THE ECONOMIC IMPACT OF THE CHEMICAL INDUSTRY ON THE LOUISIANA ECONOMY: AN UPDATE

Prepared for:

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EXECUTIVE SUMMARY

At a statewide meeting of the Rotary Club or Chamber of Commerce, look around the room: **one of every seven persons owes his/her job to the presence of the chemical industry** in Louisiana. At a statewide PTA meeting, look around the room: **at least four of every 10 public school teachers** owe their salary to the local taxes paid by the chemical industry**.** Imagine the condition of the **state budget if there was $1.1 billion less** in the treasury---the amount generated by the chemical industry.

The purpose of this report is to examine the economic impact on the state of the broadly defined chemical industry---those firms in NAICS codes 325 (chemicals) and 326 (plastics and rubber manufacturing). Our findings can be summarized as follows:

- In 2016, the total value of chemical shipments from Louisiana firms was $50.4 billion, ranking it **#6 among the 50 states**. Basic or **"bulk" chemicals**----those in the first stage of the production process---dominate the state's chemical production.

- Chemicals are **Louisiana's third largest export** to the rest of the world, shipping $9.7 billion (16% of total production in the state) in chemical products to other parts of the world in 2017. Petroleum and agricultural products are #1 and #2.

- Chemicals are the **#1 producer of direct jobs in Louisiana's manufacturing sector**, employing 29,109 people in 2017. This grossly under-estimates total chemical employment because it **omits full-time contract workers** at the plants.

- The industry is fairly concentrated in Lake Charles and from Baton Rouge along the Mississippi River to New Orleans. However, **53 of the state's 64 parishes have at least some employment in the industry**.

- The chemical industry pays the **second highest weekly wage ($2,050) in Louisiana's manufacturing sector**---only $62 behind #1 petroleum refining. The weekly wage in chemicals is (1) 52% higher than the average weekly wage in manufacturing, (2) is exceeded in only two other sectors in the entire economy (#1 oil and gas extraction and #2 securities/commodity contracts/investments), (3) is 136% higher than the average weekly wage of all workers in the state, and (4) <u>total</u> wages paid in 2017 (over $2.9 billion) were the highest of any industry in the state.

- Using an input-output table we were able to estimate the total impact (including the multiplier effect) of this industry on the state in 2017. According to the I/O table the chemical industry in 2017 created:

    - Over **$79.7 billion in sales** at firms located in the state.

- Nearly **$15.7 billion in household earnings** for state citizens---approximately **12.4% of all earnings in the state** that year.

- Supported **267,601 jobs** in Louisiana. This means (1) the job multiplier for this industry is **9.3**---meaning for every job created in the chemical industry, 8.3 jobs are created elsewhere in the state, and (2**) one of every 7 jobs in Louisiana can be traced back to this industry**.

- We estimate that in 2017 the presence of the chemical industry generated over **$1.1 billion in taxes and fees for the state treasury**, an amount comparable to the $1.1 billion the state collected from all its gaming and tobacco taxes in that year.

- We conservatively estimate that in 2017 the presence of the chemical industry generated at least **$959.5 million---nearly a billion dollars---in taxes and fees for local governments**. This is enough local government revenues to pay the salaries of 40% (19,266) of the public school teachers in the state.

- We found that of those eight parishes with the highest Industrial Tax exemptions in 2017 (1) all ranked in the **top third of parishes in terms of property tax collections per capita**, (2) with the exception of two parishes (East Baton Rouge and Ascension), all were parishes **where businesses paid 59% to 86% of property taxes** in the parish, and (3) with two exceptions (Cameron and St. John the Baptist Parishes) these parishes are in the **top 16 among the 64 parishes in teacher pay**. **Nearly $14.6 billion in chemical property will come off the ITEP rolls over the next five years and become taxable by local governments.**

Finally, our expectations are that the benefits shown above are very likely to grow in the future. Very low natural gas prices are not only reducing operating costs substantially for these plants, but also low natural gas prices are enabling the industry to gain market share away from European firms. In conjunction with GBRIA we have tabulated a remarkable **$160 billion in announcements of new chemical plants or expansions** since 2012. At a minimum, some 19,055 jobs for Louisianans are associated with these expansions.

Of the expansions announced, $89.7 billion (and associated 5,273 jobs) are still potentials. We document **two major threats** to the industry as a whole and in particular to these "potential" plants eventually going vertical:

- The change in Louisiana's ITEP.
- Additional business taxes associated with resolving Louisiana's fiscal cliff.

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THE ECONOMIC IMPACT OF THE CHEMICAL INDUSTRY ON THE LOUISIANA ECONOMY

I. Introduction

Here is a trivia question for your next round of parlor games: What Louisiana industry is the largest source of earnings in the state's manufacturing sector, is a major player in the national economy, and produces more products for export to other countries than any other Louisiana manufacturing industry? If you guessed the "chemical industry," you were right on the mark. If your choice was wrong, it may be because you are simply unaware of the industry's existence. That would be an almost natural miss because most of these plants---especially the larger ones---are located in more rural areas, well off the beaten path traveled by the average Louisianan. Thus, the chemical industry's size and importance to the state's economy often go unnoticed.

The purpose of this report is to fill in that void of knowledge. We start in Section II by clearly defining the industry and by showing where our state's chemical industry fits in the national and international economies. In that section we will also illustrate the unique makeup of the industry in our state. In Section III we will examine the crucial role this industry plays in providing **jobs** in the state. We will show trends in employment and where these jobs are located within the state's borders.

Of course, another key way the industry affects Louisiana citizens is as a provider of **high-wage** jobs. In Section IV, we will compare weekly wages in the chemical industry with overall manufacturing wages, and we will examine an even broader measure of the industry's impact on earnings---the gross domestic product.

The data in Sections III and IV only show the <u>direct</u> impact of the chemical industry on jobs and earnings in the state. In Section V we will use an input-output table

to estimate the **multiplier effect** of the industry's presence on business sales, household earnings, and jobs in Louisiana. Once we have those total job and earnings impact numbers we can estimate the impact of the industry on **revenues for state and local governments** in Louisiana, which is the topic of Section VI.

In Section VII we address the critical---and often misunderstood---industrial tax exemption program (ITEP) in Louisiana that is heavily used by the chemical industry. Finally Section VIII looks at the massive expansion in this industry that is presently underway and threats to future expansions.

II. The "Chemical" Industry

An important starting point for our inquiry is to put boundaries around what we refer to as the **chemical industry**. Fortunately, the U.S. Office of Management and Budget aides us in this classification through its North American Industry Classification System or what is more often referred to as the "NAICS codes."

Under the manufacturing sector there are two classifications which we use in defining the chemical industry in Louisiana. One is the specific NAICS code 325 which is "chemical manufacturing." To this we add NAICS code 326 which is "plastics and rubber products manufacturing." The latter is relatively small---its value of shipments in 2016 was about 3% of that of the chemical sector---but we include plastics and rubber products manufacturing in our broader definition of the chemical industry because of its close association with the more narrowly defined NAICS code 325.[1] As a side note, the petroleum refining sector is not included in our definition, though that sector is often included in the even broader term, petrochemicals.

[1] www.bea.gov

Louisiana's Chemical Industry in the Nation

Where does the State of Louisiana rank among the chemical producing states in the U.S.? Comparative data are provided in Table 1. In 2016, **the total value of chemical shipments from Louisiana firms of $50.4 billion ranked sixth in the U.S**. Texas is well out front in the rankings with $138.9 billion in chemical industry shipments, about 2 1/2 times more than Louisiana. Louisiana is certainly important to the nation's chemical supplies, generating 5.3% of the nation's total chemical production. Interestingly, if Table 1 covered only the narrowly defined chemical industry (NAICS 325 alone) Louisiana jumps to #4 in the ranking.

Table 1

Top 5 States in Value Added of Chemical Industry: 2016

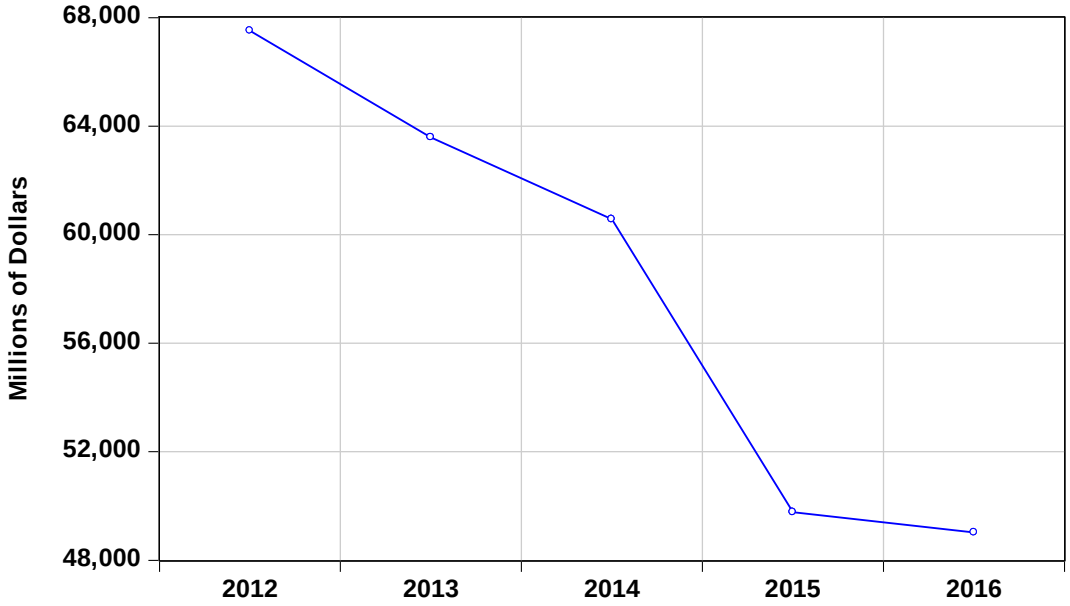
Region	Value of Shipments*	% of U.S. Total
U.S.	$959.0	100.0%
Texas	138.9	14.5%
California	96.5	10.1%
North Carolina	62.6	6.5%
Illinois	59.4	6.2%
Ohio	53.7	5.6%
Louisiana	*50.4*	*5.3%*

Source: www.census.gov. *Billions of dollars

A Side Note on Chemical Value of Shipments

Careful readers might compare Table 1 in this issue with the same table in our 2014 issue and discover an anomaly. This anomaly is illustrated in Figure 1. Note that despite the fact that the industry has been in a major expansion mode since 2012 (to be discussed in Section VIII) chemical shipments in Louisiana have fallen markedly from $67.5 billion in 2012 to $50.4 billion in 2016---a remarkable 25% decline. Similar declines were reported for the other four major chemical producing states in Table 1.

Fig. 1: Value of Shipments - Chemicals Louisiana



Source: American Chemistry Council & www.census.gov, Annual Survey of Manufacturers

It is difficult to explain this marked decline. A first thought might be that lower natural gas prices enabled the industry to price their product much lower. However, natural gas prices were $2.77 per mmbtu in 2012 and had only fallen to $2.28 by 2016, hardly enough to warrant a 25% decline in the value of shipments.

Our best guess is that this is a **reporting issue**. The shipments numbers across states for 2012 were derived from the census of business that the Census Bureau takes every five years. It is a very complete data set. Data for the years 2013 through 2016 are from surveys of manufacturing firms, and as such are not as complete as the census that was taken in 2012. Whether or not this is a reasonable explanation will be revealed when the 2017 census of business data are released. If there is a sudden major uptick in chemical shipments (we think it should be above the 2012 number), then we will know the between census survey numbers were faulty. If the 2017 census numbers show

shipments to be in line with the 2012-16 downward trend, then it is back to the drawing board for an alternative explanation.

Why So Prominent In Louisiana

Why is this industry so heavily represented in Louisiana? A combination of factors makes the state particularly enticing as a chemical plant site. First, Louisiana is a **major source of key raw materials** that the industry uses, such as natural gas, oil, salt, and sulfur. For example, if one includes the federal Gulf of Mexico production (95% of which is serviced from Louisiana ports) Louisiana produces 8.6% of the country's natural gas production (#2 in the nation) and 16.1% of its oil production.[2] Chemical firms need natural gas as a raw material (some fertilizers are made from natural gas), as a basic building block for a vast array of chemicals, or they use it as a clean-burning boiler fuel rather than dirtier coal or fuel oil. Largely because of its massive chemical industry, Louisiana ranks #3 in the nation in <u>total</u> natural gas consumption (behind Texas and California), and there is more natural gas consumed in Louisiana than in many countries (examples: Australia, Brazil, Venezuela, Pakistan, and South Korea).[3]

Secondly, many chemical firms need large amounts of **water** in their production processes. Louisiana offers the Mississippi River, the Sabine River, and the Calcasieu Ship Channel in addition to other major waterways. Thirdly many Louisiana chemical manufacturers need a **major transportation artery** for moving bulk chemicals (the primary type of chemical produced in the state as seen below). Again, the Mississippi River and the Calcasieu Ship Channel fit the bill for both moving their products into the interior of the U.S. and for access to the Gulf of Mexico and subsequent foreign markets.

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[2] "The Energy Sector: Still a Giant Economic Engine for the Louisiana Economy: An Update", Loren C. Scott & Associates, Inc., for the Grow Louisiana Coalition, February 2018, pp. 2-3.
[3] www.eia.gov/tools/faqs/faq.cfm

Finally, chemical production sites tend to be very capital-intensive operations. By offering an **industrial tax exemption program** (ITEP) for machinery and equipment, Louisiana provides a meaningful financial incentive to chemical firms as they seek a site for a new or expanded plant. At this writing, the ITEP is under attack in the state---a topic that will be covered in detail in Sections VII and VIII of this report.

Makeup of Louisiana's Chemical Industry

Table 2 illustrates the unique character of Louisiana's chemical industry. Total shipments out of the narrowly defined chemical industry (NAICS 325) were $49 billion in 2016.

Table 2

Makeup of Louisiana's Chemical, Plastics & Rubber Sector: 2016

Sector	Value of Shipments*
Total NAICS 325	$49.0 Billion
Basic Chemicals	$26.5 Billion
Resins, Synthetic Rubber, Artificial Synthetic Fibers & Filaments	$12.8 Billion
Pesticides, Fertilizers, Ag Chemicals	$5.0 Billion
Soaps, cleaning compounds, toilet preparations	$3.7 Billion
Paints, Coatings, Adhesives	$0.2 Billion
Other Chemicals	$0.5 Billion
Rubber & Plastics products manufacturing (NAICS 326)	$1.4 Billion

Source: Annual Survey of Manufactures: Geographic Area Series, 2016 Annual Survey. http://factfinder2.census.gov/faces/tableservice/jsf. *Numbers do not sum due to disclosure rules.

More than half of the value of chemical shipments produced in the state was what are broadly defined as "basic chemicals." These are the first stage, bulk chemicals. These first stage chemicals include such products as ethylene, propylene, butylenes,

benzene, styrene and other products made from refined petroleum or liquid hydrocarbons, industrial gases, dyes, and other basic inorganic chemicals.

What we do not see, for the most part, in Louisiana are plants that produce products that are closer to the end consumer product such as medicinal and botanical compounds, certain pharmaceuticals, soaps and cleansers. Too, note that the data in Table 2 confirm a point discussed earlier: While the firms in the plastics and rubber manufacturing sector (NAICS 326) are non-trivial in Louisiana manufacturing ($1.4 billion in shipments), these firms are a relatively small component (3%) of the overall chemical industry in the state.

Finally, Table 2 will see a major addition starting in 2017 as shipments from the first new LNG exporting facility begin showing up in the data. As described in Section VIII below, several new LNG facilities are poised to make a major addition to chemical output in Louisiana.

The International Connection

Chemicals also play an important role in Louisiana's exports to the world. Chemicals, plastics and rubber products are the state's #3 major export (behind petroleum products and agricultural products). In 2017, over **$9.7 billion in chemical products were shipped from Louisiana to other parts of the world** (see Figure 2).[4] This means roughly 18% of the chemical products produced in Louisiana are exported to other countries. About 17% of all merchandise exports out of Louisiana were chemicals.[5]

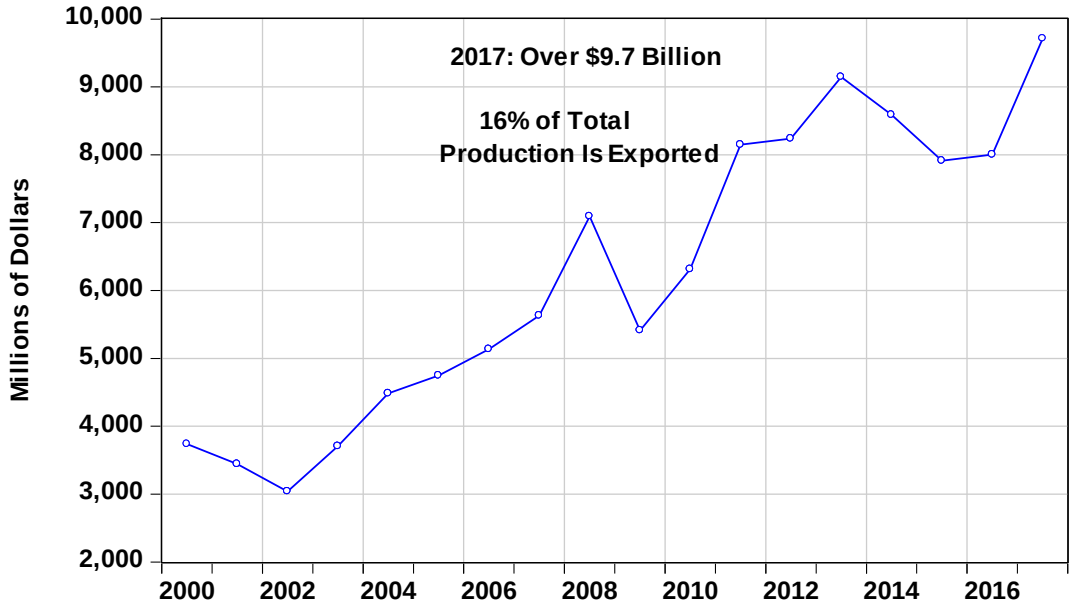
What is also interesting are the recent trends in chemical exports from the state. As seen in Figure 2, the volume of chemical exports from the state has almost tripled

[4] Data bank, American Chemistry Council
[5] www.census.gov/foreign-trade/statistics/state/data/la.html.

since 2000. The primary reason for this in the latter years--certainly 2010-17---has been the decline in the price of natural gas over this period which has not only dramatically reduced the price of a key input in the chemical production process, but it has also enabled the U.S. chemical industry to grab world market share away from European and Oriental chemical manufacturers.

The spike in 2017 can be attributed to the first LNG exports leaving the Cheniere facility in the Lake Charles area. In 2017, nearly $2.7 billion in LNG was exported from Louisiana.[6] LNG exports will continue to grow significantly as more trains come on line at Cheniere and as exports begin leaving the Cameron LNG facility which is nearing the start of production. We will discuss this in greater detail in Section VIII.

Fig. 2: Chemical Exports From Louisiana



Source: Data bank American Chemistry Council

[6] Ibid

III. Direct Employment in the Chemical Industry

Of course, a key metric that interests the general public is the jobs associated with this important industry. In this section we examine where the chemical industry ranks in the state's manufacturing sector as a job creator, where these jobs are located across the state, and what the trends have been in chemical industry employment in Louisiana.

Chemical Jobs in Louisiana's Manufacturing Sector

Table 3 documents where the chemical industry ranks among the state's manufacturing sectors as a direct job creator. As seen in this table, the broadly defined chemical industry (including plastics and rubber manufacturing) is the **number one producer of direct jobs** in Louisiana's manufacturing sector, employing 29,109 people. This means over one-fifth (21.6%) of Louisiana's manufacturing jobs are in the broadly defined chemical industry. One has to drop over 12,000 jobs to get to the #2 manufacturing employer---fabricated metal product manufacturing at 17,042.

It is very important to note that this 29,109 figure is a gross understatement of the number of people working at chemical facilities in the state. The reason is that chemical companies use a large number of **full-time contract workers** at their sites. For example, of the 2,975 workers employed in 2017 at ExxonMobil's three chemical plants in East Baton Rouge Parish, half---1,493---were full-time contract workers. These contract workers wore shirts labeled Performance Contractors, Turner Industries, Cajun Contractors, etc. and as a result were counted as <u>construction workers</u>, not chemical employees by the Bureau of Labor Statistics. It still takes 2,975 people to run these three plants but less than half are counted as chemical industry employees. ExxonMobil is not

unique. The practice of using contract workers for general maintenance and other work at these facilities is the norm and results in a **huge understatement of chemical industry employment in the state**.

Table 3
Chemical Employment Relative to Other Louisiana Manufacturing Sectors: 2017-III

Manufacturing	**134,756**
Chemical manufacturing	**25,558**
Fabricated metal product manufacturing	17,042
Food manufacturing	15,652
Machinery manufacturing	12,772
Petroleum and coal products manufacturing	11,839
Transportation equipment manufacturing	9,223
Paper manufacturing	7,057
Wood product manufacturing	6,626
Nonmetallic mineral product manufacturing	5,789
Miscellaneous manufacturing	4,178
Primary metal manufacturing	3,639
Plastics and rubber products manufacturing	**3,551**
Printing and related support activities	3,108
Beverage and tobacco product manufacturing	2,565
Computer and electronic product manufacturing	2,055
Furniture and related product manufacturing	1,257
Electrical equipment and appliance manufacturing	1,172
Textile product mills	933
Textile mills	324
Apparel manufacturing	265
Leather and allied product manufacturing	151

Source: www.Laworks.net/laborMarketInfo/

Distribution of Chemical Jobs across the State

Chemical jobs are very unevenly distributed across the state, as seen in Table 4 and Map 1. The Louisiana Workforce Commission (LWC) reports that there were 501 firms operating in the state in the broadly defined chemical sector in 2017-III. While 53 of Louisiana's 64 parishes register at least some jobs in this industry, these jobs tend to be

largely concentrated in the southern part of the state and close to significant water sources.

Table 4
Distribution of Chemical Jobs across Louisiana: 2017-III

Parish	Units	Average Employment
ACADIA	6	178
ALLEN	2	*
ASCENSION	37	4,053
ASSUMPTION	2	*
AVOYELLES	1	*
BEAUREGARD	4	279
BIENVILLE	2	*
BOSSIER	10	165
CADDO	23	899
CALCASIEU	50	4,928
CALDWELL	0	0
CAMERON	4	358
CATAHOULA	0	0
CLAIBORNE	2	*
CONCORDIA	1	*
DESOTO	1	*
E. BATON ROUGE	50	3,117
E. CARROLL	2	*
E. FELICIANA	0	0
EVANGELINE	2	*
FRANKLIN	2	*
GRANT	0	0
IBERIA	7	291
IBERVILLE	23	3,425
JACKSON	1	*
JEFFERSON	41	2,074
JEFF. DAVIS	2	*
LAFAYETTE	23	287
LAFOURCHE	5	111
LASALLE	0	0
LINCOLN	2	*
LIVINGSTON	7	149
MADISON	0	0
MOREHOUSE	1	*
NATCHITOCHES	1	*
ORLEANS	10	175
OUACHITA	19	807
PLAQUEMINES	7	139
POINTE COUPEE	2	*

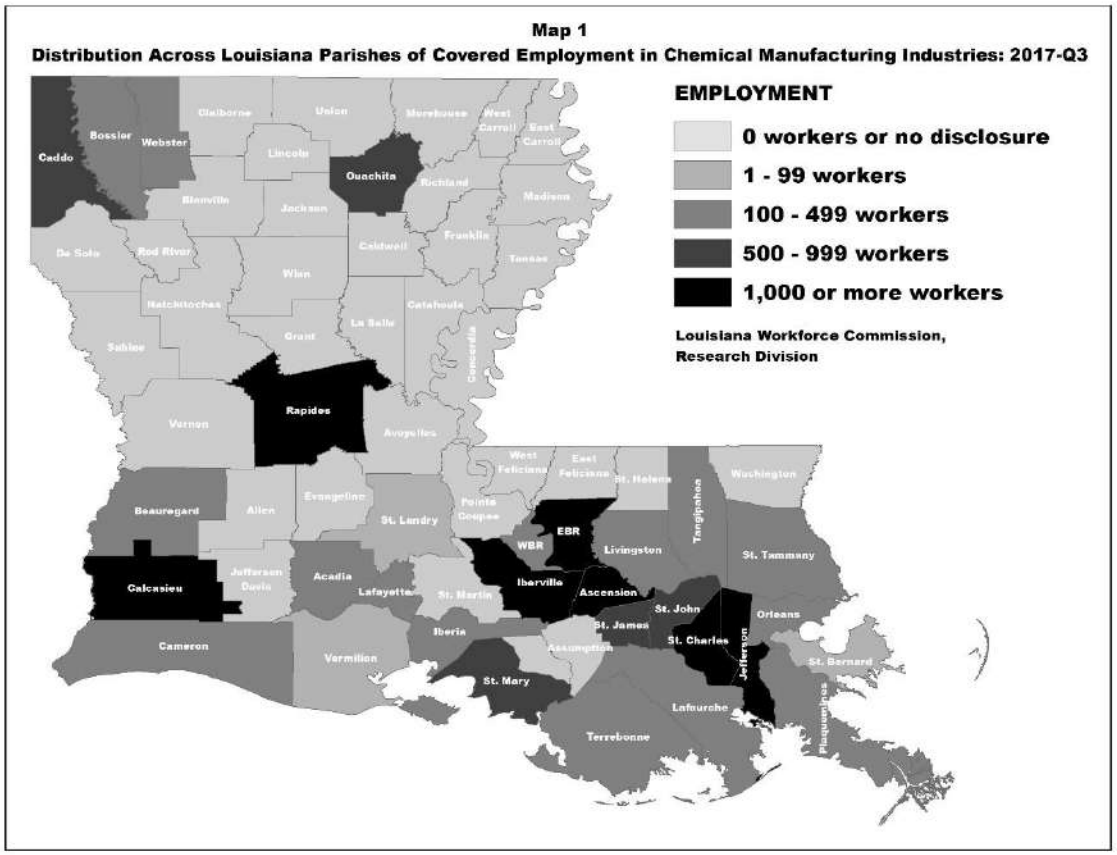
RAPIDES	12	1,065
RED RIVER	2	*
RICHLAND	1	*
SABINE	1	*
ST. BERNARD	4	16
ST. CHARLES	18	2,341
ST. HELENA	1	*
ST. JAMES	8	614
ST. JOHN	10	723
ST. LANDRY	4	10
ST. MARTIN	3	*
ST. MARY	14	521
ST. TAMMANY	21	491
TANGIPAHOA	10	151
TENSAS	0	0
TERREBONNE	15	125
UNION	1	*
VERMILION	5	75
VERNON	0	0
WASHINGTON	0	0
WEBSTER	8	339
W. BATON ROUGE	10	400
W. CARROLL	0	0
W. FELICIANA	0	0
WINN	1	*
TOTALS	**501**	**29,109**

Source: Louisiana Workforce Commission, Research Division. *Not reported due to disclosure rules.

For example, the six parishes that record 1,500 jobs or more are in Calcasieu Parish---with the largest chemical sector employment at 4,928---and the region along the Mississippi River from Baton Rouge down to New Orleans. Ascension Parish is #2 in chemical employment at 4,053, followed by #3 Iberville (3,425), #4 East Baton Rouge Parish (3,117), #5 St. Charles (2,341 jobs), and #6 Jefferson (2,074 jobs). The exceptions to this largely southern orientation of the industry are the three parishes in central and north Louisiana: Caddo Parish (899 jobs), Ouachita Parish (807 jobs), and Rapides Parish (1,065 jobs).

Note that there are several parishes in the state where the number of chemical firms is so small that LWC rules do not permit disclosure of total chemical employment in the parish. These are indicated with an asterisk in Table 4. These are largely rural parishes.

Map 1 provides a nice visual for the reader to observe the concentration of the industry within the state. The industry is clearly more concentrated in what are called the MSAs---Metropolitan Statistical Areas---and less so in the rural areas of the state. It is also heavily concentrated in (1) Calcasieu Parish and (2) the parishes along the Mississippi River from Baton Rouge to the mouth of the River. It is these two regions where ports are accessible to large ocean-going vessels that can efficiently move bulk cargo.

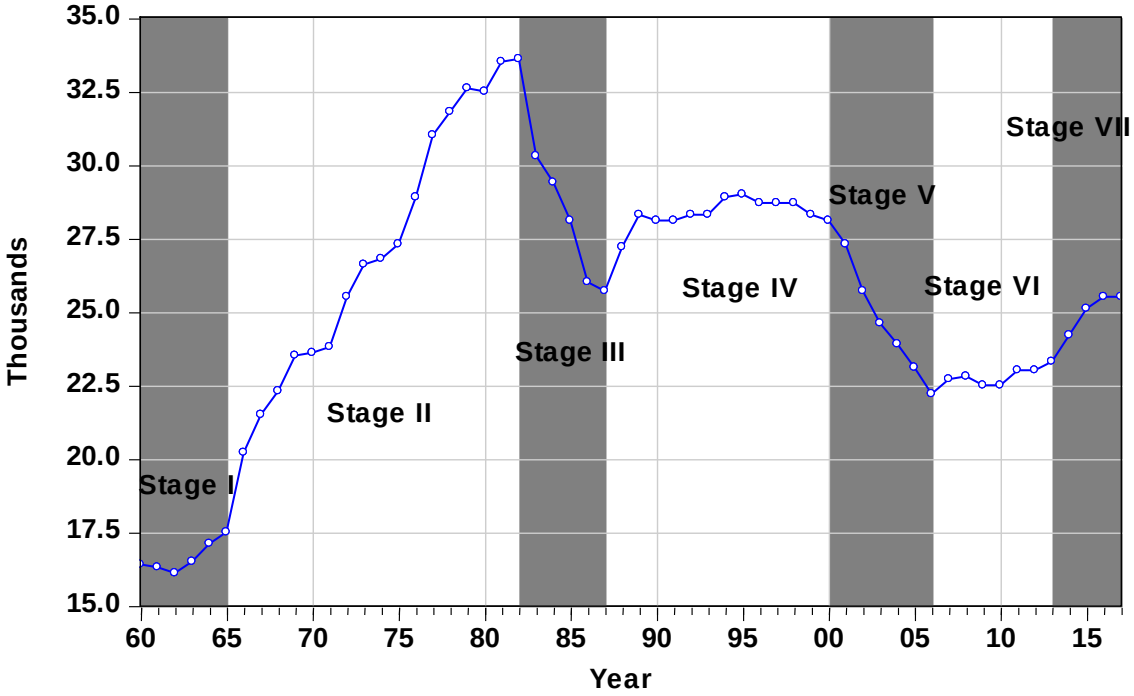


Historical Employment Trends in the Chemical Industry

When one examines historical employment trends in the chemical industry in Louisiana the discovery will be of a pretty wild ride---somewhat similar to a roller coaster. A look at Figure 3 will reveal a series of **seven stages** chemical employment has gone through since 1960.

Stage I. This is the period prior to 1966. Employment data at the chemical industry level began to be collected in the state in 1947. Between 1947 and 1965 employment in this sector was basically stagnant, varying between 12,000 and 17,000 depending on the status of the national economy.

Fig. 3: Employment in Chemical Manufacturing in Louisiana



Source: www.bls.gov. Data are for NAICS 325 only

Stage II. Stage II covers the period from 1967 to 1982 and was obviously a period of massive expansion in this industry. A combination of (1) large natural gas

discoveries in South Louisiana, (2) expanding national and international markets, and (3) the financial enticement of the 10-year industrial tax exemption provided just the right mixture to attract the industry to the state. During the 1970s, 36% of the amount of 10-year industrial tax exemptions awarded went to firms in just six parishes between Baton Rouge and New Orleans---exactly where the chemical industry was concentrating its plant locations. As this stage began there were 17,000 people employed in the industry; by 1982, employment had risen to 33,600.

Stage III. This was the extraordinarily difficult period between 1982 and 1987. During this period the chemical sector shed about one-third of its workforce. Two factors were primarily responsible for this downsizing. First, there was a significant run up in the price of natural gas, which as we mentioned earlier is a product massively consumed by this industry. The wellhead price per mmbtu of natural gas tripled from $0.89 in 1978 to $2.46 in 1984.[7] This significant increase in the price of a key input in the chemical manufacturing process forced firms to either adopt more labor-saving production measures or move their production overseas where gas was much cheaper.

The second damaging factor during Stage III was a large rise in the exchange value of the dollar. Between 1981 and 1985 the value of the dollar rose 83%, which meant the price of Louisiana chemicals to foreign customers <u>in their currencies</u> rose 83%. At the time, foreign chemical sales comprised one-third of all chemical sales by Louisiana firms. Thus, the loss of foreign markets seriously damaged the state's chemical industry.

Stage IV. The period from 1988 through 2000 was a period that began with some nice growth and then was characterized by stability. During this period there was first a

[7] http://dnr.Louisiana.gov/

reversal in the exchange value of the dollar---which boosted export sales for the industry. Secondly, natural gas prices dropped from a high of $2.46 per mmbtu in 1984 to a low of $1.20 in early 1992 where it stayed at or below $2.00 through 1999.[8]

Stage V. Between 2000 and 2006 the industry shed about 5,000 jobs as it again had to deal with a jump in the price of natural gas. From a low of $1.92 in 1999, the price of this fuel began a relentless rise upward to a peak of $14.06 per mmbtu in October 2005. With the price of this key input so high, Louisiana firms were much less competitive with similar firms in Europe and Asia for the world market for chemicals.

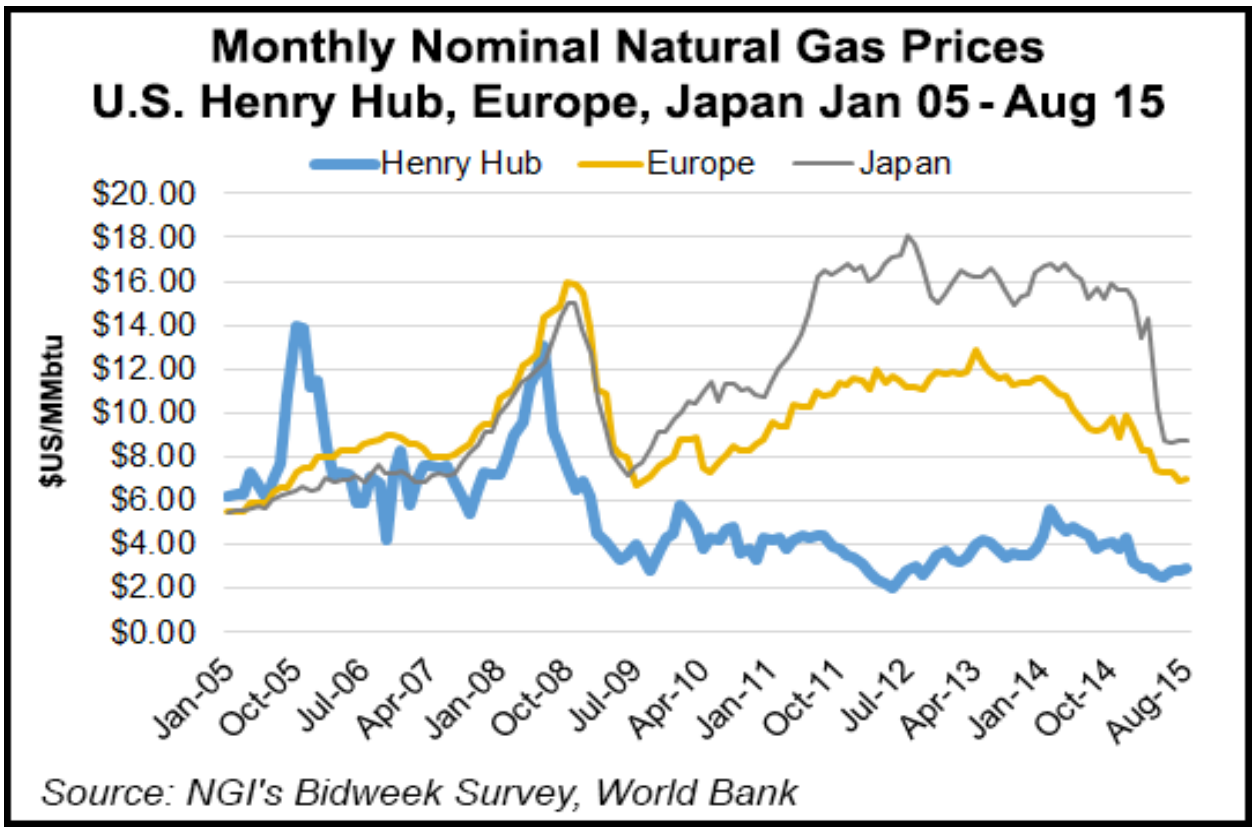
Stage VI. Fortunately, after that 2005 peak, natural gas prices began to slip downward, reaching $3.57 per mmbtu by the end of 2013[9], leading employment in the industry to stabilize in the second half of the century's first decade.

Stage VII. Since 2013, two factors involving natural gas prices are generating a new era of marked growth in this industry. First, natural gas prices in the U.S have fallen even further---from $3.57 in 2013 to $2.99 in 2017. The nation is now awash in this fuel, leading to the expectation that natural gas prices will stay low well into the future. Low natural gas prices are a great spur to growth in this industry.

A second factor has perhaps promoted growth in chemicals in the state even more. While natural gas prices have fallen in the U.S., they have remained much higher in Europe and the Orient---two areas with large chemical facilities competing with the U.S. Natural gas prices in the U.S. versus Europe and Japan are handily captured in Figure 4.

[8] Ibid.
[9] Ibid.

Figure 4



Prices are much higher in these two regions because users have to import natural gas from countries like Russia and Qatar which price their natural gas at about 15% of the price of oil. As can be seen in Figure 4, this has given U.S chemical producers a major competitive advantage. As a result, our firm has documented at least **$160 billion in new basic chemical plants and LNG export terminals** announced in the state since 2012. As seen back in Figure 3, this new activity has already started pumping up chemical employment in the state, despite the fact that most of these facilities are still under construction and have yet to impact the employment numbers. Prospects are very good for this industry moving forward.

IV. Direct Earnings in the Chemical Industry

Another key point of interest to citizens of the state is how this industry impacts their workers' pocketbooks. In this section we examine how wages in the chemical sector compare to other sectors in manufacturing, what the trends have been over time in chemical wages, how chemical earnings are distributed across the state, and finally we will look at an alternative measure of the industry's impact on earnings in Louisiana---the gross domestic product.

Chemical Industry Wages versus Other Manufacturing Wages

Table 5 compares the average weekly wage in the chemical industry in 2017-III compared to the statewide average and compared to wages paid in other sectors of the Louisiana manufacturing sector.

Several points can be made from analyzing the data in Table 5. First, the narrowly defined chemical industry pays the **second highest weekly wages in Louisiana's manufacturing sector**. At $2,050 per week, chemical industry workers are only $62 a week behind the number one sector---petroleum refining. While not shown in Table 5, there are only two other industry sectors in the entire Louisiana economy that pay higher weekly wages than the chemical industry: (1) oil and gas extraction ($2,359) and securities/commodity contracts/investments ($2,210).[10]

Secondly, the average weekly wage in the chemical industry is **52% higher than the average weekly wage in Louisiana's manufacturing sector**. This should not be too surprising since the chemical industry is very capital-intensive and thus requires a very high-skilled workforce.

[10] www.Laworks.net/Downloads/LMI/2014statewide

Table 5
Average Weekly Wages Statewide & in Louisiana's Manufacturing Sector: 2017-III

Statewide	**$870**
Manufacturing	**1,346**
Petroleum and coal products manufacturing	2,112
Chemical manufacturing	**2,050**
Paper manufacturing	1,427
Computer and electronic product manufacturing	1,412
Primary metal manufacturing	1,338
Machinery manufacturing	1,310
Electrical equipment and appliance manufacturing	1,257
Transportation equipment manufacturing	1,206
Fabricated metal product manufacturing	1,098
Plastics and rubber products manufacturing	**1,005**
Nonmetallic mineral product manufacturing	988
Wood product manufacturing	977
Beverage and tobacco product manufacturing	920
Miscellaneous manufacturing	797
Food manufacturing	790
Textile mills	779
Printing and related support activities	734
Textile product mills	699
Furniture and related product manufacturing	670
Leather and allied product manufacturing	552
Apparel manufacturing	477

Source: www.Laworks.net/Downloads/LMI/2014statewide.

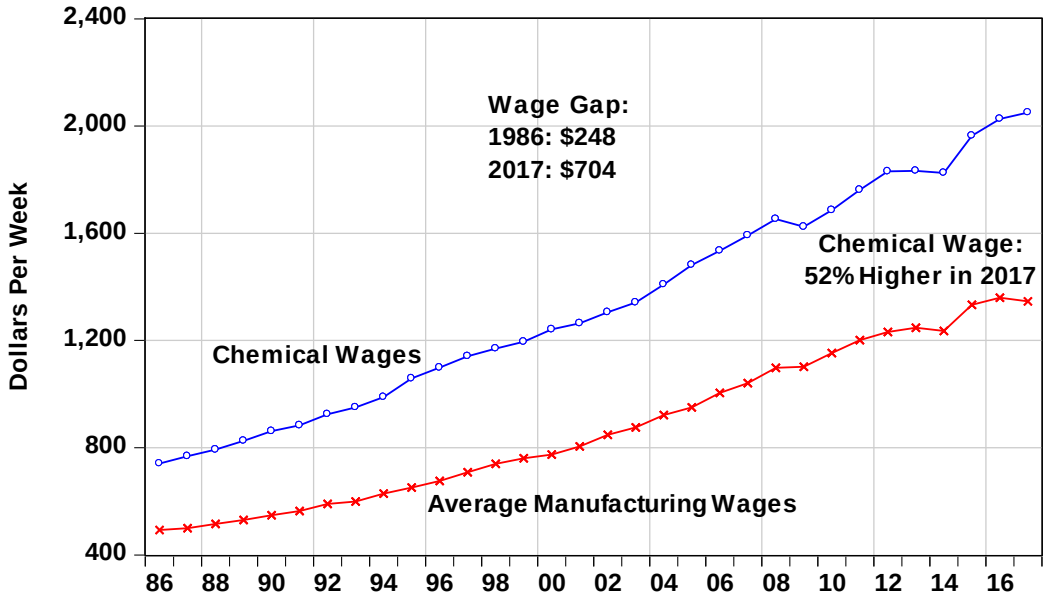
Finally, the average weekly wage in the chemical industry is **136% higher than the average weekly wage of all workers in Louisiana ($870)**. Clearly, the state has been very fortunate in attracting this high wage industry.

Trends in Chemical Industry Wages

Not only are chemical wages relatively high, but they have also been on a nice upward trend over time as seen in Figure 5. Note that over the nearly three decades since 1986, **chemical weekly wages have grown steadily upward** with the exception of the middle year of the Great Recession---2009---and in 2013 and 2014 when wage growth was flat in both chemicals and manufacturing as a whole .

Note also that in every year since 1986 chemical wages have been well above the average wage in manufacturing in Louisiana. The absolute gap between the two has widened from a difference of $248 a week in 1986 to $704 in 2017. The percentage difference between the two has remained pretty constant in the 47% to 50% range. The main point is that a wage that is both relatively high and trending upward over time is exactly what economic developers want for a state.

Figure 5: Chemical Industry Weekly Wages Compared to Manufacturing Weekly Wages-Louisiana



Source: www.Laworks.net/Downloads/LMI

Distribution of Chemical Earnings across the State

How are the earnings paid to chemical industry workers allocated across Louisiana's 64 parishes? The data on earnings by parish are detailed in Table 6 and are handily illustrated in Map 2. What we have done in Table 6 is simply add an annual

earnings column to Table 4. The earnings in the last column of Table 6 are an estimate of annual earnings in 2017 based on third quarter 2017 payments to workers.

Not surprisingly, the pattern of annual earnings as distributed across parishes pretty much follows the employment patterns shown back in Table 4 and Map 1. The top four earnings parishes are the same as the top four employment parishes except the rank order changes a bit. The #1 parish in terms of chemical industry earnings is Calcasieu Parish ($541.1million), a huge jump from 2014 due to the partial opening of a new LNG export facility and initial hiring for the expansion of the Sasol plant. Chemical earnings in this parish are poised to rise dramatically. Nearly $114 billion in new industrial announcements have been made in this area since 2012---virtually all of them chemical in nature---and construction on about half of those is underway.

Ascension Parish was in the #2 position in chemical earnings ($491.3 million) in 2017, followed by Iberville Parish ($375.8 million), and East Baton Rouge Parish ($348.2 million). Two other high earnings parishes were St. Charles Parish ($267.2 million) and Jefferson Parish ($191.1 million).[11] Map 2 confirms the dominance of the southern part of the state in generating these earnings.

Note also the bottom line number in Table 6. **In 2017 the chemical industry paid out over $2.9 billion in wages**. This is larger than any other industrial sector in the state. Oil and gas extraction plus its support activities is second at $2.8 billion, followed by petroleum refining at $1.4 billion.[12]

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[11] In this report we estimate the annual earnings in the last column of Table 6 by multiplying the quarterly earnings in 2017-III by four. The choice of the quarter to multiply by four (we always use the latest quarter available) can significantly impact the annual estimates because bonuses are paid in the first quarter. Using first quarter data to estimate the year total can result in a significant overstatement.

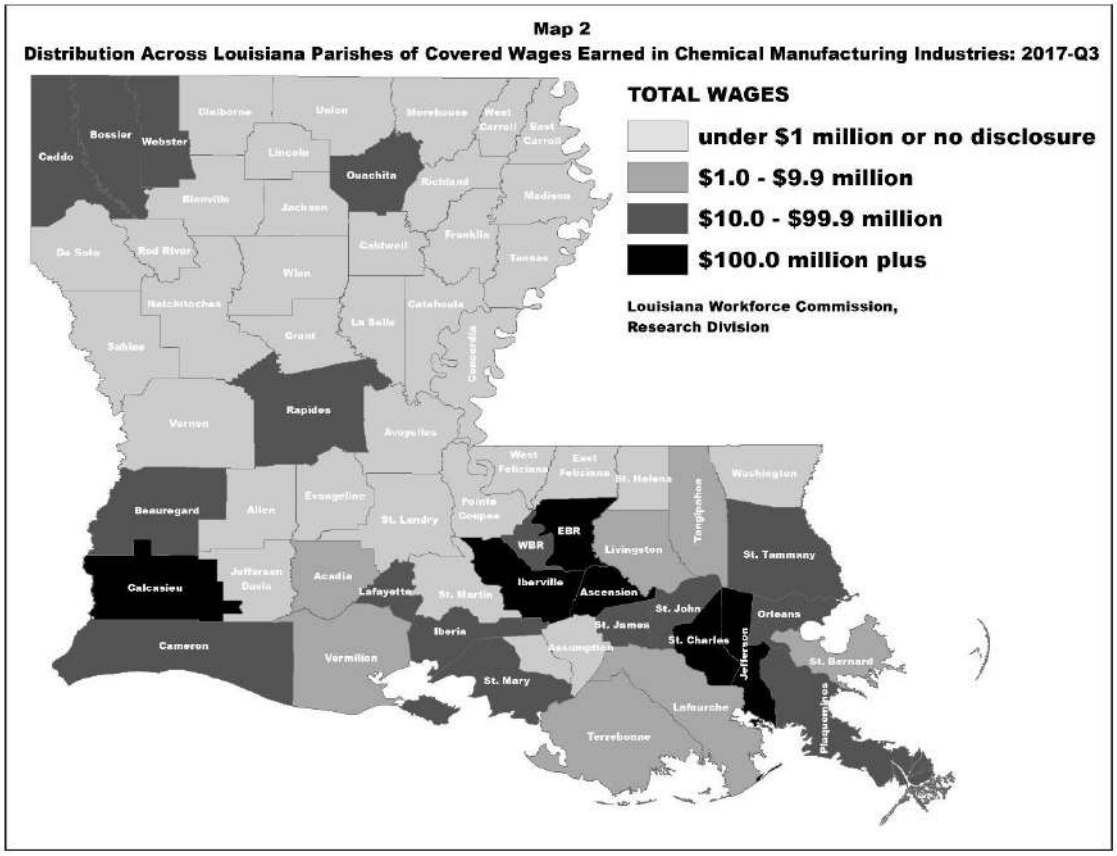
[12] "The Energy Sector: Still a Giant Economic Engine for the Louisiana Economy: An Update", Loren C. Scott & Associates, Inc., for the Grow Louisiana Coalition, February 2018, p. 7.

Table 6
Distribution of Chemical Industry Earnings across Parishes: 2017

Parish	Units	Average Employment	Total Annual Wages Paid**
ACADIA	6	178	$ 9,599,816
ALLEN	2	*	*
ASCENSION	37	4,053	491,314,248
ASSUMPTION	2	*	*
AVOYELLES	1	*	*
BEAUREGARD	4	279	20,017,112
BIENVILLE	2	*	*
BOSSIER	10	165	12,682,700
CADDO	23	899	65,738,360
CALCASIEU	50	4,928	541,145,596
CALDWELL	0	0	0
CAMERON	4	358	49,199,036
CATAHOULA	0	0	0
CLAIBORNE	2	*	*
CONCORDIA	1	*	*
DESOTO	1	*	*
E. BATON ROUGE	50	3,117	348,152,308
E. CARROLL	2	*	*
E. FELICIANA	0	0	0
EVANGELINE	2	*	*
FRANKLIN	2	*	*
GRANT	0	0	0
IBERIA	7	291	19,176,108
IBERVILLE	23	3,425	375,803,684
JACKSON	1	*	*
JEFFERSON	41	2,074	191,062,656
JEFF. DAVIS	2	*	*
LAFAYETTE	23	287	15,781,912
LAFOURCHE	5	111	7,233,012
LASALLE	0	0	0
LINCOLN	2	*	*
LIVINGSTON	7	149	8,699,860
MADISON	0	0	0
MOREHOUSE	1	*	*
NATCHITOCHES	1	*	*
ORLEANS	10	175	14,050,312
OUACHITA	19	807	51,618,224
PLAQUEMINES	7	139	11,432,760
POINTE COUPEE	2	*	*
RAPIDES	12	1,065	63,401,084

RED RIVER	2	*	*
RICHLAND	1	*	*
SABINE	1	*	*
ST. BERNARD	4	16	1,635,804
ST. CHARLES	18	2,341	267,158,852
ST. HELENA	1	*	*
ST. JAMES	8	614	62,906,816
ST. JOHN	10	723	75,051,052
ST. LANDRY	4	10	$354,260
ST. MARTIN	3	*	*
ST. MARY	14	521	44,750,632
ST. TAMMANY	21	491	35,628,576
TANGIPAHOA	10	151	8,459,044
TENSAS	0	0	0
TERREBONNE	15	125	6,596,404
UNION	1	*	*
VERMILION	5	75	5,765,580
VERNON	0	0	0
WASHINGTON	0	0	0
WEBSTER	8	339	14,352,816
W. BATON ROUGE	10	400	36,488,192
W. CARROLL	0	0	0
W. FELICIANA	0	0	0
WINN	1	*	*
TOTAL	**501**	**29,109**	**$2,910,327,972**

Source: Louisiana Workforce Commission, Research Division. *Not reported due to disclosure rules. **Based on 2017-III data.



Gross Domestic Product as Alternative Measure of Earnings Generated

One problem with the data in Table 6 and Map 2 is that they only report wage earnings. There are other earnings streams produced by the chemical plants including rents paid to those who provide property for the site, interest income to those who provide capital to the plant, and profits earned by stockholders and other owners of the firm.

There is an alternative measure that comes as close as possible to capturing all the direct income generated by the presence of the chemical plants---the **gross domestic product**. The difference between the cost of the raw materials used by the plant and the sales value of its final product is essentially the gross domestic product (GDP). GDP

contributions by an industry ultimately ends up as some form of earnings---such as wages, rent, interest and profits---paid to the different factors of production.

The Bureau of Economic Analysis (BEA) within the U.S. Department of Commerce collects gross domestic product data by manufacturing industry in the state. The results from their 2015 survey (the latest available) are shown in Table 7.

Table 7

Gross Domestic Product in Louisiana Manufacturing Sectors
2015

Sector	GDP (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**

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.

Note the prominent role that the chemical industry plays in producing direct earnings in Louisiana by this measure. In 2015, **the narrowly defined chemical industry produced over $15.3 billion in total earnings in Louisiana, fully 30.2% of total gross domestic product in the entire manufacturing sector**. If one adds the

plastics and rubber manufacturing sector into the pot, the earnings figure jumps to almost $15.8 billion---right at 31% of all earnings generated directly in the Louisiana manufacturing sector. Only the petroleum refining sector is larger at 44.3%.

One does not need a reference point to be impressed by the sheer size of these numbers. They are indeed striking.

V. The Total Impact of the Industry: Adding the "Multiplier Effect"

We attempted to be very careful in Sections III and IV to describe the employment and earnings numbers as **direct** employment and earnings. These are the jobs and incomes at the plant sites.

It is a well established principle that business activities have both direct and indirect **(multiplier)** impacts on the economy. The direct impact of a particular industry on income and employment can be measured as we have done in Tables 3 and 7.

The Multiplier Effect

However, these direct impacts alone would significantly understate the role of the chemical industry in the economy. The reason is that the chemical industry also buys from, and sells to, many other firms in the economy. Too, chemical industry employees spend money at grocery stores, car dealerships, movie theaters, etc., which creates new earnings in those establishments, which are then spent, etc., etc.

Thus, any change in the activity of a particular firm **indirectly** affects these other companies and their employees, which in turn affects firms that buy from and sell to these firms and employees, etc. For example, when a decision is made by a firm that creates a new job, a chain-reaction is started which works its way throughout the

economy. This chain-reaction (multiplier effect) causes even more jobs to be created.

Think of the Louisiana economy as a large economic pond. Into that pond a rock is dropped called the chemical industry. As we demonstrated in Sections III and IV that rock is very large. However, when that rock hits the pond it sends ripples all the way out to the edge of the pond. It is these ripples that we refer to as the "multiplier effect."

The Input-Output Table

The major difficulty lies in attempting to quantify these multiplier impacts. Fortunately, a technique has been developed for precisely this purpose---an **input-output (I/O) table**. An I/O table is a matrix of numbers that describes the interactions between all industries in a geographical area. The I/O table provides a complete picture of the flows of products and services in an economy for a given year, illustrating the relationship between producers and consumers and the interdependencies of industries in a region.

An I/O table for the state of Louisiana has been constructed by the Bureau of Economic Analysis (BEA) in the U.S. Department of Commerce. The BEA is the government agency responsible for measuring the nation’s gross domestic product each quarter. This model is referred to as the RIMS II model, and is similar to IMPLAN or the REMI models.

Normally, data from the chemical industry's value of shipments are plugged into the RIMS II model to estimate separately three impacts of the chemical industry on the state: (1) *new sales* for firms in the state; (2) *new household earnings* for residents in the state; and finally; (3) *new jobs* in the state. Unfortunately, the value of shipments data could not be used in this way in this update because of the obvious error in the trend of

shipments data we described back on pages 3-5. Trends in chemical employment were used to ratio up the multiplier estimates used in the previous study.

I/O Table Results

Table 8 contains the I/O table results. The numbers in this table contain both the direct and indirect effects of the chemical industry on the state's economy, and it should be no surprise---given the data we revealed in Sections III and IV---that the results are quite impressive.

Table 8
Business Sales, Household Earnings, and Permanent Jobs
Supported by Louisiana's Chemical Industry: 2017

Category	Impact
Sales	$79,667.4*
Earnings	$15,695.8*
Jobs	267,601

*Values in millions of dollars.

According to the I/O table, the chemical industry in Louisiana created almost **$79.7 billion in sales at firms** in the state, an impressive 15% increase over our estimates in the prior study. At least one reason for this impressive jump is the very large jump in capital expansions among existing firms in the state that we document in Section VIII.

Of course, some of those sales revenues ended up in the pockets of Louisiana residents as household earnings---a whopping total of almost **$15.7 billion**. As a reference point, in 2016 total earnings of all workers at all firms in Louisiana was $136 billion.[13] **That means that about 12.4% of all earnings (about one of every $9 earned) in Louisiana can be traced back to the presence of the chemical industry in the state**. It is also basically equivalent to the total earnings of all workers in Orleans

[13] www.bea.gov

Parish ($15.4 billion in 2016)---the third most populous parish in the state.[14] Earnings in only one of Louisiana's 64 parishes, East Baton Rouge, exceed $15.7 billion.[15]

The other truly striking number in Table 8 is the jobs number. According to the I/O table there were **267,601 jobs** in Louisiana in 2017 that could trace their very existence back to the broadly defined chemical industry. Note that:

- Dividing this figure into the household earnings number of $15.7 billion indicates that the **average job created by the chemical industry (both directly and indirectly) paid $58,669 a year**, an indication of the high quality of these jobs. The average annual wage in 2017 for all workers in the State was $45,240[16]---77% of the annual wages of the jobs created because of the chemical industry's presence in Louisiana.
- There were 1,971,000 people employed in Louisiana in 2017. Dividing this figure by 267,601 results in the figure 7.4. This means when you attend a statewide meeting of the Chamber of Commerce or Rotary Club, look around: **almost one of every 7 persons in the room owes their job to the presence of the chemical industry in the state.**
- This figure implies a **job multiplier of 9.2** (267,601 divided by 29,109 direct jobs from Table 3), meaning that every new job created in the chemical sector creates 8.2 more jobs elsewhere in the state's economy. This is a relatively high job multiplier, reflecting the very capital-intensive, high-wage character of the industry, and the fact that many contract workers at these facilities are not included in the direct employment numbers for the industry.

[14] www.bea.gov
[15] Ibid
[16] www.laworks.net/labormarketinformation

An obvious question is: "What sectors of the economy are the primary beneficiaries of these multiplier effects?" The answer is provided in Table 9, which illustrates which sectors of the Louisiana economy benefit the most in terms of business sales, household earnings, and jobs.

Table 9
Business Sales, Household Earnings, and Permanent Jobs
Supported by Louisiana's Chemical Industry by Industry: 2017

Industry	Sales*	Earnings*	Jobs
Agriculture, Forestry, Fishing, and Hunting	$364.9	$80.5	3,998
Mining	$3,173.8	$542.8	5,206
Utilities	$2,320.7	$358.3	3,844
Construction	$416.3	$161.1	2,988
Durable Goods Manufacturing	$1,096.0	$233.9	4,135
Nondurable Goods Manufacturing	$53,968.8	$8,166.5	88,997
Wholesale Trade	$2,523.4	$801.8	12,412
Retail Trade	$1,856.6	$666.0	24,343
Transportation And Warehousing	$2,180.6	$618.6	11,136
Information	$601.0	$131.6	2,607
Finance and Insurance	$1,316.1	$340.9	7,319
Real Estate and Rental and Leasing	$2,068.4	$359.7	16,657
Professional, Scientific, and Technical Services	$1,241.6	$558.2	8,995
Management of Companies and Enterprises	$1,167.2	$489.7	6,950
Administrative and Waste Management Services	$872.7	$360.9	11,862
Educational Services	$225.7	$107.7	3,796
Health Care and Social Assistance	$1,993.9	$912.8	20,589
Arts, Entertainment, and Recreation	$202.2	$60.7	2,663
Accommodation	$256.4	$74.2	2,156
Food Services and Drinking Places	$695.0	$226.0	12,085
Other Services	$1,126.0	$420.2	13,119
Households	$0.0	$23.6	1,745
Total	**$79,667.4**	**$15,695.8**	**267,601**

*Values in millions.

Obviously, the sector that benefits the most from the chemical industry's presence is the nondurable goods manufacturing sector. This is where the chemical industry is located and which contains all the direct effects of the industry plus the indirect effects.

In terms of jobs alone, the second largest beneficiary is the retail trade sector with 24,343 jobs traceable to the chemical industry, closely followed by the health care and social assistance sector which benefits to the tune of 20,589 jobs. There are ten other sectors in Table 9 that enjoyed a boost of 5,000 jobs or more due to the chemical industry's existence in the state. It is clear from a review of this table that the benefits from the presence of the chemical industry are both large and widespread.

VI. The Tax Impacts of the Chemical Industry

There is another major way that the state benefits from the substantial economic activity recorded in Section V. All that economic activity generates **taxes and fees** for state and local governments in Louisiana. At the state level, the treasury collects corporate income taxes, franchise fees, and sales taxes, to mention a few. Local governments are major beneficiaries of property tax collections from these very capital-intensive industries, and those governments also collect sales taxes off of purchases the firm makes and from purchases made by individuals whose income was generated as a result of the chemical firm's presence. It is to the measurement of these tax benefits that we now turn our attention.

Impact on State Revenues

There are two broad ways in which the chemical industry's presence impacts the state treasury. First, there are the direct taxes the industry pays, such as corporate income taxes, corporate franchise taxes, sales taxes, etc. Secondly, there are the indirect taxes the treasury gains from all the new income that the industry creates in the state.

Direct taxes paid to the state. Oddly, it is the direct taxes paid to the state that are more often the most difficult to measure. One might think that inquiries could be made to chemical firms in the state, and the information could be solicited in that way. However, these firms are more often than not very reluctant to provide this proprietary information---a characteristic that is not unique to the chemical industry but is rather a pretty common response across all industries. (It is also characteristic of individuals who do not like to divulge their state or federal income tax payments.)

There is a second approach we have taken. The Louisiana Department of Revenue (DOR) is able to provide us with corporate income and corporate franchise tax collections for 2017 by NAICS codes. According to the data the DOR provided, firms in the broadly defined chemical industry (NAICS codes 325 and 326) paid the state **$3,400,000 in corporate income and franchise taxes in fiscal year 2017**.

Finally, it is clear that firms in the chemical industry pay some sales taxes to the state (levied at a 4% rate). However, the DOR has no neat way of estimating monies coming from this revenue source from the industry. Clearly, the number is not zero, which means that our estimate of direct taxes paid to the state by the industry is necessarily conservative. The industry used to pay tens of millions of dollars a year in state sales taxes on electricity and natural gas consumed, until the governor and legislature saw the disadvantage this was to a growing chemical industry and repealed the tax in 2008. However, some of these sales taxes have been re-instated in the past three years in an attempt to solve the "fiscal cliff" (see Section VIII).

Indirect taxes collected by the state. The direct taxes detailed in the previous set of paragraphs are only those for which firms in this industry have to write out a check.

But recall back in Table 8 the presence of the chemical industry generated $15,695,800,000 in household earnings in 2017 through both the direct salaries paid and indirect earning produced through the multiplier effects. These earnings are subject to the state income tax. When spent, these household earnings also generate gasoline taxes, state sales taxes, beer/soft drink/tobacco taxes, etc.

According to the Legislative Fiscal Office, the state of Louisiana collects seven cents in revenues for every dollar earned by households in the state. Thus, the chemical industry---through the direct and indirect creation of household earnings---was responsible for generating an estimated **$1,098,706,000---over a billion dollars---in <u>indirect</u> tax collections for the state of Louisiana in 2017.**

Total taxes collected by the state - 2017. If one adds the direct corporate franchise taxes paid of $3,400,000 to the indirect taxes generated of $1,098,706,000 this implies a total boost to the state treasury in 2017 of **$1,102,106,000**. Note that because this figure does <u>not</u> include direct sales taxes paid to the state it is a conservative estimate of the impact on the state treasury. As a reference point, the total amount the state collected from its gaming taxes (e.g. lottery and video poker proceeds, riverboat gaming, racetracks, and land-based casino), and tobacco taxes combined in FY17 was a comparable $1,102.1 million.[17]

Impact on Local Government Revenues

As was the case with state tax collections, local governments gain both from the direct taxes paid to them by the industry and from indirect taxes they collect off of all the income the chemical industry generates in the state.

[17] http://www.doa.la.gov/opb/pub/REC/REC_12-14-2017_Official_Sheets.pdf.

Direct taxes collected by local governments. There are primarily two ways in which local government treasuries receive taxes directly from the presence of the chemical industry in their parish. By far the largest injection comes from **property taxes** the industry pays. Because these are typically large, capital-intensive operations, these property tax payments are quite substantial. For example, one company is by far the largest property tax payer in East Baton Rouge Parish (Entergy Corporation is a distant second), paying the local government $32.6 million in property taxes in 2017. Of that amount, 43% ($14 million) was paid by the company's three chemical plants.[18]

Unfortunately, property taxes paid to local governments are not handily collected by NAICS code and the rate applied varies significantly across parishes, so we rely on two sources: (1) a survey of its members conducted by the Louisiana Chemical Association (LCA) in March 2018 and (2) data collected from the assessors in the eight parishes with the greatest concentration of chemical employment. According to these data, in 2017 the chemical industry paid local governments at least **$174,676,308 in property taxes**. This is a very impressive number and should be considered a very conservative estimate because response to the LCA survey was not 100% and data were not collected from all parish assessors in Louisiana.

A second source of local government revenues is from **sales taxes** the industry directly pays to these governments. These sales tax rates vary considerably by jurisdiction. Unfortunately, these are not collected and documented by NAICS codes at the local government level, so we cannot report these numbers. This is another factor

[18] "Northern Lights Over Baton Rouge: The Economic Impact of ExxonMobil's Refinery/Chemical Plant Complex", Loren C. Scott & Associates, Inc., March 2018, p. iv.

making our estimates of the chemical industry impact on local government budgets very conservative.

Indirect taxes collected by local governments. The direct taxes paid to local governments detailed in the previous set of paragraphs are only those for which firms in this industry have to write out a check. But again recall back in Table 8 that the presence of the chemical industry generated $15,695,800,000 in household earnings in 2017 through both the direct salaries paid and indirect earnings produced through the multiplier effects. When these earnings are spent, local governments collect an array of taxes and fees, most notably sales taxes and property taxes.

According to Dr. James Richardson--- Past Director of the Public Administration Institute at LSU---local governments collect five cents in revenues for every dollar earned by households in the state. Thus the chemical industry---through the direct and indirect creation of household earnings---was responsible for generating an estimated **$784,790,000---over three-fourths of a billion dollars---in tax collections for local governments in Louisiana in 2017.**

Total taxes collected by local governments - 2017. If one adds the direct property taxes paid of $174,676,308 to the indirect taxes generated of $784,790,000, this implies an estimated **total boost to local government treasuries in 2017 of $959,466,308---nearly a billion dollars**. Again, this should be considered a <u>very conservative estimate</u> because the response to the LCA survey on local government taxes paid was not 100%, our survey of assessors' offices was confined to the top eight parishes, and we were unable to collect data on local sales taxes paid by the industry.

To put this number in perspective, in 2017 the average teacher salary in Louisiana was $49,801.[19] **Thus, the amount of local government revenue generated by the chemical industry would support the salaries of 19,266 public school teachers in the state**. There were 46,935 full time equivalent public school teachers in the state in 2017, so local government derived monies from the chemical industry would support the salaries of nearly 40% of the public school teachers in the state.

VII. The Industrial Tax Exemption Program

The numbers we presented in the previous section on the amount of property taxes paid by the chemical industry might surprise some in the general public because they are under the illusion that these plants pay virtually no property taxes because of the industrial tax exemption program (ITEP). Indeed, some in the public may believe that those parishes where these plants are located may suffer financially due to the ITEP. In this section we address that issue, and we begin with the data in Table 10.

Using data from the Louisiana Department of Economic Development, the data in Table 10 show the amount of investment under the ITEP that was in force in 2017, the amount that was in the broadly defined chemical industry (NAICS codes 325 and 326), and the amount of the chemical industry ITEP contracts that will **expire** over the next five years.

[19] www.Louisianabelieves.com/resources/library/workforce

Table 10

Total Value of ITEP s in Force in 2017, Value for Chemicals, and Amount of Chemical Exemptions Expiring over 2018-22

Parish	Investment in Force 2017	Chemical Contracts In Force 2017	Chemical Contracts Expiring 2018-22
Acadia	$106,248,187	$3,986,533	0
Allen	304,065,726	0	0
Ascension	7,386,817,877	7,105,448,521	$1,540,295,090
Assumption	67,460,069	66,956,172	54,844,678
Avoyelles	1,221,180	552,265	552,265
Beauregard	421,183,907	32,607,449	20,647,451
Bienville	226,053,999	168,715,347	168,715,347
Bossier	106,197,358	5,806,683	
Caddo	1,377,027,585	110,745,573	71,449,322
Calcasieu	15,201,604,553	14,585,593,312	1,362,064,937
Caldwell	108,783	0	0
Cameron	26,599,925,711	26,556,041,369	1,823,468,024
Catahoula	0	0	0
Claiborne	$127,722	$127,722	$127,722
Concordia	55,643,403	46,544,694	14,480,684
DeSoto	851,913,738	0	0
East Baton Rouge	4,282,669,094	2,551,388,500	1,852,436,016
East Carroll	58,737,531	58,737,531	58,500,329
East Feliciana	142,315,055	0	0
Evangeline	133,142,682	52,943,505	22,496,901
Franklin	0	0	0
Grant	13,429,117	0	0
Iberia	217,941,878	28,592,119	20,961,761
Iberville	5,380,104,623	5,210,328,575	4,257,934,620
Jackson	164,587,547	0	0
Jefferson	1,288,422,981	304,950,138	218,059,559
Jefferson Davis	68,775,405	27,663,606	
LaSalle	301,682,928	0	0
Lafayette	347,145,785	75,978,549	18,151,864
Lafourche	364,524,142	135,116,277	40,897,853
Lincoln	424,006,245	254,876,801	0
Livingston	96,779,198	10,571,911	5,742,260

Morehouse	183,372,120	0	0
Natchitoches	464,736,205	0	0
Orleans	454,957,168	164,610	0
Ouachita	582,138,415	108,408,216	80,231,112
Plaquemines	570,790,505	39,214,049	17,362,853
Pointe Coupee	299,646,985	386,165	386,165
Rapides	1,552,885,189	358,979,577	256,784,932
Red River	320,644,851	312,208,935	312,208,935
Richland	297,037,647	107,294,747	0
Sabine	59,722,331	9,095,854	9,095,854
St. Bernard	807,531,597	0	0
St. Charles	7,500,167,979	1,832,192,086	1,059,317,552
St. Helena	14,877,780	8,9133,975	8,530,216
St. James	1,879,083,243	1,198,043,603	290,441,530
St. John the Baptist	4,449,644,399	312,274,638	234,714,923
St. Landry	88,698,802	4,986,839	1,410,063
St. Martin	87,441,891	206,131	156,934
St. Mary	560,635,659	150,680,959	94,774,580
St. Tammany	104,605,908	105,229	105,229
Tangipahoa	135,792,972	49,058,466	26,792,568
Terrebonne	394,419,881	0	0
Union	66,882,876	0	0
Vermilion	69,045,351	54,127,694	16,372,339
Vernon	5,171,286	0	0
Washington	304,322,646	0	0
Webster	186,630,903	45,356,480	34,555,945
West Baton Rouge	1,128,846,108	627,230,896	577,686,026
West Carroll	348,820	0	0
West Feliciana	374,013,745	0	0
Winn	27,391,093	0	0
Total	**$88,961,348,364**	**$62,693,422,301**	**$14,572,781,105**

Source: Louisiana Department of Economic Development

ITEP by Parish

Note along the bottom line of this table that of the $88.9 billion in ITEP contracts in force in 2017, $62.7 billion or 71% were awarded to firms in the chemical industry. It should come as no surprise that the pattern of awards in Table 10 more or less follow the

pattern of employment and jobs shown back in Maps 1 and 2. That is, the biggest volume of awards is mainly in the southern part of the state, with the top 8 parishes in ITEP awards to chemical firms being Cameron, Calcasieu, Ascension, Iberville, East Baton Rouge, St. Charles, St. James, and West Baton Rouge.

Note that Cameron Parish is by far the #1 parish for ITEP in force at $26.6 billion, nearly twice that of the #2 parish---Calcasieu at $15.2 billion. Also, 100% of Cameron Parish's ITEP in force is in the chemical sector, with only a small percentage ($1.8 billion) of this $26.6 billion coming on the tax rolls over the next five years. The reason for this anomaly is that two huge LNG export facilities are under construction in this parish---Cheniere LNG and Cameron LNG. Full completion of these two projects will occur over the next two years, so this parish is poised for a huge bounty of new property taxes entering the parish treasury after 2022.

New Property Coming on Tax Rolls

The reader's attention is particularly called to the last column of Table 10. It is important to note that, until very recently, this has been a **10-year** tax exemption. After 10 years have passed, the property goes on the property tax roles in the parish, and taxes are collected on it. Notice that over the next five years, almost $14.6 billion in these ITEP contracts will expire, and local governments will begin to enjoy tax revenues from them.

Iberville Parish in particular will see nearly $4.3 billion in new chemical property being added to its property tax roll over 2018-22, while both Cameron and East Baton Rouge Parishes will see their taxable chemical properties bump up by over $1.8 billion over that time period. Three other parishes---Ascension, Calcasieu, and St. Charles---

will enjoy additional chemical properties to tax that exceed $1 billion. One might actually call this a tax deferral program instead of an exemption program.

Do Heavy ITEP Parishes Get Weak Property Tax Collections?

Do the top eight parishes that dominate in terms of ITEP awards lose out badly in terms of property tax collections? The data in Table 11 address that issue.

Table 11

Industrial Tax Exemptions and Local Property Taxes per Person in The 8 Parishes with Highest ITEP in Force: 2017

Parish	Value of Exemptions:* 2017		Property Taxes per Person**		
	Amount	Rank	Amount	Rank	% Paid By Business[20]
Ascension	$7,386,817,877	4th	$1,043	21st	48.4%
Calcasieu	15,201,604,553	2th	1,102	18th	69.1
Cameron	26,599,925,711	1st	4,850	1st	86.6
E. Baton Rouge	4,282,669,094	7th	1,015	22th	44.8
Iberville	5,380,104,623	5th	1,907	8th	86.0
St. Charles	7,500,167,979	3rd	2,748	5th	76.3
St. James	1,879,083,243	8th	2,554	7th	82.6
St. John the Baptist	4,449,644,399	6th	1,153	15th	59.1

*Louisiana Department of Economic Development (See Table 10). **Louisiana Tax Commission Annual Reports and author calculations.

First of all, note that though the value of exemptions awarded are the highest in the state, these same parishes **all collected much more property taxes per capita than the statewide average of $941.** All exceeded $1,000 per person. One---Cameron Parish--

[20] Residential property tax payments were calculated by adding (for each parish) total assessed value of property (Table 24) and total assessed value of improved land (Tables 22 and 23) and multiplying that sum by the millage rate (Table 43) divided by 1000. This estimate of total property taxes paid by homeowners was subtracted from total property taxes collected in the parish (Table 42) to arrive at total taxes paid by businesses. All table numbers referenced are from the Tax Commission's 2016 Annual Report.

-was ranked first in the state at $4,850, and two were in the $2,500-$2,700 range. All eight ranked in the top third of the state's 64 parishes in property taxes collected per person.

Second, **in three of the parishes well over 80% of the taxes were paid by businesses. In two other parishes over two-thirds of the property taxes were paid by business.** Only in the very populous and relatively wealthy parishes of East Baton Rouge and Ascension did the percent paid by business drop below 50%, and even then the percent was only marginally under 50%. Clearly, citizens of these chemical-intensive parishes do not suffer an unfair tax burden due to the existence of the ITEP.

Heavy ITEP Parishes and Teacher Pay

A second indicator that these parishes do not suffer from property tax revenue losses due to the ITEP is their ability to pay for a key public service---public school teacher salaries. In Table 12, average school teacher salaries in these eight highest ITEP-intensive parishes are compared to the statewide average, and it illustrates the ranking of their teacher salaries versus the other 64 parishes in the state.

The message from Table 12 is clear. With the exception of Cameron (which recall is just now joining the ranks of big ITEP users) and St. John Parishes, **teachers in these ITEP-intensive parishes earn more than the statewide average.** Six are ranked in the top 16 of Louisiana's 64 parishes, and three of them are in the top ten. This is one more indicator that the existence of the ITEP has not been harmful to local government budgets. In fact, the message is precisely the opposite. Those parishes in which these ITEPs have been used more often rank far better than their sister parishes.

Table 12

Average Teacher Salary and Rank 2017 Among
The 64 Parishes of the Eight
Parishes with the Highest Concentration of Chemical Industry Wages:

Parish	Average Teacher Salary*	Rank Among 64 Parishes
Ascension	$52,035	14th
Calcasieu	51,958	15th
Cameron	47,445	41st
E. Baton Rouge	51,804	16th
Iberville	54,476	6th
St. Charles	54,865	5th
St. James	57,035	4th
St. John the Baptist	47,966	36th
State Average	**$49,801**	**NA**

Source:www.louisianabelieves.com/resources/library/workforce. *.Includes extra compensation

VIII. Massive Expansion Underway & More Coming

Louisiana is in the midst of a remarkable industrial boom. Since 2012, an estimated **$170.4 billion** in industrial announcements have been announced in the state.[21] By way of reference, in a really good year in the past, if the state garnered $5 billion in announcements, that was considered a very good year. The state is presently over 34 times those previous levels.

Huge Chemical Expansion

Of particularly good news is that the chemical industry is heavily represented in this listing as shown in Table 13. This table lists all the announcements as of March 2018 we have been able to document (there may be projects that have been missed) from newspaper press releases, information from the Louisiana Department of Economic Development, and phone calls and discussions the author has conducted with plant

[21] As tabulated in March 2018 by the author and the staff of the Greater Baton Rouge Industrial Alliance.

managers. The capital expenditures (capex) associated with each announcement is also listed.

Table 13
Announcements of New Chemical Plants & Expansions of Existing Plants In Louisiana Since 2012

Chemicals Only	Capex	Status*	Jobs**
Air Products	$ 150,000,000	C	150
Axiall-Lotte Corp	$ 3,000,000,000	U	2,400
BASF	$ 500,000,000	C	455
BASF	$ 42,600,000	C	111
BASF	$ 20,000,000	C	167
BASF	$ 150,000,000	U	15
Cheniere Energy LNG	$ 20,000,000,000	U	148
CF Industries	$ 2,100,000,000	C	779
Commonwealth LNG	$ 200,000,000	P	NA
Dow Chemical	$ 1,060,000,000	C	541
Driftwood LNG	$ 14,459,000,000	P	498
Dyno Nobel/Cornerstone	$ 1,025,000,000	C	540
Emerald Biofuels LLC	$ 70,000,000	C	NA
Energy World LNG	$ 888,000,000	P	150
Eurochem	$ 1,500,000,000	P	1,500
ExxonMobil Plastics	$ NA	P	60
Formosa Chemical	$ 9,400,000,000	P	1,200
G2 LNG	$ 11,000,000,000	P	250
Honeywell	$ 300,000,000	C	190
Huntsman	$ 78,000,000	C	75
IGP Methanol	$ 3,600,000,000	P	325
Indorama Ventures	$ 175,000,000	U	125
Lake Charles Methanol	$ 3,800,000,000	P	200
Magnolia LNG	$ 3,500,000,000	P	70
Matheson	$ 130,000,000	C	27
Methanex	$ 600,000,000	C	650
Methanex	$ 800,000,000	C	650
Methanex	$ 1,300,000,000	P	NA
Mid South Extrusion	$ 4,000,000	C	30
Momentive	$ 66,000,000	P	85
Monkey Island LNG	$ 9,300,000,000	P	NA
Monsanto	$ 925,000,000	U	120
Myriant Corporation	$ 100,000,000	C	190

Nalco	$ 18,700,000	C	189
Occidental Chemical	$ 145,000,000	U	15
PCS Nitrogen	$ 40,000,000	U	NA
Praxair	$ 100,000,000	U	NA
Praxair	$ 150,000,000	U	NA
Sasol Ethylene	$ 11,000,000,000	U	2,895
SE Tylose at Shintech	$ 120,000,000	C	322
Sempra-Cameron LNG	$ 20,000,000,000	U	190
Shell Chemical	$ 1,000,000,000	U	NA
Shell Chemical	$ 717,000,000	C	20
Shintech	$ 1,400,000,000	C	100
Shintech	$ 500,000,000	C	NA
SNF Flopam	$ 362,000,000	C	1,400
South LA Methanol/ZEEP	$ 1,300,000,000	P	65
Syngas Energy Holdings	$ 350,000,000	P	100
Taminco/Balchem	$ 37,588,000	U	173
Trunkline LNG	$ 10,000,000,000	P	250
Venture Global LNG	$ 8,500,000,000	P	250
Venture Global LNG	$ 4,250,000,000	P	100
Virdia Biochemical	$ 60,000,000	U	81
Wanhua Chemical	$ 1,120,000,000	P	170
Westlake	$ 140,000,000	P	NA
Westlake	$ 330,000,000	U	180
Westlake	$ 425,000,000	C	454
Williams Olefins	$ 375,000,000	C	NA
Williams Olefins	$ 5,000,000,000	P	NA
Yuhuang Chemicals	$ 1,850,000,000	U	400
Total all Projects	**$ 159,532,888,000**		**19,055**
Total Potentials	**$ 89,673,000,000**		**5,273**
Total Completed/Underway	**$ 69,859,888,000**		**13,782**

Source: Tabulations as of March 2018 by author & staff of Greater Baton Rouge Industrial Alliance. *C=completed; U=underway; P=potential. **www.opportunitylouisiana.com & author's calculations, sometimes includes both direct & indirect jobs

A remarkable **60 different projects totaling nearly $160 billion in capital expansions** (capex) are listed in Table 13. Some are different projects at the same site, such as those at BASF, Methanex, Shintech, and Williams Olefins. Several of the

projects are really huge, led by the massive LNG facilities, Formosa's $9.4 billion project and Sasol's $11 billion ethylene cracker expansion.

Status of Projects

The third column of Table 13 indicates the status of each of the projects as of late March 2018 as best we have been able to determine. Of the 60 projects 39 are either already completed (C) or are under construction (U), and the capex total for this group is nearly $70 billion---a huge number by historical standards in Louisiana. The author keeps up with the economies of nine other states in the southeast, and this $70 billion figure is more than 10 times that announced in any one of those states.

Twenty-one of the projects have not gone vertical as yet and are listed still as "potential" (P). These potentials are dominated by nine very large LNG export facilities. Because all these potential projects are so large, their total capex is $89.7 billion or 56% of the total reported in Table 13 even though they represent only 21 of the 60 projects listed.

Job Impacts of New Projects

The final column of Table 13 provides estimates of the total jobs expected to be created by these investments. In most cases the job estimates include only the direct jobs at the facility, but in a few cases the indirect jobs created via the multiplier effect are included as well if available. There are several important points to make about the numbers in column four. First, they are derived primarily from estimates generated by the Louisiana Department of Economic Development (LDED) or reported in the press. Second, note that no estimates were available on 12 of the projects, and four of those

were quite large---exceeding $1 billion dollars. That means the total job impacts at the bottom are a very conservative estimate of the total job impacts.

Third, the third row from the bottom of Table 13 shows that the total jobs created in the state from these projects is estimated to be at least **19,055**. Note the phrase "at least" in that last sentence. Because estimates were not available for 12 large projects, and indirect jobs created were only available on a few, the total job impact should be considered very much a lower bound estimate. Fourth, note that of the 19,055 jobs, an estimated **13,782 jobs are associated with projects either underway or already completed**. However, seven of these projects for which no data are available are for projects underway or completed, so this number too is a gross understatement of the certain job impacts.

An estimated 5,273 of the jobs listed in Table 13 are connected to projects that are potentials, and this does not include three---the $5 billion Williams Olefins project, the $9.3 billion Monkey Island LNG facility, and the $1.3 billion Methanex plant that will no doubt have very significant job effects if they come to fruition. This is one indicator of how important it is to the state's economy to make sure these projects "go vertical." A very significant numbers of jobs are at stake.

Threats to the Industry & Its Future Expansion

It should be apparent to the reader after reviewing the information in Table 13 that Louisiana has a lot to lose if the "potential" projects listed do not become "real." At a minimum, some $89.7 billion in capital expenditures and at least 5,273 jobs are at stake (see Table 13). In addition, every year these capital-intensive firms are making multi-million dollar decisions about capital projects to improve productivity and/or to meet new

environmental regulations. From a state and local policy standpoint, what can stand in the way of these investments?

The problem of Texas. What decision makers must always keep in the forefront is that Louisiana has a very robust competitor for these investments. There are several reasons why **Texas** is the number one producer of chemicals in the U.S. Texas brings to the table many of the same characteristics as Louisiana. Our immediate neighbor to the west has several well-developed ports with easy access to the Gulf and from there to international markets. That state is home to an abundant supply of natural gas, a vast pipeline infrastructure to move this fuel where it is needed, and access to plenty of water in its southeastern corner.

But there is a reason why Texas' value of chemical shipments exceeds Louisiana's by a factor of almost three. Forbes Magazine ranks the business climate in Texas #2 in the nation, while Louisiana ranked #40.[22] The Institute for Legal Reform within the U.S. Chamber of Commerce ranked Louisiana dead last in its 2017 legal climate survey, while Texas ranked 39th.[23] In a ranking of "Best States for Transportation", Texas ranks 22nd and Louisiana ranks 44th.[24] On the education front, one 2017 ranking shows Texas higher education at #34 and pre-K through 12 at #33, while the comparable rankings for Louisiana are #42 and #45.[25]

On the business taxation front, Texas has several advantages over Louisiana. Unlike Louisiana, Texas has a unified sales tax collection, does not tax manufacturing utilities, does not tax manufacturing equipment, does not tax manufacturing inputs, and

[22] www.forbes.com/best-states-for-business/list/#tab:overall
[23] www.instituteforlegalreform.com/states
[24] www.usnews.com/news/best-states/rankings/infrastructure/transportation
[25] www.usnews.com/news/best-states/rankings/education

has significantly lower local sales tax rates. Importantly, Texas has no corporate or personal income tax. The state does have a gross receipts tax, somewhat similar to Louisiana's franchise tax, but Texas lawmakers took a major step toward eliminating this reviled tax recently, with the Texas Senate's passage of Senate Bill 17---legislation that will phase out the tax based on revenue triggers.

It should be apparent from these statistics that Texas brings a formidable array of positives to the table when competing for new or expanding chemical facilities. To keep the playing field somewhat level, Louisiana must bring significant incentives to the table to offset Texas' advantages. One might argue that state incentive programs are not the primary factors firms look at in making their final location decision. Incentive programs may not be the primary factors, but the bottom line is the location decision is typically just a matter of math. The site that provides the greater return on equity is the site selected. Incentive programs can be just the factor that, at the margin, pushes Louisiana into the win category.

Threat: The ITEP Changes. One key factor in helping that rate of return on equity equation move in Louisiana's favor has been the presence of the **ten year industrial tax exemption** (TYITE). Until June 24, 2016, firms were able to approach the Board of Commerce and Industry with their proposed capital expenditures on a new plant, replacement of key machinery, or environmental upgrades, and the Board would grant the firms an exemption from paying local property taxes on those expenditures for five years with an opportunity for a renewal for another five years.

On June 24, 2016, the Governor issued executive order **JBE 2016-26**. In this order he made the following changes in the ITEP:

- All contracts shall now require an "Exhibit A" consisting of a Cooperative Endeavor Agreement (CEA) between the State, the Department of Economic Development and the applicant providing for the creation or retention of jobs. Effectively this means the Industrial Tax Exemptions (ITEs) will no longer be awarded for replacement equipment, environmental upgrades, maintenance capital, or other investments that do not create new jobs or do not provide compelling evidence of the retention of existing jobs. The ITE can be reduced or eliminated if the applicant does not meet the job goals in the CEA.

- All new contracts now must include "Exhibit B" consisting of local approvals consisting of a resolution from the parish council or police jury, the school board, and the sheriff's office.

These changes do not apply to any CEAs issued before June 24, 2016, so TYITE agreements exist with most of the firms listed back in Table 13. However, if these firms in the future want to apply for an ITE for replacement equipment, environmental upgrades, maintenance capital, or other investments that do not create new jobs or do not provide compelling evidence of the retention of existing jobs, those applications will be turned down. This is a change in the ITEP that clearly moves against the ROE equation in Louisiana of a new firm or expansion of an existing one.

Importantly, the Governor also signed into law a bill that requires manufacturers to **choose between the inventory tax credit and ITE**. If a site utilizes ITE, the company is no longer eligible for the refundable inventory tax credit.

The Exhibit B addition---gaining local government approval---has obviously added to the cost and time to achieve an ITE. The Governor's executive order clearly says all applications "must include Exhibit B consisting of approvals…" This wording suggests strongly that local entities have gained veto power over the ITE. A sheriff in north Louisiana has used this new power to reject an ITE requested by Calumet Refinery. The Together Baton Rouge group has an explicit goal of stopping as many of these ITE

as possible in East Baton Rouge Parish under the misguided notion that this is a "give away" of tax dollars that would have been spent here anyway---a notion that flies in the face of every corporate finance class taught in classrooms in America.

To the extent that the ITEP program factored significantly into a firm's decision to locate or expand in Louisiana, these changes have added costs and uncertainty to the equation---moves that on the net harm economic development in the state. Indeed, economic development professionals have said the ITEP change has created so much uncertainty that it has **rendered the ITE basically a zero factor in the firm location decisions.** If there was no formidable competitor for these plants this would be no problem. Unfortunately, Texas looms right next door.

To be fair, Louisiana's greatest competitor for the chemical and LNG projects listed in Table 13 is Texas. From an ITEP standpoint only (ignoring significant tax, transportation, legal, and education differences), these changes do not throw us wildly out of line with Texas as seen in Table 14. Unfortunately for Louisiana, firms will consider **all tax differences** between the two states. Louisiana is now at a significant disadvantage compared to Texas as we documented above.

Table 14
Comparison of Property Tax Exemptions in Texas & Louisiana
(Before Executive Order JBE-26)

	Louisiana	**Texas**
Authority	State	Local/County
Discretion Exercised	No	Yes
Percent of Exemption	100%	Up to 100%
Term of Exemption	10 Years	Up to 10 Years
Job Creation Requirement	None	Retention of Baseline to 200 New Jobs
CapEx Requirement	None	$0.3 - $3 million
Maintenance Capital eligible	Yes	No

Source: Louisiana Department of Economic Development

Threat: Solving the "fiscal cliff". For the past three years the State of Louisiana has encountered substantial revenue shortfalls. At this writing, the 2018 regular legislative session is underway and a most certain special session will follow it immediately to address a shortfall estimated between $500 million and $1 billion.

Four fiscal sessions were called in the last 24 months to address the budget deficit. The business sector carried a substantial part of the burden of closing the revenue gap. Based on figures for each bill generated by the Legislative Fiscal Office, the Louisiana Association of Business & Industry (LABI) has estimated the total amount of new taxes imposed on business by fiscal year. LABIs estimates are as follows:

- FY16: $575 million
- FY17: 1.33 billion
- FY18: 1.35 billion

Some of the new taxes are temporary (until tax reform measures can be passed) and some are permanent. Among the larger taxes are:

- Changed the inventory tax credit from a refund to a carry forward (can only be used against income tax liability) for credits more than $1 million and reduced the refundable portion by 25% for many other taxpayers;

- Prohibited the amount of net operating loss deduction from exceeding 72% of Louisiana net income;

- Removed more than 150 exemptions and exclusions from the 4% sales tax from April 14, 2016 to June 30, 2016; Removed exemptions and exclusions from 2% of the sales tax from July 1, 2016 to June 30, 2018 (but 3% on business utilities and 1% on manufacturing machinery and equipment); and removes 1% of business utilities exemption from July 1, 2018 to March 31, 2019;

- Imposed a new 1% sales tax from April 1, 2016 until June 30, 2018 and limited more than 125 exclusions and exemptions to the existing 4% tax including business utilities (which are subject to the new tax);

- Expansion of the franchise tax to some LLCs (Act 12 James, 1ES);
- Expansion of sales tax to manufacturing inputs/byproducts (Act 2 Broadwater, 2ES).

Note that the chemical firms listed back in Table 13 are huge consumers of electricity and natural gas utilities. They also carry significant inventories. Clearly, these tax changes are increasing the cost of operating in the state.

The Governor is of the belief that it is only fair that resolution of the budgetary shortfall should be equally shared between business and the general public. That may sound reasonable from a political standpoint, but in the bowels of every one of the firms listed as "potentials" in Table 13 is an accountant estimating the rate of return on equity of the firm's proposed project in Louisiana. Actions taken by the two governors and the Legislature in the last 24 months have moved that equation against pulling the "build" trigger. Ninety billion dollars of potential projects in Table 13 are at risk in how the budget problem is resolved.