



Technical Memorandum 4 Report: *Riverport Investment Strategies*

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INTRODUCTION

This fourth Technical Memorandum in the *Kentucky Transportation Cabinet (KYTC) Riverport, Highway & Rail Freight Study* explores ways future riverport investment can enhance Kentucky's economic competitiveness and enable the Commonwealth to become a more significant component of the nation's Marine Transportation System. Kentucky's riverport system currently relies on more than 650 miles of the Ohio River and the Mississippi River to New Orleans which is constrained by older and limiting infrastructure. The 11 Kentucky public riverports rely on this system and will be improved based on Water Resources Development Act (WRDA) funding. Funding from WRDA provides for lock maintenance and replacement, dredging, and feasibility studies.

The objectives of this report are to:

- 1) Define different potential levels of investment that can be made in Kentucky's riverports to year 2045,
- 2) Explore potential payoffs of riverport investment at each level for the Commonwealth and the nation at large,
- 3) Articulate how the likely outcomes of riverport investment can support a case for funding as well as utilization of Kentucky's riverport system in the larger economy, and
- 4) Establish objectives towards which market capture¹ and investment recommendations are to be pointed in the final report for the study.

This Technical Memorandum follows three prior memoranda, available on the study's website.²

- Technical Memorandum 1 provides a basic understanding of Kentucky's freight transportation economy for the 11 public riverports. The memo identifies the existing conditions, inventories

¹ Market Capture is understood as the ability of a port to attract additional customers and revenue

² Online at <https://transportation.ky.gov/MultimodalFreight/Pages/Kentucky-Riverports.-Highway-and-Rail-Freight-Study.aspx>

strengths and weaknesses, and conveys the roles of the riverports. It also provides an overview of contemporary coordination efforts, key takeaways from port visits, and Kentucky riverport descriptions.

- Technical Memorandum 2 presents freight forecasts, describing the freight market for Kentucky’s 11 public riverport authorities—including all relevant freight modes—and identifies long-term forecasts for regional modal freight flow demands. The analysis demonstrates three potential economic growth trajectories to 2045. Through the combined hinterland,³ the overall freight market is projected to grow by between 10.7% and 24.5% by 2045, yet with the decline in fossil fuel markets, waterborne freight markets are anticipated to decline by up to 5%.
- Technical Memorandum 3 explores the strategic position of Kentucky’s riverport system in terms of statewide strengths, weaknesses, opportunities, and threats (SWOT). It considers investment needs and opportunities in the context of financial assistance programs for developing Kentucky’s public riverports. It contains a peer state review of intermodal freight financing programs as well as their current infrastructure improvement grant programs. Technical Memorandum 3 provides a look at the Kentucky Riverports Capital Improvement Program (CIP), feeding into the analysis discussed herein.



SCENARIO UNCERTAINTY: U.S. INTERNATIONAL TRADE POLICY

The forecast ranges stem from:

- **Uncertainty in Trade Policy:** U.S. international trade policies since 2019.
- **COVID Uncertainty:** COVID Impacts have increased shipping costs 3-fold with long term impacts still unknown.
- **Containers in China:** there is uncertainty regarding how U.S. shipping containers held in China may affect future trade volumes.

1. BASIS FOR RIVERPORT NEEDS AND OPPORTUNITIES

In April 2021, site visits to Kentucky’s public riverports revealed specific infrastructure needs and future investment opportunities. These build on the economic forecasts and strategic growth opportunities first

³ defined as all counties within a 90-minute one-way drive time from the nearest public port

presented during March 2021 at the second virtual summit, entitled *Kentucky Summit on Economic Development Strategies to Leverage Kentucky Riverports and Freight Network*. Within this context, port needs are found to stem from both existing port conditions and expected market changes as documented in Technical Memorandum 2. A paramount investment issue for Kentucky’s public riverport investment is the decline in the coal market, and associated investment needs to capture emerging markets in a changing economy. Year 2045 forecast scenarios show overall freight markets increasing relative to the 2018 baseline scenario: from 10.7 to 24.5 percent growth in freight volumes for the pessimistic and optimistic forecast scenarios, respectively. However, projections for the water freight transportation market range from a 32.9 percent decline for waterborne tonnage to 42.2 percent growth for truck freight by volume. The market shifts suggest potential opportunities to capture modal share in commodities such as aluminum, plastics, grains, and oils, some of which are already handled by the public riverports. Further opportunities are possible through new market capture from Kentucky’s developing public riverports if capacity and industry targeting are geared towards strategic new capacity. The range of growth for each mode and each port is summarized in **Table 2** in Technical Memorandum 3.

Kentucky transportation infrastructure changes may require new investment to improve public riverport access by road and rail, so that shippers choose inland waterway transport. The inland waterway system itself requires federal infrastructure investment to maintain the aging lock and dam system in a state of good repair to continue operating with sufficient reliability for waterway shippers.

Further, Technical Memorandum 3 inventories five years of capital improvement needs at individual public ports, gathered from site-visits and conversations with port directors and other key stakeholders. This list provides the basis for analyses presented in this Technical Memorandum.

2. PRIORITIZATION OF RIVERPORT INVESTMENTS

Beyond the Kentucky Riverport Improvement (KRI) Program discussed in Technical Memorandum 3, there are more than 75 federal funding programs applicable to port authorities—including those addressed in Technical Memorandum 3. These programs are currently being updated based on the BIL with new details expected from MARAD in 2022. Kentucky’s public and private riverports can consider more than \$40 billion in total program funding to address industry factors such as infrastructure, resilience, security, and economic development.⁴ For Kentucky public riverports, infrastructure focused funding would seem to be

⁴ Total program funding is comprised of total available programmatic funding and award ceilings; however, no program funding is considered twice.

the highest priority; however, less-considered programs including those addressing resiliency and environmental sustainability can also increase throughput by reducing operational delays.

Reconsidering the KRI Program

The purpose of the KRI Program is to provide grants for public riverport authorities to fund dredging or improvement of riverport facilities, infrastructure, or critical material-handling equipment. Since its creation in 2013, Kentucky's legislature has allocated \$500,000 from the General Fund to the KRI program each year. Program criteria require that awards:

- Provide dredging or improve riverport facilities, infrastructure, or critical material-handling equipment.
- Be within the boundary of the riverport; and
- Be identified in the Riverport Authority's officially adopted business or long-range plan (i.e., within the project list or in the affiliated city or county comprehensive plan project list).

Chapters 4 and 5 of the final report will include specific recommendations regarding Kentucky's riverport funding and priorities. The below discussion of Kentucky's funding in relation to federal programs and other states, provides context for recommendations in the final report.

In contrast to Kentucky the Louisiana Port Construction & Development Priority Program (LPCP) was developed to simply improve ports and harbors in the State, allowing the wider applicability of program funding to port projects.

Moreover, plans and studies are not eligible under the KRI program, which suggests that a port must first understand its business and be willing invest. The U.S. Department of Transportation (USDOT)'s first Transportation Investment Generating Economic Recovery (TIGER I) discretionary grant program initially did not support planning studies; however, USDOT agencies have since expanded to fund planning activities.

The LPCP is based on economic development; the applicant must project job creation and other economic impacts as well as benefit-cost analysis. There are more than 30 ports in Louisiana, each with a slightly different focus. KRI asks applicants to provide the project description, operational and marketing need, and description how the project will increase jobs and efficiency. It further asks for the number of anticipated trucks, trains, and barges per week as a result of the project—information that is inherent in transportation user cost and economic impact assessments.

This comparison is provided for the Kentucky Association of Riverports (KAR) and other decision-makers to consider a new focus or reprioritization to provide funding for ports. This could include new criteria or a revised methodology, i.e., a formula-based program. There is simply a need to provide more funding for the ports, given they provide goods and jobs to the state.

Prioritize Funding for Container-on-Barge

Currently, the detailed county level forecasts of Kentucky’s commodity markets (TRANSEARCH) show about 50 percent of goods by weight moving through counties served by Kentucky’s riverports are dry bulk commodities including aggregate, sand, and energy products. Further, less than five percent are neo-bulk⁵ comprised of steel coils



Source: <https://www.americanpatrioholdings.com/affiliates1.html>

Figure 1: American Patriot Container Transport, LLC

and just under 50 percent are general cargo goods. As goods like grain and logs, which traditionally moved as neo-bulk products, are now moved in containers, there is a growing emphasis on container-on-barge. This is evidenced by America’s Highway Program, established by the Energy Security and Independence Act of 2007, going beyond its original focus on reducing Vehicle Miles Traveled (VMT) for commercial trucks and simply addressing public benefits. In 2017, the Maritime Administration revised program priorities to notably add “promote short sea shipping”; to re-designate “corridors, connectors, and crossings” as “routes;” and to expand eligible cargo to include discrete units or packages that are handled individually, palletized, or unitized as well as roll-on/roll-off cargo on ferry services.

New developments in Mississippi river traffic further inform the modernization needs of Kentucky’s riverports as will be further explored in Chapters 2, 3, and 4 of the final report. For example, there is a focus on Continental United States (CONUS) services, the establishment of a regular “short sea service” on the Mississippi and Ohio Rivers. To convey reliability to shippers would mean a reprioritization of state and federal investments in the movement of more containers at any one given time, and a resilient method to move goods beyond the highway system, reducing highway maintenance costs. Further, there is a need to move goods in both directions—including backhauls—between the Gulf Coast and the Midwest. These movements include soybeans (outbound), Caterpillar tractors (outbound), and now common, high volume

⁵ Neo-bulk cargo is a category of prepackaged goods, not stored in containers—e.g., lumber, steel, paper

e-commerce goods that can be moved on the water and pre-staged at local distribution and fulfillment centers.

Walmart and Amazon are using water for domestic movement of goods to supply their distribution centers. In fact, Walmart has considered the domestic movement of goods on the water and now directly competes with Amazon through its own Walmart+. Moreover, Amazon is developing a full robotics fulfillment center near an inland port in Richmond, Virginia, which is served by the 64-Express container-on-barge service that transports containers from Hampton Roads.⁶ Amazon also has a fulfillment center in Baltimore, Maryland to provide inland distribution from Maryland Port Administration facilities.

This market is possible for riverports with new technology investment to facilitate container transport and load coordination. Priority infrastructure investments to attract this market includes dock improvements and new equipment to load/unload containers and unitized cargo like Intermediate Bulk Containers (IBCs), otherwise known as “supersacks.”

3. EXISTING AND POTENTIAL FUNDING STREAMS

Technical Memorandum 3 provides potential federal funding sources which are also described in the U.S. Committee on the Marine Transportation System’s Federal Funding Handbook. This biennial handbook outlines authorized funding, financing, and technical assistance programs for infrastructure in the marine transportation system.⁷

Total capital improvement needs identified by the ports equal more than \$220 million over five years. To put it in perspective, capturing even one percent of the \$41.7 billion from federal sources in one year is more than double the total needs conveyed by the riverports for the next five years.

⁶ Source: “Updated: Amazon planning huge robotics fulfillment center near Richmond Raceway, to add 1,000 jobs,” Richmond Biosensor, April 21, 2021. Available at <https://richmondbizsense.com/2021/04/21/breaking-news-amazon-planning-robotics-fulfillment-center-near-richmond-raceway/>.

⁷ Online at <https://www.cmts.gov/topics/infrastructure>

Trends in Riverport Funding

Coastal and inland port funding has grown substantially since TIGER II in 2010.⁸ The focus on investing in the maritime industry over the last 15 years points to successful messaging at the Congressional and public levels.

Public funds have been invested to improve cargo handling at marine terminals and navigational locks. Since Fiscal Year (FY) 2012, U.S. Army Corps of Engineers (USACE) funding has increased its ports and waterways Civil Works budget. In FY2021, Congress appropriated \$6.8 billion, the largest in its history, compared to \$5 billion in FY2012 or a 36% increase.⁹

Further, there are programs that have been developed to address new priorities including historically conflicting land uses: i.e., residential areas adjacent to commercial/industrial land uses.

- The U.S. Environmental Protection Agency maintains its Ports Initiative showing the reprioritization from port capacity/throughput to the impacts on nearby communities.¹⁰
- Development of America's Marine Highway Program in 2007 did apply to river and coastal ports; its focus on short sea shipping could be further developed on the Mississippi and Ohio Rivers.¹¹
- Initial funding authorized by the National Defense Authorization Act (2010) totaled \$7 million. The most recently announced round of the correlating grant program, authorized by the Consolidated Appropriations Act of 2021 (Pub. L. 116-260, December 27, 2020), totals \$10.8 million.

Funding changes at the state level have been less robust. While \$4.9 million in KRI grants have been awarded since the program began distributing funds in FY2013, the obligation has remained at \$500,000 annually. In contrast, inflation has risen by 1.17%, increasing \$500,000 to just over \$585,000 in 2021. If the annual allocation grew at the same rate, the difference could fund one to two new forklifts for general cargo.

Potential New Funding Sources

Currently, Congress is considering new infrastructure funding legislation to provide immediate funding and appropriate funds for the next five years (FY2021-FY2026). This includes one proposal for \$17 billion for

⁸ Source: "Ports Awarded Nearly \$95 Million in TIGER II Infrastructure Grants," PR Newswire, October 20, 2010. Available at <https://www.prnewswire.com/news-releases/ports-awarded-nearly-95-million-in-tiger-ii-infrastructure-grants-105390123.html>.

⁹ Source: "Army Corps of Engineers: FY2021 Appropriations," Congressional Research Service, January 4, 2021. Available at https://www.everycrsreport.com/files/2021-01-04_IF11462_baad46f9d7889f696464d6c59f13122d10adead6.pdf.

¹⁰ For more information, see <https://www.epa.gov/ports-initiative>.

¹¹ America's Marine Highway Program was authorized by the Energy Independence and Security Act of 2007.

ports to address maintenance, congestion, emissions near ports, and possibly new low-carbon technologies. One proposal for the infrastructure bill includes \$5 million annually in marine highway funding for five continuous years, \$450 million annually for the Port Infrastructure Development Program, and about \$10 billion for USACE infrastructure priorities.

However, as legislation unfolds over the coming months, it represents a substantial infrastructure funding opportunity. It is critical that Kentucky's public port authorities competitively position themselves to take advantage of this program.

Peer Review: Public-Private Partnership Models

Public-Private Partnerships (P3) allow Kentucky port authorities to share costs for new development to leverage private dollars. In Chapter 5, P3 options for economic development in Kentucky's riverport hinterland, are explored. A review of such models in other states provides context for how such legislation can work and lessons learned.

A P3 opportunity is currently being offered by the Port of New Orleans.¹² In addition, FHWA encourages the use of P3s for transportation infrastructure—such as toll roads like I-495, I-66, and I-395 in the Washington, DC metropolitan area. A key factor is the early involvement of the private sector.

Thirty-six states including Kentucky have enacted enabling legislation for P3s. Examples include:

- Arizona provides one of the most comprehensive statutes for transportation projects, authorizing AZDOT to enter into agreements with private organizations “to design, build, finance, maintain, operate, manage, and/or lease transportation facilities, or for any other project delivery method that the DOT determines will serve the public interest.” In contrast, Arkansas only authorizes P3s for the development of unpaved roads.
- Colorado has six enabling pieces of legislation for transit, toll roads, tunnels, and other transportation facilities.
- Connecticut has two enabling pieces of legislation including General Statute §§ 4-255 to 4-263 authorizing the Governor to approve five projects as P3 projects prior to January 2016. The statute limits state support of an agreement to 25% of the cost of the project.

¹² Source: “P3 Opportunity,” The Port of New Orleans. Available at <https://portnola.com/info/louisiana-international-terminal/p3-opportunity>.

- Louisiana has four pieces of enabling legislation, allocating 25% to rural projects.
- Ohio DOT can use a P3 for a “public or private highway, road, street, parkway, public transit, aviation, or rail project, and any related rights-of-way, bridges, or tunnels.”
- Oregon Revised Statute 367.800 to 826 “...establishes the Oregon Innovative Partnerships Program within the state DOT, which is authorized to enter into agreements with private entities to plan, acquire, finance, develop, design, construct, reconstruct, replace, improve, maintain, manage, repair, lease and/or operate transportation projects.” The statute also “...lists specific goals for the program, including to speed project delivery, maximize innovation, and develop partnerships with private entities.”
- Virginia’s legislation allows a private entity to develop and operate a qualifying transportation facility.

By comparison, Kentucky’s Revised Statute 45A.077 “...establishes an 11-member Kentucky Local Government Public Private Partnership, which will approve review and approve certain P3 agreements.”¹³

Other Forms of Innovative Finance Support

Innovative finance support includes tools and resources to help transportation stakeholders implement innovative strategies to provide programs and projects. This allows providers, financiers, and stakeholders to overcome resource constraints, focus on energy and environmental considerations, and provide for efficiencies in program delivery. The goal is to expand public sector capacity in delivering transportation infrastructure.

Other forms of innovative finance support that Kentucky riverports can leverage include but are not limited to:

- Alternative Project Delivery can include the long-term lease of existing, publicly financed facilities (with fees) to a private operator, e.g., a stevedore.
- Project Finance entails borrowing money through bonds, loans, or other financing mechanisms (including the use of Grant Anticipation Revenue Vehicles (GARVEEs)) to deliver a project. A key issue is whether the port or a central state office can issue bonds.

¹³ Source: “Center for Innovative Finance Support,” U.S. Department of Transportation. Available at <https://www.fhwa.dot.gov/ipd/p3/legislation/>.

- Demand Pricing involves the imposition of user fees based on the level of demand for a facility. This could include a toll road to a port or be a part of a tariff that ports typically impose. Common examples include wharfage, docking, and storage that must remain competitive despite being passed onto shippers and ultimately consumers.
- Value Capture harnesses a portion of the increased property values to pay for the improvement or for future transportation investment. This tool was used by PortMiami to construct a tunnel helping containers flow to and from the port.

4. FIVE-YEAR INVESTMENT SCENARIOS

Through on-site visits with the consulting team and subsequent dialogue through spring and summer of 2021, the Kentucky riverports provided an illustrative list of investment opportunities for FY2021/2022 through FY2025/2026 for Kentucky Riverports Capital Improvement Program line items—including new equipment, land acquisition, warehouse maintenance, and other factors. Approximately 170 line-items were identified and grouped by project based on cargo type and port. For example, enhancements to a port for a particular commodity can be represented in terms of improved efficiency or more capacity to handle one of three commodity types: (1) dry bulk, (2) neo-bulk, and/or (3) general cargo goods. As a result, 12 projects were assessed, summarized in **Table 1**.

*Table 1: Annual Port Investment Needs (\$,000s (2021)) **

Riverport Authority	Cargo (Project)	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	Grand Total
Eddyville	Dry Bulk	\$5,000	\$980	\$7,500	\$2,000		\$15,480
Greenup-Boyd County	Dry Bulk	\$20	\$1,500		\$6		\$1,526
Henderson County	General Cargo	\$600	\$750	\$1,500	\$3,000	\$15,300	\$21,150
Hickman County	Dry Bulk	\$2,500	\$3,500	\$2,100		10000	\$18,100
Louisville	Dry Bulk	500	11500	12000			\$24,000
Maysville Mason	Dry Bulk					\$4,000	\$4,000
	General Cargo					1000	\$1,000
Meade County	Dry Bulk		\$12,000				\$12,000
Owensboro	Dry Bulk	\$6,061	\$245	\$1,335	\$840	\$1,873	\$10,353
	General Cargo	844	\$2,908	2325.25	\$1,397	892.2	\$8,366
	N/A	\$3,584	\$1,132		1500	\$50	\$6,266
Paducah McCracken County	Dry Bulk	\$2,608	400	\$50,000		\$12,000	\$65,008

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	General Cargo	\$10,635		\$1,000		\$5,000	\$16,635
West Kentucky Regional	Dry Bulk	\$234	\$15,354	\$1,950	\$350	\$350	\$18,238
Grand Total	Grand Total	\$32,586	\$50,268	\$79,710	\$9,093	\$50,465	\$222,123

Note: Numbers may not add up due to rounding.

* This Table does not include \$24.366 million of needs identified for (1) three additional projects for which outlay details were not provided as of this writing and (2) non-capital administrative overhead needs or (3) envisioned outlays for categories not identified but coded as (“N/A”) in funding requests. For example, the Hickman Riverport had not provided data as of this writing.

Each prospective riverport investment opportunity is understood in terms of one of three investment classes:

- 1) **Preserve** (Business as Usual): These are investments that simply enable the ports to continue to operate based on existing conditions, without which there could be a loss of today’s market share. This may be understood as a “defensive” level of investment.
- 2) **Modernize** (Optimizing Efficiency): These are investments that enable the ports to save money and operate competitively for the future, passing savings into Kentucky’s economy even if not changing market dynamics or capturing new markets. This may be understood as an additional level of investment to achieve “modernization” of Kentucky’s riverport system.
- 3) **Expand** (New Market Positioning): These are investments that enable the ports to attract additional cargo from truck or rail markets, from new geographic markets, and to move future cargo at lower cost by adding significantly new capacity or capabilities not existing today. These represent the highest cost improvements, but also the potential highest economic benefits by reducing truck or rail miles, growing the size of the riverport economy, and enhancing long-term market share.

These three investment types, or “packages” are incremental. The preservation investment is a baseline, with the modernization outlay representing an additional investment above and beyond the preservation level, and the expansion yet another additive investment. Each incremental investment level can be understood to represent additional economic benefits and impacts for both Kentucky’s economy and the nation. Kentucky’s overall investment opportunities are summarized into investment scenarios—outlined in **Figure 2**.

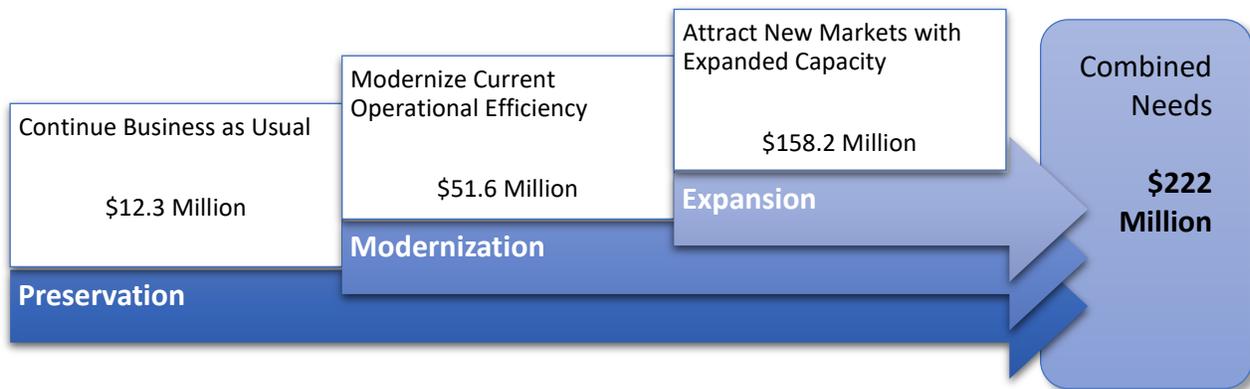


Figure 2: Riverport Investment Scenarios

The reasonableness of the investments recommended by the ports in the port visits and subsequent dialogue is supported by the benefit-cost ratios (BCR), discussed further in **Section 6**. While the focus of the current technical memorandum is overall funding levels, payoffs, and the rationale for investment, individual line items will be available as an appendix to the final report at the conclusion of the study. BCRs show that the investments identified by the riverport authorities yield benefits consistent with national standards expected for investments of the types and magnitudes identified for expansion, modernization, and preservation.

5. AFFORDING RIVERPORT INVESTMENT

Current funding streams—including the KRI program—contribute to covering \$12.3 million for the “business as usual” scenario. This leaves a \$210 million funding gap over a five-year period to realize the “optimize” and “expand” scenarios described by port directors. Breaking the \$210 million funding gap into bite-size pieces, this equates to \$42 million per year over five years or \$21 million per year over ten years. To fund these bigger scenarios, ports must aggressively and strategically seek additional federal, state, and private resources.

While the final report will suggest future state funding levels, the below analysis considers the potential benefits and impacts of different investment levels that will inform this recommendation. If Kentucky were to supplement its capital funding level by \$42 million over a five-year period, or \$21 million over a 10-year period, the Commonwealth would be able to fully afford the \$210 million of additional investments identified. Technical Memorandum 3 demonstrates that some of Kentucky’s peer states have funding programs with annual investment levels in this range (such as Florida with \$44 million and Ohio with \$23 million). However, with the emergence of a federal transportation bill expected to pass in 2021 and the wide range of programs available (explored in the Third Kentucky Summit: Statewide Strategy for Riverport Investment (August 31-

September 2, 2021)), it is recommended that the Commonwealth explore all sources to fund capital improvements in its riverport system. Table 2 below demonstrates that there was over \$41.75 billion in federal funds in the 2019/2020 federal fiscal year from various federal programs. If Kentucky riverports effectively accessed just only one percent of these funds, it would provide \$417 million. Assuming the distribution of funds over five years, the annual allocation would have been \$83 million. However, state funding is essential in order to have adequate matches for federal programs. Kentucky’s leverage to access key programs is limited by both the size of the KRI grant program and the need to clearly articulate how Kentucky riverport projects meet the societal and policy objectives of the programs. Chapter 4 of the final report further explores funding recommendations for the KRI grant program, and federal matches, and Chapter 5 addresses how the riverports can best articulate their case for wider economic development programs.

Table 2: Five Year Total Funding Available to Riverports

Type	Program	Type	Program			
Infrastructure	ATCMDTP	Resiliency	Disaster Loan Assistance	In 2022 More than \$41.7 Billion in federal funds were available		
	BUILD		Emergency Relief			
	Farm Storage		HSGP			
	INFRA		PSGP			
	Marine Highway		SaTC			
	PIDP	Environment	TSGP	Additional funds are expected to be programmed in 2022 through the Bipartisan Infrastructure Law (BIL)		
	RRIF		Clean Diesel			
	Transp Alts Set Aside		CMAQ			
	WIFIA		Endangered Species			
	Economic Development		Econ Dev Assistance		Marine Debris	Kentucky’s \$222 Million Riverport Need is less than 1% of available federal funding if KRI grants are fully leveraged for available programs
Planning Grant			Pollution Prevention			
APRA-E			SRA			
			Targeted Airshed			
					Wetland Program Development Grants	

Source: Federal Funding Handbook for Marine Transportation System Infrastructure – 4th Edition, U.S. Committee on Marine Transportation System, November 2019 (Corrected 2020)

The programs shown in **Table 2** have specific requirements, and further investigation can show (1) which of the \$222 million in Kentucky’s port investment qualify for which programs, (2) how many years it could take to qualify, and (3) which complementary investments, economic development initiatives, or other efforts may be associated with making the best case for this investment.

Furthermore, federal dollars are not the only potential source of investment. P3s and business efforts through innovation hubs can play an important role in riverport expansion as part of larger economic development strategies.

Kentucky offers significant economic development programs¹⁴ that riverports can leverage, together with local partners, to attract firms in emerging riverport industries. Kentucky’s Cabinet for Economic Development (CED) provides initiatives like the Kentucky Enterprise Fund which can provide support for up to \$750,000 for early-stage firms in Kentucky, Commonwealth Seed Capital program, and the Angel Tax Credit/Fund program offer up to \$6 million in credit for Kentucky businesses each year in addition to small business tax credits and state credit underwriting programs. These programs have not been widely leveraged for Kentucky’s riverports, however, Chapters 4 and 5 of the final report recommend ways that riverport improvements may qualify within the context of the wider development initiatives.

The final report of this study and the associated Marketing Toolkit will suggest explicit targets for industry sectors, as well as implementation and go-to market targets for industries and business profiles, which may attract on-port and port-complementary investment that could cover some of the investments envisioned in the \$158 million market positioning investment package.

6. USER BENEFITS & WIDER IMPACTS

While it is likely that the funding to re-position Kentucky’s riverports will come from a combination of grants, private investment, federal and state programs, demonstrating the payoffs of the investment is essential. At the federal level, grant programs and other funding streams prioritize applicants who demonstrate the societal benefit of investments on the larger US economy. At the federal level it is not sufficient to just show that an investment can help a Kentucky port to gain market share, a business case must show that an investment will gain market share by reducing transportation costs (or improving productivity) in the entire economy. In effect, it must be shown that investment in Kentucky’s riverports not only saves dollars and brings prosperity to Kentucky but saves dollars and brings prosperity to the entire nation through everyone involved in using the ports.

While demonstrating overall benefits is important for federal funding, it also makes a compelling case to prospective port customers. For example, if expanding port capacity to handle additional aluminum can reduce truck mileage for a shipper, it saves thousands of dollars a year and makes a case for using the port—just as it makes an economic case to the federal government to invest. At the state level, the dollars saved by the port user can be then reinvested in the business creating jobs, increasing earnings, and contributing to Kentucky’s tax base and gross domestic product (GDP). These are the components of the business case for investing in Kentucky’s port system. The stimulus effect of spending construction dollars

¹⁴ Online at https://ced.ky.gov/Locating_Expanding/kybizince

in Kentucky's economy is short-term in nature and is understood as only a small part of the overall business case.

Figure 3 describes the three elements of the business case. While Technical Memorandum 4 introduces the basic elements of this business case, they will be further developed in the final report and marketing toolkit.

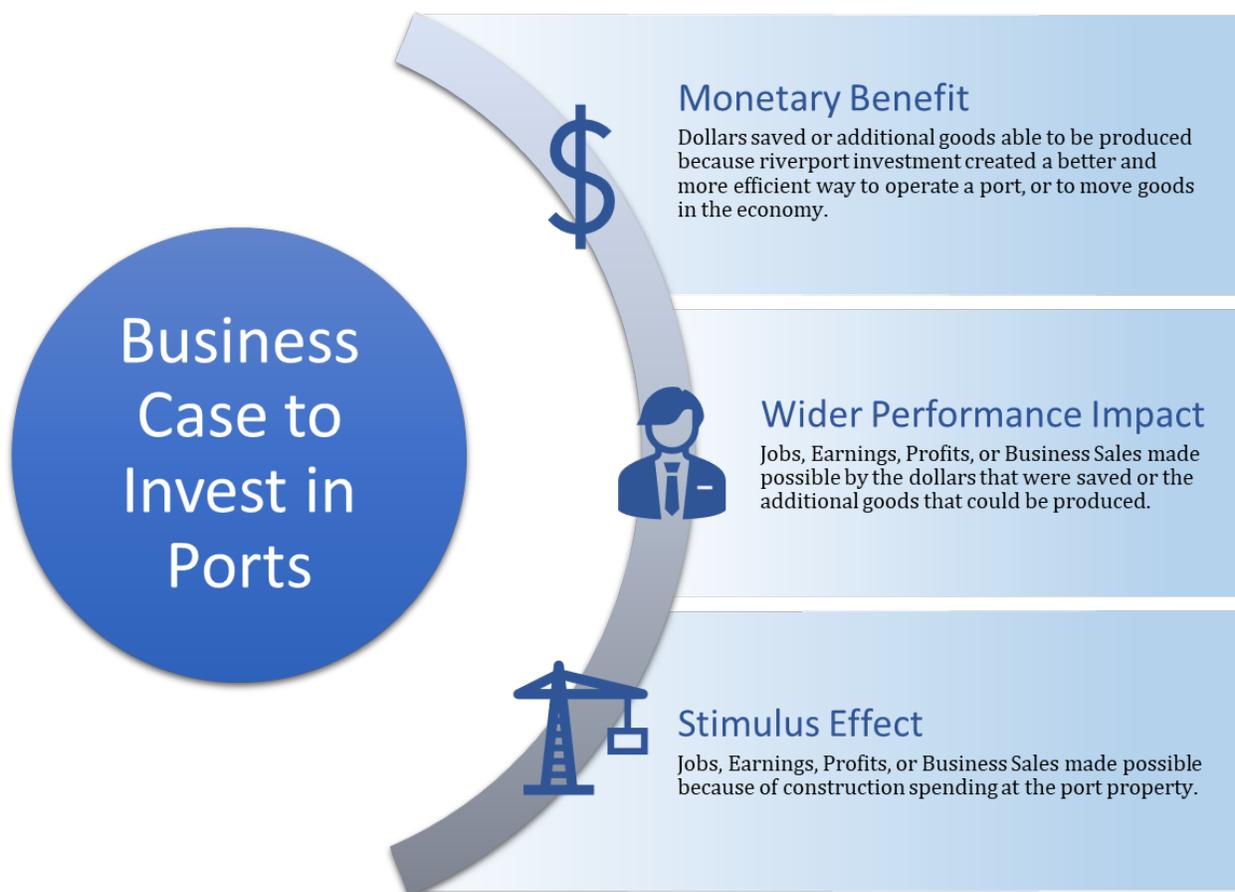


Figure 3: Elements of the Riverport Investment Business Case

Each of the three categories of investment provide monetary benefit to the state and national economy in different ways.

- **Preservation** creates benefits as well maintained infrastructure reduces maintenance costs in the long-term, enabling the ports to spend less on operations and maintenance, passing savings on to the state and national economy.

- **Modernization** creates benefits as new equipment and technology make the ports more efficient, enabling them to operate at lower costs. Ports pass those savings on to customers and into the state and national economy.
- **Expansion** creates benefits as the use of Kentucky ports provides lower costs and more efficient alternatives to other ports or modes, resulting in savings for shippers and carriers and attracting new business to ports.

Table 3 summarizes the present value of the benefit Kentucky can expect from investing in each class of riverport investments as well as the wider impacts that can be expected in Kentucky’s economy over the life of the investments to 2045.

Table 3: Discounted Long-Term Benefits and Costs of Statewide Riverport Investment

Investment Category	Present Value: Five-Year Capital Costs*	Present Value: Benefits to 2045	Benefit–Cost Ratio (3% Discount)
Preserve: Business as Usual	\$12 million	\$19 million	1.6
Modernize: Optimize Port Efficiency	\$52 million	\$101 million	2.0
Expand: New Market Positioning	\$158 million	\$490 million	3.1
Combined Total	\$222 million	\$610 million	2.7

*The 3% Discount Rate accounts for differences between undiscounted values in **Figure 2** and the values above.

BCRs for each investment category are consistent with USDOT/MARAD PIDP Guidance¹⁵, supporting the reasonableness and consistency of needs as identified in both the April 2021 port visits and subsequent dialogue with Kentucky’s riverport leadership (If riverport needs had been unrealistically inflated or deflated, ratios may have fallen outside of expected ranges). The four BCRs in **Figure 4** signify the 1.6 cost/benefit range for Kentucky’s preservation investments falls well within the expected range for modest projects of this type. Project elements (line items) that optimize port efficiency yield a 2.0 BCR falling within the MARAD expected range for moderate investments. Moreover, project elements that expand or provide a new market position provide a 3.1 BCR and entail the most investment—higher costs but also greater benefits. However, the benefits and wider impacts also justify the increased levels of investment for each scenario. Overall, the BCRs and consistency with national guidelines suggest that the basis for these investments is likely to meet the benefit-cost criteria for many grant programs and other investment opportunities.

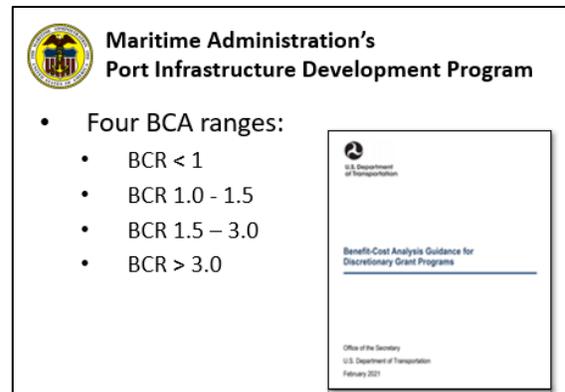


Figure 4: U.S. Department of Transportation (MARAD) Benefit-Cost Analysis Guidance

The Benefits and Economic Impacts of Market Capture for Kentucky’s Riverports

As shown in the above analysis, the greatest economic impact of investment in Kentucky’s riverport system is achieved through added capacity and positioning to serve commodities currently carried by other modes. As indicated in Technical Memorandum 2, this type of market capture will be essential for the ports to maintain and grow their market share within the overall transportation economy, especially with the decline of coal and fossil fuels. It can also represent significant savings to the economy.

A significant share of the economic benefits of riverport investments are accounted for by the potential to reduce truck and rail vehicle miles and hours of travel. The \$490 million of benefits that can occur from Kentucky riverport market capture of rail and highway traffic by 2045 represents significant streams of savings from rail and highway operating costs, vehicle mileage, safety risk, emissions, driver, and crew hours.

Assuming all \$222 million of project needs are implemented and each investment achieves the expected benefits, **Table 4** summarizes the cumulative benefits through 2045 assuming a 3 percent discount rate.

¹⁵ “Benefit-Cost Analysis Guidance for Discretionary Grant Programs,” U.S. Department of Transportation, 2021. Available at <https://www.transportation.gov/office-policy/transportation-policy/benefit-cost-analysis-guidance-discretionary-grant-programs-0>

As shown, there are \$409 million in transportation benefits: savings in travel time, reliability, safety, and vehicle operating costs. Another \$82 million come from environmental and societal benefits like reduced emissions and improved productivity.

Table 4: Cumulative Transportation Performance Benefits of Full Build and Modal Capture of Kentucky Riverports by 2045

Component Benefits for Full Investment in KY Riverports	\$Millions, 3% discount
Freight Transportation Benefits	\$408.7
Value of Improved Travel Time Reliability	\$3.4
Value of In-Vehicle Travel Time (IVTT)	\$137.4
Value of Safety Improvement	\$25.6
Value of Vehicle Operating Costs (VOC)	\$242.3
Environmental and Social Benefits	\$81.7
Value of Emission Reduction for Carbon Dioxide	\$28.1
Value of Emission Reduction for Mobile Source Pollutants	\$51.0
Wider Economic (Productivity) Benefits	\$2.6
TOTAL BENEFITS OF FULL BUILD-OUT	\$490.4

Table 5: Cumulative Transportation Performance Benefits of Full Build and Modal Capture of Kentucky Riverports by 2045

Component Benefits for Full Investment in KY Riverports	\$Millions, 3% discount
Freight Transportation Benefits	\$408.7
Value of Improved Travel Time Reliability	\$3.4
Value of In-Vehicle Travel Time (IVTT)	\$137.4
Value of Safety Improvement	\$25.6
Value of Vehicle Operating Costs (VOC)	\$242.3
Environmental and Social Benefits	\$81.7
Value of Emission Reduction for Carbon Dioxide	\$28.1
Value of Emission Reduction for Mobile Source Pollutants	\$51.0
Wider Economic (Productivity) Benefits	\$2.6
TOTAL BENEFITS OF FULL BUILD-OUT	\$490.4

Component Benefits for “Expand” Scenario	\$Millions, 3% discount
Freight Transportation Benefits	\$204.1
Value of Improved Travel Time Reliability	\$0.2
Value of In-Vehicle Travel Time (IVTT)	\$19.8
Value of Safety Improvement	\$45.2
Value of Vehicle Operating Cost (VOC)	\$138.9
Environmental and Social Benefits	\$202.1
Value of Emission Reduction for Carbon Dioxide	\$22.9
Value of Emission Reduction for Mobile Source Pollutants	\$174.6
Wider Economic (Productivity) Benefits	\$4.6
TOTAL BENEFITS OF FULL BUILD-OUT	\$406.3

As shown, \$293.3 million (60%) of the benefit associated with capturing potential divertible traffic to expanded riverport capacity in Kentucky is in the form of reductions in mobile source pollutants and vehicle operating costs for both trucks and trains. The remaining savings are in driver and crew operating hours, safety, emissions, and some degree of productivity benefits associated with more efficient logistical operations. The share of benefits accruing in Kentucky relative to the rest of the US is determined based on (1) the distribution of freight shown in Kentucky’s statewide travel demand model and (2) the distribution of freight across all modes of transportation shown in the IHS Markit TRANSEARCH database. It should be noted \$114.4 million in benefits (discounted 3%) account for only a fraction of the overall benefits of improving Kentucky’s Riverports, with an additional \$376 million in benefits for the national economy beyond Kentucky. The potential savings to households and businesses outside of Kentucky (by passing transportation savings on to shippers and carriers using the ports throughout the US) is a significant factor in the business case for the type of federal funds shown in **Table 2**.

The benefits of each type of investment create jobs, earnings, business sales, and GDP in Kentucky’s economy. Effectively, when Kentucky’s households and businesses save money on transportation, they can invest in more competitive business practices, hire new workers, spend money on better household amenities, become more educated and productive. In this way, with every dollar that the riverports save Kentuckians on transportation, Kentucky’s households and businesses can produce significantly more than a dollar’s worth of business sales, household earnings, and “value-added” profit in the state’s economy. **Table 5** below summarizes the wider economic indicators that each of the investment types can create in Kentucky’s economy relative to the undiscounted outlay.

Table 6: Economic Impacts to Kentucky of Investing in Kentucky Riverports (\$Millions)

Scenario	Undiscounted Outlays	Business Sales	GDP	Household Earnings
Preserve: Business as Usual	\$12.3	\$36.9	\$16.8	\$11.2
Modernize: Optimize Port Efficiency	\$51.6	\$154.4	\$70.5	\$46.8
Expand: New Market Positioning	\$158.2	\$473.1	\$216.2	\$143.5
TOTAL	\$222.1	\$664.3	\$303.6	\$201.4

It should be understood that a large percentage of the impacts shown above are near-term spending impacts, with the permanent impacts dependent on investment in the more aggressive expansion and market-capture investments. Effectively, all the impacts shown above for the Preservation and Modernization outlays are attributable to the short-term stimulus impact of spending the money during the construction period, with relatively little wider impact (beyond the monetary savings to the riverport) after the investment period. However, for the Expansion investments (\$158 million), \$132 million or 28% of the \$473 million in business sales are cumulative permanent impacts attributable to ongoing economic efficiency. Likewise in the Expansion package, \$61 million or 28% of the \$216 million in GDP gain and \$40 million or 28% of the \$144 million in wage income is due to permanent transportation efficiency gains by 2045.

The business case for outside investment in Kentucky’s riverports rests in the potential stimulus that Kentucky’s economy can obtain from both construction spending in modernizing riverports in the near term combined with the demonstrated long-term benefit that robust expansion and market-capture investments can provide for both the national economy and Kentucky’s GDP, wage income, and business sales. Effective federal investment in Kentucky’s riverports has been demonstrated to yield more than sufficient benefits nationally (**Table 4**) to warrant investments (**Table 5**) to provide significant economic stimulus to the Commonwealth.

7. ROLE OF INVESTMENT PACKAGES IN A PREFERRED STRATEGY

Due to the significant shifts forecast in Kentucky’s waterborne transportation economy, the recommended preferred investment strategy entails three elements.

- 1) Targeting specific federal programs to raise as close to the \$222 million investment level as possible, with a strong emphasis on programs/initiatives targeting waterborne manufacturing,

grains, plastics, oils, and metals in known growth markets found in the IHS Markit forecasts with selected trade partners.

- 2) Target both geographic and industry groups for modal capture for specific ports. Pinpoint high-value industry recruitment targets in port hinterland regions in supply chains associated with water-divertible commodities to make a case for economic development incentives and private dollars to further support the modal capture/expansion target.
- 3) Widen the envisioned time horizon for a port expansion program from a five-year capital programming horizon to a 25-year strategic planning horizon, while considering a phased approach towards a long-term vision as opposed to near-term budgeting choices.

These recommended actions are suggested based on the market forecasts articulated in Technical Memorandum 2, the port situation and funding position shown in Technical Memorandum 3, as well as the proceedings of the three summit events held in 2020-2021.

In the final analysis, the ensuing *Kentucky Riverport Marketing Toolkit* will include specific guidance on capture marketing for both port business and local new-business locations in hinterland regions; roles for port authorities, economic development partners, industry boosters, and transportation agencies; as well as guidance for ongoing use and access to the data and market tools for pinpointing specific opportunities to use data underlying forecasts. The study's final report will articulate the specific short- and long-term investments within each of the above packages likely to serve as a starting place for achieving the returns described herein, as well as the modes, commodities, and sources of market potential for those investments.

While it is not expected (or projected) that Kentucky will achieve the full benefit and impact of 100% build-out of the full market expansion potential or full funding of the \$222 million program as described above, the analysis finds significant payoffs from repositioning the ports to capture new market share. The analysis also shows that the expansion investments envisioned by Kentucky's riverports in Technical Memorandum 3 represent an opportunity for cost savings to shippers and carriers outside of Kentucky and improved transportation nationally to attract both federal and private investment through a comprehensive strategy.