

REPORT CARD FOR KENTUCKY'S INFRASTRUCTURE

ASCE
KENTUCKY SECTION

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2026

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2026 REPORT CARD FOR KENTUCKY'S INFRASTRUCTURE

Cover photo of US 460 in Pike County, photo credit: Neil Wicker Aerial Photography

Executive Summary

Kentucky's infrastructure is critical to economic growth, public health and safety, and quality of life across the Commonwealth. From transportation and energy systems to water and wastewater infrastructure, these assets support resilient communities and economic opportunity. While Kentucky has made significant progress in recent years, continued success will require sustained investment, coordinated planning, workforce development, and a focus on long-term resilience.

One of the most pressing issues affecting Kentucky's infrastructure is the increasing frequency of extreme weather. Flooding, tornadoes, and severe winter weather have caused widespread damage, exposing vulnerabilities, and disrupting essential services. Recent disasters have impacted water and wastewater systems, damaged roads and bridges, strained energy infrastructure, and generated significant debris. These events demonstrate that reactive recovery alone is not sustainable. Continued investment in resilience planning, system hardening, hazard mitigation, and updated design standards can help communities anticipate risks, strengthen infrastructure, and reduce service interruptions and recovery costs.

Workforce development is also a critical challenge across nearly all infrastructure sectors. Kentucky depends on skilled engineers, operators, technicians, and tradespeople to design, operate, and maintain increasingly complex systems, but shortages are driven by retirements, private-sector competition, and limited training pipelines. Smaller and rural communities face additional challenges recruiting and retaining qualified personnel. Declining enrollment of civil engineering students and rising higher education costs may further constrain the pipeline of future engineers. Expanding STEM education, strengthening training partnerships, and improving access to higher education and recruitment and retention programs will be essential to building Kentucky's infrastructure workforce.

Affordability remains a central consideration in infrastructure investment. Aging systems, resilience needs, and growing demand require significant upgrades, but utilities and agencies must balance these investments with residents' and businesses' ability to pay. Funding gaps are substantial in sectors such as water and wastewater, yet raising rates can be challenging, particularly for low-income households. Maintaining affordable energy and transportation costs is also critical to economic competitiveness and household stability. Strategic planning, targeted investment, federal funding, and public-private partnerships can help address these challenges while keeping improvements accessible and equitable.

Emerging trends and regulatory requirements further reinforce the importance of forward-looking planning. Growing demand for energy and water, data center development, electric vehicles, and evolving requirements such as PFAS regulations will place new pressures on infrastructure systems and require coordinated planning and investment across sectors.

Executive Summary

Land use and development patterns present further challenges. With 120 counties and only 30 planning boards, Kentucky faces limitations in coordinating residential growth, data centers, and industrial development, placing pressure on agricultural lands, natural resources, and local economies. Addressing these challenges early can align infrastructure investments with future growth, protect natural resources, and maintain system reliability.

Looking ahead, Kentucky can strengthen its infrastructure by shifting from reactive recovery to proactive planning focused on preparedness, resilience, and long-term sustainability. Identifying risks, monitoring emerging trends, and investing before problems become emergencies can reduce vulnerabilities, improve reliability, and lower long-term costs while supporting economic competitiveness, protecting public resources, and enhancing quality of life.

Recommendations to Raise the Grades

- **Establish sustainable, long-term infrastructure funding.** Increase and stabilize state and local investment, maximize available federal funding, and pursue innovative financing and partnerships to address aging infrastructure, maintenance backlogs, and growing capital needs. Consistent funding reduces costs and keeps the civil engineering profession competitive in the employment market.
- **Prioritize asset management and preventive maintenance.** Expand condition assessments, life-cycle planning, data-driven decision-making, and preventive maintenance to extend asset life, identify critical needs, reduce emergency repairs, and make the most effective use of limited resources.
- **Build resilience into infrastructure planning and investment.** Incorporate hazard mitigation, risk assessment, updated design standards, redundancy, and emergency preparedness into infrastructure decisions to reduce vulnerabilities to flooding, severe storms, and other extreme weather events and improve recovery.
- **Strengthen Kentucky's infrastructure workforce.** Expand partnerships with universities, technical schools, training programs, and industry to recruit, train, and retain the engineers, operators, technicians, and skilled tradespeople needed to design, operate, and maintain infrastructure.
- **Plan proactively for growth and changing infrastructure demands.** Strengthen coordination among state and local governments, utilities, infrastructure owners, and regional partners to prepare for population and economic growth, changing land use, emerging technologies, and increasing demands on energy, water, and transportation systems.
- **Balance infrastructure investment with affordability.** Develop sustainable funding and rate structures that reflect the cost of providing reliable infrastructure while leveraging assistance programs, regionalization, federal funding, and other strategies to limit burdens on households and communities.
- **Modernize policies and regulations.** Update standards, permitting, and planning requirements to support sustainable growth, effective maintenance, and future infrastructure needs.

About ASCE Kentucky

Established in 1936, the ASCE Kentucky Section is a professional organization serving civil engineers across the Commonwealth through four active Branches. The Section provides opportunities for members to learn from their peers, share knowledge, collaborate, and build professional relationships. Through conferences, technical programs, scholarships, and other activities, ASCE Kentucky supports the continued development of the civil engineering profession. At its core, the organization supports the purpose of civil engineering: protecting people and the environment through smart, safe, and economical infrastructure solutions.

Kentucky Infrastructure Report Card Steering Committee

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A special thank you to WordsFresh for their countless hours spent developing, editing, and producing this report, and to ASCE National staff for their guidance, resources, and support throughout the Report Card process.

Together, these contributions have helped create a valuable tool for informing infrastructure investment and advocacy throughout the Commonwealth.

Grading Criteria

The Report Card sections are analyzed based on the following eight criteria:

Capacity – Does the infrastructure's capacity meet current and future demands?

Condition – What is the infrastructure's existing and near-future physical condition?

Funding – What is the current level of funding from all levels of government for the infrastructure category as compared to the estimated funding need?

Future Need – What is the cost to improve the infrastructure? Will future funding prospects address the need?

Operation and Maintenance – What is the owners' ability to operate and maintain the infrastructure properly? Is the infrastructure in compliance with government regulations?

Public Safety – To what extent is the public's safety jeopardized by the condition of the infrastructure and what could be the consequences of failure?

Resilience – What is the infrastructure system's capability to prevent or protect against significant multihazard threats and incidents? How able is it to recover quickly and reconstitute critical services with minimum consequences for public safety and health, the economy, and national security?

Innovation – What new and innovative techniques, materials, technologies, and delivery methods are being implemented to improve the infrastructure?

Grading Scale

The Report Card sections are graded on the following scale:

A **Exceptional: Fit for the Future**

The infrastructure in the system or network is generally in excellent condition, typically new or recently rehabilitated, and meets capacity needs for the future. A few elements show signs of general deterioration that require attention. Facilities meet modern standards for functionality and are resilient to withstand most disasters and severe weather events.

B **Good: Adequate for Now**

The infrastructure in the system or network is in good to excellent condition; some elements show signs of general deterioration that require attention. A few elements exhibit significant deficiencies. Safe and reliable with minimal capacity issues and minimal risk.

C **Mediocre: Requires Attention**

The infrastructure in the system or network is in fair to good condition; it shows general signs of deterioration and requires attention. Some elements exhibit significant deficiencies in conditions and functionality, with increasing vulnerability to risk.

D **Poor: At Risk**

The infrastructure is in poor to fair condition and mostly below standard, with many elements approaching the end of their service life. A large portion of the system exhibits significant deterioration. Condition and capacity are of significant concern with strong risk of failure.

F **Failing/Critical: Unfit for Purpose**

The infrastructure in the system is in unacceptable condition with widespread advanced signs of deterioration. Many of the components of the system exhibit signs of imminent failure.

Summary of Kentucky Grades



AVIATION

2026 Kentucky Infrastructure Report Card

C+

Executive Summary

Kentucky's aviation system plays a vital role in the Commonwealth's economy and transportation network. The state's airports generate $23.7 billion in annual economic activity, supporting military operations, medical transport, and cargo movement for the e-commerce marketplace. Kentucky has also experienced tremendous growth in its passenger activity, with all primary commercial service airports back to or exceeding pre-pandemic enplanement activity, providing service to 12.8 million passengers in 2024. The condition of Kentucky's commercial service airports meets or exceeds Federal Aviation Administration (FAA) standards, as these facilities continue to invest in infrastructure to meet demands. Additionally, many of the general aviation airports in the state have been undergoing pavement evaluations in recent years to ensure runways and taxiways are in good repair; however, the focus has shifted to runway and taxiway lighting, visual aids and approach lighting, runway safety obstruction removal, and terminal facilities. Continued investment will be necessary to ensure Kentucky's aviation system remains safe, reliable, and capable of supporting future economic growth.



Figure 1.
CVG Terminal (CVG Airport website: cvgairport.com)

2026 Kentucky Infrastructure Report Card: AVIATION

Background

Kentucky is home to 58 public-use airports, 56 of which are part of the National Plan of Integrated Airport Systems (NPIAS). Five airports provide commercial service in the state, while the remaining 53 are classified as general aviation (GA) airports. Airport planning and funding are coordinated through the FAA and the Kentucky Department of Aviation (KDA) to maintain and improve the system's infrastructure.

Capacity

Kentucky is home to five commercial service airports and 53 GA airports. According to KDA's 2024 Economic Contribution Report, commercial service airports provided service to 12.8 million passengers and moved over 5.4 million tons of cargo, while GA airports recorded approximately 1.3 million flight operations and housed more than 1,500 based aircraft.

Airport size classifications—which influence funding—range from Large Hub to Nonhub based on annual passenger enplanements. Kentucky has no Large Hub airports. Of note, several airports illustrate recent trends and changes within these classifications. Cincinnati/Northern Kentucky International Airport (CVG), located in northern Kentucky, is the state's busiest facility and is classified as a Medium Hub. Blue Grass Airport (LEX), located in Lexington, is classified as a Small Hub airport and saw double-digit growth at nearly 17% year-over-year from 2023 to 2024. Owensboro-Daviess County Airport (OWB) in Owensboro moved out of the Primary Commercial Service category to the Nonprimary Commercial Service classification after annual enplanements fell below 10,000. The remaining airports in the state are classified as General Aviation airports. The GA classification applies to an airport with fewer than 2,500 annual passengers and is not used for commercial aviation. This airport type is the largest single group of airports in the system.



Figure 2.

Total Passengers, Total Landed Weight, and Total Cargo at Louisville Muhammad Ali International Airport (Louisville Regional Airport Authority)

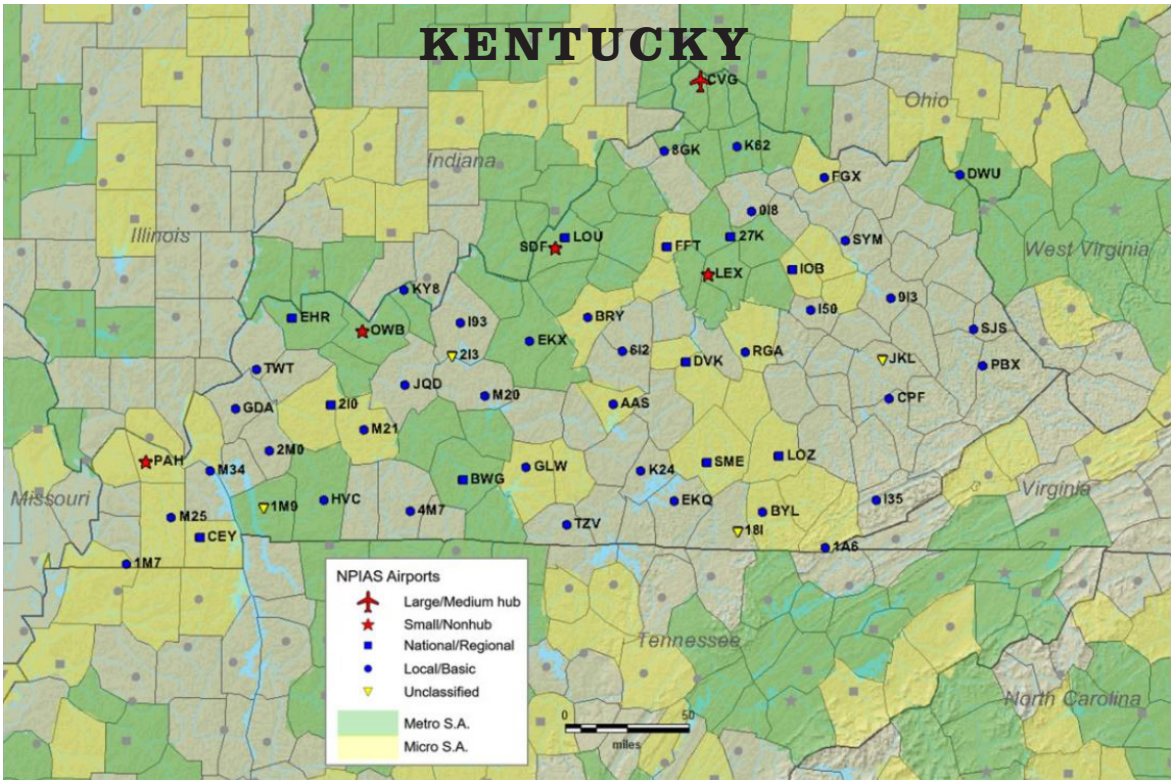
Table 1.

Kentucky Airport Classifications and Passenger Enplanements, 2024 (FAA, NPIAS)

Airport	Code	Location	FAA Classification	2024 Annual Enplanements	2023–24 Growth
Cincinnati/Northern Kentucky International Airport	CVG	Northern Kentucky	Medium Hub	4.5+ million	+4.9%
Louisville Muhammad Ali International Airport	SDF	Louisville	Small Hub	2.3+ million	+3.3%
Blue Grass Airport	LEX	Lexington	Small Hub	776,000+	~+17%
Barkley Regional Airport	PAH	Paducah	Nonhub	13,000+	+3.0%
Owensboro-Daviess County Airport	OWB	Owensboro	Nonprimary Commercial Service	Fewer than 10,000	—

Figure 3.

Public-Use Airports in the Commonwealth of Kentucky (National Plan of Integrated Airport Systems, 2025–2029)



2026 Kentucky Infrastructure Report Card: AVIATION

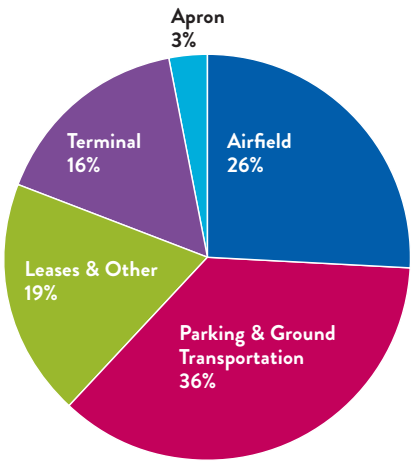
Condition

All public-use airports in Kentucky maintain paved runways and taxiways, ensuring a consistent baseline of infrastructure quality across the Commonwealth's aviation system. KDA has a tool, PowerPM, for tracking and managing airport pavement data. The system lists an aggregate score of 75.6 for Kentucky airports, reflecting generally favorable pavement conditions. Most of these airfield surfaces are constructed with asphalt; however, airports that experience higher traffic volumes or regularly accommodate larger aircraft—such as CVG and Louisville Muhammad Ali International Airport (SDF)—utilize concrete pavement. Concrete is regarded as a more durable and sustainable material than asphalt and is therefore often selected for newer commercial service facilities or locations where long-term structural performance is a priority.

As required under the FAA's Pavement Management Program (PMP), all public-use airports in Kentucky conduct annual pavement evaluations to monitor surface conditions and identify emerging maintenance needs. If a Pavement Condition Index (PCI) survey is performed in accordance with specified ASTM standards, the interval for detailed inspections may be extended to three years. In addition to these formal assessments, airports are required to perform routine daily, weekly, and monthly inspections of their runways and taxiways to support safe and continuous operations.

Funding

Kentucky's aviation system is funded through a combination of federal, state, and local/private sources, each playing a distinct role in sustaining airport infrastructure, safety, and long-term development. At the federal level, the FAA Airport Improvement Program (AIP) remains the backbone of capital investment. Kentucky airports typically receive $55–65 million per year in AIP funding, including primary entitlements, nonprimary entitlements, and discretionary awards. GA airports receive between $110,000 and $295,000 annually, depending on their NPIAS role (basic, local, or regional), while Kentucky's largest primary commercial airports—SDF, CVG, and LEX—receive between $1.3 million and $7.2 million per year in entitlement funding. State funding is provided through KDA, which administers grants for pavement maintenance, safety improvements, and small capital projects, supplemented by local and private investment for hangars, terminals, and revenue-generating facilities.



At Muhammad Ali International Airport (SDF) in Louisville, parking and ground transportation are the largest sources of revenue. Autonomous vehicles and drone taxi services could significantly impact the economic viability of the airport. The airfield provides only 26% of the revenues.

Figure 4.

FY2025 Operating Revenues at SDF (Louisville Regional Airport Authority)

2026 Kentucky Infrastructure Report Card: AVIATION

Since 2022, Kentucky airports have benefited substantially from the Infrastructure Investment and Jobs Act (IIJA), which introduced two major aviation funding streams: Airport Infrastructure Grants (AIG) and the Airport Terminal Program (ATP). Through AIG, general aviation airports in Kentucky have received $110,000–$295,000 annually, while primary commercial airports have received $2–$7 million per year, totaling more than $100 million statewide across FY 2022–2025. Kentucky has also secured significant ATP competitive awards, including up to $20 million for SDF, $10 million for CVG, $5 million for LEX, and $10 million for Barkley Regional Airport to support its new terminal. In total, IIJA funding has delivered over $150 million to Kentucky airports, accelerating terminal modernization, airfield rehabilitation, and safety-critical improvements across the Commonwealth.

Future Need

Kentucky has made meaningful progress modernizing its airport system, but the scale of future investment remains substantial. The FAA's 2025–2029 NPIAS identifies more than $141 million in capital needs for the Commonwealth's GA airports, and KDA estimates an additional $191 million in GA needs between 2027 and 2031. When the five commercial service airports are included, total statewide aviation infrastructure needs exceed $1.2 billion over the next five years. With $23.7 billion in annual economic activity tied directly to aviation, these investments are essential to preserving system performance, competitiveness, and long-term economic vitality.

Growing passenger volumes, expanding cargo operations at CVG and SDF, and aging airfield and terminal infrastructure underscore the urgency of modernization. Priority needs include runway and taxiway rehabilitation, terminal upgrades, consolidated rental car facilities, and safety-critical airfield improvements. These projects generate significant economic returns: SDF supports nearly 49,000 jobs and $9.9 billion in output; CVG contributes $11.5 billion and 55,000 jobs; and LEX adds nearly $900 million and 5,400 jobs. Strategic investment will strengthen these impacts while improving the passenger experience through shorter security lines, expanded airline competition, and modern, technology-enabled facilities. Addressing Kentucky's $1.2 billion infrastructure need is not only feasible—it is foundational to meeting future demand and sustaining the Commonwealth's economic momentum.

Operation and Maintenance

Primary commercial airports rely on FAA AIP entitlement funds for pavement projects and other eligible capital improvements, while the GA airports depend on federal AIP and discretionary state funding to meet their infrastructure needs.

Beyond routine maintenance activities, system-wide operational efficiency is significantly influenced by the performance of the National Airspace System (NAS). Navigational aids—including localizers, glideslopes, and advanced NextGen technologies—are essential for supporting

safe aircraft operations, particularly during periods of reduced visibility or increasingly frequent adverse weather conditions. Nearly 85% of Kentucky's public-use airports are equipped to support at least one non-visual approach capability, underscoring the statewide commitment to maintaining safe and resilient airfield operations.

Additional maintenance initiatives further enhance the safety and reliability of aircraft arrivals and departures. These efforts include improvements to runway and taxiway lighting systems, upgrades to visual aids and approach lighting infrastructure, and the systematic removal of runway safety area obstructions. Collectively, these measures ensure that airports across the Commonwealth can maintain safe, efficient, and continuous operations in alignment with federal aviation standards.

A strong workforce is critical for the operation and maintenance of Kentucky's aviation system. Nationwide shortages of air traffic controllers and other aviation professionals highlight the importance of maintaining a strong workforce pipeline to support safe and efficient airport operations. Training delays during the pandemic slowed the certification of new controllers and aviation personnel, increasing pressure on existing staff. Continued investment in workforce development—including support for air traffic control staffing, airport operations personnel, and maintenance professionals—will help strengthen staffing levels and support long-term operational resilience across the aviation system.

Public Safety and Resilience

Public safety at Kentucky's airports is a layered, system wide responsibility that extends far beyond Transportation Security Administration (TSA) screening. Airports function as critical public safety infrastructure, supporting law enforcement, fire and rescue operations, emergency medical response, and statewide disaster coordination. Whether at a commercial service airport or a GA facility, maintaining secure airfields, protecting the traveling public, and ensuring rapid response capability are foundational to safe and reliable aviation operations across the Commonwealth.

Aviation safety begins with compliance with federal standards. At commercial service airports, the TSA oversees passenger and baggage screening, secure area access control, and coordination with airport operators to ensure adherence to federal security requirements. These airports must also maintain dedicated police units and Aircraft Rescue and Firefighting (ARFF) capabilities scaled to aircraft size and operational volume. GA airports, while not subject to TSA mandates or Part 139 requirements, still implement essential safety practices such as perimeter security, emergency response coordination with local agencies, and wildlife hazard mitigation based on local conditions.

Kentucky's airports generally perform well in meeting Runway Safety Area (RSA) requirements. All commercial service airports maintain RSAs that meet or exceed FAA dimensional and grading standards. Most GA airports also comply fully with remaining nonstandard conditions typically tied

to legacy runway geometry, terrain constraints, or adjacent roadways. The Commonwealth continues to use AIP, IIJA AIG, and state aviation funds to correct RSA deficiencies through grading improvements, object removal, and pavement adjustments.

Airports also play a vital role in disaster response and emergency management. In the event of a catastrophic incident, whether caused by terrorism, severe weather, hazardous materials, or other large scale disruptions, airports serve as essential hubs for coordinating relief operations. Every commercial service airport in Kentucky maintains a comprehensive Airport Emergency Plan, designed not only for aircraft-related incidents but also natural disasters and community-wide emergencies requiring multi-agency coordination.

Beyond emergency preparedness, airports employ multiple layers of operational safety measures to protect the public and airport users. These include perimeter fencing, controlled access gates, airfield lighting and signage, safety management systems, and runway incursion prevention technologies. Wildlife hazard management programs reduce the risk of wildlife strikes through regular inspections, habitat modification, and coordination with wildlife experts. Kentucky's wildlife strike rates are comparable to national averages, with most incidents involving small birds and resulting in no damage. The national average is about 10.6 strikes per 100,000 aircraft operations, and Kentucky commercial airports are reporting eight to nine strikes per 100,000 operations. Similarly, runway incursion rates at Kentucky's commercial airports also remain low and are generally below national averages for airports of similar size, with 0.0006 to 0.0007 per 1,000 operations being reported for Kentucky commercial airports, compared to the national average of 0.0009 incursions per 1,000 operations. Aviation fatalities and injuries per 100,000 flight hours in Kentucky mirror national general aviation trends, with most incidents linked to pilot decision-making or weather rather than airport infrastructure. Together, these layered systems of federal oversight, RSA compliance, airport-based emergency response units, wildlife hazard mitigation, and modern airfield safety practices form an integrated framework that safeguards passengers, airport personnel, aircraft, and surrounding communities. Kentucky's strong safety performance reflects both the resilience of its aviation infrastructure and the ongoing commitment of airport operators to maintaining safe, secure, and reliable facilities across the Commonwealth.

Innovation

Kentucky's airport system continues to advance through targeted investments in forward-looking technologies and infrastructure improvements designed to enhance the passenger experience, improve operational efficiency, and support long-term system resiliency.

At SDF and CVG, multi-year terminal modernization programs are underway to enhance passenger experience and improve operational efficiency. At SDF, the SDF Next Program represents a comprehensive capital improvement effort across the terminal and airfield, including development of a new Airport Operations Command Center, upgraded baggage handling

systems, improvements to passenger boarding bridges, expansion of the security checkpoint, and modernization of concourse gate areas with enhanced lighting and passenger amenities. Future phases include upgrades to ticketing areas, terminal exterior improvements such as curb front expansion and roadway realignment, and development of a new Federal Inspection Services (FIS) facility to support international passenger service. At CVG, the Elevate CVG program is similarly focused on modernizing terminal infrastructure, with current projects including reconfiguration of the Welcome Point, installation of new exit lane technology, and implementation of an upgraded baggage handling system. Planned improvements include expansion of ticketing areas, enlargement of the security checkpoint, and continued modernization of concourses, the FIS facility, and curb front areas.

Airports across the Commonwealth are also implementing advanced technologies to support more efficient and data-driven operations. Parking guidance systems have been deployed at both CVG and SDF to improve circulation and enhance customer experience. At SDF, a recent airfield modernization project replaced in-pavement runway lighting with a smart lighting system that enables real-time monitoring and control of individual fixtures, improving reliability, reducing maintenance downtime, and enhancing airfield safety. In addition, both LEX and SDF have implemented Bluetooth-based wayfinding systems to assist visually impaired travelers, supporting a more accessible and inclusive passenger environment.

Sustainability and resiliency initiatives are also being incorporated into airport development efforts. SDF has implemented a large-scale geothermal system to support terminal heating and cooling, reducing reliance on traditional energy sources while lowering operating costs and emissions. The airport is also advancing a microgrid project to improve energy resiliency, manage peak demand, and allow continued operations during power disruptions. Across the system, airports are incorporating energy-efficient LED lighting, expanding electric vehicle charging infrastructure, and exploring opportunities to accommodate emerging aviation technologies. At CVG, this includes evaluating opportunities to support electric vertical takeoff and landing aircraft as part of its long-term planning efforts.

In addition to passenger-focused improvements, Kentucky's airports continue to support broader economic activity through strategic investments in aviation infrastructure. At CVG, ongoing development of cargo and logistics facilities has reinforced its role as a major freight hub, including support for operations by DHL and Amazon. The airport has also expanded its aircraft maintenance capabilities through the development of new maintenance hangars operated by FEAM Aero, supporting both airline operations and continued growth in aviation-related services. The airport is also advancing development of its Global Logistics Park and expanding aviation-related services, including aircraft maintenance and workforce training. At LEX, recent investments in Hangar One and the WestLEX campus have expanded general aviation capabilities and created new opportunities for tenants and aviation-related businesses.

Figure 5.

SDF Geothermal Facility (Louisville Regional Airport Authority)



Collectively, these efforts reflect a coordinated approach to innovation across Kentucky's airport system, supporting modernization, operational efficiency, an enhanced customer experience, and continued growth of the Commonwealth's aviation sector.

Figure 6.

WestLEX Facility (www.bluegrassairport.com/)



2026 Kentucky Infrastructure Report Card: AVIATION

Recommendations to Raise the Grade

- **Advocate for federal action** to ensure consistent AIP reauthorization that is vital to maintaining stability in airport funding.
- **Increase the Passenger Facility Charge cap** to expand infrastructure funding.
- **Continue implementing FAA NextGen technologies**.
- **Reevaluate the state jet fuel tax cap** to strengthen funding for aviation facilities.
- **Modernize existing airport infrastructure** and explore opportunities for expanded air service.
- **Align various modal transportation plans** to improve multimodal connectivity.
- **Support aviation workforce development** through new and continued partnerships with FAA, the Kentucky Department of Aviation, airports, and technical training programs.

Definitions/Key Terms

- **Large Hub** – commercial, publicly owned airports with 1% or more of annual passenger boardings
- **Medium Hub** – commercial, publicly owned airports with at least .25% but less than 1% of annual passenger boardings
- **Small Hub** – commercial, publicly owned airports with at least .05% but less than .25% of annual passenger boardings
- **Nonhub** – commercial, publicly owned airports with more than 10,000 but less than .05% of annual passenger boardings
- **Nonhub, nonprimary** – commercial, publicly owned airports with at least 2,500 and no more than 10,000 annual passenger boardings

AIP Airport Improvement Program
CVG Cincinnati/Northern Kentucky International Airport
GA General Aviation
LEX Blue Grass Airport
NAS National Airspace System
OWB Owensboro-Daviess County Airport
PAH Barkley Regional Airport
PFC Passenger Facility Charge
SDF Louisville Muhammad Ali International Airport
TSA Transportation Security Administration

Sources

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BRIDGES

2026 Kentucky Infrastructure Report Card

C

Executive Summary

Kentucky's 14,508 bridges are critical to the state's transportation network, supporting daily travel, economic activity, and freight movement across the Commonwealth. As of 2025, 7.5% of bridges were in poor condition, while nearly two-thirds were in fair condition, representing a significant portion of the system at risk of further deterioration without continued investment. Approximately 4.6% of daily bridge traffic occurs on bridges in poor condition, and there are 4,437 bridges with posted load restrictions, impacting mobility and freight movement. The average bridge age is 48 years, approaching the traditional 50-year service life, meaning that the need for rehabilitation and replacement is increasing. While Kentucky has implemented strong asset management practices and secured major federal investments, funding levels remain insufficient to meet long-term needs, particularly for locally owned bridges, which are more likely to be in poor condition. Continued investment in preservation, resilience, and local system support will be essential to maintain safe and reliable bridge infrastructure.



Figure 1.

The Big Four Bridge between Louisville, Kentucky, and Jeffersonville, Indiana (visitindiana.in.gov)

2026 Kentucky Infrastructure Report Card: BRIDGES

Background

Kentucky's bridges are owned and maintained by a combination of state and local agencies, including 9,101 state-owned and 5,407 locally owned bridges. Oversight and management of state bridges are led by the Kentucky Transportation Cabinet (KYTC), which is responsible for inspection, maintenance, and capital improvements. Bridge projects are primarily funded through a mix of state transportation revenues and federal programs, including the Federal Highway Trust Fund.

Condition and Capacity

Bridges in Kentucky are foundational to the transportation network, connecting residents to employment, education, and essential services across the Commonwealth—from the mountainous communities of eastern Kentucky to rural agricultural areas and urban centers. They also play a vital role in supporting the state's economy by facilitating the movement of freight through interstate commerce.

As of 2025, Kentucky has 14,508 bridges in its inventory. Figure 2 shows that while the percentage of bridges in poor condition remains relatively low, the large share of bridges in fair condition represents a significant portion of the inventory that will require continued maintenance and investment to prevent further deterioration. A bridge is rated in poor condition when any of its main components (deck, superstructure, substructure) are rated as a 4 (out of 9) or below based on National Bridge Inventory condition rating guidelines. It is important to note that bridges classified as poor are not necessarily unsafe.

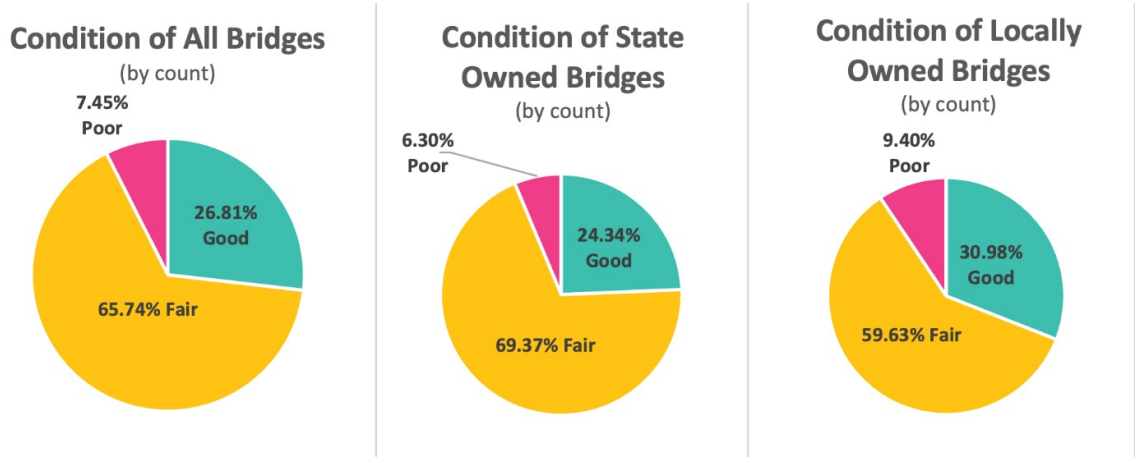


Figure 2.

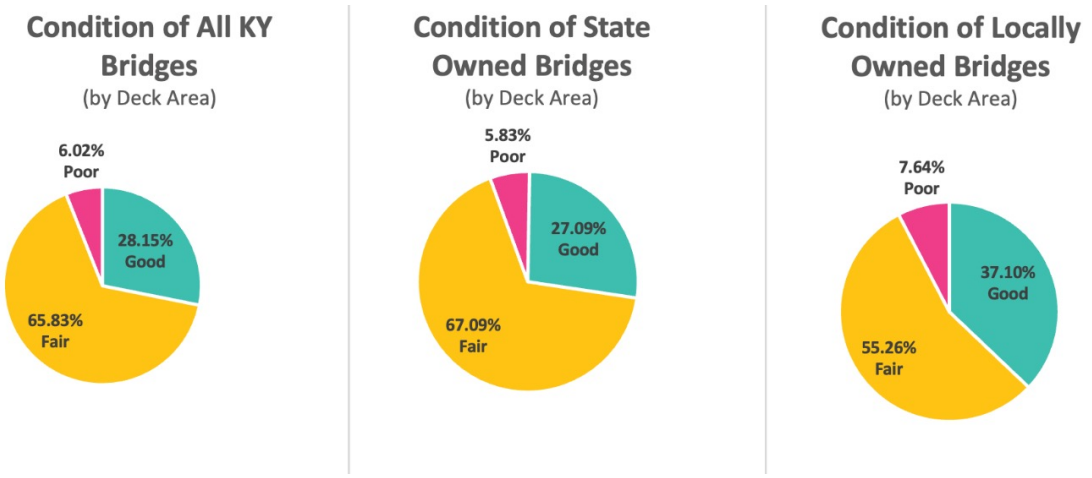
Condition of Bridges in Kentucky, by Owner (2025 Kentucky National Bridge Inventory Submittal)

When evaluated by deck area—the total surface area that vehicles and pedestrians travel on—Kentucky's bridges have a combined total of 73,366,791 square feet. While a smaller percentage of total deck area is in poor condition, a substantial portion of the system is aging and may require rehabilitation in the coming years.

2026 Kentucky Infrastructure Report Card: **BRIDGES**

Figure 3.

Condition of Bridges, by Deck Area (2025 Kentucky National Bridge Inventory Submittal)



Bridge restrictions also impact system capacity and mobility. There are 4,437 bridges with posted load ratings restrictions. Approximately 2,300 of these are owned by KYTC, and the balance are owned by cities and counties. Of these restricted bridges, 630 are rated between 3 and 22 tons. An additional 58 bridges are currently closed to traffic. These restrictions and closures can limit freight movement, increase travel times, and require detours, particularly for heavy vehicles such as trucks, school buses, and emergency response vehicles.

Traffic impacts further highlight the importance of bridge conditions. Approximately 3,035,026 of the state's 66,299,027 average daily trips occur on bridges classified in poor condition. This represents about 4.6% of all bridge traffic, indicating that a notable number of travelers rely on bridges that may require significant rehabilitation or replacement.

Bridge ownership is also an important factor in overall system condition. Of Kentucky's bridges, 9,101 are state-owned and 5,407 are locally owned. The higher percentage of poor-condition bridges among locally owned systems highlights the challenges faced by local agencies, which often have fewer resources for maintenance and replacement.

Overall, 7.5% of Kentucky's bridges are classified as being in poor condition. While this figure is consistent across the statewide inventory, the concentration of poor bridges within locally owned systems presents a key challenge for improving overall system performance. A rating of poor indicates that, while the bridge is safe today, unsafe conditions are more likely to develop.

The average age of bridges in Kentucky is 48 years, which is approaching the traditional 50-year service life for many structures. Although modern bridge design and materials can extend service life to 75 years or more, many existing bridges were not built to these standards and will require ongoing maintenance, rehabilitation, or replacement to remain in service.

Funding and Future Need

Funding for bridge infrastructure in Kentucky is primarily administered by KYTC through the State Highway Plan, which is approved by the Kentucky General Assembly as part of the biennial budget process. The plan outlines projects for the upcoming two years and provides a planning framework for the following four years. Bridge replacement, rehabilitation, and maintenance projects are included within this plan.

Funding for these projects is derived from a combination of state and federal sources, including the state motor fuels tax, vehicle usage taxes, and federal funding through the Federal Highway Administration (FHWA). As of July 1, 2026, the Kentucky motor fuels tax is 26.4 cents per gallon. The gas tax is tied to the wholesale price of gasoline and is adjusted quarterly. The vehicle usage tax is 6% on the purchase price of a new or used vehicle. These funding sources support both ongoing maintenance and capital improvement projects across the bridge network.

Figure 4.

Brent Spence Bridge Corridor (City of Covington, Kentucky)



Kentucky receives approximately $1.1 billion annually in federal highway funds, with $285 million of that dedicated to bridge repair and replacement programs. Recent federal investment has provided significant support for major bridge projects above the annual allocation. In 2023, Kentucky and Ohio received $1.7 billion in Bridge Investment Program (BIP) and Mega Grant funding for the Brent Spence Bridge Corridor project. Kentucky's share of the project cost is estimated at $1.5 billion, with federal funding covering $778 million. The remaining costs are supported through $285 million in matched federal National Highway (NH) funds, $250 million in state General Fund appropriations, and $195 million in additional state matching funds. KYTC has used alternative delivery methods to advance major projects at a lower cost, including the I-69

bridge in Henderson and the Cairo bridge replacement. KYTC has issued several projects using alternative delivery (Design-Build, Progressive Design-Build, and Construction Manager/General Contractor). In those projects, the contractors are involved in the design process, which can allow for overlap of design and construction, as well as identifying cost-saving opportunities and reducing change orders.

In addition to large-scale projects, dedicated programs support improvements to locally owned bridges. The County-City Bridge Improvement Program (CCBIP) allocates $25 million annually in state construction funds to assist local agencies with bridge preservation, repair, and replacement. In Fiscal Year 2025, this funding supported 58 projects, including 40 bridge replacements and 18 repair or preservation projects. As of December 31, 2025, Fiscal Year 2026 funding has advanced 29 additional projects. This program plays a critical role in addressing the higher percentage of poor-condition bridges among locally owned systems.

The most recent Transportation Asset Management Plan (TAMP) update, completed in 2022, outlines a 10-year investment strategy and recommends $2.5 billion in bridge-related investments, with a goal of maintaining 97% of bridge deck area in good or fair condition. Total available state and federal bridge funds are approximately $360 million annually for the next six years.

Despite these efforts, current funding levels remain insufficient to meet long-term needs. Recent trends indicate that overall network condition has declined in recent years and currently does not meet established performance targets. KYTC anticipates that available funding will not fully achieve desired performance targets for bridges or pavements by 2032. While the percentage of bridges in poor condition is currently approximately 4.5% by deck area, a significant portion of bridges in fair condition are at risk of deteriorating into poor condition without sustained investment. Deterioration modeling indicates a growing number of bridges will require replacement in the coming years.

Rising construction costs are further limiting the impact of available funding. According to FHWA, highway construction costs increased by approximately 61% between 2020 and 2025. This escalation reduces the number of projects that can be delivered with existing funding and contributes to delays in addressing infrastructure needs. Continued investment in preservation and rehabilitation is essential to prevent further system decline and reduce long-term costs.

Additional challenges remain in addressing the needs of locally owned bridges. A more comprehensive and centralized assessment of local bridge conditions and funding needs could support the development of targeted investment strategies and improve overall system performance across the Commonwealth. Limited staffing and technical resources at the local level may also affect the ability to plan, prioritize, and deliver needed bridge improvements.

Operation and Maintenance

In addition to funding support, effective operation and maintenance practices are essential to preserving Kentucky's bridge network.

KYTC has focused on a number of practices to improve the performance of bridges and balance the bridge management program. For example, the state has emphasized asset management through the last two State Highway Plan cycles, in which bridge projects are selected by utilizing the Priority Index (based on bridge condition, risk, and mobility), district recommendations, and optimization runs through AASHTOWARE BrM, a software tool used to analyze bridge conditions and prioritize investments. As an example, asset management data for the I-65 bridges in Louisville demonstrated the need for replacement and identified a favorable benefit-cost ratio for the investment.

In addition to state-led efforts, local agencies also play an important role in maintaining bridge infrastructure. Through the CCBIP program, counties and local public agencies (LPAs) are required to learn about bridge maintenance and preservation activities in order to receive funding for bridge projects. KYTC conducts routine bridge inspection workshops to share best practices in bridge inspection, review bridge inspection policy, and showcase bridge preservation projects.

In response to national bridge safety concerns, KYTC evaluated T1 steel retrofits (repairs or modifications to bridge components made from T1, a high-strength structural steel) following the I-40 Hernando de Soto bridge failure in 2021 between Tennessee and Arkansas, which involved a critical fracture in T1 steel. FHWA mandated that all states review, perform non-destructive testing on the welds with this steel, and retrofit the indications. As of December 2025, all 2,500 welds on seven Kentucky bridges have been inspected, and the 183 rejectable indications have been remediated.

Kentucky is in the process of delivering its Six-Year Plan to bring bridge projects to construction, and in recent years KYTC has made significant progress expanding its bridge program to implement a more comprehensive set of preservation activities. This implementation has required training of personnel, acquisition of new materials and equipment, and development of new capabilities, such as bundling bridges with similar construction parameters into one procurement package to gain efficiencies through innovations, means, and methods in the contractor community.

KYTC also addresses specific structural risks through targeted inspection and retrofit programs. Retrofits for conditions such as constraint-induced fracture are planned over the next two years, with over 100 bridges having been identified as possibly having these details.

Figure 5.

Effective Bridge or Pavement Management Program Balance (KYTC TAMP, 2022)

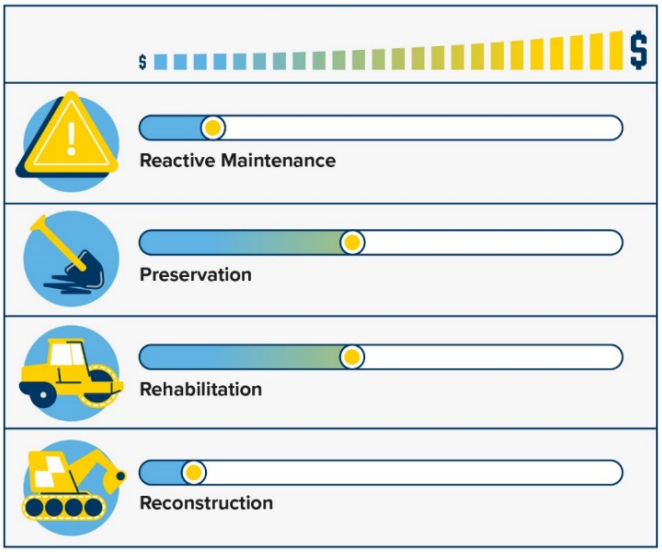
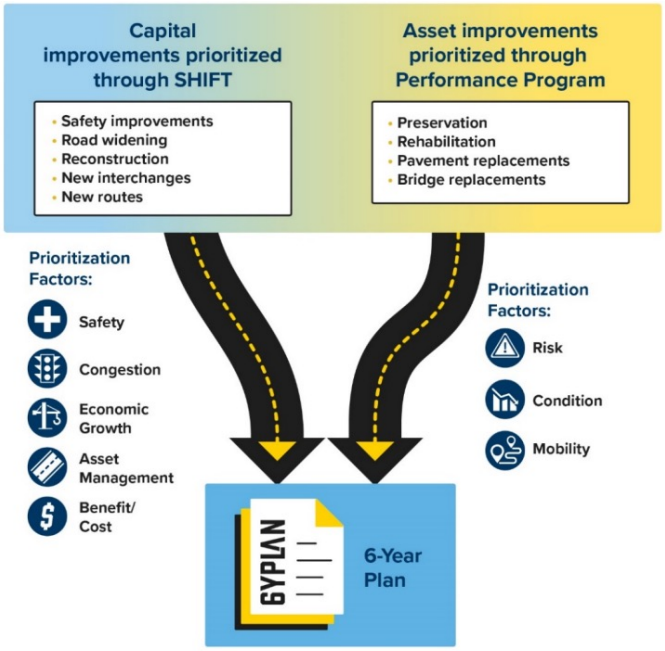


Figure 6.

The project selection and prioritization processes used in developing the Six-Year Plan (KYTC TAMP, 2022)



Long-term planning is guided by KYTC's TAMP, which has been required for all roads and bridges on the National Highway System by federal law since 2012. This extends to all bridges and roads on the state highway system. The TAMP reflects planned road and bridge investments and desired levels of service for the next 10 years. It links planned investments to performance expectations. KYTC has adopted a desired State of Good Repair of 97% of bridge deck area in good or fair condition.

For bridges that need more detailed assessments, KYTC performs nondestructive testing, including magnetic particle testing, dye penetrant, and ultrasound tests. KYTC uses different software packages for load rating its bridges, including the nationally used AASHTOWARE BrR for state structures and automated permitting. KYTC is still utilizing LARS (Load Analysis and Rating System) for locally owned structures but has plans to move to BrR for all structures.

KYTC uses existing transportation funds strategically to prioritize preservation and maintenance before more costly repairs are needed. These investments are not additional funding; rather, they help ensure that available funds are directed toward keeping existing transportation assets in good condition and extending their useful lives.

KYTC prioritizes preservation and maintenance because keeping transportation assets in good condition is significantly less expensive than rebuilding or replacing them. Investing in an asset at the right time can prevent small problems from developing into more costly issues.

Figure 7.

Asset Life Cycle (KYTC TAMP, 2022)

The TAMP uses a Life Cycle Planning approach to identify the right treatment at the right time. Transportation assets naturally deteriorate due to traffic, weather, and the environment. Applying relatively low-cost preventive treatments early in an asset's life can slow deterioration, extend service life, and maximize the value of public investment. Examples include pavement sealing and resurfacing, bridge deck repairs and protective treatments, and drainage maintenance.

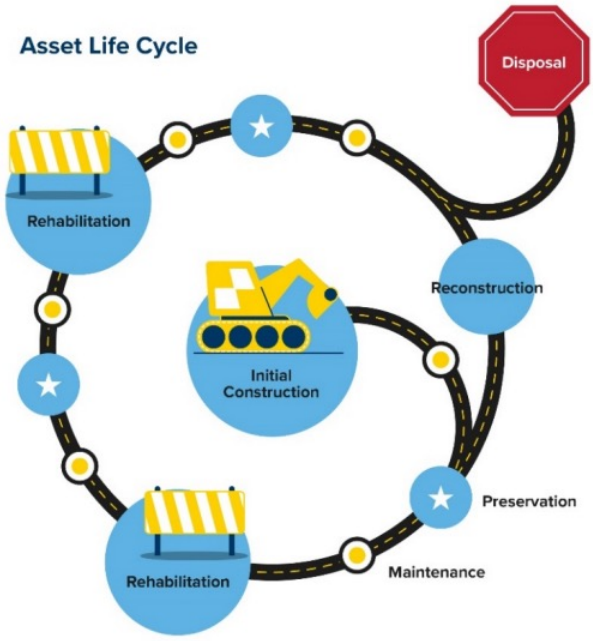
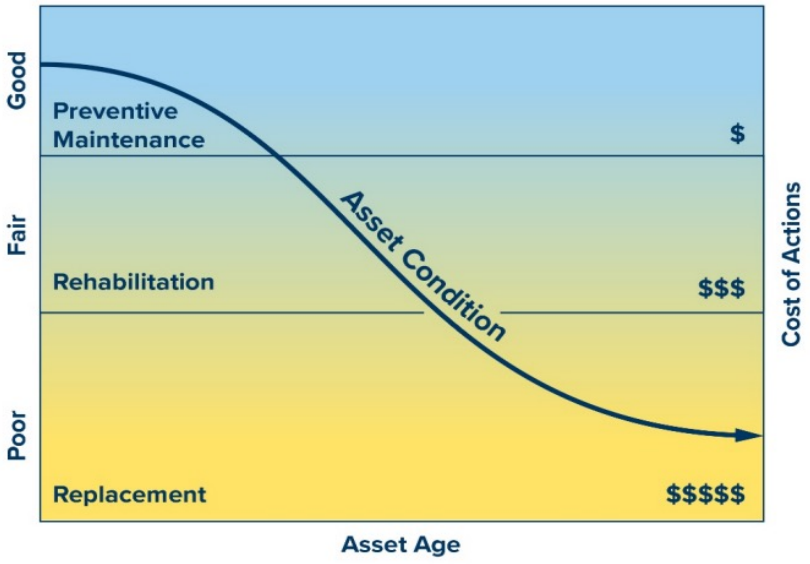


Figure 7 illustrates how an asset's condition changes over time and how timely investments can extend its useful life. This proactive approach helps KYTC preserve existing infrastructure, avoid premature reconstruction, and make the most of available transportation funding.

Figure 8.

Relationship Between Asset Age and Cost of Action (KYTC TAMP, 2022)



Public Safety

The condition and maintenance of bridges directly influence public safety and are critical considerations in the management of Kentucky's bridge network. While bridges classified in poor condition are not necessarily unsafe, they require more frequent monitoring, maintenance, and, in some cases, load restrictions or closure to ensure safe operation.



Figure 9.
Load restrictions on a bridge in Woodford County (Shane McKenzie)

In Kentucky, 4,437 bridges have posted load ratings restrictions, and 58 bridges are currently closed to traffic. These restrictions are necessary to protect public safety but can result in detours, increased travel times, and limited access for emergency response vehicles, school buses, and freight traffic. Approximately 4.6% of daily bridge traffic occurs on bridges in poor condition, highlighting the importance of continued investment to reduce risk to the traveling public.

Structural concerns also play a role in maintaining safety. Following national guidance, Kentucky has inspected and remediated fracture-critical steel details and continues to evaluate bridges susceptible to sudden failure mechanisms such as constraint-induced fracture. Factors such as aging infrastructure, increasing traffic loads, and environmental conditions—particularly flooding and scour (the erosion of soil around bridge foundations caused by flowing water)—can further impact bridge safety if not properly managed.

Continued inspection, maintenance, and targeted investment are essential to ensuring Kentucky's bridges remain safe and reliable for the traveling public.

Resilience and Innovation

Kentucky's bridges are increasingly exposed to severe weather events, including flooding and extreme precipitation, which can contribute to scour, erosion, and other damage to bridge structures and their approaches. Recent flooding in Cumberland County washed out roads and bridges and triggered mudslides that left some neighborhoods cut off. High-water and severe weather events have also created secondary hazards, such as loose river barges threatening major regional connections like the Milton-Madison Bridge and forcing precautionary closures. These safety risks underscore the importance of building more resilient bridge infrastructure.

2026 Kentucky Infrastructure Report Card: **BRIDGES**

Figure 10.

Milton-Madison Bridge (Indiana Department of Transportation)



As a part of the Infrastructure Investment and Jobs Act of 2021, Congress added a new category of federal funds named Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation ("PROTECT") to help states improve the resilience of transportation. A portion of the federal aid allotment is dedicated to this program. In addition, there is a federal competitive grant opportunity to apply for these additional discretionary funds. The KYTC's recommended 2026 Highway Plan includes projects using the formula funds.

For bridge reconstruction projects in the bridge program funds, KYTC has incorporated detour length in their prioritization of bridge projects. That component in the decision is a reflection of vulnerability and risk assessment, helping prioritize bridges that serve as critical connections and would result in significant impacts if disrupted.

KYTC completed a pilot resilience assessment in 2019 with the support of the Kentucky Transportation Center at the University of Kentucky. The assessment resulted in the development of tools to evaluate risk and a GIS-based system to support decision-making. For bridges, this tool focuses on flooding and scour using the National Bridge Inventory database as the foundation of the data.

KYTC is also using historical data to better understand and respond to recurring risks by using a database that tracks structures that require periodic repair and reconstruction during emergency events. Through that process, KYTC has identified 103 bridge sites that required multiple

repairs over 20+ years of data. This information is shared with project development teams in the prioritization of capital projects and in the determination of the appropriate solution.

The CCBIP program also promotes maintenance, reconstruction, and replacement of locally owned bridges in a manner that improves the resilience of the structure and the corridor it supports, providing dedicated funding for these projects to local agencies that have completed training in preventive and routine bridge maintenance.

In addition to resilience efforts, Kentucky is incorporating new technologies to improve bridge inspection and maintenance. Unmanned Aircraft Systems (UASs) are being incorporated into several aspects of bridge design, construction, and maintenance. Drones are commonly used for aerial imaging, bridge profiling, and channel assessment, providing high-quality documentation of bridge conditions and surrounding environments. This is particularly helpful when dealing with channel migration and scour. UASs also support bridge inspection, allowing inspectors visual access to portions of bridges that can be difficult to reach physically. This reduces the need for specialized access equipment and improves inspection efficiency. Finally, drones can be used for emergency response impacts (such as a fire or disaster), as well as for damage assessment and condition monitoring.

Kentucky is also using innovative contracting methods to improve project delivery and efficiency. Since 2022, KYTC has advanced its alternative delivery portfolio by procuring four Progressive Design-Build (PDB) projects and initiating a pilot Construction Manager/General Contractor (CM/GC) project. Multiple early work packages have been awarded on PDB and CM/GC projects, enabling early material procurement and utility relocations, highlighting key advantages of early contractor involvement. This proactive approach has been instrumental in the successful delivery of complex projects. In parallel, Kentucky continues to utilize Best-Value Design-Build and, in partnership with Indiana, advance the Ohio River Crossing Bridge as an Open Bridge Type Design-Build project.

Continued investment in resilience and innovation will be essential to address future risks and improve the long-term performance of Kentucky's bridge network.

2026 Kentucky Infrastructure Report Card: **BRIDGES**

Recommendations to Raise the Grade

- **Increase and stabilize funding for bridge maintenance and replacement, particularly for locally owned bridges**, which have a higher percentage of poor-condition structures and often lack sufficient resources to address critical needs.
- **Incorporate recommendations from the current and future TAMP** into the Six Year Plan process to help achieve performance goals.
- **Prioritize preservation of bridges in fair condition through continued investment in asset management and life-cycle planning**, helping to extend service life and prevent more costly rehabilitation or replacement in the future.
- **Balance the need** for maintaining larger surface area bridges located on interstate, high traffic volume highways with smaller surface area bridges located on local, low traffic volume roadways.
- **Continue support for local agencies through programs such as the County-City Bridge Improvement Program**, including technical assistance and funding, to improve maintenance practices and address system disparities between state and locally owned bridges.
- **Continue to incorporate resilience and risk-based decision-making into project prioritization**, including consideration of detour length, flooding and scour vulnerability, and critical freight and emergency routes, to improve system reliability and public safety.

Sources

- Federal Highway Administration, "Specifications for the National Bridge Inventory," 2022.
- Indiana Department of Transportation, "Milton-Madison Bridge."
- Kentucky Transportation Cabinet, "2025 Bridge Inventory data submitted to U.S. Department of Transportation, Federal Highway Administration, National Bridge Inventory," 2025.
- Kentucky Transportation Cabinet, "Enacted Highway Plan, 2026–2032," 2026.
- Kentucky Transportation Cabinet, "Transportation Asset Management Plan," 2022.
- U.S. Department of Transportation, Federal Highway Administration, "Bridge Investment Program (BIP): BIP Large Bridge Grant Awards," 2022.
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DAMS

2026 Kentucky Infrastructure Report Card

D+

Executive Summary

Dams across Kentucky provide essential water management functions, including flood control, water supply, and recreation, while supporting the state's economy and public safety. Population growth and development have elevated the potential risk posed by dams, increasing the number classified as high-hazard as more people and structures are located downstream. Nearly 55% of the Commonwealth's dams (584 of 1074 total dams) are over 60 years old, exceeding their typical design life.

Emergency preparedness has improved. Legislation enacted in 2023 gives the state authority to adopt regulations requiring owners of high- and significant-hazard dams to maintain Emergency Action Plans (EAPs). While 75% of high-hazard dams reportedly had EAPs in 2019, that percentage is now 25%. In recent years, funding for dam safety programs and rehabilitation hasn't been sufficient to address dam-related needs, limiting the state's ability to continue to address aging infrastructure. Additional investment is needed to rehabilitate dams, improve maintenance and inspection capabilities, strengthen emergency preparedness, and support staffing and public education efforts.



Figure 1.

Kentucky Dam, a hydroelectric dam on the Tennessee River on the county line between Livingston and Marshall counties (Kentucky Energy and Environment Cabinet)

Capacity and Condition

Kentucky's dams provide critical benefits including flood control, water supply, recreation, and energy generation. According to the 2026 National Inventory of Dams (NID), Kentucky has 1,074 dams, including 277 classified as high-hazard potential, 150 classified as significant or moderate hazard potential, and 647 classified as low hazard potential. High-hazard dams are those whose failure could result in loss of life. Of the state's high-hazard dams, 89 are listed in poor condition, and 17 are rated unsatisfactory in the NID, which stresses the need for vital infrastructure upgrades. Of the regulated dams in Kentucky, approximately 85% are state-regulated and 15% federally regulated. The NID includes all regulated dams, which are those that are 25 feet or higher or store 50 acre-feet of water or more.

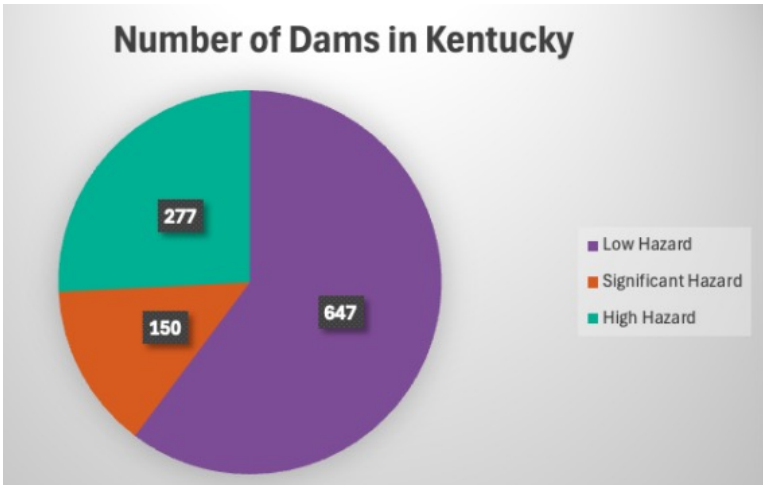


Figure 2.
Number of Dams in Kentucky (U.S. Army Corps of Engineers, National Inventory of Dams)

Most dams in the Commonwealth are constructed as earthen embankments and hold billions of gallons of water. The resources and services provided by these dams are a valuable part of Kentucky's economy.

The Kentucky Division of Water's (DOW) Dam Safety program has regulatory authority over more than 900 dams throughout the state and has requirements for regulated dams based on their hazard classification. Dams under Kentucky DOW's authority include all dams in the state with the exception of federally owned dams, dams associated with mining,* and dams that do not technically meet the Kentucky DOW definition of a dam.† Approximately 60% of Kentucky's dams are privately owned, with the remainder owned by municipalities, the Commonwealth, the federal government, or the mining industry. In addition, there are dams that are not state-regulated, as they do not exceed the height and storage requirements to be a regulated dam. This includes smaller structures such as low-head dams, which often fall outside of regulatory thresholds but can still pose significant public safety risks.

** Mining dams are regulated by the U.S. Department of Labor's Mining Safety and Health Administration and the Kentucky Department of Natural Resources.*

† Kentucky Revised Statute (KRS) 151 defines a regulated dam as a structure that has an embankment that is a minimum of 25 feet in height, measured from the downstream toe of the dam, or has a maximum impounding capacity of 50 acre-feet or more at the top of the structure.

2026 Kentucky Infrastructure Report Card: DAMS

Per the NID, the average completion year for dams in Kentucky is 1965, placing a significant portion of the inventory at or beyond their typical design life, requiring increased attention and investment to the aging inventory of dams in Kentucky. Therefore, it becomes increasingly important to rely on the state's risk-based classification system to better understand vulnerabilities and prioritize investment needs.

A "low-hazard," or Class A, dam is defined as a structure whose failure would cause loss of the structure itself but little or no additional damage to other property. These structures are generally located in rural or agricultural areas where failure may cause little to no damage or damage farm buildings other than residences, and agricultural lands. Nearly 650 dams in Kentucky are classified as "low-hazard."

A "significant-hazard," or Class B, dam[§] is typically defined as a dam whose failure would cause significant property destruction but no loss of human life. These dams are located in predominantly rural areas where failures may damage highways or major railroads, or cause interruption of use or service of relatively important public utilities. There are 150 significant-hazard dams in Kentucky, and of those, 22 are federally regulated, according to the NID.

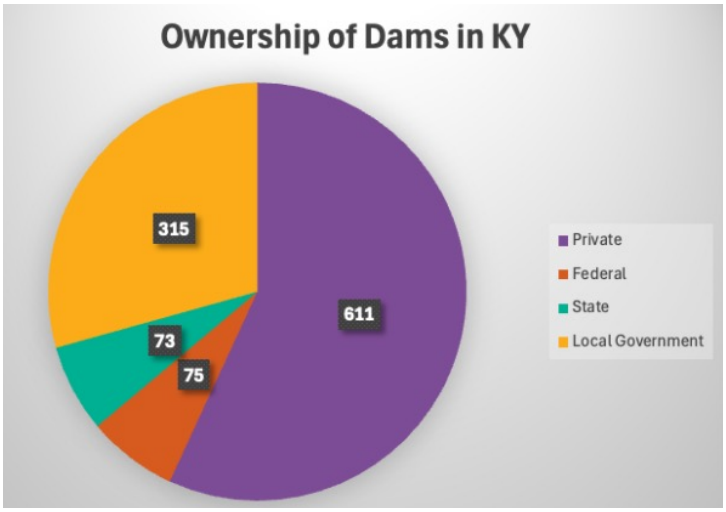


Figure 3.

Ownership of Dams in Kentucky (U.S. Army Corps of Engineers, National Inventory of Dams)

A "high-hazard," or Class C, dam is typically defined as a dam whose potential failure or improper operation would cause loss of human life or significant property destruction to houses, industrial or commercial buildings, important public utilities, main highways, or major railroads. The number of state-regulated "high-hazard" dams in Kentucky is 183, with an additional 94 that are not state-regulated, for a total of 277 overall in this category, according to the NID. The non-state-regulated high-hazard dams are owned by entities including federal agencies and mining companies. (Many mining dams are regulated by the Mine Safety and Health Administration.) Of all high-hazard dams in the NID, 89 are listed in poor condition, 17 as unsatisfactory, and 92 are not rated or do not have ratings available, indicating a potential significant need for upgrading these dams.

§ Significant-hazard dams are also referred to as moderate-hazard dams in some dam safety classification systems. Kentucky uses the term significant-hazard (Class B).

2026 Kentucky Infrastructure Report Card: DAMS

Due to the potential for loss of life or significant property damage, each high-hazard dam should have an EAP in place to guide response if a crisis were to occur. EAPs provide structured procedures to guide community response in the event of a dam-related emergency. These plans include standard procedures such as a list of which agencies to alert, as well as flood inundation maps so officials know when and where they need to evacuate.

Legislation was passed in 2023 giving the state authority to enact regulations requiring EAPs for significant- and high-hazard dams; however, those regulations have not been introduced or implemented. As reported by NID, EAPs for 70 out of the 277 high-hazard dams have been developed—approximately 25%—indicating some progress; however, these types of evaluations, planning efforts, and associated investments require sustained time, resources, and ongoing maintenance of documentation to ensure plans remain current and effective.

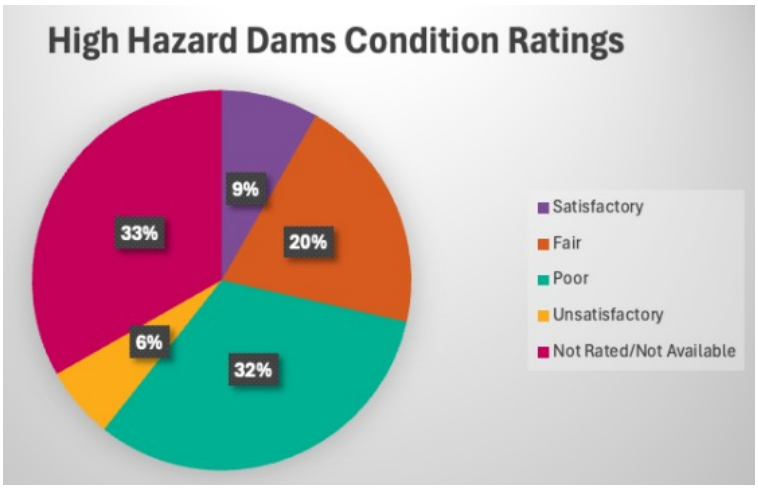


Figure 4.
High Hazard Dams Condition Ratings (U.S. Army Corps of Engineers, National Inventory of Dams)

In addition to regulated dams, low-head dams present an ongoing public safety concern. Low-head dams are structures that span the full width of a stream or river and have water continuously flowing over them, but they do not meet the requirements of a dam by the state or federal guidelines. Historically, these structures were commonly installed for purposes such as water supply, mill operations, industrial use, navigation control, or small-scale hydroelectric generation; however, many no longer serve their original function and remain in place without a clear ongoing need. Today these structures can pose risks to kayakers, anglers, and swimmers due to strong recirculating currents that can trap individuals and lead to drowning. There is not a comprehensive list of low-head dams in the state; however, in recent years a national effort to develop a list of low-head dams has been initiated. Congress authorized the development of a national low-head dam inventory in 2022 and gave funding to U.S. Army Corps of Engineers (USACE) for it in 2024. As of this date, Kentucky has 278 low-head dams listed in the National Low-Head Dam Inventory, although data is limited to little more than names and some geospatial details.

Funding and Future Need

From 2020 to 2025, the Kentucky DOW Dam Safety program operated with an annual budget of $525,550, which is a slight decrease from the previous ASCE report card in 2019 ($529,490). Investments that have been made in dam safety have remained relatively static, while dam-related risks and rehabilitation needs increase each year.

In addition to funding for the Dam Safety program, there is a dedicated funding stream for rehabilitation and repair of state-owned dams, provided through the State-Owned Dam Repair fund, managed by the Kentucky DOW. This funding source generally receives biennial appropriations in the state budget; however, this revenue stream is insufficient to address rehabilitation needs of more than one or two state-owned dams at a time. Over the previous three budget biennia (2020 – 2026), nearly $77 million has been invested into addressing hazards and risks at state-owned dams by the Kentucky DOW. Despite these efforts, overall investment remains insufficient to address long-term rehabilitation needs and aging infrastructure across the state's dam inventory. In 2025, the Association of State Dam Safety Officials (ASDSO) estimated that dams in Kentucky have approximately $2.9 billion in rehabilitation needs. The rehabilitation needs for high-hazard dams alone in Kentucky is approximately $1.2 billion. This is mainly attributable to the identification of deficiencies outpacing the completion of rehabilitation projects and funding and permitting constraints contributing significantly to the slower rate of completion.

Federal dam-related investments in Kentucky since 2019 include the Kentucky Lock Addition Project, consisting of about $680 million in new federal appropriations between FY2019-FY2022, including $465.5 million from the Infrastructure Investment and Jobs Act (IIJA), and more than $1.2 billion invested overall. Additionally, Barkley Dam modernization and repairs consist of multi-year hydropower rehabilitation plus more than $8 million in specific 2022 infrastructure and recovery funding, and Rough River Lake Dam has received approximately $890 million for dam rehabilitation efforts. Ongoing USACE operations, maintenance, and dam safety efforts continue at other federal reservoirs.

While some dam owners maintain established funding streams for ongoing maintenance and repairs, a limited number of large private owners are able to fully self-fund operations, including the development and upkeep of EAPs. Therefore, funding availability and technical capacity vary widely among dam owners across the state.

The Kentucky Dam Safety program regularly encounters funding and resource limitations that hinder inspections and compliance activities of the state's inventory of dams. In recent years, additional Dam Safety funds have been received from the IIJA, and the State-Owned Dam Repair (SODR) program regularly receives biennial legislative appropriations. However, funding and resource limitations often reduce the frequency of inspections and may delay identification of needed repairs or compliance actions.

Additional efforts will be required to update applicable Kentucky Dam Safety regulations and to modernize the Dam Safety program to better address evolving risks and aging infrastructure. In addition, Kentucky may consider taking enhanced enforcement actions on non-compliant dams that have a critical need for rehabilitation or repair.

Operation and Maintenance

Dam owners are responsible for the operation, maintenance, and safety of their dams, which includes financing any needed upgrades and repairs. Because of the potential downstream impact to communities and infrastructure, the state maintains regulatory authority over dam safety.

The Commonwealth's Energy and Environment Cabinet, through its Division of Water, is responsible for administering Kentucky's Dam Safety program. This program is responsible for conducting regular inspections, overseeing remediation of deficient dams, and coordinating with local officials and dam owners on emergency preparedness. The Dam Safety program is also responsible for the permitting required for new dam construction. As of this writing, there are four full-time staff members supporting these functions, which limits the program's capacity to meet inspection and oversight needs.

The Kentucky DOW currently has an inspection schedule of once per year for all regulated high-hazard dams, once every three years for significant-hazard dams, and once every five years for low-hazard dams. Each inspection starts with an in-office file review to note any identified deficiencies and to become familiar with hydrologic evaluations. The inspector then performs a field evaluation.



Figure 5.
Dam Hazard Classification and Inspection Frequency (Kentucky DOW, Dam Safety)

The Dam Safety section of Kentucky DOW regularly updates the list of dam structures and submits this list to the NID. To determine the frequency of inspection for each dam, the cabinet takes into consideration factors such as the size and type, topography, geology, soil condition, hydrology, climate, use of the reservoir, the lands located in the floodplain downstream, and the hazard classification of the dam.

If the structure meets all the necessary requirements, an Inspection Report is issued to the owner. If the dam does not meet all necessary requirements, the owner is notified of any deficiencies, which may require corrective action(s) or additional monitoring.

The Kentucky DOW Dam Safety staff also perform periodic inspections of new dams under construction. A final inspection is performed when the construction is complete, and if the dam is constructed according to the plans and specifications, a letter is issued approving the impounding of water. The dam is then added to the inventory database.

In the future, to help prioritize projects, a risk-informed asset management plan should be developed and maintained for Kentucky's dam inventory. This will support data-driven inspection and compliance actions and allow dam owners to focus on repairs and operational changes needed to manage dam-related risks to acceptable levels.

Adequate staffing and resources will be necessary to maintain inspection schedules and ensure safe operation of Kentucky's dam infrastructure. Sustained investment in workforce development, including recruitment, training, and retention of qualified dam safety professionals, will also be essential to support inspection, enforcement, and long-term program effectiveness.

Public Safety, Resilience, and Innovation

Hundreds of dams across the Commonwealth have the potential to fail with tragic consequences, and Kentuckians need to understand the risks associated with potential incidents and failures. Recent events in Marion, Kentucky, illustrate the significant community impacts that can result from dam-related emergencies. In 2022, concerns over potential failure of the Lake George dam led to an emergency breach and the loss of the city's primary water supply, highlighting the importance of emergency preparedness, coordinated decision-making, and continued investment in dam safety infrastructure. This underscores the need for increased awareness and investment in measures that reduce risks to public safety and economic assets.

Regular dam inspections are the first line of defense in protecting Kentucky citizens, agriculture, and property. One of Kentucky DOW's Dam Safety program goals is to provide routine inspections on regulated dams, and they strive to meet this goal with limited resources. While the state conducts inspections, dam owners remain responsible for the proper operation and maintenance of their dams.

The next most important action to take to reduce the risks of loss of life and property damage from dam failures is to create EAPs at all high- and significant-hazard potential dams in the state. It is especially critical to have an EAP at the high-hazard potential dams that have been found to be unsafe or do not meet current accepted dam safety criteria. Updates to KRS 151 give the state authority to adopt regulations requiring EAPs for high- and significant-hazard dams, but those regulations have not yet been updated to reflect these requirements.



Figure 6.
Social media campaign signage (Kentucky DOW)

In addition, the status of mining dams is not well documented in the NID. Kentucky regulatory agencies and MHSA should undertake an effort to better identify and quantify the risks associated with these structures. Often, the owners and their construction and maintenance history are unknown.

To share dam safety best practices throughout the state, Kentucky DOW's Dam Safety program has been working on developing collaborative interagency forums to share lessons learned, innovative ideas, and financial/economic needs. The Dam Safety program routinely communicates and coordinates with multiple agencies both locally and nationwide to discuss key issues and trends in dam safety best practices. The Kentucky DOW's Dam Safety program is working to coordinate with federal agencies through initiatives like the Silver Jackets Program, which is focused on flood risk management and mitigation, and with other associations such as the Kentucky Association of Mitigation Managers and ASDSO.

The Kentucky DOW also has created innovative ways to remind citizens where their drinking water comes from. With new signage and posts on social media, citizens are encouraged to consider their role in keeping lakes and reservoirs clean since those waters are a source of drinking water to surrounding communities. Many of these reservoirs are created and maintained by dams, reinforcing the role that safe, well-maintained dams play in protecting reliable water supplies.

Continued investment in inspection, emergency planning, and innovative monitoring technologies including automated data-acquisition systems, real-time data loggers, and centralized data platforms will be essential to improve public safety and strengthen resilience across Kentucky's dam-related infrastructure.

2026 Kentucky Infrastructure Report Card: DAMS

Recommendations to Raise the Grade

The following recommendations are supported by ASCE:

- **Maintain and expand funding for dam safety, rehabilitation, and repairs**, including continued support for the Dam Safety program and SODR program, full federal appropriations for the High Hazard Potential Dam Rehabilitation program, and assistance to dam owners in securing federal funds and required matching resources.
- **Update dam safety regulations in 401 KAR Chapter 4** to reflect current industry standards, updated requirements, and authorization in KRS 151 related to developing Emergency Action Plans (EAPs).
- **Develop a risk-based asset management system** maintained by the Kentucky DOW to identify and prioritize the greatest needs for dam-related compliance, upgrades, and repairs.
- **Develop a funding program for municipally owned dams and dams with beneficial uses**, modeled on the SODR program, to support needed repairs and upgrades.
- **Strengthen workforce development** through recruitment, training, and retention of qualified dam safety professionals to support the capacity of Kentucky's Dam Safety program.
- **Expand dam safety education and outreach** to dam owners and operators, emergency management officials, first responders, and the public regarding dam risks, emergency response, regulatory responsibilities, funding resources, and proper operation, maintenance, and inspection.
- **Improve low-head dam safety and management** by increasing public awareness of their hazards; developing a statewide inventory and assessment; reporting structures to the national inventory of low-head dams; and prioritizing dams where removal would be beneficial.

Definitions/Key Terms

DHS – Department of Homeland Security

DOW – Kentucky Division of Water

FEMA – Federal Emergency Management Agency

EAP – Emergency Action Plan

KIA – Kentucky Infrastructure Authority

USACE – U.S. Army Corps of Engineers

WIIN – Water Infrastructure Improvements for the Nation Act

2026 Kentucky Infrastructure Report Card: DAMS

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2026 Kentucky Infrastructure Report Card

DRINKING WATER

C+

Executive Summary

Kentucky's drinking water systems serve approximately 4.5 million residents through 1.9 million service connections, and most meet both self-imposed and regulatory standards for water quality. However, aging infrastructure, workforce challenges, and financial constraints present ongoing challenges. Public water systems have a combined treatment capacity of 1.1 billion gallons per day, yet approximately 27% of treated water is lost or unbilled, indicating system inefficiencies. Smaller systems in particular struggle with limited staffing and resources, with only 12% demonstrating sufficient technical, managerial, and financial capacity. The state faces an estimated $7.84 billion in drinking water infrastructure needs over the next 20 years. Emerging contaminants such as per- and polyfluoroalkyl substances (PFAS) and revised federal lead regulations are increasing costs and operational complexity. Severe weather events have also highlighted system vulnerabilities. Continued investment, regional collaboration, and workforce development will be essential to maintaining safe, reliable drinking water across the Commonwealth.

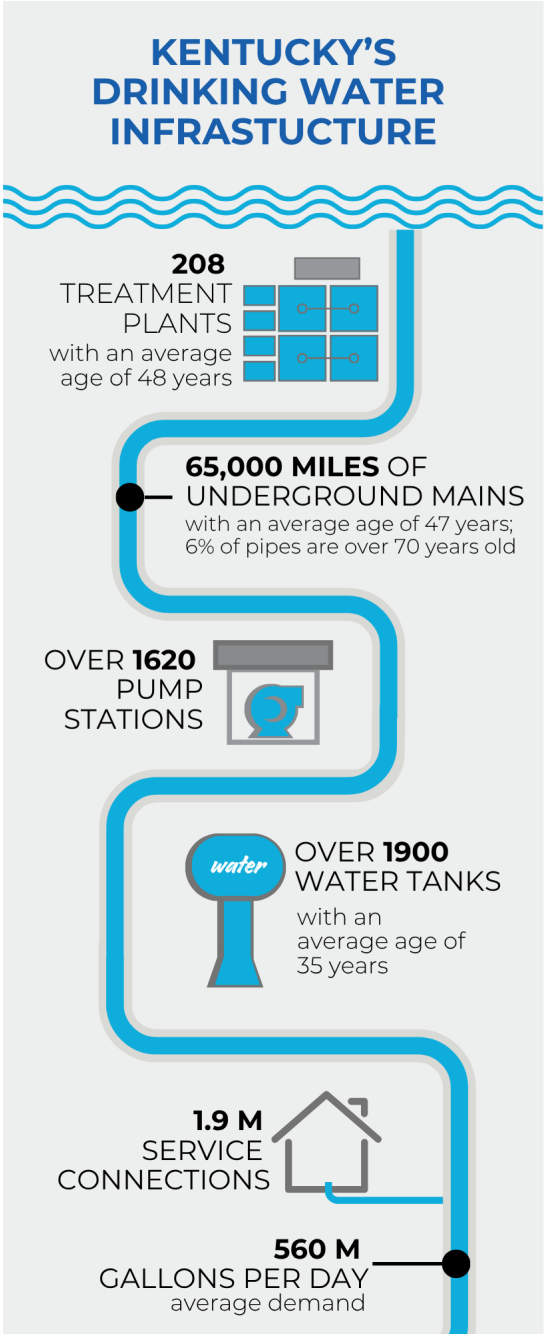


Figure 1.

Kentucky's Drinking Water by the Numbers (Kentucky Division of Water data)

Background

Kentucky's drinking water system includes 424 public water systems, which include 208 treatment plants, 65,000 miles of underground water mains, and over 1,620 pump stations. These systems rely primarily on surface water sources, such as rivers, streams, and reservoirs, serving about 90% of customers, with the remainder served by groundwater. The system has a combined treatment capacity of 1.1 billion gallons per day. Oversight is provided by the Kentucky Division of Water (DOW), within the Energy and Environment Cabinet, which regulates public water systems under the 1974 federal Safe Drinking Water Act (SDWA). Drinking water infrastructure is primarily funded through user rates and is supplemented by state and federal programs such as the Drinking Water State Revolving Fund.

Condition and Capacity

Kentucky's drinking water infrastructure is comprised of surface-water intakes, groundwater wells, treatment plants, storage facilities, pump stations, and water mains. There are 1.9 million service connections to the public water systems. Community water systems, a subset of public water systems, serve 98% of Kentuckians with a total of approximately 4.5 million customers. Kentucky's three largest water systems provide direct service to over 27% of Kentucky's population with a combined population served of over 1.2 million. Kentucky public water systems have a combined treatment capacity of 1.1 billion gallons per day, with an average daily production of 560 million gallons per day (MGD).

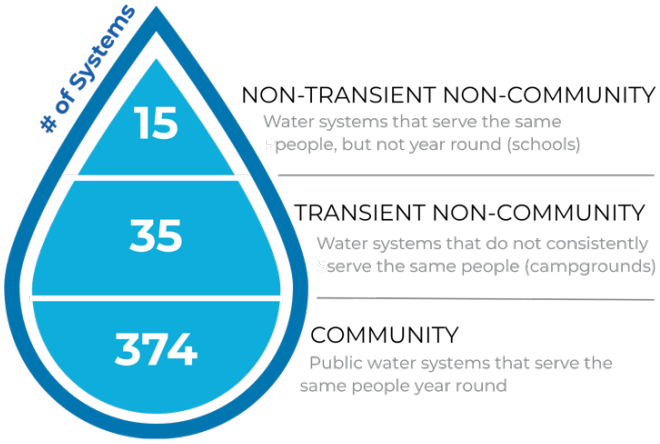


Figure 2.
Kentucky's Public Drinking Water Systems by Type (WRIS System Data, Kentucky Infrastructure Authority)

Unlike community water systems, private wells are not regulated by the U.S. Environmental Protection Agency (EPA) or the SDWA, but are still a part of our state's drinking water infrastructure. Of registered active water wells, 31,524 are registered as domestic wells. Private water-well owners may be susceptible to contaminated drinking water through local land-use practices, many of which they do not control. Domestic well drilling has declined significantly, averaging 15 new wells per year from 2020 to 2024 compared with 75 per year from 2015 to 2019. This is a decades-long trend that reflects increasing reliance on public water sources.

The predominant source of drinking water in Kentucky is surface water. Drought poses risks to both supply and water quality. The 2023 Drought Risk Assessment identified eastern Kentucky as most vulnerable. Interconnections between systems help address these risks.

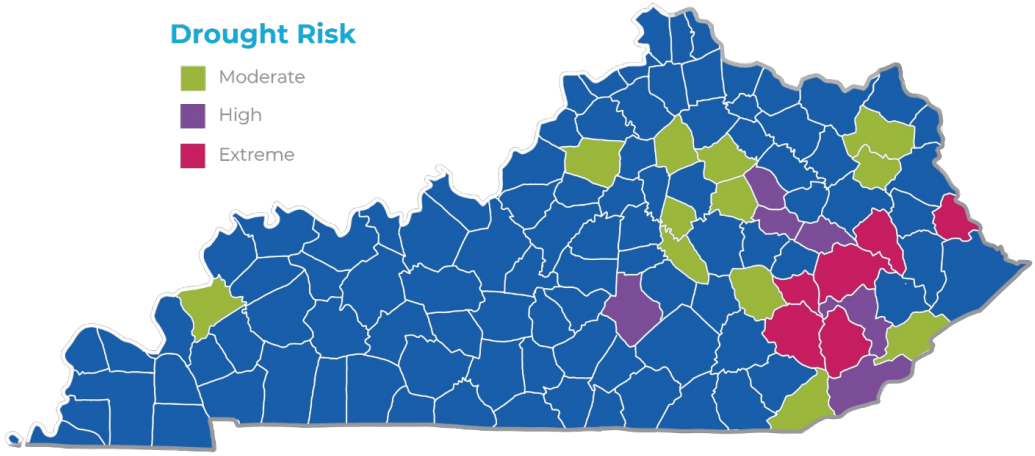


Figure 3.

Public Water System Drought Risk by County (Kentucky Energy and Environment Cabinet, "Kentucky Hazard Mitigation Plan: Drought Risk Assessment," 2023)

Non-revenue water (NRW), or water that is treated but does not generate income due to leaks, metering inaccuracies, or theft, averages around 27% of water produced statewide. Utilities are exploring leak detection and meter replacement programs to reduce losses.

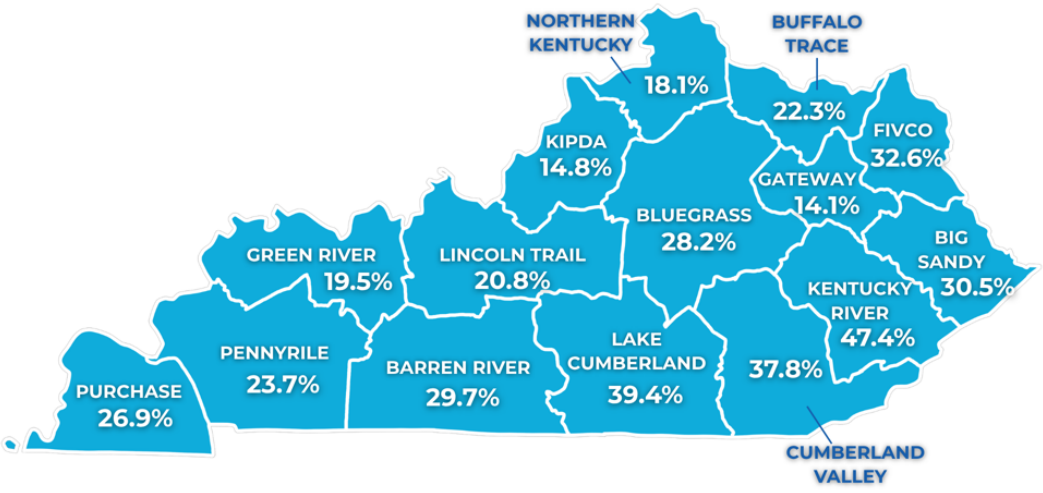


Figure 4.

Estimated Non-revenue Water by Area Development District (Kentucky DOW and Kentucky Infrastructure Authority)

Water main breaks are an indicator of system condition and present challenges for all water systems. The Partnership for Safe Water program, an alliance of national water systems, recommends 15 breaks or fewer per 100 miles of pipe per year. Kentucky's largest utility reports a five-year average of 14.8; however, they have a proactive main replacement program to maintain the condition of their pipes.

Most medium and large utilities have main replacement programs, but many small utilities lack resources to proactively replace pipes. Costs for pipe and other materials have sharply increased since the COVID-19 pandemic, reducing the amount of pipe replacement that utilities have been able to complete annually.

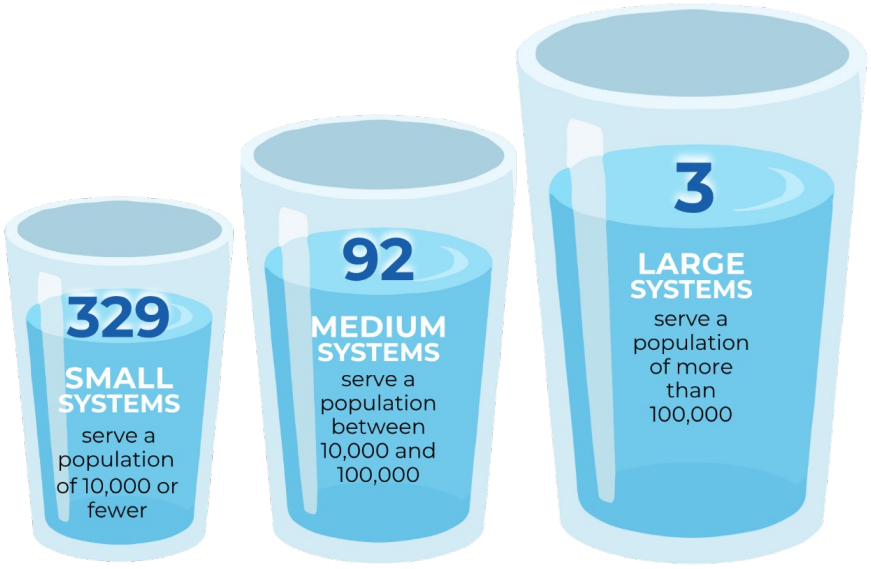
While Kentucky's drinking water systems generally meet performance benchmarks, maintaining this level of service depends on effective operation and maintenance across all systems of all sizes.

Operation and Maintenance

Effective operation and maintenance are essential to ensuring the reliability and safety of Kentucky's drinking water systems. Maintenance is primarily performed by individual utilities that own and operate these systems. Smaller water systems often struggle with operation and maintenance due to limited revenue and staffing.

Figure 5.

Kentucky's Public Drinking Water Systems by Size (USEPA, Safe Drinking Water Information System Federal Data Warehouse)



Asset management planning helps utilities prioritize repairs and replacements. Since the last report card was released in 2019, a greater number of systems possess an asset management program and an operations and maintenance manual that meets regulatory requirements. In addition, more systems are tracking water loss on a monthly basis.

Senate Bill 263 (2023), enacted by the Kentucky General Assembly, reflects ongoing efforts to support water systems in developing asset management plans, reduce water loss, and strengthen long-term system planning across the state.

As of 2024, 67% of large community water systems demonstrated sufficient technical, managerial, and financial capacity to meet SDWA objectives, compared with 33% of medium and 12% of small systems. Asset management remains the primary gap, followed by lack of financial planning, emergency response planning, operational documentation, and tracking water loss.

In addition to infrastructure challenges, utilities are facing growing workforce constraints that impact daily operations and long-term system reliability. There are currently 1,397 Drinking Water Operators certified in Kentucky. Smaller systems face workforce challenges due to lower pay and broader job responsibilities. Larger utilities may have the budget for more employees with specialized roles.

A 2022 University of Kentucky survey found 55% of utilities did not have enough operators. In addition, more than 30% of current operators plan to retire by 2028.

In 2022, the median pay for operators was around $25 per hour, which is below national averages. Significant changes to the state employee retirement benefits have reduced incentives for public-sector employment.

In addition to growing operator vacancies, utilities have reported receiving fewer job applicants for their open positions. Programs such as Appalachian Regional Initiative for Stronger Economies (ARISE) and Kentucky Rural Water Association (KRWA) apprenticeships aim to address workforce needs by training the next generation of water professionals.

These operational and workforce challenges are closely tied to the financial capacity of water systems to maintain and improve infrastructure.

Funding

Kentucky's drinking water utilities fund their infrastructure from a combination of user rates, fees, municipal bonds, and federal/state programs.

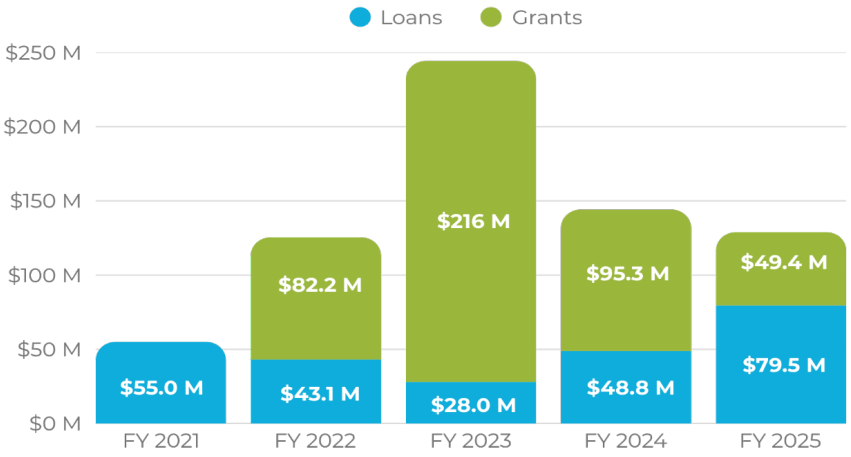


Figure 6.
Drinking Water Infrastructure Funding Provided by KIA (Kentucky Infrastructure Authority, various reports)

2026 Kentucky Infrastructure Report Card: DRINKING WATER

The EPA Drinking Water State Revolving Fund (DWSRF) provides grants to states to meet the goals of the Safe Drinking Water Act. Allocations to the DWSRF have varied throughout the program's history since its inception in 1996. The Kentucky DOW and Kentucky Infrastructure Authority (KIA) jointly administer the DWSRF program.

Since the inception of the DWSRF, Kentucky has committed more than $713.4 million to 260 drinking-water infrastructure projects.

The Infrastructure Investment and Jobs Act (IIJA) provided supplemental funding to the DWSRF from 2022 to 2026, including dedicated funding for lead service line replacement and emerging contaminants. During this period, $49.6 million has been allotted to Kentucky for an emerging contaminants program, and $193.6 million to the lead service line replacement program. Grants are awarded non-competitively to states and territories, and, as such, affected smaller community water systems in Kentucky are encouraged to apply.

The Water Infrastructure Finance and Innovation Action of 2014 (WIFIA) offers low-cost credit assistance to both public and private borrowers for drinking water and stormwater projects, although Kentucky has not yet utilized this program for drinking water projects. Another potential funding source for rural Kentucky communities is the US Department of Agriculture (USDA), which provides loans and grants to help communities of less than 10,000 people build or upgrade essential water infrastructure. The Kentucky Water and Wastewater Assistance for Troubled or Economically Restrained Systems (WWATERS) program was created by House Bill 563 of the 2024 Regular Session of the Kentucky General Assembly, providing multiple types of funding assistance for public water systems.

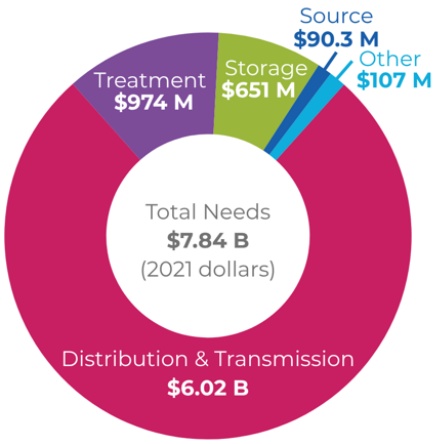
Despite these funding sources, systems continue to face financial pressures. Many utilities charge rates that are inadequate to meet infrastructure needs; however, raising rates is challenging due to affordability concerns and regulatory oversight. A 2022 study found the average monthly residential consumption was approximately 4,000 gallons at an average cost of $42.35. However, the study found a large variation in water rates and rate burden across the state. Some of the highest water bills were in census tracts with the lowest median household incomes. From 2021 to 2024, the Low-Income Household Water Assistance Program (LIHWAP) provided temporary assistance to help pay for water bills, but this program has since expired.

Future Need

Kentucky has experienced shifting population patterns in recent years, partly influenced by pandemic-related workplace changes. While urban growth continued (3.8% from 2011 to 2023), rural populations grew between 2020 and 2024, after a decade of decline, particularly in counties near urban centers. This population shift presents opportunities for large and medium systems to wholesale more water to smaller systems through interconnections, but infrastructure improvements are necessary to meet the changing water demands.

Figure 7.

20-Year Drinking Water Infrastructure Investment Needs (2021 Drinking Water Needs Survey)



At the same time, future water demand is becoming less predictable. Water demand has been stagnant or declining in recent years, but the building of new data centers may rapidly increase demand.

At the time of their 2024 report to the EPA, Kentucky's Capacity Development program found that only 17% of public water systems regularly demonstrated sufficient technical, managerial, and financial capacity to consistently provide safe drinking water now and long into the future. In the 2021 Drinking Water Needs Survey, Kentucky reported $7.84 billion in drinking water infrastructure needs over 20 years.

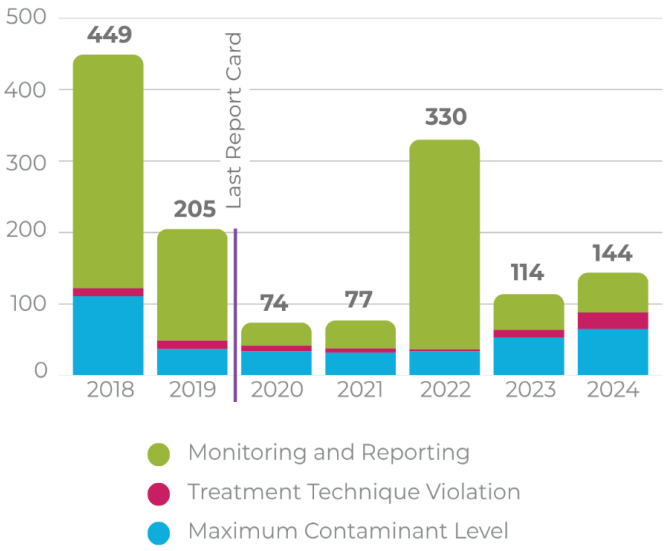
Addressing these challenges will require continued investment, regional coordination, and careful planning to ensure reliable and safe drinking water for all Kentuckians.

Public Safety

Protecting public health remains the primary goal of Kentucky's drinking water systems. Since the last report card was released in 2019, there has been a reduction in the number of water systems with annual SDWA violations, but no significant changes to the overall number of treatment and contaminant violations. Small water systems accounted for the majority of violations. Many of the violations are monitoring or reporting issues that do not pose a risk to public health.

Figure 8.

SDWA Violations – Kentucky Public Water Systems (Kentucky DOW Annual Compliance Reports)



The Kentucky Area-Wide Optimization Program (AWOP), which has been managed by the Kentucky DOW since 1997, is a voluntary program that helps utilities optimize water-treatment processes to surpass regulatory standards, reduce the risk of contaminants, and improve the reliability and safety of drinking water for customers. AWOP provides technical assistance to public systems and recognition for those systems reaching the treatment goals.

Emerging contaminants are creating new challenges for water utilities. PFAS have become a major concern recently. PFAS are long-lasting chemicals that have been widely used in industry and consumer products since the 1940s. The EPA announced drinking water standards in 2024, requiring monitoring and treatment of PFAS.

The Kentucky PFAS Explorer, launched in April 2025, allows online viewing of PFAS results from sampling conducted by the Kentucky DOW. As of March 2026, 78% of public water systems have completed the initial PFAS monitoring due by 2027. Based on this sampling, 16 water systems showed PFAS concentrations above regulatory limits. Because PFAS compounds are so chemically and thermally stable, many water treatment plants are not equipped to remove these compounds from water. Separation of PFAS from the raw water requires systems to add additional treatment technology to their existing water treatment plants.

The EPA has listed PFOA and PFOS as hazardous constituents under the Resource Conservation and Recovery Act (RCRA). There is growing concern that PFAS-laden treatment residuals will be classified by the EPA as hazardous waste. If this happens, treatment plants will have to modify their residuals management and disposal systems, and the cost of disposal will grow exponentially.

Alongside PFAS, minimizing the risk for lead to enter drinking water remains a public health concern. In 2021, the EPA revised the Lead and Copper Rule (LCRR) which established more stringent requirements for water utilities to identify, report, and remove lead service lines. This was followed by Lead and Copper Rule Improvements (LCRI) in 2024. Compliance has created additional costs for utilities.

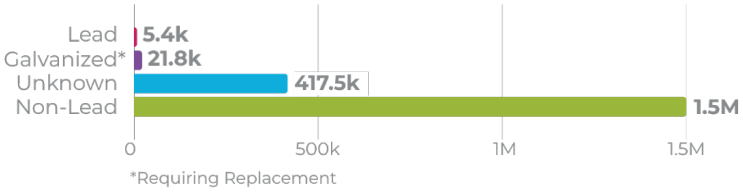


Figure 9.

Statewide Service Line Materials (Kentucky Energy and Environment Cabinet, Kentucky Lead Service Line Inventory)

Kentucky's Lead in Drinking Water Reduction Program offers schools and childcare facilities free lead testing. In addition, the state has developed the Drinking Water Service Lines Viewer, an interactive map of the inventories (lead, galvanized, unknowns, and non-lead). The Kentucky DOW has also started an outreach campaign called "Check Your Pipes, Kentucky" to assist public water systems in creating public awareness and education about the lead service-line initiatives.

Water systems are required to develop a plan to replace all lead services lines and galvanized steel pipes downstream of lead by 2037. Several utilities are making funds available to customers to replace their service lines or are covering these costs as a utility. Funds from the 2021 IIJA are available to cover the costs of both the utility-owned and customer-owned service line replacements. Funding does not cover the costs of the additional tap sampling, water treatment, customer communications, or working with schools and childcare centers. All of these items are creating upward pressure on costs for drinking water utilities to comply with the new LCRR.

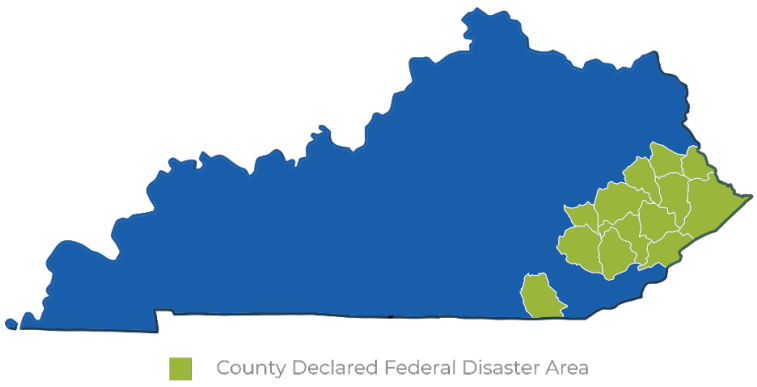
From 2018 to 2025, more than 21,000 samples were collected for lead and copper testing. Of those, 15% showed detectable lead, and only six systems exceeded the current action level. While exceedances remain limited, continued monitoring, public education, and investment in private lead removal are necessary to reduce exposure to lead and copper to ensure long-term public health protection.

Resilience and Innovation

Kentucky water utilities have made progress to improve resilience since 2019. The America's Water Infrastructure Act of 2018 (AWIA) required community water systems serving more than 3,300 people to develop and update risk and resilience assessments and emergency response plans every five years. All of Kentucky's water systems are up to date on the initial development. Kentucky's water systems are beginning to submit their updated five-year plans now. Natural disasters have become an increasingly visible risk to drinking water, as shown by increasing extreme weather events since the last issue of this infrastructure report card.

Figure 10.

July 2022 Flooding Disaster in Eastern Kentucky, July 2022 (Federal Register.gov)



Since 2019, Kentucky experienced two major disasters that impacted drinking water systems in the Commonwealth. In 2022, flooding in eastern Kentucky disrupted water service to tens of thousands of customers. The scale of this water emergency was unprecedented and beyond the management capacity of local utilities. Through the Kentucky Water/Wastewater Agency Response Network (KYWARN), more than 20 Kentucky utilities rapidly coordinated mutual aid and emergency relief and dispatched qualified personnel during the emergency. The KYWARN member response substantially shortened water outages by expediting the location, isolation, prioritization, and repair of issues in affected distribution systems and treatment plants.

Figure 11.

Flooding in Knott County, July 2022 (Credit Image: © Sgt. Jesse Elbouab/Kentucky Nati/Planet Pix via ZUMA Press Wire)



In 2021, several devastating tornadoes hit Kentucky, including one with a 200-mile path of destruction. Multiple systems were initially under boil water advisories and water shortages. Many Kentuckians went days without power and water. In Mayfield, a tornado destroyed a finished water storage tank, while other systems experienced damage to treatment and distribution infrastructure. Emergency response efforts included distribution of bottled water, generators, and mutual aid, with recovery continuing into early 2022. The aftermath of the disaster highlighted challenges in responding to such widespread damage and the challenges of quickly getting alternative drinking water to a widespread area when public water supplies fail.

Figure 12.

Path of Tornado Outbreak, December 10, 2021 (National Weather Service)

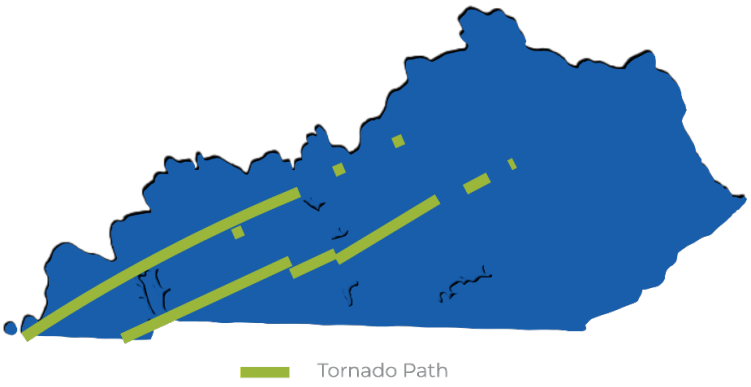


Figure 13.

A town water tower destroyed by tornado in Mayfield, December 13, 2021 (Credit: REUTERS/Cheney Orr TPX IMAGES OF THE DAY)



Non-profit organizations have provided support to improve system resilience during major events in the Commonwealth. KYWARN is a statewide network of "utilities helping utilities." Participation is free and voluntary. Through the organization, water and wastewater utilities that sustain damage from disasters in the state of Kentucky can receive emergency assistance in the form of personnel, equipment, materials, and other associated services as needed to protect the health and welfare of the affected utility's customers. Services are provided by the partner utilities, and the organization does not receive any direct funding.

Innovative technologies are also helping increase resilience. WaterStep, a Kentucky-based organization, provides mobile water treatment systems, known as WOWCarts, to support both emergency response and long-term access to safe water. In 2025, WaterStep's WOWCart became one of the first mobile emergency water treatment systems to receive certification from the National Sanitation Foundation (NSF). Their work in Kentucky includes the Kentuckiana LilyPad Program, which is providing WOWCarts and training community teams across the state's 15 Area Development Districts to improve disaster preparedness.



Figure 14.

WaterStep volunteers setting up a WOWCart in Eastern Kentucky during flood disaster response (WaterStep)

New technologies are improving leak detection, asset management, and system monitoring in the Commonwealth's drinking water systems. Various AI/machine learning technologies are gaining popularity to fill existing data gaps. Data-driven decision-making has improved with the use of business intelligence software programs which can process large datasets and recognize trends. While these technologies offer significant benefits in improving efficiency and reducing water loss, utilities must ensure they can provide a return on investment.

To build on these advancements and address remaining challenges, targeted actions are needed to improve Kentucky's drinking water systems.

Recommendations to Raise the Grade

- **Increase investment in drinking water infrastructure** to address the state's $7.84 billion in identified needs, including replacement of aging pipes, reduction of water loss, and system upgrades to meet current and future demand.
- **Strengthen workforce development and retention efforts** by supporting training programs, improving compensation, and expanding outreach to attract new operators and technical staff to address ongoing staffing needs.
- **Expand regionalization and system interconnections** to improve reliability, reduce costs for smaller systems, and enhance resilience to drought, population shifts, and emergency events.
- **Support compliance with emerging regulations** by providing funding and technical assistance for PFAS treatment, lead service line replacement, and other regulatory requirements that are increasing operational and capital costs for utilities.
- **Develop full-cost pricing structures for water rates** that cover the full cost of service including operation, maintenance, and capital improvements. Develop and renew funding assistance programs to maintain affordability for low-income customers.

Definitions/Key Terms

DOW – Kentucky Division of Water

DWSRF – Drinking Water State Revolving Fund

IIJA – Infrastructure Investment and Jobs Act

KIA – Kentucky Infrastructure Authority

KYWARN – Kentucky Water/Wastewater Agency Response Network

MGD – Million gallons per day

NRW – Non-revenue water

PFAS – Per- and Polyfluoroalkyl Substances

PFOA – Perfluorooctanoic Acid, a PFAS Compound

PFOS – Perfluorooctanesulfonic Acid, a PFAS Compound

SDWA – Safe Drinking Water Act

USEPA or **EPA** – U.S. Environmental Protection Agency

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ENERGY

2026 Kentucky Infrastructure Report Card

B-

Executive Summary

Kentucky's energy system provides reliable, affordable service, supported by diverse utilities and low-cost electricity. Coal remains the dominant generation source, accounting for nearly 67% of in-state electricity production in 2024, while natural gas and renewables are increasing their shares. Kentucky is also an energy corridor, with transmission and pipeline networks connecting energy supplies and markets across the Midwest and other regions of the United States.

Current capacity meets demand, but aging infrastructure, evolving energy markets, and more frequent extreme weather events present growing challenges. Electricity demand in Kentucky is projected to increase by more than 40% by 2050, driven in part by increased electrification in transportation, industry, and buildings. This anticipated growth will require expansion of both generation capacity and transmission infrastructure. In response, utilities are already investing in grid modernization and resilience, while diversifying their energy resources to include solar, battery storage, pumped storage hydropower, and advanced nuclear energy. The Kentucky Nuclear Energy Development Authority and new nuclear initiatives reflect growing interest in nuclear energy. Long-term needs include continued investment in transmission, distribution, and workforce development to maintain reliability and affordability while supporting future growth.



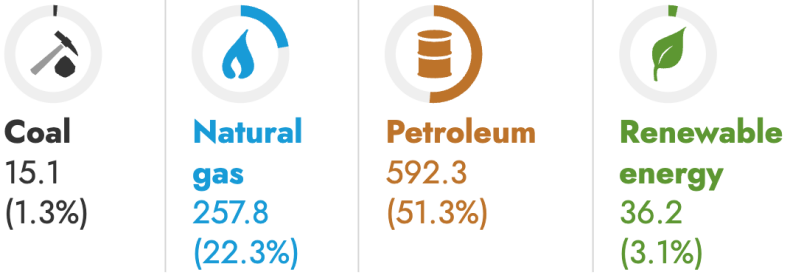
Figure 1.

Solar power contributes to Kentucky's evolving energy mix (LouisvilleKY.gov)

2026 Kentucky Infrastructure Report Card: ENERGY

Background

Figure 2.
Kentucky End-use Energy Consumption by Source, excluding losses (U.S. Energy Information Administration)



Kentucky's electricity is provided by a mix of investor-owned utilities, rural electric cooperatives, and municipal utilities, which are regulated in part by the Kentucky Public Service Commission, as well as the Tennessee Valley Authority (TVA), which provides electricity to portions of Western Kentucky.

Condition and Capacity

Kentucky's energy system continues to meet current demand; however, changes in generation and energy demand present long-term capacity challenges. The Commonwealth benefits from historically low-cost electricity and a robust generation fleet—the mix of power plants and energy sources used to produce electricity—but aging infrastructure, changes in the generation mix, and increasing system complexity will require sustained investment to maintain reliable service in the future.

Electricity

Kentucky's electric system has a diverse ownership structure that includes investor-owned utilities, rural electric cooperatives, municipal utilities, and federally owned generation through TVA. These entities operate within a broader regional framework that includes participation in organized wholesale markets such as PJM Interconnection and the Midcontinent Independent System Operator (MISO), as well as TVA's integrated system. This structure provides access to regional generation resources and supports system reliability through interconnection.

In 2024, Kentucky had the twelfth-lowest average electricity price of any state and the lowest price east of the Mississippi River. The state's electric generation portfolio remains heavily reliant on coal for power production, which accounted for approximately 67% of in-state electricity generation in 2024, a larger share than all states except West Virginia. Natural gas accounted for nearly 26% of electricity generation, more than nine times its share a decade earlier, while renewable energy sources, mostly hydropower, accounted for approximately 2.5%. Although coal continues to provide baseload generation, the generation mix is gradually diversifying in response to market forces, environmental considerations, and federal policies. For example, Kentucky utility companies Louisville Gas & Electric (LG&E) and Kentucky Utilities (KU) are constructing three 645-megawatt (MW) combined-cycle natural gas plants to replace aging coal-fired generation, with expected service dates in 2027, 2030, and 2031, while also upgrading existing coal units.

Figure 3.

Net Electricity Generation (Utility-Scale) by Energy Source, Annual (U.S. Energy Information Administration, Power Plant Operations Report)

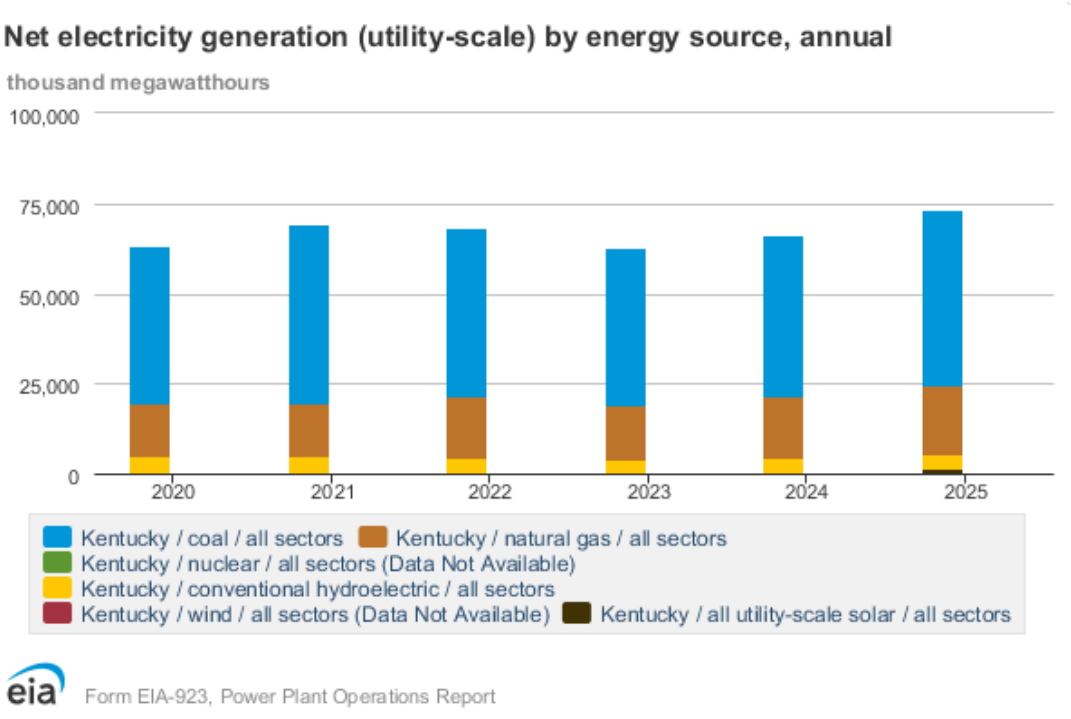


Figure 4.

Utility-Scale Generating Units Planned to Retire from June 2026 to May 2027 (U.S. Energy Information Administration, Annual Electric Generator Report and Monthly Update to the Annual Electric Generator Report)

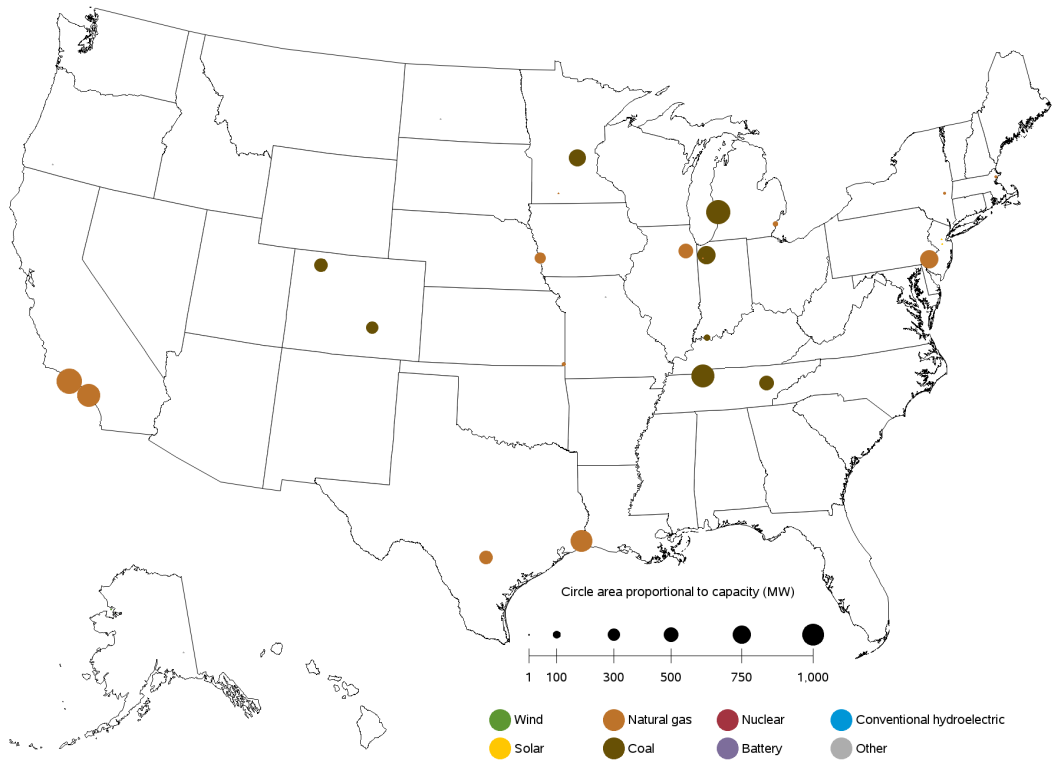
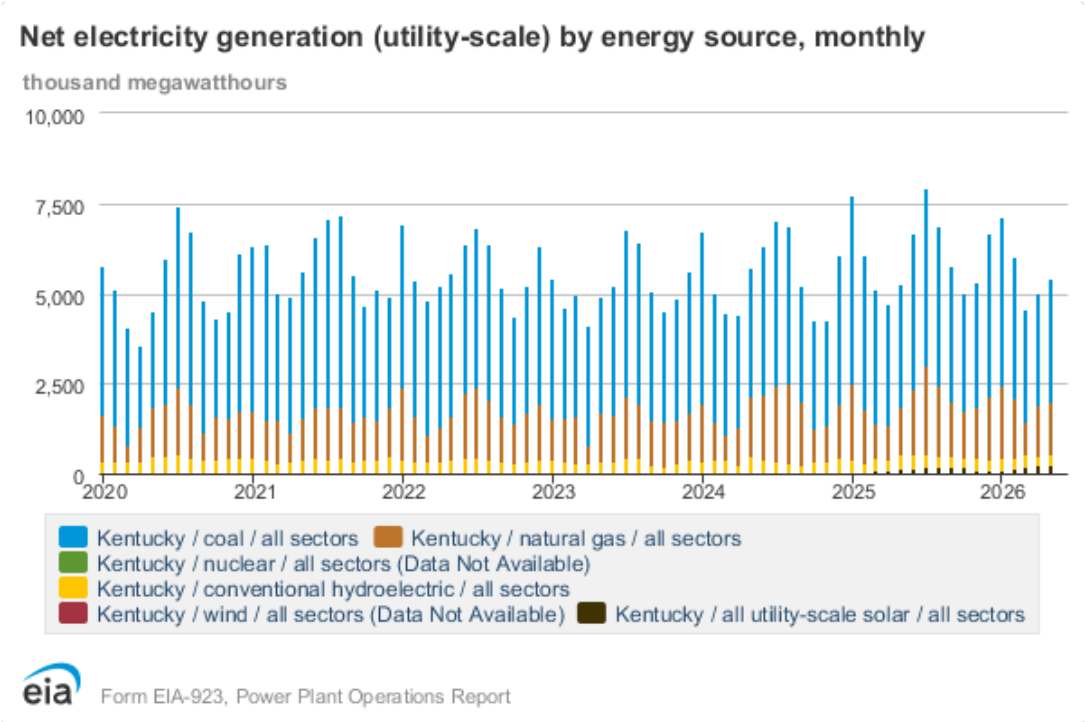


Figure 5.

Net Electricity Generation (Utility-Scale) by Energy Source, Monthly (U.S. Energy Information Administration, Power Plant Operations Report)



Kentucky's transmission and distribution systems are generally capable of meeting current demand, but continued upgrades are needed to address aging infrastructure and support future growth. Approximately 13,000 miles of transmission infrastructure serve the Commonwealth, much of which was constructed decades ago and requires ongoing maintenance and modernization. Utilities are investing in system improvements, including grid hardening, advanced monitoring technologies, and targeted capacity upgrades. Future system needs are expected to include greater use of automated distribution technologies capable of detecting outages and rerouting power. These efforts are supported in part by federal funding through the Infrastructure Investment and Jobs Act (IIJA) and other programs aimed at improving grid resilience.

Demand for electricity in Kentucky has historically been driven by industrial and manufacturing activity, which continues to account for a significant share of consumption. While overall demand growth has been relatively stable in recent years, emerging trends—including increased electrification of transportation and buildings, economic development initiatives such as Kentucky's E3 Strategy, and potential growth in data centers and logistics facilities—may place additional pressure on generation and transmission capacity over the medium and long term. The location of large new energy users in areas with available infrastructure capacity can help limit the need for additional system investments. Planning efforts increasingly rely on scenario-based modeling to evaluate future system needs under varying assumptions for load growth, fuel prices, and policy conditions.

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The Kentucky Energy and Environment Cabinet (EEC) has also developed programs and initiatives addressing energy, environmental, and economic development needs, including the Kentucky Resilient Microgrid Project and Solar for All, as well as hydrogen and nuclear development workgroups.

Kentucky's grid is interconnected with neighboring states, and the Commonwealth relies in part on interstate electricity flows, with net inflows of approximately 102 trillion British thermal units (BTU). This regional connectivity supports reliability and underscores the importance of transmission capacity and coordination across state lines. Renewables account for approximately 2.5% of electric generation, reflecting the state's existing generation mix as well as regulatory and siting constraints.

Kentucky has no mandatory renewable portfolio standard (RPS), so renewable energy development is driven largely by market conditions, voluntary utility programs, and federal incentives. Solar development has increased in recent years, but growth can be affected by land-use regulations, interconnection requirements, and economic considerations.

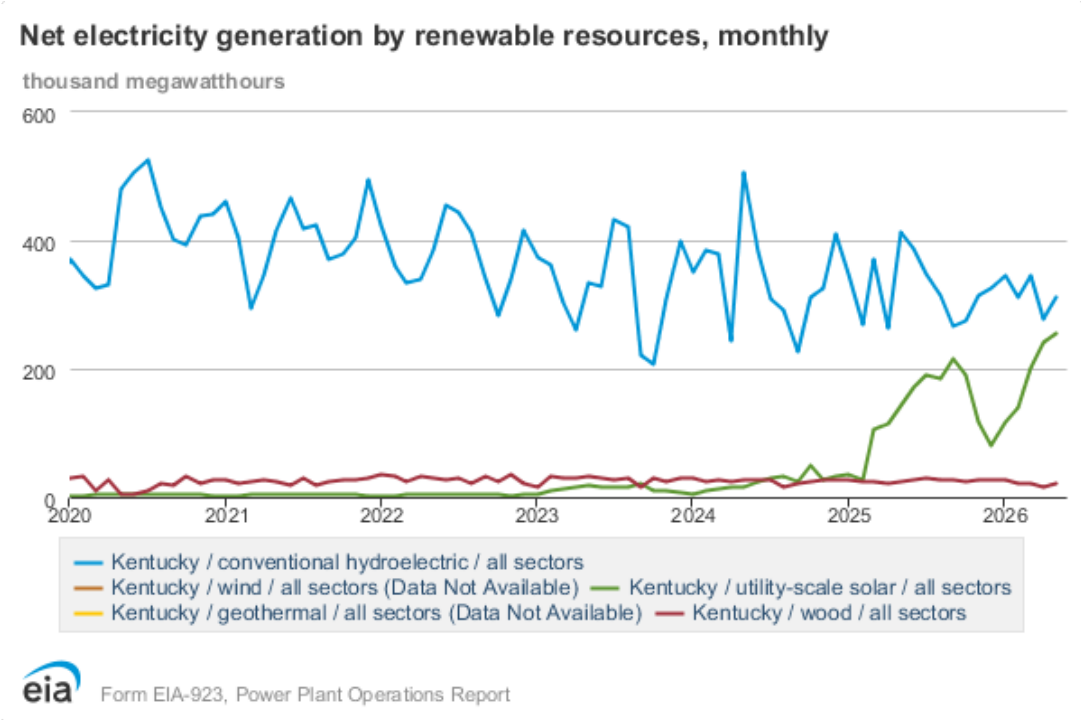


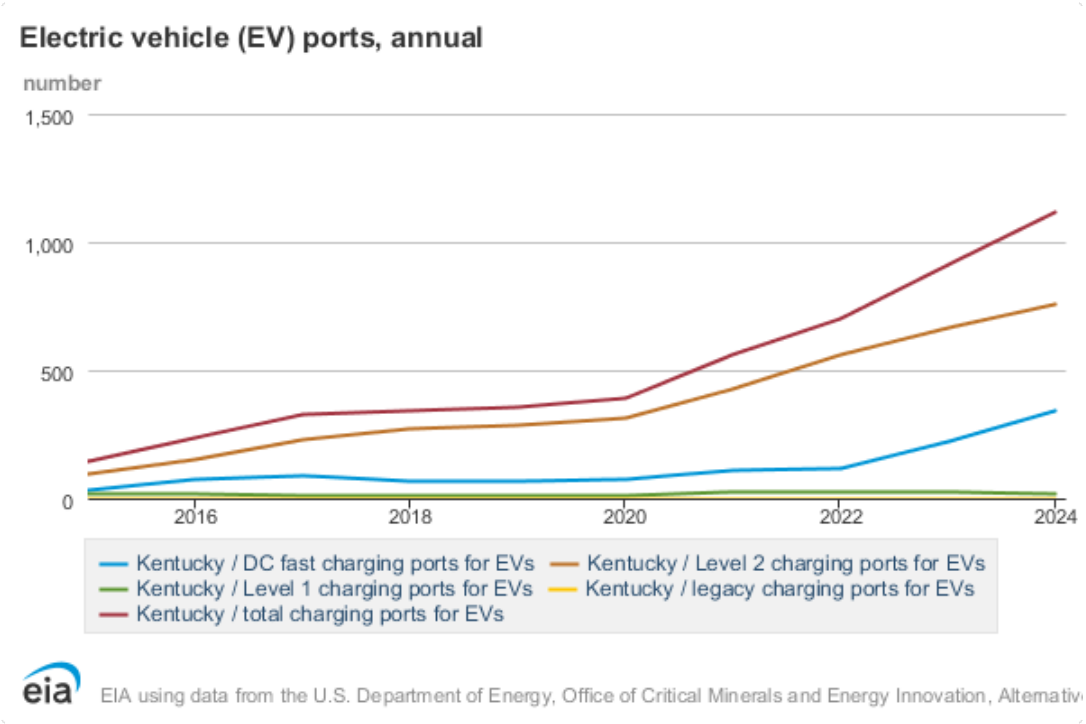
Figure 6.

Net Electricity Generation by Renewable Resources, Monthly (U.S. Energy Information Administration, Power Plant Operations Report)

The state is also experiencing growth in electric vehicle (EV) infrastructure, with an expanding network of publicly available charging stations supported by federal and state initiatives. While EV adoption remains lower than in many other states, continued investment in charging infrastructure will be needed to support broader transportation electrification.

Figure 7.

Electric Vehicle (EV) Ports, Annual (U.S. Energy Information Administration, using data from the U.S. Department of Energy)



According to the Kentucky League of Cities, future EV adoption and usage is expected to increase, as indicated by the trends from 2020-2025 in Table 1.

Table 1.

Registered Electric Vehicles by Type (Kentucky League of Cities)

Registered Electric Vehicles by Type

Kentucky registration totals, 2020–2025

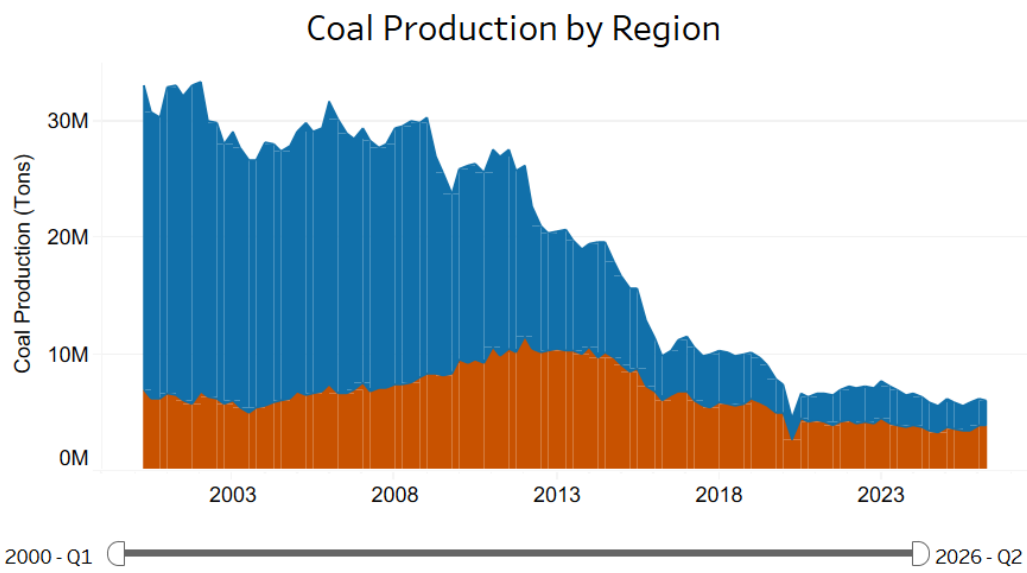
VEHICLE TYPE	2020	2021	2022	2023	2024	2025
Electric motorcycles	0	0	0	0	41	47
Plug-in hybrid electric vehicles (PHEVs)	1,743	2,523	3,463	4,636	6,346	8,343
Hybrid/gasoline vehicles	35,698	41,917	47,930	57,497	72,829	92,794
Electric automobiles and trucks	2,273	3,621	5,876	9,478	14,410	19,540
TOTAL	**39,714**	**48,061**	**57,269**	**71,611**	**93,626**	**120,724**

Coal, Oil, and Natural Gas

Kentucky remains an energy-producing state, particularly in coal, which continues to play a significant role in both the state's economy and its electric generation sector. Although coal production has declined over the past two decades, production continues in both Eastern and Western Kentucky. This decline reflects broader national trends, including competition from natural gas and renewable energy sources.

Figure 8.

Coal Production by Region, 2000–2026 (Kentucky Energy and Environment Cabinet, Quarterly Coal Report)



Natural gas plays a growing role in Kentucky's energy mix, particularly in electric generation and industrial use. The state has more than 27,000 miles of pipelines, much of which was installed prior to the 1970s, creating ongoing replacement and modernization needs. Equipment failure, corrosion, and material degradation account for a substantial share of pipeline incidents, underscoring the need for continued investment in system safety and reliability.

Petroleum products account for the largest share of end-use energy consumption in Kentucky, primarily due to transportation demand. Much of this supply depends on out-of-state refineries and interstate transportation systems, making reliable transportation and distribution networks important to the state's fuel supply. Fuel supply chains, storage capacity, and distribution infrastructure support transportation and other economic activity throughout the state. While these systems generally meet current needs, they are subject to supply disruptions and price volatility during extreme weather events and broader market fluctuations. Barge transportation along the Ohio River remains a critical component of Kentucky's petroleum supply chain, and aging water control infrastructure and funding constraints present long-term reliability considerations.

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While fossil fuels continue to dominate Kentucky's energy mix, the state is also considering opportunities for energy diversification. Federal policies, market trends, and technological advancements will continue to influence Kentucky's energy system. Recent state actions, including the establishment of the Kentucky Nuclear Energy Development Authority, reflect growing interest in nuclear energy as part of the state's long-term energy planning.

Funding and Future Need

Investment in Kentucky's energy infrastructure is primarily supported by private utility capital, ratepayer funding, and targeted federal programs. Most energy assets in the Commonwealth are owned and operated by investor-owned utilities, cooperatives, municipal utilities, or federal entities such as TVA. System improvements are largely financed through utility rates approved by the Kentucky Public Service Commission, rather than through direct state appropriations.

Utilities across Kentucky continue to invest in generation, transmission, and distribution infrastructure to maintain reliability and meet regulatory requirements. These investments include the replacement and rehabilitation of aging assets, grid modernization efforts, and targeted capacity upgrades. Federal funding programs—particularly those authorized through the IIJA and the Inflation Reduction Act (IRA)—have provided additional resources to support resilience, efficiency, and emerging energy technologies. For example, Kentucky has received approximately $27 million in federal funding for grid resilience projects, with additional funding supporting energy efficiency, electrification, and alternative fuel initiatives. East Kentucky Power Cooperative (EKPC) is also expected to receive $1.4 billion in federal grants and loans through the USDA's Empowering Rural America (New ERA) program for 757 MW of renewable energy generation and associated transmission projects. EKPC is also constructing a 745 MW combined-cycle natural gas generating facility at the John Sherman Cooper Station in Somerset.

Despite these investments, long-term funding needs are expected to increase, especially as the generation mix changes and new energy technologies are developed. Nuclear-related projects in Paducah and large-scale solar projects are among the investments being considered or developed as electricity demand grows. Much of Kentucky's energy infrastructure—including transmission lines and natural gas distribution systems—was constructed decades ago and requires ongoing maintenance, replacement, or upgrades. In some cases, infrastructure dating to the mid-twentieth century remains in service, creating a growing need for capital reinvestment to maintain continued reliability and safety. At the same time, utilities must balance these investments with the need to maintain affordable energy rates for customers.

Emerging system demands are also contributing to future funding pressures. Kentucky's future electricity needs are expected to require a diverse mix of generation resources and technologies. Under moderate conditions, Kentucky's electricity load could increase by about 44% from 2026 to 2050, requiring approximately 28 gigawatts of additional generation capacity from a range

of technologies. Under a high-demand scenario, Kentucky could need up to 3 gigawatts of advanced nuclear capacity. Other resources considered in future generation scenarios include existing coal generation with natural gas co-firing, renewable resources such as solar, wind, and hydropower, and short- and long-duration energy storage.

State and utility planning efforts, including the Kentucky Grid Resilience Program, the Kentucky State Board on Electric Generation and Transmission Siting, and the Nuclear Development Workgroup address these challenges through planning and investment in grid modernization, resilience initiatives, and emerging technologies such as energy storage, microgrids, and alternative fuels, including hydrogen. These efforts recognize the need to balance existing generation resources, emerging technologies, infrastructure investment, reliability, and affordability.

With the formation of the Kentucky Nuclear Energy Development Authority and the passage of Senate Bill 57 during the 2026 General Assembly, Kentucky has taken steps to support potential future nuclear energy development. SB 57 provides a framework for grants covering up to one-third of eligible costs associated with obtaining federal permits and licenses for nuclear energy facilities, up to $25 million per project. In addition, two nuclear fuel enrichment projects in Paducah would contribute to the nation's nuclear fuel supply.

At the same time, growing interest in electrification, electric vehicle infrastructure, and alternative fuels such as hydrogen may increase demand for both generation and distribution capacity. These trends may require capital investment beyond traditional system maintenance. Locating large new energy users in areas with available infrastructure capacity may reduce the need for additional system investments and associated costs.

Energy affordability remains a critical consideration in funding decisions. While Kentucky benefits from relatively low energy prices, energy burden varies significantly across the population. On average, households spend approximately 3% of their income on energy costs; however, for low-income and disadvantaged communities, that burden can reach as high as 18%. These disparities highlight the challenge of funding necessary infrastructure improvements while maintaining affordable energy service.

In addition to financial considerations, regulatory and market structures influence investment decisions. Kentucky's regulatory framework, overseen by the Public Service Commission, provides stability for utilities and consumer protections that help mitigate exposure to market volatility while supporting long-term infrastructure planning.

Kentucky's energy infrastructure also depends on reliable supply chains for critical components such as transformers, turbines, and other specialized equipment. Supply chain constraints can affect system maintenance and expansion, particularly when long-lead equipment is needed to accommodate new demand. While this challenge is national in scope, planning for the availability of equipment and materials will be important to maintaining reliability and meeting future demand.

Federal funding has provided important support in the near term; however, sustained long-term investment will be necessary to ensure that the Commonwealth's energy system can meet future needs while maintaining reliability and affordability.

Operation and Maintenance

Kentucky's energy infrastructure is operated by investor-owned utilities, rural electric cooperatives, municipal utilities, and federally operated systems such as TVA. These entities maintain generation, transmission, and distribution systems, while the Kentucky Public Service Commission oversees regulated utilities' performance, planning, and rates.

Utilities use routine maintenance, asset management, and system monitoring to maintain reliability and prioritize rehabilitation and capital investments. Preventive maintenance can extend asset life, while advanced sensors and controls improve real-time monitoring and help identify issues before service disruptions occur.

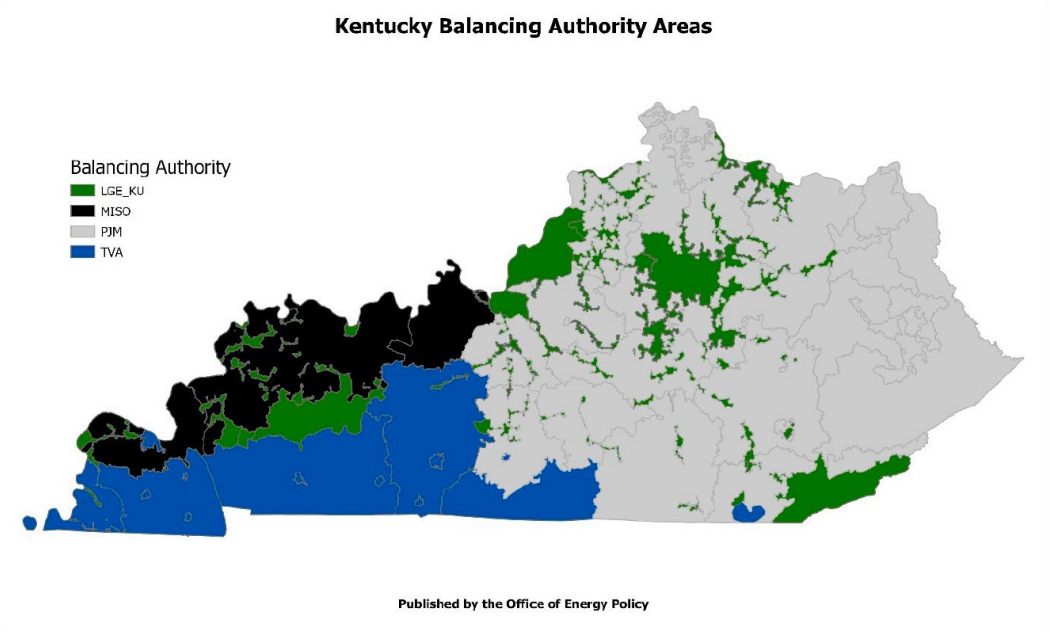
Grid modernization efforts are also shaping operations and maintenance (O&M) practices. Approximately 80% of electric meters in Kentucky are advanced metering infrastructure (AMI), which can improve outage detection, system visibility, and customer energy management capabilities. Investments in smart grid technologies—including AMI, automated switching, and improved outage management systems—can help utilities identify system disturbances and restore service more quickly. These technologies can also improve system operations and support the integration of distributed energy resources and emerging technologies. However, only a small portion of distribution circuits currently utilize advanced optimization technologies, leaving opportunities for additional efficiency and reliability improvements.

Maintenance of transmission and distribution infrastructure remains a significant focus, particularly given the age of many system components. Because portions of Kentucky's electric grid and natural gas distribution systems were constructed several decades ago, they require ongoing inspection, repair, and replacement. Utilities are investing in upgrades to critical infrastructure, including pole replacements, line reconductoring, substation improvements, and pipeline modernization programs, to maintain system reliability and safety.

Coordination among utilities and regional grid operators is an important component of system operations. Regional transmission organizations (RTOs) coordinate the movement of wholesale electricity across interconnected transmission systems, allowing participating Kentucky utilities to balance supply and demand across a broader regional network. This coordination supports system reliability and is particularly important during periods of peak demand or system stress.

Figure 9.

Kentucky Balancing Authority Areas (Kentucky Office of Energy Policy)



O&M activities also extend to fuel supply infrastructure. Natural gas systems require continuous monitoring and maintenance to support safe and reliable delivery, including leak detection, pipeline integrity management, and system upgrades. Similarly, petroleum supply chains depend on the maintenance of storage, transportation, and distribution infrastructure to meet transportation and industrial demand.

Despite these efforts, aging infrastructure, changing energy demands, financial and regulatory constraints, and workforce needs present ongoing challenges. Maintaining a skilled workforce capable of designing, operating, and maintaining increasingly complex energy systems will be important to maintaining system reliability and supporting future energy needs.

Public Safety

The safe and reliable operation of Kentucky's energy infrastructure is essential to public health, economic stability, and emergency response. Disruptions to electric power or fuel supply systems can have immediate and widespread impacts, affecting critical services such as healthcare, water and wastewater treatment, transportation, and communications. Maintaining public safety requires sound infrastructure, effective maintenance, and the ability to withstand and respond to natural hazards and other disruptions.

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Extreme weather is a significant threat to energy system reliability in the Commonwealth. According to FEMA, Kentucky has experienced 16 federally declared disasters since 2020, including the COVID-19 pandemic. Natural hazards such as severe storms, flooding, tornadoes, and winter weather can damage generation facilities, down transmission and distribution lines, disrupt fuel supply chains, and cause widespread power outages, particularly at the distribution level.

Major storms and tornadoes have caused prolonged outages across Kentucky, posing risks to vulnerable residents and disrupting critical services such as hospitals, emergency response, and water treatment. Utilities use measures such as pole replacement, vegetation management, and equipment upgrades to improve system resilience. While Kentucky's interconnected grid allows utilities to draw on regional resources, widespread weather events can strain the system and limit external support.

Fuel infrastructure also plays a critical role in public safety. Pipeline failures and leaks, such as the incident near Graham, Kentucky, in June 2026 and the nearly 900 pipeline leaks caused by excavation in 2024, present risks to both public safety and the environment. Integrity management, inspection, leak detection, and monitoring help reduce these risks, while continued maintenance and upgrades are particularly important for aging infrastructure. Disruptions to natural gas and petroleum systems can also affect transportation, emergency response, freight movement, and other essential services.

The increasing digitalization of energy systems also introduces new security considerations. Advanced grid technologies and automated systems can improve operations but require appropriate cybersecurity and system protections. Protecting these systems from disruption is an increasingly important component of energy system reliability and public safety. Kentucky has taken steps to enhance energy system resilience and reduce risk to the public, as detailed in the next section.

Resilience and Innovation

As Kentucky's energy system faces extreme weather, aging infrastructure, and changing demand, resilience measures are increasingly important to maintaining reliable energy service. Utilities and state agencies are working to strengthen system performance during disruptions and prepare for future energy needs. Power outage trends in Kentucky vary significantly from year to year, with the most grid disruptions occurring in January and July, mainly due to weather, falling trees, and seasonal demand. According to KY EEC, an average Kentucky electric customer experiences approximately 1.8 service disruptions per year, above the national baseline average of 1.4 annual outages.

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Resilience initiatives in Kentucky focus on improving the ability of critical infrastructure to withstand and recover from major events. Severe storms, flooding, tornadoes, and winter weather have highlighted vulnerabilities in energy infrastructure and increased attention to system hardening and localized resilience strategies. State and federal programs are supporting improvements to electric grid infrastructure, including targeted upgrades to distribution systems and critical facilities. For example, Kentucky has implemented grid resilience projects funded through the IIJA to improve reliability at key community locations, including state parks and municipal utilities that serve as emergency response hubs during disasters.

Microgrids and distributed energy systems are another area of resilience planning. Microgrid initiatives are being explored and implemented at universities, municipal utilities, and other critical facilities to provide localized backup power during outages. State-level assessments have identified significant potential for distributed energy solutions, including more than 500 potential nanogrid installations and a dozen regional microgrid opportunities across Kentucky. These systems can improve resilience by allowing local energy systems to operate independently from the larger grid during disruptions, helping maintain essential services such as healthcare, emergency response, and public safety operations. Projects such as pumped hydroelectric storage in Eastern Kentucky could also support system resilience by providing dispatchable energy during periods of grid stress. Microgrids can also support energy efficiency and the integration of renewable energy resources.

Innovation in Kentucky's energy sector also includes efforts to modernize grid operations and improve system efficiency. Utilities are incorporating advanced technologies such as smart grid systems, automated controls, and real-time monitoring to enhance situational awareness and accelerate response to system disturbances. Continued investment in automated distribution systems that can detect and reroute power during outages will be critical as disruptions become more frequent. These technologies enable more flexible system operation and support the integration of distributed energy resources, energy storage, and demand-side management strategies. Utilities are also increasingly using drones, remote sensing, and advanced inspection tools to monitor infrastructure and identify potential issues before failures occur.

Emerging energy technologies are also shaping the future of Kentucky's energy system. The state is evaluating alternative fuels, particularly hydrogen, for potential industrial and transportation applications. Hydrogen development initiatives include possible applications along freight corridors and logistics hubs, where the technology has the potential to reduce emissions while maintaining the operational needs of heavy-duty transportation. These initiatives remain in the early stages and are supported in part by federal programs and regional planning efforts.

Energy efficiency and demand-management programs can also help reduce system demand and energy costs. Federal and state initiatives support energy-efficient building upgrades, appliance improvements, and grid-interactive technologies designed to reduce energy consumption. Reducing peak demand can also decrease pressure on generation and distribution infrastructure.

Despite these efforts, challenges remain in expanding innovative solutions across the state. Regulatory frameworks, funding availability, and local implementation conditions can influence the pace of adoption of new technologies. Additionally, integrating emerging energy resources into an existing system dominated by traditional generation requires careful planning to maintain reliability and affordability.

Continued investment and coordinated planning will be needed to modernize Kentucky's energy infrastructure, strengthen resilience, and prepare the system for changing energy demands.

Recommendations to Raise the Grade

- **Continue investing in modernization and replacement of infrastructure**, including aging electric transmission, distribution, and natural gas infrastructure, including transmission capacity, smart grid technologies, automated distribution systems, and electric vehicle charging infrastructure to support reliability and future demand.
- **Continue expanding grid resilience initiatives**, including microgrids, backup power systems, grid hardening measures, and localized energy systems that support critical facilities and improve recovery from more frequent extreme weather events.
- **Sustain a balanced and diversified energy portfolio** by encouraging strategic investment in renewable energy, energy storage, advanced nuclear generation, alternative fuels such as hydrogen, and grid modernization technologies while maintaining reliable baseload generation capacity.
- **Continue to strengthen long-term energy planning and workforce development efforts** to ensure utilities, regulators, and industry partners have the technical capacity to maintain, operate, and modernize Kentucky's evolving energy system.
- **Continue leveraging federal funding opportunities and public-private partnerships to improve energy affordability**, resilience, efficiency, and infrastructure sustainability across the Commonwealth.
- **Support resilience-focused energy policies** that encourage smart investment in a diverse and flexible energy mix capable of withstanding any natural disaster. By expanding renewable energy, distributed generation, and energy storage, the state can reduce reliance on centralized systems and improve reliability during disruptions.

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HAZARDOUS WASTE

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2026 Kentucky Infrastructure Report Card

Executive Summary

Kentucky's hazardous waste management system plays a critical role in protecting human health, natural resources, and communities across the Commonwealth. The Division of Waste Management (DWM) within the Energy and Environment Cabinet regulates hazardous waste generators, oversees contaminated site cleanup programs, and manages corrective actions for underground storage tanks and brownfield redevelopment. Through programs such as the Superfund Program and the Kentucky Brownfields Program, contaminated properties are being evaluated and redeveloped to support economic revitalization in local communities. Kentucky's Emergency Response Team (ERT) is trained to respond immediately to environmental emergencies where hazardous materials may have been spilled. However, the Hazardous Waste Management Fund has experienced declining revenues while cleanup costs and regulatory demands continue to increase. Without additional funding, Kentucky will face growing challenges in addressing contaminated sites, promoting the proper disposal of household hazardous wastes, and the environmental impacts of increasingly frequent natural disasters.



Figure 1.
Transit Authority of Lexington, located on a reclaimed brownfield site (Kentucky Energy & Environment Cabinet)

2026 Kentucky Infrastructure Report Card: HAZARDOUS WASTE

Background

Many industries in Kentucky generate hazardous waste, such as health care/hospitals, construction, and even dry cleaning. The top generators of hazardous waste in Kentucky are chemical, metal, and plastic manufacturing facilities. Common household hazardous wastes include paints, cleaners, oils, batteries, and pesticides. The DWM, working in coordination with federal programs such as the Resource Conservation and Recovery Act (RCRA), is the principal regulatory agency responsible for regulating hazardous waste in Kentucky.

Capacity

Hazardous waste is generally defined as any liquids, solids, contained gases, or sludges that pose a serious threat to human health and the environment. Kentucky manages its hazardous waste programs through four branches of the DWM:

1. the Hazardous Waste Branch;
2. the Superfund Branch;
3. the Kentucky Brownfields Program; and
4. the Underground Storage Tank Branch.

The U.S. Environmental Protection Agency (EPA) named Kentucky number 25 on a list of states generating hazardous waste (over 150,000 tons) in 2023.

The Hazardous Waste Branch oversees the management of hazardous waste from generation to disposal, or "cradle to grave." This includes monitoring, permitting, and overseeing corrective actions for hazardous waste sites for newly generated materials. The Hazardous Waste Branch has registered over 1,700 entities that generate hazardous waste and regulates around 30 hazardous waste landfills in Kentucky.

The Superfund Branch manages sites with known or suspected releases of hazardous substances, petroleum pollutants, or contaminants into the environment that are not specifically regulated by other branches. This includes providing oversight to responsible parties, but in some cases the branch takes a more active state-led role. The Superfund Branch also coordinates with the EPA on 10 National Priority List (NPL) sites in Kentucky. The Superfund Branch oversees more than 200 sites in Kentucky.

The Kentucky Brownfields Program provides resources and services to stakeholders to facilitate the assessment and redevelopment of contaminated properties.

The Underground Storage Tank (UST) Branch is responsible for managing UST system registration and notification requirements, assisting owners and operators with operational and maintenance requirements, corrective action oversight, and managing claims and payment funds. In 2023, the UST Branch received and processed over 400 new and amended UST registrations.

National Capacity Assessment

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) was amended by the Superfund Amendments and Reauthorization Act, including provisions under Section 104(c)(10) that require states to assure the availability of hazardous waste treatment or disposal facilities that have adequate capacity to manage the hazardous waste expected to be generated within the state over 20 years, before EPA can provide any federal remedial action funding to the state. The agency's 2024 assessment of the availability of capacity for the treatment and disposal of hazardous waste generation, as documented in the 2025 National Capacity Assessment Report, indicates that there exists adequate capacity nationwide through the year 2049.

Condition

Several programs within the Division of Waste Management evaluate and remediate contaminated sites across the Commonwealth.

The DWM implements four key contaminated land cleanup programs:

1. the RCRA program to clean up hazardous waste sites;
2. the Superfund Program;
3. the Kentucky Brownfields Program; and
4. the Underground Storage Tank Corrective Action program

Corrective Action at RCRA Hazardous Waste Sites

The Hazardous Waste Branch oversees the corrective action of existing, permitted RCRA sites in Kentucky. The corrective action process for these sites typically begins with a RCRA Facility Assessment to identify areas impacted by the management of hazardous wastes at the site. After the facility assessment, next steps include site environmental characterization and remediation.

The branch currently oversees the corrective action of over 60 facilities in Kentucky. More than 30 of these sites have attained "remedy constructed" status, which means that restorative measures have been implemented to address contamination at the site.

Superfund Program

The Superfund Branch oversees companies or individuals who have taken responsibility for cleaning up contamination found on their property; however, in cases where a responsible party cannot be found or is unable to act, the Superfund Branch may take a direct role in cleaning up a site. Because these sites are otherwise abandoned and do not have a viable responsible party, the Superfund Branch takes on financial liability. As funding dwindles, and as the number of sites, costs of remediation, and long-term oversight continue to increase, the financial capacity of the Superfund Branch to address contaminated sites has steadily declined. The Superfund Branch oversees the characterization and cleanup of over 200 non-federal Superfund sites in Kentucky.

The Superfund Branch coordinates with the EPA on the assessment and remediation of 10 NPL sites in Kentucky, a list created by the EPA of the most serious threats of hazardous substances, pollutants, or contaminants throughout the United States. These NPL sites require monitoring and maintenance.

Kentucky Brownfields Program

Brownfield sites are abandoned, closed, or under-used industrial or commercial facilities, such as a shuttered factory in the middle of town or a closed commercial warehouse in a suburban setting. Brownfields can be located anywhere and can be quite small, such as a dry-cleaning establishment or a closed gas station.





Figures 2 and 3.

West Sixth Brewing in Lexington occupies a reclaimed brownfield site that was once home to the Rainbo Bread Company (Kentucky Brownfield Redevelopment Program)

The Kentucky Brownfields Program provides resources and services to help various stakeholders implement brownfield redevelopment projects, cleaning up the environment and restoring blighted properties that can boost the local economy, while preserving environmental and cultural resources.

The brownfield redevelopment process typically begins with an environmental site assessment (ESA). After the ESA, next steps include liability relief, further site characterization (if necessary), cleanup, and redevelopment. Kentucky's Brownfields Inventory includes over 350 properties that are receiving, or have received, assessments and/or cleanups under the state program. With an estimated 8,000 brownfields across the state and only 34 notices of concurrence issued in Fiscal Year 2025, it would take hundreds of years to assess all brownfield sites at the current rate.

Underground Storage Tank Corrective Action Program

The UST Branch oversees corrective actions for releases from underground storage tanks. The UST Branch also provides regulatory guidance to stakeholders regarding release response and reporting, initial abatement, site check, closure, site investigation, and corrective action to various stakeholders. The UST Branch currently oversees the cleanup of over 400 sites in Kentucky.

Funding

The ability to evaluate and remediate contaminated sites depends heavily on the availability of stable funding sources.

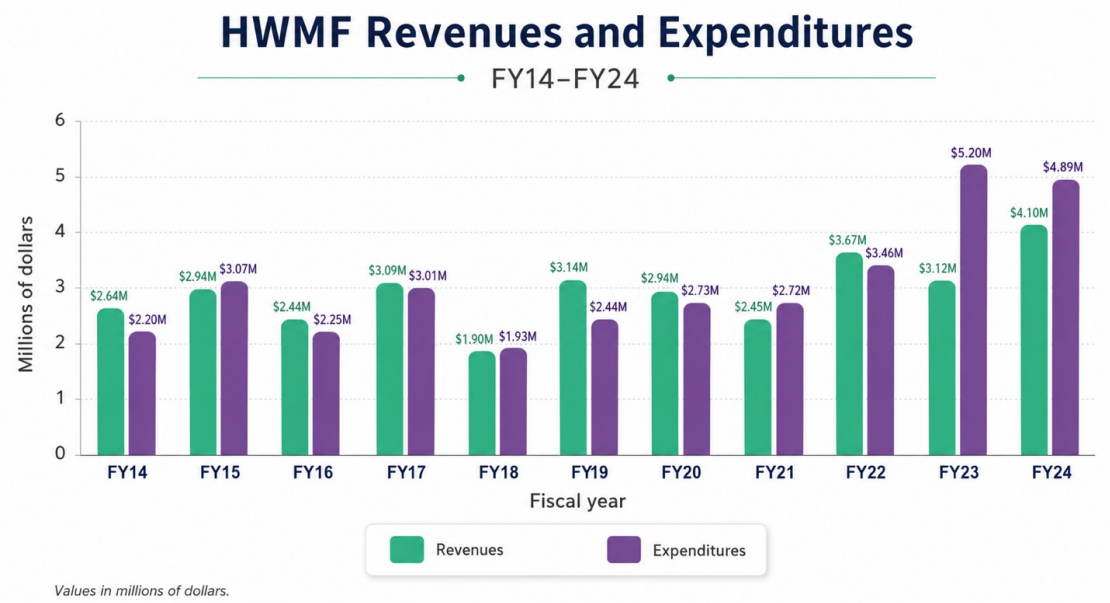
Funding sources for Kentucky's hazardous waste include federal funds. Kentucky receives funding from a total of 15 federal grants and cooperative agreements, including the following:

- There are site-specific grants for facilities such as the Paducah Gaseous Diffusion Plant and the Blue Grass Army Depot.
- The Core Program Cooperative Agreement funds are used for identifying, investigating, and addressing environmentally contaminated sites in accordance with the Superfund Program.
- The Five-Year Review Cooperative Agreement provides funding from the EPA to the Superfund Program to perform five-year reviews of remedial action at NPL sites in Kentucky. The purpose of a five-year review is to determine whether a site's ongoing or completed remedial actions will remain protective of human health and the environment.
- Partnership Performance Grants support various programs, including:
  - RCRA permitting, corrective action, closure, compliance, and enforcement;
  - Brownfields Redevelopment Program; and
  - Compliance-monitoring for polychlorinated biphenyls (PCBs) and tracking facility information in the PCB Transformer Registration Database.
- The Leaking Underground Storage Tank (LUST) Cleanup Cooperative Agreement with the EPA provides financial assistance to the UST program to oversee the cleanup of leaking underground storage tanks by responsible parties and to ensure the cleanup at sites where an owner or operator is unwilling or unable to take necessary corrective action.

In addition to federal funding sources, Kentucky has a Hazardous Waste Management Fund to provide the DWM with the funds necessary to protect the health of the citizens and environment of the Commonwealth from threats associated with releases of hazardous substances, pollutants, and contaminants. The Hazardous Waste Management Fund is Kentucky's primary funding source for emergency response and state-led remediation activities where no viable responsible party exists. Since the fund was established in 1980, Kentucky has spent nearly $85 million to remediate contaminated sites. The Hazardous Waste Management Fund has experienced challenges since revenues are not keeping pace with expenditures; see Figure 4 below. This has resulted in the Hazardous Waste Management Fund no longer being able to sustain and manage all existing and projected superfund backlogs. Insufficient funding to support large scale emergency remedial projects that arise unpredictably year-to-year, and the inability to reasonably fulfill its statutory mandate to protect human health and the environment continue to burden the funds.

Figure 4.

Hazardous Waste Management Revenues and Expenditures in Kentucky, FY2014-FY2024 (Hazardous Waste Management Fund)



Values in millions of dollars.

The Hazardous Waste Branch receives approximately $300,000 in permit review fees that are applied to the program costs. State general funds make up the balance of the funding needed to run the Hazardous Waste Program in Kentucky.

Future Need

Kentucky has experienced multiple catastrophic flooding events within the last five years. Flooding can result in the transport of hazardous materials downstream, which can impact waterways and cause potential threats to human health and the environment. DWM staff have aided communities impacted by flooding, including debris cleanup and regulatory relief. As part of the 2022 Southeastern Kentucky flood relief efforts, the Superfund Branch assembled rapid assessment teams to evaluate potential redevelopment sites like the High Ground Neighborhood Development Concept shown in Figure 5. The teams performed Phase I environmental site assessments and limited site investigations to evaluate the potential for developing former properties into residential subdivisions above the floodplain. Acid mine drainage and other environmental conditions were considered in the assessments. The site investigation reports were completed within a few weeks to help expedite the planning process. The Emergency Response Team, which is staffed with personnel from DWM and other state agencies, coordinated the assessment of regulated facilities and release response efforts for impacted areas. As the frequency of these events trends upward, additional resources will be needed for emergency response and resiliency planning in the future.

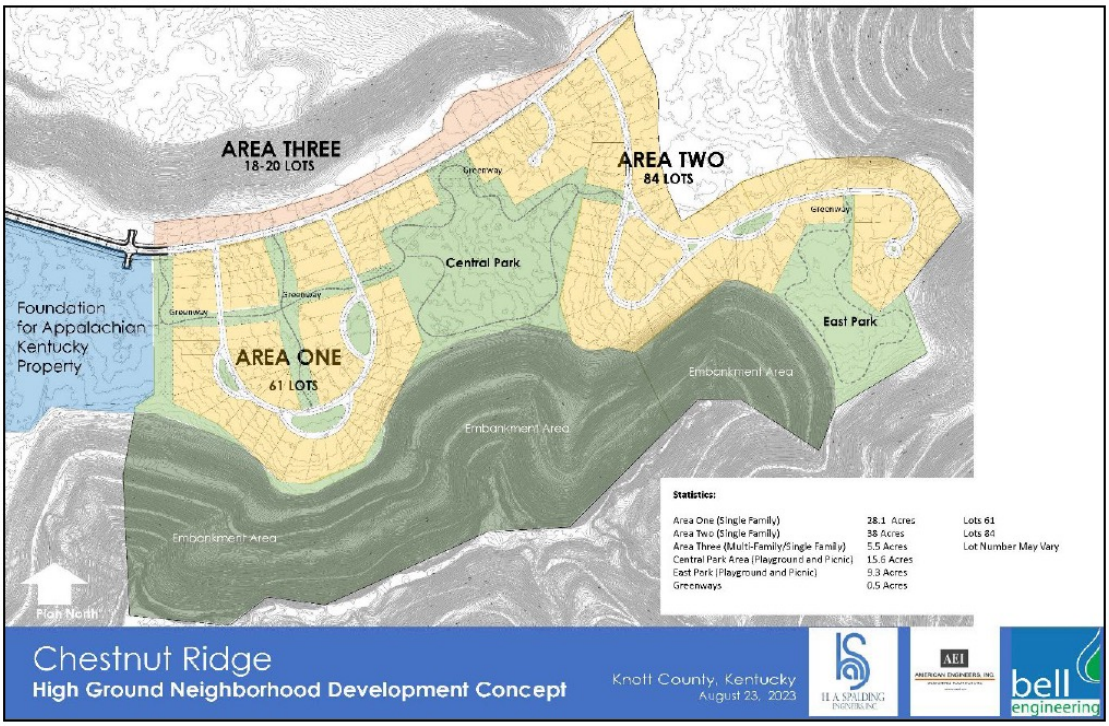


Figure 5.

Southeastern Kentucky Flood Recovery Master Plan (Kentucky Energy and Environment Cabinet, Division of Waste Management)

Additional resources are also needed to promote best practices for the disposal of electronic nicotine delivery systems (ENDS), also known as e-cigarettes and electronic vapes. Many consumers are not aware that ENDS waste is considered hazardous by the EPA due to the presence of nicotine, which is a hazardous waste under RCRA. The accumulation of more than 2.2 pounds of nicotine-containing ENDS cartridges triggers special requirements under RCRA. These products must be handled carefully to avoid exposure to unused nicotine, which can cause accidental poisoning by absorption through the skin. These products also include lithium ion batteries, which are fire hazards, especially when damaged. Lithium batteries can catch fire when damaged by trash compactors, during transportation, and at waste and recycling facilities. Additional resources to educate consumers and promote the proper disposal of ENDS waste via household hazardous waste collection events or hazardous waste disposal facilities can reduce potential impact to human health and the environment from this waste stream.

Operation and Maintenance

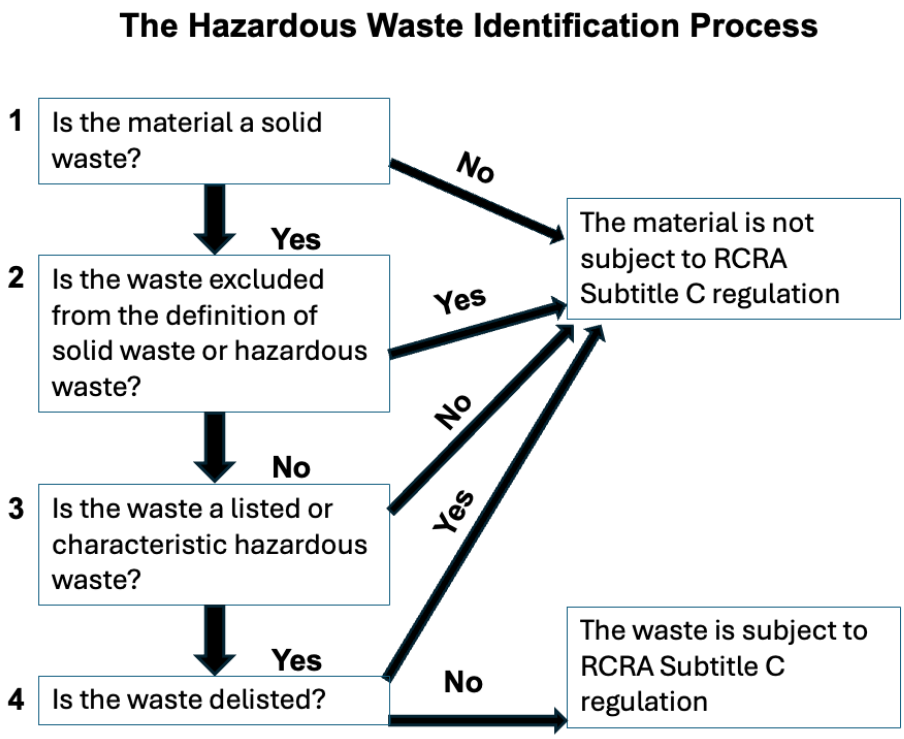
Kentucky's hazardous waste sector faces workforce challenges including a steady demand for hazardous materials technicians, heavy equipment operators, and CDL drivers as well as environmental professionals.

Effective operation and maintenance of hazardous waste systems begins with properly identifying and classifying hazardous materials under federal and state regulations. Hazardous wastes are

either specifically listed as hazardous by the EPA or the state, or exhibit one or more characteristics: ignitability, corrosivity, reactivity, or toxicity. The EPA developed the process shown in the figure below to help waste generators identify hazardous waste. If a waste is hazardous, it is, by definition, subject to EPA's Resource Conservation & Recovery Act (RCRA) Subtitle C regulations. RCRA Subtitle C requires "cradle to grave" management and provides the critical foundation needed to protect human health and the environment.

Figure 6.

Hazardous Waste Identification Process (EPA)



In addition to regulatory oversight, Kentucky promotes proper waste management through household hazardous waste collection events and recycling initiatives. Programs such as the Kentucky Pride Fund and the statewide electronic scrap (e-scrap) recycling contract help local governments, schools, and state agencies safely manage electronic waste and other hazardous materials. These initiatives reduce environmental risks while supporting responsible waste management practices across the Commonwealth.

Public Safety, Resilience, and Innovation

Public safety is the utmost priority behind all hazardous waste laws and regulations in Kentucky. Traditional hazardous waste remediation and land-use management help protect Kentucky's drinking water, human health, and other natural resources.

Each operating RCRA Part B Treatment, Storage, and Disposal Facility is required to have a waste minimization plan in place to reduce the waste generated at hazardous waste sites. In addition, the DWM encourages facilities to minimize hazardous waste whenever possible.

The Kentucky Pride Fund is supported by an environmental remediation fee of $1.75 per ton of waste disposed of in Kentucky landfills. This program provides grant funding for household hazardous waste collection events to promote the proper management of waste such as e-scrap, pesticides, solvents, and mercury.

Kentucky has a contract with Powerhouse Recycling for the collection and recycling of e-scrap. The primary users of the contract have been state agencies and county school districts. The DWM is also encouraging county governments to use this service which would reimburse them for collecting specific items. The DWM also provides guidance to organizations and businesses for selecting an e-scrap vendor that meets their specific needs. There is currently a high demand for rare minerals, which are found in e-scrap. As technologies emerge to extract these rare minerals from e-scrap and other waste streams, reimbursement rates may become more competitive, resulting in higher recycling rates.

In addition to prevention, waste minimization, and recycling efforts, Kentucky has established systems to respond to hazardous materials incidents and environmental emergencies. Kentucky has established an ERT to respond to environmental emergencies and staff the State Emergency Operations Center. These emergencies include things such as petroleum releases, landfill fires, train derailments, tanker truck releases, industrial chemical releases, crude oil releases, natural disasters, and many other environmental issues requiring immediate attention. ERT responses within the last five years include the 2022 Southeastern Kentucky floods and an incident in 2023 when a barge loaded with over 400,000 gallons of methanol broke free and lodged against the McAlpine Dam on the Ohio River. The ERT uses equipment including a mobile command post, mobile environmental monitoring trailer, watercraft, equipment trailers, generators, high volume water pumps, drones, and utility terrain vehicles. The use of drones allows the ERT to quickly collect multiple samples from remote or unsafe locations without exposing staff to hazardous conditions.

Together, these programs and response capabilities reflect Kentucky's comprehensive approach to managing hazardous waste and protecting public health and the environment. Continued investment in prevention, response, and innovation will be essential to address emerging risks and support long-term system performance.

2026 Kentucky Infrastructure Report Card: HAZARDOUS WASTE

Recommendations to Raise the Grade

- **Increase state funding to eliminate the backlog** of unfunded remedial actions and fund responses to natural disasters and other emergencies.
- **Increase state funding to promote the proper disposal of e-cigarettes** and electronic vapes.
- **Continue DWM staff retention and recruitment initiatives** such as job fairs, internships, and enhanced employee benefits.
- **Promote the e-scrap recycling program** to increase recycling rates.
- **Promote a dry-cleaning fund**, which exists in neighboring states, to help mitigate the cost of hazardous waste cleanups that typically exceed the financial capability of facility owners.
- **Evaluate the chemical composition of waste streams** for critical mineral content.

Definitions/Key Terms

CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act, also known as "Superfund"

DWM – Division of Waste Management

ENDS – Electronic Nicotine Delivery Systems

EPA – U.S. Environmental Protection Agency

ESA – Environmental Site Assessment

HWMF – Hazardous Waste Management Fund

LUST – Leaking Underground Storage Tank

NPL – National Priorities List

RCRA – Resource Conservation and Recovery Act

UST – Underground Storage Tank

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LEVEES

2026 Kentucky Infrastructure Report Card

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Executive Summary

Levees are a critical component of Kentucky's flood risk reduction system, protecting more than 290,000 residents, 125,000 structures, and $36 billion in property and assets. The Commonwealth's 35 levee systems, totaling 127 miles, play a vital role in safeguarding communities along the Ohio and Mississippi Rivers and other waterways. However, Kentucky's levee infrastructure is aging, with more than half of systems exceeding their 50-year design life and many mechanical components dating to the 1940s and 1950s.

While levee systems have performed well during recent major flood events, ongoing aging, limited funding, and staffing constraints tasked with oversight of these structures present growing challenges. Most levees are locally operated and maintained, often with limited resources, and many systems face increasing costs for repair and replacement.

To sustain system performance and reduce risk, Kentucky must invest in rehabilitation, strengthen funding mechanisms, improve emergency preparedness, and enhance coordination among levee owners and stakeholders.



Figure 1.
Louisville and Jefferson County Metropolitan Sewer District's Pond Creek Flood Pumping Station, the second largest flood pumping station in its system (Louisville MSD)

2026 Kentucky Infrastructure Report Card: LEVEES

Background

Levee systems are an important part of Kentucky's landscape. They have reduced flood risk and protected homes, infrastructure, and businesses during extreme rainfall events for decades. According to the U.S. Army Corps of Engineers (USACE) National Levee Database, Kentucky has 35 levee systems totaling approximately 127 miles. Levees play a key role in public safety and economic stability, especially as Kentucky experiences more intense weather events more often.

Most levees in Kentucky were federally constructed by the USACE and are now operated and maintained by local public sponsors, including cities and municipalities. The Commonwealth of Kentucky learned the importance of building flood protection after the historic flood of 1937 that caused extensive damage. Since that time, Kentucky has addressed this through building a network of levees across the state.

Condition and Capacity

Flood risk reduction is important in Kentucky, as the state's entire northern border is the Ohio River, and its western border is the Mississippi River. Major cities that depend on the state's levee systems for protection include Covington, Louisville, Newport, and Paducah, along with other communities and citizens throughout the state along smaller waterways.

Most levees in Kentucky are stormwater facilities, primarily earthen embankments designed and constructed for the purpose of containing, controlling, or diverting the flow of water to reduce the risk of flooding. Levee systems can also include concrete floodwalls, removable street closures, flood gates, and flood pump stations that work together to provide risk reduction from potentially devastating flood waters.

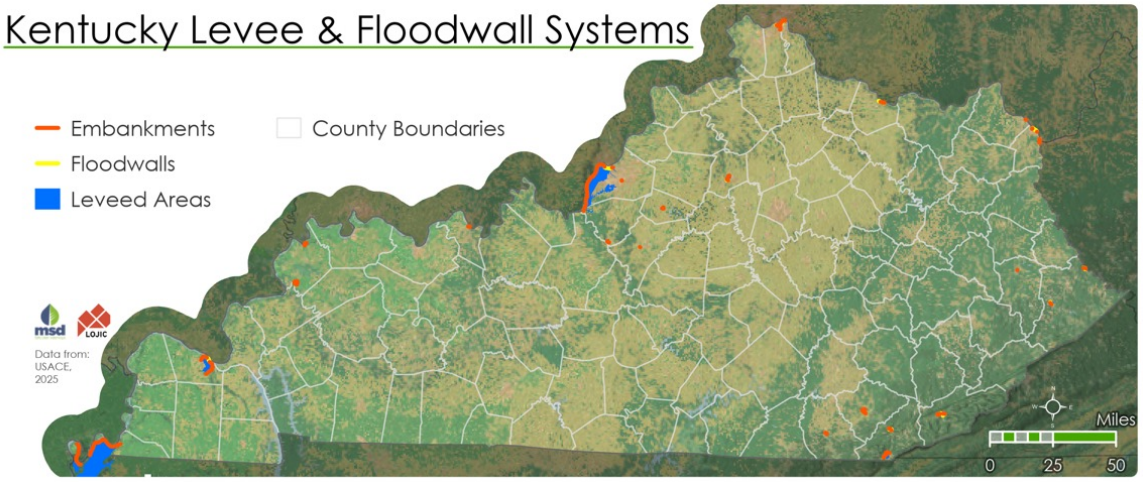
There is no single agency responsible for oversight of all levee systems in Kentucky, and responsibilities are shared among federal, state, and local entities.

Figure 2 shows a map of the 35 levee systems in Kentucky, consisting of 127 total miles. It is part of the National Levee Database (NLD), an online resource created by the USACE as part of the larger National Levee Safety Program efforts to consolidate levee information into one database. Of the 35 levee systems in Kentucky, five are federally constructed and operated by USACE; 29 were federally constructed but have been turned over to local public sponsors for operations and maintenance; and one is locally constructed and operated.

2026 Kentucky Infrastructure Report Card: LEVEES

Figure 2.

Kentucky Levee & Floodwall Systems (Louisville and Jefferson County Metropolitan Sewer District graphic, from USACE data)



The average age of Kentucky's levees exceeds the original 50-year design life. And nearly half of the state's inventory of levees were built in or before 1968, putting many of their components at the end of their life expectancy. Parts of these systems, such as pumping stations, were constructed in the 1940s and 1950s, and repair to the mechanical and/or electrical systems may not be possible since replacement parts are often no longer available, or the parts are extremely costly. When repairs are not possible, the cost of replacing these assets is high.

In a recent study of Kentucky's levee owners and operators, respondents supported the data above and identified aging infrastructure as a key concern. The survey results also identified staffing capacity and technical expertise as ongoing challenges, highlighting risks associated with institutional knowledge loss and limited human resources.

The four major systems in Kentucky with population greater than 10,000 in the leveed area are:

Louisville Metro Levee System – This levee system provides flood-risk reduction against the Ohio River for the city of Louisville and portions of Jefferson and Bullitt Counties. The levee system has a total length of 25.9 miles and consists of earthen levees, concrete walls, 16 pump stations, over 60 removable closures, and more than 150 floodgates. This system has been identified as having a high risk based on uncertain performance and the associated consequences of potentially high loss of life (with over 200,000 people at risk) and extremely high property damage (projected at $23 billion). This system has a limited loading history, and there is uncertainty concerning the flood wall performance at the upstream end of the segment. Analyses show that some areas of the concrete floodwall do not meet the minimum factor-of-safety if water were within four feet of the top. The Louisville Metro System was last assessed in 2020.

2026 Kentucky Infrastructure Report Card: LEVEES

Figure 3.

Workers install a floodwall in advance of predicted flooding (Louisville and Jefferson County Metropolitan Sewer District)



Hickman-Obion River System – This levee system provides flood-risk protection for portions of southwest Kentucky and northwest Tennessee (levee systems are not always confined within state boundaries). This system contains 62.2 miles of levee to protect flooding from the Mississippi River. More than 15,000 people and $1 billion in property value are within the area protected by this levee system. Significant investment in the levee in recent years has helped to reduce but not eliminate risk. The potential exists for flood events to occur that could lead to overtopping or breach of the levee or floodwall. If such events occurred or if there were a failure of the system, the areas behind the levee would experience high damages and potential loss of life. Levee sponsors, local communities, and USACE are taking action to reduce risk associated with this levee system. The Hickman-Obion River System was last assessed in 2016.

Covington Levee System – The Covington Levee System consists of approximately 9,250 linear feet of earthen levee embankment, 5,750 linear feet of floodwall, 10 pump stations, and 40 drainage structures, with both flap gates and sluice gates. Construction of this system was completed in August 1955 when it was turned over to the City of Covington. A 2021 Screening Level Risk Assessment classifies the Covington Levee as high risk (LSAC 2). Key concerns of this levee system include historical slope instability, seepage, embankment erosion, and floodwall instability. Approximately 10,000 residents live within the area protected by the levee, with residential development adjacent to recent slope stability issues. The levee protects approximately $2 billion in property value. Warning time notices prior to overtopping or breach may be limited.

While walking evacuation is likely and overall life-loss estimates may be reduced, inundation depths of up to 32 feet pose a significant risk to those remaining. Overtopping potential is relatively low, and high river stages are typically forecast days in advance, allowing time for evacuation and reducing life-safety risk. The Covington Levee System was last assessed in 2021.

Paducah Levee System – This levee system consists of just over nine miles of earthen embankment, approximately three miles of concrete wall, 12 pump stations, and other necessary appurtenances. The City of Paducah-leveed area has a population of 23,547 according to the National Structure Inventory in 2023 and contains about $5 billion in property value.



Figure 4.

Paducah's floodwall murals combine critical flood-protection infrastructure with artwork depicting the city's history and culture (source: Farragutful – Creative Commons license BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=69870434)

Funding and Future Need

Funding for Kentucky's levee systems continues to depend heavily on the entity responsible for operation and maintenance, the type of improvement required, and the availability of federal, state, and local funding programs. Major rehabilitation and reconstruction projects are often supported through USACE appropriations and other federal programs, while local sponsors remain responsible for substantial portions of routine operation, maintenance, engineering, and capital improvements.

2026 Kentucky Infrastructure Report Card: LEVEES

Since 2019, several Kentucky levee systems have received significant federal and local investment. Louisville Metro received approximately $6.3 million in federal funding in fiscal year 2023 to 2024 for design and initiation of rehabilitation work. Along the Mississippi River Mainline Levee in Fulton County, approximately $8.3 million was allocated for the Island 8 seepage remediation project, completed in 2025, including relief wells, subsurface drainage, culvert improvements, erosion protection, and other measures to reduce under-seepage and protect the levee toe.

The Middlesboro Flood Protection Project received approximately $6 million in additional federal funding between 2021 and 2023, including $4.2 million in fiscal year 2021 and $1.8 million through the Infrastructure Investment and Jobs Act (IIJA), contributing to a $7.9 million federally funded rehabilitation project that included levee armoring and other system improvements.

Local and combined funding sources have also supported levee work. Covington budgeted $937,000 in fiscal year 2023 for repairs to the Licking River levee near Oakland Avenue, Frankfort authorized $89,360 in 2025 for floodwall and flood protection system engineering and design, and Ashland reported approximately $246,522 in fiscal year 2023 for floodwall operation and maintenance. Paducah also continued major floodwall rehabilitation through federal assistance, financing, grants, local matching funds, and operations/maintenance expenditures, with approximately $5 million in federal funding associated with rehabilitation activities from 2020 to 2025.

Local non-federal sponsors continue to face substantial financial responsibilities for operation, maintenance, engineering, matching requirements, and capital repairs. Documented examples from Covington, Frankfort, Ashland, Paducah, Louisville, and other systems show that funding needs vary widely by community and are often addressed through a combination of federal appropriations, state assistance, local budgets, and project-specific grants or financing.

Operation and Maintenance

Levees are stationary earthen embankments that require upkeep and maintenance, providing protection against static water loading, and need to be well maintained to perform well. In addition, some portions of the state's systems require active mechanical operations of pumps and gates, for example, which need to be tested periodically to keep them in good working order. All levees require regular maintenance and periodic repairs, replacements, or upgrades to retain their level of protection. These responsibilities typically include routine inspections, periodic testing of mechanical components, and documentation to ensure systems perform as intended during flood events.

The USACE designed and built most of Kentucky's levee systems, then in many cases turned over operations and maintenance to a local sponsor. A local sponsor is usually a legally constituted public entity—such as a city, town, public utility, or the state itself—that will operate and maintain the levee to ensure it will function as designed to prevent or mitigate flood damage. Local sponsors are responsible for operating mechanical or electrical systems regularly to make sure they are in working order, inspecting the levees on a regular schedule, and keeping records of all operations and maintenance.

Local sponsors share some of this data with USACE, who maintains detailed records of levee systems nationwide in the National Levee Database. The NLD was created and is maintained by USACE as an authoritative resource for information about levees, including data on inspections, flood plain management, and risk assessment.

Public Safety, Resilience, and Innovation

Kentucky's 35 levees protect more than 290,000 people based on information provided in the NLD. These systems are protecting more than 125,000 buildings, and $36 billion in property, including hospitals, universities, major manufacturing facilities, homes, treatment plants, power plants, and densely populated metropolitan areas. With significant flooding events along the Ohio River in 2005, 2008, 2011, 2015, 2018, and 2025, the Commonwealth's network of levee systems performed well, and no breach occurred. In terms of public safety, levees reduce flood risk but do not eliminate it, and all levee systems carry residual risk from overtopping, seepage, or structural failure.

Figure 5.

Louisville's temporary flood protection measures during the 2025 flood event (Louisville and Jefferson County Metropolitan Sewer District)



2026 Kentucky Infrastructure Report Card: LEVEES

As extreme rainfall events with increased intensities become more frequent, flooding remains a significant public concern, and levees play a key role in keeping Kentucky's citizens safe from the devastating effects floods can cause. Additionally, while owners and operators rated flood action preparedness strong on a scale from 1 to 5, they noted challenges related to public risk awareness, emergency planning complexity, and maintaining community support for flood protection investments.

Flood awareness and emergency preparedness play a key role in risk management for individuals and communities living behind levees. Levees participating in federal programs are typically required to maintain emergency preparedness measures, including emergency action plans (EAP). The size of the community within the leveed area will dictate the complexity of the EAP, meaning EAPs for larger, more densely populated urban communities, such as Louisville, will require more detailed evacuation route mapping and a broader emergency contact flowchart than EAPs of small communities. In addition, communities located behind levees may also face varying levels of vulnerability based on economic and social factors, which can influence their ability to prepare for and respond to flood events.

Advances in flood modeling, monitoring systems, and data collection are also improving the ability of levee sponsors to assess risk and enhance emergency response planning.

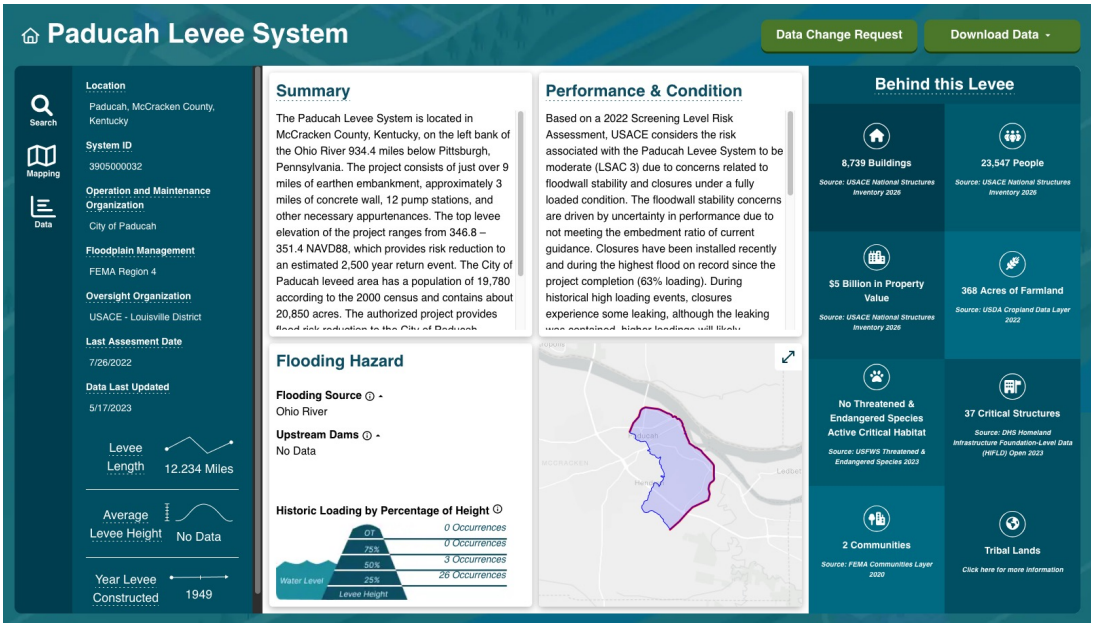


Figure 6.

The National Levee Database is a dynamic, searchable inventory of information about levees, including the Paducah Levee System (USACE)

2026 Kentucky Infrastructure Report Card: LEVEES

Recommendations to Raise the Grade

The Kentucky section of the American Society of Civil Engineers (ASCE) recommends the following measures be taken for the levee infrastructure of the Commonwealth:

- **Increase investment** in rehabilitation and replacement of aging levee infrastructure.
- **Develop sustainable and dedicated funding mechanisms** for levee maintenance and improvements.
- **Establish a statewide levee sponsor program** to encourage sharing of emergency plans, education, best practices, trainings, and inspection data, allowing Kentucky levee owners/operators access to a central repository of information.
- **Encourage all levee owners to have emergency action plans** in place and to keep them up to date.
- **Explore a program for non-federal levees to require safety inspections** and have EAPs in place.
- **Invest in workforce development** to support levee safety and operations.
- **Encourage all non-federal levee owners and operators to apply for the non-federal levee screenings** conducted through USACE as part of the National Levee Safety Program.
- **Encourage communities and levee owners and operators and/or sponsors to increase public outreach** to educate communities about how important levees are to protect lives.

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ROADS

2026 Kentucky Infrastructure Report Card

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Executive Summary

Kentucky's roadway system is a critical component of the Commonwealth's economy, supporting the mobility of millions of residents and the movement of goods across the state. Approximately two million employed people in Kentucky in industries such as tourism, retail, agriculture, and manufacturing are completely dependent on the state's road network. The network includes approximately 167,000 lane miles of pavement and facilitates nearly 42 billion vehicle miles traveled (VMT) annually. Nearly one-third of Kentucky's major roads are in poor or mediocre condition, increasing costs for motorists and placing pressure on limited transportation funding. Traffic safety is also a concern, as the state's fatality rate per VMT remains higher than the national average. Kentucky continues to invest in its roadway network while using asset management, data-driven planning, and innovative technologies to prioritize projects and improve system performance. However, rising construction costs, staffing constraints, and the growing impacts of severe weather further complicate long-term infrastructure management. Addressing Kentucky's roadway conditions, safety, and long-term funding challenges will require sustained investment and strategic prioritization to maintain a safe, reliable, and resilient roadway system.



Figure 1.
U.S. 460 Corridor in Pike County (Neil Wicker Aerial Photography)

Background

In Kentucky about 75% of residents aged 16 and older are licensed—reflecting the Commonwealth's strong reliance on personal vehicles. Much of the state is rural and low density; only about one in four Kentuckians live in the five largest metropolitan areas, while the majority live in rural areas and depend on personal vehicles for daily travel. Responsibility for the roadway system is shared among the Kentucky Transportation Cabinet (KYTC), counties, and municipalities, with KYTC overseeing the state highway system and statewide transportation planning.

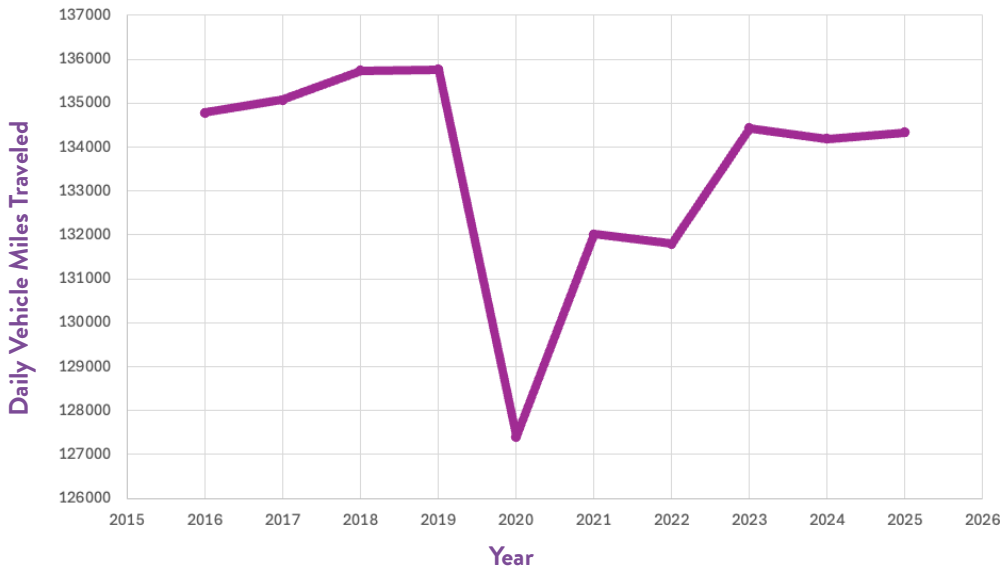
Condition and Capacity

Kentucky's public roadway network is comprised of about 167,000 lane miles, which ranks eighth largest nationally. In 2024, vehicles traveled almost 42 billion total miles on Kentucky roads.

The number of VMT in the Commonwealth has been flat since a peak in 2019. This is primarily attributed to the COVID-19 pandemic, which caused daily vehicle miles traveled (DVMT) to fall drastically starting in 2020. By the end of 2024, however, DVMT had recovered to about 99% of the 2019 peak and appears to be back on its normal growth trend. Figure 2 depicts DVMT in Kentucky since 2016.

Figure 2.

Summary of Kentucky Daily Vehicle Miles Traveled in Thousands (DVMT), 2016–2025 (KYTC)



Traffic patterns have shifted nationally since the pandemic. Starting in March 2020, many commuters were able to work from home, a trend that then largely transitioned to a hybrid model, with employees having the freedom to manage their commute and avoid peak-hour rushes. By 2024, however, morning and afternoon rush hours returned to pre-pandemic levels, with midday and weekday congestion increasing over 2019. While congestion isn't the primary challenge in Kentucky's rural areas, it is an important topic in the state's urban metro areas.

The peak congestion area in the state is the Louisville-Jefferson County Metro. Louisville averaged 54 annual hours of delay and 19 gallons of excess fuel consumed per commuter due to congestion in 2024. These figures rank 48th and 38th, respectively, among the areas studied. For reference with other cities in the same region and population study group, Memphis, Tennessee, averaged 58 annual hours of delay and 22 gallons of excess fuel per commuter, and Cincinnati, Ohio, averaged 50 hours and 16 gallons.

In addition to monitoring traffic volume, KYTC also assesses the condition of Kentucky's roads through the Maintenance Rating Program. KYTC has established performance goals for its pavement and bridges. The desired state of good repair (SOGR) is generally defined as the condition at which the assets are performing at an acceptable level of at least 92% in good or fair condition. The chart below indicates a 20%+ gap from this goal.

Figure 3.

Historic Trends for Mile Point (MP) Pavement Conditions (KYTC)



Kentucky's performance score for all roads in 2023 was 80.4, above the goal of 80. KYTC assesses the condition of the state's roads each year and assigns a target performance level score, on a scale of 1 to 100. In addition to roadway features such as potholes, this score also addresses items like shoulder drop-offs, signage, striping, guardrails, and trees within the right of way. The performance score for all roads in 2023 was 80.4, which is above the goal of 80.

However, Kentucky's overall road condition has declined since 2022. In addition, the Commonwealth has received generally lower scores for state and rural routes versus the interstate and national highway system, which is likely due to the more consistent funding, monitoring, and preservation for federally maintained roads.

2026 Kentucky Infrastructure Report Card: ROADS

According to the national transportation research group TRIP, which focuses primarily on pavement condition, as of 2025, a total of 29% of Kentucky's major roads are in poor or mediocre condition, costing Kentucky motorists an estimated $1.7 billion per year, or $558 per driver—less than the national average of $725 per driver. These conditions also affect Kentucky's broader economy, as approximately 907,000 full-time jobs depend on the reliability of the state's road network. While the state is still meeting its annual roadside maintenance scores, the trend is in decline and the national report still shows a large portion of pavement in poor condition.

Operation and Maintenance

Operation and maintenance of Kentucky's roads are a shared responsibility. As shown in Figure 4, counties are responsible for the largest share of roads in the Commonwealth, at about 48%, while KYTC manages about 38%. A significant portion of the network is also maintained by cities and other local municipalities. The county-heavy responsibility highlights how rural and local governments play a critical role in operating and maintaining Kentucky's roadway network.

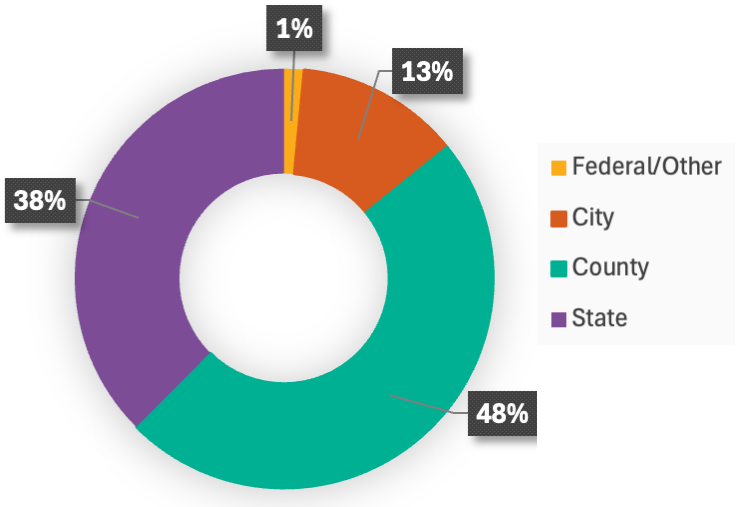


Figure 4.
Oversight of Kentucky Road Centerline Miles by Agency (KYTC)

During the winter months, roads and highways are generally maintained with salt treatment in a timely fashion. Priority routes are either pre-treated or treated within one hour of inclement weather. Throughout the snow season, which runs from November to March, highway response teams across Kentucky serve weekly on-call rotations. The teams monitor weather reports when snow is in the forecast and determine when to activate the state's arsenal of snow-fighting equipment, including more than 1,000 snowplows.

For roads maintained by the Commonwealth, KYTC has expanded its pavement preventive-maintenance program each year, increasing both its scope and funding to provide more options for addressing pavement needs.

One increasingly disruptive issue for operation and maintenance is extreme weather events. When the cabinet experiences any shortfall in maintenance funding due to extreme weather response or other emergencies, funds are diverted from construction funding to meet these

extraordinary circumstances. With increasingly severe and frequent weather events, this diversion of funds may slow progress on those needed construction projects and severely hinder the state's ability to address long-term infrastructure needs.

One additional area that is a particular challenge to the operation and maintenance of Kentucky roadways is staffing. KYTC struggles to maintain professional, paraprofessional, and skilled staffing sufficient to perform the duties needed. Contracting work has increased over the last several years, which is expected to continue.

Funding

Kentucky's roadway system relies on a blend of federal, state, and local revenue sources. At the state level, regular operation and maintenance programs are funded through the legislatively approved state maintenance budget, which is part of the approved transportation budget, with motor fuels taxes forming the core of the Kentucky Road Fund. Roughly half of all state roadway funding comes from these taxes, which are paid directly by drivers at the pump. Kentucky's gas tax of 26.4 cents per gallon is approximately 6.2 cents below the national average state gas tax of 32 cents per gallon, contributing to lower fuel taxes but also reducing the revenue available for state and local transportation infrastructure. The gas tax is subject to change annually but that can be suspended by legislation or emergency executive order by the governor. Only 44.4% of this revenue is returned to local governments to support city and county road maintenance.

Federal funding plays a significant role in Kentucky's transportation budget. The Infrastructure Investment and Jobs Act of 2021 (IIJA) increased Kentucky's federal formula highway funding to an average of $916.2 million annually, compared to the previous authorization law's average of $721.8 million. This represents an increase of approximately 27%. Despite these recent increases in funding, inflation and post-pandemic construction cost escalation have reduced the purchasing power of both state and federal dollars.

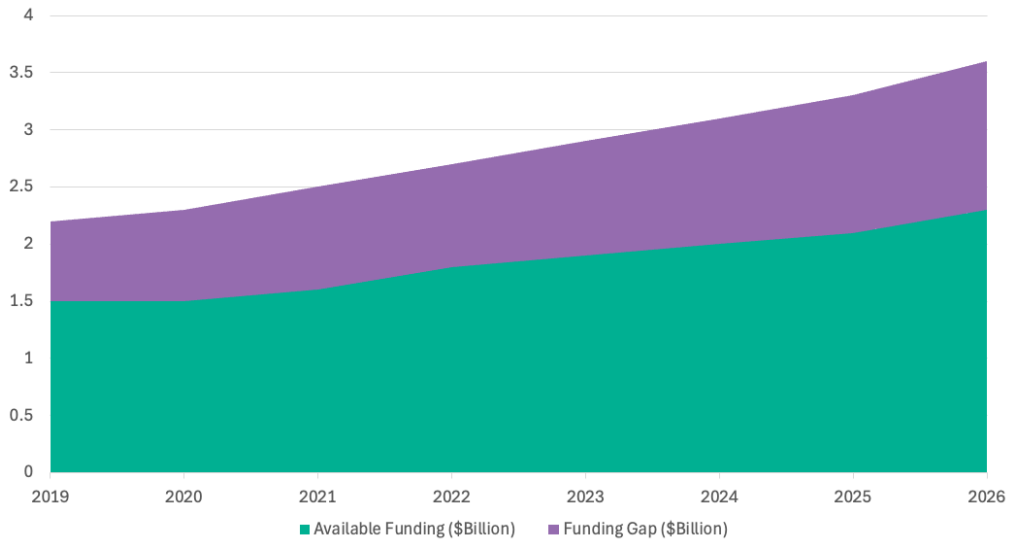
State and local governments contribute to the funding of roads through programs such as the Local Assistance Road Program, which provides up to $500,000 per project and requires a variable local funding match based on population and economic growth trends, as well as the County Priority Projects Program. Local governments also invest in roads using Road Fund revenues that are distributed through a legislative formula.

The Kentucky General Assembly appropriated $20 million in Fiscal Year (FY) 2025 and $20 million in FY 2026 to support county and city roadway improvements. These funds help address a backlog of more than $30 million in unfunded local project requests identified by KYTC.

KYTC has indicated that current funding levels do not meet the long-term needs of the state's roadway system.

Figure 5.

Estimated Need vs. Available Funding (FY 2019–FY 2026) (KYTC Long-Range Statewide Transportation Plan)



Although the state receives substantial support from federal and state sources, revenue growth has remained flat, while construction and maintenance costs have risen sharply. The cabinet's revenue forecasts assume flat state and federal funding from FY 2026 through FY 2030, which limits the ability to expand or accelerate roadway improvements. Short-term funding capacity has strengthened due to the 2024 through 2026 Biennium Highway Construction Plan, which provides nearly $450 million in General Fund support for local road improvements. This allows other transportation revenues to be directed toward state highway needs. Kentucky is also actively pursuing federal funding for major initiatives, including the Brent Spence Bridge Corridor Project, which forms a vital link between Kentucky and Ohio.

Kentucky uses a data-driven process for scoring and prioritizing highway projects to determine how limited transportation funds should be invested. The Strategic Highway Investment Formula for Tomorrow (SHIFT) scoring helps identify the most critical projects, and KYTC notes that many needs remain unfunded even after prioritization. Additional considerations, such as previous commitments, community impacts, and new federal priorities, must also be balanced within a constrained budget.

Future Need

KYTC's long-range planning documents highlight a growing gap between available transportation funding and Kentucky's long-term infrastructure needs. Although long-range planning helps advance critical projects, the state continues to face a substantial backlog of pavement rehabilitation, safety improvements, and corridor modernization efforts. Addressing this shortfall will require strategic project prioritization, exploration of new revenue sources, and continued federal support to better meet Kentucky's transportation demands.

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Kentucky maintains one of the nation's largest state-owned transportation systems, including more than 63,000 lane-miles of pavement. Despite significant annual investments from federal and state transportation programs, KYTC has identified a growing gap between available revenues. Although KYTC does not currently publish a single statewide dollar estimate for deferred roadway maintenance, the backlog consists primarily of pavement rehabilitation and reconstruction projects, drainage, and roadside infrastructure repairs, safety improvements, and other maintenance activities that have been delayed due to funding constraints. Recent highway planning efforts have allocated approximately $600 million annually toward pavement and bridge repairs.

In addition to deferred maintenance, Kentucky faces significant unmet modernization needs that extend beyond preserving existing infrastructure. These needs include corridor modernization projects, highway widening and capacity improvements, interchange upgrades, freight mobility enhancements, intelligent transportation systems (ITS), traffic management technologies, and safety improvements designed to reduce crashes and improve system reliability. Many of these projects are critical to supporting economic development, freight movement, regional connectivity, and quality of life.

Kentucky's transportation system represents a substantial public asset that requires ongoing investment to preserve, improve, and modernize. While the Commonwealth continues to dedicate significant resources toward maintaining its roads, long-range planning documents indicate that current revenues are insufficient to meet all identified infrastructure needs.

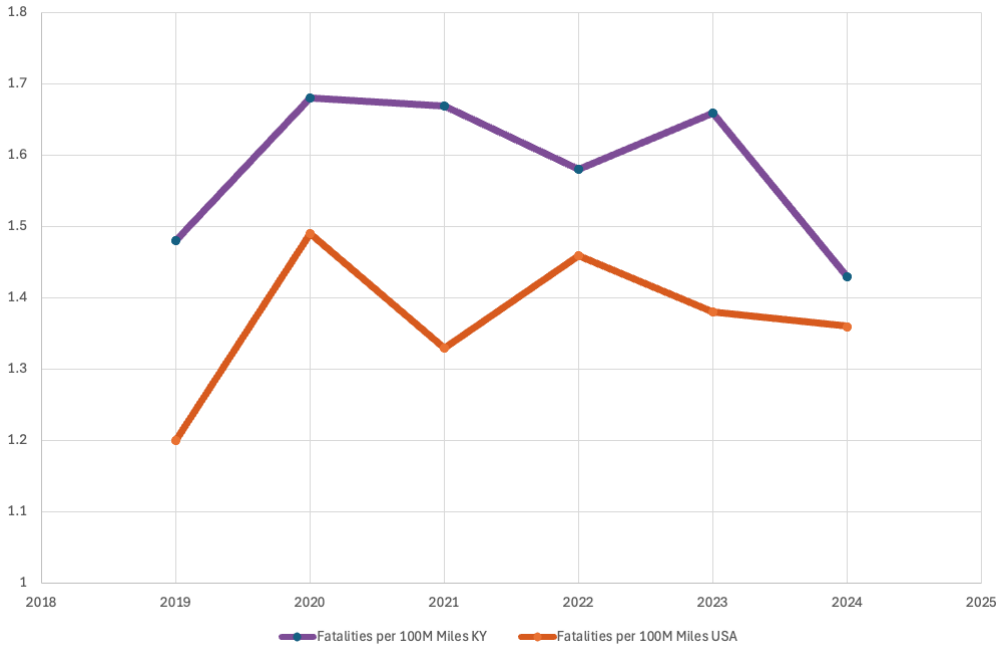
Public Safety

Roadway safety and a reliable road network are fundamental to protecting Kentucky's residents, visitors, and communities. In the period between 2019 and 2024, there was an average of 39,994 traffic fatalities per year on public roads nationally. In Kentucky, that average was 767 traffic fatalities, accounting for 1.9% of fatalities nationally. Over the same six-year period, Kentucky has averaged 1.61 fatalities per 100 million VMT versus the national average of 1.27 fatalities per 100 million VMT, although 2024 did see a reduction toward the national average. The year-to-year comparison of fatalities per 100 million VMT is plotted in Figure 6.

Kentucky's 2024 traffic fatality rate of 1.45 fatalities per 100 million VMT is the ninth highest in the nation, higher than the national rate of 1.2 fatalities per 100 million VMT. The fatality rate on rural, non-interstate roads is 2.57 per 100 million VMT, ranking 8th nationally. The state averaged 15.4 pedestrian deaths annually between 2020 and 2024, equating to 0.34 deaths per 100,000 residents, placing the Commonwealth 5th nationally and significantly higher than their neighbors, Indiana, Ohio, and West Virginia, which all average 0.07 deaths per 100,000 residents. Kentucky's higher fatality rate is driven by a combination of terrain, exposure to high speed rural driving, lower seatbelt use, more alcohol-related crashes, and longer emergency response times.

Figure 6.

Fatalities per 100 Million Vehicle Miles Traveled (2019-2024)(KYTC)



There are some signs of improvement though. In Kentucky, from 2021 to 2024, the number of traffic fatalities decreased 11%, and the fatality rate per 100 million VMT decreased 13%. Though recent investments may be showing progress, traffic fatalities per year in Kentucky increased 6% and the fatality rate per 100 million VMT increased 4% during the period from 2014 to 2024.

Based on the traffic crash cost methodology from the National Highway Traffic Safety Administration (NHTSA), TRIP estimates that fatal and serious traffic crashes in Kentucky in 2024 caused a total of $29.7 billion in the value of societal harm, which includes $7.4 billion in economic costs and $22.3 billion in quality-of-life costs.

Kentucky has made efforts to reduce fatalities for drivers and vulnerable road users. The KYTC SAFERoad Solutions initiative provides guidance on efficient designs aimed at increasing safety. Significant expansion of the use of roundabouts has occurred in the state since 2019, even including use of the turbo roundabout design in Bardstown, Kentucky, which is currently being constructed. The turbo roundabout reduces conflicts using spiral shaped lanes and raised dividers to force drivers to choose their lane before they enter and follow it until they exit, eliminating lane changes. Other intersection improvement strategies have also been implemented with great success, including Reduced Conflict U-Turns (RCUTs). RCUTs eliminate left-turn and through movements from minor roads by directing traffic right on the main road to a designated, protected U-turn.

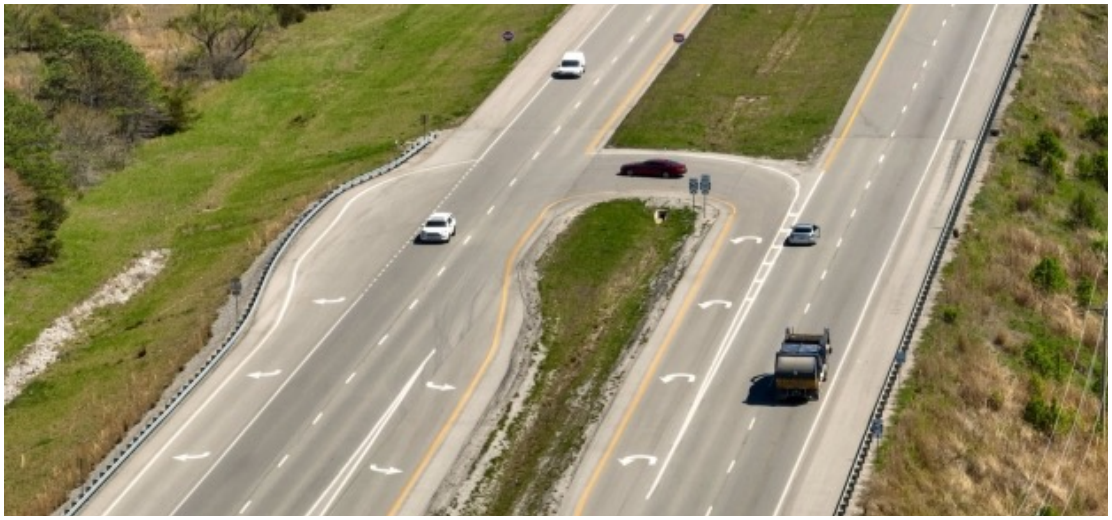
Figure 7.

Roundabout on Graves Road in Boone County (KYTC)



Figure 8.

Reduced Conflict U-Turn on KY 80/KY 1535 in Laurel County (KYTC)



Initiatives like the federal Safe Streets and Roads for All (SS4A) Grant Program have provided $5 billion between 2022 to 2026 to support nationwide infrastructure investment targeted at increasing safety in Kentucky communities. One program directly funded by SS4A is Vision Zero in Louisville, which aims to eliminate traffic fatalities by 2050. This program focuses on two-way conversions of the city's highest risk corridors in the downtown area and rightsizing of roads less than 20,000 Average Daily Traffic (ADT). These measures serve mainly to reduce travel speeds.

Resilience

Planning, research, and targeted investment strategies have strengthened Kentucky's road system throughout the years. KYTC's Transportation Resilience Improvement Plan evaluates the vulnerability of roadways to hazards such as flooding, landslides, and increasingly severe weather events. The cabinet has conducted pavement sensitivity analyses using projected climate data to evaluate how increased temperatures and changing precipitation patterns may affect pavement performance and service life. KYTC has also participated in research focused on transportation asset management, resilience, and the use of extreme-weather indicators to improve infrastructure planning and risk management practices. These activities support the development of resilience-based project screening and prioritization methodologies.

The Kentucky Transportation Center's (KTC) research on resilient systems contributes additional insight by analyzing how weather events affect infrastructure performance. This research helps the cabinet predict damage, improve routing during emergencies, and select materials and construction practices that enhance long-term durability. These efforts support the system's ability to maintain essential mobility during emergencies and recover quickly when disruptions occur.

Despite these efforts, Kentucky continues to experience significant weather-related impacts. KYTC reports approximately 200 to 300 emergency repair sites annually, with emergency repair costs averaging between $25 million and $35 million per year, underscoring the ongoing need for resilience investments throughout the transportation system.

Innovation

Kentucky has established itself as a leader in roadway infrastructure innovation through the collaborative efforts of the KYTC and the KTC at the University of Kentucky. The Commonwealth has embraced advanced technologies that improve project planning, design, construction, and long-term asset management. The adoption of Digital Project Delivery (DPD), Building Information Modeling (BIM), mobile LiDAR, drone surveying, and Ground Penetrating Radar (GPR) has enhanced the accuracy of roadway design, accelerated data collection, and enabled more efficient evaluation of pavement conditions while minimizing disruptions to traffic.

Kentucky has also advanced the use of innovative roadway materials and preservation strategies to improve pavement performance and reduce lifecycle costs. Research conducted by KTC has supported the development of durable asphalt mixtures with greater resistance to rutting and cracking, as well as preventive maintenance techniques such as thin overlays, crack sealing, and surface treatments that extend pavement service life. These data-driven approaches allow the state to maximize infrastructure investments while improving roadway durability and reducing future rehabilitation needs.

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In addition to technological and material advancements, Kentucky has modernized roadway project delivery through digital construction management, enhanced project coordination, and data-driven decision-making. The state has also implemented proven roadway safety innovations, including high-friction surface treatments, centerline and edge-line rumble strips, and Intelligent Transportation Systems that improve traffic operations and reduce crashes. By integrating research, technology, and practical implementation, Kentucky continues to serve as a model for innovative, cost-effective, and resilient roadway infrastructure development.

Recent highway investments across the state have also strengthened regional connectivity and supported economic development. In Western Kentucky, a 38-mile section of the Wendell Ford Western Kentucky Parkway has been designated the Future I-569 Corridor, signaling planned upgrades and reinforcing the importance of interstate access for the logistics, manufacturing, and distribution industries. In Eastern Kentucky, the completion of the new U.S. Route 460 corridors in Pike County represents one of the region's largest recent transportation investments, providing a modern four-lane highway with multiple bridges and interchanges that improve safety and connectivity between Kentucky and Virginia. Together, these corridor improvements enhance freight mobility, reduce travel times, and support economic development opportunities in regions that have historically lacked direct interstate access.

Recommendations to Raise the Grade

- **Increase and stabilize transportation funding**. Explore sustainable revenue options and maintain strong federal partnerships to close the growing gap between available funding and Kentucky's long-term roadway investment needs.
- **Continue strengthening local roadway funding and partnerships**. Provide additional resources and technical support for counties and municipalities, which maintain a large portion of Kentucky's roadway network and face growing maintenance backlogs.
- **Prioritize pavement preservation and rehabilitation**. Expand preventive maintenance programs and rehabilitation projects to address deteriorating pavement conditions and reduce long-term reconstruction costs.
- **Improve roadway safety through proven design strategies**. Continue expanding safety treatments such as roundabouts, Reduced Conflict U-Turns (RCUTs), rumble strips, and other low-cost safety improvements that reduce fatal and serious injury crashes.
- **Strengthen local roadway funding and partnerships**. Provide additional resources and technical support for counties and municipalities, which maintain a large portion of Kentucky's roadway network and face growing maintenance backlogs.
- **Invest in resilient infrastructure and hazard mitigation**. Prioritize improvements that reduce vulnerability to flooding, landslides, severe storms, and other extreme weather events to ensure reliable transportation during emergencies.

- **Address workforce and operational challenges**. Support recruitment and retention of skilled transportation professionals while strategically using contracting and modern project delivery methods to maintain system performance.
- **Expand data-driven planning and innovative technologies**. Continue leveraging tools, such as the SHIFT prioritization process, advanced modeling, and intelligent transportation systems to ensure investments produce the greatest safety and mobility benefits.

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2026 Kentucky Infrastructure Report Card

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Executive Summary

Kentucky generates approximately 5.6 million tons of municipal solid waste each year, or about 6.7 pounds per person per day, which is well above the national average. While the state has more than 40 years of landfill capacity and universal access to waste collection across all 120 counties, recycling rates have declined from 31.7% in 2019 to 24.14% in 2024, indicating growing reliance on landfills. The solid waste system is largely self-funded through tipping and permitting fees, generating an estimated $254 million annually, but funding remains insufficient to address long-term needs such as landfill remediation and waste diversion. The last time Kentucky updated the solid waste permitting fees was 2010. More than 500 orphan landfills remain to be evaluated or closed across the state, posing potential ongoing environmental and public health concerns. Increasingly frequent severe weather events are also placing added strain on debris management systems. Strengthening recycling programs, investing in legacy waste cleanup, and supporting workforce development will be critical to improving system sustainability and resilience.



Figure 1.

Landfill Transfer Station, Henderson, Kentucky (City of Henderson, Kentucky)

Background

Kentucky's solid waste system manages approximately 5.6 million tons of municipal solid waste (MSW) annually through a network of over 130 permitted landfills and universal collection services available in all 120 counties. Oversight is provided by the Division of Waste Management (DWM) within the Energy and Environment Cabinet, with coordination between state and local governments to ensure proper collection, disposal, and recycling. Solid waste management in Kentucky is primarily funded through user and operator fees, including permitting and landfill tipping fees, with supplemental support from state programs such as the Kentucky Pride Fund.

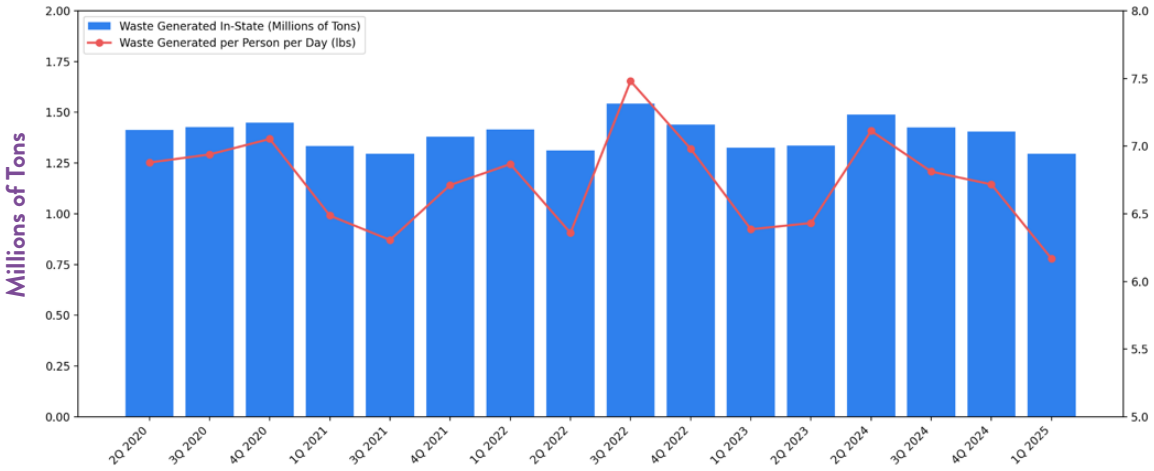
Condition and Capacity

In Kentucky, the Solid Waste Branch (SWB), within the DWM, is responsible for the solid waste (non-hazardous) program. The DWM Recycling and Local Assistance Branch coordinates with each county to ensure that solid waste is managed through an integrated system of waste collection, reduction, and recycling. All 120 Kentucky counties offer a system of universal waste collection, which means that collection service is available to households either through curbside collection, drop-off collection centers, or transfer stations.

Figure 2 shows that the amount of solid waste generated and landfilled in Kentucky averaged 1.4 million tons per quarter (5.6 million tons per year) over the last five years. The amount of solid waste generated in Kentucky averaged 6.7 pounds per person per day over the last five years compared with a national average of 4.9 pounds per person per day in 2018. This figure shows that the amount of solid waste generated in pounds per person per day in Kentucky has decreased by about 1 pound over the last four reported quarters.

Figure 2.

Summary of Kentucky Solid Waste Metrics (Division of Waste Management)



There are over 130 permitted landfills in Kentucky that receive MSW, which includes everyday discarded materials such as paper, plastics, food waste, and other common items discarded by households, businesses, and institutions. These landfills are categorized as either: (a) contained, (b) construction/demolition debris (CDD), or (c) residual. Of these facilities, approximately 20% are contained, which means they have a bottom liner system, which is designed to protect groundwater. The total remaining airspace capacity of these landfills is approximately 290 million cubic yards, which exceeds 40 years of solid waste disposal capacity based on 1.4 million tons of waste generated per quarter and an average compaction rate of 1,700 pounds per cubic yard. This total capacity is evenly distributed statewide. Three landfills have a remaining capacity of 0 to 5 years, and their locations are spread across north, central, and western Kentucky. The permitted landfills are owned by private entities, publicly traded companies, or municipalities.

There are around 75 facilities that process recycling materials, including material recovery facilities (MRFs), in 44 of Kentucky's 120 counties. Kentucky's recycling rate for 2024 was 24.14%, which was a decrease from 31.7% in 2019, as shown in Figure 3. This represents a lower recycling rate than the national recycling rate of 32%. This could possibly be due to the unfortunate closure of a few recycling centers throughout the state. Smaller recycling operations are particularly sensitive to decreased revenue when commodity prices are low, often resulting in scaling back or closing operations.

Though some states burn a portion of MSW to generate energy, there is no municipal solid waste being burned in Kentucky, although several landfills use landfill gas for energy conversion.

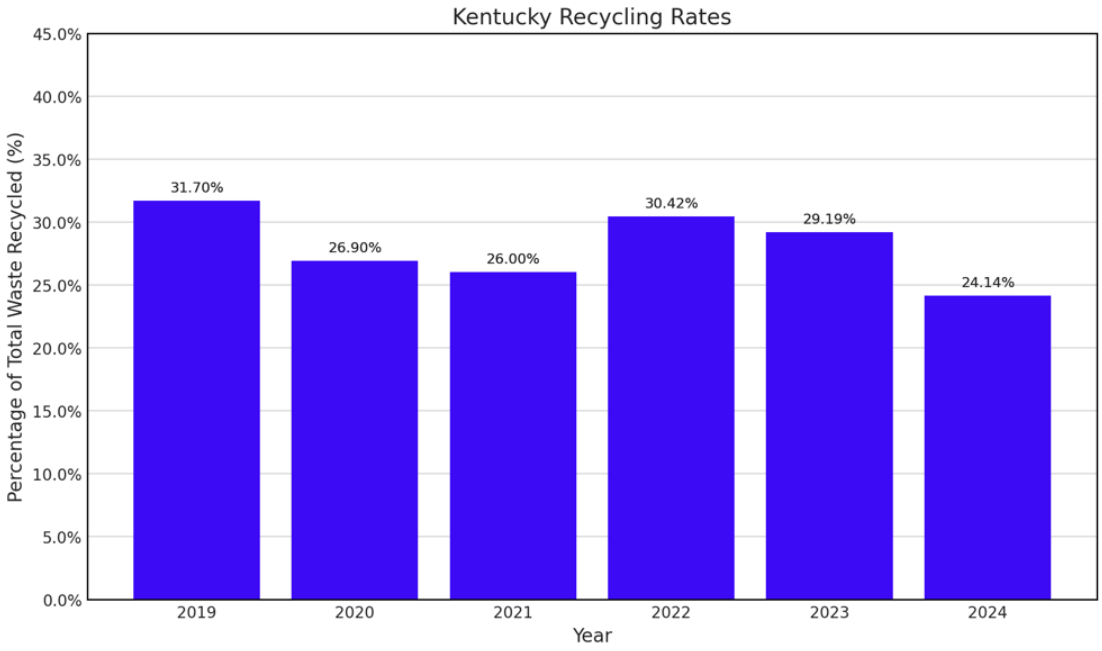


Figure 3.

Kentucky Recycling Rates (Division of Waste Management)

Funding

Because permitted Kentucky landfills are either privately or publicly owned, they are self-funded through waste collection fees. Landfills charge a tipping fee, which is the charge levied upon a given quantity of waste when it is emptied or "tipped" out of the truck. The South Central Regional Average tipping fee, which includes Kentucky, is approximately $45.25 per ton. Based on an average 5.6 million tons of MSW per year sent to landfills in Kentucky, the total tipping fees would be approximately $253 million. All of this revenue goes directly to the operations and maintenance of the individual landfills.

The Kentucky Pride Fund is supported by an environmental remediation fee (ERF) of $1.75 per ton of waste disposed of in Kentucky landfills. This money is used for the closure of historic landfills, recycling grants, composting grants, household hazardous waste management (including e-scrap) grants, and remediation of illegal open dumps. Additionally, this fund receives $5 million annually from the Kentucky Transportation Cabinet, specifically for distribution to counties and incorporated cities (that have a solid waste ordinance or a solid waste contract with a hauler) for litter abatement activities.

Counties use Kentucky Pride Fund recycling grant funding to upgrade their recycling equipment (such as optical sorters) to increase the market value and boost the capture rate of recyclable materials.

The Solid Waste Branch program facilities paid $767,850 in fiscal year 2025 fees. Of that, $189,350 was collected for 49 solid waste and special waste permitting actions, and $578,500 was paid for the annual recurring fee for Coal Combustion Residual facilities, Merchant Electric Generating Facilities (MEGF), and solid waste facilities. Compliance for payment is 100% for both types of non-ERF fees. These fees fund the review and processing of permit applications, registrations, technical reports, and groundwater data. The last time Kentucky updated the solid waste permitting fees was 2010.

A $2 per tire fee is deposited into the Waste Tire Trust Fund, which is used for waste tire collection events, waste tire management grants to counties, crumb rubber, and rubber-modified asphalt grants, in order to facilitate market development for the use of waste tires and to clean up waste tires at mismanaged sites.

The Environmental Protection Agency (EPA) recently awarded a grant under the Solid Waste Infrastructure for Recycling Grants for Political Subdivisions Grant Program to DWM to develop a sustainable materials management plan. The plan will identify ways that the state can increase landfill diversion and recycling rates, access to and participation in recycling programs across Kentucky, and the volume and quality of materials being recycled.

Additional funding could allow Kentucky to implement the recommendations for improvement outlined in the 2025 Kentucky Solid Waste Planning and Management Report.

Despite current funding sources, additional investment will be needed to address aging facilities, increase recycling rates, and manage legacy waste sites.

Future Need

Kentucky's solid waste system faces growing challenges related to waste reduction, recycling participation, and the long-term management of legacy waste sites. Each of Kentucky's 120 counties is required to file five-year solid waste management plans with the DWM, including capacity assurance and waste projections for 20 years. DWM also conducts annual solid waste workshops and provides training for solid waste coordinators and other local officials involved in managing solid waste.

With over 500 orphan landfills (abandoned waste sites) in Kentucky that have not been evaluated, additional funding and staffing are needed to inspect and monitor sites that have been repaired by the Closure Section of DWM. Under current funding levels, the Commonwealth is only able to address a limited number of projects each year through the Historic Landfills Program. Since 2002, around 100 historic landfills have been closed in the program. With the current funding levels, it will take another 100 years to address the 500 orphan landfills that have not been evaluated.

In addition to traditional solid waste responsibilities, the DWM Solid Waste Branch has also been tasked with enforcing new regulations requiring decommissioning plans and financial assurances for large solar projects.

Increasing waste diversion through recycling and composting will be critical to reducing landfill demand and improving long-term sustainability. Additional resources and program support will be needed to expand participation and improve material recovery across the Commonwealth.

Beyond long-term waste management needs, Kentucky must also address the impacts of severe weather events on solid waste systems and debris management. Kentucky has experienced multiple catastrophic flooding and tornado events within the last five years. The DWM has supported local communities after these severe weather events by identifying and managing over 80 debris staging sites to expedite cleanup and recovery. As the frequency of these events increases, additional resources will be needed for emergency response and resiliency planning.

Operation and Maintenance

The permitted landfills in Kentucky are operated by private entities, publicly traded companies, or municipalities. Like much of the waste and recycling industry nationwide, Kentucky's solid waste sector faces workforce challenges related to recruitment, retention, and retirement of experienced personnel. Common challenges cited by industry groups include:

- Aging workforce and retirements.
- Competition for CDL drivers from trucking, construction, and logistics sectors.
- Increasing technical requirements for equipment operation and environmental compliance.
- Difficulty attracting younger workers to solid waste careers.
- Tight labor markets in many regions.

The DWM Solid Waste Branch oversees the permitting, regulation, and long-term management of solid waste facilities in Kentucky. This oversight includes reviewing technical applications and reports for all types of landfills, including residential garbage, construction debris, industrial waste, sludge, and special waste such as coal ash. The Solid Waste Branch also issues or denies construction and operation permits and is responsible for the closure and post-closure care of abandoned and historic landfills for which a responsible party has not been identified. Kentucky permitted landfills have specific closure and monitoring requirements to ensure the protection of human health and the environment. Maintaining adequate staffing and technical expertise is essential to support inspections, permitting, and long-term site management.

The Solid Waste Branch implements a Historic Landfills Program, in which "orphan" landfills can be monitored and closed. An orphan landfill is one that may not have been officially closed but stopped accepting waste before 1992, when the EPA put more stringent policies and penalties in place. A total of 110 historic landfills have been closed under the program through construction and remediation projects or by no further action due to intensive site studies.

Public Safety

The primary mission of the DWM is to protect human health and the environment. Solid waste management is essential to this mission, particularly when systems fail or are not properly managed. The Commonwealth currently has statutes and regulations in place to oversee solid waste landfills, and these regulations are in place to address common landfill problems, such as location restrictions, liner requirements, leachate collection and removal systems, groundwater monitoring requirements, and closure and post-closure care. These regulations are designed to prevent contamination of soil and groundwater and reduce risks to nearby communities. In 2026, DWM denied a landfill expansion request from a landfill due to compliance issues with permit requirements.

Resilience and Innovation

Kentucky developed a solid waste reduction and management plan in 2025 to evaluate current solid waste management practices, waste generation trends, infrastructure capacity, diversion rates, and recommendations for improving strategies. The plan identifies opportunities to reduce waste by funding composting programs, implementing advanced sorting technologies at recycling facilities, creating waste-to-energy facilities, and implementing educational programs to promote recycling and waste reduction. These strategies reflect a broader shift toward treating solid waste as a resource rather than a material for disposal. Additional funding would help implement these waste reduction opportunities and other recommendations for improvement outlined in the 2025 Kentucky Solid Waste Planning and Management Report.

In addition, solid waste systems must be resilient to the increasing natural disasters and extreme weather events that Kentucky has experienced over the last five years, including the 2025 flood and tornado events in Eastern and Southeastern Kentucky, which have generated significant debris and required coordinated response efforts. The DWM has supported local communities by identifying and managing over 80 debris staging sites to expedite cleanup and recovery. See Figure 4 for one such site in Knott County. As the frequency and intensity of these events increase, additional planning, funding, and infrastructure improvements will be needed to enhance system resilience and emergency response capabilities.



Figure 4.

Starfire Vegetative Debris Staging, Knott County (Division of Waste Management)

Recommendations to Raise the Grade

- **Increase funding** to fully fund the 2025 Solid Waste Planning and Management Report.
- **Renew and extend the Waste Tire Trust Fund** to maintain critical funding for waste tire collection, recycling, and environmental protection initiatives across the Commonwealth.
- **Increase funding for the Historic Landfills Program** so that more of these sites can be monitored and closed sooner rather than later, which would reduce the health and safety impacts to communities and the environment.
- **Strengthen DWM's workforce** by expanding staff recruitment and retention efforts through targeted outreach, internships, and enhanced employee benefits.
- **Increase waste diversion** through expanded recycling and composting programs, including investment in infrastructure, education, and market development to improve participation and reduce reliance on landfills.

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STORMWATER

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Executive Summary

Kentucky's stormwater infrastructure plays a critical role in managing runoff, protecting water quality, and reducing flood risk. Stormwater services are provided through 109 regulated Municipal Separate Storm Sewer System (MS4) communities, including 15 stormwater utilities serving approximately 1.5 million residents, and numerous unregulated rural areas. However, much of the Commonwealth lacks dedicated funding and comprehensive system oversight. Aging infrastructure, limited condition data, and increasing development pressures are straining system capacity. Stormwater runoff contributes significantly to water quality impairments, with nearly 67% of assessed waterbodies failing to meet at least one of seven designated uses. Kentucky also faces a substantial funding gap, with needs exceeding available resources and average stormwater utility fees below the national benchmark. More frequent extreme weather and continued urbanization are further increasing demands. Sustained investment, improved asset management, and workforce development will be critical to maintaining reliable, resilient stormwater infrastructure.



Figure 1.
Floyds Fork, in the eastern part of Jefferson County (Louisville and Jefferson County Metropolitan Sewer District)

Background

Stormwater runoff is any precipitation, such as rain or melted ice, snow, or sleet, that flows over land or impervious surfaces and does not soak into the ground. This water often carries dirt, chemicals, and trash as it makes its way to creeks, lakes, and rivers. Stormwater infrastructure—such as storm drains, pipes, ditches, canals, channels, and green and gray infrastructure—collects stormwater runoff and transports it to nearby waterways to prevent flooding, reduce pollution, and protect people and property. In Kentucky, stormwater is managed through Kentucky Pollutant Discharge Elimination System (KPDES) permits, which are primarily managed by the Kentucky Energy and Environment Cabinet Division of Water. Stormwater management in Kentucky is guided by federal Clean Water Act requirements and implemented through the KPDES permitting program.

Capacity

Kentucky's stormwater system includes a combination of Environmental Protection Agency (EPA)-regulated MS4 communities, utility-based programs, and legacy infrastructure systems. An MS4 community is a public entity that owns or operates an MS4, which consists of stormwater conveyances that are separate from sanitary sewage systems and discharge to local water bodies. There are 109 MS4 communities in 32 counties across the Commonwealth that are regulated by the MS4 program, as well as universities and the Kentucky Transportation Cabinet (KYTC). This means that 88 of Kentucky's 120 counties are not regulated by the MS4 program. Kentucky has 15 stormwater utilities that serve approximately 1.5 million people. This amount is only about 30% of the state's population, but it covers the Commonwealth's municipalities and urbanized areas.

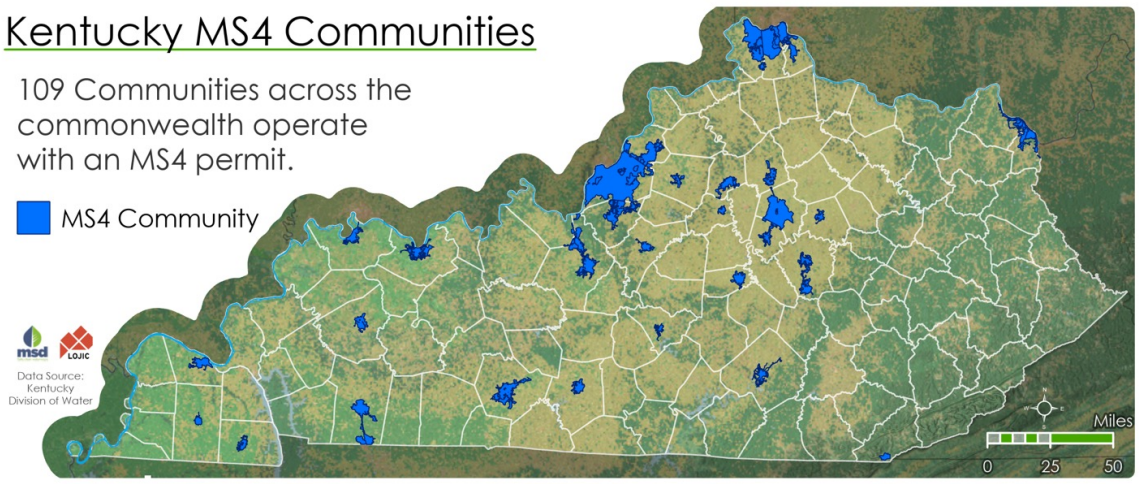


Figure 2.

Kentucky MS4 Communities (Louisville and Jefferson County Metropolitan Sewer District graphic, from Kentucky Division of Water data)

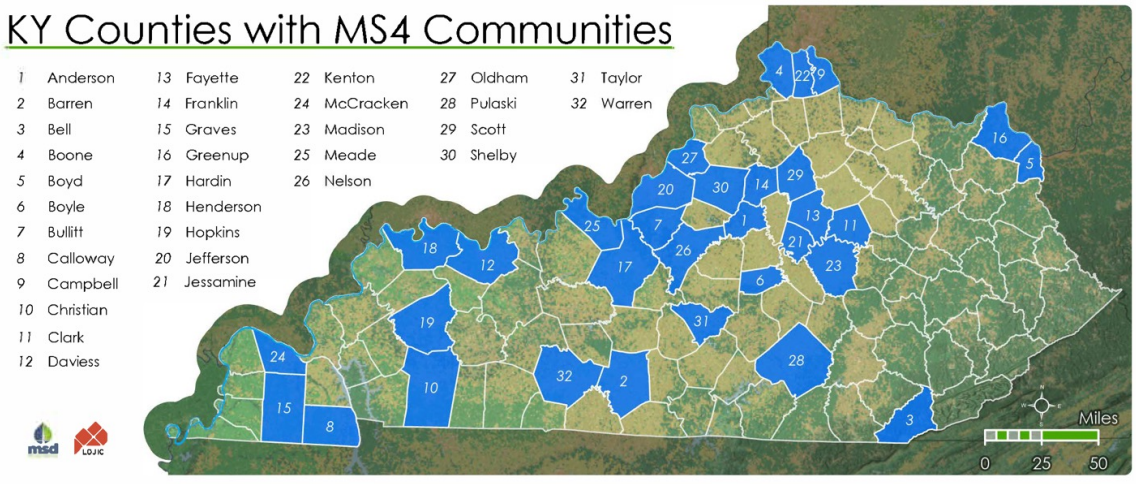


Figure 3.

Kentucky Counties with MS4 Communities (Louisville and Jefferson County Metropolitan Sewer District graphic, from Kentucky Division of Water data)

There are 13 communities in Kentucky that operate and maintain combined sewer systems, which consist of pipes and treatment infrastructure that convey both stormwater and wastewater through the same system. These combined systems were mainly built in older cities before modern sewer design separated sewage from stormwater. During heavy rain, these systems can overflow, which is known as a combined system overflow (CSO). In Kentucky, there are 289 permitted CSO locations where these overflows can occur. To address this, these communities are under federal consent decrees or state consent judgments to complete projects that manage capacity during storms and reduce CSO occurrences.

In addition to traditional "gray" infrastructure systems, such as pipes and concrete ditches, the use of green infrastructure to manage stormwater has been encouraged and implemented throughout the state for decades. The Kentucky Association of Mitigation Managers, in collaboration with state government cabinets and universities, has compiled many resources encouraging the use of nature-based solutions to mitigate flooding impacts.

Condition

Stormwater systems in Kentucky include ditches, pipes, retention/detention basins, channels, and other related structures. In portions of the state with karst topography, the natural underground conveyance channels also take on stormwater flows. Across the state, stormwater systems are often mapped in GIS, but condition assessments have not been completed. This data is not collected at a state level, but rather by individual MS4s and communities. Some stormwater systems are maintained by homeowners associations. Kentucky House Bill 472, state legislation passed in 2024, allows cities to request reimbursement if stormwater infrastructure is being improperly maintained.

Aging of stormwater systems was reported by stormwater organizations as one of the largest challenges to their stormwater program. Understanding current conditions can help utilities proactively replace pipes to keep the system functioning as it should.

Stormwater runoff is a significant contributor to water quality impairments in Kentucky. Of the 3,168 assessment units (lakes, rivers, springs) evaluated in 2024, almost 67% were impaired for at least one use. These uses may be aquatic life, fish consumption, or recreation. Outstanding State Resource Waters, which are designated as needing additional protection due to having significant aesthetic or ecological value, are also assessed. Of the 5,063 parameters identified as causing impairment for a waterbody, nearly 70% have sources associated with stormwater runoff.

Sedimentation, the accumulation of soil and other material carried into waterways, is the second most common cause for water quality impairment. Excess sediment can degrade aquatic ecosystems and impair downstream water bodies by increasing turbidity and transporting pollutants. Sedimentation can also reduce the storage and conveyance capacity of water infrastructure. Sources of sedimentation include land use; construction and other land-disturbing activities; and erosion. A study of the Upper Little River Basin in Western Kentucky found that streambanks and cropland were the largest contributors of sediment to the stream. Streambank erosion can be combatted by creating floodplain access for the stream, planting vegetation along the stream banks, and building structures to stabilize streambanks and redirect flow.

Operation and Maintenance

Operation and maintenance responsibilities for stormwater infrastructure in Kentucky fall under multiple parties. There are two Phase I MS4 communities in Kentucky—Louisville and Jefferson County Metropolitan Sewer District and Lexington-Fayette Urban County Government. In Kentucky, Phase I MS4 communities are large municipalities with populations of 250,000 or more. There are also over 100 Phase II MS4 communities covered under a general permit. Phase II MS4 communities are smaller municipalities with populations of fewer than 100,000 that have been designated by EPA or Kentucky Division of Water (DOW). The MS4 permits in Kentucky specify operation and maintenance requirements for each permittee and are further described in their respective Stormwater Quality Management Plans.

MS4 permits require communities to include features in new developments that help manage stormwater and improve water quality. After construction is complete, many of these stormwater features—such as ponds or other systems designed to treat runoff—must be maintained by the property owners who installed them. Local stormwater programs may enforce maintenance requirements to ensure these privately owned systems continue to function properly.

Kentucky does not have a complete, statewide inventory of its stormwater infrastructure, pointing to a clear need for more robust asset data collection and management. The 2018 revision of the Phase II general permit broadened the storm-sewer mapping requirement, shifting from documenting only major outfalls to creating a full storm-sewer system map that includes catch basins, pipes, ditches, flood-control structures, post-construction water-quality features, and privately owned stormwater treatment features.

A skilled workforce is essential to effective stormwater system operation and maintenance. As infrastructure becomes more complex and regulatory requirements evolve, agencies will require trained engineers, technicians, and maintenance personnel to effectively manage both traditional and green stormwater systems. Many communities, particularly smaller and rural jurisdictions, face challenges in recruiting and retaining qualified staff, which can limit their ability to implement projects and maintain compliance.

Funding and Future Need

Stormwater infrastructure in Kentucky is supported by multiple sources of funding, including stormwater fees, local funding, low-interest loans, and grants. One of the biggest obstacles to improving Kentucky's stormwater infrastructure is funding. Most of the MS4 permits in the state have identified funding challenges as one of their greatest concerns. Since only 13.4% of Kentucky's MS4s have a stormwater utility, they are left to rely on local funding through the city or county's general fund, which is primarily funded through property and occupational taxes, low-interest loans, and grants. Unfortunately, resources are minimal, leaving an approximate $48 million funding gap, according to the MS4 needs assessment survey in 2024.



Figure 4.

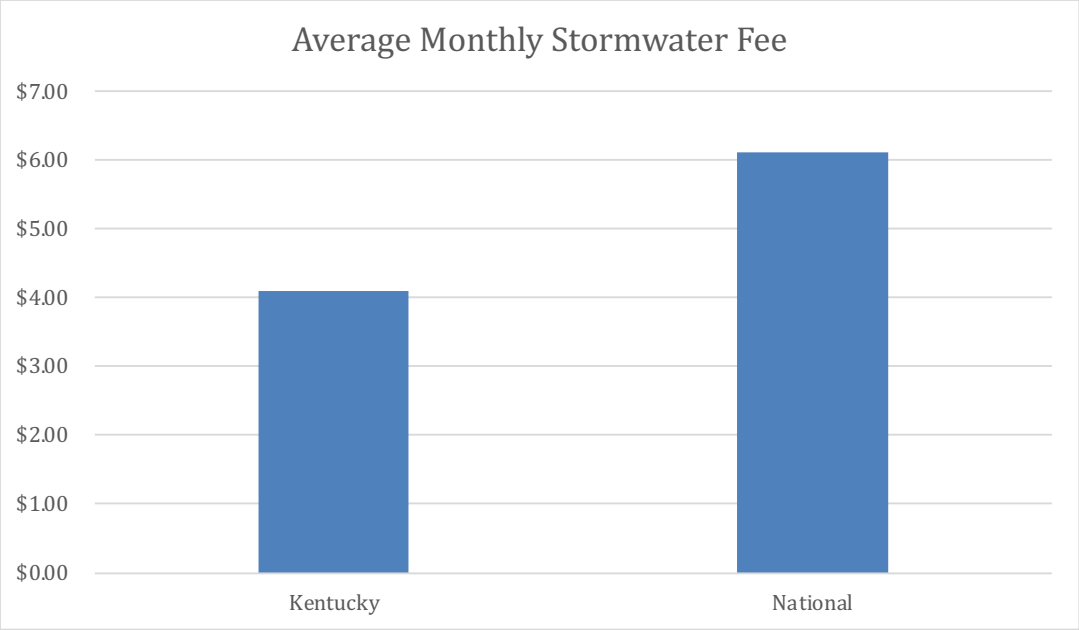
Stream erosion and trash (nonpoint source pollution) illustrate the impacts of urban runoff (Louisville and Jefferson County Metropolitan Sewer District)

According to the EPA's Clean Watersheds Needs Survey 2022 Report, Kentucky reported $48 million in identified stormwater infrastructure needs and $885 million in nonpoint source pollution control needs. These figures reflect both programmatic and capital (hard) infrastructure costs required to meet Clean Water Act obligations, reduce nutrient loading, and mitigate flood risk.

Kentucky faces a significant stormwater infrastructure funding gap, suggesting limited revenue capacity relative to need. While documented needs exceed $48 million for stormwater alone, only 15 of 109 MS4 communities operate stormwater utilities, and the statewide average fee is below the national benchmark, as indicated in Figure 5.

Figure 5.

Average Monthly Stormwater Fee, 2022 (Western Kentucky University)



Notably, larger utilities such as Louisville/Jefferson County generate substantially more revenue due to higher fees and broader service populations. The limited number of stormwater utilities has significant implications, including inconsistent funding statewide, reliance on General Fund allocations, reduced long-term planning certainty, and difficulty building reserves for capital improvements.

Table 1.

Selected Stormwater Utilities in Kentucky

Community	Monthly Fee	Equivalent Residential Unit (sq ft)	Year Established	Population	Annual Revenue
Danville	$3.36	3,813	2007	15,385	—*
Glasgow	$2.00	—	2012	14,059	$493,000
Henderson	$5.00	3,000	1998	27,373	—*
Hopkinsville	$3.00	3,350	2006	30,089	$1,108,128
Lexington/Fayette County	$4.90	2,500	2009	260,512	—*
Louisville/Jefferson County	$10.58	2,500	1987	693,604	$17,100,000
Murray	$1.50	—	2004	14,950	—*
Oldham County	$3.91	6,000	2008	40,502	$750,000
Radcliff	$5.26	2,800	2003	21,961	$770,000
Sanitation District 1	$5.04	2,600	2003	290,000	$13,500,000
Warren County	$4.00	—	2007	43,226	$1,000,000

** Some annual revenue data is missing either because the utility did not respond to the request, or the utility was so new that annual revenue was unknown at the time.*

Communities without a stormwater utility draw the majority of funds from local government allocations. However, there are a few sources of federal and state funding opportunities.

- The EPA's Sewer Overflow and Stormwater Reuse Municipal Grant (OSG). This grant funds green infrastructure projects in rural communities with a population of less than 10,000 and disadvantaged communities with a median household income (MHI) less than 80% of the state MHI. In FFY 2022 and 2023, $1.65 million was awarded to communities across the state through the OSG program.
- 319(h) Grant Program, distributed by the Kentucky DOW from the EPA to help fund watershed-based plans, innovative best management practices, and education and outreach programs. In FFY 2025, $1.26 million was awarded to 12 projects. Generally, approximately $1 million is made available for Kentucky in an average year.
- The Federal Emergency Management Agency's (FEMA) Flood Mitigation Assistance Grant Program for projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the National Flood Insurance Program.
- FEMA's Building Resilient Infrastructure and Communities (BRIC), a hazard mitigation program for projects that enhance climate resilience and reduce disaster risk. In 2022, Kentucky Emergency Management was awarded a $570,500 BRIC grant to update the Commonwealth's Multi-Hazard Mitigation Plan, identify future mitigation projects, and conduct a study on expanding an existing detention basin to mitigate flooding and improve drainage.

- The American Rescue Plan Act, one-time federal funding that allocated funds for clean water projects. Stormwater funding through this program totaled $5.66 million in Kentucky.

In addition to funding challenges, changing climate patterns and continued urban development are increasing demands on Kentucky's stormwater systems. Changing climate impacts in Kentucky include an increase in extreme weather, with extended periods of drought and periods of extreme rain. 2025 was the 10th wettest year on record for the Commonwealth with 57.43" of precipitation, despite also having the driest August on record.

Planning for intense storms is critical. Rain events can also be exacerbated by urban development, which increases impervious surfaces such as concrete, making it difficult for precipitation to be absorbed by the ground. In the last two decades, Kentucky has seen increases in impervious surfaces in areas with large populations where development is continuously occurring, including Jefferson County, Fayette County, and northern Kentucky. More extreme storms combined with increasing urbanization heighten the need for stormwater storage and effective conveyance. However, financial and spatial restrictions make it impossible for utilities to plan for every amount of storm flow.

Public Safety and Resilience

Stormwater infrastructure directs runoff away from buildings and roads, making it essential for protecting people and property. When that infrastructure breaks down or is overwhelmed, it can lead to localized flooding, create sinkholes, and damage surrounding infrastructure. Flooding has been a major threat to public safety in recent years, with 22 out of 26 federally declared disasters between 2011 and 2025 being flood related and over 100 flood fatalities between 2011 and 2025. Flood events threaten public safety by causing road closures and impacting power, water, and wastewater utilities, which can lead to loss of life.

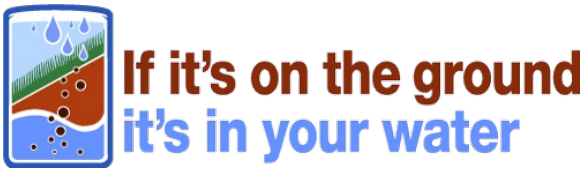
The frequency of severe storms has increased in recent years, leading to more strain on stormwater infrastructure. According to the 2024 Water Environment Federation U.S. MS4 Needs Assessment Survey, the majority of stormwater communities in Kentucky do not have stormwater resilience plans developed and are unsure if they will develop a plan. Additionally, 83% of survey respondents have not updated their design standards and specifications to address climate change and stormwater resilience. Using updated standards and specifications is crucial to ensure that infrastructure can withstand both current and future climate conditions.

Kentucky's building codes were adopted in 2018 based on 2015 International Building Code standards. Federal funding opportunities to address hazards from stormwater, such as FEMA's BRIC program, include building code adoption in grant criteria, suggesting codes align with 2021 or 2024 criteria. Without a statewide update, Kentucky is at a severe disadvantage for competitive funding opportunities to build stormwater resilience.

Innovation

Kentucky is advancing stormwater management through a combination of research, partnerships, and emerging technologies.

Regional partnerships are helping advance innovative approaches to nutrient reduction. Excess nutrients, primarily nitrogen and phosphorous, in stormwater can have detrimental impacts for downstream ecosystems. Nutrient loading can cause algal growth that is harmful to aquatic life. Sources of nutrient loading include agriculture, urban land use, and wastewater management. Kentucky is a member of the EPA's Mississippi River/Gulf of Mexico Watershed Nutrient Task Force to develop nutrient reduction strategies. The program as a whole is focused on addressing nutrient loading in the Mississippi River Basin, which is contributing to a hypoxic zone, also known as a "dead zone," in the Gulf of Mexico. This zone has extremely low levels of dissolved oxygen, making it unable to sustain normal populations of aquatic life. Kentucky also sees local impacts of nutrient loading, primarily through algal blooms. The Kentucky DOW has been working since 2014 to reduce nutrient loading in waterways. In Kentucky, this includes a focus on erosion reduction in relation to agricultural practices.



Kentucky's Nonpoint Source Pollution Control Program helps fund projects—through 319(h) grants—to reduce pollution that is washed into rivers, lakes, and sources of drinking water from places like roads, neighborhoods, and farms. This is also known as nonpoint source pollution. Between 2020 and 2023, over 46 types of best management practices were installed in over 58 watersheds, with estimated reductions in nitrogen, phosphorus, and sediment for the impacted waterways.

Citizen science opportunities are helping educate the public about water quality while generating accessible data that can augment work being done by government agencies. One example of this in Kentucky is the Volunteer Lakes Monitoring Program, which provides an early warning system for suspected Harmful Algae Blooms. Volunteers in the program follow standard procedures for data collection that were developed by the Kentucky DOW and the nonprofit organization Kentucky Watershed Watch. Training and monitoring equipment are available at no cost to participants.

Other water quality studies in the state include a study of microplastic transport in groundwater from Western Kentucky University. With the unique karst topography in South-Central Kentucky, understanding pollutant transport in groundwater can provide greater understanding of stormwater quality.

Another example of innovative infrastructure is the University of Kentucky's stormwater harvesting and reuse system, which captures more than 25 million gallons of collected stormwater per year to offset campus water usage and help run the Central Utility Plant. The system went online in the fall of 2023.



Figure 6.

University of Kentucky's stormwater harvesting system (University of Kentucky, Credit: Arden Barnes | UKphoto)

Recommendations to Raise the Grade

- **Develop an asset management program** that includes condition assessments for stormwater systems.
- **Increase sustainable local, state, and federal funding** for stormwater infrastructure, including establishing stormwater utilities with dedicated funds for stormwater projects and fees that align with national averages.
- **Broaden financing mechanisms** to strengthen Kentucky's ability to meet regulatory obligations, reduce nutrient pollution, and mitigate flood risk.
- **Adopt a coordinated strategy** that addresses sediment at its source, strengthens land use practices and development regulations, and improves long-term watershed resilience.
- **Enhance resilience planning and design standards** to prepare for extreme storm events, including developing stormwater resilience plans, modernizing design standards and specifications, and updating state building codes.
- **Strengthen workforce development** through training programs, partnerships, and targeted recruitment to ensure the long-term performance and resilience of stormwater infrastructure across the Commonwealth.
- **Strengthen public education programs** to include financial needs and incorporate the message on websites and community apps.
- **Incorporate local development regulations** that protect waterways and strengthen storm sewer infrastructure in sensitive watersheds.

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WASTEWATER

2026 Kentucky Infrastructure Report Card

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Executive Summary

Kentucky's wastewater infrastructure plays a vital role in protecting public health and water quality across the Commonwealth. About 67% of residents are served by public sewer systems, with treatment plants providing a combined capacity of 708 million gallons per day. However, aging infrastructure, funding limitations, and workforce pipeline challenges continue to strain system performance. In 2021, 40% of sewer lines were more than 50 years old, increasing the risk of failures, overflows, and service disruptions. The state faces an estimated $6.6 billion in wastewater infrastructure needs, while many utilities are hesitant to raise rates due to affordability concerns. Efforts to improve system performance, including connecting smaller systems to larger facilities, have helped reduce water quality impacts. At the same time, stronger storms and flooding are placing additional stress on wastewater systems. Without sustained investment, better planning, and workforce support, Kentucky will face growing challenges in maintaining reliable and resilient wastewater infrastructure.



Figure 1.
Morris Forman Water Quality Treatment Center (Louisville and Jefferson County Metropolitan Sewer District)

2026 Kentucky Infrastructure Report Card: WASTEWATER

Background

Kentucky's wastewater infrastructure includes municipal treatment plants and collection systems, as well as decentralized septic systems serving urban and rural communities. Two thirds of Kentucky residents are served by public sewer systems, and municipal wastewater treatment plants provide a combined permitted capacity of 708 million gallons per day. Oversight is primarily provided by the Kentucky Energy and Environment Cabinet, Division of Water, while the Kentucky Infrastructure Authority and federal programs provide funding and financing support. Onsite septic systems are regulated by the Kentucky Department for Public Health and local public health departments.

Condition and Capacity

Kentucky's municipal wastewater treatment plants have a combined permitted capacity of 708 million gallons per day, a 3% increase since 2019. In 2021 (the most recent available data), the average age of treatment plants in Kentucky was 35 years old. Currently there are 44 wastewater treatment plant service areas that cannot construct any collection line extensions due to limited treatment capacity. These capacity constraints are limiting development within the affected sewersheds.

Smaller and rural wastewater systems in Kentucky often face challenges related to limited staffing, aging infrastructure, and funding constraints. Regionalization and system consolidation can help address some of these challenges by transferring wastewater treatment to larger systems with greater capacity and resources. One example of this approach is Kentucky's effort to address failing package treatment plants across the state. Package plants are pre-manufactured treatment plants used to treat low volumes of wastewater in small communities or on individual properties. The Kentucky Legislature directed the Energy and Environment Cabinet to address failures at these facilities, and since 2018, 100 package plants statewide have been terminated, with their flows redirected to larger treatment systems. The termination of 28 of these package plants alone has resulted in the elimination of an estimated 25,700 pounds of ammonia per year and 8.9 billion colonies of *E. coli* per day from adjacent waterways, demonstrating one potential benefit of system consolidation.

While regionalization is improving performance in centralized systems, many Kentucky households continue to rely on decentralized wastewater treatment. In 2026, there were 2,493 KYG40 Home Unit Discharge permits, which are issued for individual family residences. These permits are issued by the Kentucky Division of Environmental Protection (KDEP) for onsite systems that discharge to the waters of the Commonwealth. There are also onsite septic systems providing wastewater treatment that discharge to groundwater. It is estimated that 40% of Kentucky households have onsite septic systems, which is the same percentage estimated in 2019. These onsite systems are regulated by the Kentucky Department of Public Health and are

rigorously inspected and permitted by local public health departments. Septic systems, when properly designed and maintained, are a cost-effective solution and positively impact the groundwater by providing a source of recharge. To ensure onsite septic systems are installed properly, Kentucky requires a minimum of 100% redundancy on a lot, providing sufficient space for a replacement system if needed. The state regularly provides training for all registered sanitarians, and these efforts have given Kentucky a strong program to regulate onsite septic systems. Along with a strong design and inspection program, outreach, community engagement, and system improvements can help restore water quality, as is exemplified in the Red Bird River delisting project in southeastern Kentucky.

Figure 2.

Red Bird River, in southeastern Kentucky (Kentucky Waterways Alliance)



The **Red Bird River** was previously listed as an impaired waterway due to high fecal coliform counts. Watershed planning efforts began in 2010, culminating in a 2016 plan that included education, outreach, and septic system improvements. By 2018, *E. coli* levels had improved enough for the Kentucky Division of Water (DOW) to propose removing the 15-mile segment from the impaired waters list for recreational use in 2022.

2026 Kentucky Infrastructure Report Card: WASTEWATER

Water and wastewater infrastructure can be expected to provide useful service for 25 to 75 years, depending on material, design, and maintenance. As systems age beyond their intended service life, the risk of deterioration and failure increases. Some of the oldest wastewater pipes in Kentucky include large-diameter, often brick, sewers that are susceptible to collapse and cave-ins due to their deteriorated condition. Louisville maintains about 43 miles of brick sewer, with some pipes dating back to the 1860s. Failure of these large-diameter pipes often results in a greater impact to the community. The collapsed sewer pipes can damage other utilities in the vicinity, causing disruption of service to customers and potential health hazards by releasing wastewater into the community. They can also pose public safety risks by impacting roadways above, creating risk for people and property. In July of 2024, a sewer collapse in Louisville opened a large hole in a downtown street, requiring road and lane closures while the 27-inch brick sewer line was being replaced. Louisville is not alone in facing aging sewer infrastructure. In 2021, 16% of Kentucky's sewer lines were 70 years old or older, and 40% were 51 years old or older.

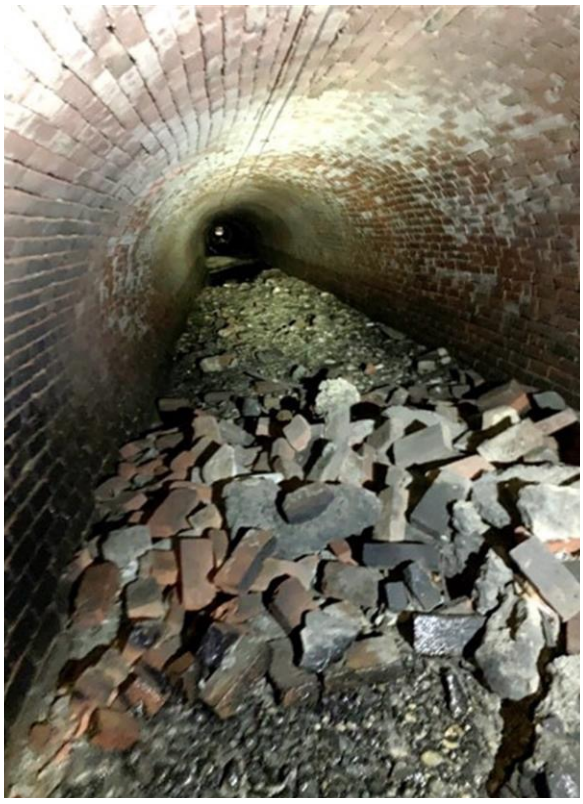


Figure 3.

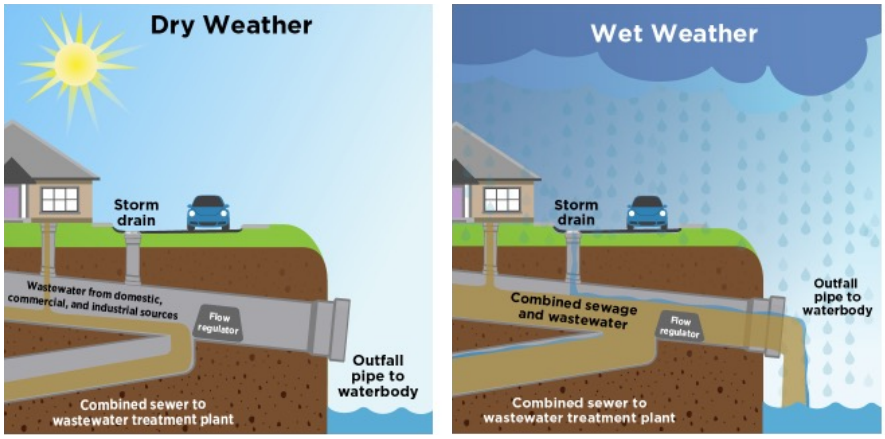
Brick sewers, some of which date to the 1860s (Louisville and Jefferson County Metropolitan Sewer District)

Aging wastewater treatment plants and pump stations also contribute to sewer overflows. In some cases, there may be a need for the infrastructure to be upsized to account for growth in the area. In other cases, deterioration from age may contribute to leaks and inoperable infrastructure.

Kentucky communities use both combined and separate sewer systems. Combined systems, generally found in older communities, carry sanitary wastewater and stormwater in the same pipes, while more modern separate systems use different pipes for sanitary wastewater and stormwater. In 13 Kentucky communities, combined sewer systems (CSSs) convey stormwater runoff, domestic sewage, and industrial wastewater through a single pipe to a wastewater treatment plant (WWTP). During dry weather, only sewage and industrial wastewater are conveyed. During rain events, stormwater can exceed system capacity, causing untreated wastewater to overflow into nearby streams and rivers. These events are known as combined sewer overflows (CSOs) (see Figure 4). Because complete separation of existing combined systems can be costly or technically challenging, CSOs are allowed at designated locations but are regulated to reduce how often they occur and their impacts.

Figure 4.

Illustration of a Combined Sewer System (EPA)



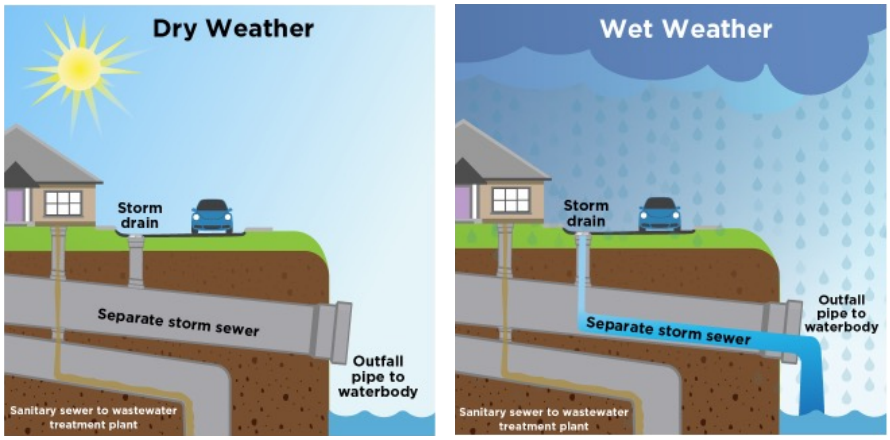
CSO discharges pose a significant threat to Kentucky's waterways. Separating stormwater from sanitary systems can increase sewer capacity and reduce the cost of pumping and treating stormwater. In 2019, Kentucky had 17 combined sewer systems; since then, four communities have fully separated their systems. Four additional communities are pursuing separation, although high costs and spatial constraints in developed areas can make separation economically or technically infeasible.

The 13 remaining CSSs in Kentucky are working to reduce overflows through targeted separation and flow equalization efforts. To comply with consent decrees, these communities use tools such as Long-Term Control Plans (LTCPs) and Nine Minimum Control (NMC) programs. Collectively, these 13 communities include 289 permitted CSO outfall points, each representing a potential discharge location during wet weather events that can impact water quality and public health.

Sanitary sewer systems carry wastewater from homes, businesses, and industries separately from stormwater (see Figure 5). However, raw sewage can still be released from sanitary pipes, resulting in sanitary sewer overflows (SSOs). Unlike CSOs, SSOs are not permitted discharges. Kentucky communities are working to reduce SSOs by adding storage and capacity and limiting excess water entering systems through leaks, aging infrastructure, and improper connections.

Figure 5.

Illustration of a Separate Sanitary Sewer System (EPA)



Leaks and improper connections can allow stormwater and groundwater to enter sanitary sewer systems, a process known as inflow and infiltration (I/I). Excessive I/I can overwhelm system capacity and contribute to overflows. Kentucky regulations (Title 401 5:005) require applicants to demonstrate that systems are not subject to excessive I/I before constructing sewer extensions. Lexington and Louisville have programs to identify and remove improper connections, such as sump pumps and downspouts, to sanitary sewers.

Of the 5,063 water quality parameters identified as a cause of impairment to a Kentucky waterbody in 2024, nearly 9% are associated with a wastewater source, such as sewer overflows, package plant discharges, and septic systems. There are 742 impairments due to *E. coli*, and of these, 214 are associated with a wastewater source.

Operation and Maintenance

Effective operation and maintenance are essential to the reliability of Kentucky's wastewater systems. Each utility is responsible for routine maintenance of its sanitary sewer infrastructure. Many major infrastructure improvements have been driven by consent decrees and agreed orders with the U.S. Environmental Protection Agency (EPA) and/or the state of Kentucky.

Figure 6.

Hunters Hollow Wastewater Treatment Plant (Louisville and Jefferson County Metropolitan Sewer District)



To effectively manage budgets and ensure the right investments are made at the right time, many public utilities track the condition of their assets through organized asset management programs. This type of system helps municipalities assign priority to projects based on criticality and condition. This type of management is encouraged to allow more proactive planning rather than reactive emergency repairs.

Beyond funding for O&M, Kentucky utilities face ongoing workforce pressures, including an aging operator workforce and a limited pipeline of new workers entering the utility sector. The average age of Class IV operators continues to increase, while fewer students and skilled tradespeople are entering utility careers. Workforce challenges are expected to persist as experienced employees retire and utilities compete with the private sector for younger workers. Lower public-sector wages and reduced retirement benefits further hinder recruitment and retention, making it difficult to attract and retain engineers, scientists, IT professionals, and skilled tradespeople.

Funding and Future Need

The 2022 Clean Watersheds Needs Survey (CWNS) indicated approximately $6.6 billion in wastewater infrastructure needs in Kentucky. This is an increase of $400 million from the 2012 CWNS.

Many municipalities are struggling to pay for their capital projects and higher O&M costs due to increases in the cost of fuel, labor, and other resources, especially since the COVID-19 pandemic. Considering the profound impacts of the pandemic, utilities are hesitant to increase rates though the infrastructure needs continue to increase. This hesitancy can also be attributed to additional factors, including concerns about affordability, even though increased rates are necessary to support capital investment needs.

The federal Low Income Household Water Assistance Program provided $20.8 million to Kentucky through October 2024 to help low-income households pay water and wastewater bills. Although the program has ended, some Kentucky communities continue to offer bill assistance. Maintaining affordability remains critical as utilities balance rising costs with infrastructure investment.

The 2024 Kentucky legislature established the Kentucky Water and Wastewater Assistance for Troubled or Economically Restrained Systems (KY WWATERS) program to fund public water and wastewater projects, providing $75 million annually for two years. In its first year, the program received 150 applications totaling more than $657 million in requested funding; in 2025, 164 applications, totaled over $444 million. The gap between $150 million in available funding and demand highlights Kentucky's significant water infrastructure funding needs.

An additional source of funding is Kentucky's Clean Water State Revolving Fund (CWSRF), a 20-year, low-interest loan program that supports planning, design, and construction of wastewater, stormwater, and nonpoint source projects. The program requires financial audits from the past three years to approve funding, which can be a barrier to small systems, unless they are able to get support from programs such as the Rural Community Assistance Partnership. Since 2018, yearly project commitment dollars have averaged $92 million, and the fund has remained a reliable source of financing for wastewater infrastructure improvements.

In 2021, thanks to the Infrastructure Investment and Jobs Act (IIJA), the federal government added surplus funds to the CWSRF Capitalization Grant. Unfortunately, those funds were only allocated for five years, and the Capitalization Grant has now been reduced to pre-pandemic funding amounts.

During the pandemic, the federal government initiated a one-time funding program through the American Rescue Plan Act (ARPA), which allocated $350 billion in grants to state and local governments for all types of infrastructure improvements. Out of those funds, $500 million was dispersed to the Commonwealth of Kentucky for clean water projects. Projects in all 120 counties were funded through Kentucky's Cleaner Water Program, which was established to disburse ARPA funding. Through those funds, eligible utilities were able to initiate any project that met the minimum qualifications for CWSRF funding. Those investments were made across the state to improve both wastewater and stormwater infrastructure.

The EPA and USDA's Closing America's Wastewater Access Gap Community Initiative provided technical assistance and identified grant and loan opportunities through the IIJA for wastewater improvements. Harlan County participated in the pilot to address aging infrastructure and inflow and infiltration. Additional funding will be needed to implement these improvements at scale.

The federal Water Infrastructure Finance and Innovation Act (WIFIA) program provides long-term, low-cost supplemental loans for regionally and nationally significant projects. The Louisville and Jefferson County Metropolitan Sewer District was awarded a WIFIA loan for $97 million for a biosolids processing project. Beyond this, Kentucky has had limited participation in the program due to minimum project size and match requirements.

Despite the availability of multiple funding programs, the gap between identified needs and available resources remains substantial. Many communities continue to face aging infrastructure, increasing regulatory requirements, and persistent sanitary sewer overflows, all of which require sustained investment. Without expanded funding, increased rate support, and continued technical assistance for smaller systems, Kentucky will face growing challenges in maintaining reliable wastewater service and protecting public health and water quality.

Public Safety

The condition and performance of wastewater infrastructure have direct implications for public health and environmental protection. Currently, the state has set nutrient standards that are allowable in wastewater discharge. With increasing pressure on more stringent nutrient regulations, utilities are faced with the challenge of identifying solutions to reduce nutrient loading in plant discharges. Additionally, per- and polyfluoroalkyl substances (PFAS) are an emerging concern for wastewater utilities.

These long-lasting chemicals can enter treatment plants through incoming wastewater and may remain in treated wastewater and biosolids. Because wastewater treatment plants do not generate PFAS, reducing concentrations will require collaboration with the sources that discharge them into wastewater systems. In 2024, SJR 149 encouraged the Energy and Environment Cabinet to provide PFAS management guidance for entities discharging to Kentucky waterways. Future wastewater regulations will require collaboration with PFAS sources to reduce concentrations entering treatment plants.



Figure 7.

Sewer Overflow Notice (Louisville and Jefferson County Metropolitan Sewer District)



Figure 8.

Severe Flash Flooding in Downtown Whitesburg (National Weather Service)

Sewer overflows and improperly managed septic systems continue to have an impact on water quality in Kentucky's surface waters. The Upper Cumberland River, Kentucky River, and Licking River have had swimming advisories in place for several years due to high levels of *E. coli* bacteria, which indicates the presence of untreated or inadequately treated sewage. In 2024, wastewater contributed to water quality problems in 88 waterbodies considered unsafe for recreational use, affecting 475 miles of rivers and streams. However, efforts are underway to ensure new septic systems are installed properly and that treated wastewater discharged from treatment plants complies with Kentucky Pollutant Discharge Elimination System (KPDES) permits, and water quality is continuing to improve in these areas.

Resilience and Innovation

In 2022, Eastern Kentucky experienced catastrophic flooding. Several wastewater systems suffered damage and have received funding from the Kentucky Disaster Recovery Program to help rebuild. This program is administered by the Kentucky Department for Local Government with funding through the U.S. Department of Housing and Urban Development's Community Development

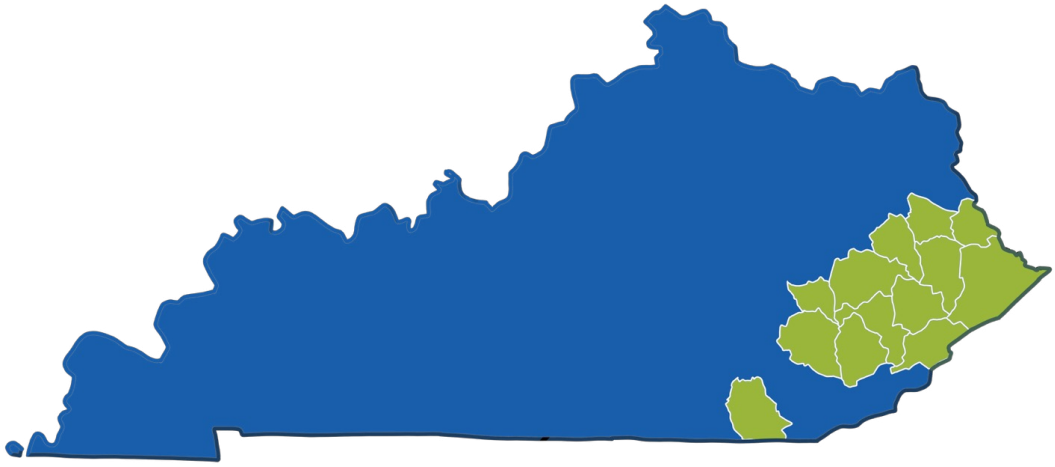


Figure 9.

July 2022 Flooding Disaster. Counties noted in green were declared Federal Disaster Areas (Federal Register.gov)

Block Grant Disaster Recovery Program. This funding will be used to rehabilitate or replace wastewater treatment plants and collection system infrastructure to be more resilient to future flooding, either by relocating out of the floodplain, or incorporating new equipment that will protect the system from flooding impacts. As the region rebuilds, high-ground communities are being established to enable residents to move out of the floodplain. Part of this effort includes improving sewer infrastructure to provide service to the new communities. These catastrophes highlight the increasing vulnerability of wastewater infrastructure to more frequent and severe storm events.

Increasingly intense rainfall and flooding are placing additional stress on Kentucky's wastewater systems, a trend expected to continue as climate patterns shift. During extreme rainfall in April 2025, several utilities asked residents to conserve water to reduce overflows and backups. These events highlight the need to manage I/I and educate the public about how household water use affects collection system capacity.

The Kentucky Energy and Environment Cabinet and EPA Region IV developed a pilot program to help wastewater treatment plants identify opportunities for nutrient and energy efficiency. Part of this program includes use of a free Excel-based tool called Bio-Tiger, developed by Dr. Larry Moore at the University of Memphis. The Princeton, Kentucky, WWTP participated in this pilot program in 2017 and identified an opportunity to improve nitrogen by shutting off rotors in the plant's oxidation ditches for part of the day. After implementation, the total nitrogen in the treated wastewater decreased by 56%. Similar results were found in Greenville and Lawrenceburg, with optimization reducing both nutrient load and electricity usage for the plants. These types of operational innovations demonstrate how existing infrastructure can be optimized to improve performance and resilience without significant capital investment. Addressing these challenges will require sustained investment, strategic planning, and targeted policy actions to strengthen the resilience and performance of Kentucky's wastewater systems.

Recommendations to Raise the Grade

- **Increase sustainable state and federal funding for wastewater infrastructure** to address the gap between identified needs and available resources, particularly for small and rural communities facing affordability challenges.
- **Develop and implement wastewater utility fees that cover the full cost of service, including operation, maintenance, and capital needs**.
- **Expand and support regionalization and system consolidation efforts** to improve operational efficiency, reduce failures at underperforming systems, and enhance water quality outcomes.
- **Invest in rehabilitation and replacement of aging infrastructure**, prioritizing large-diameter sewers, collection systems vulnerable to collapse, and facilities nearing or exceeding their design life.
- **Strengthen strategies to reduce CSOs and SSOs** by increasing system capacity and reducing excess water entering systems through leaks and improper connections.
- **Enhance resilience planning and design standards** to address increasingly frequent and severe storm events, including updating state building codes, floodproofing infrastructure, relocating critical assets, and improving emergency response capabilities.
- **Support the development and retention of a skilled wastewater workforce** through expanded training programs, competitive compensation, and partnerships with technical schools and universities to address long-term staffing shortages.
- **Promote source control and regulatory coordination** for nutrients and emerging contaminants such as PFAS, including collaboration with industrial users to reduce pollutant loading to wastewater systems.
- **Expand asset management and data-driven decision-making practices** to help utilities prioritize investments, reduce emergency repairs, and improve long-term system performance.

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