Appendix B

Commodity Flow Profile

1.0 Introduction

The overall goal of the Kansas Department of Transportation (KDOT) Statewide Freight Plan is to develop a set of infrastructure, operational, and institutional recommendations to help the State understand and address freight issues as part of its transportation planning and programming process. A key step toward this goal is to develop a detailed understanding of the type, weight, and value of commodities moving into, out of, within, and through the State, the modes on which those commodities are moving, and how those movements are expected to change in the future. Understanding commodity flow patterns by both weight and value is critical to help KDOT better assess the ways in which freight vehicles are using the transportation system, and how freight movements contribute to system capacity and congestion, bridge stress, pavement consumption, economic development, and overall quality of life.

This technical memorandum documents our analysis of commodity flows moving into, out of, through, and within Kansas. Our findings will be used to help inform infrastructure, operational, and institutional recommendations to be developed in subsequent tasks. The following sections of this memorandum summarize the data and methodology used to conduct the commodity flow analysis, and current and future commodity flows, mode splits, top commodities in the State, top domestic and international trading partners, and truck travel patterns for selected commodities.

2.0 Data and Methodology

The commodity flow data used to support this commodity flow analysis were taken from Global Insight's TRANSEARCH commodity flow dataset. TRANSEARCH is a proprietary dataset that provides estimates of commodity flows (by both weight and value) moving into, out of, through, and within Kansas for a base year of 2006 and a forecast year of 2030. Individual commodities are described using two-digit Standard Transportation Commodity Codes (STCC)[1] and are assigned to one of five modes: truck, rail, water, air, and other (unclassified).[2] Pipeline movements are not included.

Commodity flow data within TRANSEARCH are provided for every Kansas County, nearby U.S. Bureau of Economic Analysis (BEA) economic areas,[3] states, and Census regions, as shown in Figure 2.1. Information describing commodity flows originating or terminating in Canada and Mexico also is provided.

We used the TRANSEARCH data set to identify all base year (2006) and future (2030) interstate (both inbound and outbound), intrastate, and through movements in Kansas, by weight and by value. These movement types are defined as follows:

- **Intrastate** movements are those that both originate and terminate in the State;
- **Interstate** movements include shipments from Kansas to other states and movements from other states to Kansas; and
- **Through** movements are those traveling through the State that neither originate nor terminate in Kansas.

The remaining sections provide an overview of the commodities moving in to, out of, through, and within Kansas, the modes they use, Kansas' top trading partners (both domestic and international), and how each of these elements is expected to change between now and 2030.

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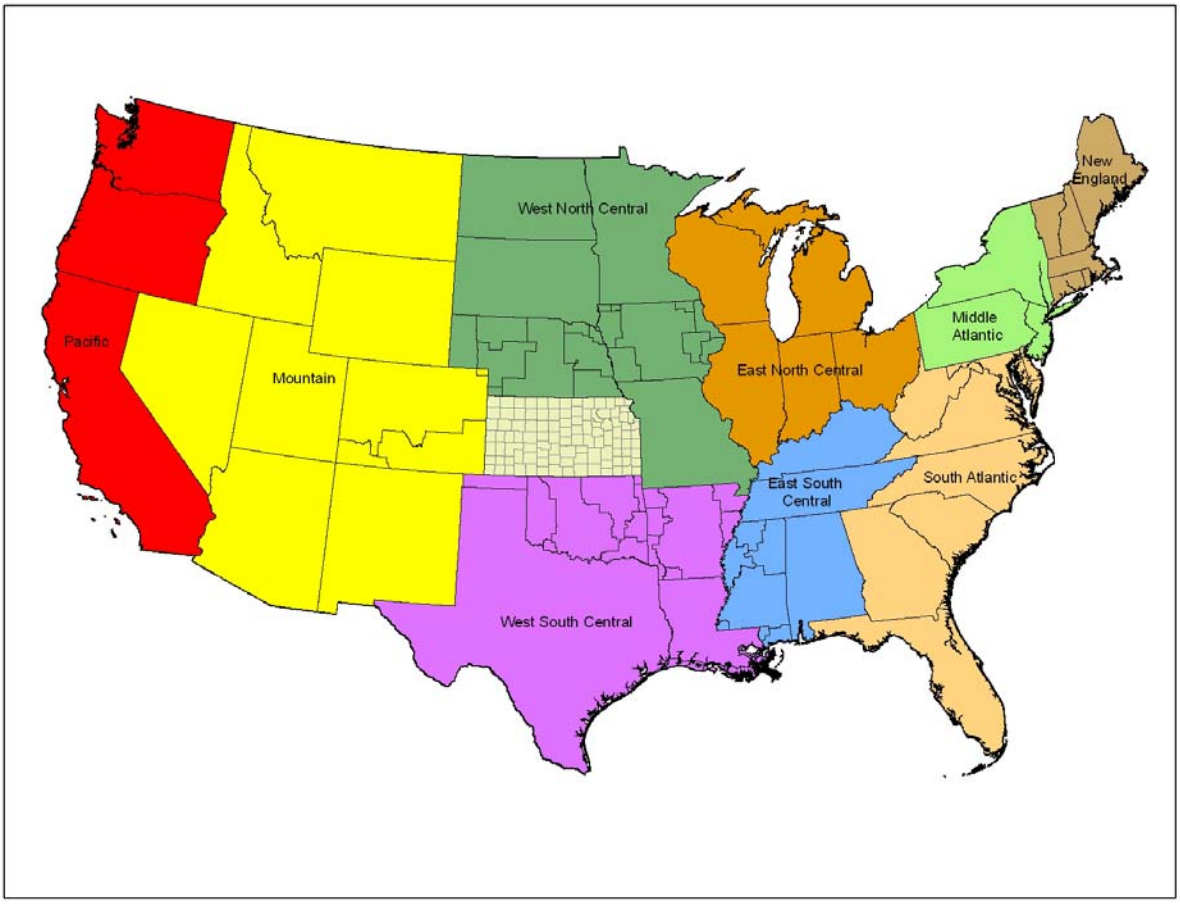
[1] STCC codes are a part of a commonly used commodity classification system developed by the Association of American Railroads (AAR). A list of STCC codes and their corresponding commodities is presented in Table A.1 of Appendix A.

[2] Because other (unclassified) shipments accounted for only 0.22 percent (by weight) and 0.08 percent (by value) of all shipments, they were not considered in the analysis.

[3] BEA economic areas define the regional markets surrounding metropolitan areas. They are defined by commuting patterns from the U.S. Census, statistical areas defined by the U.S. Office of Management and Budget, and newspaper circulation data from the Audit Bureau of Circulations. A list of BEA economic areas within the Kansas data set and their corresponding counties is presented in Table A.2 in Appendix A.

Figure 2.1 TRANSEARCH 2006 Counties, Economic Areas, and Regions



3.0 Overview of Commodity Flows

Approximately 801 million tons of freight valued at about $894 billion moved into, out of, through, or within Kansas in 2006, representing 3.8 percent (by weight) and 6.4 percent (by value) of the nation's overall freight bill. By 2030, total freight movements are expected to grow to 1,152 million tons valued at $1.7 trillion, or 3.5 percent (by weight) and 5.8 percent (by value) of total U.S. freight movements. The following sections describe in more detail commodity flows moving into, out of, through, and within Kansas in 2006 and 2030.

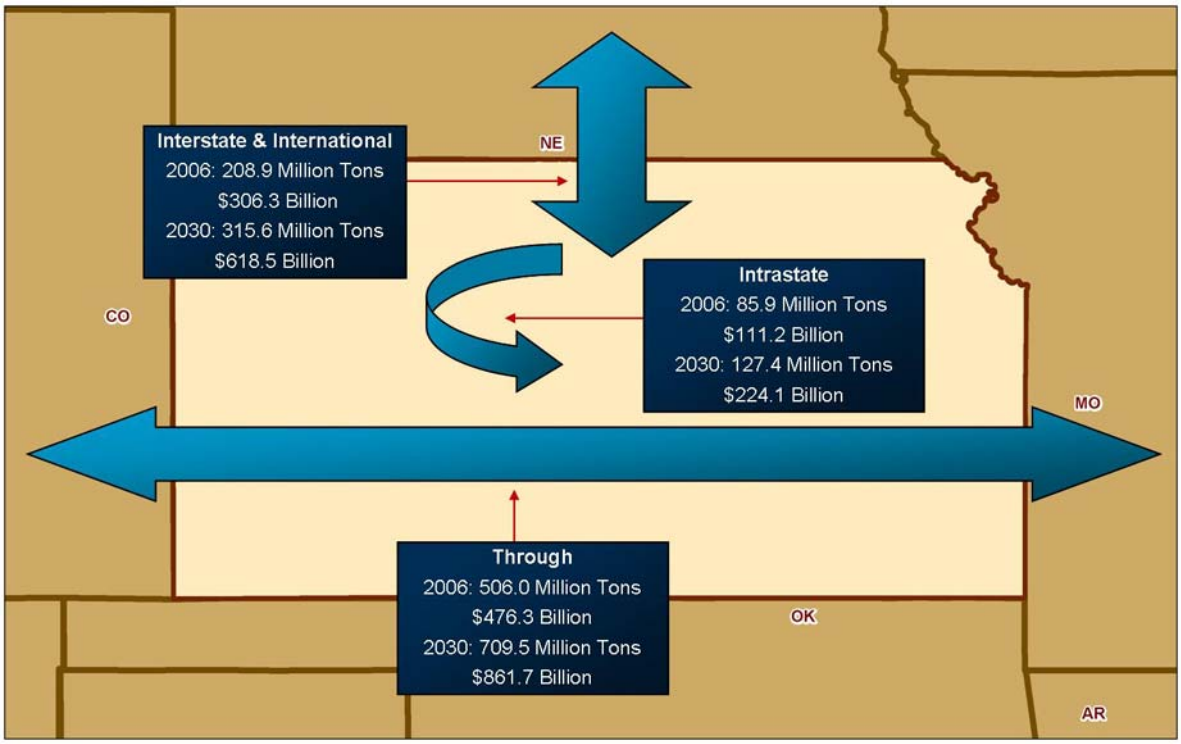
3.1 Weight versus Value

A commodity flow analysis based on shipment weight is the fundamental approach to a freight study, as the weight of commodities is important in understanding the ways in which freight vehicles are using the transportation system. Understanding how freight vehicles travel along the Kansas transportation system is critical when addressing factors such as bridge stress, pavement consumption, and congestion at rail crossings. Shipment weights for different commodity types are also crucial when assessing the impacts of certain commodity industries (including agriculture, mining, and beef processing) on the transportation system.

However, it also is important to consider the value of the products being transported into, out of, and within Kansas. Describing shipment value provides a more holistic picture of the characteristics of freight movements within Kansas, and is particularly important in understanding the impacts of value-added manufacturing (including aerospace and transportation equipment manufacturing) and service-related industries. These industries tend to generate and ship lower-weight, higher-value commodities.

Commodity flow patterns by both weight and value are presented throughout this Technical Memorandum to provide a comprehensive understanding of freight movements to, from, within, and through Kansas. Figure 3.1 shows the total volume and value of shipments into, out of, through, and within Kansas for 2006 and 2030 and the following sections provide more detail about these movements.

Figure 3.1 Intrastate, Interstate, and Through Movements

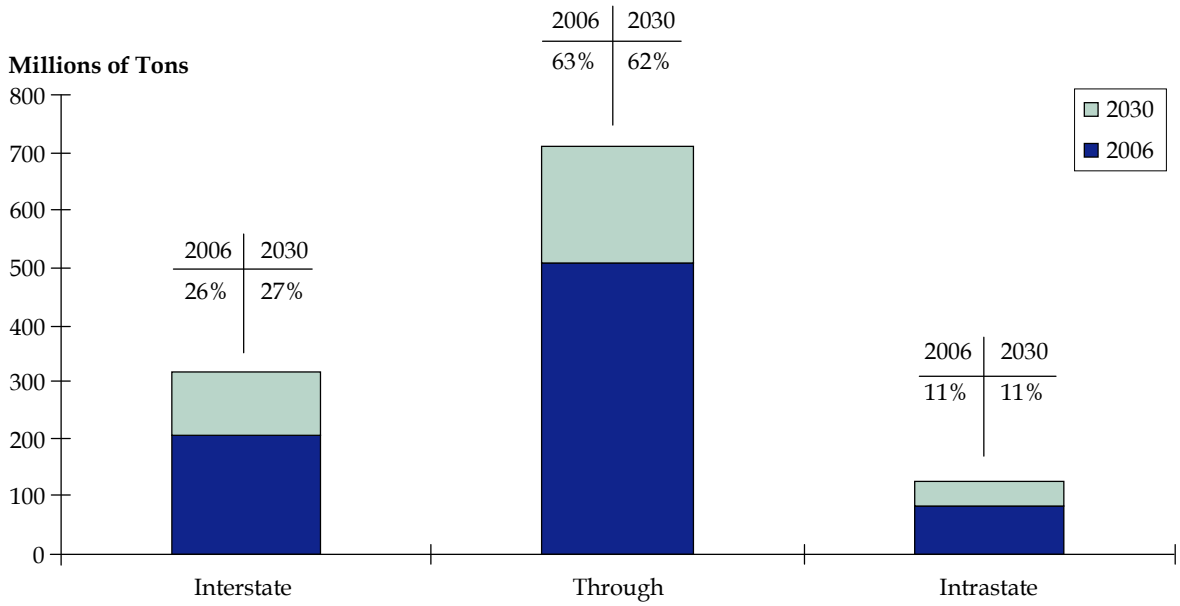


3.2 Statewide Commodity Flows (by Weight)

Figure 3.2 shows total freight flows in Kansas by type of movement (intrastate, interstate, and through) by weight for 2006 and 2030.[4]

- Through movements accounted for the largest share of all freight movements in 2006 at 63 percent (or 506 million tons); this share is expected to decrease slightly to 62 percent, or 710 million tons by 2030; [5]
- Interstate movements made up the next largest share, at 26 percent or 209 million tons, and are projected to increase to 27 percent (316 million tons) by 2030; and
- Intrastate movements accounted for 11 percent of all shipments, or 85.9 million tons in 2006, and are expected to grow to 127.4 million tons by 2030, remaining at 11 percent of total 2030 shipments in the State.

Figure 3.2 Total Freight Flows in Kansas by Type of Movement
2006 and 2030



[4] International movements to and from Kansas are included in interstate trade. These shipments are analyzed separately in Section 5.0 of the Technical Memorandum.

[5] Most of these through movements represent coal extracted from the Powder River Basin in Wyoming, which is shipped by rail through Kansas to markets in the eastern United States.

As shown in Table 3.1, the overall annual growth rate for all freight movements (by weight) between now and 2030 is expected to be approximately 1.5 percent. This growth rate is roughly in line with Kansas' statewide economic growth, which averaged 2 percent per year in the 10 years from 1997 to 2006.[6] Growth rates for the different shipment types are expected to be similar to the overall growth rate, with interstate (including international) and intrastate movements growing slightly faster than through shipments. The slightly larger growth in intrastate movements will be driven by increasing output from Kansas agricultural producers.

Table 3.1 Growth by Movement Type by Weight
2006 to 2030

Movement Type	2006 Tons	2030 Tons	Overall Growth	CAGR
Interstate	208,916,968	315,577,100	51.1%	1.7%
Through	505,987,783	709,510,779	40.2%	1.4%
Intrastate	85,937,140	127,427,327	48.3%	1.7%
Total	**800,841,891**	**1,152,515,205**	**43.9%**	**1.5%**

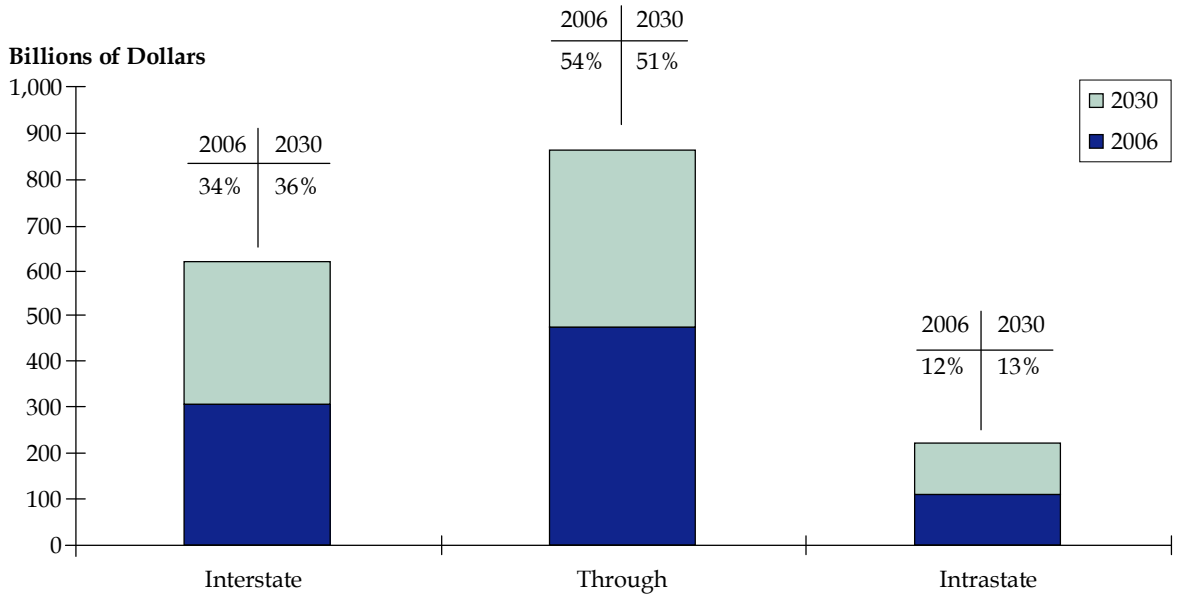
3.3 Statewide Commodity Flows (by Value)

Figure 3.3 shows base year and projected shipment values by movement type:

- Through movements accounted for 54 percent ($476.3 billion) of all freight movements in Kansas by value in 2006; this share is expected to decline to 51 percent ($861.7 billion) by 2030;
- Interstate movements constituted 34 percent (or $306.3 billion) in 2006 but are expected to grow to 36 percent of the total ($618.5 billion) in 2030; and
- Intrastate shipments made up 12 percent of the total or $111.2 billion in 2006; this proportion is expected to increase to 13 percent or $224.1 billion by 2030.

[6] U.S. Department of Commerce, Bureau of Economic Analysis.

Figure 3.3 Value of Freight Flows in Kansas by Type of Movement
2006 and 2030



Although the overall percentage of through movements is expected to decline slightly from 2006 to 2030 (54 to 51 percent), these movements (which are overwhelmingly concentrated on the State's major highway and rail trade corridors) will still dominate overall movements in the State. It is important to note that interstate movements are expected to grow significantly, making up 36 percent of total movements by 2030. This may indicate that a greater portion of freight movements in Kansas will be directly related to economic activities within the State.

The value of freight movements in Kansas is projected to grow at 2.7 percent per year, compared to 1.5 percent by weight (Table 3.2). Much of the growth observed in the value of interstate shipments is related to the manufacturing industries (including aerospace, motor vehicle, and food manufacturing) and wholesale and retail trade industries in Kansas, which have been expanding in recent years.[7] Growth in the value of through traffic will likely be caused by increasing demand for imported goods being shipped from West Coast freight gateways to growing markets in the eastern half of the country and continued domestic and international demand for bulk products moving through and out of the State. Much of this freight consists of intermodal shipments moving through regional rail facilities, particularly in and around the Kansas City metropolitan area. The development of the Gardner (Kansas) Intermodal terminal will exacerbate this trend. In any case, the rising demand for freight transportation in the State will result in more trucks and trains on the Kansas freight transportation system in the future.

[7] See the *KDOT Industry and Economic Profile* Technical Memorandum for a detailed analysis of Kansas output and employment trends by industry.

Table 3.2 Growth by Movement Type by Value
2006 to 2030

Movement Type	2006 Value	2030 Value	Overall Growth	CAGR
Interstate	$306,324,902,328	$618,498,102,354	101.9%	3.0%
Through	$476,289,036,885	$861,691,581,384	80.9%	2.5%
Intrastate	$111,247,200,963	$224,129,216,512	101.5%	3.0%
Total	**$893,861,140,177**	**$1,704,318,900,249**	**90.7%**	**2.7%**

In addition to understanding both the weight and value of commodities, it also is important to understand the average value per ton of shipments moving into, out of, through, and within the State, and how that average value is expected to change in the future. As described earlier, there are significant differences between the weight and value of different movement types. Through movements, for instance, made up 63 percent of movements by weight, but only 54 percent of all movements by value; interstate movements accounted for 26 percent of movements by weight and 34 by value; and intrastate movements 11 percent by weight and 12 percent by value. These differences can be traced directly to the types of commodities being handled by these types of movements.

As can be seen in Figure 3.4, the average value per ton for through movements in 2006 was just $941, compared to $1,760 for outbound moves, $1,183 for inbound, and $1,295 for intrastate movements. While the value of these movements is expected to grow to about $1,200 per ton in 2030, it will remain the lowest among all the shipment types. At first this seems counterintuitive, as through movements normally consist of lower-weight, higher-value goods and products moving from gateways on the Gulf and West Coasts to major Midwest and Eastern consumer markets. However, through movements in Kansas are dominated by coal shipments moving through Kansas on the way from the Powder River Basin (in Wyoming) to power plants in the South and Eastern U.S. These coal movements have the lowest average value per ton of any movement type, bringing down the overall average.

Figure 3.5 shows the average value per ton for all shipment types in 2006 and 2030 with coal removed. As the chart demonstrates, when coal movements are excluded, the average value for through shipments in 2006 was $2,884 in 2006, the highest of all the shipment types. This pattern is expected to persist through 2030.

Subsequent sections will describe in more detail the types and volumes of commodities being moved across the State.

Figure 3.4 Average Value per Ton by Movement Type (All Commodities)
2006 and 2030

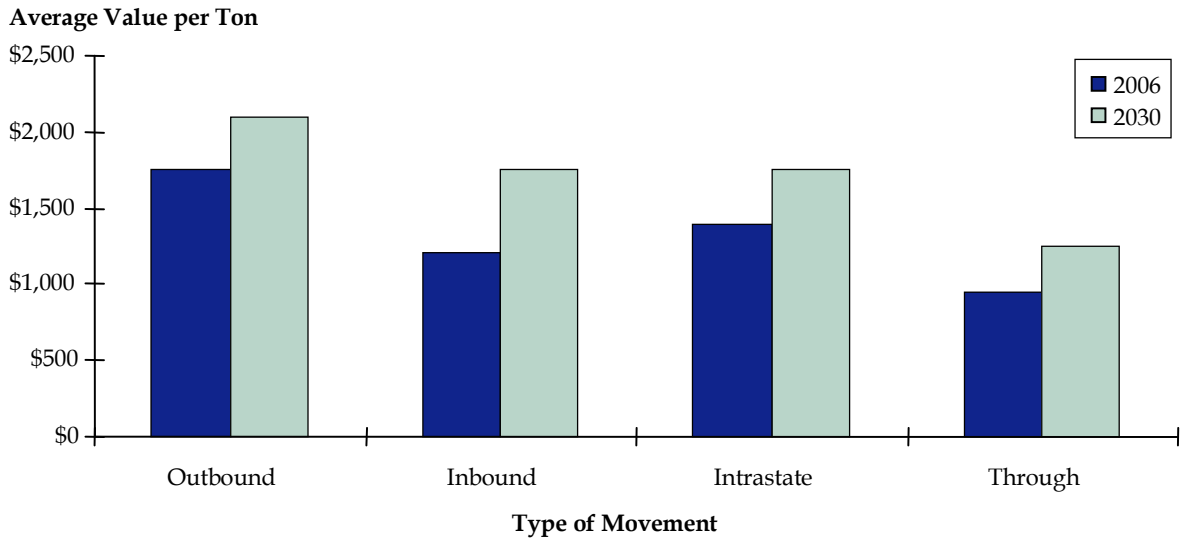
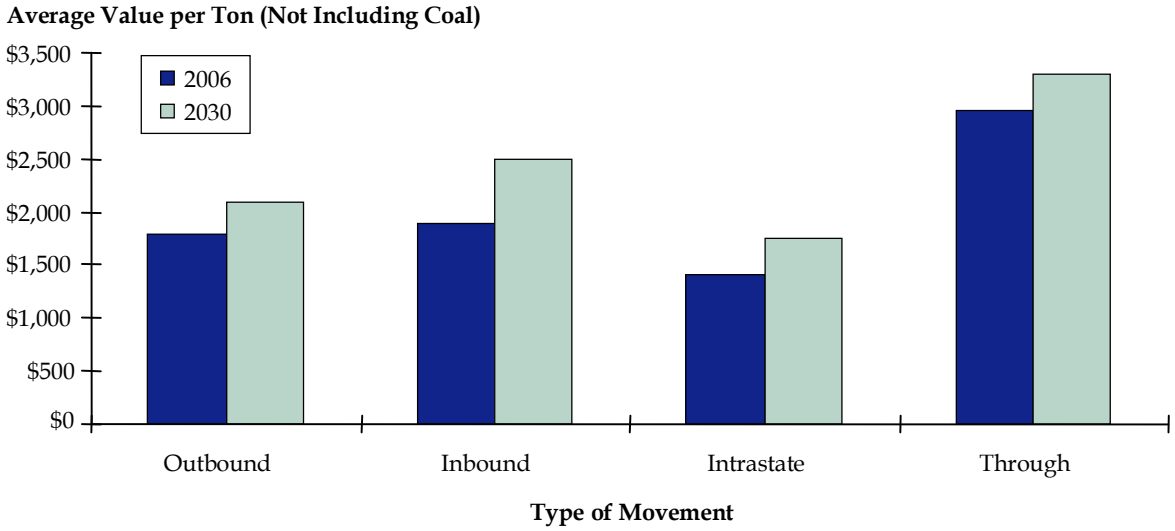


Figure 3.5 Average Value per Ton by Movement Type (Excluding Coal)
2006 and 2030



4.0 Freight Modal Usage

Understanding mode splits can help provide insight onto current and future stresses and capacity issues on individual elements of the Kansas freight system. Like most states, Kansas is dependent on trucks for movement of much of its freight, particularly intrastate shipments. Some movement types, however, have a much more diverse mode split, as described in the following sections.

4.1 Interstate Movements

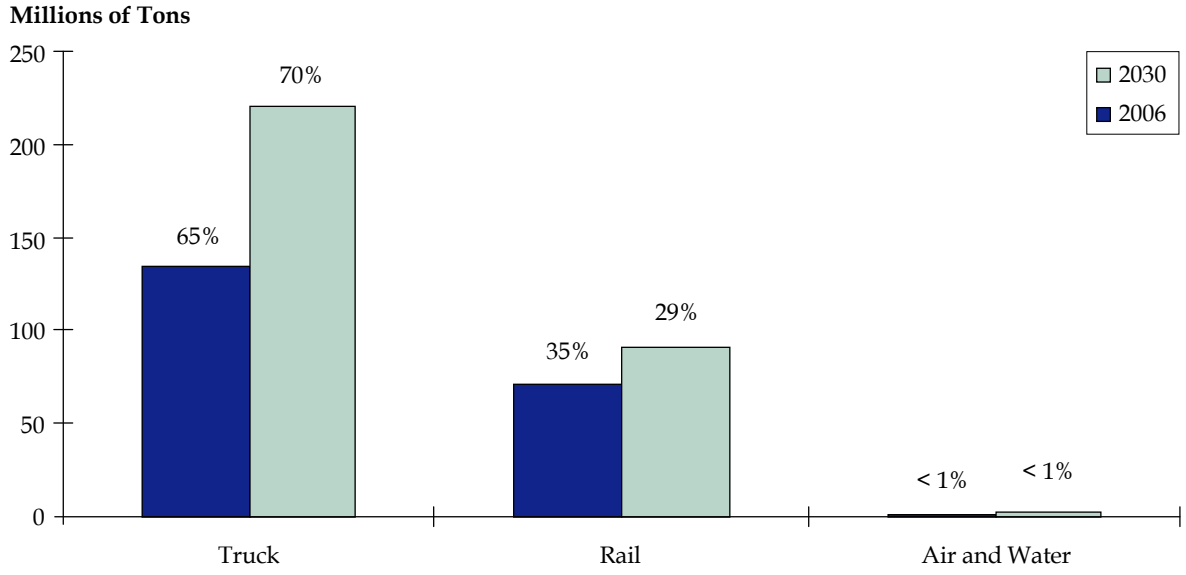
By Weight

Figure 4.1 shows the mode splits by weight for all freight movements to and from Kansas in 2006 and 2030. Clearly, trucks are by far the dominant mode, handling nearly 135 million tons (65 percent of the statewide total). This is expected to grow to about 220 million tons, or 70 percent, by 2030. In other words, there were about 12 million interstate truck trips per year in Kansas in 2006 and it is predicted that there will be approximately 19.5 million in 2030.

Rail had a much smaller share of the market than trucks in 2006 (72 million tons, or 35 percent). Total rail volumes are expected to increase to about 91 million tons in 2030 but market share will decline to 29 percent. Other modes (air and marine cargo) currently account for less than 1 percent of total Kansas interstate freight volumes; this proportion is expected to remain unchanged through 2030.

It is important to note that although rail's overall volume is expected to grow between 2006 and 2030, its market share is expected to decline from 35 to 29 percent. At the same time, truck's market share is expected to grow from 65 to 70 percent. This is an important finding, as increasing volume and decreasing market share indicate that the State's rail system may not have sufficient capacity to absorb expected growth. Even though railroads are investing heavily in capacity improvements, this indicates that it may not be enough to offset increases in demand, particularly on the mainline system. As a result, some of this traffic may shift to truck, further fueling growth in that mode.

Figure 4.1 Mode Shares by Weight for All Movements To and From Kansas
2006 and 2030

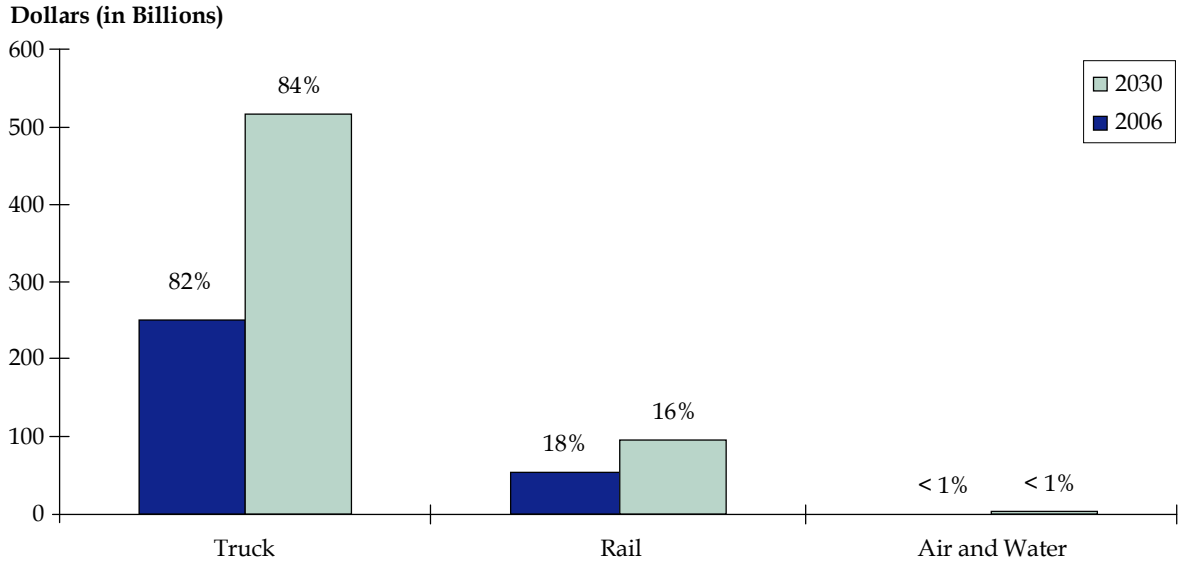


By Value

Figure 4.2 shows mode splits for 2006 and 2030 by value. Again, trucks account for the largest share of the value of shipments to, from, and within Kansas, handling 82 percent of shipments, valued at $251 billion. Rail handles a lower share of overall value, approximately 18 percent of shipments in 2006, valued at $54 billion. Truck and rail market shares are expected to shift slightly to 84 percent ($743 billion, more than doubling by 2030) and 16 percent ($96 billion, an increase of 78 percent by 2030), respectively.

It is important to note that air and water modes handled approximately $1.3 billion worth of goods in 2006, and these movements are expected to more than double to $3 billion in 2030. Air movements account for the lion's share of this growth; air cargo movements are expected to nearly triple, from $838 million in 2006 to $2.2 billion in 2030. Although small in absolute terms, this growth in air cargo traffic can have significant impacts for the State, as all are handled by truck on the front and back ends. Continued growth in Kansas' high-tech manufacturing industries, which are heavily dependent on just-in-time shipments of light but high-value goods, will drive this growth.

Figure 4.2 Mode Shares by Value for All Movements To and From Kansas
2006 and 2030



4.2 Intrastate Movements

By Weight

Figure 4.3 shows the mode splits by weight for freight movements within Kansas in 2006 and 2030. Intrastate movements, the vast majority of which are short distance (less than 500 miles), lend themselves to trucks and it is not surprising that the truck mode is overwhelmingly dominant, handling over 85 million tons (99.5 percent of the total). This is expected to grow to about 127 million tons, or 99.6 percent, by 2030. In other words, there were about 10 million intrastate truck trips per year in Kansas in 2006 and it is predicted that there will be approximately 13.5 million of these truck trips per year in 2030.

According to TRANSEARCH, the average shipment distance for intrastate movements in Kansas in 2006 was about 187 miles. Because of this, modes other than truck play very small roles in Kansas intrastate freight movement.[8] Rail carried only 0.5 percent of all

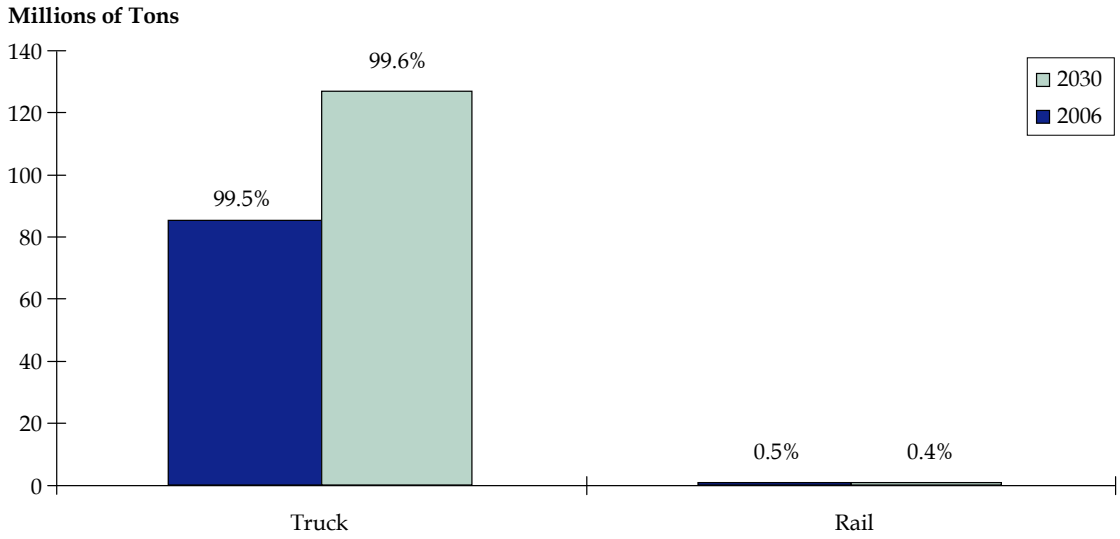
[8] Rail flow data in TRANSEARCH is based on the Surface Transportation Board's Carload Waybill Sample, which includes all carriers terminating at least 4,000 carloads per year. This encompasses all Class 1 and 2 railroads and the larger short lines, but excludes the smaller short haul railroads that move much of Kansas' grain production to train loading facilities. In addition, many of these

(Footnote continued on next page...)

intrastate freight in 2006 and while the total volume of intrastate freight moved by rail annually is expected to increase by nearly 150 million tons to 556 million tons in 2030, the share of total intrastate freight moved by rail is expected to decline. Water was not used for intrastate freight shipments in 2006 and air cargo made up less than 0.1 percent of the volume of all intrastate freight movements. It is expected that in 2030 intrastate water and air freight transportation will remain negligible.

Figure 4.3 Intrastate Mode Shares by Weight

2006 and 2030[9]



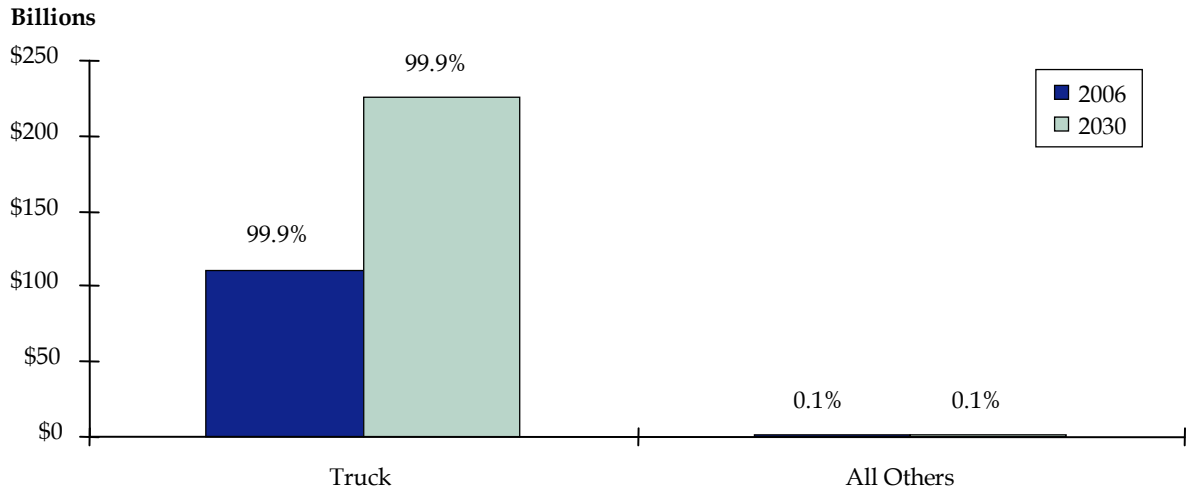
By Value

Figure 4.4 shows mode splits for intrastate shipments in 2006 and 2030 by value. Again, trucks accounted for the overwhelming share of the value of shipments within Kansas, handling 99.9 percent of shipments, valued at $111 billion. All other modes combined (rail, water, and air) made up only 0.1 percent of intrastate freight value in 2006. This pattern is expected to remain unchanged through 2030, with the value of intrastate truck freight growing to $224.1 billion and maintaining its market share of 99.9 percent.

moves are classified as interstate since the ultimate destination is outside of Kansas. As a result, the data probably underestimates the true volume of intrastate rail movements.

[9] There were no intrastate waterborne freight movements in 2006 and air cargo accounted for less than 0.1 percent of all intrastate freight moves.

Figure 4.4 Intrastate Mode Shares by Value
2006 and 2030



4.3 Through Movements

By Weight

In contrast to the mode splits of interstate and intrastate movements, the majority of tonnage moving through Kansas is carried by rail. Figure 4.5 shows the mode split by weight for through movements in Kansas in 2006 and 2030.[10]

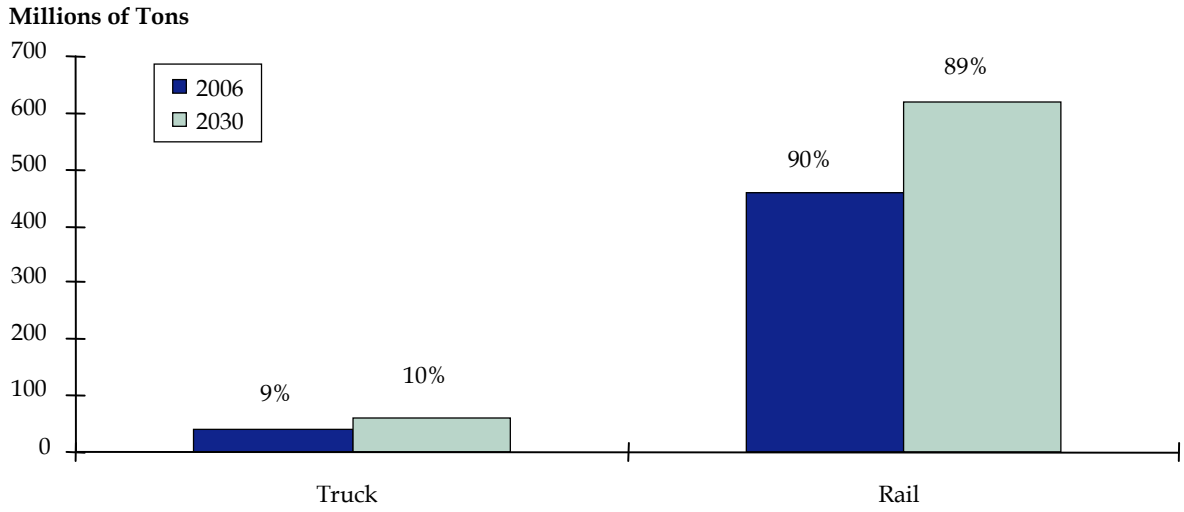
Freight rail movements handled 456 million tons of cargo traveling through Kansas in 2006, or 90 percent of all through movements. The vast majority of this tonnage (342 million tons in 2006) is coal, most of which is taken from the Powder River Basin in Wyoming and passes through Kansas on the way to major eastern markets. Trucks handled only 9 percent of all through movements, or 48 million tons (2.6 million truck loads). Even if coal is removed from the analysis, rail remains the dominant mode for through shipments in Kansas. This is because a significant amount of intermodal freight, chemicals, food products, and farm products still move through the State by train.

By 2030, the through freight moved by truck is expected to grow by 55 percent to 74 million tons (4.1 million truck loads). However, despite this increase, truck's share of total through freight will only grow to 10 percent. Rail's market share will decline slightly to

[10]Other modes carried significantly less than one percent of all through shipments in the State.

89 percent, but overall volume is expected to increase to 632 million tons, a 39 percent increase by 2030. Through shipments via all other modes are expected to remain a relatively insignificant part of total through freight volume, comprising less than one-half of one percent.

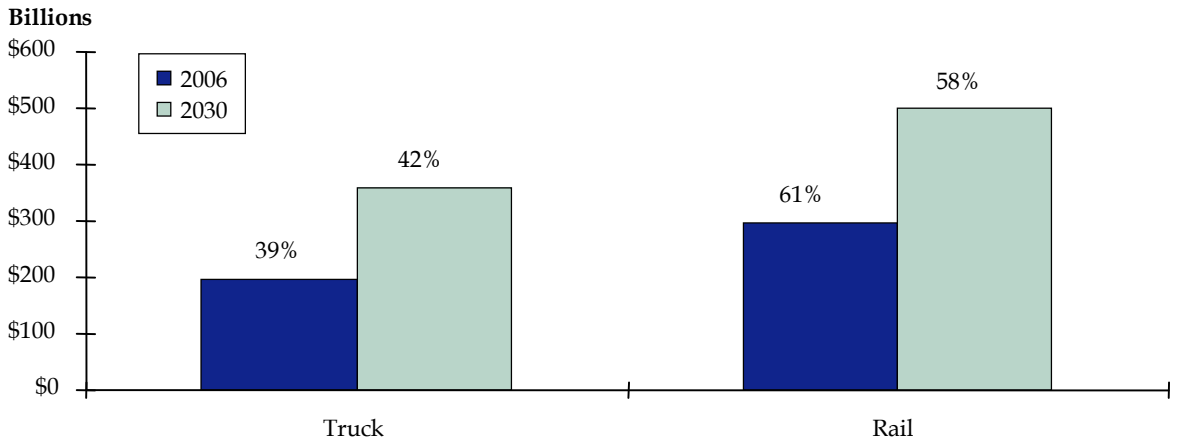
Figure 4.5 Through Shipment Mode Shares by Weight
2006 and 2030



By Value

Figure 4.6 presents mode splits by value for all through movements in Kansas in 2006 and 2030. Unlike most states, more freight value is moved by train than by truck in Kansas. Rail shipments, while less dominant when measured by value than by weight, carried 61 percent of total through shipments by value in 2006 ($290 billion). Trucks moved the remaining 39 percent of through freight, valued at $185 billion. The dominance of rail can be explained by the high level of intermodal traffic passing through Kansas, much of which is transshipped in Kansas City metro area rail yards. When the BNSF Gardner intermodal facility comes on line, much of this through traffic will be coming through Kansas. However, truck market share is expected to grow to 42 percent by 2030 ($365 billion). Rail movements are expected to grow by 71 percent to $496 billion in 2030, its share of the total value of through shipments decreasing to 58 percent.

Figure 4.6 Through Shipment Mode Shares by Value
2006 and 2030



5.0 Top Commodities

In addition to the overall weight and value of freight shipments moving within the State, it also is important to understand the specific types of commodities being moved on Kansas' freight transportation infrastructure. Understanding the types of goods moving on the State's freight system provides insights into what industries are being supplied.

When measured by weight, coal is the most dominant commodity moving on the system, with agriculture and livestock, nonmetallic minerals, chemicals, and food products also being some of the main commodities moved on Kansas' freight infrastructure. When measured by value, the commodity mix is more diverse, consisting mostly of high value-added products such as transportation equipment, chemicals, food, agricultural products, electronics, and machinery. The following sections provide more detail on the top commodities by weight and value for Kansas.

5.1 Top Commodities by Weight

Figure 5.1 shows the top 10 commodities moving into, out of, through, and within Kansas by weight in 2006. Coal represented 48 percent of all movements in Kansas by weight, or 383 million tons. Agricultural production and livestock represented the next largest share, at 11 percent or 91 million tons. Nonmetallic minerals made up 8 percent (66 million tons), while food products (including beef and processed meats) and chemicals each constituted about 6 percent of the total (48 and 45 million tons, respectively). The remaining top commodities made up less than 4 percent each, while all others combined accounted for the remaining 7 percent.

This mix of commodities is projected to stay roughly the same through 2030 (see Table 5.1). Coal is predicted to remain the top commodity in terms of tonnage at 42 percent (or 484.9 million tons). Agricultural products are expected to maintain the next largest share of overall tonnage at 13 percent (152 million tons). Nonmetallic minerals are expected to remain the third largest commodity shipped in the State by weight with 9 percent of the total (104.2 million tons). Food and chemicals are expected to be overtaken by miscellaneous mixed shipments (largely intermodal containers moving by rail) and secondary traffic, but the top 10 commodities in the State are expected to remain the same despite the reordering.[11]

[11] Secondary traffic refers to drayage movements transporting cargo between origin or destination points and a transshipment facility, such as an intermodal rail yard.

Figure 5.1 Top 10 Commodities in Kansas by Weight
2006

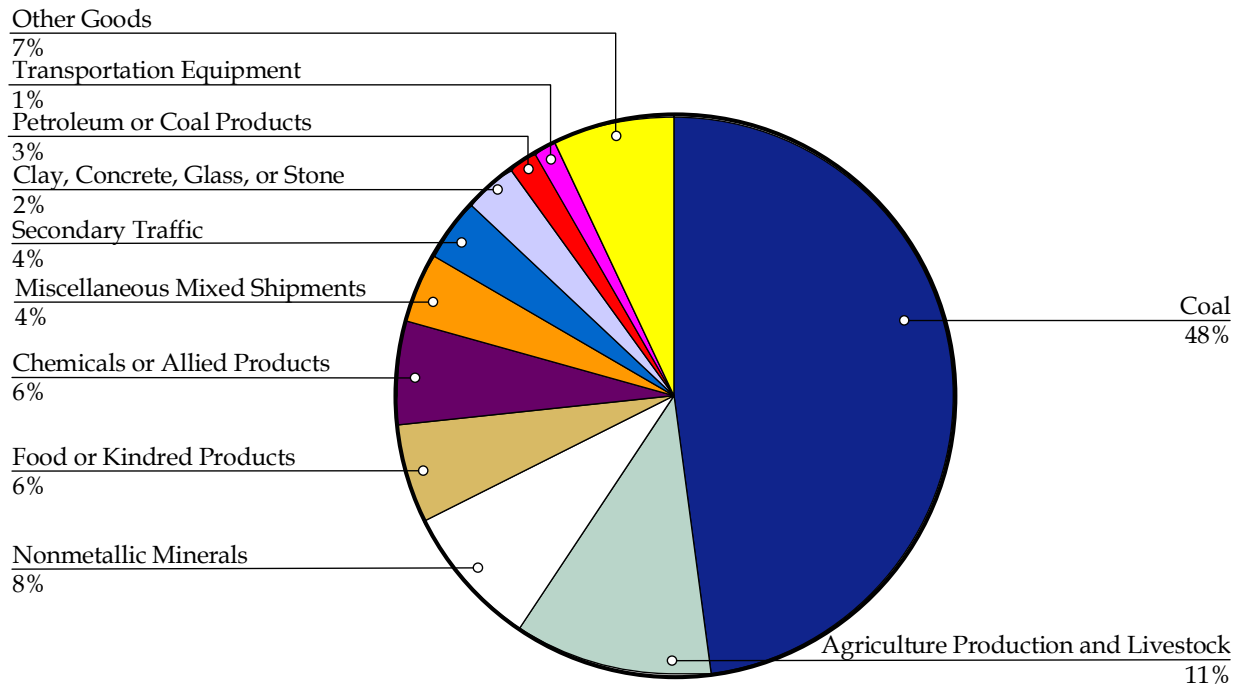


Table 5.1 Top 10 Commodities by Weight
2030 Projected

Commodity	Millions of Tons	Percent of Total	CAGR
Coal	484.9	42%	1.0%
Agriculture Production and Livestock	152.0	13%	2.1%
Nonmetallic Minerals	104.2	9%	1.9%
Miscellaneous Mixed Shipments	70.8	6%	2.9%
Secondary Traffic, i.e., Warehouse Moves	65.5	6%	3.6%
Food or Kindred Products	60.6	5%	1.0%
Chemicals or Allied Products	47.8	4%	0.3%
Petroleum or Coal Products	36.1	3%	1.8%
Clay, Concrete, Glass, or Stone	26.2	2%	2.4%
Transportation Equipment	14.2	1%	1.5%
Other Goods	90.1	8%	2.0%
Total	**1,152.5**	**100%**	**1.5%**

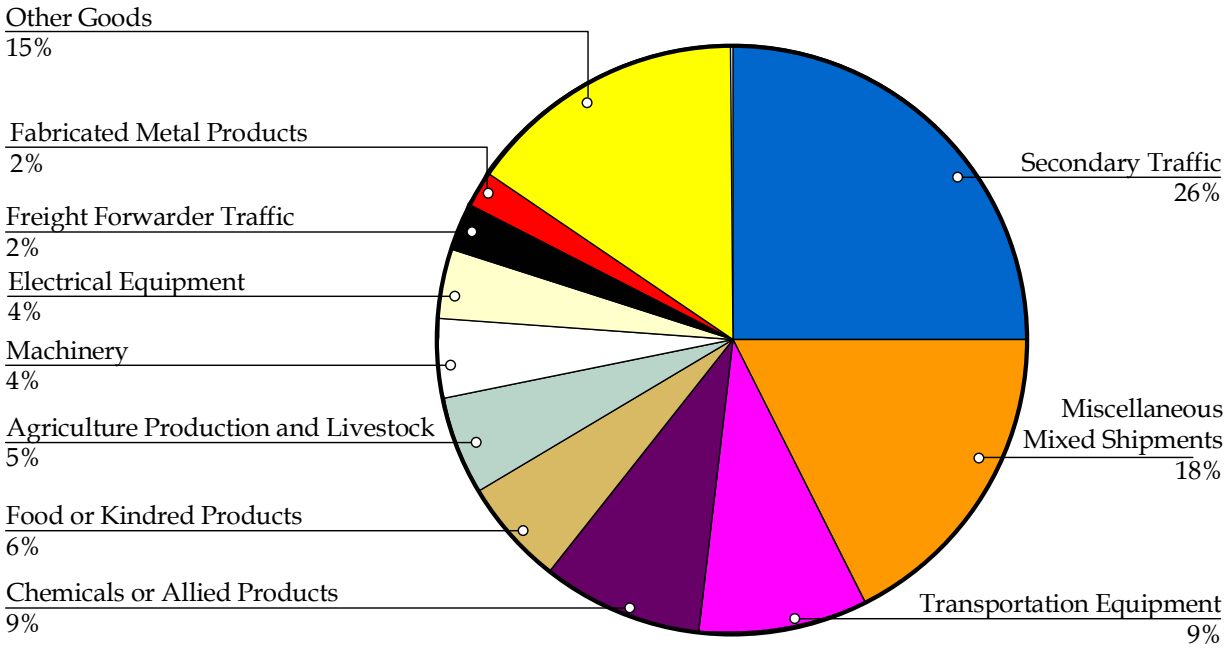
The analysis of top commodities highlights a few key points for Kansas. First, coal, much of which is mined in Wyoming and transported on the Class I rail system through Kansas to other parts of the United States, will continue to be the dominant freight in the State, by tonnage. Second, agricultural products and livestock, which are of special importance to the State, will continue to be transported primarily on the State's highway network rather than on railroads. Agricultural products and livestock along with nonmetallic minerals make up nearly 50 percent of the total freight volume moved on Kansas roads (26.5 and 23.3 percent, respectively). As natural resource-based commodities tend to be heavy, growth in these industries could exacerbate existing concerns about pavement condition and maintenance and rural congestion, especially on corridors that connect rural agricultural areas to mainline Interstate highway facilities.

5.2 Top Commodities by Value

Kansas' commodity mix is more diverse when measured by value. Figure 5.2 presents the top 10 commodities by value moving to, from, through, and within Kansas in 2006. Secondary traffic and miscellaneous mixed shipments, including intermodal containers, comprise the two largest commodity groups in terms of value, which is not surprising since these groups include many high-value consumer goods. Together secondary traffic and miscellaneous mixed shipments account for 44 percent of goods movement in Kansas by value (a total of $379 billion). Transportation equipment and chemicals each comprise 9 percent of the total value shipped on Kansas' freight network ($82 and $81 billion, respectively). Food products ($51 billion) and agricultural production and livestock ($48 billion) combined account for 11 percent of total freight value shipped in Kansas. Machinery and electrical equipment also were major commodities on Kansas' freight network in 2006, each representing about 4 percent of the total value on the system. The remaining top commodities, freight forwarder traffic and fabricated metals, each accounted for 2 percent of the freight value moving in the State and all other commodities combined to make up 15 percent.

It is interesting to note the absence of coal from the top 10 commodities by value, given that it represents nearly half of all movements by weight. This can be explained by coal's extremely low value per ton. Total coal shipments to, from, within, and through Kansas were valued at $4.7 billion in 2006, or about $12 per ton. By comparison, fabricated metal products (which only made up two percent of Kansas freight value in 2006) were valued at $18.5 billion, or about $3,800 per ton.

Figure 5.2 Top 10 Commodities in Kansas by Value
2006



By 2030, the value of secondary shipments and miscellaneous mixed shipments are expected to account for 49 percent of the value of all freight moved in the State (Table 5.2). Electrical equipment ($118 billion), machinery ($117 billion), and transportation equipment ($113 billion) are each expected to account for about 7 percent of total freight value. Of these electrical equipment and machinery are among the fastest growing commodities with predicted annual growth rates of 5.2 and 4.6 percent, respectively. Computer and electronic product manufacturing is a growing industry in Kansas; its contribution to statewide economic output jumped by 1,350 percent from 1997 to 2007, to nearly $1.7 billion.[12] Chemicals are expected to make up 6 percent of all freight value ($98 billion). Agricultural production and livestock ($75 billion) and food products ($66 billion) are expected to remain important, each accounting for about 4 percent of total value. All other goods together are expected to make up approximately 14 percent of the value of all freight moving in Kansas in 2030.

[12] See the *Industry and Economic Profile* Technical Memorandum for a detailed analysis of Kansas industry trends.

Table 5.2 Top 10 Commodities in Kansas by Value
2030 Projected

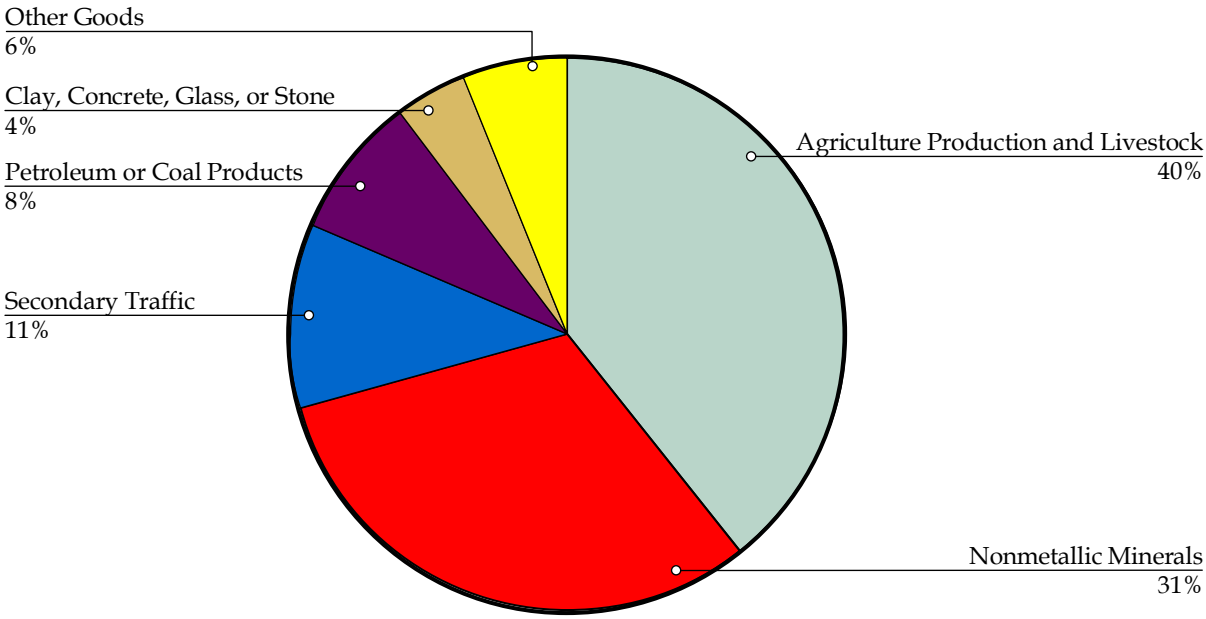
Commodity	Billions of Dollars	Percent of Total	CAGR
Secondary Traffic	520.8	31%	3.6%
Miscellaneous Mixed Shipments	309.4	18%	2.9%
Electrical Equipment	118.4	7%	5.2%
Machinery	116.7	7%	4.6%
Transportation Equipment	113.1	7%	1.3%
Chemicals or Allied Products	97.7	6%	0.8%
Agriculture Production and Livestock	76.0	4%	1.9%
Food or Kindred Products	65.9	4%	1.0%
Freight Forwarder Traffic	42.2	2%	3.0%
Miscellaneous Manufacturing Products	40.1	2%	4.7%
Other Goods	204.1	12%	1.6%
Total	**1,704.3**	**100%**	**2.7%**

5.3 Top Commodities by Movement Type

It also is useful to identify the top commodities by type of movement (intrastate, inbound, outbound, and through).[13] This gives a better sense of the commodities that are moving to, from, through, and within the State and how those shipments will affect the State's freight transportation system. Figure 5.3 shows the top 10 commodities by weight for intrastate shipments in Kansas in 2006. The vast majority of intrastate freight in Kansas is comprised of agricultural production and livestock along with nonmetallic minerals; these two commodity groups make up 71 percent of the total intrastate tonnage. Important agricultural commodities moving within Kansas include grains moving to silos and livestock moving to feed yards and then on to processing plants.

[13] International shipments are included in inbound and outbound trade statistics but also will be isolated for analysis separately.

Figure 5.3 Top 5 Intrastate Commodities in Kansas by Weight
2006



This pattern is expected to persist through 2030 (Table 5.3), with agricultural products and livestock and nonmetallic minerals accounting for 63 percent of intrastate freight flows by weight. Secondary traffic within the State is expected to grow by 3.6 percent per year and increase from 11 to 17.4 percent of total intrastate freight between 2006 and 2030.

The small contraction observed in agricultural products and livestock[14] moving within the State will be primarily driven by falling intrastate grain shipments, which are expected to decline from 15.5 million tons in 2006 to 11.5 million tons in 2030. However, this drop will be more than offset by a growth of 4.8 million tons in grain shipments moving out of Kansas, indicating that a greater proportion of Kansas' grain production will be exported in the future.

As discussed previously, these industries tend to generate a lot of truck shipments. These, in turn, can lead to increased maintenance requirements due to factors such as pavement consumption and bridge deterioration. They also contribute to congestion and access issues in rural parts of Kansas.

Secondary traffic within the State is expected to grow by 3.6 percent per year and increase from 11 to 17.4 percent of total intrastate freight between 2006 and 2030.

[14] Agriculture production and livestock constitute a combined STCC code (STCC 01), which is made up of 27 separate commodities. As a result, a significant increase or decrease in any particular commodity (like grain) can impact the entire commodity group.

Table 5.3 Top 5 Intrastate Commodities in Kansas by Weight
2030 Projected

Commodity	Millions of Tons	Percent of Total	CAGR
Agriculture Production and Livestock	31.9	25.1%	-0.2%
Nonmetallic Minerals	48.4	38.0%	2.5%
Secondary Traffic	22.2	17.4%	3.6%
Petroleum or Coal Products	11.3	8.9%	2.0%
Clay, Concrete, Glass, or Stone	6.7	5.3%	2.6%
Other Goods	6.8	5.3%	1.1%
Total	**127.4**	**100.0%**	**1.7%**

Figure 5.4 displays the top 10 commodities moving into Kansas by weight in 2006. Natural resource-based products comprise the majority of the commodity mix, including coal (40.4 million tons), nonmetallic minerals (24.5 million tons), and petroleum or coal products (3.4 million tons). Chemicals, food, secondary traffic, and agricultural products and livestock also make up a significant share of total volumes. Livestock are trucked in from all over the country to be finished and processed in Kansas, particularly in the "meat packing triangle" of southwest Kansas.

Table 5.4 presents the projected top 10 inbound commodities in Kansas by weight for 2030 and their expected percentage growth in tonnage between 2006 and 2030. Overall, the commodity mix is expected to be similar to that of 2006. Growth in overall inbound tonnage is expected to be modest, three of the top commodities are expected to maintain growth rates of 2 percent or greater but coal, the top inbound commodity is predicted to decline by 10 percent between 2006 and 2030. According to the Energy Information Administration, a combination of higher mining and transportation costs and slow growth in total demand for coal could lead to a drop in output from Wyoming's Powder River Basin.[15] Ninety-four percent of the coal moving in Kansas (by weight) comes from the Powder River Basin, according to TRANSEARCH.

[15]U.S. Department of Energy, Energy Information Administration, *Annual Energy Outlook 2008*, June 2008.

Figure 5.4 Top 10 Inbound Commodities in Kansas by Weight
2006

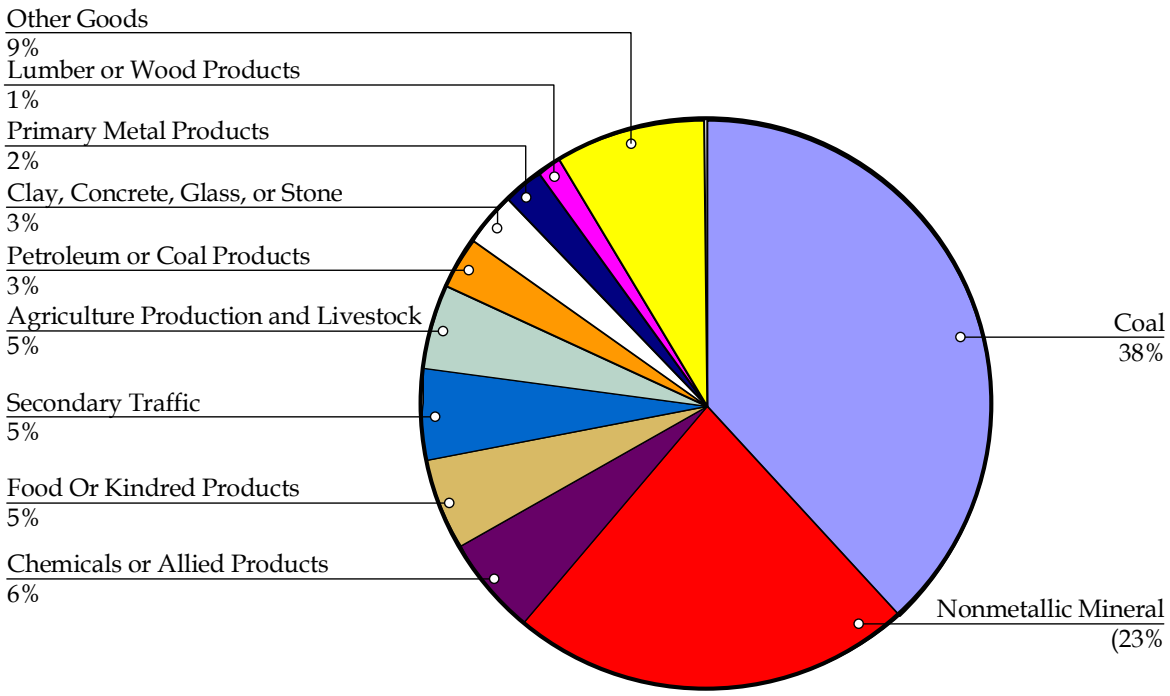


Table 5.4 Top 10 Inbound Commodities in Kansas by Weight
2030 Projected

Commodity	Millions of Tons	Percent of Total	CAGR
Coal	37.5	28%	-0.3%
Nonmetallic Minerals	33.8	26%	1.3%
Chemicals or Allied Products	6.1	5%	0.2%
Food or Kindred Products	7.5	6%	1.1%
Secondary Traffic	10.2	8%	2.7%
Agriculture Production and Livestock	5.7	4%	0.7%
Petroleum or Coal Products	5.5	4%	2.1%
Clay, Concrete, Glass, or Stone	5.3	4%	2.0%
Primary Metal Products	3.7	3%	1.9%
Lumber or Wood Products	1.8	1%	0.6%
Other Goods	15.4	12%	2.2%
Total	**132.5**	**100%**	**0.9%**

Figure 5.5 displays the top 10 commodities moving out of Kansas by weight in 2006. Agricultural products and livestock are the dominant commodities at 33 percent of total volumes (33.2 million tons), followed by food products (16 percent, or 16.8 million tons). Food manufacturing (a key industry in Kansas) is heavily dependent on inputs from the Kansas agricultural sector. Transportation equipment is another important outbound commodity, reflecting the presence of well developed clusters of aerospace manufacturers (in Wichita) and automobile manufacturers (in Kansas City).

Table 5.5 presents the projected top 10 outbound commodities in Kansas by weight for 2030 and their expected percentage growth in tonnage between 2006 and 2030. Overall, the commodity mix is expected to be similar to that of 2006. Growth in overall outbound tonnage is expected to be strong; 8 of the top commodities are expected to maintain growth rates of 2 percent or greater with 3 of those maintaining growth rates above 3.5 percent annually. Secondary traffic and miscellaneous mixed shipments are 2 of the fastest growing major outbound commodities and this growth may indicate the growing importance of Kansas as an intermodal hub.

Transportation equipment shows a very slight decline in volume. This is almost entirely due to declining volumes of motor vehicles being shipped out of Kansas. By contrast, shipments of aircraft and aircraft parts, key industries in the State, are expected to increase by 20 percent and 190 percent, respectively.

Figure 5.5 Top 10 Outbound Commodities in Kansas by Weight
2006

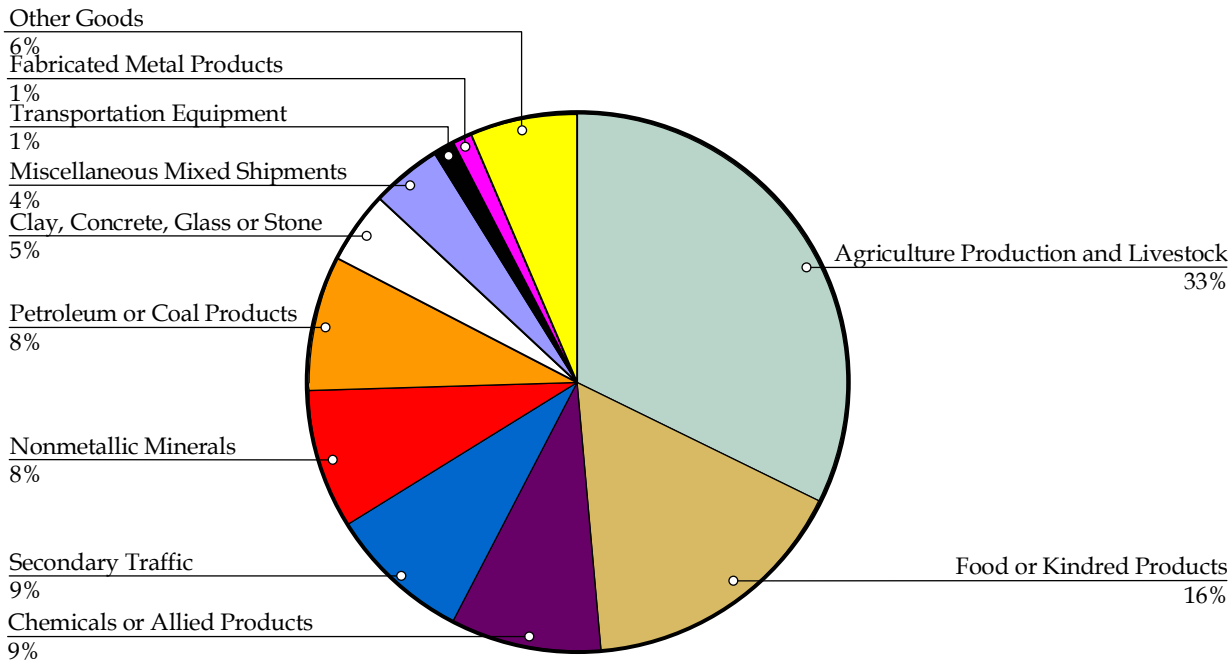
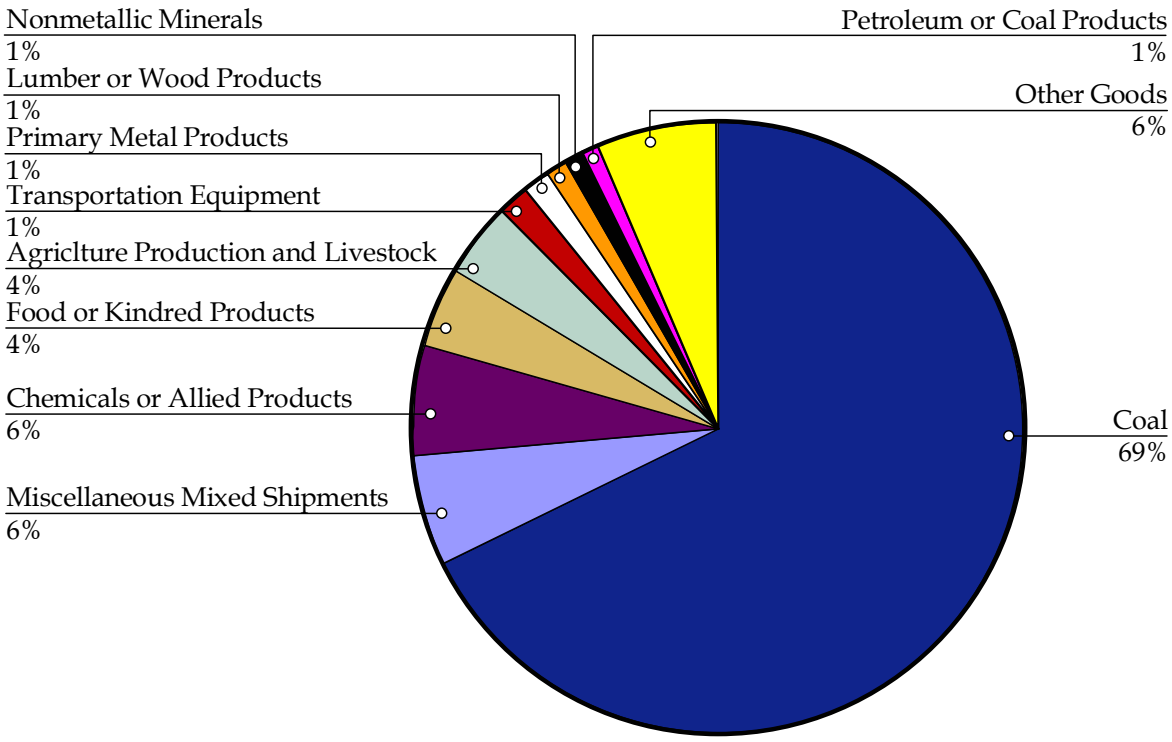


Table 5.5 Top 10 Outbound Commodities in Kansas by Weight
2030 Projected

Commodity	Millions of Tons	Percent of Total	CAGR
Agriculture Production and Livestock	62.4	34.1%	2.7%
Food or Kindred Products	21.6	11.8%	1.1%
Chemicals or Allied Products	10.7	5.8%	0.7%
Secondary Traffic	23.2	12.7%	4.1%
Nonmetallic Minerals	14.7	8.0%	2.3%
Petroleum or Coal Products	13.8	7.5%	2.1%
Clay, Concrete, Glass, or Stone	8.1	4.4%	2.3%
Miscellaneous Mixed Shipments	10.0	5.4%	3.7%
Transportation Equipment	1.3	0.7%	-0.2%
Fabricated Metal Products	3.0	1.6%	4.1%
Other Goods	14.3	7.8%	3.3%
Total	**183.1**	**100.0%**	**2.4%**

Because of its geographic location, between major consuming markets on the West Coast and in the Midwest and along a primary rail corridor for coal leaving Wyoming, there is considerable freight traffic in Kansas that is simply moving through the State without originating or terminating in it. Figure 5.6 displays the top 10 through commodities by weight in 2006. While coal makes up nearly 70 percent of through freight volume, the other top 10 commodities represent a wide variety of industries. It is interesting to note that the second largest through commodity is miscellaneous mixed shipments, which includes intermodal container movements and indicates the position of Kansas as a transportation hub for freight moving across the United States. In fact, Kansas City is the second largest rail hub in the nation after Chicago. It also is important to note that railroads carried nearly 10 times the amount of freight through Kansas (456 million tons) than did trucks (48 million tons) in 2006. While trucks will increase their share of Kansas' through freight traffic by 2030 (to 74 million tons), rail will continue to be dominant through traffic mode in Kansas, hauling 632 million tons.

Figure 5.6 Top 10 Through Commodities by Weight
2006



As Table 5.6 demonstrates, this mixture of through commodities is expected to remain roughly the same through 2030 with the exception of petroleum or coal products being displaced by secondary traffic. While the amount of coal moving through Kansas is expected to increase, coal's share of overall through traffic is expected to decline from 69 to 63 percent. The fastest growing major through commodities between 2006 and 2030 are expected to be agricultural products and livestock, secondary traffic, and miscellaneous mixed shipments.

When the value of through movements is analyzed, the commodity mix consists almost entirely of consumer goods (miscellaneous mixed shipments and secondary traffic) and other relatively light, more refined products such as transportation equipment, food, chemicals, machinery, and electrical equipment (Figure 5.7). Shipments of these products are expected to exhibit strong growth in value through 2030 (Table 5.7). For example, the value of electrical equipment shipments is expected to grow by 5.1 percent per year. This implies that much of the freight traffic in Kansas is serving growing markets on the West Coast and the eastern half of the country – as those markets continue to grow, so will freight shipments moving through Kansas. Furthermore, because 39 percent of the value of through freight shipments moves by truck, growth in the value of through commodities is likely to lead to increased truck trips through Kansas, particularly on I-70, the Kansas Turnpike, and I-35.

Table 5.6 Top 10 Through Commodities by Weight
2030 Projected

Commodity	Millions of Tons	Percent of Total	CAGR
Coal	447.1	63.0%	1.1%
Miscellaneous Mixed Shipments	59.0	8.3%	2.8%
Agriculture Production and Livestock	51.9	7.3%	4.0%
Chemicals or Allied Products	29.3	4.1%	0.1%
Food or Kindred Products	28.0	4.0%	1.1%
Transportation Equipment	10.9	1.5%	1.8%
Secondary Traffic	10.0	1.4%	3.3%
Primary Metal Products	8.3	1.2%	0.7%
Nonmetallic Minerals	7.3	1.0%	1.0%
Lumber or Wood Products	6.5	0.9%	0.3%
Other Goods	51.2	7.2%	2.0%
Total	**709.5**	**100.0%**	**1.4%**

Figure 5.7 Top 10 Through Commodities by Value
2006

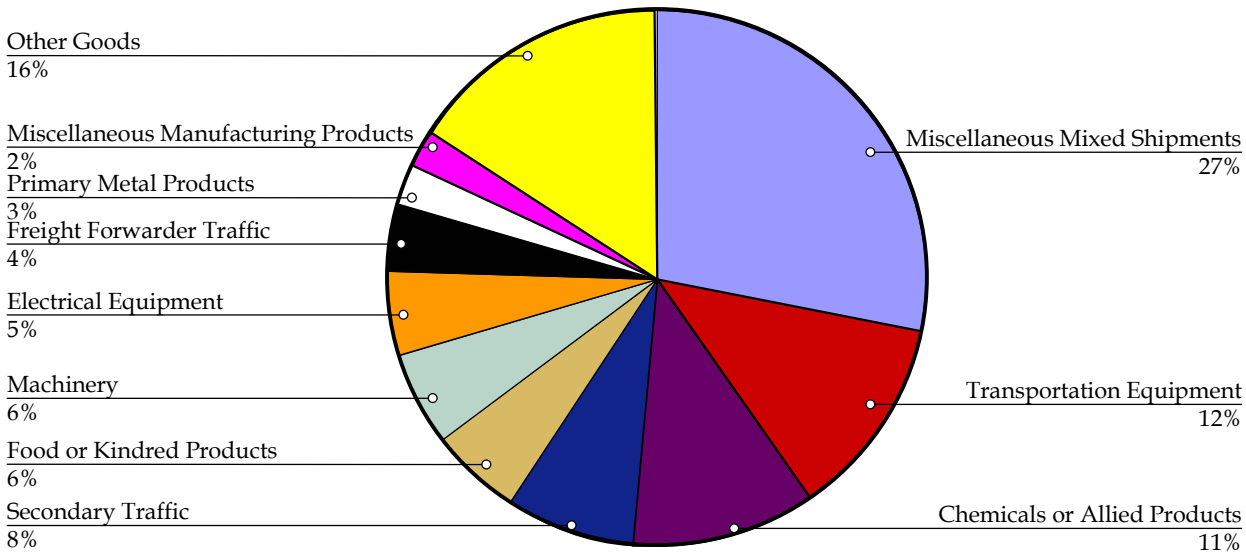


Table 5.7 Top 10 Through Commodities by Value
2030 Projected

Commodity	Millions of Dollars	Percent of Total	CAGR
Miscellaneous Mixed Shipments	$258,113	30.0%	2.8%
Transportation Equipment	$88,139	10.2%	1.8%
Chemicals or Allied Products	$65,386	7.6%	0.8%
Secondary Traffic	$79,049	9.2%	3.3%
Food or Kindred Products	$34,233	4.0%	1.0%
Machinery	$67,655	7.9%	4.0%
Electrical Equipment	$80,671	9.4%	5.1%
Freight Forwarder Traffic	$34,981	4.1%	2.8%
Primary Metal Products	$14,197	1.6%	0.6%
Miscellaneous Manufacturing Products	$30,475	3.5%	4.3%
Other Goods	$108,793	12.6%	1.6%
Total	**$861,692**	**100.0%**	**2.5%**

5.4 Top International Commodities

International shipments are defined as movements to or from Kansas that either originate or terminate in a foreign country. Because international freight makes up a relatively small fraction of freight in Kansas (4.2 percent by weight, 11.8 percent by value in 2006), it has been included in previous sections dealing with inbound, outbound, and through freight. However, while international shipments make up a small proportion of total freight flows in Kansas, they are expected to increase at a faster rate than the other shipment types. Total international exports from Kansas are expected to nearly triple by 2030 and imports from international sources in 2030 are expected to be nearly twice the 2006 level. By 2030, international shipments will account for 6.4 percent (by weight) and 14.6 percent (by value) of all shipments into, out of, and through the State. It is, therefore, important to understand the commodity mix of international shipments and how it relates to key industries and freight volumes in Kansas.

Figures 5.8 and 5.9 show the top 10 international commodities being exported from and imported into Kansas by weight in 2006. The highest volume international exports from Kansas by weight are miscellaneous mixed shipments, food, transportation equipment, and chemicals. The largest international imports into Kansas by weight are crude petroleum or natural gas and chemicals.

Figure 5.8 Top 10 International Exports from Kansas by Weight
2006

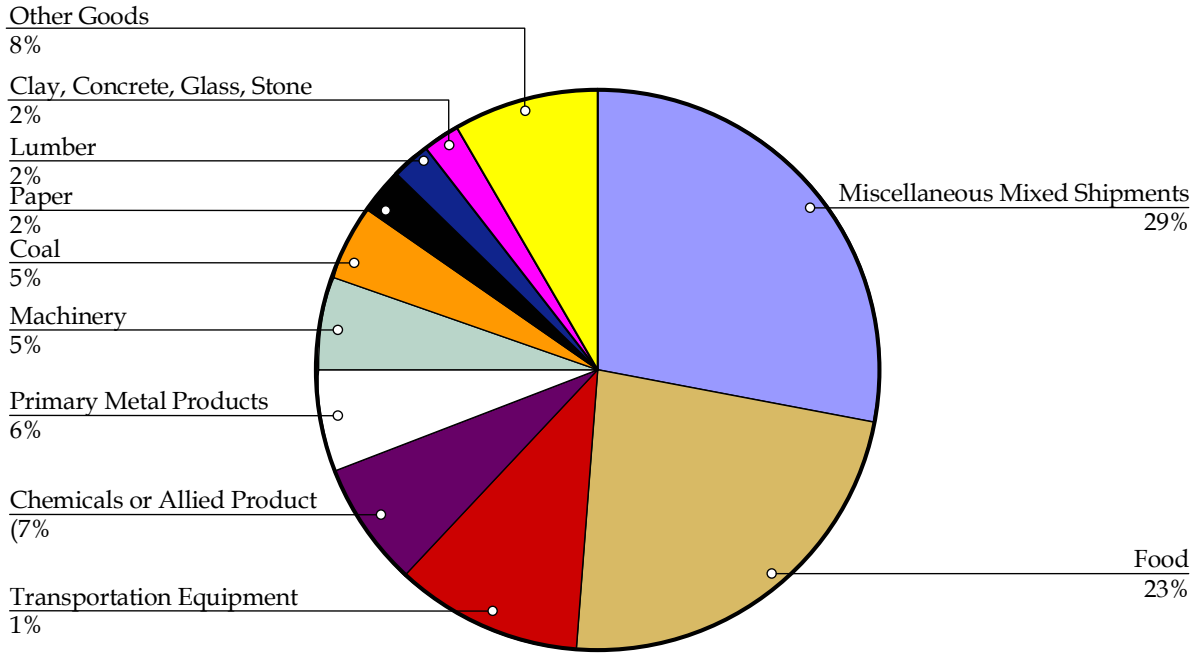
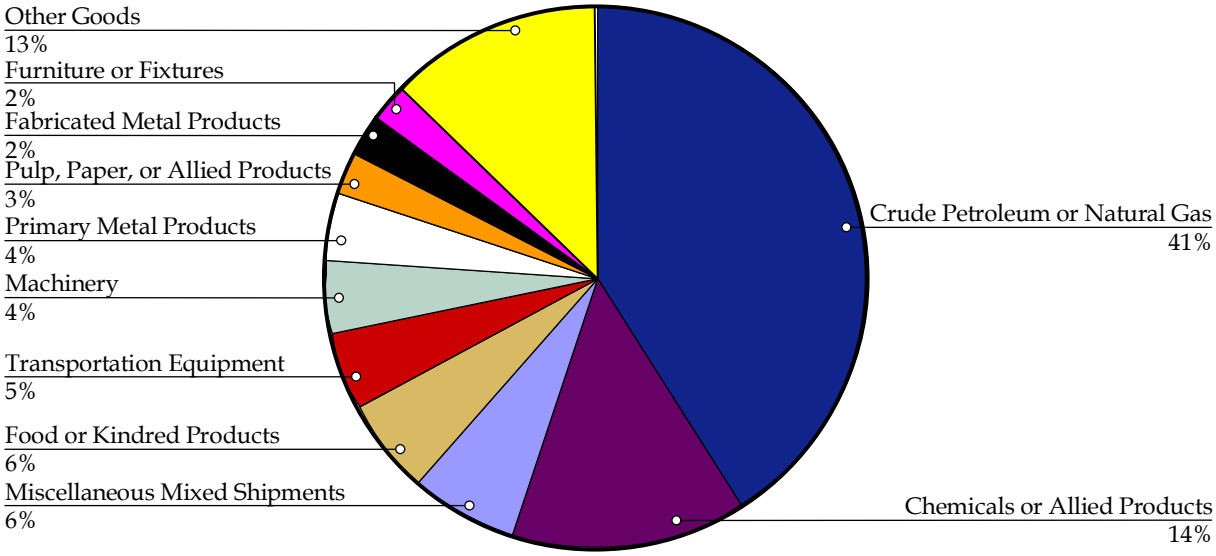


Figure 5.9 Top 10 International Imports into Kansas by Weight
2006



As shown in Tables 5.8 and 5.9, this commodity mix is expected to remain fairly similar through the year 2030, with a few notable changes. Miscellaneous mixed shipments, which include intermodal container shipments, are projected to exhibit a tremendous growth in volume, increasing from 29 percent of total international exports to nearly 46 percent by 2030. The largest expected change in international imports between 2006 and 2030 will be a large decline in the amount of imported crude petroleum and natural gas entering the State. Crude petroleum and natural gas comprised 41 percent of all international imports in 2006 but is expected to decline to 24 percent of total international imports by 2030. However, while its share of total imports is expected to decline, this commodity group is expected to grow in absolute terms over the next 22 years (to about 983,000 tons).

Table 5.8 Top 10 International Exports from Kansas by Weight
2030 Projected

Commodity	Tons	Percent of Total	CAGR
Miscellaneous Mixed Shipments	4,412,967	45.9%	6.7%
Food	1,506,305	15.7%	2.9%
Transportation Equipment	608,246	6.3%	2.3%
Chemicals or Allied Products	756,028	7.9%	5.0%
Primary Metal Products	430,113	4.5%	3.3%
Machinery	456,780	4.7%	4.2%
Coal	105,244	1.1%	-1.5%
Paper	139,891	1.5%	2.3%
Lumber	135,726	1.4%	2.5%
Clay, Concrete, Glass, Stone	139,739	1.5%	3.1%
Other Goods	932,859	9.7%	5.2%
Total	**9,623,897**	**100.0%**	**4.6%**

Table 5.9 Top 10 International Imports into Kansas by Weight
2030 Projected

Commodity	Tons	Percent of Total	CAGR
Crude Petroleum or Natural Gas	983,280	24.3%	0.4%
Chemicals or Allied Products	534,956	13.2%	2.4%
Miscellaneous Mixed Shipments	262,950	6.5%	2.7%
Food or Kindred Products	165,068	4.1%	1.4%
Transportation Equipment	269,235	6.6%	4.0%
Machinery	268,276	6.6%	4.6%
Primary Metal Products	189,399	4.7%	3.5%
Pulp, Paper or Allied Products	125,822	3.1%	3.3%
Fabricated Metal Products	194,523	4.8%	5.5%
Furniture or Fixtures	201,725	5.0%	6.2%
Other Goods	858,543	21.2%	4.9%
Total	**4,053,777**	**100.0%**	**2.7%**

Figures 5.10 and 5.11 show the top 10 international commodities being imported into and exported from Kansas by value in 2006. The highest international exports from Kansas by value are miscellaneous mixed shipments, which accounts for a full 48 percent of the total. Transportation equipment, food, and machinery are all major international exports as well. The largest international imports into Kansas by value are machinery, transportation equipment, and miscellaneous mixed shipments. The total value of international shipments into Kansas in 2006 was $6.7 billion and the total value of international exports from Kansas was $7.9 billion.

Figure 5.10 Top 10 International Exports from Kansas by Value
2006

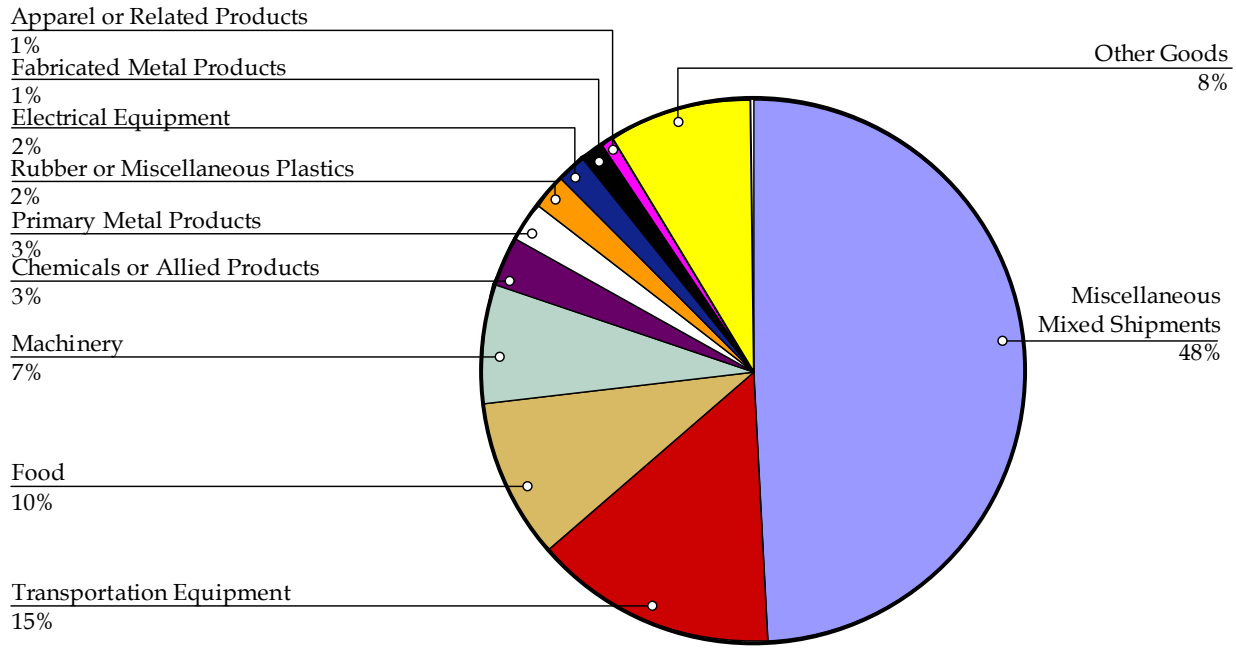
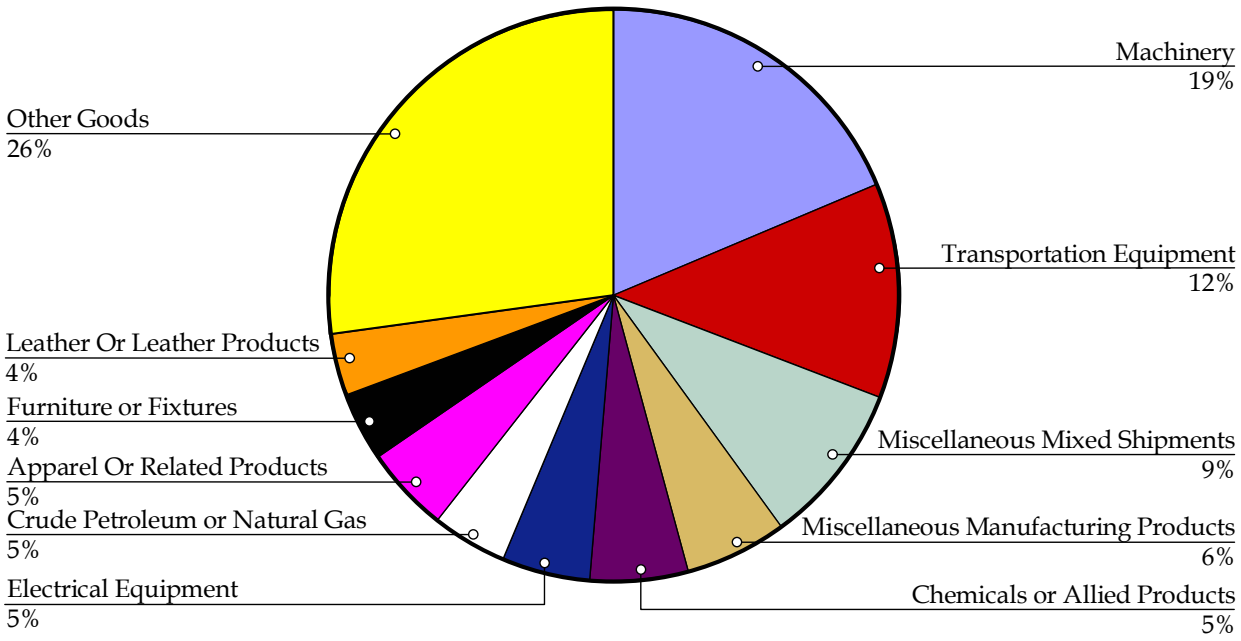


Figure 5.11 Top 10 International Imports into Kansas by Value
2006



As Tables 5.10 and 5.11 show, both inbound and outbound international shipments are expected to grow by approximately 5.5 percent per year over the next 22 years. The fastest growing exports are projected to be miscellaneous mixed shipments (6.7 percent), chemicals (5.2 percent), primary metal products (6.4 percent), and electrical equipment. The growth in miscellaneous mixed shipments will lead it to become the largest commodity being shipped internationally from Kansas (67 percent of total) and may indicate strong future growth in international intermodal shipments from Kansas. Declines in shipments of apparel and related products is likely being driven by resourcing of these manufacturing activities to Mexico or overseas locations.

The commodity mix of international imports into Kansas is expected to remain relatively stable with a few significant changes. International imports of machinery are expected increase by 7.3 percent per year and make up 28.5 percent of the total value of international imports by 2030. The importation of leather products into Kansas from overseas is expected to decline drastically, from $243 million per year in 2006 to just $21 million per year in 2030. Again, this decline is likely being driven by re-sourcing activities.

Table 5.10 Top 10 International Exports from Kansas by Value
2030 Projected

Commodity	Millions of Dollars	Percent of Total	CAGR
Miscellaneous Mixed Shipments	$19,213.5	67.0%	6.7%
Transportation Equipment	$2,415.1	8.4%	2.9%
Food	$1,815.1	6.3%	3.5%
Machinery	$1,685.2	5.9%	4.6%
Chemicals or Allied Products	$816.6	2.8%	5.2%
Primary Metal Products	$930.6	3.2%	6.4%
Rubber or Miscellaneous Plastics	$325.1	1.1%	3.4%
Electrical Equipment	$457.2	1.6%	5.0%
Fabricated Metal Products	$308.0	1.1%	4.1%
Apparel or Related Products	$39.2	0.1%	-3.1%
Other Goods	$660.9	2.3%	3.2%
Total	**$28,666.5**	**100.0%**	**5.5%**

Table 5.11 Top 10 International Imports into Kansas by Value
2030 Projected

Commodity	Millions of Dollars	Percent of Total	CAGR
Machinery	$6,996.4	28.5%	7.3%
Transportation Equipment	$1,899.1	7.7%	3.7%
Miscellaneous Mixed Shipments	$1,144.8	4.7%	2.7%
Miscellaneous Manufacturing Products	$1,392.1	5.7%	5.5%
Chemicals or Allied Products	$845.3	3.4%	3.6%
Electrical Equipment	$3,048.3	12.4%	9.7%
Crude Petroleum or Natural Gas	$343.6	1.4%	0.4%
Apparel or Related Products	$624.8	2.5%	3.0%
Furniture or Fixtures	$1,139.7	4.6%	6.2%
Leather or Leather Products	$21.0	0.1%	-9.7%
Other Goods	$7,115.9	29.0%	5.8%
Total	**$24,570.9**	**100.0%**	**5.6%**

Freight movements related to the North American Free Trade Agreement (NAFTA) comprise a subset of total international freight movements in Kansas. NAFTA, which took effect in January 1994, removed many trade barriers between the United States, Canada, and Mexico with the goal of increasing trade and boosting the economies of the member states. Kansas' central location and transportation infrastructure may allow the State to benefit from this increased trade. In 2006, Kansas' exports to Canada and Mexico amounted to just over $3 billion (about 38 percent of total international exports) while imports from these countries amounted to approximately $2.2 billion (about 32 percent of total international imports). The commodity mix for these shipments is similar to overall international movements. Machinery and transportation equipment are among both the top imports and exports to these countries. Food is another primary export from Kansas to Canada and Mexico, while crude petroleum or natural gas forms the third major import from these countries.