

2013 REPORT CARD FOR
KANSAS'
INFRASTRUCTURE

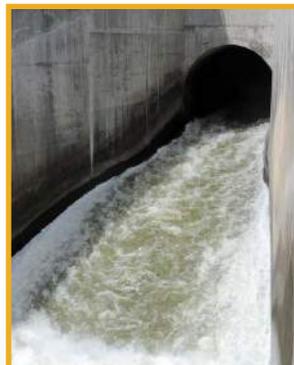
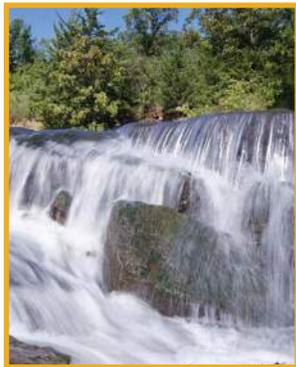


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EXECUTIVE SUMMARY

BACKGROUND AND METHODOLOGY:

Infrastructure is the backbone of the state's economic and social activity. On any given day we engage in the use of infrastructure in all of our daily activities. From the water we drink, to the roads we drive on, to the energy that heats and cools our homes and powers our computers, to the schools in which our children are educated; we are completely dependent on the infrastructure that provides these necessities. Although they often go unnoticed, elements such as reliable power, efficient transportation, and safe schools provide quality of life and drive our economic engines as they attract business and allow it to prosper. The central location of the state of Kansas gives our infrastructure a unique importance as the crossroads of several interstate highways and rail systems intersect in our state.

With this in mind, engineers from the Kansas City and Kansas Sections of the American Society of Civil Engineers (ASCE) came together to grade the infrastructure for the entire state of Kansas and raise awareness of the need for continued funding and maintenance of these essential facilities. This report provides a state perspective of the 2013 Report Card for America's Infrastructure that reviews the nation's infrastructure. Find out more at <http://www.infrastructurereportcard.org/kansas/kansas-overview/>.

Technical committees reviewed existing reports and inventories of the nation's infrastructure and discussed the current condition and funding levels with public officials. All available information was used to summarize the current state of the infrastructure and a composite grade was awarded based on individual grades for the following criteria:

- **Capacity.** The measure of the infrastructure's capacity to meet current and future demands
- **Condition.** The existing physical condition of the infrastructure
- **Funding.** The current level of funding of each infrastructure type compared to the estimated funding need
- **Future Need.** The cost to improve infrastructure to an acceptable level
- **Operation and Maintenance.** The measure of the owner's ability to operate and maintain the infrastructure properly and within government regulations
- **Public Safety.** The extent to which the public's safety is jeopardized by the condition of the infrastructure and the consequence of failure
- **Resilience.** The infrastructure's capability to prevent or protect against significant multi-hazard threats and incidents

The report card utilizes a 10-point grading scale, similar to a traditional school report card. Each of the seven grading components was assigned a grade as follows:

- 90-100 = A
- 80-89 = B
- 70-79 = C
- 51-69 = D
- 50 or Below = F

RESULTS:

Nine different categories of infrastructure for the state of Kansas were evaluated and graded. They are summarized in the following table:

Infrastructure Category	Grade
Aviation	C
Bridges	D+
Dams	D-
Drinking Water	C
Energy	C-
Levees	C-
Railroads	C
Roads	C+
Schools	C+
Overall	C-

Overall, the infrastructure for the state of Kansas receives a C- grade. It is the hope of ASCE that this evaluation can be used by citizens, and public officials to:

- Raise awareness about the significance of infrastructure to our daily lives,
- Highlight the importance of efficient operation and maintenance of the state's critical infrastructure; and
- Provide a starting point for discussion about the importance of continued funding to maintain and improve the condition of the state's infrastructure.

ACKNOWLEDGEMENTS:

Many ASCE Members have devoted a considerable amount of time to this effort. We would like to acknowledge following the groups of individuals:

The Report Card Oversight Committee for their work in organizing this effort and reviewing the write-ups. Members included:

- Tom Jacobs, P.E., CFM – Co-chair
- Chad Schrand, P.E. – Co-chair
- Alex Darby, P.E. – Co-chair
- Steve Lackey, P.E. – Subgroup Leader
- John Dowell, P.E. – Subgroup leader

The Authors for their efforts in researching, writing and grading the infrastructure categories. Individual authors are recognized in each write-up. The authors are recognized at the end of this document.

Shockey Consulting Services for their expertise in graphic design and editing.

The Kansas City, and Kansas Sections of ASCE and ASCE Society for their support in promoting and funding this effort.

C

AVIATION

RECOMMENDATIONS:

- Implement the recommendations from the Kansas Airport System Plan to continue progress toward meeting the system objectives.
- Explore revenue sources to provide additional steady long-term funding sources for airport improvement grants.
- Promote increasing the cap on Passenger Facility Charges (PFC) to improve funding options for Primary Commercial Airports in Kansas.
- Support multi-year reauthorizations of the Airport Improvement Program to promote long-term program funding and avoid short-term uncertainty for funding of airport projects.
- Monitor FAA implementation of new General Aviation Airport categories to assure AIP funding decisions provide adequate funding to all categories of General Aviation airports.

EXECUTIVE SUMMARY:

Airports in Kansas provide billions of dollars in economic activity and tens of thousands of jobs. With a wide-variety of airport types and runways, it is important that the state is involved in maintaining and supporting both regulatory and financial requirements. Without adequate agency and airport funding, Kansas citizen's health and safety will be at greater risks due to inadequate access to a properly operated and maintained airport. It is projected there will be an almost \$200 million funding shortfall in the next five years. State legislators should be focused on finding adequate funding solutions to maintain and improve the current grade of "C" for the state.

BACKGROUND:

There are 140 airports in the state of Kansas that are open for public use. Twenty (20) of these public-use airports are privately owned and the remaining 120 are owned by a government organization. The Kansas Department of Transportation (KDOT), Division of Aviation classifies airports into five (5) categories, according to their role in the Kansas Airport System.

These categories and numbers (x) of each type of airport are:

- Commercial Service Airports – Airports that accommodate scheduled commercial air service (9).
- Regional Airports – Airports that accommodate regional activities, connect the state and national economies, and serve all types of general aviation users (15).
- Business Airports – Airports that accommodate local business activities and general aviation users (42).
- Community Airports – Airports that serve a supplemental role in local economies, primarily serving smaller business, recreational, and personal flying (51).
- Basic Airports – Airports that serve a limited role in the local economy, primarily serving recreational and personal flying (23).

The Federal Aviation Administration (FAA) identifies seventy-nine (79) of the public-use airports in Kansas as significant to the national transportation system and includes them in the National

Plan of Integrated Airport Systems (NPIAS). The Kansas airports in the NPIAS are eligible to fund improvements through FAA grants. The FAA classifies airports by the principal use of the airport as:

- Primary Commercial Service Airports – Airports that enplane at least 10,000 passengers per year (3).
- Non-Primary Commercial Service Airports – Airports that enplane at least 2,500 passengers, but less than 10,000 passengers per year (5).
- General Aviation Airports – Airports that are not classified as Commercial Service Airports (71).

The public-use airports in Kansas \$10.4 billion of annual economic activity, \$2.3 billion of annual payroll, and 47,650 jobs.

Kansas General Aviation airports account for 23,266 jobs and \$1.1 billion in payroll annually. Kansas Commercial Service airports account for 24,385 jobs and \$1.2 billion in payroll. **The total economic output by Kansas aviation represents 8.5 percent of the 2009 State Gross Domestic Product.**

CONDITION:

Runway Pavement

Kansas has turf and paved runway airports. Thirty (30) public-use airports in Kansas do not have any paved runways. These turf runways are not rated by a numeric system. The remaining 110 public use airports have a paved runway as the primary runway that is evaluated by rating the pavement using the Pavement Condition Index (PCI).

The PCI value ranges from 100 (new pavement) to 0 (the lowest value).

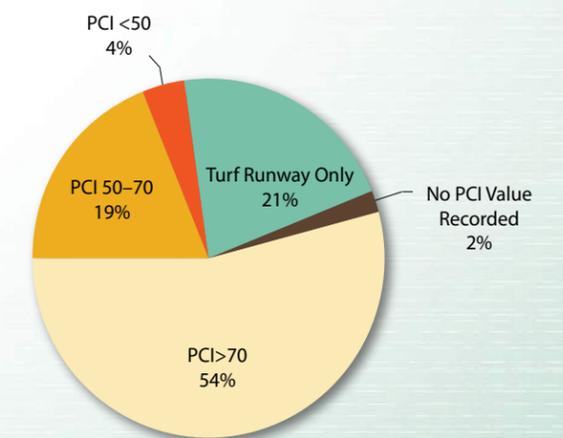
- A PCI value greater than 70 is considered in good condition.
- A PCI value between 50 and 70 is considered in fair condition.
- A PCI value of less than 50 is considered in poor condition.

Of the 110 airports with a paved primary runway, PCI values for the primary runway are recorded for 107 airports.

Seventy-six airports report a PCI for their primary runway of greater than 70, 26 airports report a PCI of between 50 and 70, and five airports report a PCI value less than 50.

The benchmark for Kansas public-use airports is all airports with a paved primary runway have a PCI value of 70 or greater. **Twenty-five percent of airports with paved runways need improvement.**

Kansas Public-Use Airports Pavement Condition Index Value



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AVIATION

Airport Air Access

The utilization of airports in Kansas is affected by the ease of access to the airport for pilots in the air. A criteria to evaluate the safety of approaching and landing at an airport is that an approach to the primary runway is clear of obstructions such as trees, power lines and terrain features that penetrate the approach envelope of the runway. The FAA has established the minimum criteria for maintaining an approach clear of obstructions. The benchmark for Kansas airports is to have all approaches to the primary runway clear of obstructions.

Another criterion is the type of navigational aid (NAVAID) equipment at the airport. The NAVAID equipment at the airport assists the pilot on final approach to the airport. This is particularly critical during poor weather conditions. The benchmark for airports in Kansas is established based on the airport's role in the Kansas airport system. The table below shows the benchmark value for these criteria and the percentage of the airports that meet the benchmark value.

Kansas Public-Use Airports Access Benchmarks

Airport Category	Evaluation Criteria			
	Clear Approaches to Primary Runway		Approach Capability	
	Benchmark	% Meeting Benchmark	Benchmark	% Meeting Benchmark
Commercial	9	67%	Precision	100%
Regional	15	67%	Near-Precision	87%
Business	42	46%	Non-Precision	78%
Community	52	20%	Non-Precision	19%
Basic	23	22%	Visual	100%

System-wide, only 36 percent of Kansas airports meet the benchmark for clear approaches to the primary runway and 61 percent of airports meet the benchmark for approach capability.

Landside Facilities

The Kansas Airport System Plan reviewed the landside facilities at Kansas airports and identified a minimum level of facilities that airports in each role should have to serve the target users. Landside facilities are structures and areas at the airport that support flight activities, but are not directly involved in aircraft activities. The table below shows the percentage of airports in each role that meet the minimum facility benchmark.

Kansas Public-Use Airports User Service Level

Airport Role	Percentage Meeting Minimum Criteria				
	General Aviation Terminal	Aircraft Apron	Auto Parking	Hangars for All Based Aircraft	Public Restrooms
Commercial	100%	100%	100%	100%	100%
Regional	100%	93%	100%	93%	100%
Business	76%	93%	79%	74%	62%
Community	N/A	53%	35%	27%	16%

Access to the Kansas Airport System

The Kansas Airport System Plan evaluated the convenience of access to the Kansas airport system from both the ground and the air. The benchmark is to serve the largest number of residents and businesses by providing effective access to the airport system.

The Kansas Airport System Plan study reported the following information:

- The target benchmark is that 91 percent of the state's population and 59 percent of the state's landmass is within 60 minutes of a Commercial Service airport. **Currently 76 percent of the state's population and 31 percent of the state's landmass are within 60 minutes of a Commercial Service airport.**
- The target benchmark is that 91 percent of the state's population and 55 percent of the state's landmass is within 45 minutes of a Regional airport. **Currently 76 percent of the population and 31 percent of the landmass are within 45 minutes of a Regional airport.**
- The target benchmark is that 91 percent of the population and 56 percent of the state's landmass be within 45 minutes of an airport meeting the needs of business users. **Currently 84 percent of the state's population and 42 percent of the landmass are within 45 minutes of an airport that meets the needs of business users.**

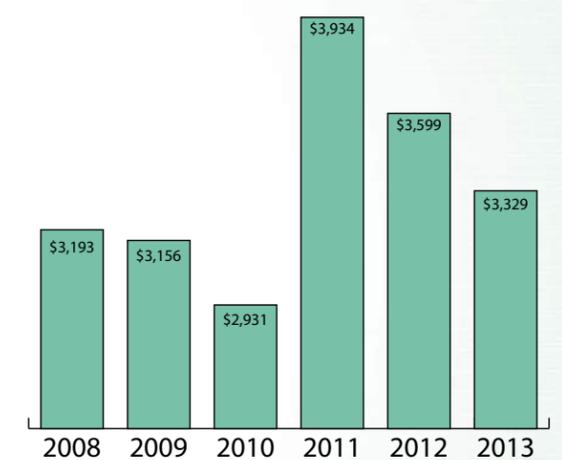
Economics:

The Kansas Department of Transportation, Division of Aviation administers the Kansas Airport Improvement Program (KAIP), which provides grant assistance to public-use airports in Kansas. The program is designed to assist airports in improving and maintaining the state's system of public-use airports. KAIP grant funds cover 95 percent of the approved project costs on publicly owned airports, with the remaining 5 percent being paid by the airport owner. For privately owned public-use airports, KAIP grant funds cover 90 percent of the approved project costs and the airport owner

is responsible for the remaining 10 percent of the project costs.

The annual amounts of grants awarded through the Kansas Airport Improvement Program are:

AIP Grants (in millions)



Kansas airports that are part of the NPIAS are eligible for FAA Airport Improvement Program (AIP) grants. AIP grants are allocated by a formula that considers the function of the airport and the funding needs for eligible construction or planning projects. Funding for AIP grants is from the Federal Airport and Airway Trust Fund supported by revenue from several aviation-user taxes. These user taxes are assessed on items such as airline fares, air freight and aviation fuel. The table below shows the grant funding allocated to Kansas airports from Fiscal Year 2008 through Fiscal Year 2012.

Kansas Public-Use Airports Grant Funding

Funding Source	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	Total FY 2008–FY 2012
FAA Airport Improvement Program Grants	\$57,009,0100	\$45,270,000	\$26,274,000	\$32,051,000	\$39,009,000	\$199,613,000
Kansas Airport Improvement Program Grants	\$3,193,000	\$3,156,000	\$2,930,000	\$3,934,000	\$3,599,000	\$16,812,000
American Recovery and Reinvestment Act Grants			\$6,026,000			\$6,026,000
Total Grant Funding	\$60,202,000	\$48,426,000	\$35,230,000	\$35,985,000	\$42,608,000	\$222,451,000

Federal Commercial Service Airports are also allowed to assess and collect a Passenger Facility Charge (PFC) to fund FAA-approved projects. These projects must enhance safety, security, or capacity: reduce noise; or increase air carrier competition at the airport. Currently, this PFC fee cannot exceed \$4.50 for every boarded passenger at commercial airports controlled by public agencies.

Airports in the NPIAS prepare a planning and capital program forecast of their funding needs for the next five year period. These forecasts are combined with other airports' forecasts to identify the amount of FAA Airport Improvement Plan money needed to bring airports up to current standards and add capacity to congested airports. The FAA provides a five year estimate of these development costs to Congress every 2 years.

The requested development costs for Kansas airports included in the 2011 - 2015 NPIAS Report is \$286,401,664. The Kansas Airport System Plan reports that Kansas airports will need at least \$665 million over the next twenty years to respond to the Capital Improvement Plan recommendations of Kansas airports.

The development costs in the 2009 – 2013 NPIAS Report were \$341,845,351. Comparing the \$222,451,000 in total grant funding to Kansas airports for the past five years to the 2009 – 2013 NPIAS development costs represents a \$119 million shortfall in funding for Kansas airports. **The Kansas Airport System Plan estimates a \$194.1 million funding shortfall in the next five years.**

RESOURCES:

1. Kansas Airport System Plan, Wilbur Smith Associates with assistance by HNTB Corporation, 2008.
2. Kansas Aviation Economic Impact Study, Wilbur Smith Associates with assistance by Burns & McDonnell, May 2010.
3. Federal Aviation Administration.
4. Kansas Department of Transportation, Division of Aviation.
5. AirNav, LLC. Retrieved from <http://AirNav.com/airports/State/KS>.

D+

BRIDGES

RECOMMENDATIONS:

The state of Kansas enjoys a reputation of exceptional transportation infrastructure, which is a firm foundation for thriving business and economic growth. To keep this reputation, ASCE recommends:

- KDOT Funding needs to remain at or above historic levels; a \$700 million funding gap is unacceptable.
- Funding for local bridges needs to at least double, or this will become an even weaker link in our state's overall transportation infrastructure, regardless of adequate funding to KDOT.

EXECUTIVE SUMMARY:

Kansas bridges provide a vital link in the network connecting the far reaches of the state. With one in six bridges considered deficient and a lack of funding to correct the issue, the Kansas bridges receive a grade of D+. While KDOT has made strides to improve the condition of the highway bridges over the last twenty years, the funding gap must be addressed to prevent having a negative impact on safety and the economy.

BACKGROUND:

According to the Federal Highway Administration's (FHWA's) National Bridge Inventory (NBI), Kansas ranks 4th in the nation for total number of bridges at 25,233. The number of bridges in The Kansas Department of Transportation's (KDOT) inventory, including 2,426 National Highway System (NHS) bridges, is above the national average for state departments of transportation.

The Kansas Department of Transportation (KDOT) is responsible for all NHS bridges. The National Highway System (NHS) includes the Interstate Highway System as well as other roads important to the nation's economy, defense, and mobility.

CONDITION:

Due to the vast number of roads and bridges in Kansas, a certain amount of inherent redundancy is built into the network. Which should serve the state well in the short term, should a portion of the network be taken out of service due to an unexpected event such as a natural disaster or a terrorist attack.

While Kansas has a relatively low percentage of NHS bridges that are functionally obsolete, the number of functionally obsolete bridges in Kansas is above the national average. A functionally obsolete bridge has older design features and, although it is not unsafe for all vehicles, it cannot safely accommodate current traffic volumes or vehicles of certain sizes and weights.

When the use of a bridge is restricted due to structural deterioration, then it is categorized as structurally deficient. A bridge is considered deficient if it is either functionally obsolete or structurally deficient. Although not necessarily unsafe, these bridges must have limits for speed and weight. At 12 percent, Kansas ranks in the top half of the nation in percentage of structurally deficient non-NHS bridges.

An even gloomier statistic is the total number of structurally deficient non-NHS bridges; only five states have more structurally deficient non-NHS bridges than Kansas at almost **3,000 bridges**.

ECONOMICS:

In the wake of the now infamous I-35W bridge collapse in Minnesota in 2007, the FHWA tightened the National Bridge Inspection Standards (NBIS). The FHWA found that Kansas was not in compliance with the 2007 and 2008 NBIS, including documentation of fracture critical bridge inspection. A bridge is fracture critical when it has a member whose failure might cause a portion of or the entire bridge to collapse; the same type of failure that caused the I-35W bridge collapse.

Scouring is the result of erosive action of flowing water. Flowing water might remove sediment from the streambed and banks as well as from around the piers and abutments of bridges. A bridge with a foundation element that has been determined to be unstable for the observed or evaluated scour condition due to observed scour at the bridge site or a scour potential as determined from a scour evaluation study is considered scour critical.

Starting in 2009, KDOT began the five-year \$25 million Kansas Local Bridge Evaluation Program to bring the documentation of Kansas bridges in compliance. The \$25 million is diverted from an annual \$45 million in FHWA funds allotted to Kansas for bridge maintenance, repair, and construction.

While diverting the funds is necessary to better understand the condition of the existing infrastructure, this further limits bridge maintenance in the state.

KDOT has a record of improving the condition of the highway bridges over the last twenty years. However, according to KDOT's latest Long Range Transportation Plan, KDOT faces a funding gap of

\$700 million, putting their record of improvement in jeopardy.

Additionally, the local roads and bridges in Kansas receive less than half of the funding needed; which results in the ability to replace or rehabilitate only about 40 local bridges per year in a state with almost 5,000 deficient bridges.

RESOURCES:

1. United States. Federal Highway Administration. National Bridge Inventory 2011.
2. State of Kansas. Department of Transportation. Long Range Transportation Plan 2008.
3. State of Kansas. Department of Transportation. Kansas Local Bridge Evaluation Program. 8 May 2012 <<http://klbep.ksdot.org/>>.
4. Anschutz, Kent. Telephone interview. 18 May, 2012.
5. State of Kansas. Department of Transportation. Off-System Bridge Program Fact Sheet. 10 Jul. 2012 <http://www.ksdot.org/burLocalProj/Forms/Off-System_Bridge_Fact_Sheet.pdf>.
6. State of Kansas. Department of Transportation. Bridge Inspection Manual 2012.
7. United States. Federal Highway Administration. National Highway System. 10 Jul. 2012 <http://www.fhwa.dot.gov/planning/national_highway_system/>.

RECOMMENDATIONS:

With 26 of the state's high hazard dams in poor condition, directly putting lives at real risk, and limited funding available to address this, ASCE recommends immediate action:

- Funding should be increased to national averages in order to ensure DWR's dam safety program oversight of the remediation of the 26 high hazard dams in poor condition.
- Funding needs to continue to ensure that dams in the future are safe and have sufficient emergency action planning.
- All high hazard dams need a recorded Emergency Action Plan.

EXECUTIVE SUMMARY:

The dams in Kansas provide essential benefits such as flood control, water for irrigation and fire protection; however, their increasing age and lack of funding for regulation and maintenance have led to an ever increasing number of high hazard dams. Currently 26 of the state's 230 high hazard dams are considered in poor condition and their failure would likely lead to a loss of life and significant property damage. Significant steps must be made in terms of funding for oversight and maintenance to improve the current grade of D-.

BACKGROUND:

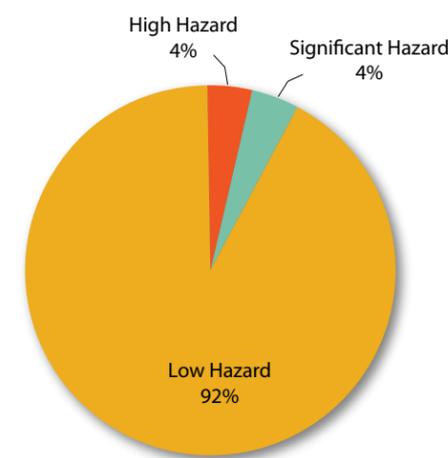
Kansas dams are a critical part of the state's infrastructure. Dams provide vital benefits to Kansas citizens that include fire protection, flood control, water for irrigation, and recreation areas. **With 6,087 dams, Kansas has the second most dams in the United States next only to Texas.**

Kansas has 230 high hazard dams, which threaten the lives of those communities should they fail. **Thirty-eight percent of high hazard dams have no emergency action plans, and 92 percent of significant hazard dams have no emergency action plans.** Despite the state's massive inventory, sustainable funding for dam infrastructure is practically non-existent.

CONDITION:

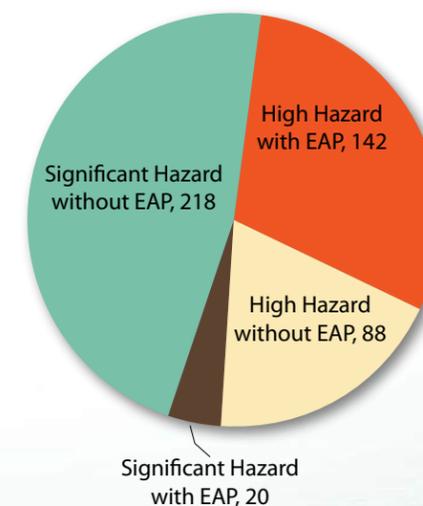
The state dam safety program, part of Kansas Department of Agriculture Division of Water Resources (DWR), is responsible for regulating dam inspections, oversight of remediation of deficient dams, and coordination with local officials and dam owners on emergency preparedness. **Of the state's 6,087 dams, 230 are classified as high hazard, meaning failure would likely lead to loss of life and significant property damage.** Of these 230 high hazard dams, 136 are only in fair condition, meaning that extreme hydrologic and/or seismic events may result in a dam safety deficiency. More alarmingly, 26 dams are in poor conditions because a dam safety deficiency is recognized for loading conditions which may realistically occur. The average age of all dams in Kansas is 45 years.

Dam Hazard Status



Emergency Action Plans are a critical part of the state's dam safety program. Lack of planning puts downstream lives and properties at increased risk in the event of a dam breach.

Emergency Action Plans for High and Significant Hazard Dams



The dam safety program averages one full time employee responsible for 668 regulated dams. The national average is 208, meaning a higher workload per person in Kansas, and greater potential for missing deficiencies.

ECONOMICS:

Kansas ranks far below the national average in funding per high hazard dam and in funding per regulated dam. 2010 state budgets provided for approximately \$1,700 per high hazard dam versus the national average of \$3,900, and \$60 per regulated dam versus \$500.

RESOURCES:

1. National Inventory of Dams, U.S. Army Corps of Engineers, 2010.
2. Dam Safety Performance Report for the State of Kansas, Association of State Dam Safety Officials, 2010.
3. 2011 Statistics on State Dam Safety Regulation, Association of State Dam Safety Officials, July 2012.
4. Federal Guidelines for Dam Safety, Federal Emergency Management Agency, April 2004.
5. Division of Water Resources Dam Rules and Regulations, K.A.R. 5-40-1 to 5-40-106, October 2008.

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DRINKING WATER

RECOMMENDATIONS:

- Develop dedicated revenue sources for nutrient and sediment removal and for increased funding for improved irrigation efficiency and management.
- Negotiate interstate compacts for allocating and managing groundwater resources with adjoining states.
- Increase participation in Water Transition Assistance Program (WTAP) to encourage conservation.
- Continue and strengthen long-term management of the Ogallala High Plains aquifer.
- Develop methods to increase recharge of Ogallala and other aquifers in Kansas.
- Support water reuse programs of wastewater for Kansas western communities.
- Encourage water utilities to develop and/or improve their local source protection plans.
- Promote programs which reduce sedimentation of Kansas' rivers and reservoirs.

EXECUTIVE SUMMARY:

Water is critical to our very survival. Adequate, clean drinking water is imperative for our health as well as the state's ability to attract and support industries that use water for producing materials. While Kansas, currently has a good supply of clean water; aquifers continue to be depleted and it is difficult to assess the true condition of the infrastructure. Estimates would indicate that there is a significant shortfall in water infrastructure funding in the coming years.

OVERVIEW:

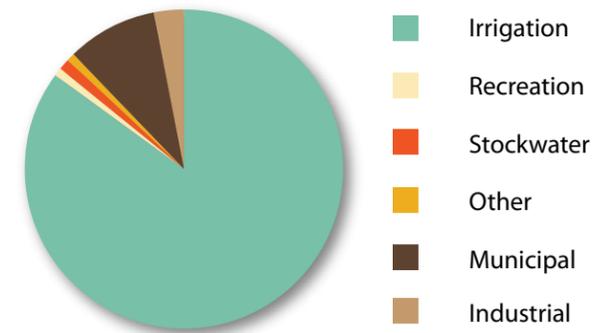
At the close of 2011, Kansas had a total of 1,021 public water supply systems including: 88 community systems, 89 non-community public water supply system and 44 non-transient non-community systems. According to a comprehensive study dated April 2012 titled "Water Main Break Rates, in the USA and Canada" Kansas was estimated to have approximately 11,000 miles of water pipe. Much of the infrastructure has reached the end of its' useful life. The majority of public water supply systems (59 percent) serve less than 500 people while only five water supply systems serve over 100,000 people. Even though 69 percent of the state's public water systems rely on groundwater resources, these same systems serve only 27 percent of the state's population.

The Kansas public water system was graded for capacity, water quality and public safety, and funding. The 2009 Kansas Water Plan provided information to grade capacity, water quality, and public safety. The Kansas Water Authority 2012 Annual Report to the Governor and Legislature was used to grade funding.

CAPACITY:

According to the Kansas Department of Agriculture, total water use in the state is about 1.6 to 1.9 trillion gallons of water per year. Historically, from 1990 to 2008 the largest use of water in Kansas is irrigation. By type of use, irrigation accounts for approximately two-thirds of total water use while water power and industrial only account for 16 percent and 9 percent, respectively. Actual drinking water represents only 9 percent of the state's total water use. Drinking water consumption is about 416 million gallons of the total 4,430 million gallons used per day in Kansas.

Historic Water Usage
(1990–2008)



A significant issue for water in Kansas is the ability for the state to accommodate current and future need for its water resources which also affects future need. Currently, the Ogallala High Plains aquifer supplies over 90 percent of water needs in Kansas and is the state's largest aquifer. **Annual withdrawals from the Ogallala aquifer exceed its average annual replenishment, and it is estimated that within 25 years some areas of the aquifer will be too depleted to support widespread, high volume pumping.**

Depletion of the groundwater resources is not limited to the Ogallala aquifer but also much of the other alluvial aquifers affecting many streams and rivers. The depletion of the Ogallala aquifer and others will not only affect pumping but also has resulted in decreased base flows of the Arkansas, Solomon, Smokey Hill, Pawnee, and Walnut rivers.

Capacity is also limited in much of Kansas since the majority of water rights for groundwater and surface water have been granted. Water rights are legal rights by a governing agency to a user for a specific apportion of a water source such as an aquifer, lake, river, or spring. Presently, the water rights for the Ogallala and many other aquifers have been fully allocated.

Also, during irrigation seasons, the majority of water streams have been granted with only the Kansas, Missouri, Little Blue, and Spring rivers available for allocation. Since water rights are significantly limited in much of Kansas, capacity to meet water demand in the state is limited.

In Kansas, capacity is also impacted by drought and sedimentation of its reservoirs. In 2006, about 17 percent (133 of 800 assessed) public water suppliers were considered drought vulnerable with the primary reason due to base source limitations. In 2007 due to concern of sedimentation of Kansas reservoirs, the Kansas Water Authority (KWA) adopted a strategic plan to better manage water resources of its lakes.

FUNDING:

According to the Environmental Protection Agency's Drinking Water Infrastructure Needs Survey and Assessment, Kansas has over \$4 billion in total need over the next 20 years. Kansas funding is administered by the Kansas Water Authority (KWA) through the state's Water Plan. In 2012, the budget was about \$17.9 million; due to state budget constraints, the budget for 2013 was reduced to \$13.3 million. The most significant change in program funding is \$1.58 million for the Water Transition Assistance Program (WTAP) and the Conservation Reserve Enhancement Program (CREP) which promote incentives to retire water rights and encourage conservation.

To maintain current funding the levels, the KWA has requested program funding from the State General Fund (SGF) and the Expanded Lottery Act Revenue Fund (ELARF). KWA has requested funding of \$6 million from the SGF and \$8.5 million from the

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DRINKING WATER

ELARF. These funding requests would be appropriated for programs such as improving irrigation system efficiency and nutrient and sediment reduction. Since this program funding is discretionary and not based on a dedicated revenue stream, the programs would be subject to potential future budget cuts.

The Kansas Water Office (KWO) also provides water under contract to municipal and industrial customers for water storage from federal reservoirs through the Kansas' Water Marketing and Water Assurance Programs. Based on the KWO 2010 Financial Report for these programs, from 2009 through 2024, a balance inequity for these programs is projected. The balance inequity is the result of the costs for using additional storage in Hillsdale and Clinton reservoirs and increased costs for operation while most customer contracts remain capped.

Presently, **there are no dedicated revenue streams to support the necessary funding to support the initiatives outlined in the Kansas Water Plan** for water conservation and improving management of water resources. Also, since current customer contracts are capped for the Water Assurance and Water Programs, a balance inequity in these funds can be anticipated.

PUBLIC SAFETY:

According to the Kansas Department of Health and Environment (KDHE), overall compliance with drinking water regulations by Kansas public water suppliers is about 97 percent. Even though most public water suppliers comply with state requirements, there is significant potential for contamination of many systems. In 2004, KDHE assessed 763 public water supply systems and found that 46 percent of groundwater systems and 49 percent of surface water systems had a moderate to high susceptibility to

contamination.

CONDITION:

Another water concern in Kansas is overall water quality of its streams and their ability to support their designated use for drinking, industry, and recreation.

In 2006, of the 18,679 miles of stream sampled, approximately 67 percent (11,776 miles) failed to support one or more of its designated uses. Similarly, about 81 percent (155,340 of 190,982 acres assessed) were impaired for one or more of their designated uses. Major causes for loss of the ability to support their designated uses by order of prevalence were:

- Nutrient removal (e.g. nitrogen and phosphorous)
- Natural climatic impacts (e.g. drought)
- Sedimentation (e.g. soil buildup in lakes)
- E. coli concentrations (e.g. fecal matter)

Although compliance with drinking water regulations is good in Kansas, many of these systems are susceptible to potential contamination at their sources. Also, many water resources are significantly limited for their designated use.

RESOURCES:

1. Kansas Department of Agriculture: Water Use in Kansas. <http://www.ksda.gov/appropriation/?cid=321>
2. Kansas Water Authority: 2012 Annual Report to the Governor and Legislature. http://www.kwo.org/%5C/reports_publications/Reports/Rpt_2012_KWA_Rpt_Governor_Legislature.pdf
3. Kansas Water Office: 2010 Financial Report for Kansas Water Marketing and Water Assurance Programs. http://www.kwo.org/reports_publications/Reports/rpt_2010_market_assurance_financial_report_061611_crb.pdf
4. Kansas Water Authority: 2009 Kansas Water Plan. http://www.kwo.org/%5C/Kansas_Water_Plan/Kansas_Water_Plan.htm
5. EPA 816-R-09-001:2007 Drinking Water Infrastructure Needs Survey and Assessment.
6. Kansas Department of Health and Environment -- State of Kansas Public Water Supply Annual Compliance Report - 2011
7. Utah State University Buried Structures Laboratory - Water main Break Rates In the USA and Canada: A Comprehensive Study April 2012

RECOMMENDATIONS:

- Provide a clear statewide Energy policy including potential sources of energy generation, goals for make-up of the future generation sources and the transmission (delivery) systems required.
- Provide for maintenance and retrofit to existing facilities, specifically the aging generation and transmission infrastructure.
- Continue to develop the wind energy generation projects and associated transmission lines to support future portfolio requirements and efficient marketplaces.
- Remove any unnecessary permitting hurdles that delay needed projects.
- Create proper incentives to catalyze the generation and transmission investments.

EXECUTIVE SUMMARY:

Kansas is one of the top 10 producers of fossil fuel and wind energy in the United States. Approximately 70 percent of the energy in Kansas is produced through coal power plants with another 20 percent being provided through nuclear energy. Recent developments in renewable energy have seen wind energy production increase to 5 percent of overall energy production in Kansas. Aging infrastructure and government regulation continue to be major drivers for large expenditures at both power plants and in the distribution system. Energy prices in Kansas are currently very affordable; however due to a projected \$107 billion dollar national shortfall in funding, additional costs will likely be passed along to the consumers and drive up energy costs. A clear plan for energy development should be developed for the state to help improve the current grade of “C-”.

BACKGROUND:

Energy and transmission infrastructure in North America is divided into several networks. These networks separate the infrastructure into geographical regions which are then managed by Independent System Operators (ISO). The ISOs are responsible for supplying the country with efficient and reliable energy. Kansas is part of the Southwest Power Pool (SPP) network.

The nation's energy is primarily generated from four different types of fuel: coal, gas/oil, nuclear, and renewables. The dominant fuel type varies by region but in general Gas/Oil is the predominant fuels in the SPP system. Kansas relies mostly on coal for its generation. **Currently, the SPP network is experiencing planning uncertainties related to fuel cost variability, wind tax credits, government environmental regulations, decaying infrastructure, land acquisition restrictions and growing load demand. These challenges and uncertainties make it difficult to anticipate and plan where investment needs to be focused relative to new projects, upgrades and maintenance.** Furthermore, generation and transmission reliability is a priority, but necessary projects are challenged by hesitancy to invest. However, power generation and delivery investment are both needed to upkeep the aging infrastructure, access renewable sources, assure reliability and create a more efficient energy marketplace.

ENERGY MAKE UP:

Kansas is a state with abundant fuel types used in generating power. **Kansas relies mainly on coal, nuclear, gas and wind generation**

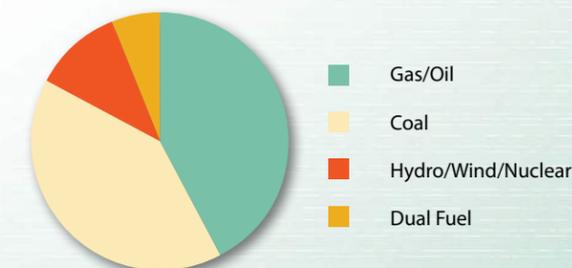
means. Kansas is a substantial contributor to wind generation, landing in the top 10 for output nationally. Kansas ranks in the top 10 for crude oil production and has one of the largest natural gas fields (Anadarko Shelf, Hugoton Gas Area) in the United States. Technological advances have made the recovery of bituminous coal more economical in many areas of Kansas, which were avoided in the past. These advancements have led to increased production seen in the Cherokee Platform. In addition to its resources, the state contains essential infrastructures needed to transport and process energy sources. Ethanol production is also a Kansas energy resource. Kansas' corn production creates a source for ethanol in the state; however, ethanol does not significantly contribute to energy generation.

POWER GENERATION AND DELIVERY CONDITION:

Kansas' current energy generation portfolio is predominately coal. **The state attributes roughly 70 percent of its energy production to coal**, with the remainder principally coming from nuclear means, via the Wolf Creek Plant. The Wolf Creek Plant recently renewed its licensing until 2045 and is forecasted to be a key contributor for the foreseeable future. **However, the Wolf Creek plant was recently forced to go offline for 73 days due to repair work at the plant.** Another source in the state is wind energy, which provides nearly 10 percent of its current power generation.

Wind production has potential in Kansas and recent reports show that Kansas ranked 3rd in wind turbine construction for 2012 and ranks 9th in wind production nationally. Kansas' new renewable standard, adopted in 2009, will require utilities in the state to provide one-fifth of their energy via renewable means by 2020. The state also exports roughly 40 percent of its energy to other states. The Kansas Governor Sam Brownbeck recently expressed concerns on Kansas' potential to maximize its wind generation potential without new transmission lines. **New investment in wind generation and**

transmission is needed to meet these goals. This will be challenged by the expiration of existing wind incentives. Natural gas also plays a role in Kansas' energy generation, contributing nearly 6 percent to its portfolio. Many utilities around the country have found that gas generation is an immediate solution to the generation lost by decommissioned coal plants. **Coal plants can be decommissioned due to environmental regulations and gas has less of an environmental impact associated with emissions.** Kansas does not prescribe to cap and trade rules but is an observer of the Western Climate Initiative and is a member of the Midwestern Regional Greenhouse Gas Reduction Accord. Both of these organizations are closely tied to cap and trade, which will principally impact coal generation. The introduction of the U.S. Environmental Protection Agency's (EPA) cross state pollution standards will have an impact on utilities. **Some fear that brownouts and blackouts are possible without proper investment** to modify or replace the current generation types as these environmental standards are enforced. Nationwide, **miles of aging transmission systems are exceeding their design life** and environmental events associated with wind and ice storms will likely impact the reliability of these systems. To maintain, expand and improve these transmission systems, projects must overcome land acquisition obstacles. These obstacles can drastically affect the outcome of these necessary projects.

Southwest Power Pool (SPP) Network

INVESTMENT PLANNING:

All power generation facilities and transmission systems require maintenance and replacement; especially those in excess of 30 to 50 years old, which is the typical design life for most electrical infrastructure. New design codes and environmental policies impact on how power producers assess the upgrade or replacement potential of existing infrastructure. For instance, nationally, 73 percent of coal-fired plants and 70 percent of transmission systems are in excess of 30 years old. Utilities have dedicated staff to make decisions about routine maintenance to ensure reliability of the source. **However, routine asset maintenance differs in magnitude from large capital improvement projects driven by new codes, environmental regulations or strategic transmission needs. Prioritizing this work will require incentives to ensure that capital investment align with the strategic energy needs of our nation. Consistency in environmental regulations, incentives to act and faster access to land rights for transmission projects could provide power providers better means by which to plan future capital projects, maintenance and upgrades.**

ECONOMICS:

In the SPP region, the anticipated growth in the upcoming years is forecasted to be roughly 1.16 percent (per year). As of 2010, the SPP generation portfolio consisted of the following breakdown: gas/oil (42 percent), coal (40 percent), Hydro/Wind/Nuclear (11 percent), Dual Fuel (6 percent).

Kansas power customers are currently provided some of the least expensive energy in the country, in relative terms. This is principally linked to Kansas' use of coal generation. **Tightening rules regarding SO2 and NO2 emissions will create the need for large capital improvements at plants leading to higher prices**

for users, needed to pay for these projects. This is occurring around the nation today. In the future, potential carbon regulations will impact prices but this is less eminent than SO2 and NO2 regulations, which are already moving forward. The reasons for these standards have been provided by EPA and are linked to prevention of premature deaths, preventable sick days and \$280 billion dollars of healthcare benefits.

The condition of the existing power transmission system is important to monitor. Sources indicate that a national shortfall of \$37.3 billion in investment is expected between now and 2020.

Without the needed improvements, the probability of failure associated with environmental wind storms and ice events increases for transmission infrastructure.

Utilities can create a more reliable business model through more efficient transmission systems. Creating an efficient system appears to be an opportunity currently being vetted. Transmission infrastructure is critical to creating reliable energy distribution network for a day-ahead marketplace. With the establishment of a day-ahead marketplace, it appears that utilities and their clients could potentially benefit from these efficiency's as well as improve reliable energy delivery. **Financial incentives and improvements to permitting speed and land access would help accelerate these projects.**

Renewable energy in Kansas is moving forward but its future appears to be closely tied to the economic benefits of credits and other incentives associated with wind. **Without these incentives, many speculate that this market becomes less viable for prospective investors and power producers.**

Gas is abundant in Kansas and is beginning to establish a marketplace that has proved reliable in the near term. This marketplace is tied to innovative methods of drilling and a strong demand. **Infrastructure projects associated with gas delivery have proven**

to be difficult to permit due to environmental challengers, delaying the potential economic benefits of gas exports and the associated jobs. Gas is being used around the country for new power generation and also to replace decommissioned coal plants, due to its decreased emissions.

Given current trends, a national investment shortfall of \$107 billion is expected by 2020. Eleven percent of this shortfall is new generation and 89 percent is transmission and distribution. The SPP alone is expected to have an investment shortfall of \$2.4 billion by the year 2020. This lack of investment is expected to reduce GDP by \$70 billion and cost 529,000 jobs by the year 2020.

CONCLUSION:

Power customers in Kansas are currently benefiting from reliable and cheap energy. The state relies on power from multiple sources but largely coal. This infrastructure will need to expand and upgrade due to new demand, current age, and environmental standards. Wind energy is growing but could stall due to expiring incentives. The state delivers energy through a transmission network that is aging and needs to grow to meet the new renewable sources. Gas production has become an important part of the Kansas economy but its potential is tied to environmental regulations, which may delay projects. The power generation and delivery market is facing investment needs driven by new demand, environmental regulations, deteriorating infrastructure, expiring incentives, land acquisition restrictions and a lack of proper enticements to investment. Finding permitting and regulatory balance, coupled with investment solutions will require action by government, power providers and power users.

RESOURCES:

1. http://www.spp.org/publications/2010_SPP_Strategic_Plan.pdf
2. <http://205.254.135.7/state/state-energy-profiles.cfm?sid=KS>
3. <http://205.254.135.7/state/state-energy-profiles-analysis.cfm?sid=KS>
4. http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=KS07R
5. <http://www.instituteforenergyresearch.org/state-regs/pdf/Kansas.pdf>
6. <http://www.kansascity.com/2011/12/02/3302145/kansas-utilities-predict-new-epa.html>
7. http://205.254.135.7/forecasts/archive/aeo11/source_nuclear.cfm
8. http://www.asce.org/uploadedFiles/Infrastructure/Failure_to_Act/energy_report_FINAL2.pdf
9. <http://www.bizjournals.com/kansascity/news/2013/04/16/wolf-creek-nuclear-plant-repairs.html>
10. <http://www.kansascity.com/2013/04/11/4176084/kansas-moves-up-in-wind-energy.html>
11. <http://www.mcclatchydc.com/2013/03/25/186856/new-transmission-lines-funnel.html>

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LEVEES

RECOMMENDATIONS:

The state of Kansas has standardized regulatory or statutory rules governing design and construction of levees. However, there is no federal or state inventory or inspection program for those levees that are not part of the National Levee Inventory or the USACE PL 84-99 program.

There are several cities throughout the state with populations over 10,000 that require extensive protection from flooding by levee systems for the majority of their populations. Development continues to occur behind levees in both urban areas and less populated areas, without a comprehensive system to ensure adequate flood protection levels or adequate funding to maintain levee infrastructure.

- There should be a greater effort to ensure proper identification, inspection and maintenance of levees in the state.
- Adequately fund efforts to ensure the ongoing maintenance and operation

(continued)

EXECUTIVE SUMMARY:

It is estimated that over 1,000 miles of levees exist in the state of Kansas. Only 490 miles of this total distance are under the jurisdiction of the U.S. Army Corps of Engineers (USACE) and have any documented ongoing inspection or maintenance program. Of the 395 miles of levees that have been inspected in the last three years only 79 percent were considered minimally acceptable with less than 1 percent considered unacceptable. If the total number of levee miles are considered the percentage of unacceptable levees would increase substantially. A yearly expenditure of between \$5 and \$50 million dollars would be needed annually to fund the necessary maintenance to bring all levees to an acceptable level. To help do this and increase the current grade from a “C-” a set of standardized regulatory rules should be developed and put into place for all levees not just those under the U.S. Army Corps of Engineers’ jurisdiction along with funding sources to assist in completing the necessary inspections and improvements.

BACKGROUND:

Levees in the state of Kansas provide flood protection for lands in urban, suburban, and rural/agricultural settings that would otherwise be subject to frequent flooding. Although levees have long been utilized for flood protection in the state of Kansas, **there are no consistent standards or regulations governing the maintenance and ongoing inspection of levees in the state.**

Levees in Kansas are owned and maintained by a variety of organizations, including the federal government, state government, local drainage and levee districts, local governments and government entities, and private interests such as power plants, industrial and commercial sites and agricultural areas. In the National Levee Database (NLD), there are 12 levee units in the state representing 26 levee miles for which the sponsor or owner is unknown or does not exist.

Although a comprehensive tabulation of all levees in the state is not available, the NLD, or a compilation of levees participating in USACE programs, lists a total of 98 levee units which are wholly or partly in the state of Kansas with a total length of 490 levee miles. It is estimated that a large percentage of levees in the state of Kansas are not included in the NLD nor have they been inventoried by the state of Kansas Department

of Agriculture, Division of Water Resources. Due to the large number of levee miles along the Kansas River and Arkansas River as well as several of the large tributary rivers and streams, it is impossible to tell the actual number of levee miles in the state of Kansas.

The Levee Law of 1929 makes it unlawful to construct fills and levees without prior approval from the Chief Engineer, Division of Water Resources, Department of Agriculture. Approximately 75 percent of the permitted levees in Kansas were constructed prior to 1987 when specific design requirements were adopted in Kansas Administrative Regulation. A statewide inventory of levees has never been undertaken and many unpermitted levees are known to exist, especially in rural areas.

For levees designed and constructed by the USACE, the responsibility of operations and maintenance has been turned over to the local sponsor in most cases, which is typically a community, drainage district or levee district. These communities participate in the USACE’s PL 84-99 program, which allows the USACE to provide funding and assistance for preparedness, response activities, and certain types of rehabilitation. As part of this program, the USACE completes annual inspections, and more detailed periodic inspections of the levee systems approximately once every five years. In order to remain eligible for the PL 84-99 program, the levee sponsor must maintain the levee system in an acceptable, or minimally acceptable condition.

FEMA requires that for levees to be shown as providing protection for the 1 percent chance annual flood event on a Flood Insurance Rate Map (FIRM), they be certificated by a licensed professional engineer. FIRM’s are used by local communities to administer floodplain management ordinances and to remain in compliance with the National Flood Insurance Program (NFIP). FIRM’s are also used by lending

institutions to determine if a home is in a 100-year floodplain.

Homeowners with federally backed mortgages whose homes are within the 100-year floodplain, are required to purchase NFIP flood insurance. If a levee system within the state were to lose its FEMA accreditation by not being certified, then those residents would be mapped as being in the 100-year floodplain and subject to mandatory flood insurance requirements for federally backed mortgages and other regulations. It is estimated that between **100,000 and 300,000 homes and businesses are currently mapped on FEMA FIRM’s as protected by levees within the state.**

The requirements for a levee to be certified are provided in FEMA’s Code of Federal Regulations, Section 65.10 (CFR 65.10). Among these requirements are having adequate freeboard for the 1 percent chance annual flooding event, meeting levee seepage and stability levee design requirements, and maintaining an operations and maintenance manual for the levee system. FEMA requires this documentation of certification in order for a levee to continue to be shown as providing protection on any new FIRM project.

Multiple communities in the state of Kansas have either provided or are in the process of providing this certification documentation, including Augusta, Dodge City, Gypsum, Hutchinson, Lawrence, Manhattan, Marion, Osawatomie, Ottawa, Salina, Topeka, and Wichita to name a few. This has been completed so that their new floodplain maps continue to show these levees providing protection for the 1 percent chance

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LEVEES

RECOMMENDATIONS: (continued)

of the levees. This is especially true for those non-federal levees that are not part of the USACE PL 84-99 Program.

- A statewide inventory of levees should be undertaken.

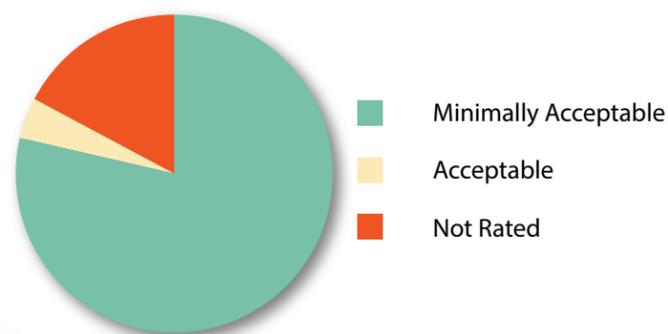
The levees in the state of Kansas receive a grade of C- due to the large uncertainty of existing condition of levees, the uncertainty on availability of funds for future repairs and improvements, and the continuing deterioration of the levee infrastructure as it reaches and exceeds its design life. With the exception of the levees in the USACE's NLD and PL 84 - 99 Program, there is a lack of information about this chapter's levees and the areas or infrastructures they protect.

annual flooding event. While all of the listed communities are in the USACE PL 84-99 program, are compliant with that program and have active maintenance programs, most of these communities were required to complete or are in the process of completing levee rehabilitation projects in order meet FEMA certification requirements.

CONDITION:

Regular maintenance and inspection of all levees in Kansas is the responsibility of the individual levee owners or sponsors. The NLD indicates that approximately 395 levee miles (80 percent) have been inspected since 2009. Based on the results of these inspections, less than 0.29 miles (<1 percent) were considered unacceptable, 386 levee miles (79 percent) were considered minimally acceptable, 21 levee miles (4 percent) were considered acceptable, and 84 miles (17 percent) were not rated in the database.

Levee Miles Inspected Since 2009



The levees in the NLD have an average age over 50 years, and this is likely indicative of the age of levees in general. Although the information gathered on documented levees indicates good inspection and maintenance frequency, this information likely represents much less than half of the actual levee miles currently constructed. Because the levees contained in the NLD are typically in the USACE PL 84-99 program, they typically see much more maintenance and repairs than those levees that are not contained in the NLD. Therefore, **there is a much higher percentage of levees operated and maintained in an unacceptable condition when considering all levees throughout the**

state, than those levees contained within the NLD. In addition, as levees age, they require more intensive maintenance and vigilance to ensure they will perform properly in a large flood event.

The improvements and development behind levees, in levee protected areas, continue to have residual risk from the potential failure or breaching of the levee. Often, the residents and businesses behind a levee do not recognize the protection of the levee, nor do they understand the requirements to ensure a properly functioning levee. **With no universal or state standards and regulations for inspection, operation and maintenance of levees, the actual condition of levees and risk to properties protected by levees is often misunderstood by those protected.**

For example, levees that once protected agricultural fields from frequent flooding along small streams were often designed with only a 10-year or 25-year protection level, since overtopping or failure of the levee only threatened agriculture. However, these same levees may now protect newer homes and businesses which depend on the levee's protection but are unaware of the level of protection and overall importance of the levee to prevent flood damage. If a moderate flood event occurs that exceeds the capacity of the levee, the homes and businesses could be subject to significant flood damage.

Very few levees in Kansas (less than five) have provided FEMA documentation of certification in accordance with FEMA 65.10 thus far, although additional communities are working on obtaining this certification. There are a number of levee system operators who are in the process of having consultants develop this documentation. However, this process has been slow as much of the documentation to show compliance with FEMA 65.10 does not exist and has had to be developed, and in many cases levee rehabilitation or repairs are needed before certification

of the levee system can be completed.

The condition of levees in Kansas is generally minimally acceptable based on evaluation of documented levee locations in the NLD, but there is not a comprehensive list of levees, their design protection level, and conditions. Furthermore, those undocumented levees are far more likely to be lacking maintenance or have serious deficiencies than those levees that are documented as part of the NLD.

ECONOMICS:

There is not a definitive measure of the condition or potential for repairs on levees in the state. The USACE pays 75 percent to 100 percent of repairs for levees in various USACE programs, if the levee system is eligible for one of these programs and if funding is available. However, the USACE funding has been flat and is subject to yearly appropriations. Thus, the USACE may not be able to cover all repairs that are identified and eligible due to limited funding. This indicates that yearly mowing of grass lined levees may be feasible, but replacement of aging pipe penetrations through levees, settlement or erosion damage, repair/replacement of concrete structures, or other larger capital improvements to maintain the integrity of an aging system are not adequately funded.

Repair of levees can range from \$20,000-50,000 per levee mile for minor repairs or vegetation establishment to several million dollars per mile for upgrades to provide adequate protection or repairs necessitated by a levee failure. It is likely that a small

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LEVEES

percentage of levees in the state have adequate funding for long-term repairs that will be required as the levees continue to age.

Based on the above figures, **it is estimated that there are likely a minimum of 1,000 miles of levee in the state of Kansas (assumes twice the number of miles of that contained in the NLD), and nearly all of these miles will require maintenance in the next 20 years. Assuming an average improvement cost of \$100,000 to \$1 million per levee mile that is currently not funded, the resulting funding deficit is \$100 million to \$1 billion over the next 20 years, or approximately \$5 million to \$50 million per year.**

RESOURCES:

1. ASCE – Infrastructure Report Card (2009).
2. National Committee on Levee Safety – Recommendations for a National Levee Safety Program (Draft) (January 15, 2009).
3. National Committee on Levee Safety Web site: <http://www.leveesafety.org/index.cfm>, accessed December 2012.
4. National Levee Database Web site: <http://nld.usace.army.mil/egis/f?p=471:1:0::NO>, accessed December 2012.
5. Interagency Levee Policy Review Committee – The National Levee Challenge, Levees and the FEMA Flood Map Modernization Initiative (September 2006).
6. Kansas Department of Agriculture Web Site: <http://www.ksda.gov/dwr/>, accessed December 2012.

C

RAILROADS

RECOMMENDATIONS

- Identify and address critical bottlenecks and high volume to capacity corridors, identify economic impact.
- Apply for and receive federal funding for short-term investments identified in the Statewide Rail Plan.
- Identify funding sources for long-term investments identified in the Statewide Rail Plan.
- Continue to identify improvements to passenger rail as an alternate for intercity travel, and apply for federal funding for these investments.
- Continue to identify ways to align with the National Rail Plan for intermodal and multimodal systems for the efficient movement of people and goods.

EXECUTIVE SUMMARY:

Railroads in Kansas consist of 4,700 miles of track and move 340 million tons of freight through the state. The 2,800 miles of track owned by the major rail companies are typically well maintained, it is the shortline tracks that carry lower traffic volumes that have not had adequate funding in place to provide the necessary maintenance and upgrades. Rail traffic is forecasted to increase and will cause increased delays in moving both goods and passengers. It is estimated that the railroad industry provides \$5 billion in economic benefit to Kansas. To maintain this benefit and help improve the current “C” grade, adequate funding must be found to increase rail capacity and help to align the state with the National Rail Plan.

BACKGROUND:

Kansas has the sixth largest rail system in the United States in terms of total rail miles, tons of freight carried, and total number of carloads carried. Statewide, railroads play a vital role for both rural and urban economies. Farmers ship grain by railroads, which keep freight costs low, and keep trucks off of the highways.

Centrally located, Kansas City is the third largest railroad center in the United States, serving as a crossroads for freight and passengers². Approximately 340 million tons of freight terminate, originate, or move through the state of Kansas. Grain and coal are the two largest commodities exported and imported respectively.

The state of Kansas has recognized the economic importance of its railroad system and has developed the Kansas Statewide Rail Plan. This plan evaluated existing conditions, analyzed current economic impacts, and established long-range goals for the state’s railroad system. The plan will serve as guided growth for railroad development in the future.

CONDITION:

Kansas has approximately 4,700 miles of railroad track. Of the 4,700 miles, approximately 2,800 are owned by Class I railroads, which are the largest railroad companies. The remaining track is owned or operated by Class III railroads and tourist railroads. The three Class I railroads that operate in Kansas are Union Pacific Railroad (UP), Burlington

Northern Santa Fe Railroad (BNSF), and Kansas City Southern Railroad (KCS). There are 14 Class III railroads, or shortline railroads, that shuttle freight between the Class I carriers and the local shippers and receivers. Much of the freight railroad infrastructure is privately owned and maintained by the railroads.

Class I railroad carriers depend on efficient transportation to make a profit. Having sufficient capacity and well maintained infrastructure is an important part of the Class I railroads’ business strategy. Therefore, in general, the capacity and condition of the major railroad corridors is well managed by the railroad carriers.

Capacity Study

An evaluation of the capacity of railroad tracks across the country was performed in the National Rail Freight Infrastructure Capacity Study. The Capacity Study evaluated major railroad corridors by the ratio of the corridor’s volume to the corridor’s capacity. A ratio of 0.7 or less indicated low to moderate traffic with the ability to accommodate maintenance and recover from incidents, and a ratio between 0.8 and 1, indicated heavy traffic with limitations on maintenance and potential service impacts during recovery from incidents.

Based on the Capacity Study, many miles of railroad corridor through Kansas were found to be operating at a volume to capacity ratio of 0.7 or less, which is considered to be below capacity. Only a small portion of the major railroad corridors were found to operate at a volume to capacity ratio between 0.8 and 1. However, nationally, many state’s main railroad corridors were found to operate at a volume to capacity ratio of 0.7 or less, indicating room for improvement in Kansas. Additional passing sidings and signal control improvements have been identified to improve

capacity.

In addition to improvements to the railroad system for current capacity, Kansas should plan for growth and future traffic. **The Kansas Statewide Rail Plan has forecast railroad freight traffic to increase by about 36 percent by the year the year 2030.** The Capacity Study forecasted future corridor volumes to current corridor capacity and the majority of the railroad corridors in Kansas were found to be at volume to capacity ratios of 1. **Therefore, without continual upgrades and improvements, Kansas’s railroads will be operating at or above capacity in the future.**

The Class III railroads generate less revenue than the Class I railroads and generally operate at lower speeds and have smaller volumes. Therefore, much of the Class III track has not received the maintenance and upgrades that the major railroad corridors have. The lack of maintenance and upgrades has resulted in more than ½ of the shortline railroad system being limited to 263,000 pound cars, while the Class I railroads use 286,000 pound cars. The difference in weight for farmers shipping grain translates to higher shipping costs.

It is anticipated that the traffic forecasts for the shortline railroads will be similar to those of the Class I railroads. **Therefore, shortline railroads not only need to be upgraded for current capacity but should be upgraded to account for forecast traffic levels.**

INTERMODAL AND MULTIMODAL RAILROAD FACILITIES:

Multimodal refers to systems with more than one transportation mode available, while intermodal

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RAILROADS

refers to connecting different modes of transportation. The Statewide Rail Plan identifies the regional intermodal facilities and their role in international freight shipping. T-WORKS is Kansas's multimodal transportation program. T-WORKS increased the State Rail Service Improvement Fund from \$3 million to \$5 million starting July 1, 2013 in response to public support of improving short line railroads.

Kansas's vision for their intermodal system includes developing the railroad system to provide efficient transfer of people and goods from one transportation mode to the next, and integrate with the National Rail Plan to form a more complementary transportation system. A new intermodal facility is being constructed outside of Edgerton. This facility will connect local shippers to national and international shipping opportunities via the BNSF railroad that connects to ports in Long Beach California, and other rail facilities in Chicago, Illinois.

Passenger Railroad

Amtrak operates the Southwest Chief along BNSF track through Kansas. The on-time performance of the entire route for 2010 was 79.1 percent, which was a 6 percent decrease from their 2009 performance. Approximately 25 percent of the delays were attributed to train interference, and another 25 percent of the delays were attributed to operational conflicts. Despite a reduction of on-time performance, average ridership increased by approximately 25 percent since 2005. Total ridership in 2010 was 44,081 passengers. This number represents riders boarding or exiting the train at one of the six stations that the Southwest Chief serves in Kansas.

Kansas is considering additional passenger rail services in concert with recent federal initiatives to expand the passenger rail network. KDOT has actively pursued

grants from the Federal Railroad Administration (FRA). Kansas has teamed with Oklahoma to study a new passenger rail route, and has joined the Midwest Regional Rail Initiative, which is a consortium of Amtrak, FRA, and nine Midwestern states, which advocates for passenger rail in the Midwestern states.

Safety

There are approximately 6,000 at grade public crossings in Kansas. Grade crossing accidents and fatalities have decreased over the past five years. Despite this positive trend, safety is an ongoing challenge. Rail safety initiatives should continue to play an important role in future railroad planning.

ECONOMICS:

The railroads in Kansas provide direct and indirect economic benefits. Direct benefits include jobs for Kansas residents and payroll taxes and property taxes for the state. Indirect benefits include fuel savings, highway maintenance savings, and shipping cost savings. It has been estimated that the total annual benefit from operation of the railroad system is over \$5 billion.

Class I Investments

The Class I railroads are not required to report their infrastructure investments by state. However the Class I railroads often provide news releases that outline their planned investments in the states that they operate in. In a news release dated May 15, 2012, BNSF announced it would spend \$242 million in Kansas in 2012 for maintenance, capacity enhancement, and expansion.

On April 19, 2013, Union Pacific announced it would spend \$19 million on enhancements on the railroad between Salina and Oakley. Union Pacific also

invested \$28 million in 2012 on the railroad between Wellington and the Kansas Oklahoma border.

Future Investments

In accordance with the federal Passenger Rail Investment and Improvement Act, Kansas has identified short- and long-term investment programs. Short-term investments include replacing rail, new switching yards and upgrading at-grade crossings. Many of these projects have federal funding sources. Long-term investments include upgrading shortline railroad, adding sidings, and upgrade existing yards and tracks. **Funding sources for the long-term investments have not been identified yet.**

RESOURCES:

1. Babcock, M., Bunch, J., Sanderson, J., Witt, J., Kansas State University. (2003). Economic impacts of railroad abandonment on rural Kansas communities (KS-03-4). Topeka: Kansas Department of Transportation.
2. HNTB Corporation. (2012). Missouri state rail plan. Jefferson City: Missouri Department of Transportation.
3. Wilbur Smith Associates, HDR Corporation, Olsson Associates, Patti Banks Associates. (2011). Kansas Statewide Rail Plan. Topeka: Kansas Department of Transportation.
4. Cambridge Systematics, Inc. (2007). National rail freight infrastructure capacity and investment study. Washington, D.C.: American Association of Railroads.
5. Cambridge Systematics, Inc. (2009). Kansas statewide freight study. Topeka: Kansas Department of Transportation.

RECOMMENDATIONS

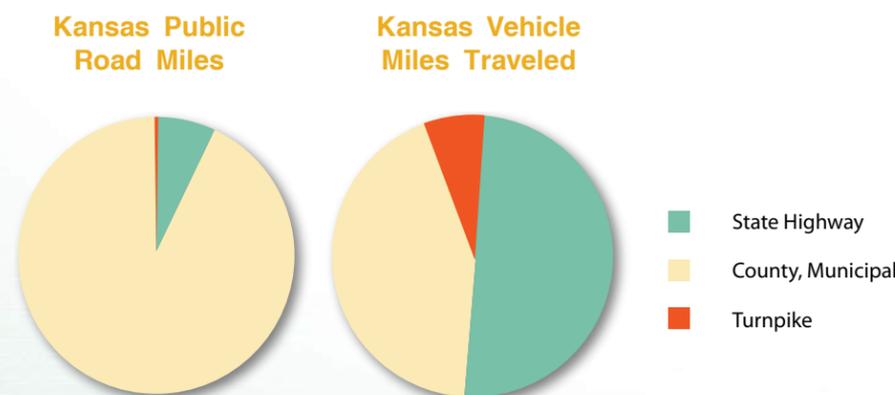
- Keep road safety a top priority to reduce traffic fatalities and injuries; continue placing road safety at the top of selection criteria for road improvement projects.
- Fulfill T-WORKS funding promises to maintain and expand the state highway network. Decreased levels of funding will have a negative impact on Kansas's state highways good pavement condition and ability to meet traffic demand.
- Emphasize importance of preservation projects to key decision makers and the public to ensure maintenance is performed before major rehabilitation is required.

EXECUTIVE SUMMARY:

Kansas can take pride the overall condition of its highway system. The state is also seeing a significant increase in seat belt use and a corresponding reduction in fatal crashes. Funding, however, is a major concern. While preservation projects are fully funded until 2020, there is a shortfall in modernization and expansion funds. Furthermore, current practice of transferring money out of the T-WORKS program to balance the state budget is troublesome. The state should work to fulfill the T-WORKS funding promises.

BACKGROUND:

Kansas has over 140,000 miles of public roadways, with drivers traveling nearly 82 million miles on roads every day. The Kansas Department of Transportation (KDOT) is responsible for administering the state highway and local transportation programs. While KDOT's roadway network consists of only 10,300 miles of the state's total public road miles, 51 percent of the daily miles traveled are on these roads. This section of the Report Card only addresses routes owned and maintained by KDOT, with a brief overview of routes owned and maintained by Kansas Turnpike Authority (KTA).



CONDITION:

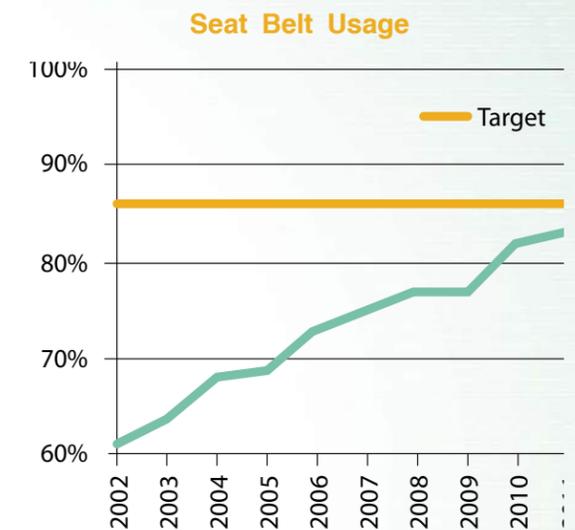
The condition of Kansas's roads can be measured by several factors:

- Public safety
- Pavement condition
- Capacity
- Resilience

Public Safety

In 2010, KDOT set a goal to reduce traffic fatalities and injuries by 50 percent by 2020. Current performance measures indicate a decreasing trend in accident fatalities and injuries over the past decade, coinciding with an increasing trend in seat belt use. KDOT's seat belt use goal is 86 percent usage by 2016; in 2011, seat belt usage was at 83 percent.

Vehicle crashes have many causes and KDOT focuses on the 4E's of traffic safety to reduce crashes: engineering, education, enforcement, and emergency medical services through the Strategic Highway Safety Plan (SHSP) (KDOT, March 2012).

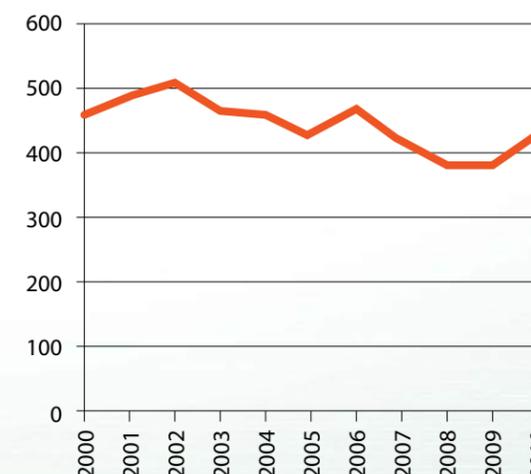


The results of safety data tracking and research help KDOT develop safety improvements and steer investments. KDOT works with many organizations and programs throughout the state to support safety initiatives including:

- Occupant protection (child passenger safety, seat belt use)
- Drunk driving and impaired driving prevention
- Motorcycle safety
- Work zone safety
- Pedestrian and bicycle safety

KDOT's emphasis on the many factors relating to road safety seeks to improve the public's quality of life by reducing crashes. Their efforts to make roads safer also include maintaining the state highway system pavement in good condition.

Annual Fatalities in Kansas



Pavement Condition

KDOT sets a high threshold for pavement condition based on pavement health. Pavement health is monitored based on the following pavement factors:

- Pavement roughness (surface quality)
- Joint distress and cracking (structural quality)
- Faulting and rutting (structural quality)

The state highway system exceeds the pavement condition goals and has consistently seen 80 percent of roads being in good or very good condition since 1980. KDOT's investment in preservation projects helps create a safe and smooth ride for Kansas road users through maintaining the pavement condition at or above the set thresholds.



Capacity

KDOT's transportation program for state highways is primarily focused on preservation, but 30 percent of the funding through 2020 is allotted toward modernization and expansion projects.

- Modernization projects improve the existing roadway (e.g. addition of shoulders, clear zone improvements, and straightening curves).
- Expansion projects improve the roadway

through new construction (e.g. addition of lanes, new interchanges, and improved access).

The current state highway program anticipates funding approximately 20 percent of projects outlined in the Statewide Transportation Improvement Plan (STIP), selected through local consultation with communities throughout the state. In order to address the need for all modernization and expansion projects, additional funding would be required. However, preservation projects also play a large role in meeting user demand by maintaining the existing roads that Kansas road users already depend on.

Resilience

Resilience is the ability of Kansas's state highway system to endure natural and human-made events and return to normal service following these incidents. KDOT takes an all-hazards approach to mitigate risks to the road system and respond to emergency incidents. Programs and procedures have been developed to maintain safety and mobility in an emergency, including:

- Kansas 511: road condition information (e.g. weather, crash reports, construction detours)
- Intelligent Transportation Systems (ITS): AMBER alert, detour information, incident management, emergency notification

Kansas Turnpike Authority (KTA)

KTA owns and maintains 236 miles of tollway throughout the state:

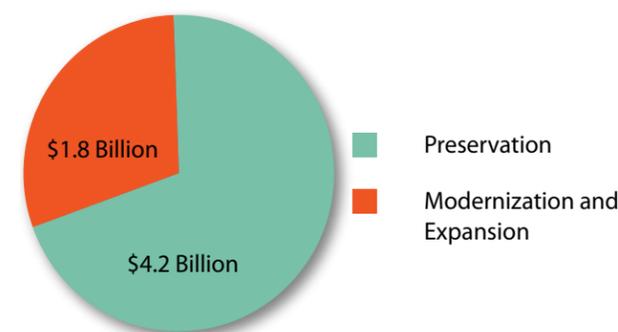
- I-70 from Topeka to Kansas City
- I-470 around Topeka
- I-335 from Topeka to Emporia
- I-35 from Emporia to the Kansas/Oklahoma border

KTA follows a pavement resurfacing schedule to meet customers' expectations. While KTA pavement condition is not tracked, KTA estimates their tollways meet or exceed KDOT's performance measure threshold for interstates. Traffic demand is met through preservation and expansion projects (e.g. mill and overlay, additional lanes).

ECONOMICS:

T-WORKS, is a \$7.8 billion, ten year transportation program (2011-2020). The program allocates a minimum of \$8 million to each of Kansas's 105 counties. As stated previously, spending on state highways is divided into two parts preservation and modernization and expansion.

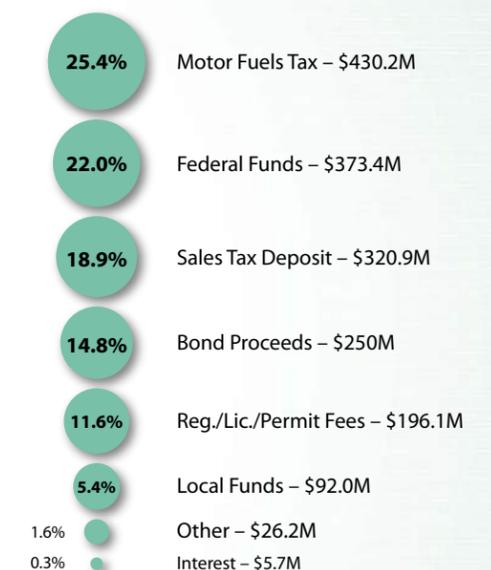
T-WORKS State Highway Funding: \$6 Billion



T-WORKS is expected to completely fund all preservation needs of the state highway system through 2020. This commitment to maintaining existing state roads puts Kansas well ahead of other states that struggle to cover preservation projects. However, approximately 20 percent of all modernization and expansion project needs in the STIP can be funded in the program. A continued commitment to sustainable funding mechanisms is essential to completing additional modernization and expansion projects.

Revenue sources include funding at both the federal and state levels.

KDOT All Funds Revenue Sources FY 2013



KDOT Transportation Funding Overview, April 2012 Economic Lifelines Kansas

T-WORKS assumes federal funding in the new federal transportation program Moving Ahead for Progress in the 21st Century (MAP-21) is at or near the level of federal funding seen in previous years through the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). T-WORKS also relies heavily on the motor fuels tax, an increasingly unsustainable revenue source as vehicles become more fuel efficient. A decrease in federal and state funding levels has a direct impact on the quality of roads in Kansas, from safety to pavement condition.

Kansas Turnpike Authority

KTA is funded solely from user fees and does not receive any federal or state funding. Capital improvements are primarily funded through bonds. KTA revenue has remained stable through the recent recession and projected trends show continued revenue growth. A recently completed long-term needs study identified three major categories for funding improvements:

- Capital improvement needs: system upgrades, widening, major bridges, pavement replacement
- Operations and maintenance
- Replacement reserve fund: “major, extraordinary items”

RESOURCES:

1. Economic Lifelines Kansas. (April 2012). Transportation Funding Overview. Retrieved from <http://www.economiclifelines.com/EL%20KDOT%20Presentation%20Spring%202012.pdf>.
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SCHOOLS

RECOMMENDATIONS:

Looking at just the funding amounts compared to future expenses, Kansas has a growing issue of maintaining or replacing old and deteriorating buildings. Unless strides are taken to improve these buildings, their condition will only worsen, and the cost to maintain them will increase. Over 50 percent of all schools (more than 900), were built before 1960. There was such a huge building expansion in the 1950s that the following actions need to be taken to maintain Kansas's school system:

- Evaluate the condition and implement an asset management plan for all school buildings.
- Develop and fund a 10 year plan to modernize outdated schools and provide maintenance for newer buildings.
- Encourage school administrators to evaluate and report their maintenance and funding needs annually for input into the overall school building plans.

EXECUTIVE SUMMARY:

Like many states in the Midwest, Kansas had a significant building boom from 1950 through 1970. The current amount of older buildings is expected to have a significant impact on the maintenance costs incurred by school districts. They must also plan for future replacement of many of these older buildings. It is important for school districts to evaluate the condition and implement an asset management plan for all buildings.

BACKGROUND:

The Kansas State Department of Education produces its own Kansas Building Report Card annually to provide information to the general public about state testing, attendance rate, crime, funding, age of buildings, and a wide range of other information. Although this information is helpful, it does not provide the full picture as to the age and condition of the buildings.

There was a huge expansion in the 1950s where the amount of schools in Kansas more than doubled. These building are now 60 years old and many are in need of major repair or replacement. As buildings get older, the need to replace them or make costly repairs increases. This has led to some school districts are being forced by budget cuts to close the doors to older, less populated schools.

CONDITION:

The state of Kansas school system reports a total of 2,589 buildings. In the schools database only 1,766 buildings have the year they were built on file due to missing data. Less than 10 percent of those buildings were built in the last 20 years and approximately 30 percent of the buildings were built before 1950. The average age of reporting school buildings in Kansas is 60 years old.

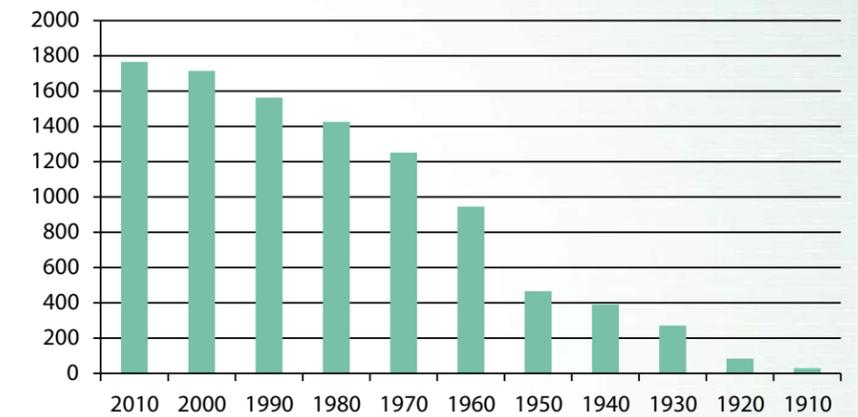
The table to the right shows that there was a huge expansion in the 1950s, doubling the amount of buildings in the state system. In general, with the age of these buildings increasing so does the annual maintenance cost without steps to modernize the buildings.

In 2008, a total of \$27,437,076 was spent on building repairs and maintenance. In 2011, the amount was up to \$29,100,408. The amount spent on maintenance in recent years has met the need; however the six percent maintenance cost increase in just three years should be expected to continue to increase at that rate. Unless significant upgrades or new buildings are built, the cost to maintain the current school buildings will soon become a major funding problem.

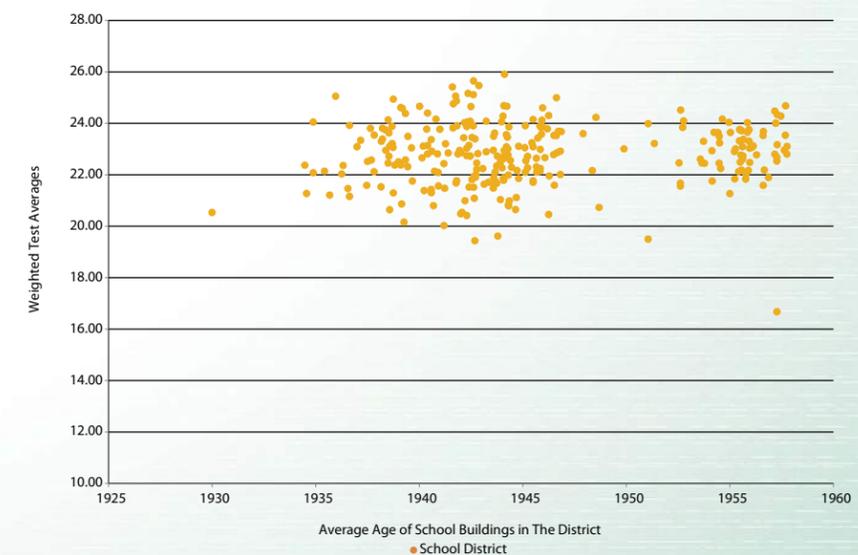
This chart shows that in 2011 there is no correlation between the age of school buildings and standardized test scores. A weighted average was figured using the percentage of standardized test scores in academic warning, approaching standard, meeting standard, exceeding standard, and in exemplary.

With school infrastructure not playing a role in Kansas standardized tests scores the sole focus shifts to economics. As buildings continue to age unless maintenance and new construction outweighs the depreciation cost of those buildings, the Kansas system will deteriorate.

Number of School Buildings



Age of School Buildings vs. Test Averages



ECONOMICS:

The total amount of funding for Kansas schools has increased over the last four years, however only 1.73 percent. Factoring in the cost of living increase over that same time span, the assessed valuation actually went down 7.7 percent. The following table shows the total assessed valuation for all school districts (combined) and per pupil.

5-Year History of Assessed Valuation (State Totals)

	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
Total Assessed Valuation	\$28,948,160,024	\$30,014,680,214	\$30,900,997,318	\$30,251,084,206	\$29,448,254,388
Total Assessed Valuation Per Pupil	\$65,070	\$67,166	\$69,021	\$66,726	\$64,741

The reason the per pupil valuation number have stayed about the same over the last 4 years is due to enrollment levels remaining close to the same. In the last three years, total state enrollment, (kindergarten through 12th grade) is not even up a full 1 percent.

The Kansas school infrastructure appears to be at a stable point right now but with the huge expansion in the 1950s, another large effort will be needed in the near future to keep up with maintenance costs of the aging system.

RESOURCES:

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2. Kansas State Department of Education. (2011-2012). Data, Media and Reporting Portal <http://www.ksde.org/Default.aspx?tabid=83>.
3. S. Craig Neuenswander
Kansas State Department of Education
School Finance, Director

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PHOTO CREDITS

COVER *(from top left)*

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