THE ENERGY SECTOR: STILL A GIANT ECONOMIC ENGINE FOR THE LOUISIANA ECONOMY---AN UPDATE

by

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EXECUTIVE SUMMARY

This study is an update of a study done for Mid-Continent Oil and Gas in 1996, and updated in 2002, 2007, 2010, and 2014 entitled, "The Energy Sector: A Giant Economic Engine for the Louisiana Economy." This is one of the first updates conducted when one energy sector---oil and gas extraction—has been in a serious recessionary mode. Our conclusions from this review of the impact of the extraction, refining, and pipeline industries can be summarized in a series of bullet points:

General size of the industry:

- Louisiana, through the luck of natural resource distribution, is the nation's **number two producer of crude oil and the number four producer of natural gas** among the 50 states.

- Louisiana---with its 18 refineries--- ranks **number two among the states in petroleum refining capacity**.

- There are over **92,000 miles of pipelines** transporting crude petroleum and natural gas within the state and in its offshore area of the Gulf of Mexico.

Total sales, earnings and jobs impacts on the economy:

- Through both their direct and multiplier effects **these three industries supported $72.8 billion in sales in Louisiana firms, generated over $19.2 billion in household earnings for Louisianans, and supported 262,520 jobs in the state in 2015.** The $19.2 billion in earnings represented 13.7 percent of total earnings in Louisiana in that year. This number exceeds the earnings of every single parish in Louisiana. One hundred of the 211 countries ranked by the World Bank in 2016 have smaller gross domestic products than $19.2 billion.

- On average **the job multiplier for these three industries was 4.4**. That is, for every job created in these sectors, 3.4 additional jobs are created in other sectors in the state. The job multiplier for the oil and gas extraction industry is about 3.7, and for the very capital-intensive refinery industry it is about 8.0.

State and local tax impacts:

- These three industries directly **paid $688.7 million in state taxes and fees** in FY17---despite the fact that the extraction sector was in a serious recession at the time. This

figure represents 5.86 percent of total state taxes, licenses, and fees collected. If all these collections were spent on K-12 education, it would be enough to support 13,824 teachers.

- Through the $19.2 billion in household earnings generated by these three industries, state government indirectly was able to collect an additional $1,346,200,000 in taxes, **for a total boost to the state treasury of $2 billion**.

- A very conservative estimate is that these three industries directly paid **$382.8 million in ad valorem taxes to local governments** in the state in 2016, enough tax revenue to support nearly 7,700 public school teachers. In 42 of the state's 64 parishes, these ad valorem taxes exceeded $1 million. In 21 parishes the number exceeded $5 million. Dramatic increases in property tax receipts occurred in Caddo, Bossier, Desoto, Webster, and Red River Parishes over 2005-16 as a result of the activity in the Haynesville Shale.

- The $19.2 billion in household earnings generated by these three industries added approximately **$846,200,000---over four-fifths of a billion dollars**---indirectly to the treasuries of local governments, for a total of just over **$1.2 billion contributed to local government treasuries**.

- If the $3.2 billion dollars collected by state and local governments was used exclusively to pay public school teachers, **the salaries of every school teacher in the state would be covered plus an additional 19,000 teachers**.

Direct employment and wages:

- Despite three years of deep recession in the extraction industry, in 2017-II there were **44,580 workers employed** in the extraction, pipeline, and refining industries---a number approximately equivalent to the 2016 population of St. Bernard Parish, the 26th most populous parish in the state. Fifty-one of Louisiana's 64 parishes had total covered employment smaller than this number in November 2017.

- These three industries paid nearly **$5.3 billion in wages** for Louisiana households in 2017-II---a figure equivalent to five percent of total covered wages in the state that year.

- In the second quarter of 2017, the average weekly wage in Louisiana's manufacturing sector was $1,332. **In the oil and gas extraction sector it was 76 percent higher at $2,343 and the refining sector paid $2,259 weekly---70% higher than the average in manufacturing. Weekly wages in the pipeline industry were $1,673---26 percent higher than the average manufacturing wage.**

- **Energy jobs and earnings were found in all but one of Louisiana's 64 parishes in 2017**. There were 13 parishes where more than 1,000 workers were employed in these three

industries. In Lafayette Parish (the highest energy employment parish), 9,086 workers were directly employed in these energy industries.

Federal Taxes:

- In 2016, the federal government collected over $2.7 billion in mineral taxes and fees from companies operating in the Gulf of Mexico. An estimated $30 million of these monies flow back to the State of Louisiana.
- Beginning in 2009, Louisiana began collecting shared revenues generated in the Gulf from the Gulf of Mexico Energy Security Act (GOMESA). Under Phase I of this act, the state collected only $100,595 in 2016. **Under Phase II, 2017 collections are uncertain but Louisiana's total share is expected to be in the $91-98 million range**. GOMESA monies to Louisiana could potentially reach $253 million a year in 2020 and 2021.

Energy contribution to value-added:

- Value added is a broader measure of the total income created directly in an industry. In 2015 (latest data available), **Louisiana's oil and gas extraction sector alone produced $11.1 billion in total income**. That figure exceeds the **sum** of all the state's manufacturing sectors except refining and chemicals.

- The **refining sector's value added in 2015 was $22.4 billion**. That figure was an impressive 44.3 percent of the total value added in the state's manufacturing sector.

Comparison to a non-energy state:

- A rough view of what Louisiana would be like without its robust energy sector is to look one state to the east. Though Mississippi has one large oil refinery and some oil production, it is a fraction of that in Louisiana. As a result, note some of the comparative economic metrics in Table EX-1.

Table EX-1
Comparative Statistics: Mississippi v. Louisiana: FY17

Metric	Mississippi	Louisiana
Mineral Taxes: FY17	$27.3 million	$538.8 million
Direct Taxes as % of General Fund	0.5%	4.5%
Per Capita Income: 2016[b]	$35,484	$42,298
Per capita Income Rank: 2016	50th	38th
Average Teacher Salary:2016[c]	$42,744	$49,745
Teacher Salary Rank: 2016	42nd	34th

"It is the engine that makes the difference." For Louisiana, the presence of the extraction, refining, and pipeline industries have indeed made all the difference. The energy industry, and its accompanying multiplier effects, has been a powerful engine for economic growth in Louisiana.

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I. Introduction: It's the Engine That Matters

Survey car owners and you will find a consensus on one issue: It is the engine that makes the difference. A weak, undependable engine gets you nowhere. It is a drag on your attempts to get things done. On the other hand a strong, powerful engine gets you where you need to go quickly and dependably. Much gets accomplished.

In the world of economics, some states have only weak engines for economic growth. Their basic industries are either non-existent or are made up of slow-growing, low-wage manufacturing firms. These states are doomed to remain at the bottom rung of the economic ladder, and their prospects for growth are lackluster at best. Examples would be the states of Arkansas and West Virginia.

Other states, either because of the sheer luck of the draw in resource distribution and/or because of innovative development policies, have attracted industries that are veritable dynamos of energy---creating high-wage jobs and spillover business for all kinds of firms. These states not only enjoy the benefits of healthy jobs and income, but also state and local government treasuries get a boost from taxes and fees these industries generate both directly and indirectly.

Louisiana Was Lucky

When it came to the geographical distribution of natural resources, Louisiana won the flip, so to speak. Below her borders, and in the waters of the adjoining Gulf of Mexico, lies a virtual mother-lode of oil and natural gas. Table 1 details Louisiana's oil production relative to her sister

states. **Louisiana is the nation's number two producer of oil, producing almost 1.6 million barrels a day in October 2017** (this figure includes the federal outer continental shelf production)**.** This represents 16.1 percent of the nation's crude oil production, behind Texas, with North Dakota in a close third place.[1]

A comparison of the data in Table 1 with the same table generated back in 2010 reveals the remarkable effect that the **fracking technology** has had on oil production in the U.S. In 2010, Texas ranked second behind Louisiana in total production. Application of the fracking technique in the Eagle Ford and Permian Basin areas of Texas caused an astounding 156% increase in Texas crude production since 2010. North Dakota's Bakken Play went from producing 0.310 mmb/d in 2010 to pass (then third place) Alaska and produced 1.164 mmb/d in 2017. Louisiana has its large shale play---the Tuscaloosa Marine Shale---but exploration companies have struggled to break the code on how to efficiently harvest this "mushy" shale at a competitive breakeven price.

Table 1
Crude Oil & Lease Condensate Production in U.S.: October 2017
(1,000 Barrels per Day)

Area	Production	Percent U.S.
United States	9,637	100.0%
Texas	3,767	40.7%
Louisiana*	***1,576***	***16.1%***
North Dakota	1,164	11.3%
Alaska	507	5.4%
Oklahoma	491	5.1%

*****Includes Federal offshore production; Source:www.eia.gov/dnav/pet

The U.S. is also reliant on Louisiana as a source of **natural gas**. As Table 2 shows, **Louisiana ranks fourth in the U.S. in natural gas production** when the federal Gulf of Mexico

data are included. Louisiana accounted for a little less than a tenth of the nation's natural gas production in October 2017, generating a total of 279,919 million cubic feet of natural gas production.

Table 2
Gross Withdrawals & Production of Natural Gas in the U.S.: October 2017
(Millions of Cubic Feet)

Area	Production	Percent U.S.
United States	2,886,216	100.0%
Texas	694,012	21.3%
Pennsylvania	449,363	13.8%
Alaska	283,185	8.7%
Louisiana*	***279,919***	***8.6%***
Oklahoma	224,740	6.9%

https://www.eia.gov/dnav/ng ***Includes Federal offshore production in the Gulf of Mexico.

Again, the influence of the fracking revolution shows up in these natural gas data. Pennsylvania was not even on the list back in 2010 and is now the nation's number two producer of natural gas behind Texas due to harvests from the Marcellus Shale Play. Ohio---which has the Utica Shale play---is now ranked #6 in the U.S. with 169,566 mmcf of production in October 2017.

Refineries

The tasks of exploring for and lifting these two resources to the surface---what economists label oil and gas extraction---have created thousands of jobs and billions in household income for Louisianans each year. It has also attracted closely related industries to the state as well. For example, **Louisiana ranks number two among the 50 states in petroleum refining capacity** (see Table 3). Louisiana ranks below Texas and ahead of California by this measure.

It is interesting to note that our refining industry is quite different from that of California. California uses 18 refineries to refine its 1.991 million barrels of crude a day. Louisiana, on the other hand, uses the same number of refineries---18---to handle 68 percent more crude per day (3.343 million barrels). California refines its crude in relatively small refineries. Louisiana uses much larger refineries. Indeed, the Marathon Refinery in Garyville is the third largest refinery in the country and the eleventh largest in the world, and the ExxonMobil Refinery in Baton Rouge is the fourth largest in the country and the twelfth largest in the world.[2] In addition, California refineries serve only California, while Louisiana refineries serve Louisiana, Texas, Mississippi, Illinois and the eastern seaboard.

Table 3
Petroleum Refining Operating Capacity: 2017
(Millions of Barrels per Calendar Day)

Area	Refinery Capacity	Number	Percent U.S. Capacity
United Sates	18.617	141	100.0%
Texas	5.671	30	30.5%
Louisiana	***3.343***	***18***	***18.0%***
California	1.991	18	10.7%
Illinois	0.981	4	5.3%
Washington	0.634	5	3.4%

Source: www.eia.gov/dnav/pet/pet_pnp_cap1_dcu_nus_a.htm

Pipelines

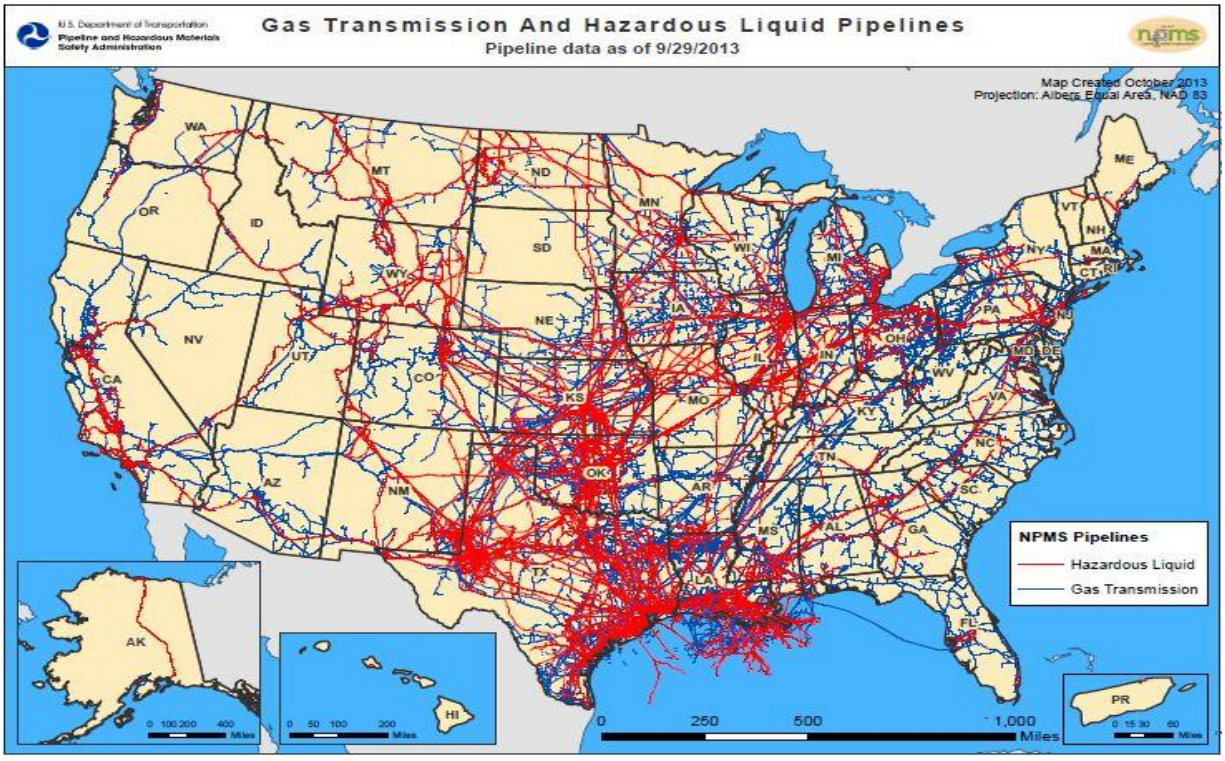
A second closely related industry to oil and gas extraction is the **pipeline industry**. Because pipelines are effectively hidden from view, Louisianans are little aware of the massive amount of oil and gas products that move underground in this state. Consider these figures:

- There were 75,450 miles of gas pipelines both onshore Louisiana and in OCS-Gulf of Mexico in 2017.[3]

- In 2017, there were 17,032 miles of hazardous liquids pipelines---that carry crude oil, petrochemical products, gasoline, jet fuel, and refined products--- both onshore Louisiana and in OCS-Gulf of Mexico.[4]

These 92,482 miles of pipelines are the ones for which reasonable data are available because they fall under direct state or federal regulation. This figure does not, for example, cover many miles of gas gathering pipelines in the rural areas of the state. **This is enough miles of pipeline to circle the earth almost four times.** Figure 1 gives readers a sense of just how intensively the industry is concentrated in our state.

Figure 1



The Trip Ahead

How has such a massive energy industry affected the economic lives of Louisiana citizens? If the extraction, refining, and pipeline industries are lumped under one heading---the energy industry, has it been a weak or powerful economic engine? Has the whole state benefited from its presence, or have the economic effects been limited to only a few parishes? Are the multiplier effects on other industries in Louisiana small or large? Has the industry's impact on state and local treasuries been trivial or significant?

These are the topics covered in the sections to follow. Section II is devoted to the direct income and employment effects of the energy industry. How many people are employed in it and what is the nature of the wages paid to its employees? Section III uses an input/output table to estimate the multiplier impacts of the energy industry. In which sectors are employees benefiting the most from these possible spillover effects? In section IV, the contribution to state, local and federal treasuries is measured along with a discussion of the ten-year industrial tax exemption program. Section V contains the summary and conclusions.

II. The Direct Employment and Income Impacts

A helpful way to think about an industry's impact on a state is to think of the state's economy like a large economic pond. Into this pond we are going to drop a rock labeled "oil and gas extraction, refining and pipeline industries." Would such a rock make much of a splash in the pond? It is these **direct impacts** that we attempt to measure in this section. In section III, we will examine

the extent of the ripples (the multiplier effects) this rock makes in the pond as the ripples work their way to the shore.

Covered Employment and Wages

By far the most detailed and reliable information on employment and wages in these three industries are the data gathered by the Louisiana Workforce Commission on **covered employees**, i.e., covered by unemployment compensation regulations. Because of legal reporting requirements, detailed data are available down to the parish level in most cases.

Covered Employment

Table 4 contains information on covered employment and annual wages paid in these four energy industries. **In 2017-II, there were 44,580 covered workers employed in the oil and gas extraction, support activities for mining, refining, and pipeline industries.**[5]

Table 4
Employment and Annual Wages Paid
in Petroleum-Related Industries: Louisiana
2017-II

Sector	Employment [a]	Annual Wages Paid [b]
Oil & Gas Extraction	6,136	$747,391,508
Support Activities for Mining	24,595	1,949,190,032
Petroleum Refining [c]	11,257	1,380,891,076
Pipelines	2,592	225,558,528
TOTAL	**44,580**	**$4,303,031,144**

Source: www.Laworks.net. Go to LMI section. [a] Second quarter data. [b] Annual estimate based on 2017-II data. [c] Data are for "petroleum & coal products" sector, which is 98 percent petroleum refining.

To get some idea of the relative size of this number, in November 2017, fifty-one of Louisiana's 64 parishes had total covered employment less than 44,580.[6] Total employment in

Terrebonne Parish was 44,549 in that month. **The number of persons employed in these industries is approximately equivalent to the 2016 population of St. Bernard Parish (45,688), the 26th most populous parish in the state**.[7]

Two important points need to be made about the data in Table 4. First, **note that employment and earnings in these energy sectors remains very significant despite the fact that Louisiana's oil and gas extraction sector---and its related support activities---have been in a major recession since late 2014 when the price per barrel of oil fell from $100+ to under $30 at one point**. Employment in the top two rows of Table 4 fell 39% since our last report. Still, a very significant 30,731 people were employed in the extraction and its support activities in 2017-II---a figure almost equivalent to employment in the state's chemical and shipbuilding industries combined (32,125). **The extraction industry and its supporting companies are still generating $2.7 billion in wages for Louisianans despite being in the third year of a very bad recession**.

Secondly, the numbers in Table 4 significantly understate total employment in the energy sector because it **omits contract workers** from the refinery numbers. For example, when the Bureau of Labor Statistics (BLS) counts employment at the ExxonMobil Refinery in Baton Rouge, it counts only persons wearing ExxonMobil shirts. Of the 3,724 employees at that plant in 2017, two-thirds or 2,474 people were contractors. These contractors were wearing Performance Contractors, Turner Industries, Cajun Industries, etc. shirts. These workers were counted by the BLS in the construction sector even though their work was essential to operating the refinery. The use of contractors to help run the plants is commonplace across the refinery industry and results in a significant understatement of refinery total employment.

Covered Annual Wages

What is more remarkable is the impact of these three industries on the incomes of Louisianans who work in these four sectors. According to the data in Table 4, **these three industries generated over $4.3 billion in covered wages for these workers in 2017-II.** These four industries, through their direct effects alone, **generated five percent of the total covered wages earned in Louisiana in 2017-II.**[8] Note that this $4.3 billion estimate is a lower bounds estimate, because it does not include the wages of contractors that are employed at refineries in the state.

What is especially telling is what these data indicate about the average annual wage rate across these four sectors----**$96,524** a year ($4,303,031,144/44,580). This is almost double the average annual wage for Louisianans in general---$45,188---and speaks to the high-wage quality of these jobs.

Comparative Weekly Wage Rates

One reason these annual wage numbers are so large is because these four sectors are among the highest wage industries in the state. Table 5 provides data on the average weekly earnings in these four sectors and Louisiana's manufacturing industries in the second quarter of 2017.

Note that the oil and gas extraction and refining sectors rank #1 and #2, respectively among the industries listed, with pipeline wages ranking #4 and support activities for mining ranking #5. **Oil and gas extraction's weekly wage of $2,343 is a whopping 75.9 percent higher than the average wage in manufacturing ($1,332)**. Even more telling is that oil and gas extraction wages are two and two-thirds larger than the average wage earned by a Louisiana worker ($869 per week). Refining wages are 70 percent higher than the average manufacturing wage. Both oil and gas

extraction and refining are unusually capital-intensive industries requiring very skilled labor for their operations.

Our review of the direct wage and employment impacts of these industries reveal something important about the energy sector. This economic engine is far from small. **It has been a powerful factor for creating thousands of high-wage jobs in Louisiana.**

Table 5
Average Weekly Wage – Second Quarter 2017
Louisiana Petroleum-Related Industries & Manufacturing

Sector	Average Weekly Wage
Oil & Gas Extraction	*$2,343*
Petroleum & Coal Products(98% Refinery)	*2,259*
Chemicals & Allied Products	1,940
Pipeline Transportation	*1,673*
Support Activities for Mining	*1,524*
Paper Manufacturing	1,469
Computers & Electronics	1,430
Primary Metals Manufacturing	1,384
Transportation Equipment	1,232
Machinery Manufacturing	1,226
Fabricated Metals	1,118
Plastics & Rubber Products	1,050
Non-metallic Minerals	964
Beverage & Tobacco Products	936
Wood Products	879
Miscellaneous Manufacturing	821
Food manufacturing	788
Furniture Manufacturing	780
Textile Products	773
Printing & Related Products	754
Apparel Products	512
Average Manufacturing Wage	**$1,332**
Average Wage in All Sectors	**$869**

Source: www.Laworks.net. Go to LMI section. Louisiana Statewide Employment and Total Wages, Second Quarter 2017.

Job Distribution across the State

Have the benefits of these excellent jobs been narrowly confined to just one area of the state, or have they been more widely distributed across Louisiana? One advantage of the covered employment data is they are available by parish, as seen in Table 6, except where disclosure rules prevent their release.

Table 6 contains the distribution of reporting units, employment, and annual wages paid in the four energy industries by parish for the second quarter of 2017. The data to construct this table were provided by the Research and Statistics Unit of the Louisiana Workforce Commission. The Department cannot release data at the parish level unless there are a minimal number of reporting units. Too few a number of reporting units kicks in disclosure rules which ensure that an individual firm's employment and wage data cannot be identified.

The most important message from Table 6 is that the benefits of the energy sector are wide spread across Louisiana. **Energy jobs and income were found in all but one of Louisiana's 64 parishes in 2017.** There were 13 parishes where more than 1,000 persons were employed in the energy sector, and in the largest---Lafayette Parish---there were 9,086 persons working directly in the energy sector. There were 23 parishes where between 100 and 999 persons were directly employed in the energy sector.

It is very important to note that in those parishes containing major refineries the employment and wage numbers will be significantly <u>understated</u> due to the omission of contract workers.

Table 6
Number of Reporting Units, Employment, and Annual Wages in Oil and Gas Extraction, Support Activities for Mining, Refining and Pipeline Industries by Parish: Second Quarter 2017

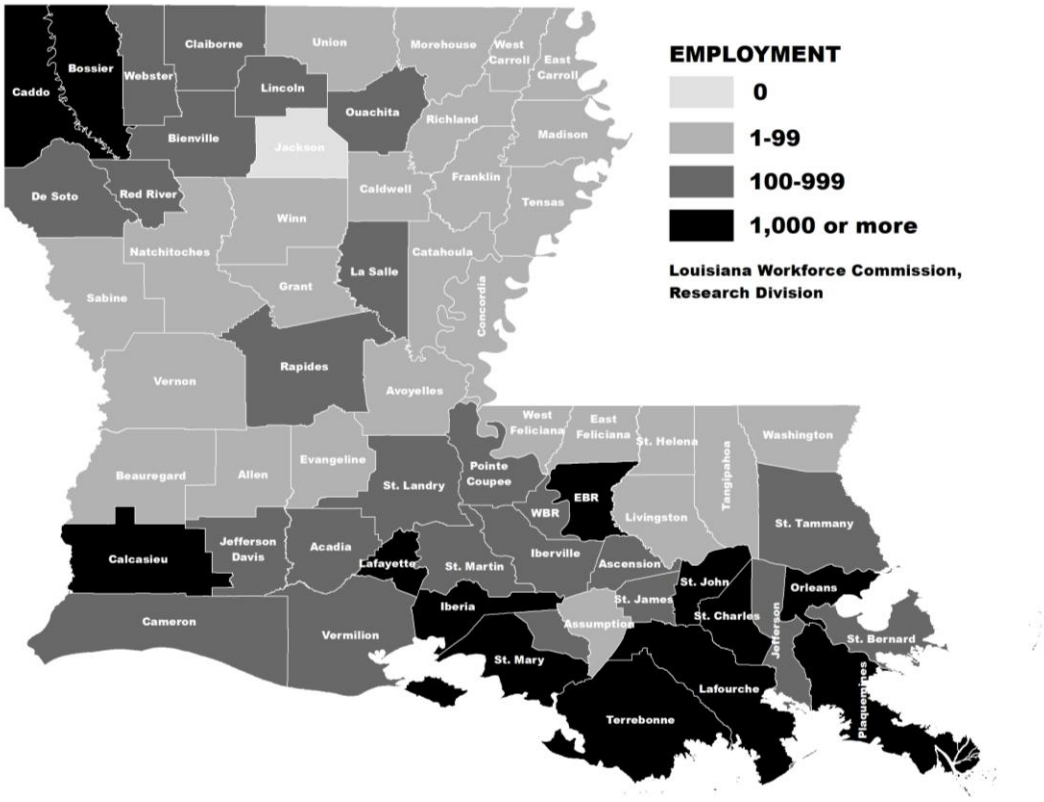
Parish	Units	Average Employment	Annual Wages
ACADIA	42	330	$22,076,508
ALLEN	4	53	$3,994,544
ASCENSION	8	752	$100,085,404
ASSUMPTION	8	34	$3,284,884
AVOYELLES	4	63	$6,642,392
BEAUREGARD	13	64	$5,056,688
BIENVILLE	27	234	$16,972,700
BOSSIER	75	1,214	$96,461,648
CADDO	197	1,803	$129,057,992
CALCASIEU	51	2,501	$285,992,056
CALDWELL	11	67	$4,600,384
CAMERON	17	227	$18,698,248
CATAHOULA	6	41	$964,196
CLAIBORNE	30	350	$22,131,104
CONCORDIA	13	97	$4,828,288
DESOTO	45	716	$57,758,200
E. BATON ROUGE	57	1,958	$222,424,884
E. CARROLL	2	2	144,676
E. FELICIANA	5	89	$7,913,272
EVANGELINE	5	53	$3,318,704
FRANKLIN	5	14	$822,836
GRANT	5	20	$898,064
IBERIA	56	2,456	$222,322,676
IBERVILLE	7	251	$20,409,396
JACKSON	2	0	0
JEFFERSON	59	830	$87,352,396
JEFF. DAVIS	19	167	$8,827,724
LAFAYETTE	317	9,086	$779,950,744
LAFOURCHE	43	1,214	$101,558,320
LASALLE	31	234	$12,477,672

LINCOLN	18	201	$13,375,964
LIVINGSTON	5	13	$833,624
MADISON	1	6	$422,420
MOREHOUSE	3	15	$876,500
NATCHITOCHES	13	68	$4,406,600
ORLEANS	41	1,577	$264,205,532
OUACHITA	27	189	$16,556,488
PLAQUEMINES	43	1,550	$172,475,232
POINTE COUPEE	6	105	$5,834,960
RAPIDES	11	118	$7,852,088
RED RIVER	6	125	$14,101,416
RICHLAND	8	48	$2,984,976
SABINE	19	39	$2,294,100
ST. BERNARD	7	930	$111,739,384
ST. CHARLES	13	1,493	$170,636,360
ST. HELENA	1	11	$785,728
ST. JAMES	7	730	$94,572,512
ST. JOHN	14	1,433	$204,098,344
ST. LANDRY	32	530	$51,694,812
ST. MARTIN	31	395	$26,372,012
ST. MARY	36	1,856	$185,861,428
ST. TAMMANY	52	497	$60,684,988
TANGIPAHOA	5	30	$3,271,188
TENSAS	2	4	$115,516
TERREBONNE	107	4,198	$338,993,640
UNION	4	11	$698,572
VERMILION	44	870	$72,585,244
VERNON	5	3	$202,324
WASHINGTON	4	29	$1,912,648
WEBSTER	39	352	$24,947,612
W. BATON ROUGE	7	325	$42,895,576
W. CARROLL	3	18	$1,417,708
W. FELICIANA	1	9	$653,436
WINN	6	53	$2,255,304

Source: Louisiana Workforce Commission

Map 1 provides a visual illustration of the distribution of energy jobs across the 64 parishes. From this map it appears there is some concentration of the energy sector in the southern portion of the state, but there are still several parishes in the northern and central regions with 100 or more energy employees. For example, Caddo Parish employed 1,803 people in these four industries, while Bossier Parish employed 1,214.

Map 1
Distribution Across Louisiana Parishes of Covered Employment in the Oil & Gas Extraction, Refining, Pipeline, and Support Activities for Mining Industries: 2017:Q2



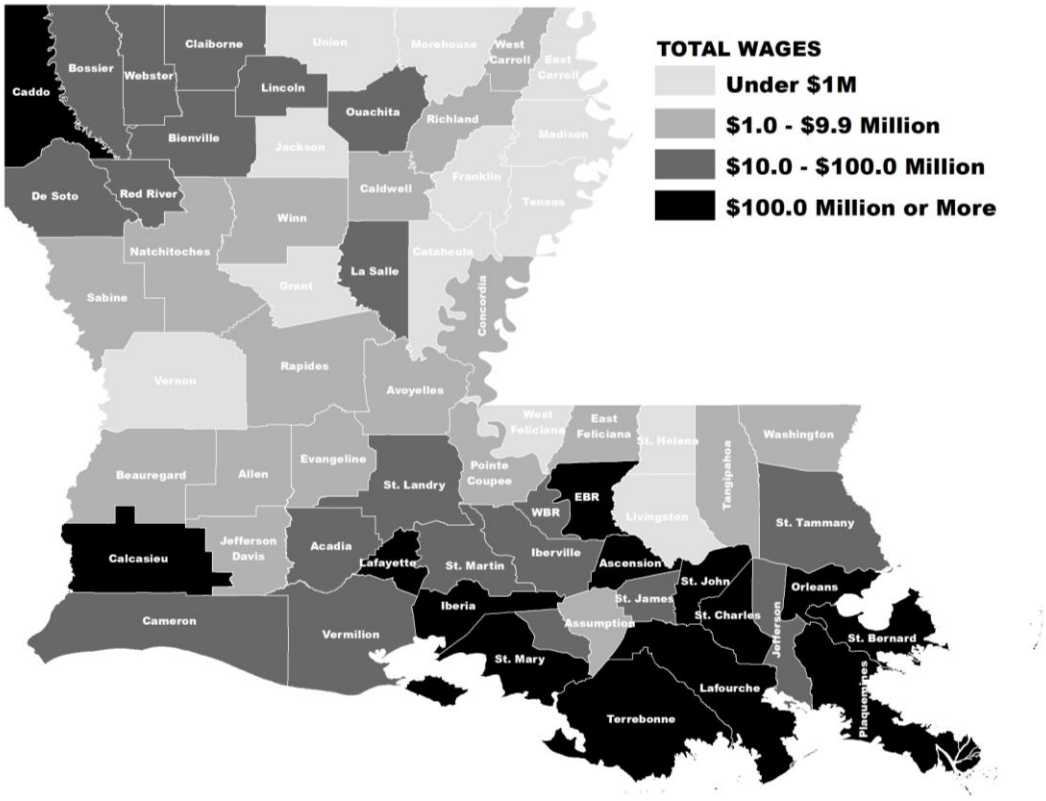
Distribution across the State: Annual Wages

The last column of Table 6 contains annual covered wage data by parish. Map 2 provides a visual illustration of the distribution of covered wages. These data detail what is in some cases a massive injection of earnings into a parish's economy. Note for example that in 2017-II:

- There were 41 parishes where energy wages exceeded $1 million a year.
- There were 14 parishes where energy wages exceeded $100 million.
- In Lafayette Parish energy wages were almost $800 million dollars, and in Calcasieu, Orleans and Terrebonne Parishes annual energy wages totaled over a quarter of a billion dollars.

Clearly, the energy sector is vitally important to the economic health of these parishes. It is also important to note that these are only the **direct** effects of the energy sector on these economies. They do not include the additional multiplier or spillover effects that will be estimated later in this report.

Map 2
Distribution Across Louisiana Parishes of Covered Wages in the Oil & Gas Extraction, Refining, Pipeline, and Support Activities for Mining Industries: 2017:Q2



A Broader Income Measure: Value Added

Care has been taken in the material above to describe the wage data as pertaining to covered employment in the three energy industries. While this measure will fairly comprehensively include most wage and salary workers, it will not include wages and salaries paid to self-employed individuals or unpaid family members---probably a small set within total wage and salary workers in these industries.

However, it is important to realize that wages and salaries are only one component of the income generated for Louisiana citizens by these industries. Not included in the tables above are other labor income, rental incomes, profits, and interest earnings.

One of the best measures of the **total income** created by an industry is its **value added**. There are two main sources of value added numbers by industry in Louisiana. One is the various industrial censuses and surveys that are taken by the U.S. Bureau of the Census. Unfortunately, the latest **Annual Survey of Manufactures** which provides value added data for all of the state's manufacturing sectors was in 2012. Plus, the Census Bureau does not conduct an annual survey of the mining sector or the pipeline industry.

A second source is the **gross domestic product data by industry** estimated by the Bureau of Economic Analysis (BEA) also within the Census Bureau. Officials within the BEA confirm that their GDP estimates by industry are equivalent to value added by industry. The advantages of this second source are that (1) the data are timelier (detailed data for 2015 are available) and (2) data are also provided for the oil and gas industry and pipelines.

Table 7

Value Added in Louisiana Manufacturing Sectors
And in Support Activities for Mining & Oil and Gas Extraction & Pipelines
2015

Sector	Value Added (Millions)	Percent of Manufacturing Total
Petroleum & Coal Products	**$22,444**	**44.3%**
Chemicals	15,329	30.2
Food Manufacturing	2,492	4.9
Paper Manufacturing	2,007	4.0
Fabricated Metals	1,955	3.9
Machinery Manufacturing	1,781	3.5
Transportation Equipment	1,379	2.7
Nonmetallic Mineral Products	676	1.3
Wood Products	581	1.1
Primary Metals	471	0.9
Plastics & Rubber Products	462	0.9
Misc. Manufacturing	278	0.5
Computers & Electronics	232	0.5
Printing & Related Products	201	0.4
Electrical Equipment	152	0.3
All Other Manufacturing	272	0.5
Total Manufacturing	50,714	100
Oil & Gas Extraction	**7,003**	**NA**
Support Activities for Mining	**4,057**	**NA**
Pipelines	**647**	**NA**
TOTAL ALL ENERGY	**$34,151**	**NA**

Source: www.bea.gov. Data are for gross domestic product by industry which BEA officials report is equivalent to value added by industry. NA = Not Applicable. The petroleum & coal products sector is 98 percent refining and support activities for mining is 99.9 percent associated with the oil and gas extraction sector.

There are several striking conclusions that arise from examining these data.

- In 2015, **the oil and gas industry, the refining sector, and the pipeline industry combined created a remarkable <u>$34.2 billion of income</u> in Louisiana**.

- Note **that in 2015 nearly $11.1 billion in income was created by Louisiana's oil and gas extraction sector and it's associated "support activities for mining" sector.** This figure exceeds that of every manufacturing sector in Louisiana except chemicals and refining. It almost equals the sum ($12.9 billion) of all the other manufacturing sectors listed below chemical manufacturing in Table 7. This is despite the fact that the oil and gas sector was entering a serious recession in 2015.
- **With over $22.4 billion in value added, petroleum refining is the largest source of total income in Louisiana's manufacturing sector in 2015**. Indeed, nearly one half (44.3 percent) of Louisiana's value added in manufacturing is derived from the refining sector.

III. Indirect or Multiplier Effects of the Industry

Earlier in this report it was mentioned that a helpful way to think of the energy sector's impact on the Louisiana economy was to think of the state as one large economic pond. Into this pond a rock is dropped labeled "energy industries". Data in Section II show this rock is no pebble---it is a substantial stone. The industry employs 44,580 people in the state, paying them $4.3 billion a year in wages and salaries, for an average annual wage of over $96,500---almost double the average annual wage in the state. When taking into account all types of income---wages/salaries, rent, interest, profits---generated directly in the industry (its value added), the total comes to $34.2 billion. This is the initial splash made when the rock hit the pond, and it is obviously a huge splash.

Ripples in the Pond: The Multiplier Effect

When this rock hits it will also send out ripples to the edge of the pond---what are called the **multiplier** or indirect effects of the industry. For example, the extraction industry will order offshore platforms from a Louisiana fabricator such as Gulf Island Fabricators. This creates sales, income, and jobs in that firm, which in turn calls its suppliers and orders sheet steel, pipes, electrical generators, etc., which creates sales, income, and jobs in those firms, and so on. The employees that are hired in the extraction industry are paid wages and salaries which they then spend at car dealerships, grocery stores, eating establishments, etc., which generates new sales, income, and jobs there, etc., etc.

As it turns out, there is a useful tool for measuring these multiplier effects for the industries. It is called an **input-output (I/O) table**. Such a table has been constructed for the Louisiana economy by the U.S. Bureau of Economic Analysis (BEA) in the U.S. Department of Commerce.

As we did in our last study of this industry we went to the 2011 (latest data available) Louisiana gross state product (GSP) statistics provided by the BEA. The BEA estimated the contribution made by the oil and gas exploration industry, the support industry to oil and gas extraction, the refining industry and the pipeline industry to state GSP. These were the figures we inserted into the I/O tables.

This methodology worked well in estimating the multiplier effects of the refining and pipeline industries, just as it did when using the 2011 data in the last study. However, when using the methodology on the extraction industries, the methodology broke down, giving results that were

inconsistent with other data on these two sectors. This was caused, we believe, in part by the dramatic drop in oil prices that occurred in 2015.

In the case of the two extraction industries we used a modified methodology. We started with the impact numbers from the last study using 2011 data. We then (1) reduced sales, earnings and jobs by the same ratio that that jobs in these two industries experienced between 2011 and 2015, (2) we boosted the resulting earnings number by the increase in the national employment cost index over 2011-15, and (3) we boosted the reduced sales number by the consumer price index over 2011-15. This technique resulted in estimates that were consistent with the direct measures of the industry.

The multiplier effects on business sales, household earnings, and jobs in Louisiana are documented for the oil and gas extraction and its support sector in Table 8, for the refining sector in Table 9 and for the pipeline industry in Table 10.

Ripple Effects of the Extraction Industry

Table 8 contains the estimated multiplier effects from the I/O table of the broadly-defined extraction industry. The I/O table enables one to estimate the impact of an industry on three key variables in the state: (1) sales at firms; (2) household incomes; and (3) jobs.

Any question about whether or not the extraction industry is a weak or strong engine for economic activity in Louisiana should be completely answered by the numbers in this table. By any reasonable measure, these spillover impacts are very large---even in a year when the industry was in the early stages of a significant downturn. **According to the I/O table, extraction industry activity in 2015 created nearly $39.2 billion in <u>sales</u> at Louisiana firms**.

Table 8
Impacts of Oil & Gas Extraction & Its Support Sectors on the Louisiana Economy: 2015

Industry	Business Sales*	Earnings*	Jobs
Agriculture, Forestry, Fishing, and Hunting	$71.6	$31.3	704
Mining	$24,172.1	$5,612.8	58,541
Utilities	$584.4	$163.3	1,217
Construction	$890.1	$365.4	7,206
Manufacturing	$2,966.2	$955.7	8,055
Wholesale Trade	$829.2	$427.5	4,041
Retail Trade	$946.1	$502.2	11,823
Transportation and Warehousing	$719.5	$383.0	3,992
Information	$397.2	$126.8	1,533
Finance and Insurance	$880.0	$324.1	4,529
Real Estate and Rental and Leasing	$1,918.5	$328.9	8,658
Professional, Scientific, and Technical Services	$1,258.2	$1,084.6	9,879
Management of Companies and Enterprises	$695.9	$483.2	4,631
Administrative and Waste Management Services	$414.2	$293.8	6,355
Educational Services	$151.5	$115.6	2,420
Health Care and Social Assistance	$1,159.4	$841.2	12,320
Arts, Entertainment, and Recreation	$112.5	$67.9	1,582
Accommodation	$153.7	$69.5	1,237
Food Services and Drinking Places	$389.3	$196.8	6,392
Other Services	$472.2	$316.1	4,944
Households	$0.0	$13.8	732
Total	**$39,181.6**	**$12,682.0**	**160,792**

*Values in millions. Source: Louisiana Input-Output Table, Bureau of Economic Analysis, U.S. Department of Commerce, Washington, D.C.

Table 8 provides details on how these sales are distributed across firms in different industries. The greatest beneficiary is the crude petroleum and natural gas industry (the mining sector in Table 8)---where the "rock" is, so to speak. But notice that multi-millions of dollars in sales are enjoyed by firms in many other sectors of the Louisiana economy. The manufacturing industry does particularly well (nearly $3.0 billion) as this capital-intensive industry provides fabricators, shipbuilders, and

other manufacturers with huge amounts of business. Firms in the real estate sector also do well ($1.9 billion) not only because the earnings created by this industry allows Louisianans to purchase homes and boosts the demand for shopping centers and other business establishments, but also because the extraction industry purchases a lot of property for drilling and production purposes. Over one billion dollars in sales are created in professional/scientific/technical services (almost $1.3 billion), and health care (almost $1.2 billion).

For most citizens, the key numbers in Table 8 are the ones in the middle column---the ones dealing with household income. **According to the I/O table, the extraction industry pumped nearly $12.7 billion into the bank accounts of Louisiana citizens in 2015.** Persons that worked in the extraction industry earned the biggest fraction of this money---over $5.6 billion---but note that there were 16 sectors of the economy where household earnings exceeded $100 million in 2015. Employees in the professional/scientific/technical services sector were the second largest gainers ($1.1 billion), followed by manufacturing (almost $1 billion) and employees in healthcare ($841.2 million).

Finally, the last column of Table 8 provides the jobs impact of the oil and gas extraction sector. Here, the numbers are particularly impressive. According to the I/O table **a total of 160,792 jobs in Louisiana in 2015 could be traced directly or indirectly to the presence of the extraction industry**. This number is down from over 180,665 in 2011due to the impact of lower oil prices in 2015, and no doubt this number continued to drop over 2016-17 as the industry dealt with even lower oil prices and dismissed about 30% more of its workforce.

The creation of 160,792 jobs in total implies a job multiplier for this industry of 3.7. That is, for every new job created in this sector, there are 2.7 jobs created in other sectors of the Louisiana economy via the multiplier effect. Notice in the last column of Table 8 that thousands of jobs are supported in many other sectors of the Louisiana economy because of extraction's presence here. The retail trade, health care, and professional/scientific/technical services sectors especially benefit from these spillover impacts with 11,823, 12,320, and 9,879 jobs created, respectively.

Finally, the jobs created both directly and indirectly via the multiplier effect from the oil and gas industry are particularly high paying jobs. They average **$78,872 a year** ($12,682 million divided by 160,792). By way of comparison, the average annual wage in all sectors of the Louisiana economy in 2015 was a marked 72% lower at $45,916.

Ripple Effects of the Refining Industry

The existence of a mother lode of petroleum beneath our borders, and beneath the waters in our coastal Gulf of Mexico, has attracted to Louisiana an industry that operates immediately down-stream from oil and gas production---**refineries**. Table 9 contains the I/O estimates of the spillover effects of this industry. It is important to note that we were careful not to double count the impact of this industry by including the extraction sector effects. That is why the "mining" sector in Table 9 contains zeroes.

Note the bottom line of the first column of Table 9. **The existence of the refining industry in Louisiana created almost $32.8 billion in sales at Louisiana firms in 2015**. Clearly, this industry has had a very powerful economic effect on the Louisiana economy. Almost two-thirds of

these sales ($24.8 billion) occurred in the non-durable goods manufacturing sector---a sector which includes the refinery sales in that year associated with "dropping the rock in the pond".

Table 9
Impacts of Refineries on the Louisiana Economy: 2015

Industry	Business Sales*	Earnings*	Jobs
Agriculture, Forestry, Fishing, and Hunting	$46.1	$11.5	533
Mining	0	0	0
Utilities	$341.3	$53.0	565
Construction	$350.5	$136.1	2,509
Durable Goods Manufacturing	$242.1	$48.4	895
Nondurable Goods Manufacturing	$24,781.4	$3,729.0	31,684
Wholesale Trade	$719.5	$228.3	3,540
Retail Trade	$754.1	$272.1	9,907
Transportation and Warehousing	$844.0	$251.4	4,209
Information	$232.9	$50.7	994
Finance and Insurance	$484.3	$124.5	2,747
Real Estate and Rental and Leasing	$797.9	$133.8	6,808
Professional, Scientific, and Technical Services	$408.2	$182.2	2,950
Management of Companies and Enterprises	$239.8	$101.5	1,427
Administrative and Waste Management Services	$237.5	$101.5	3,425
Educational Services	$103.8	$48.4	1,734
Health Care and Social Assistance	$922.4	$422.0	9,531
Arts, Entertainment, and Recreation	$85.3	$25.4	1,114
Accommodation	$108.4	$30.0	911
Food Services and Drinking Places	$299.8	$96.9	5,200
Other Services	$380.5	$143.0	4,442
Households	$0.0	$9.2	807
Total	**$32,379.8**	**$6,198.9**	**95,932**

*Values in millions. Source: Louisiana Input-Output Table, Bureau of Economic Analysis, U.S. Department of Commerce, Washington, D.C.

There were five other sectors where over $700 million in sales could be traced back to the refining industry: healthcare ($922.4 million), transportation/warehousing ($844 million), real estate ($798 million), retail trade ($754.1 million), and wholesale trade ($719.5 million).

Column two of Table 9 reveals the impact of the refining industry on household incomes of Louisianans in 2015. **Nearly $6.2 billion in earnings were injected into the Louisiana economy through both the direct and indirect effects of the refining industry in that year**. That is about 3.1 percent of Louisiana's $200.1 billion in personal income earned in that year.[9] Over $3.7 billion of this income went to workers in the nondurable goods manufacturing sector where the refineries are located. Note that there were 11 other sectors in Louisiana that saw their workers' earnings boosted in excess of $100 million in 2015 through spillover effects of the refining industry.

The jobs impacts were equally impressive. According to the last column in Table 9, **there were 95,932 jobs in Louisiana in 2015 that could be traced directly or indirectly to the refining industry**. Some 31,684 of those jobs were in the manufacturing sector, which includes the direct jobs in the refining industry. In excess of 9,000 jobs were supported in the health care (9,531) and retail trade (9,907) sectors traceable to the refining industry. There were 12 other sectors where more than 1,000 jobs were related to refining activities in 2015.

Those familiar with input-output multiplier estimates may raise their eyebrows at the size of the total employment effect of the refining sector of 95,932 jobs. In 2015, the Louisiana Workforce Commission reported there were 12,060 people employed at the state's refineries. This implies a job multiplier of 8.0---a number so high that one might question the credibility of the estimate.

However, there is a key nuance about this industry that lends credence to the job multiplier estimate. The 12,060 in direct employment is the number of people working for the refinery owners, like Citgo, ConocoPhillips, ExxonMobil, etc. In reality, the number of people working at a refinery is much larger than the direct payroll of these firms because a significant amount of work---especially maintenance and repairs---is subcontracted to other firms. For example, in 2017 there were 3,724 people working at the ExxonMobil Refinery in Baton Rouge making gasoline, jet fuel and other refined products. However, only 1,250 of those workers wore ExxonMobil shirts (and were counted officially as refinery workers); another 2,474 workers wore shirts like Performance Contractors, Turner Industries, Cajun Contractors, etc. which means they were counted as construction workers even thought they were at the refinery continually and were vital to operations at the plant.

Ripple Effects of the Pipeline Industry

As mentioned in the introductory section of this report there are approximately 92,482 miles of pipelines crisscrossing Louisiana, vividly shown back in Figure 1. The industry directly supported 2,592 jobs and generated almost $225.6 million in wages and salaries for its employees in 2017 (Table 4). The I/O table estimates of the total impact of the industry are shown in Table 10.

The mass of pipelines shown in Figure 1 should have been a sort of early warning signal that this industry's impact---though not as large as extraction and refining---is still non-trivial. According to the I/O table, **the pipeline industry was responsible for almost $1.2 billion in sales at Louisiana businesses, almost one-third of a billion dollars in earnings for Louisiana households, and 5,796 jobs for Louisianans**.

Table 10
Impacts of Pipelines on the Louisiana Economy: 2015

Industry	Business Sales*	Earnings*	Jobs
Agriculture, Forestry, Fishing, and Hunting	$2.3	$0.6	27
Mining	$73.4	$12.6	107
Utilities	$15.6	$2.4	26
Construction	$29.8	$11.7	214
Durable Goods Manufacturing	$40.4	$8.7	149
Nondurable Goods Manufacturing	$52.0	$8.0	101
Wholesale Trade	$26.7	$8.5	132
Retail Trade	$38.1	$13.6	500
Transportation and Warehousing	$656.7	$190.1	1,975
Information	$13.3	$2.9	57
Finance and Insurance	$29.2	$7.7	166
Real Estate and Rental and Leasing	$40.1	$6.5	359
Professional, Scientific, and Technical Services	$58.7	$26.3	425
Management of Companies and Enterprises	$5.7	$2.4	34
Administrative and Waste Management Services	$23.5	$10.4	358
Educational Services	$5.0	$2.4	85
Health Care and Social Assistance	$44.4	$20.4	459
Arts, Entertainment, and Recreation	$4.2	$1.2	55
Accommodation	$5.6	$1.6	47
Food Services and Drinking Places	$14.8	$4.8	258
Other Services	$19.4	$7.2	226
Households	$0.0	$0.5	39
Total	**$1,199.0**	**$350.4**	**5,796**

*Values in millions. Source: Louisiana Input-Output Table, Bureau of Economic Analysis, U.S. Department of Commerce, Washington, D.C.

The Total Impact: More than "Ripples"

A large number of figures are contained in Tables 8, 9 and 10. Table 11 presents a handy summary of the bottom line from those three tables. According to the I/O table, **the energy industry in Louisiana supported almost $72.8 billion in sales at firms in the state, $19.2 billion in**

household earnings for Louisianans, and 262,520 jobs for Louisiana citizens in 2015. The term "ripple" hardly does justice to the magnitude of these impacts. These are more like small waves.

Table 11
Total Impacts on Louisiana Economy: 2015

Industry	Business Sales*	Earnings*	Jobs
Oil & Natural Gas Extraction	$39,181.6	$12,682.0	160,792
Refineries	$32,379.8	$6,198.9	95,932
Pipelines	$1,199.0	$350.4	5,796
Total	**$72,760.4**	**$19,231.3**	**262,520**

*Values in millions. Source: Louisiana Input-Output Table

Numbers in the billions are used so frequently in society today that it is difficult to get a grasp on what they really mean. Table 11 shows that the industry created $19.2 billion in household earnings for Louisianans in 2015. Perhaps a few comparisons will put these numbers in perspective.

- That is 13.7 percent of the total earnings of Louisianans in that year.[10]
- This number exceeds the total earnings of persons in each of every single parish in the state in 2015 except East Baton Rouge Parish. The #2 parish that came closest to matching this total was Orleans Parish at $15.3 billion.[11]
- The United Nations has generated a table listing the gross domestic product (GDP) of 211 countries in the world in 2016.[12] One hundred of those countries have gross domestic products smaller than $19.2 billion.

Table 10 shows that the jobs of 262,520 Louisianans are dependent on the presence of the energy industry in this state. By way of reference:

- This number represented 13.6% of covered employment in 2015 in Louisiana.[13]
- In 2015,there were 59,019 people employed directly in the energy industries in the state. **This means the job multiplier for these four industries is 4.4**, a figure which includes the direct jobs. **This means for each job created in these three industries, 3.4 additional jobs are created elsewhere in the state.**

What these numbers reveal is that the economic impact of the energy industry is both huge and widespread. Clearly, it has been a powerful influence for economic growth in Louisiana.

IV. Tax Impacts of the Energy Industry

Our analysis of the employment and earnings impacts of these energy industries reveals an economic engine with extensive job and income creating powers. It should come as no surprise then that both state and local governments enjoy a nice boost to their treasuries from the presence of the extraction, refining and pipeline industries in our state.

These industries influence tax payments to these two governmental units in <u>two ways</u>. First, there are the taxes paid **directly** by the industry to state and local governments in the form of corporate income and franchise taxes, sales taxes, severance taxes, royalties, rentals, bonuses, property taxes, fees, etc. However, there is a second major source of revenues generated by the industries' presence---**indirect taxes**. Recall that in section III, it was determined that $19.2 billion in household earnings was created in the state both directly and through the multiplier effects of these industries' activities (see Table 11). State and local governments collect additional taxes via these earnings as well.

Direct State Taxes

Table 12 documents the direct state taxes and fees paid by the extraction, refining, and pipeline industries in fiscal year 2016-17 (FY17). **The energy industry paid $688.7 million in state taxes in FY17 or about 5.8 percent of total taxes, licenses, and fees collected by the state.** Clearly, if this sector did not exist in Louisiana, our citizens would be able to do far less in terms of infrastructure, education, care for the poor, etc., than it is doing today. Nearly seven hundred million dollars can correct a lot of social problems.

By far the largest portion of these tax collections are mineral taxes and payments such as severance taxes, royalties, rentals, and bonuses. Counting payments to the 8g fund, these mineral taxes totaled nearly $538.8 million or 78 percent of total direct taxes paid by this sector. Few people consider the nature of these mineral taxes. **What other industry is required to give 12.5% of its total revenues to the state off the top, whether it is making or losing money, and then additionally pay income taxes on any profits afterwards?** The next biggest set of taxes in Table 12 was the corporate franchise and income taxes and sales taxes which came to $126.5 million in FY17.

Louisiana is quite fortunate to have an industry within its boundaries that contributes two-thirds of a billion dollars to the state's general fund. For example, the average teacher salary in Louisiana in 2016 was $49,745.[14] **That means $688.7 million supported 13,845 teachers**. And this does not include all the indirect taxes generated for the state from jobs and earnings created via the multiplier effect (calculated below). Think of the extra money to support K-12 education that would have to be raised via taxes on citizens if the energy industry was not in Louisiana.

Table 12

Direct State Taxes Collected From Oil & Gas Extraction, Refining, And Pipeline Industries: Fiscal Year 2016-17

Tax Category	Taxes Paid Millions of Dollars
Severance Taxes	$371.2
Royalties, Rentals, Bonuses, Leases	160.5
Corporate Income & Franchise & Sales Taxes	126.5
Direct Fees to Dept. of Natural Resources	14.9
Royalties Paid to 8g Fund	7.1
Fees Paid to Dept. of Environmental Quality	8.5
TOTAL DIRECT TAXES PAID	**$688.7**
Total State Taxes, Licenses & Fees	$11,935.6
Total Direct Taxes as Percent of Total State Taxes, Licenses, Fees	**5.8%**

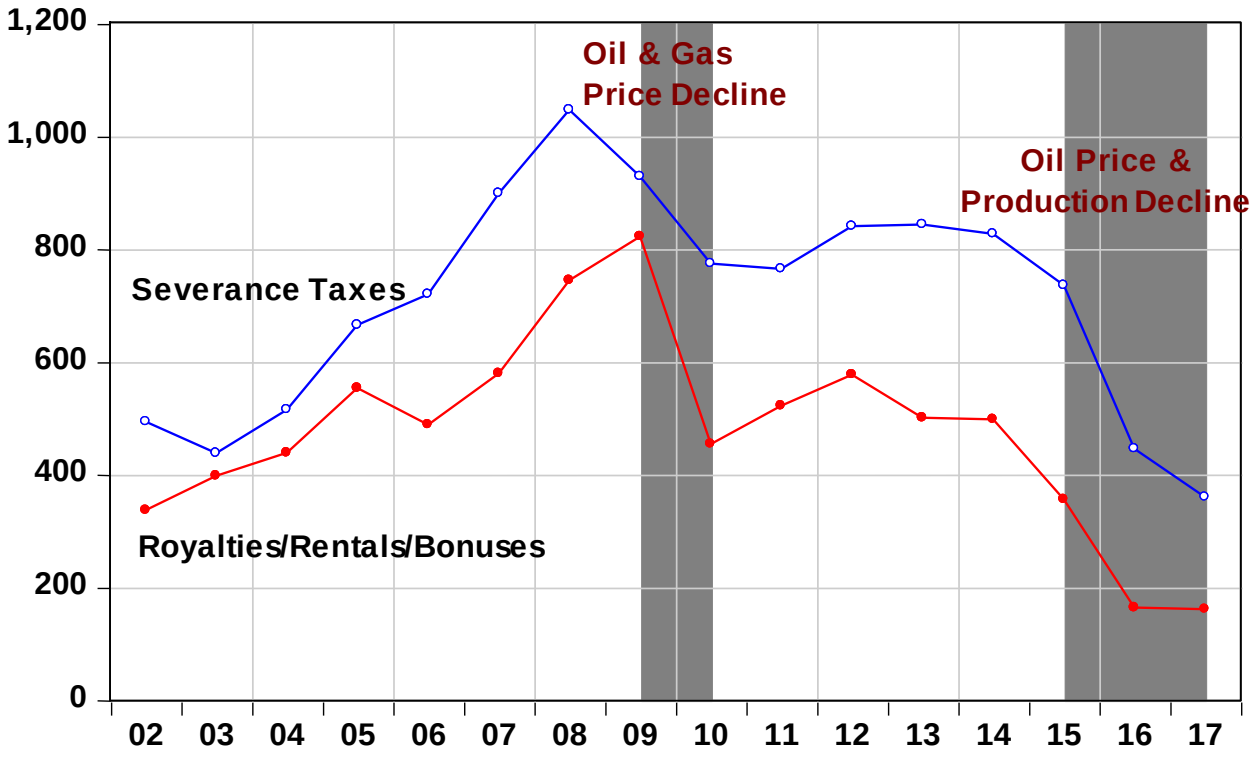
Source: Departments of Revenue, Environmental Quality, Natural Resources, and Legislative Fiscal Office. Total State Taxes, Licenses, and Fees do not include some agency receipts included in direct taxes paid by the industry.

Reasons for Direct Tax Decline

Readers who watch this industry closely will note that while the numbers in Table 12 are impressive, they are down substantially from the FY13 numbers that we reported in our last report. For FY13, direct taxes paid by the industry were $1,497 million or 14.6% of the state's total taxes, licenses, and fees. What is behind this stunning 54% decline in revenues from the industry?

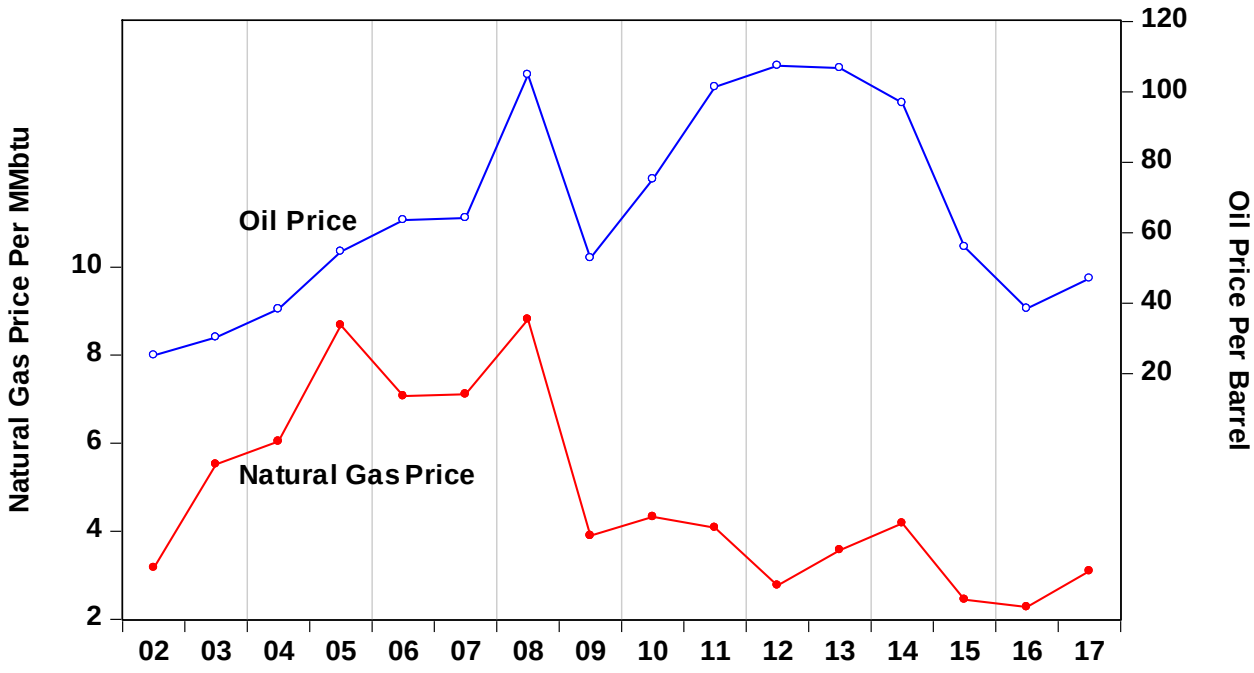
The data in Figure 2 tell the tale. The answer is the marked decline in mineral revenues, specifically severance taxes and royalties/rentals/ bonuses. Severances taxes fell from $847.1 million to $371.2 million, and royalties/rentals/bonuses fell from $526.9 million to $160.5 million.

Fig. 2 :Severance Taxes & Royalties/Rentals/Bonus Payments by Fiscal Year



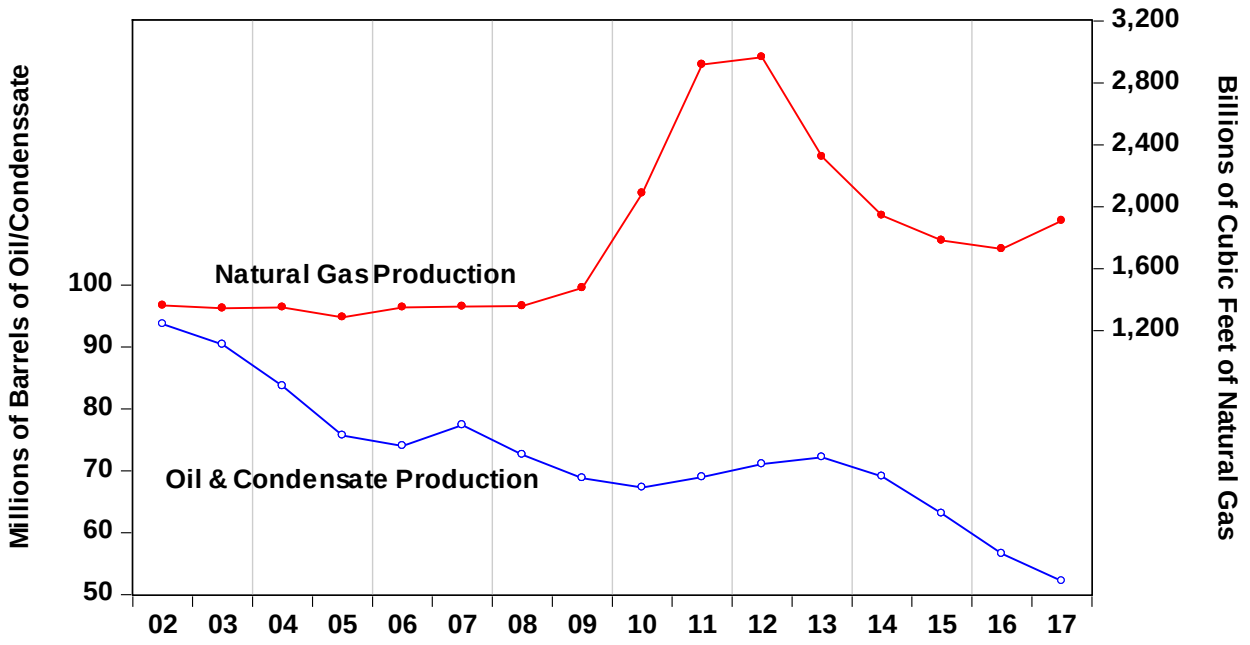
What caused such a serious decline? Recall that severance taxes and royalty payments are a function of both (1) the prices of oil and natural gas and (2) the production of these two fuels within the state's jurisdiction. Both factors played a role in the overall decline in these revenues. Notice in Figure 3 that the price of oil dropped from over $100 a barrel in 2013 to $40 in 2016 before rising slightly in 2017. The drop in natural gas prices was not as dramatic but still was a factor in natural gas severance and royalty collections.

Fig. 3 :Oil & Natural Gas Prices
2002-17



Prices of these fuels were the major, but not the sole source of the decline in taxes. Figure 4 shows that production declines played a role as well, especially so for natural gas where production fell from almost 3tcf per year in 2013 to about 1.7 tcf in 2016, before rising slightly in 2017 to 1.9 tcf. This decline was largely due a to serious reduction in activity in the Haynesville Shale in northwest Louisiana. In the case of oil production the slide was pronounced but less intense than natural gas. Oil production fell from 72.2 mmb/d in 2013 to 52.2 mmb/d in 2017.

Fig. 4: Oil/Condensate & Natural Gas Production in Louisiana
Calendar Years 2002-17



A Comparison to a Non-Energy State

Despite the declines shown in Figures 2-4, $688.7 million in direct taxes contributed to the state treasury still remains a quite impressive number. Another way to view how important the energy sector and its tax revenues are to Louisiana is to compare it to a non-energy state with similar characteristics to Louisiana. A helpful comparison is to look one state to the east---Mississippi. In addition to abutting Louisiana, Mississippi has many of the same geographic and population mix characteristics of Louisiana. One significant difference is Louisiana shares much of the Mississippi River with its sister state, but Louisiana got the navigable mouth of the river.

But the really big difference is Louisiana has a huge energy sector. Mississippi has three refineries, but only one---the Chevron Refinery in Pascagoula, refining 330,000 b/d---is of significant size. The other two are quite small---Ergon (25,000 b/d) and Hunt (10,000 b/d). By comparison,

Louisiana's 18 refineries have a capacity of 3,343,206 b/d. Mississippi has some oil production, producing 56,000 b/d in 2016. Louisiana's production was three times higher at 154,000 b/d but Louisiana is also the main hub for servicing offshore Gulf of Mexico production which measured 1,598,000 in 2016. Louisiana's natural gas production was almost 1.8 tcf in 2016 while Mississippi's was too small to be reported by the Energy Information Administration.[15] This large gas output made it possible to attract the huge, high-wage chemical industry to Louisiana, making the state the 3rd largest producer of chemicals in the country.

Table 13 gives some comparative metrics that reveal the difference an energy sector makes to Louisiana. Note that Louisiana's mineral taxes (severance taxes, royalties, rentals, bonuses and 8g monies) are 20 times higher than Mississippi's. Largely because of the existence of the energy industry (and the other indirect industries it helped attract, e.g., chemicals), Louisiana's per capita income ranks 38th among the 50 states, compared to Mississippi's ranking of 50th. Louisiana's teachers are paid over 16% more than Mississippi's.

Table 13

Comparative Statistics: Mississippi v. Louisiana: FY17

Metric	Mississippi	Louisiana
Mineral Taxes: FY17	$27.3 mm[a]	$538.8 mm
Direct Taxes as % of General Fund	0.5%	4.5%
Per Capita Income: 2016[b]	$35,484	$42,298
Per capita Income Rank: 2016	50th	38th
Average Teacher Salary:2016[c]	$42,744	$49,745
Teacher Salary Rank: 2016	42nd	34th

[a] Mississippi Department of Revenue, Annual Report, Fiscal Year 2017, p.17. Mineral taxes do not include income taxes or indirect taxes collected.[b]www.bea.gov. [c] Rankings & Estimates, Rankings of the States 2016 and Estimates of School Statistics 2017, National Education Association, Table C-5.

Ad Valorem Taxes to Local Governments

The data in Table 12 include only direct tax payments to the state. The energy sector is also a major contributor of taxes to local governments via the property tax. From data tabulated by the Louisiana Tax Commission it is possible to derive a very conservative estimate of the property taxes collected from the energy industries by local governments in Louisiana. The phrase "very conservative" was used in that last sentence because the Tax Commission has reliable data on the assessed value of pipelines, drilling rigs, oil and gas surface equipment, and oil and gas wells from which property tax payments can be derived. In addition, a survey was conducted of the 16 largest refineries in the state to obtain their property tax payments in 2016.

However, what is not available are data on the assessed value of business furniture and fixtures, leased equipment, buildings and land, machinery and equipment owned, and inventories in all of the pipeline and extraction companies. This would no doubt be quite a large figure. Because

these items cannot be isolated from the Tax Commission data, our property tax numbers for the industry will be at the very lower limit of total property taxes paid.

Table 14 contains a wealth of data on ad valorem taxes paid in Louisiana. This table shows total ad valorem taxes paid, our very conservative estimate of taxes paid by the extraction, refining, and pipeline industries, and what percent of total ad valorem taxes in each parish was paid by these three energy industries.

According to these data:

- The extraction, refining, and pipeline industries **paid right at $382.8 million in ad valorem taxes to local governments in 2016**---a slight 4.5 percent decrease over the 2013 number we reported in our last impact study. **This is enough tax revenue to support nearly 7,700 public school teachers**.
- In 42 of the 64 parishes, ad valorem taxes paid by the industries exceeded $1 million. In 21 parishes, the figure exceeded $5 million.
- The distribution of high-tax-collection parishes for these industries correlates closely with the distribution of earnings and employment shown back in Maps 1 and 2.
- **Parishes with refineries within their boundaries enjoy a special largess in property taxes as seen in Table 14.** Calcasieu Parish, home to three refineries---ranked #2 with $35.8 million, followed by St. Charles Parish (Motiva and Valero Refineries) at $25.3 million. St, John Parish---home of the huge Marathon Refinery---was #4 at $20.6 million, and Plaquemines Parish---home of Phillips 66 and Chalmette Refineries---was #5 at $20.2 million. These very capital intensive industries have an abundance of property subject to the ad valorem tax.

Table 14
Ad Valorem Taxes Paid by Parish and Amount Paid
By Oil & Gas, Refining, and Pipeline Industries: 2016

Parish	Total Property Taxes	Energy-Related Property Taxes	Percent Energy-Related
Acadia	$29,012,862	$3,419,579	11.8%
Allen	$14,439,439	1,342,710	9.3%
Ascension	$126,815,088	1,734,301	1.4%
Assumption	$16,876,630	904,672	5.4%
Avoyelles	$9,936,172	402,573	4.1%
Beauregard	$25,831,047	4,733,816	18.3%
Bienville	$39,045,061	13,520,775	34.6%
Bossier	$111,676,142	12,408,015	11.1%
Caddo	$235,532,499	20,286,825	8.6%
Calcasieu	$221,001,117	35,822,825	16.2%
Caldwell	$8,352,986	3,169,752	37.9%
Cameron	$33,378,175	9,261,102	27.7%
Catahoula	$3,569,632	110,903	3.1%
Claiborne	$10,582,528	3,032,853	28.7%
Concordia	$14,601,683	403,174	2.8%
Desoto	$77,716,820	47,209,751	60.7%
E. Baton Rouge	$453,791,725	19,670,442	4.3%
E. Carroll	$5,482,664	17,735	0.3%
E. Feliciana	$7,317,263	226,624	3.1%
Evangeline	$17,448,066	2,428,594	13.9%
Franklin	$9,935,856	10,536,536	106.0%
Grant	$8,631,432	138,995	1.6%
Iberia	$43,309,874	2,495,700	5.8%
Iberville	$62,784,572	3,235,424	5.2%
Jackson	$24,786,923	9,237,058	37.3%
Jefferson	$364,788,082	3,342,033	0.9%
Jefferson Davis	$21,984,028	2,412,056	11.0%
Lafayette	$191,122,443	943,041	0.5%
Lafourche	$132,168,784	15,989,332	12.1%
LaSalle	$11,814,404	1,666,396	14.1%
Lincoln	$36,358,563	6,446,595	17.7%

Livingston	$54,443,500	821,567	1.5%
Madison	$12,060,014	405,388	3.4%
Morehouse	$13,112,047	246,784	1.9%
Natchitoches	$28,907,558	908,813	3.1%
Orleans	$537,569,658	0	0.0%
Ouachita	$100,174,879	699,945	0.7%
Plaquemines	$69,329,213	20,234,835	29.2%
Pointe Coupee	$26,162,909	1,609,182	6.2%
Rapides	$93,382,387	586,998	0.6%
Red River	$23,393,878	12,029,396	51.4%
Richland	$16,290,326	1,213,298	7.4%
Sabine	$16,100,429	5,994,621	37.2%
St. Bernard	$45,059,001	7,691,599	17.1%
St. Charles	$145,407,682	25,327,326	17.4%
St. Helena	$7,635,208	1,103,105	14.4%
St. James	$55,066,863	14,455,311	26.3%
St. John	$50,305,539	20,554,642	40.9%
St. Landry	$37,266,701	3,360,860	9.0%
St. Martin	$37,410,909	2,750,326	7.4%
St. Mary	$58,670,974	6,662,909	11.4%
St. Tammany	$290,750,020	0	0.0%
Tangipahoa	$50,298,391	1,030,543	2.0%
Tensas	$6,394,275	200,222	3.1%
Terrebonne	$85,150,895	8,105,927	9.5%
Union	$12,420,660	878,097	7.1%
Vermillion	$31,611,031	5,372,366	17.0%
Vernon	$17,307,400	2,087,724	12.1%
Washington	$20,273,047	20,604	0.1%
Webster	$27,386,312	6,602,946	24.1%
W. Baton Rouge	$33,719,060	3,088,794	9.2%
W. Carroll	$3,968,505	0	0.0%
W. Feliciana	$22,540,862	194,221	0.9%
Winn	$6,856,367	229,833	3.4%
Total	**$4,405,518,091**	**$382,801,128**	8.7%

Source: Louisiana Tax Commission Annual Report, 2016 & industry survey.

- **A total of 8.7 percent of property taxes collected by local governments in 2016 came from the energy sector**. Clearly, local governments are getting even more dependent on the energy sector for property taxes since this number was 5.7 percent in 1999 and 7.1 percent in 2005.
- It is apparent from the numbers in the last column of Table 14 that some parishes would face some very serious financial problems if for some reason these energy industries vanished from their borders. There were 28 parishes where over ten percent of property taxes came from the energy sector, and **there were 12 parishes where energy sector property taxes made up a remarkable quarter of property taxes collected**.

The Haynesville Play Effect. What is not readily apparent from the data in Table 14 is the impact on certain local governments of the new **Haynesville Shale play** in northwestern Louisiana. This new play did not really become a serious factor in the economy until late 2008 when a great deal of money was spent buying mineral leases in the area. There was then a boom in exploration in the play, with the rig count in the northern part of the state leaping from an average of 48 rigs in 2005 to a high of 140 in April 2010. Because of a diversion of rigs from this "dry" play to "wet" plays in Texas, North Dakota and Pennsylvania that rig count has dropped to under 20. Recently, the play has enjoyed resurgence due to industrial demand coming from new and expanding chemical plants in the southern part of the state. The rig count has risen back to the 40 range. As shown in Table 15 the impact on property tax collections has been dramatic in the five parishes where activity in the Haynesville Play action was concentrated.

Table 15

Energy-Related Property Tax Collections in Northwestern Parishes:

2005 Versus 2016

Parish	Property Taxes 2005	Property Taxes 2016	% Energy-Related 2005	% Energy-Related 2013
Desoto	$22,395,351	$77,716,820	18.9%	60.7%
Red River	$3,549,617	$23,393,878	3.6%	51.4%
Webster	$15,728,690	$27,386,312	17.1%	24.1%
Bossier	$52,449,881	$111,676,142	8.5%	11.1%
Caddo	$158,347,601	$235,532,499	2.8%	8.6%

Desoto Parish is now the largest source of energy-related property taxes in the state with over $47.2 million (see Table 14 as well) ---a figure that is 11 times higher than the pre-Haynesville period in 2005. Almost 61% of this parish's property taxes come from energy-related industries, a percentage that is the highest in the state. A similarly dramatic change took place over 2005-16 in Red River Parish, where energy-related property taxes jumped from about $128,000 in 2005 to $12 million in 2016. Energy's share of this parish's property taxes rose from only 3.6% in 2005 to 51.4% in 2016. Smaller, but still very significant boosts also occurred in Caddo and Bossier Parishes, with eastern-most Webster Parish also participating in the largess from this play. Luckily, these increases occurred right in the middle of the "Great Recession", making it much easier for these parishes to weather that economic storm.

The Industrial Tax Exemption. Some readers may be surprised at the numbers back in Table 14. They believe that the 10-year industrial tax exemption (TYITE) protected these industries from paying much in the way of property taxes. First of all, the TYITE applies for the most part only to **manufacturing firms**. Thus, while it would apply to refineries, it is not available to pipelines or to the extraction industry.

Secondly, it is a **ten year** exemption. At the end of that 10-year period, the property rolls off the exemption schedule and onto the taxable rolls. Table 16 provides data by parish on the value of TYITE in force as of 2017 and the portion of that which applies to refineries. Of the $83.2 billion in exemptions in force as of that date, about $12.1 billion, or 14.5 percent of the total, was for refineries.

The last column of Table 16 indicates that exemptions on over $7.4 billion of refinery property will expire over the five-year period from 2018-22. St. John the Baptist Parish, in particular, will experience a taxable property bonanza during this period as over $3.5 billion in refinery property becomes taxable. In St. Charles Parish the figure is also very large with over $1.5 billion in property becoming taxable over the next 5 years. There are six other parishes in Table 16 where over $100 million in refinery property will become taxable over 2018-22.

Table 16

Total Value of 10-Year Industrial Tax Exemptions in Force in 2017, Value for Refineries, and Amount of Refinery Exemptions Expiring over 2018-22

Parish	Investment in Force 2017	Refinery Contracts In Force 2017	Refinery Contracts Expiring 2018-22
Acadia	$146,256,044		
Allen	304,065,726		
Ascension	1,180,595,723	18,947,511	18,741,728
Assumption	67,460,069		
Avoyelles	1,221,180		
Beauregard	421,183,907		
Bienville	226,053,999		
Bossier	105,797,641	32,920,775	12,354,194
Caddo	1,377,838,909	576,680,692	539,625,296
Calcasieu	15,173,497,120	98,462,193	57,611,061
Caldwell	108,783		
Cameron	27,099,925,711		
Catahoula	0		
Claiborne	$127,722		
Concordia	55,643,403		
DeSoto	851,913,738		
East Baton Rouge	4,282,669,094	576,855,687	267,221,753
East Carroll	58,737,531		
East Feliciana	142,315,055	141,365,264	
Evangeline	133,142,682		
Franklin	0		
Grant	13,429,117		
Iberia	218,457,825		
Iberville	5,380,104,623		
Jackson	164,587,547		
Jefferson	1,288,422,981	10,265,771	2,339,822
Jefferson Davis	68,775,405		
LaSalle	301,682,928		
Lafayette	347,145,785	8,486,739	7,895,018

Lafourche	364,524,142		
Lincoln	424,006,245		
Livingston	54,342,074	2,632,600	2,632,600
Morehouse	211,084,788.00		
Natchitoches	464,736,205		
Orleans	454,957,168	11,771,317	
Ouachita	582,138,415		
Plaquemines	570,790,505	397,091,683	364,481,249
Pointe Coupee	299,646,985	396,603	
Rapides	1,552,885,189	4,785,964	4,785,964
Red River	320,644,851		
Richland	297,037,647		
Sabine	59,722,331		
St. Bernard	807,531,597	779,145,497	437,979,189
St. Charles	7,447,102,616	4,396,357,814	1,541,758,701
St. Helena	14,877,780		
St. James	1,879,083,243	453,544,309	301,145,864
St. John the Baptist	4,449,644,399	4,058,401,933	3,508,334,031
St. Landry	88,698,802	70,972,258	39,853,586
St. Martin	87,441,891.00		
St. Mary	560,635,659		
St. Tammany	104,605,908		
Tangipahoa	135,792,972.00	12,853,265	2,188,324
Terrebonne	394,419,881.00	931,614.00	239,013
Union	66,882,876		
Vermilion	69,045,351.00		
Vernon	5,171,286	1,456,875	
Washington	304,322,646	2,634,633	2,293,450
Webster	186,630,903	11,986,290	4,277,852
West Baton Rouge	1,128,846,108	427,208,766	312,575,543
West Carroll	348,820		
West Feliciana	374,013,745		
Winn	27,391,093		
Total	**$83,200,164,369**	**$12,096,156,053**	**$7,426,145,914**

Source: Louisiana Department of Economic Development

Indirect Taxes Generated

The taxes detailed in Tables 12 and 14 are only those for which firms in these industries have to write out a check. But the presence of the extraction, refining, and pipeline industries generated $19,231,300,000 in household earnings in 2015 through both the direct salaries paid and indirect earning produced through the multiplier effects (see Table 11). These earnings are subject to the state income tax. When spent, these household earnings generate gasoline taxes, sales taxes (both state and local), beer/soft drink/tobacco taxes, etc.

According to the Legislative Fiscal Office, the State of Louisiana collects seven cents in revenues (excluding mineral revenues) for every dollar earned by households in the state. **Thus the extraction, refining, and pipeline industries---through the direct and indirect creation of household earnings---were responsible for generating an estimated $1,346,191,000---well over a billion dollars---in tax collections for the state of Louisiana in 2015.**

What about local taxes paid via these household earnings? Local governments collect approximately 4.4 cents for every dollar earned by a Louisiana household. **Thus, the $19.2 billion in household earnings generated by the three energy industries through direct and multiplier effects added approximately $846,177,200---nearly a billion dollars---to the coffers of local governments in 2015.**

Total Taxes Generated

A lot of ground has been covered to this point in documenting the amount of taxes---both directly and indirectly---generated by these three energy-related sectors. Table 17 handily summarizes our findings.

Table 17

Total State and Local Taxes Generated by the Energy Sector: 2016 (Millions)

Tax Source	State Government	Local Government
Direct	$688.7	$382.8
Indirect	1,346.2	846.2
Total	**$2,034.9**	**$1,229.0**

The numbers are eye-popping, but not unexpected given our documentation of the size of this sector of the Louisiana economy. Note that over **$2 billion of state government revenues can trace their origins back to the energy sector. For local governments, over $1.2 billion dollars that were pumped into their treasuries is due to the presence of this industry**.

State and local tax dollars in Louisiana support a wide variety of social goods and services, such as elementary, secondary, and higher education, highways, the state-supported hospital system, economic development efforts, tourism promotion, public safety, and many others. For example, if all of this $3,263,900,000 was used to pay public school teachers (at $49,745 per teacher) it would support **65,613 teachers**. There are about 46,493 teachers employed in the state, so this revenue source is enough to cover the salary of every public school teacher in the state plus 41% more! The average salary of a deputy sheriff in Louisiana is roughly $45,041.[16] If the entire $3,263,900,000 was

used to hire deputy sheriffs, the salaries of 72,465 could be covered! Clearly, if the extraction, refining, and pipeline industries suddenly vanished from our borders, the provision of these social goods and services would have to be dramatically retrenched. The impact of these three industries goes far beyond just jobs and incomes.

Federal Taxes by the Industry

We began the tax impact section by focusing on state and local taxes that can be traced to the industry mainly because state and local taxes are rather neat and tidy. There are clear techniques for isolating how much revenues are derived from firms in the energy industry NAICS codes.

When it comes to the federal impact, things are not so neat and tidy. How does the state benefit from the federal taxes and fees paid to the federal government? After all, federal tax/fee monies generated by Louisiana energy operations go to Washington, and then some of them are returned to Louisiana in the form of federal spending here. How much tax/fee revenues do Louisiana energy operations send to DC? Some are basically impossible to determine. For example, we know of no data bank that reveals how much in corporate income taxes flow from our energy companies to Washington.

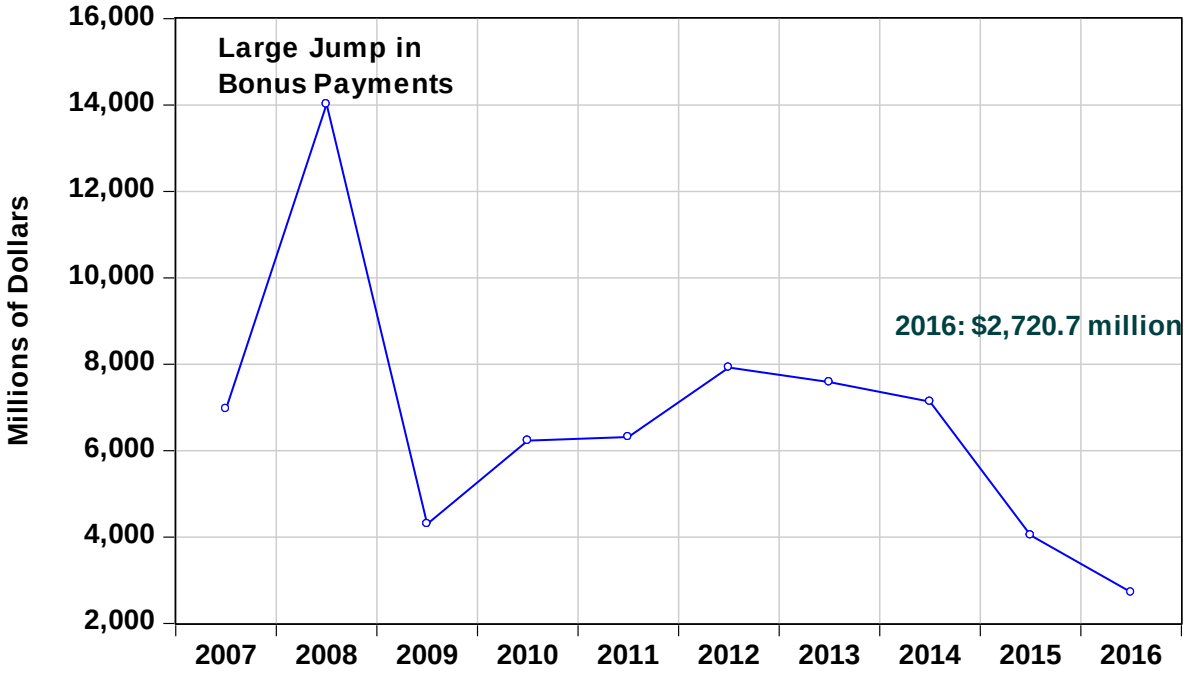
GOM Exploration Fees. There are two revenue flows that can be measured. One is fees paid on drilling activity in the Gulf. Drilling activity in the Gulf of Mexico is heavily serviced out of ports in Louisiana. It is estimated that 90% of the drilling and well sites in the Gulf are serviced out of Port Fourchon alone. Exploration companies that operate in the Gulf contribute monies to the federal treasury by (1) buying leases, (2) making royalty payments, and (3) making rental fee

payments. The Office of Natural Resources Revenue documents these collections, and Figure 5 tracks these receipts over 2007-16.

There was a significant drop in these revenues in 2015 and 2016 due to the decline in the price of oil. Of the $2,720.7 million in fees collected in 2016, 88% or $2,115.7 million were collected in the central Gulf which basically exists off the Louisiana shoreline.

If one makes the perhaps heroic assumption that these revenues are associated with Louisiana based energy operations, then the question becomes, how much of this money provided to the U.S. treasury flows back to Louisiana? The Census Bureau formerly produced the Consolidated Federal Funds Report which tracked how much of the federal budget flowed back to each state. Due to budget cutbacks, up-to-date data are no longer published. The latest data are for 2013. In that year, of the $3.149 trillion spent by the federal government $44.7 billion or 1.4% made its way to Louisiana.[17] If we assume this ratio is still correct, **then just over $30 million dollars (1.4% of $2,115.7 million) flowed back to the Louisiana economy from the federal government due to fees paid by Louisiana energy activity.**

Fig. 5: Federal Revenues from The Gulf of Mexico



Source: Office of Natural Resources Revenue

GOMESA Monies. In 2006 the Gulf of Mexico Energy Security Act (GOMESA) was passed that allowed four states---Louisiana, Texas, Mississippi, and Alabama---to share in lease bonuses, rentals, and royalty payments collected by the federal government from offshore exploration activities in the Gulf. The sharing arrangement is rather complex. First, the sharing agreement was to be implemented in stages, with Phase I covering collections from a rather limited area of the Gulf, and then Phase II starting in 2017 covering leases in a much larger area of the Gulf. Secondly, the GOMESA sharing applies only to lease sales made after the Western Gulf lease sale on August 22, 2007.

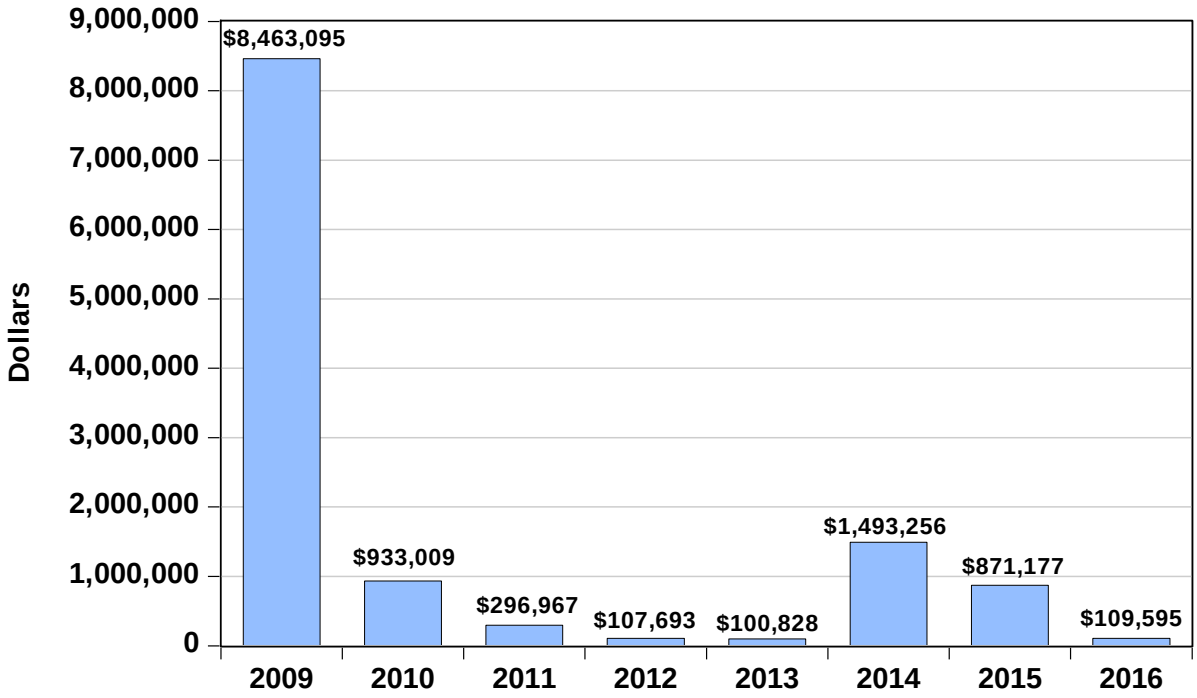
Thirdly, the amount allocated to each state depends on how far the state boundary is from each lease sale. As of 2017 Louisiana's share among the four states was about 39%.[18] Fourth, the

states receive 50% of the revenues collected, but of that 50% one-fourth was to be shared among coastal political subdivisions (parishes and counties) within those states. Finally, the amount that the federal government would share with these four states was initially capped at $500 million, but was increased to $650 million for years 2020 and 2021 under the recently passed tax reform act.

Figure 6 documents the amount of GOMESA monies that have been allocated to Louisiana over 2009-16. Collections have ranged from a high of nearly $8.5 million in 2009 to a low of only $100,828 in 2013. Amounts vary dramatically depending on lease sales in the affected areas, production in the areas, and the prices of oil and natural gas. The large amount in 2009 was due to large bonus payments received due to lease sales in the affected areas. The decline over 2014-16 was primarily due to the drop in oil prices.

Louisiana officials are watching closely to see what the allocation will be for 2017, the first year of the greatly expanded Phase II region for revenues. At this writing, the expectation is that the figure would be in the **$68,000,000 to $73,000,000 range** for the state's coastal protection authority, and another **$23,000,000 to $25,000,000** for coastal political subdivisions. If activity in the Gulf ever reaches the point where the maximum share level of $650 million is reached, in 2020 and 2021 Louisiana's potential share could be as high as $253 million (39% of $650) to split between these entities.

Fig. 6: GOMESA Revenues to Louisiana 2009-16



Source: Louisiana Energy Facts Annual, Louisiana Department of Natural Resources, 2016, Table 30, data adjusted to total to all Louisiana.

V. Summary and Conclusions

This study is an update of a study done for Mid-Continent Oil and Gas in 1996, and updated in 2002, 2007, 2010, and 2014 entitled, "The Energy Sector: A Giant Economic Engine for the Louisiana Economy." This is one of the first updates conducted when one energy sector---oil and gas extraction—has been in a serious recessionary mode. Our conclusions from this review of the impact of the extraction, refining, and pipeline industries can be summarized in a series of bullet points:

General size of the industry:

- Louisiana, through the luck of natural resource distribution, is the nation's **number two producer of crude oil and the number four producer of natural gas** among the 50 states.

- Louisiana---with its 18 refineries--- ranks **number two among the states in petroleum refining capacity**.

- There are over **92,000 miles of pipelines** transporting crude petroleum and natural gas within the state and in its offshore area of the Gulf of Mexico.

Total sales, earnings and jobs impacts on the economy:

- Through both their direct and multiplier effects **these three industries supported $72.8 billion in sales in Louisiana firms, generated over $19.2 billion in household earnings for Louisianans, and supported 262,520 jobs in the state in 2015.** The $19.2 billion in earnings represented 13.7 percent of total earnings in Louisiana in that year. This number exceeds the earnings of every single parish in Louisiana. One hundred of the 211 countries ranked by the World Bank in 2016 have smaller gross domestic products than $19.2 billion.

- On average **the job multiplier for these three industries was 4.4**. That is, for every job created in these sectors, 3.4 additional jobs are created in other sectors in the state. The job multiplier for the oil and gas extraction industry is about 3.7, and for the very capital-intensive refinery industry it is about 8.0.

State and local tax impacts:

- These three industries directly **paid $688.7 million in state taxes and fees** in FY17---despite the fact that the extraction sector was in a serious recession at the time. This figure represents 5.86 percent of total state taxes, licenses, and fees collected. If all these collections were spent on K-12 education, it would be enough to support 13,824 teachers.

- Through the $19.2 billion in household earnings generated by these three industries, state government indirectly was able to collect an additional $1,346,200,000 in taxes, **for a total boost to the state treasury of $2 billion**.

- A very conservative estimate is that these three industries directly paid **$382.8 million in ad valorem taxes to local governments** in the state in 2016, enough tax revenue to support nearly 7,700 public school teachers. In 42 of the state's 64 parishes, these ad valorem taxes exceeded $1 million. In 21 parishes the number exceeded $5 million.

Dramatic increases in property tax receipts occurred in Caddo, Bossier, Desoto, Webster, and Red River Parishes over 2005-16 as a result of the activity in the Haynesville Shale.

- The $19.2 billion in household earnings generated by these three industries added approximately **$846,200,000---over four-fifths of a billion dollars---**indirectly to the treasuries of local governments, for a total of just over **$1.2 billion contributed to local government treasuries**.

- If the $3.2 billion dollars collected by state and local governments was used exclusively to pay public school teachers, the salaries of every school teacher in the state would be covered plus an additional 19,000 teachers.

Direct employment and wages:

- Despite three years of deep recession in the extraction industry, in 2017-II there were **44,580 workers employed** in the extraction, pipeline, and refining industries---a number approximately equivalent to the 2016 population of St. Bernard Parish, the 26th most populous parish in the state. Fifty-one of Louisiana's 64 parishes had total covered employment smaller than this number in November 2017.

- These three industries paid nearly **$5.3 billion in wages** for Louisiana households in 2017-II---a figure equivalent to five percent of total covered wages in the state that year.

- In the second quarter of 2017, the average weekly wage in Louisiana's manufacturing sector was $1,332. **In the oil and gas extraction sector it was 76 percent higher at $2,343 and the refining sector paid $2,259 weekly---70% higher than the average in manufacturing. Weekly wages in the pipeline industry were $1,673---26 percent higher than the average manufacturing wage.**

- **Energy jobs and earnings were found in all but one of Louisiana's 64 parishes in 2017**. There were 13 parishes where more than 1,000 workers were employed in these three industries. In Lafayette Parish (the highest energy employment parish), 9,086 workers were directly employed in these energy industries.

Federal Taxes:

- In 2016, the federal government collected over $2.7 billion in mineral taxes and fees from companies operating in the Gulf of Mexico. An estimated $30 million of these monies flow back to the State of Louisiana.

- Beginning in 2009, Louisiana began collecting shared revenues generated in the Gulf from the Gulf of Mexico Energy Security Act (GOMESA). Under Phase I of this act, the state collected only $100,595 in 2016. **Under Phase II, 2017 collections are uncertain but Louisiana's total share is expected to be in the $91-98 million range**. GOMESA monies to Louisiana could potentially reach $253 million a year in 2020 and 2021.

Energy contribution to value-added:

- Value added is a broader measure of the total income created directly in an industry. In 2015 (latest data available), **Louisiana's oil and gas extraction sector alone produced $11.1 billion in total income**. That figure exceeds the **sum** of all the state's manufacturing sectors except refining and chemicals.

- The **refining sector's value added in 2015 was $22.4 billion**. That figure was an impressive 44.3 percent of the total value added in the state's manufacturing sector.

Comparison to a non-energy state:

- A rough view of what Louisiana would be like without its robust energy sector is to look one state to the east. Though Mississippi has one large oil refinery and some oil production, it is a fraction of that in Louisiana. As a result, note some of the comparative economic metrics in Table EX-1.

Table EX-1

Comparative Statistics: Mississippi v. Louisiana: FY17

Metric	Mississippi	Louisiana
Mineral Taxes: FY17	$27.3 million	$538.8 million
Direct Taxes as % of General Fund	0.5%	4.5%
Per Capita Income: 2016[b]	$35,484	$42,298
Per capita Income Rank: 2016	50th	38th
Average Teacher Salary:2016[c]	$42,744	$49,745
Teacher Salary Rank: 2016	42nd	34th

This report began with the statement: "It is the engine that makes the difference." For Louisiana, the presence of the extraction, refining, and pipeline industries have indeed made all the

difference. The energy industry, and its accompanying multiplier effects, has been a powerful engine for economic growth in Louisiana.

ENDNOTES

[1] www.eia.gov/dnav/pet. We include federal offshore production in the Gulf in Louisiana's total because the great majority of the offshore production is serviced out of Louisiana ports. For example, the Lafourche Port Commission---which has regulatory authority over Port Fourchon---estimates that that port services over 90% of the offshore exploration/production activity in the Gulf.

[2]https://en.wikipedia.org/wiki/List_of_oil_refineries.

[3] Steven Giambrone, Director of Pipeline Division, Louisiana Department of Natural Resources, email January 10, 2018.

[4]Ibid.

[5] Note that the category "support activities for mining" contains companies that drill for oil and provide service work (seismic, well servicing, etc.) to the industry.

[6]www.Laworks.net. "Louisiana Workforce at a Glance", January 3, 2018, p.17.

[7] www.bea.gov/bea/regional/reis/drill.cfm.

[8]www.Laworks.net/Downloads/LMI.

[9] www.bea.gov/regional/spi

[10]Ibid. Total earnings by place of work in Louisiana in 2015 were $140.2 billion.

[11]www.bea.gov/regional/reis/drill.

[12] en.wikipedia.org/wiki/List_of_countries_by_GDP_(nominal)

[13]www.laworks.net
[14] Rankings & Estimates, National Education Association, Rankings of States 2016 and Estimates of School Statistics 2017, Table C-5.
[15] www.eia.gov
[16] www.glassdoor.com/Salaries/louisiana-deputy-sheriff-salary-SRCH
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