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# OKLAHOMA'S OIL AND NATURAL GAS INDUSTRY

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**Economic Impact and Jobs Report – May 2017**

Commissioned by:



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## Introduction

Oklahoma's oil and gas industry enjoyed a robust expansion that began with the exodus from the great recession and carried into the summer of 2014. By the fall of 2014, commodity prices began to contract. Any hopes of a mild correction were dashed by the summer of 2015 as all signs pointed to bust cycle with a serious slowdown of industry activity and economic ripple effects that would send the state's economy into recession.

Industry activity formed and held a tentative bottom in the summer of 2016 with prices and activity slowly improving through the end of the year. Oil and gas activity continues to

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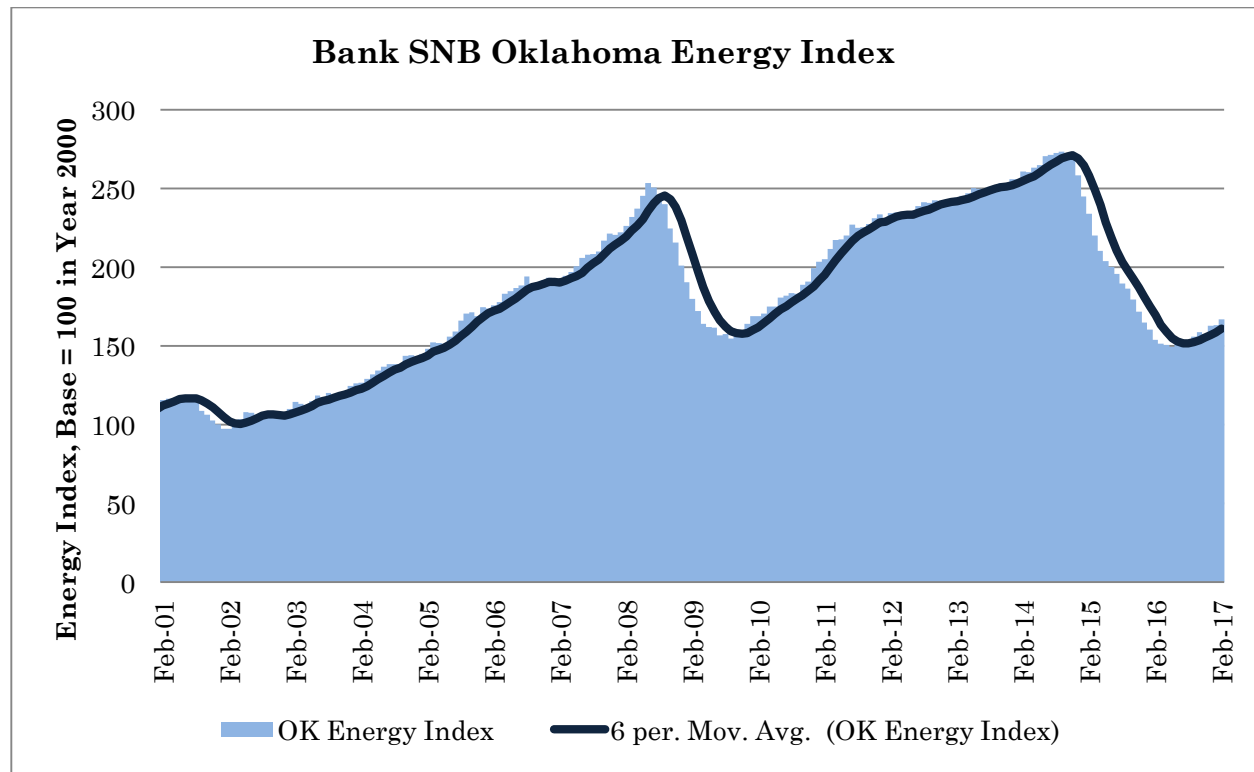
increase slowly but surely as we approach the summer of 2017. Absent an as yet unforeseen economic shock (U.S. recession, geopolitical turmoil, OPEC reversal, etc.) 2017 promises to be a year of recovery with both the industry and the state's economy feeling much better by year's end.

This report serves as a brief update to the last economic impact and jobs report prepared for Oklahoma's oil and gas industry in 2014 as an analysis of 2013 industry operations. The previous report stands as an analysis of the industry at its apex. This update provides a similar analysis of the industry's 2016 operations, representing an economic impact analysis of the industry at its nadir. This impact report provides both a reminder of the importance of the industry – even in the midst of contraction – as well as a baseline against which future years will be evaluated.

This report provides a brief overview of oil and gas industry activity through the commodity price cycle, presents estimates of the economic profile of the industry in 2016, and provides current estimates of the economic impacts from industry operations.

## Oil and Natural Gas Industry Overview

The Bank SNB Oklahoma Energy Index, developed by the Steven C. Agee Economic Research and Policy Institute with support from the Oklahoma Independent Petroleum Association tracks monthly activity in the state's oil and gas sector. The index is strongly correlated with economic conditions in the state providing a dual look into both the state of the industry and the state of the economy.



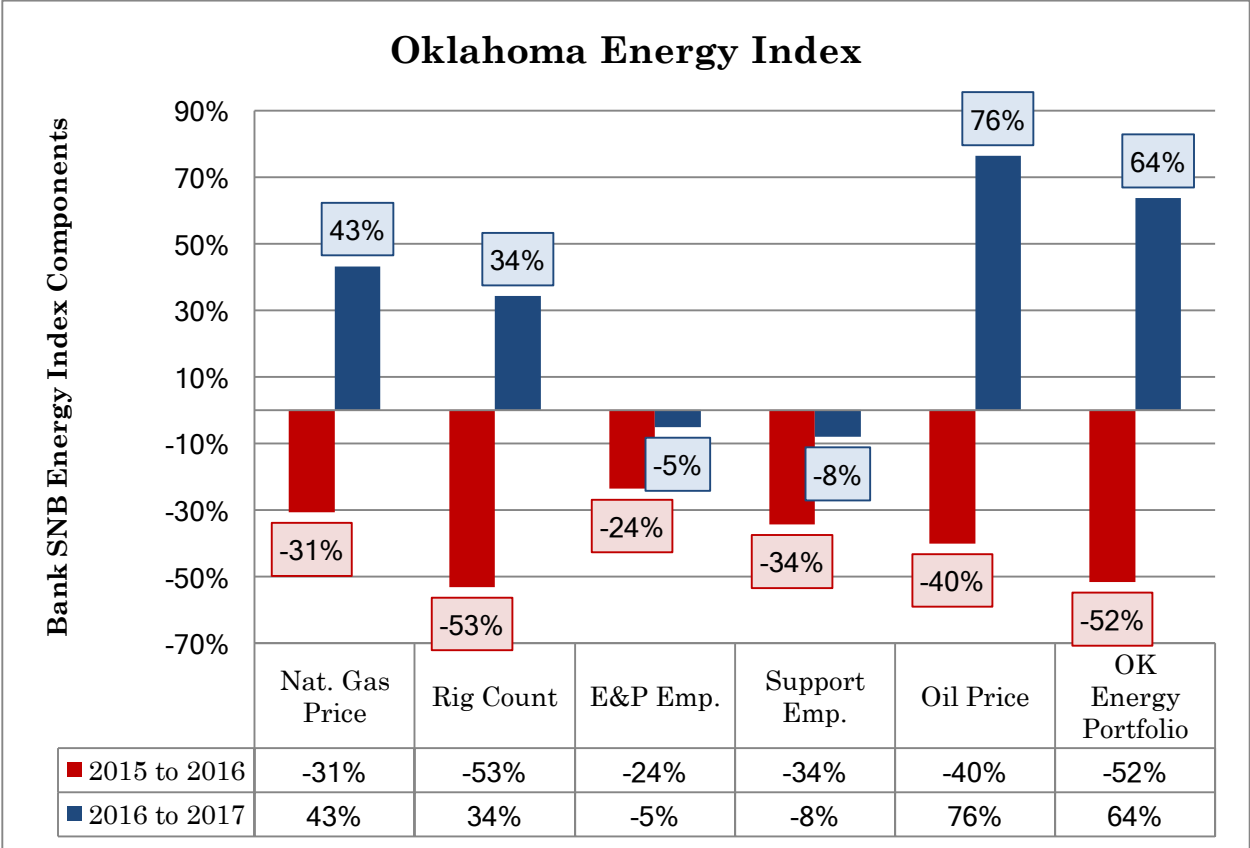
Industry activity peaked in the late summer of 2014 before entering an abated nearly two-year fall through early summer 2016.

Activity held at these low levels through the

summer before moving into a modest recovery through the end of the year. Current levels of activity in the industry are up nearly 12% from the low established in May 2016. Industry activity is expected to build off of the 2016 lows in 2017 as prices combined with production improvement make large portions of the state's geological fields profitable at current prices.

Current activity in the state's oil and natural gas sector is up nearly 12% from the index low established in May 2016.

The energy index is composed of six variables covering industry employment, rig activity, commodity prices, and stock market performance. Each of the six components moved decidedly negative from February 2015 to February 2016 but has since improved markedly.



Over the last twelve months rig activity, spot commodity prices, and equity prices have all improved considerably while industry employment is moving towards year-over-year gains. The patterns in the index components underscore two realities. First, the state’s economic challenges of 2016 cannot be entirely explained away by energy industry activity alone. Instead, the economic challenge of 2016 was a severely weakened national economy exhibiting recession like symptoms that immediately followed the energy industry contraction of 2015. Second, both the industry and economic cycles reached their respective lows in 2016. The economic profile developed and presented subsequently with the accompanying impact estimates will serve as the cyclical low against which future gains will be evaluated.

The technological revolution that opened production opportunities to previously inaccessible geology has exerted a particular influence on Oklahoma. Crude oil production nationally increased by 66% since 2009 to just over 3.2 billion barrels annually, approximately 9 million barrels per day.

Oklahoma is not only home to the firms developing, deploying, and refining new production technologies but also home to

Crude oil production in Oklahoma increased from 66.6 million barrels in 2009 to 153.6 million barrels in 2016 representing growth of 131% over the period.

favorable geologic fields in which to operate. Crude oil production in Oklahoma increased from 66.6 million barrels in 2009 to more than 153.6 million barrels in 2016 representing a 131% increase in Oklahoma crude oil production over the time period. Oklahoma currently is the nation's 5<sup>th</sup> largest crude oil producing state accounting for 5% of total U.S. production.

Crude Oil U.S. Production Profile, 2016		
State	Annual Production, Thousands of Barrels	Share of U.S. Total
Texas	1,176,072	36%
North Dakota	378,428	12%
California	187,586	6%
Alaska	179,170	6%
Oklahoma	153,650	5%
New Mexico	147,283	5%
Colorado	115,365	4%
Wyoming	72,313	2%
Louisiana	56,808	2%
Gulf of Mexico Offshore	587,995	18%
U.S. All Other	193,300	6%
U.S. Total	3,247,970	100%
2009 Production		
	2009 Production	2009-2016 Growth
U.S. Total, 2009	1,953,858	66%
Oklahoma Total, 2009	66,637	131%

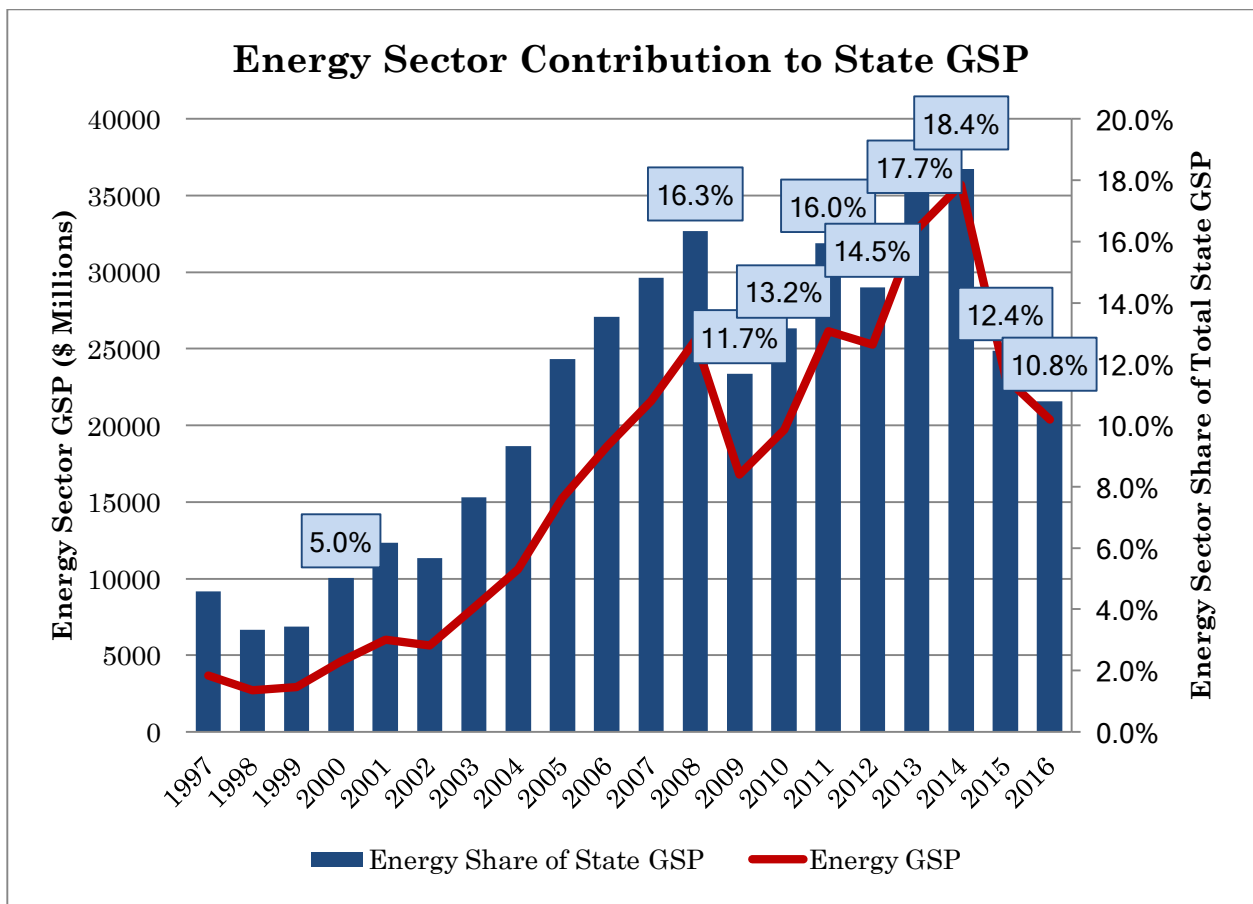
Natural gas production in Oklahoma also benefited from the technological revolution in the oil and gas sector that powered the recent boom. While commodity prices favored crude oil production, natural gas production increased as well both from targeted and associated production. Nationally, natural gas production increased by 31% with Oklahoma production matching the broader trend with 30% growth making it the third largest natural gas producing state and accountable for 9% of total U.S. production.

Oklahoma is the third largest natural gas producing state accounting for 9% of total U.S. production in 2016.

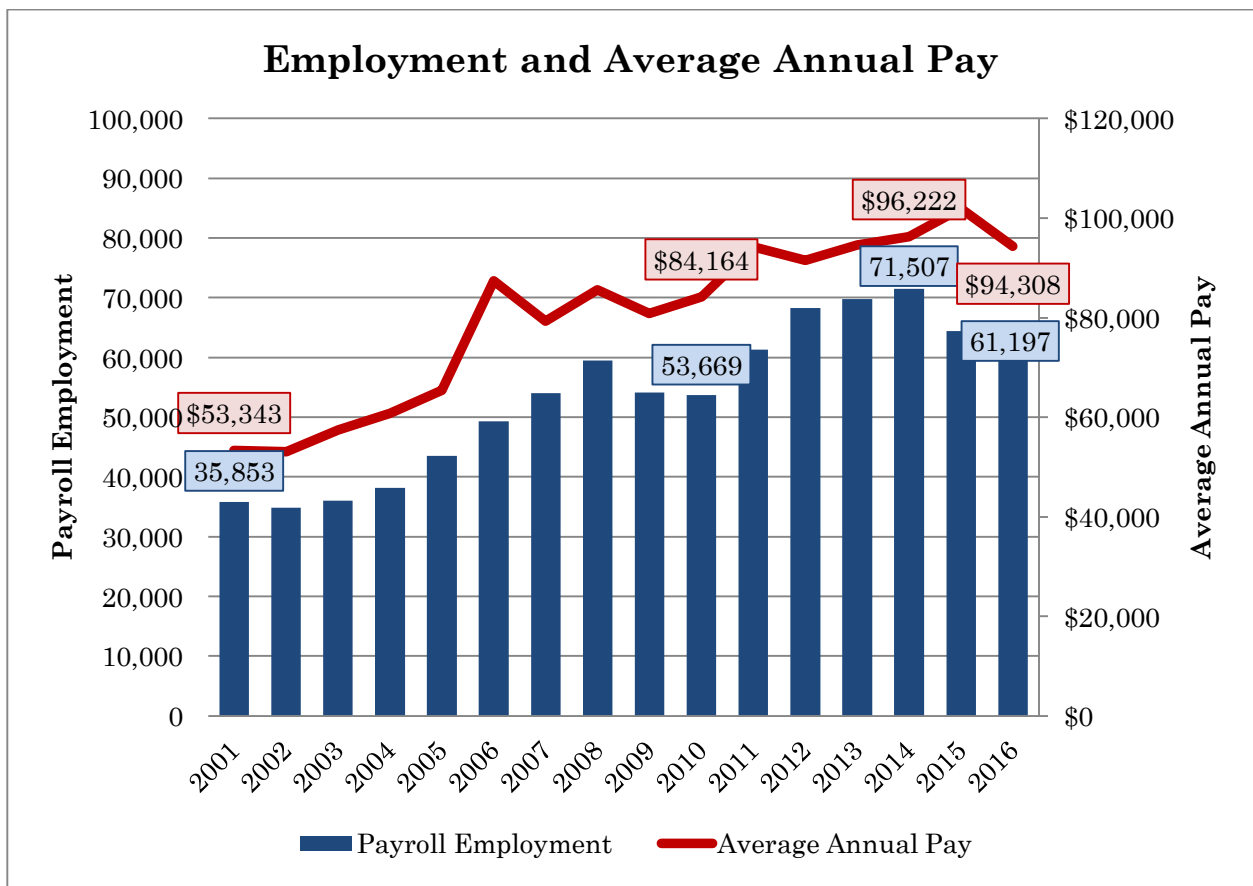
Natural Gas U.S. Production Profile, 2016		
State	Marketed Production, MMcf	Share of U.S. Total
Texas	6,985,115	25%
Pennsylvania	5,263,960	19%
Oklahoma	2,472,607	9%
Louisiana	1,861,033	7%
Colorado	1,703,201	6%
Wyoming	1,602,691	6%
Ohio	1,465,073	5%
West Virginia	1,374,918	5%
New Mexico	1,230,467	4%
Gulf of Mexico Offshore	1,226,432	4%
U.S. All Other	3,110,920	11%
U.S. Total	28,296,417	100%
	2009 Production	2009-2016 Growth
U.S. Total, 2009	21,647,936	31%
Oklahoma Total, 2009	1,901,556	30%

The state's energy sector grew to a \$25.5 billion industry in 2008 directly accounting for 16.3% of the state's economy before yielding to the financial crisis and great recession. The industry resumed growth in 2010 peaking in 2014 at nearly \$36 billion and 18.4% of the state's gross state product. Successive years of decline find the industry roughly at 2010 levels generating just over \$20 billion in gross state product but accounting for just 10.8% of state product. Even at the current level, the energy sector accounts for twice as much of the state's economy than in 2000 suggesting that much of the gains of the expansion remain with the state's economy.

Even in the midst of the current downturn, the energy sector still accounts for twice as much of the state's economy than it did in 2000.

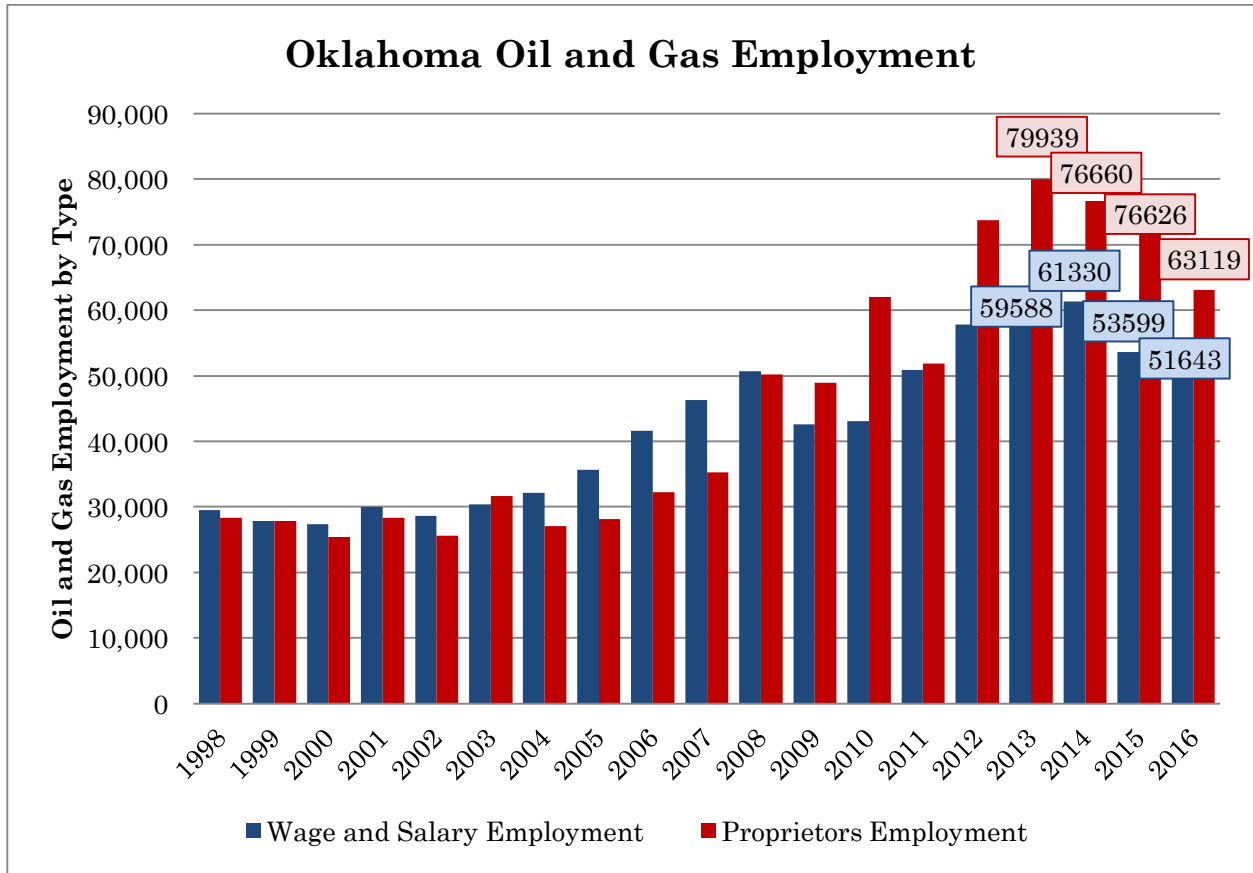


Payroll employment in Oklahoma’s oil and gas industry contracted modestly in the aftermath of the great recession, setting a recessionary low of 53,669 positions in 2010. Employment in the industry grew consistently with the economic recovery and boom in the energy sector through the peak of 2014. Oil and gas employment in the state peaked at 71,507 positions in 2014 up 33 % from 2010 while the average annual pay in the industry peaked at \$96,222, up 14 % from 2010 levels. Employment and average annual pay in the industry fell to 2016 estimated levels of 61,197 positions and \$94,308 respectively.

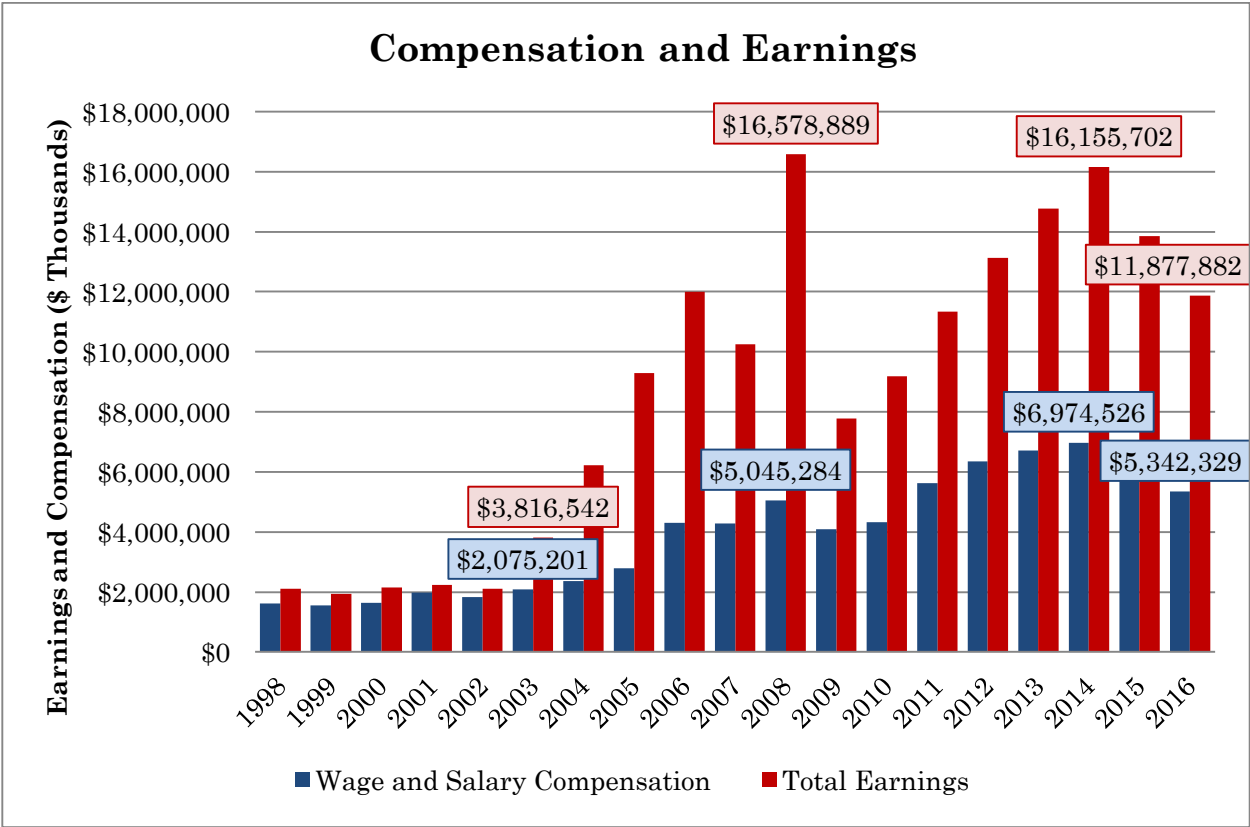




Broader measures of employment reported by the Bureau of Economic Analysis reveal full and part-time employment in the industry for both wage and salary workers and the self-employed. This measure of employment is particularly important as it is most closely related to the measures of employment reported in economic impact analysis. As expected, proprietor employment is the most responsive to commodity price changes having peaked in 2013 before contracting by 21 % in recent years. Wage and salary employment peaked in 2014 and contracted by 16 % since. In total, full and part-time employment peaked at just less than 140,000 in 2013 before setting a bottom of just less than 115,000 in 2016 shedding almost 25,000 jobs in the downturn.



Wage and salary compensation combines with proprietor income to support total earnings in the oil and natural gas sector. As expected, in high-price periods of rapid industry expansion proprietor employment and earnings react aggressively exaggerating the differential between payroll and self-employed earnings. The differential peaked in 2008 before falling sharply in the recession. The payroll to self-employed differential grew again during the industry boom reaching levels in 2014 similar to those of 2008. In the industry contraction, the differential has fallen considerably through 2016 with current estimates of total industry earnings at \$11,877,882 down more than 35 % from 2014 levels. In 2016, wage and salary compensation accounted for approximately 45 % of total industry compensation.



## The Economic and Jobs Impact of the Oil and Natural Gas Industry

Economic impact estimates provide valuable information on the economic linkages between an individual industry and the broader economy. The annual operations of the oil and natural gas industry provide a critical source of direct economic activity to the state. The linkages between the energy industry and the state's broader economy generate secondary economic impacts referred to as indirect, or multiplier economic impacts. Both direct and indirect economic impacts generate income gains to local labor and capital market participants. As a portion of those income gains circulate back through the economy as household expenditures a third layer of economic impacts, referred as induced impacts, occur. The industry's total economic impact is given by the sum of direct, indirect, and induced impacts.

The direct economic influence of Oklahoma's oil and natural gas sector in 2016 is estimated to be: 114,762 full and part-time jobs (wage, salary, and proprietor employment) and \$20.4 billion in gross state product.

The economic impact of the state's oil and natural gas industry will vary over time both because direct activity will fluctuate with commodity prices and because as the economy evolves so will the underlying industry linkages. That is, economic multipliers change over time. This assessment provides a baseline against which future assessments can be compared while serving as a reminder that even in the downturn the energy industry is an important driver of economic activity.

Economic impacts are measured from a set of inputs that describe the current industry. The inputs for the current report are the industry descriptors reported previously for industry value added, employment, and earnings. Specifically, the direct economic influence of Oklahoma's oil and gas industry in 2016 is estimated to be as follows: 114,762 full and part-time wage, salary, and proprietor employment, \$20.4 billion in state value added (gross state product), \$5.3 billion in employee compensation, and \$6.5 billion in proprietor compensation. From this set of direct industry activity indirect, induced, and total economic impacts are estimated.

<b>Economic Impact of Oil and Gas Industry</b>					
	2015	2016e	Indirect Impact	Induced Impact	<b>Total Economic Impact</b>
Total Employment	130,225	114,762	134,961	149,074	<b>398,798</b>
Value Added (GDP, \$Millions)	\$23,114	\$20,369	\$11,742	\$7,410	<b>\$39,521</b>
Employee Compensation, (\$Thousands)	\$6,603,452	\$5,342,329	\$3,870,285	\$3,475,417	<b>\$12,688,031</b>
Proprietor's Compensation, (\$Thousands)	\$7,255,594	\$6,535,553	\$7,385,616	\$1,927,547	<b>\$15,848,716</b>
Total Industry Earnings	\$13,859,046	\$11,877,882	\$11,255,902	\$5,402,964	<b>\$28,536,747</b>

Industry operations in 2016 supported wage and salary and proprietor employment of 398,798 associated with total household earnings from oil and natural gas production of \$28.5 billion.

Considering the magnitude of the impacts against the size of the current economy provides context for the importance of industry operations. The

The total employment impacts from 2016 operations of 398,798 represents 1 out of every 6 Oklahoma jobs while the total value added impact of \$39.5 billion represents \$1 out of every \$5 in gross state product.

130,225 estimated workers in the oil and natural gas industry represent 5% of the state’s total full and part-time labor force while the total employment impact of 398,798 represents 17%, or 1 out of every 6, Oklahoma jobs. Importantly, the direct jobs estimate does not include many midstream and downstream jobs typically associated with the industry. Among the omitted jobs are many construction, manufacturing, and refining jobs. While some of these jobs are captured by the impact estimates, many likely remain unaccounted for by the process. Similarly, the oil and natural gas sector directly accounted for 10.8% of the state’s economy in 2016 but, including indirect and induced impacts, the industry supports over \$39.5 billion of the state’s economy, representing 21% or \$1 out of every \$5 of state economic activity.

Against the backdrop of current economic conditions the importance of the industry becomes clear. Even at the bottom of the current cycle, the oil and natural gas industry continues to hold on to much of the economic gains of the expansion and continues to exert a singular effect on the state’s economy.

**Fiscal Impact**

Gross production tax collections on oil and natural gas in fiscal year 2016 totaled \$355,906,163 resulting in total state apportionments of \$319,784,759. Of the nearly \$320 million in state apportioned funds, approximately 57% stem from gross production taxes on oil production with the remaining 43% from natural gas.

Much of the taxes collected from the oil and natural gas industry are directly apportioned back to the areas in which the activity took place, including apportionments to county roads, highways, bridges, and local school districts.

The tables below summarize information published by the Oklahoma

Tax Commission in the annual report for the fiscal year ending June 30, 2016.

<b>Gross Production Tax - Oil</b>	
Total Collections	\$ 192,488,025
Cancelled Vouchers	\$ 106,300
Transfers In	\$ 2,435,513
Refunded	\$ (12,860,948)
Reserve	\$ (1,200,656)
<b>Total Apportionment</b>	<b>\$ 180,968,233</b>
<b>Gross Production Tax - Natural Gas</b>	
Total Collections	\$ 163,418,138
Cancelled Vouchers	\$ 387,337
Refunded	\$ (22,889,436)
Transferred Out	\$ (2,099,513)
<b>Total Apportionment</b>	<b>\$ 138,816,527</b>
<b><i>Grand Total</i></b>	<b><i>\$ 319,784,759</i></b>

Much of the taxes collected from the oil and natural gas industry are directly apportioned back to the areas in which the activity took place, including apportionments to county road, highways, bridges, and local school districts.

Remaining funds are divided between the general revenue fund, several state education funds, and other miscellaneous funds.

The apportionment of gross production tax dollars from oil and natural gas are summarized below.

<b>Gross Production Tax Apportionment - Natural Gas</b>			
Category		Apportionment	Share
General Revenue	\$	90,643,543	65.30%
County Roads and Highways	\$	24,086,492	17.35%
School Districts	\$	24,086,492	17.35%
<b>Total</b>	<b>\$</b>	<b>138,816,527</b>	<b>100.00%</b>

Gross production taxes on natural gas accounted for \$90.6 million to the general revenue fund and another \$48 million equally divided between local school districts and county highways.

<b>Gross Production Tax Apportionment - Oil</b>			
Category		Apportionment	Share
General Revenue	\$	4,367,817	2.41%
County Roads and Highways	\$	31,879,167	17.62%
School Districts	\$	31,879,167	17.62%
County Bridge and Road Improvement	\$	4,838,223	2.67%
Common Ed Technical	\$	33,890,977	18.73%
Higher Ed Capital	\$	33,890,977	18.73%
Oklahoma Student Aid Revolving	\$	33,890,977	18.73%
Community Water Infrastructure Development	\$	1,879,915	1.04%
Conservation Commission Infrastructure Revolving	\$	1,879,915	1.04%
Tourism and Recreational Capital Expenditure	\$	1,879,915	1.04%
Statewide Circuit	\$	691,183	0.38%
<b>Total</b>	<b>\$</b>	<b>180,968,234</b>	<b>100.00%</b>

Gross production taxes on oil accounted for nearly \$181 million in state apportioned funds with nearly all directly apportioned. Almost \$69 million was returned to local jurisdictions for

In 2016 over \$218.4 million in gross production taxes were directly apportioned to roads and education funds with \$60.8 million to roads and \$157.6 million to a variety of education accounts.

roads, highways, bridges, and local school districts. Another \$102 million was apportioned to a series of state common education, higher education, and student aid funds.

## Conclusion

Oklahoma's oil and natural gas industry remained mired in downturn through 2015 and much of 2016. Conditions began to gradually improve in the summer of 2016 with cautious optimism guiding 2017 expectations. It is very likely that 2016 will mark the trough of the current cycle and offer a guidepost for evaluating future growth in the industry. As such, an economic assessment of the industry's economic contribution in 2016 offers important insights into both the role of the industry even in decline as well as shape future economic expectations.

A review of available 2016 data and estimates of annual operations reflect an industry that directly accounts for over \$20 billion of the state's \$180 billion economy while employing nearly 115,000 wage and salary employees and proprietors supporting almost \$14 billion in Oklahoma household earnings. Even in the current climate, the industry continues as a significant economic force in the state. Including estimates of spillover effects, industry operations in 2016 are estimated to have supported nearly 400,000 jobs, \$39.5 billion in gross state product, and \$28.5 billion in household earnings. As the industry continues to recover, the state's economy will continue development of support enterprises allowing both the direct and spillover impacts to grow from the 2016 baseline.