

## 7. FREIGHT TRANSPORTATION AND ECONOMIC CONDITIONS

Oklahoma's economy has become more diverse over the past few decades. Since the oil price collapse in the mid-1980s and the subsequent U.S. recessions, Oklahoma has become less dependent on energy and agriculture. Although energy and agriculture remain important parts of the state's economy, other sectors, such as service and manufacturing, have grown over time. This diversity is a critical factor in growing and sustaining Oklahoma's economy, which in turn increases freight movement and demand on the transportation system.

### 7.1. CONSUMER AND ECONOMIC CONDITIONS

As discussed in **Chapter 5**, a strong population base is crucial for growing and sustaining industries such as manufacturing, retail, and other freight-related businesses. The transportation system is critical for responding to people's demands for goods and services, and for providing a means of travel to respective businesses and places of work. Since 2010, Oklahoma's population has increased by an approximate average of 33,000 per year. As population grows, the need for transportation services and freight also increases.

In Oklahoma, per capita personal income has increased by nearly 50 percent since 2003, from \$27,724 to \$40,620 in 2012. The state per-capita income is higher in metropolitan regions, along major corridors, and in northwest Oklahoma. Growth in per capita income is highest in the rural areas of the state. This growth in income has consistently outpaced that of all other neighboring states; and as per capita income has risen, people have consumed more goods and services.

The low cost of living in Oklahoma is one factor that has helped Oklahoma attract and develop industry and businesses. Low cost of living means

employees can obtain household needs at a lower overall cost. Oklahoma's urban areas, in particular, have a cost of living that is below the national average, and below similar municipalities in neighboring states. The overall cost of living index is about 10 percent less in Oklahoma City and Tulsa than in urban areas nationally.<sup>1</sup> This makes Oklahoma attractive to both businesses and future employees, which means more freight will be produced and consumed within the state.

The cost of doing business affects freight demand through the businesses that choose to work in Oklahoma. The Oklahoma State Chamber reports that Oklahoma has the fourth lowest nationwide state cost of doing business.<sup>2</sup> When the cost of doing business is lower, it attracts new businesses to the state, and encourages existing businesses to stay. With more businesses in the state, this increases freight and personal travel demand on the transportation system.

### 7.2. GROSS DOMESTIC PRODUCT

Gross Domestic Product (GDP) is the output of goods and services produced by labor and property located in the U.S. and is the broadest measure of economic activity. According to the Bureau of Economic Analysis (BEA), the GDP increased in 49 states in 2013, including Oklahoma.

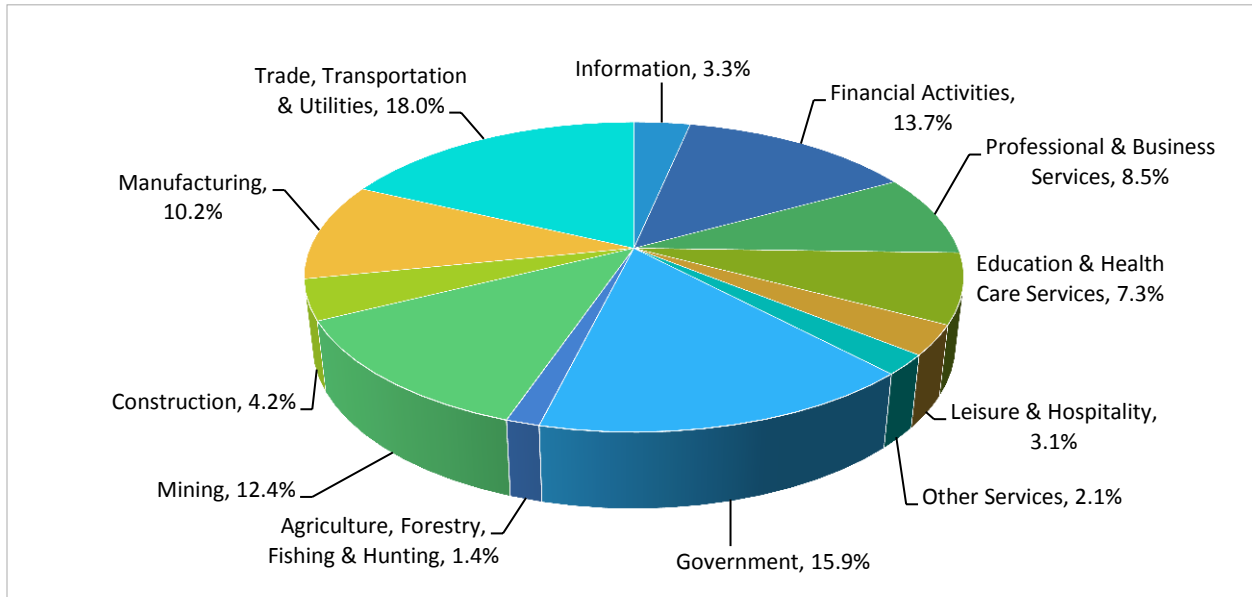
In 2013, Oklahoma's GDP was \$164.3 billion, up from \$157.7 billion in 2012. The state's real (adjusted for inflation) GDP increased by \$6.56 billion, or 4.2 percent in 2013, with the mining sector accounting for the majority of the growth. Oklahoma's 4.2 percent growth rate was the 4<sup>th</sup> highest in the U.S.

As shown in **Figure 7-1**, 16 Oklahoma industry sectors contributed to GDP growth in 2013, with the trade, transportation and utilities sector as the largest contributor at 18 percent. The government sector, financial activities sector, and

mining sector were the next largest contributors, combining to produce 42 percent of Oklahoma’s GDP in 2013. The oil and gas industry is included within the government sector and mining sector.

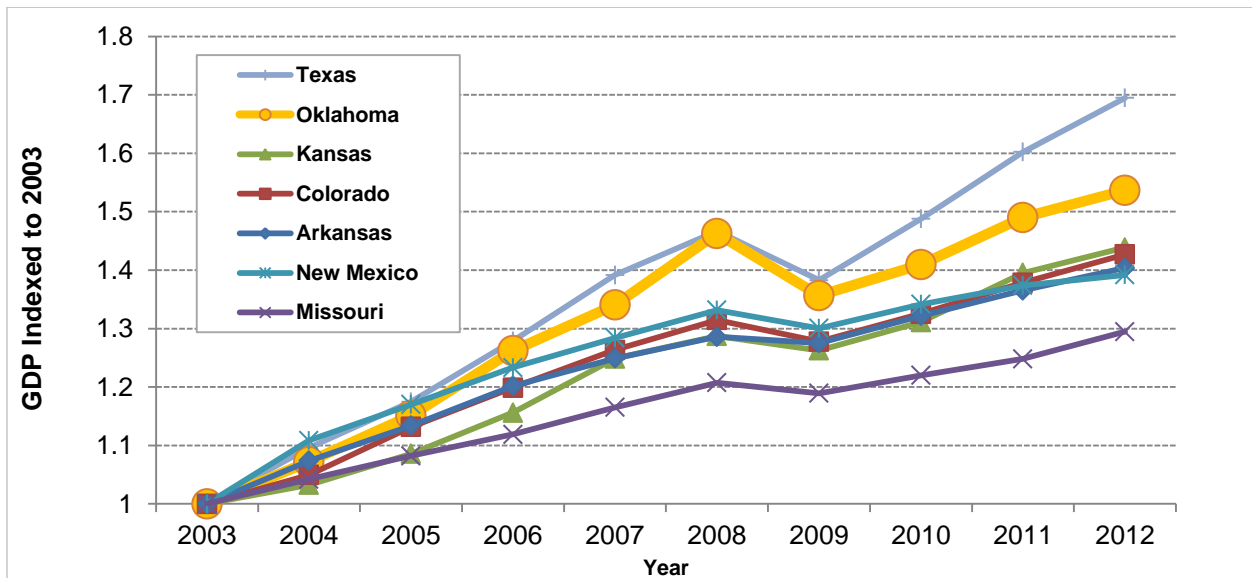
**Figure 7-2** compares the change in Oklahoma’s GDP to neighboring states. For the decade ending 2012, Oklahoma GDP growth has outpaced neighboring states, with the exception of Texas.<sup>3</sup>

**Figure 7-1. Industry Share of Oklahoma’s Economy in 2013  
(by percentage of Gross Domestic Product)**



Source: U.S. Department of Commerce, Bureau of Economic Analysis, Oklahoma Economic Indicators Report

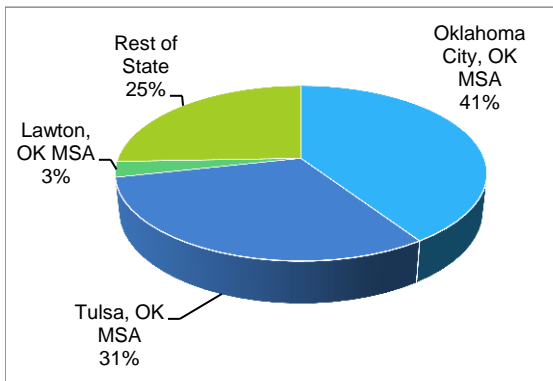
**Figure 7-2. Change in Gross Domestic Product in Oklahoma and Neighboring States, 2003-2012**



Source: Bureau of Economic Analysis

**Figure 7-3** illustrates the 2013 state real GDP percent contribution by three MSAs in Oklahoma. An MSA is a geographic area consisting of a large population nucleus together with adjacent communities having a high degree of economic and social integration with the nucleus.<sup>4</sup> The three MSAs in Oklahoma accounted for nearly 75 percent of the total state GDP. The Oklahoma City MSA had the highest contribution at 41 percent followed by the Tulsa MSA (31 percent) and Lawton MSA (3 percent).

**Figure 7-3. Metropolitan Area Contribution to State Gross Domestic Product, 2013**



Source: U.S. Department of Commerce, Bureau of Economic Analysis, Oklahoma Economic Indicators Report

Agriculture produces about one percent of Oklahoma’s GDP, and has been identified as a critical user of the transportation system. The state ranks in the top ten of the United States for production levels of rye, canola, wheat, sorghum, and other crops as shown in **Table 7-1**.

Several Oklahoma top industry sectors contributing to the GDP are reliant on the freight transportation system. A safe and efficient transportation system is important for the continued growth of Oklahoma’s economy.

**Table 7-1. 2013 Selected Oklahoma Crops Totals and U.S. Rank**

Crop Production			
Commodity	Unit	Total	U.S. Rank
Rye	Bushels	1,600,000	1
Canola	Pounds	208,600,000	2
Winter Wheat	Bushels	105,400,000	3
Sorghum, Grain	Bushels	14,850,000	4
Pecans	Pounds	20,000,000	5
Hay	Tons	4,350,000	6
Sorghum, Silage	Tons	200,000	8
Peanuts	Pounds	59,200,000	9
Sunflower	Pounds	5,180,000	9

Source: [http://www.nass.usda.gov/Statistics\\_by\\_State/Oklahoma/Publications/Annual\\_Statistical\\_Bulletin/ok\\_pocket\\_facts\\_2014.pdf](http://www.nass.usda.gov/Statistics_by_State/Oklahoma/Publications/Annual_Statistical_Bulletin/ok_pocket_facts_2014.pdf)

### 7.3. OKLAHOMA INDUSTRIES

As mentioned in **Chapter 5**, Oklahoma’s employment is expected to grow by 10 percent from 2012 to 2022. This would add approximately 175,000 jobs to the state’s economy, with growth anticipated in all major industry sectors but one.

Employment growth by industry identifies the types of jobs being created in the state. Conversely, industries with a declining employment trend indicate those which are becoming less important in the state’s economy. There may also be industries that act more cyclically, growing during expansion and decreasing in times of economic slowdown or

contraction. The industry sectors projected to show the highest employment growth from 2012 to 2022, along with their percentages, are as follows:

- Construction, 20.9 percent;
- Professional and Business Services, 16.8 percent;
- Education and Health Services, 15.5 percent;
- Leisure and Hospitality, 15.0 percent; and
- Natural Resources and Mining, 14.6 percent.

All industry sectors contributing to the GDP are projected to show employment growth, with the exception of the information sector, which is anticipated to decrease employment by 3.3

percent. More jobs result in an increase in the movement of goods and people on the transportation system.

With favorable trends in population and other demographics, a rising GDP, and employment growth, freight demand on the transportation system will continue to increase. Therefore, freight transportation plays an important role in Oklahoma's economy. The movement of goods is essential to business success and meeting consumer needs.

## 7.4. FREIGHT TRANSPORTATION

Oklahoma's multimodal freight transportation system consists of highways, freight rail, ports and waterways, and airports, and is discussed in detail in **Chapter 6**. This transportation system is essential for the movement of freight into and out of, within and through the state. Freight related industries, the direction of freight movement, and trends that impact future freight movement all influence Oklahoma's economy.

### 7.4.1. Oklahoma's Freight Related Industries

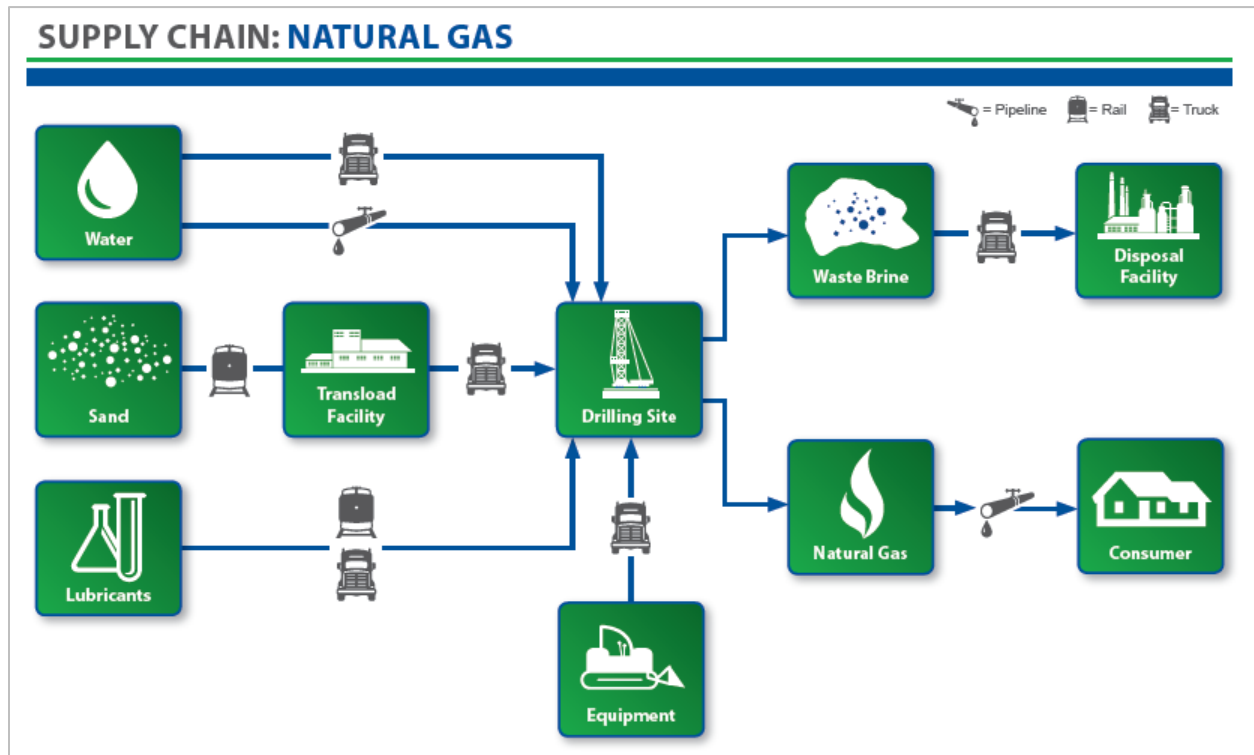
Industries that depend on the movement of goods, referred to in this chapter as "freight-related industries," are a key component of Oklahoma's economy. Five industry groups in Oklahoma have been identified as critical users of the freight transportation system, and several of these are among the major contributors to Oklahoma's GDP<sup>5</sup>. They accounted for more than half of the state's GDP in 2013. Below are the five industry groups.

- **Agriculture** – Agricultural production and agricultural support activities, including farm and ranch operations.
- **Energy and Mining** – Extraction of minerals and gases and supporting activities; utilities providing power or other services, excluding waste management.
- **Manufacturing** – Plants, factories, or mills that characteristically use power-driven machines and materials-handling equipment, but may also include other establishments that process or transform materials into new products.
- **Transportation and Distribution** – Industries providing transportation of passengers and cargo, warehousing and storage for goods, scenic and sightseeing transportation, and support activities, wholesaling of agriculture, mining, manufacturing, and other products.
- **Other Industry (including retail and construction)** – Establishments primarily engaged in the construction of buildings or engineering projects, and entities selling merchandise through a store or non-store location to the general public.

The future competitiveness of these major and emerging industries in the global marketplace require an integrated freight transportation system with strengths in all modes – airports for moving light weight, time-sensitive products; waterways and railroads for handling bulk shipments or intermodal containers; and highways for serving distribution centers and warehouses. Each industry relies on at least one, or often multiple modes within its supply chain network (see **Figure 7-4** for an example supply chain for natural gas); and each mode serves more than one function for Oklahoma's freight system.

Rail and waterways serve commodities traveling over long distances, but also serve for specialized goods transport and link to major export markets. Airports respond not only to high value freight needs with tight delivery timeframes, but also serve to link businesses and industry with global partners and supply chains. The highway system provides not only connections to and from origins and destinations, but also serves as the "last and first mile" connector to users of rail, water, and air transport.

Figure 7-4. Natural Gas Supply Chain  
(For Example Purposes Only)



Source: CDM Smith Inc.

### 7.4.2. Oklahoma’s Freight Movements by Mode and Direction<sup>6</sup>

#### Current Freight Flows

In 2015, more than one billion tons of freight is expected to move by highway, rail, and waterway in Oklahoma. **Table 7-2** shows Oklahoma’s freight flows in estimated tonnage by transportation mode and direction.

Highways account for the majority of tonnage at 66 percent, and the dominant movement is freight moving *through* Oklahoma.

Rail typically moves bulk commodities, as it is the most efficient transport method for long

distances. As such, internal rail movements in Oklahoma are few. Instead, rail accounts for a greater portion of inbound, outbound, and through movements in Oklahoma. Overall, about a third of all freight tonnage is moved by rail in Oklahoma.

Waterway movements in Oklahoma transport bulk commodities, which are not as time-sensitive as rail and highway commodities. However, there is also a growing trend where large energy sector equipment is transported to Oklahoma ports via the MKARNS waterway, which is then transloaded to trucks for final delivery within Oklahoma or to nearby states.

**Table 7-2. Oklahoma Freight Tonnage Flow, by Mode and Direction (2015 estimate)**

Mode	MILLION TONS OF FREIGHT, 2015					Percent by Mode
	Inbound	Outbound	Internal	Through	Total	
Truck	45.8	59.0	149.8	407.1	661.7	65.7%
Rail	31.0	18.9	3.8	285.0	338.7	33.6%
Waterway	3.1	3.3	0.0	0.0	6.4	0.6%
<b>Total</b>	<b>79.9</b>	<b>81.2</b>	<b>153.6</b>	<b>692.1</b>	<b>1,006.8</b>	<b>100.0%</b>

Note: Numbers may not add due to rounding.

Sources: Freight Analysis Framework, FHWA (FAF3), 2013; Class1 Railroad Annual Reports, 2013; Commerce on the Oklahoma Segment, MKARNS, 2013; Tulsa District, U.S. Army Corps of Engineers.

### Future Freight Flows

Total freight tonnage (inbound, outbound, through and within the state) is forecasted to grow to 1.4 billion tons by 2040, an increase of 42 percent from the 2015 estimate. The 2015-2040 growth is characterized by a 52 percent increase in truck tonnage, followed by a 22 percent

increase in rail tonnage, and 30 percent increase in waterway tonnage. By 2040, trucks are forecasted to carry 71 percent of all freight tonnage, while rail is projected to transport 29 percent. Waterborne freight is expected to carry less than one percent of the total tonnage. (See **Table 7-3.**)

**Table 7-3. Oklahoma Forecasted Freight Tonnage Flow, by Mode (2015 and 2040)**

Mode	MILLION TONS OF FREIGHT, 2015-2040							2015-2040 Change
	2015 Total Estimated	2040						
		Inbound	Outbound	Internal	Through	Total Forecast	% by Mode	
Truck	661.7	79.8	76.2	222.6	629.9	1,008.4	70.6%	52.4%
Rail	338.7	47.7	17.3	5.0	341.7	411.7	28.8%	21.6%
Waterway	6.4	4.0	4.3	0.0	0.0	8.3	0.6%	29.7%
<b>Total</b>	<b>1,006.8</b>	<b>131.5</b>	<b>97.7</b>	<b>227.6</b>	<b>971.7</b>	<b>1,428.5</b>	<b>100.0%</b>	<b>41.9%</b>

Note: Numbers may not add due to rounding.

Sources: FHWA Freight Analysis Framework, version 3; ODOT Traffic Analysis Branch; Class One Rail data; 2012 ODOT Freight Flows Study; 2035 Oklahoma Long Range Transportation Plan; ODOT Waterways Program; U.S. Army Corps of Engineers, Tulsa District.

Directional freight patterns are expected to stay largely similar to 2015, with through freight still capturing 68 percent of all freight tonnage. Overall, the increased freight demand on the transportation system will require maintenance and operational improvements, particularly to the highways.

### Through Freight

Through tonnage is forecasted to grow 40 percent between 2015 and 2040 in Oklahoma. This increase will continue to place a large demand on highways and rail as shown in **Table 7-4.**

**Table 7-4. Oklahoma Forecasted Through Tonnage, by Mode (2015 and 2040)**

Mode	Million Tons		2015-2040 % Change
	2015 Total Estimate	2040 Total Forecast	
Truck	407.1	629.9	54.7%
Rail	285.0	341.7	19.9%
Waterway	0.0	0.0	NA
<b>Total</b>	<b>692.1</b>	<b>971.6</b>	<b>40.4%</b>

Sources: FHWA Freight Analysis Framework, version 3; ODOT Traffic Analysis Branch; Class One Rail data; 2012 ODOT Freight Flows Study; 2035 Oklahoma Long Range Transportation Plan; ODOT Waterways Program; US Army Corps of Engineers, Tulsa District.

### Inbound Freight

**Table 7-5** shows the Oklahoma inbound 2015 and 2040 freight tonnage by mode and it is expected to increase by 65 percent over the next 25 years. Trucks will continue to be the dominant freight mode, and truck tonnage is projected to increase 74 percent, followed by rail at 54 percent.

**Table 7-5. Oklahoma Forecasted Inbound Tonnage, by Mode (2015 and 2040)**

Mode	Million Tons		2015-2040 % Change
	2015 Total Estimate	2040 Total Forecast	
Truck	45.8	79.8	74.5%
Rail	31.0	47.7	53.9%
Waterway	3.1	4.0	29.0%
<b>Total</b>	<b>79.9</b>	<b>131.5</b>	<b>64.6%</b>

Sources: FHWA Freight Analysis Framework, version 3; ODOT Traffic Analysis Branch; Class One Rail data; 2012 ODOT Freight Flows Study; 2035 Oklahoma Long Range Transportation Plan; ODOT Waterways Program; U.S. Army Corps of Engineers, Tulsa District.

### Outbound Freight

Outbound freight tonnage is projected to grow at the slowest rate (20 percent) over the next 25 years as compared to other directional movements. Similar to the other directional movements, trucks will continue to be the dominant mode. (See **Table 7-6**.)

**Table 7-6. Oklahoma Forecasted Outbound Tonnage, by Mode (2015 and 2040)**

Mode	Million Tons		2015-2040 % Change
	2015 Total Estimate	2040 Total Forecast	
Truck	59.0	76.2	29.2%
Rail	18.9	17.3	-8.5%
Waterway	3.3	4.3	30.3%
<b>Total</b>	<b>81.2</b>	<b>97.7</b>	<b>20.3%</b>

Note: Numbers may not add due to rounding.  
Sources: FHWA Freight Analysis Framework, version 3; ODOT Traffic Analysis Branch; Class One Rail data; 2012 ODOT Freight Flows Study; 2035 Oklahoma Long Range Transportation Plan; ODOT Waterways Program; US Army Corps of Engineers, Tulsa District.

### Internal Freight

Internal freight tonnage movement is projected to grow by 48 percent and all modes, except for waterways, will experience some internal freight tonnage growth over the next 25 years. (Waterway movements are either inbound or outbound.) Trucks will continue to be the dominant freight mode and truck tonnage is projected to increase 49 percent, followed by rail at 32 percent. (See **Table 7-7**.)

**Table 7-7. Oklahoma Forecasted Internal Tonnage, by Mode (2015 and 2040)**

Mode	Million Tons		2015-2040 % Change
	2015 Total Estimate	2040 Total Forecast	
Truck	149.8	222.6	48.6%
Rail	3.8	5.0	31.6%
Waterway	0.0	0.0	NA
<b>Total</b>	<b>153.6</b>	<b>227.6</b>	<b>48.2%</b>

Sources: FHWA Freight Analysis Framework, version 3; ODOT Traffic Analysis Branch; Class One Rail data; 2012 ODOT Freight Flows Study; 2035 Oklahoma Long Range Transportation Plan; ODOT Waterways Program; U.S. Army Corps of Engineers, Tulsa District.

### 7.4.3. Freight Trends: Oklahoma and Beyond

Understanding current and future trends and the issues influencing how businesses move their products is critical to maintaining and improving Oklahoma's freight transportation system, as well as ensuring it remains an asset to the citizens and supports the state's economic competitiveness. The following are critical freight trends that impact Oklahoma's transportation system.

#### Energy Sector

Oklahoma's energy industry includes the core components of raw materials extraction, machinery and manufacturing, natural gas products, distribution, and engineering services. Oklahoma is a national energy leader, and it has recently seen increasing focus on technological and manufacturing solutions for the energy market. One such example is General Electric's construction of a \$110 million research center in Oklahoma that will focus on researching new

ways to improve oil and gas extraction. This facility is expected to be completed in 2016.<sup>7</sup>

Weight limitations are an issue for the energy industry. Oklahoma is experiencing growth in oversize-overweight (OS/OW) cargo volume, due in part to the increase in the wind turbine industry and cargo associated with transporting large-scale wind energy components, such as blades and other turbine components, as well as oil and gas extraction equipment. Transporting OS/OW equipment safely and efficiently through Oklahoma requires coordination between the energy sector and state agencies responsible for enforcement, safety, and transportation policy.

There are various potential negative impacts associated with OS/OW trucks. Oversize/overweight trucks and high truck volumes accelerate pavement deterioration and the overall pavement service life. This results in the need for more frequent preservation, reconstruction, and maintenance activities. In addition, OS/OW trucks can impact highway safety in general, and pedestrian and bicyclist safety in particular. For example, highways with no shoulders or safe passing areas are problematic when cars and other vehicles pass slower moving OS/OW trucks. The Oklahoma Department of Transportation (ODOT) understands these issues and trends and is especially aware of the need to improve shoulder conditions on rural roadways.

Additionally, oil and gas companies are increasingly transporting petroleum products via rail since it is more accessible than pipelines in certain areas of Oklahoma. For example, pipelines are not available between Oklahoma and North Dakota, so petroleum is transported inbound by rail from North Dakota to Stroud, Oklahoma, and then pipelined to Cushing, Oklahoma. According to the AAR in 2008, Class I railroads originated 9,500 carloads of crude oil nationally compared to 234,000 in 2012.<sup>8</sup> Although costs to transport petroleum by rail are higher than pipeline, rail offers competitive advantages and it is expected to grow in volume

and market share. Rail serves all major refineries in the U.S., as well as the inland waterway and Gulf markets. This provides energy companies a viable and efficient way to transport petroleum products.

### **Shipping and the Panama Canal Expansion**

Since 1914, the Panama Canal has played an instrumental role in moving freight globally. Today, the Panama Canal serves over 140 maritime trade routes to over 80 countries; an estimated five percent of global maritime cargo transits the Panama Canal every year.<sup>9</sup> The Panama Canal is undergoing a \$5.25 billion expansion to accommodate more and larger ships. Currently expected to be completed in 2016, the expansion will have an impact on demand for U.S. ports, rail service, and highways.

Oklahoma is connected to ocean shipping through the inland waterway system and the road and rail connections to the Port of New Orleans, Houston, and other Gulf ports. The MKARNS is a Marine Highway Corridor, which leads to the Mississippi River and the Gulf of Mexico. Oklahoma commodities including but not limited to grain, petroleum products, gravel, and oversize energy and agricultural equipment depend on the inland waterway system.

According to Panama Canal executives, some of the biggest growth cargoes in Panama after the expansion project is completed will be dry and liquid bulk cargoes,<sup>10</sup> which may lead to the potential for increased export traffic from Oklahoma, among others. According to the Panama Canal Phase I Report,<sup>11</sup> reductions in transportation costs out of Gulf ports may lead to a reduction of costs to export bulk commodities, particularly grain, by the Mississippi River System, and could help increase overall demand for exports. However, as noted by the USACE, increases in congestion on the inland waterway system may offset some of these cost reductions.

While the full impacts to the Oklahoma transportation system are unknown at this time, rail and water infrastructure serving the Panama Canal trade routes will be monitored to



determine if shippers and carriers will shift their supply chains to take advantage of this improved international routing option.

### **Inter-American Trade and Nearshoring**

Trade between the U.S. and its southern neighbors in Mexico and Central and Latin America is an important part of the U.S. economy. Increasing trends in Inter-American trade, as well as potential new trade agreements<sup>12</sup> between these countries, increase the potential for increased import and export trade for Oklahoma's businesses. According to the U.S. Census Bureau Foreign Trade Statistics, Oklahoma exported \$6.9 billion worth of products in 2013, up 5.2 percent from 2012.<sup>13</sup> Manufactured exports support 21 percent of manufacturing jobs, and since 2003 export manufacturing has risen more than twice as fast as the state's overall economy. A total of 90 percent of Oklahoma's exports are manufactured goods, and 50 percent of Oklahoma's total exported manufactured goods went to Free Trade Agreement partner countries in 2010.<sup>14</sup>

In addition to increased trade opportunities, U.S. businesses are increasingly moving overseas operations to locations in the U.S. or Mexico, potentially increasing the supply chain and manufactured goods traffic that will flow through the southern border of the U.S. This "reshoring" or "nearshoring" trend is the result of many factors influencing manufacturing costs, such as labor and production costs, quality control, and transportation costs and transit times.

### **Other Logistics Trends**

Changing demand for when and how goods are shipped and delivered has led to changes in the logistics sector and growth in the warehousing and distribution sector of the economy. With the rise of e-commerce, consumers can order directly from a company or online retailer, and receive the products without visiting a retail store. Companies are competing to provide the most timely delivery services, including same-day service to consumers.

Distribution centers are also being located closer to rail lines in order to take advantage of the reduced rates and environmental factors of shipping via rail versus truck. Growth in and around urban areas, especially those with access to highway and rail, is expected to continue as e-commerce trends increase. Consequently, there are opportunities to capture growth in the warehousing and distribution sector, especially due to Oklahoma's geographic location and proximity to major markets. However, for companies preferring to locate adjacent to major dense urban areas to meet consumer demand, location options should be monitored closely to ensure the transportation system can support its operations.

Both Class I and Class III railroads<sup>15</sup> are making large infrastructure investments in Oklahoma to improve rail capacity to support customer requirements. Regional intermodal facilities, such as the BNSF Logistics Park Kansas City Intermodal Facility outside of Kansas City, Missouri, provide a hub for intermodal traffic to be delivered in a 300 mile radius to and from a single location, which includes most of Oklahoma.

Transload and multimodal facilities are also being built by railroads, private operators, and public agencies to facilitate industry and distribution center growth by providing rail and/or water access, and to offset supply chain volatility by allowing customers to utilize multimodal shipping options.

With trends in technology, reduced transportation costs, growth in the energy sector and in U.S. manufacturing, there is great potential for Oklahoma's economy to continue to grow and thrive.

## **7.5. CONCLUSION**

Oklahoma is experiencing a steady rise in population and economic growth, resulting in an increase of freight movement on the transportation system. This demand, along with an established multimodal transportation system, generates an increase in freight movement.

With increased demand and activity, the transportation system will experience more use, leading to issues such as deterioration, congestion, and potential safety concerns. The modal transportation needs are further discussed in **Chapter 9**; and **Chapter 11** identifies freight policies that address the trends and issues discussed in this chapter.

## 7.6. ENDNOTES

<sup>1</sup> Cambridge Systematics, *Oklahoma Freight Study: Task 3 - Description of the Current Oklahoma Economy, Key Industries, and Critical Trends, and Task 4 - System Inventory and Demand*, 2014.

<sup>2</sup> *Ibid*

<sup>3</sup> Bureau of Economic Analysis.  
<http://www.bea.gov/regional/index.htm>

<sup>4</sup> Oklahoma Employment Security Commission, *Oklahoma Economic Indicators*, February 2015.

<sup>5</sup> Oklahoma Department of Commerce.  
<http://commerce.gov/location-or-expansion/oklahomas-business-ecosystems/energy>

<sup>6</sup> The primary source for the rail and truck data was the FHWA Freight Analysis Framework, version 3. The FAF3 information (2012 and 2040) was available for inbound, outbound and internal traffic. This was supplemented with historical truck AADT information available through the ODOT Traffic Analysis Branch, Class One Rail information provided through ODOT Rail Programs, and truck and rail information provided through the 2012 ODOT Freight Flows Study, and the 2035 Oklahoma Long Range Transportation Plan. The rail and truck data for 2015 was forecast based on a 0.9 percent growth rate. Waterways data for 2013 were provided through ODOT Waterways Program and the U.S. Army Corps of Engineers, Tulsa District. The Waterway 2040 forecast was calculated based on a 0.9 percent growth rate, and was developed in consultation with staff from ODOT Waterways Program and the U.S. Army Corps of Engineers, Tulsa District. Regarding through tonnage, the 2015 through estimate was derived based on updating the 2009 and 2010 data from the 2012 Oklahoma Freight Flows Study and the 2035 Oklahoma Long Range Transportation Plan. This was supplemented with truck AADT data available through the ODOT Traffic Analysis Branch, and Class One Rail information provided through ODOT Rail Program. Through truck volumes were calculated based on an assumed average annual growth rate of 1.6 percent, consistent with national freight trends. Through rail tonnage was calculated based on consultation with ODOT Rail Programs staff and data from

*Class One Railroads, and used an assumed average annual growth rate of 0.9 percent.*

<sup>7</sup> Bailey, Brianna. "Oklahoma's manufacturing sector sees growth." *The Oklahoman*, October 10, 2013.  
<http://newsok.com/oklahomas-manufacturing-sector-sees-growth/article/3891821>

<sup>8</sup> Association of American Railroads.  
<https://www.aar.org/keyissues/Documents/Background-Papers/Crude-oil-by-rail.pdf>

<sup>9</sup> Panama Canal Authority, *2009 Annual Report*.  
<https://www.panacanal.com/eng/general/reporteannual/2009/pdf/InformePDFingles.pdf>

<sup>10</sup> Mongelluzzo, Bill. "Panama Canal's Sabongé: Canal to Recapture Much Suez Traffic." *Journal of Commerce*, September 11, 2013.  
[https://www.joc.com/port-news/panama-canal-news/panama-canal-sabonge-canal-recapture-much-suez-traffic\\_20130911.html](https://www.joc.com/port-news/panama-canal-news/panama-canal-sabonge-canal-recapture-much-suez-traffic_20130911.html)

<sup>11</sup> U.S. DOT Maritime Administration. *Panama Canal Expansion Study Phase I Report*, November, 2013.  
[http://www.marad.dot.gov/documents/Panama\\_Canal\\_Phase\\_I\\_Report\\_-\\_20Nov2013.pdf](http://www.marad.dot.gov/documents/Panama_Canal_Phase_I_Report_-_20Nov2013.pdf)

<sup>12</sup> Miami Herald. "U.S. Considering Deal to Expand Trade in the Americas." December 14, 2013.  
<http://www.miamiherald.com/2013/12/14/3819165/andres-oppenheimer-us-considering.html>

<sup>13</sup> <https://www.census.gov/foreign-trade/statistics/state/data/ok.html>

<sup>14</sup> National Association of Manufacturers,  
<http://www.nam.org/~media/A11D3C9D16F14B16BE10DE3117E15310.ashx>

<sup>15</sup> Class I railroads operating in Oklahoma in 2015 are BNSF, UP, and KCS. There are 20 Class III railroads operating in Oklahoma in 2015. In the United States, the Surface Transportation Boards defines a class of railroad based on revenue thresholds adjusted for inflation. For the most recent year of classification (2013), Class I railroad is defined as a carrier having operating revenues of \$467.0 million or more. Class III railroad is a carrier with yearly operating revenues under \$37.4 million. (Source: Federal Railroad Administration, *Summary of Class II and Class III Railroad Capital Needs and Funding Sources – A Report to Congress*, October 2014).