologies. In this scenario, Kentucky is one of the leading global freight hubs with a freight ecosystem composed of freight movement, logistics management, engineering, and manufacturing. Rapid economic growth and expansion of freight hubs put new demands on the transportation system across modes.
- **Tech Innovations:** This scenario describes a future in which technology changes not only how people travel, but also where and how they live. Facilitated by telework, telemedicine, and electronic commerce (e-commerce), the population is dispersed across Kentucky, into exurban and rural areas. Fast adoption of transportation technology means that people can travel farther more conveniently, increasing trip lengths and shifting heavy travel outside of metro regions. Productivity increases rapidly as more and better technology is embedded into nearly every part of life.

KYTC convened subject matter experts and stakeholders with knowledge about different parts of the multimodal transportation system throughout the Commonwealth at the KYTC Scenario Planning Workshop in April 2022. Workshop participants were separated into four groups, one for each scenario, and were asked to allocate an associated projected transportation revenue in programmatic investment areas to achieve necessary transportation performance, which required trade-offs to prioritize the portions of the multimodal transportation system that are most essential under each scenario. Programmatic investment areas included pavement and bridge asset management, highway capacity, maintenance, signs and pavement markings, transportation systems management and operations (TSMO), safety, active transportation (bike and pedestrian movement), public transit, and ferries. Each scenario breakout group was asked the following five questions:

- **Network vulnerabilities:** What network vulnerabilities or lack of preparedness do you see in relation to the demands of this scenario?
- **Investment Strategies:** What policies and policy changes are needed in relation to the demands of this scenario?
- **Policies and Policy Changes:** What network investment strategies are needed in relation to the demands of this scenario?
- **Internal Business Processes:** How might internal business processes and structure need to change in relation to the demands of this scenario?
- **SHIFT Process:** How might the KYTC's Strategic Highway Investment Formula for Tomorrow (SHIFT) process and key attributes need to change in relation to the demands of this scenario?

The following subsections summarize the common themes that emerged from the breakout groups' answers to these five questions.

NETWORK VULNERABILITIES

Three primary themes emerged that were shared across the discussions about most of all four of the scenarios.

- **Revenue:** Most breakout groups perceive funding instability as a threat to fulfilling KYTC's mission. There already exists a revenue gap between KYTC's current needs and today's spending, and revenue trends exacerbate this gap independent of any changes in needs. This threat was perceived to be most severe in scenarios when revenue projection was low and when spending needs were high.

- **Technology:** Most breakout groups discussed technological vulnerabilities that could be categorized as either 'protecting technology from harm', such as cyber security for KYTC and its customers and connected and automated vehicle (C/AV) hacking, or 'adequate investment to support new technologies,' including the need for electric vehicle (EV) charging infrastructure and safeguarding against investing in technologies that could be displaced.
- **Changing Nature of Demand for Transportation:** All breakout groups expressed concern about not being able to keep up with the changes in transportation demand, although the ways in which transportation demand is expected to change varied across the scenarios. The Survival Mode and Live, Work, Local breakout groups were concerned about potentially not having enough non-single occupancy vehicle (non-SOV) transportation services to meet demand, such as insufficient transit service and the lack of a non-motorized local road network that can meet the demand for local, short-distance movement. The Tech Innovations breakout group worried about the speed with which KYTC could build and maintain a spatially dispersed transportation network to meet spatially dispersed demand. Lastly, the Global Market Growth breakout group anticipated problems in having the adequate infrastructure to support new passenger and freight technologies.

INVESTMENT STRATEGIES

The following five themes emerged from the discussions about the four scenarios.

- **Preservation:** Most breakout groups identified asset management and preservation as a priority. Identified asset management and preservation strategies included using durable and resilient materials and methods for infrastructure construction, preserving existing roadways, bridges, and non-motorized infrastructure, and pursuing opportunities to research and deploy advanced materials and construction techniques to extend facilities' useful life.
- **Partnerships:** Most breakout groups emphasized partnerships, particularly those related to revenue since KYTC can leverage public-private partnerships to make up for revenue deficiencies. Local partnerships were suggested to address the increased transportation demand that results from population concentration in cities and non-state-owned infrastructure supporting an increasing share of movement. Additionally, partnerships present an avenue to address rising investment needs brought on by rapid growth and to capitalize on technological opportunities.
- **Technology:** In high-tech scenarios, breakout groups supported making large investments in new technologies that help transition to new types of vehicles (e.g., C/AVs), build new communication infrastructure (e.g., broadband), and upgrade Transportation Management Centers (TMCs) to handle new data and management/operations issues that may arise with fleet transition.
- **Freight:** In high-growth scenarios, breakout groups supported investment to support freight and logistics. Examples of freight investments included freight ports and other intermodal centers where shipments can transition from long-haul automated vehicles to short-distance and last-mile vehicles, especially if automation is less prevalent on local roads than in more predictable highway environments.
- **Complete Streets:** In scenarios with high reliance on non-automotive transportation, breakout groups suggested investing in transit, pedestrian and bicycle infrastructure, particularly in the form of 'complete streets' where feasible.

POLICIES AND POLICY CHANGES

The following three themes emerged from the discussions about the four scenarios at the scenario planning workshop.

- **Revenue:** All breakout groups noted the importance of replacing lost revenue and having the flexibility to adjust taxes and spend revenue where it is needed most based on the scenario conditions. However, some of the changes required to raise revenue or increase flexibility in allocating funding among programmatic areas depend on decisions made by the Kentucky General Assembly. One common concern was how to develop new revenue streams that are more stable in the face of increased overall fleet efficiency. One way to address this challenge could be to partner with local or private entities on technology-based projects that would shift funding responsibilities from KYTC, create new revenue sources for congestion and capacity, and would allow limited available funds to be focused on other needs.
- **Planning:** Most breakout groups saw a need for follow-up planning to address key issues or needs that the scenarios raised. Examples of follow-up planning strategies included completing state and regional bike and pedestrian plans (thereby producing projects and expanding modal networks to meet rising demand), enhancing policy connections between statewide transportation planning and local government planning and zoning, TSMO, and leveraging transportation data for TMCs. Additionally, the Survival Modes breakout group highlighted the importance of thinking ahead to promote resiliency in infrastructure design.
- **Programs and Projects:** The Survival Mode breakout group supported allocating more funding to non-SOV modes and less funding to highway expansion in response to the scenario's low population growth and limited economic opportunities for individuals. The Global Market Growth breakout group focused more on accelerating project development so that projects are completed faster and can address system needs sooner.

INTERNAL BUSINESS PROCESSES

There are three themes around KYTC's internal business processes that emerged from the discussion about the four scenarios.

- **Skills:** Most breakout groups discussed the need for KYTC to hire staff with right skills, although the particular skills needed vary based on the scenario's prominent traits. The Survival Modes breakout group noted skill needs focused on safety, security, and emergency response, including having adequate staff to meet documentation requirements for federal reimbursements for disasters and emergencies. The Global Market Growth and Tech Innovations breakout groups both noted the need to have staff with subject matter expertise in transportation system technologies, data science skills, and flexibility to adapt to technological changes. All groups recognized that attracting employees with the right skills may require KYTC to offer market-rate salaries, which could only be done via action by the Kentucky General Assembly.
- **Change in Focus:** Several breakout groups highlighted a need to change KYTC's focus. The Live, Work, Local scenario suggested increasing the focus on multimodal transportation, while the Tech Innovations scenario requires more of a TSMO focus due to transportation technology adoption (e.g., C/AVs, truck platooning).
- **Structural Changes:** Most breakout groups discussed the possibility of making changes to KYTC's organizational structure in order to respond to scenario-specific challenges. In the Survival Modes scenario, the world is especially unpredictable, making KYTC subject to many potential threats, so the breakout group proposed developing an office for each mode to track threats or assigning 'megatrends' staff either as a standalone office or located within the Division of Planning. In the Tech Innovations scenario, large cybersecurity threats are

expected to arise, and the breakout group suggested increasing collaboration between the Office of Information Technology (OIT) and TMC. The focus is on local decision-making and decentralization in the Live, Work, Local scenario, and as a result, the breakout group recommended allotting more resources to localities and giving more funding flexibility for the District offices.

SHIFT PROCESS

The following three themes about the SHIFT process emerged from the discussion about the scenarios.

- **Local Input:** In scenarios with a local focus, breakout groups called for more local input via community meetings and suggested working with local governments to obtain consistent plans and data sources.
- **Change in Projects Included:** Most breakout groups encouraged expanding the types of projects included in SHIFT to include TSMO projects, transit and non-motorized transportation projects, and other non-highway projects related to aerial drones, waterways, and rail.
- **Changes in Criteria Weights:** While there is not complete agreement on how to weight criteria, some trends stand out. For instance, most breakout groups recommended giving more weight to asset management. The Survival Modes and Global Market Growth groups agreed on giving more weight to congestion and safety but disagreed on how to weight the benefit-cost ratio, with the former recommending reducing the weight and the latter recommending that it be weighted more heavily. Lastly, the Tech Innovations breakout group called for less safety weight due to greater adoption of in-vehicle safety-enhancing technology.

MODAL REPORTS, OPPORTUNITIES, AND CHALLENGES

The 2022-2045 LRSTP effort developed modal reports with an inventory of existing conditions, needs, or opportunities and challenges for programmatic areas and modes, namely for active transportation, aviation, marine transportation, rail, transit, highway capacity, pavement, and bridge asset management, TSMO, highway maintenance, signs and pavement markings, and ferries. The modal reports were based on interviews with KYTC subject matter experts, data analysis, modeling, and/or existing reports, which together provided information on potential areas of improvement related to KYTC's action for that mode or programmatic area in the form of existing gaps in KYTC's data or capabilities, threats, opportunities, or existing recommendations.

These items were converted to recommendations for the plan of action by:

- Developing actions to remedy identified threats or maximize opportunities.
- Carrying over recommendations that remain relevant.
- Generalizing areas where interviews revealed current data or capabilities to be inadequate into overall recommendations.

VISION, GOALS, OBJECTIVES, AND GUIDING PRINCIPLES

Kentucky's LRSTP vision, goals, objectives, and guiding principles were drafted for the 2022-2045 LRSTP after accounting for the input gathered through the discussions with KYTC leadership, multimodal stakeholders, and over 8,300 participants from across the state involved in a Kentucky Transportation Survey. This is the foundation for the LRSTP's overall strategic direction, including the Plan of Action and the Implementation Plan.

VISION

The vision is an overarching statement describing the desired transportation system to be delivered regardless of the challenges or opportunities that the future holds. The Kentucky 2022-2045 LRSTP vision is for a viable, reliable, and resilient multimodal transportation system to provide access and mobility for all users for the safe movement of people and goods.

GOALS & OBJECTIVES

Goals are value-based statements that specify what issues a plan will address, but they typically do not include measurable aspects and are instead concerned with purpose, scope, and context. To achieve KYTC's expressed vision, a set of five goals was derived from the collected input and aligned with the seven national goals (Safety, Infrastructure Condition, Congestion Reduction, System Reliability, Freight Movement and Economic Vitality, Environmental Sustainability, and Reduced Project Delivery Delays). KYTC has developed five interconnected goals which support the delivery of the 2022-2045 LRSTP vision for the Commonwealth of Kentucky and are aligned with National Performance Goals:

- Enhance safety
- Deliver a high level of maintenance & resiliency
- Enable a reliable flow of people and freight
- Provide local, regional, and global connectivity for communities
- Deliver and operate a system that protects or enhances the natural or human environment

In tandem with goal development, KYTC has developed objectives that reflect how progress will be made toward the five goals. Objectives are more specific than goals in that they identify clear ends with measurable aspects that detail how a related goal will be achieved. Table 1 outlines KYTC's 2022-2045 LRSTP goals and objectives.

Table 1: 2045 LRSTP Goals and Objectives

Goal	Objective Number	Objective
Enhance Safety	S1	Reduce the number of crashes
	S2	Reduce the amount of disruption to traffic flow resulting from crashes
	S3	Reduce the amount of conflict between motor vehicles, pedestrians, and bicycles
Deliver a high level of maintenance and resiliency	M1	Improve pavement and bridge conditions for the existing system
	M2	Protect transportation infrastructure from extreme weather events
	M3	Provide a level of redundancy to the system
	M4	Maintain the right of way to create an attractive as well as unobstructed view
Establish a reliable flow of people and freight	R1	Reduce travel time delays created by congestion
	R2	Deliver construction and maintenance projects in a manner to reduce delays or disruptions
	R3	Facilitate the cooperation in the development and operations for all modes which creates seamless trips for people and goods
Provide local, regional, and global connectivity for communities	C1	Support a multimodal transportation system which provides connections for people and goods to reach their destinations in a timely manner
	C2	Reduce the amount of vehicles hours traveled for people and goods
	C3	Provide travel options across physical and financial capabilities of system users
Deliver and operate a system that protects or enhances the natural and human environment	E1	Reduce emissions
	E2	Avoid, minimize, or mitigate environmental impacts
	E3	Coordinate land use and transportation decisions

GUIDING PRINCIPLES

Guiding principles provide the process framework for the delivery of improvements or policies supporting the achievement of all five 2022-2045 LRSTP goals. Also derived from the stakeholder and public input, the five LRSTP Guiding Principles address:

- **Equity** related to the impacts or benefits of the transportation system.
- **Adaptability/Sustainability** of the system regarding emerging technologies and disruptive trends.
- **Seamlessness** of movement among all transportation modes.
- **Quality of Life** of a community as a potential impact from the operation or development of the system.
- **Economic Vitality** as a consideration for the actions to support employment or market opportunities.

RECOMMENDATIONS

This section summarizes recommendations for KYTC's long-term action, which are derived from several components of the 2022-2045 LRSTP, namely analysis of existing plans, results of scenario planning, and modal reports. These recommendations are filtered through KYTC's vision and

are aligned with goals and objectives to ensure that their implementation will advance KYTC in the desired direction. The recommendations are grouped into four broad categories: funding and revenue, programming and project decision making, KYTC's organizational structure, and standards and processes.

The following subsections describe the Plan of Action's recommendations grouped into four categories: Funding and Revenue, Programming and Project Decision Making, KYTC's Organizational Structure, and Standards and Processes. The recommendations together help advance the Commonwealth toward all of KYTC's goals and objectives. The most relevant objectives for each recommendation are indicated by the objective number, which matches the objectives described in Table 1. Some recommendations could affect many or even all of the objectives depending on how they are implemented, which is indicated in the "objectives" section next to the recommendation.

FUNDING AND REVENUE

Declining or falling transportation revenue threatens KYTC's ability to fulfill its mission, particularly when spending needs are high due to population and economic growth, needs to invest in new technologies or capabilities, aging infrastructure, increases in severe weather, or other factors that require greater spending to preserve or expand the multimodal transportation system. Beyond the adequacy of funds is the question of whether 'colors of money' prevent available funds from being used where it is needed most. Table 2 summarizes recommendations for heading off threats to the adequacy of KYTC's transportation revenue or spending adaptability.

Table 2: Recommendations Related to Funding and Revenue

RECOMMENDATION 1: Provide information to elected leaders about revenue trends and needs	**Objectives Supported:** Varies depending on General Assembly decisions
Increasing vehicle fuel efficiency and prevalence of electric vehicles is expected to diminish transportation revenue available for preserving, managing, and expanding the multimodal transportation system. Decisions affecting most of Kentucky's transportation revenue ultimately rest with the Kentucky General Assembly and the U.S. Congress. KYTC can provide information to elected decision-makers about the trends facing revenue for the Kentucky transportation system and outcomes of potential legislative solutions that they might consider, including tax structure adjustments. KYTC should work with the General Assembly to provide the data and information necessary to inform these decisions including the historic revenue figures, revenue forecasts, and transportation needs because changes required to increase gas tax or vehicle fee revenue, or to increase flexibility in allocating funding among programmatic areas depend on decisions made by the Kentucky General Assembly. KYTC can coordinate with the Kentucky General Assembly to improve flexibility in gas tax rates and other potential transportation revenue sources.	
RECOMMENDATION 2: Flexibly spend where the needs are greatest	**Objectives:** Depends on spending
The revenue-constrained environment is nearly certain to continue making KYTC's spending needs surpass its available revenue, which will continue to require the agency to prioritize its needs within and across modes and programmatic areas. KYTC should continue to use data-driven decision-making to spend revenue where it is needed most based on changing conditions.	

RECOMMENDATION 3: Establish public-private partnerships	**Objectives:** S1, S2, M1, M3, M4, R1, R2, R3, C1
Partnerships present an avenue to address rising investment needs brought on by growth, aging infrastructure, or technological changes by leveraging private capital. Public-private partnerships may also capitalize on technological opportunities. KYTC should leverage public-private partnerships on technology-based projects that would shift funding responsibilities from KYTC, create new revenue sources for congestion and operational improvements, and allow limited available funds to be focused on other needs. Additionally, KYTC should strengthen customer relationships with the rail, waterborne, air, and truck freight industries through communication, cooperation, and information exchange. KYTC could also establish an advisory committee to facilitate freight representation across modes and participation by the private sector in the state and MPO planning processes.	
RECOMMENDATION 4: Explore local partnerships	**Objectives:** R3, C1, C2, C3, E1, E2, E3
Local infrastructure supports a large share of transportation movement, KYTC should explore local partnerships to address the increased transportation demand from population growth and in some cases population concentration in towns and cities. Local partnerships are an opportunity to not only improve transportation coordination, but also the connection between local land use and KYTC's transportation planning to increase synergy. These partnerships can be facilitated by holding community meetings and working with local governments around data sharing and the consistency of plans between localities and the state government. KYTC should continue developing a methodology to better inform local officials and add transparency to the project selection process on a statewide basis. Additionally, KYTC can support local agencies by developing educational programs for local officials.	

PROGRAMMING AND PROJECT DECISION-MAKING

KYTC's development, prioritization, and implementation of projects shapes the state's transportation system. Table 3 presents recommendations affecting KYTC's project pipeline and other investment venues.

Table 3: Recommendations Related to Programming and Project Decision Making

RECOMMENDATION 5: Invest in promising emerging technologies	**Objectives:** S1, S2, M1, R1, R3, C3, E1, E2
KYTC should invest in the emerging technologies that promise the greatest long-term usage while also being aware of and coordinating efforts with local, federal, and private organizations that may also be investing in these technologies to maximize their investments' complementarity. Investments in emerging technologies could include EV charging infrastructure, connected infrastructure for vehicle-to-infrastructure connections (V2I), broadband or fiber-optic infrastructure, TSMO, ATDM, traffic management center (TMC) upgrades, and intelligent transportation systems (ITS). Even while investing in emerging technologies, KYTC should be cognizant of the speed at which technology changes and the risk of locking into technologies or standards that may be surpassed and never achieve widespread adoption. The risk of even emerging technologies becoming obsolete is especially strong where there are competing standards or technologies serving similar purposes, such as has existed for connected infrastructure communication standards (e.g., 5G vs dedicated short-range communication) and vehicle	

energy sources (e.g., battery-powered electric vs fuel cell). In technological investment, KYTC should also consider the risks that bad actors can pose to the investments, meaning that KYTC should, in parallel, develop robust cybersecurity safeguards to protect systems and connected infrastructure from unauthorized access or disruption that can come from hacking, and work to harden publicly and privately owned transportation infrastructure such as connected infrastructure and connected vehicles against cybersecurity threats like hacking and ransomware attacks.

RECOMMENDATION 6: Invest in freight and support logistics	**Objectives:** S3, R1, R3, C1, C2, E1, E2

In all futures, freight movement is expected to grow. Investing in improvements that support freight movement on critical freight corridors at intermodal connections can make the transportation system function more smoothly by addressing congestion, travel time reliability, and safety issues, and can also support the state's economic development. There are many potential ways in which KYTC can invest in freight across modes and support logistics. Locks and dams facilitate freight movement on Kentucky's navigable rivers and allow for container-on-barge shipments, including in areas where railroads do not provide adequate access. Preserving the aging lock and dam system supports waterborne freight movement. Similarly, new transportation technologies such as automation may change how freight moves. For example, if carriers can adopt truck automation most completely or quickly in more predictable highway environments than less predictable local roads, then there could be a need for freight ports and other intermodal centers where shipments can transition from long-haul automated vehicles to short-distance and last-mile vehicles. Finally, identifying and closing first and last-mile gaps near manufacturing or multimodal centers can also improve freight connectivity.

RECOMMENDATION 7: Continue to update the SHIFT process in line with future developments	**Objectives:** Depends on updates to SHIFT

The environment that SHIFT prioritizes projects for is changing over the medium and long terms as new data sources become available, new modeling techniques are developed, and the state's transportation system and the commonwealth's transportation priorities change. Although it is impossible to know exactly what the future holds, it is likely that the changes in the environment within which SHIFT operates will be large enough to merit updates to the process. The KYTC should track new sources of transportation data and new measurement and modeling techniques and consider adopting them into the SHIFT scoring process if they provide advantages over current practices. The agency may also consider expanding the categories of projects included in SHIFT, adding new criteria, and / or adjusting criteria weights to match the Commonwealth's transportation priorities more closely. For instance, the project categories could be expanded to include TSMO projects, transit and non-motorized transportation projects, and other non-highway projects related to aerial drones, waterways, and rail. Second, the project criteria weights could be adjusted on a more regular basis to reflect changing conditions and commonwealth priorities more accurately. For instance, scenario planning revealed that asset management is likely to become more important in several different futures and may merit additional weight in the SHIFT process.

RECOMMENDATION 8: Expand focus of projects	**Objectives:** S2, S3, M3, R3, C1, C2, C3, E1, E2

KYTC can benefit from expanding the focus of its prioritization program to include multimodal and non-automotive transportation projects as well as highway operational improvements. Across all project types, KYTC can continue to track trends and risks through asset management and promote resiliency in infrastructure design.

RECOMMENDATION 9: Support local match	**Objectives:** S3, C2, C3, E1, E2

In Kentucky, there are currently some federal funds that are being left on the table due to the lack of a required non-federal match, notably for some local transit projects. To the extent KYTC can support the local match requirement for relevant federal programs, KYTC may help to enable small local government and transit agencies in Kentucky to access additional funds.

KYTC ORGANIZATIONAL STRUCTURE

KYTC's organizational structure includes the roles that it hires for, the responsibilities and capabilities that different teams or groups have, and their relationships to one another and to the Commonwealth's elected and appointed leaders. Table 4 addresses recommendations for KYTC's organizational structure that better prepare the agency for the future.

Table 4: Recommendations Related to KYTC Organizational Structure

RECOMMENDATION 10: Hire and retain staff with appropriate expertise and skillsets, even when not traditional DOT functions	**Objectives:** Potentially all objectives. Depends on staff skills hired.
KYTC should remain vigilant to changes in the transportation system and proactively employ and retain staff with strong subject matter expertise and the skills that allow it to respond better to these changes. For instance, the proliferation of new transportation data and the expected adoption of new transportation technologies may make data and analytical skills related to transportation systems technologies and data science more important than they are today. By contrast, if severe weather events become more frequent or intense, KYTC would need to acquire extra skills or staff with strong safety, security, and emergency response skills, including having adequate staff to meet documentation requirements for federal reimbursements for disasters and emergencies. Some of these skills may be acquired through contracts in addition to employment. Attracting and retaining competitive staff may require KYTC to offer market-rate salaries which may differ from state wage rates that it is authorized to offer and would require the approval of the Kentucky General Assembly to change.	
RECOMMENDATION 11: Consider structural changes where helpful to respond to new trends	**Objectives:** M2, R2, R3
Implementing changes to KYTC's organizational structure can help the agency respond to changing needs and new challenges. For instance, some possible structural changes could include developing an office for each mode to track system performance and risks or assigning 'megatrends' staff either to a standalone division or located within the Division of Planning, both of which would help KYTC to stay abreast of changes affecting its ability to fulfill its mission. There may also be opportunities to fulfill a function better by using a merger to create helpful synergies. Some futures may also require reviewing the division of responsibilities between KYTC central office and district offices to determine if those should change over time to address trends.	
RECOMMENDATION 12: Provide training opportunities	**Objectives:** Depends on training opportunities offered
KYTC can offer training opportunities on project funding and appropriation in order to ensure that ADD planners are aware of the location and limitations of relevant transportation data. KYTC should continue developing an orientation packet for new Regional Transportation Committee members and additional standard processes such as establishing reporting standards and setting participation expectations.	

RECOMMENDATION 13: Continue and expand data sharing and technical assistance	**Objectives:** Potentially all objectives depending on data used and technical assistance provided
Many portions of the multimodal transportation system are owned, maintained, and managed by other entities besides KYTC. While KYTC has limited ability to directly advance the Commonwealth's transportation vision for these portions of the system, it can have indirect influence by several means, including sharing data with and providing technical assistance to the non-state public and private entities responsible for these parts of the system. The 2015 *Kentucky Statewide Rail Plan* correctly highlighted that abandoned rail lines are one of the potential areas of influence. For instance, KYTC can provide technical guidance and assistance during abandonments related to rail banking and other topics.	

STANDARDS AND PROCESSES

KYTC's standards and processes guide the execution of its work. Table 5 provides recommendations related to KYTC's standards and processes.

Table 5: Recommendations Related to Standards and Processes

RECOMMENDATION 14: Develop follow-up planning procedures	**Objectives:** Depends on follow-up plans.
Developing plans that follow up on and delve into identified needs can help KYTC address key issues, discover emerging needs, and produce additional project ideas. Examples of follow-up planning strategies include completing state and regional bike and pedestrian plans, expanding mode networks according to demand, enhancing policy connections between statewide transportation planning and local government land use regulation and zoning, planning TSMO investments to improve reliability and operation of the system, and updating freight and modal plans to inform decision making. KYTC should also leverage transportation data for better operations management and decision making. This can be accomplished by implementing and refining performance measures to track implementation progress.	
RECOMMENDATION 15: Focus on asset management and preservation	**Objectives:** M1, M2
Asset management and preservation strategies may include using durable and resilient materials and methods for infrastructure construction; preserving existing roadway and non-motorized infrastructure; improvement to bridge, pavement, and other asset condition data and management systems; and pursuing opportunities to research and deploy advanced materials and construction techniques to extend facilities' useful life. The results of the scenario planning workshop revealed that asset management is likely to gain importance in the future, requiring a continued and expanding cabinet focus on it.	
RECOMMENDATION 16: Implement complete streets standards	**Objectives:** S1, S3
The new Statewide Bicycle and Pedestrian Plan and the KYTC Complete Streets Policy support these recommendations.	
RECOMMENDATION 17: Foster inter-agency and inter-state collaboration	**Objectives:** C1, C2, E1, E2, E3
Collaboration and partnerships allow KYTC to promote the Commonwealth's transportation vision beyond the system that it owns and manages. Since KYTC does not own the entire multimodal transportation system, it will need partnerships to realize its vision. Some of the potential partnerships and areas for collaboration are with:	

- The Kentucky Cabinet for Economic Development (KCED) related to the identification of needs and impacts of businesses that are recruited to Kentucky
- The Division of Commercial Vehicle Enforcement (Kentucky State Police) related to truck routes, truck parking, and WIM technology
- Support for multi-state coordination of infrastructure improvements through federal grant opportunities
- The Department of Parks and the Department of Local Government around the Rails to Trails program

RECOMMENDATION 18: Focus on project delivery	**Objectives:** R2
KYTC should aim to accelerate project development so that projects are completed faster and can address system needs sooner. KYTC can evaluate and modify its procurement process to improve the efficiency of the project delivery process and pursue innovative contracting methods and revenue streams for projects involving federal funds.	

The recommendations included in this Plan of Action will inform the development of the specific shorter-term actions for KYTC to begin to implement these recommendations and the LRSTP over the next five to ten years.

SUBAPPENDIX A: EXISTING PLANS REVIEWED

The following existing plans were reviewed.

- 2013 Your Turn LRSTP Survey Report (link)
- 2013 - 2014 Kentucky's LRSTP Public Involvement Notebook (link)
- 2014 - 2035 Kentucky's Long-Range Statewide Transportation Plan (link)
- 2015 Kentucky Statewide Rail Plan (link)
- 2017 Kentucky Freight Plan (link)
- 2019 Freight Modes Booklet (link)
- 2019 Transportation Asset Management Plan (link)
- 2019 Statewide Transportation Improvement Plan (STIP) Book (link)
- 2019 Truck Parking Plan (link)
- 2020 Highway Plan (link)
- 2020 Public Involvement Process (PIP) Plan (link)
- 2020 Rural Consultation Survey (link)
- 2020 - 2024 Strategic Highway Safety Plan (link)
- 2020 Planning Guidance Manual (link)
- Bike & Pedestrian Plans and Clubs (link)
- Bridging KY (link)
- Kentucky Riverports Highway & Rail Freight Study (link)
- State Management Plan (link)
- Statewide Corridor Plan (link)
- Strategic Highway Investment Formula for Tomorrow (SHIFT) Project Prioritization Process (link)
- Strategic Plan Summary (link)