THE ECONOMIC IMPACT OF THE CHENIERE ENERGY SABINE PASS LIQUEFACTION PROJECT

By

Loren C. Scott and Associates, Inc.

743 Woodview Court

Baton Rouge, Louisiana 70810

lorencscott@aol.com

225-751-1707

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EXECUTIVE SUMMARY

The State of Louisiana is in the midst of the largest capital expansion project in its history. Cheniere Energy, Inc. is spending approximately $20 billion over the 8-year period from 2012-19 to construct the Sabine Pass Liquefaction Project. This project involves constructing six "trains" to convert natural gas into a liquid form called liquefied natural gas (LNG). The purpose of this report is to estimate the impact of both constructing and operating this facility on the economies of (1) the Lake Charles Metropolitan Statistical Area (MSA), (2) the State of Louisiana, and (3) the U.S.

Our findings can be summarized as follows:

- The cumulative impact over 2012-2019 of **constructing** the six trains on the **Lake Charles MSA** is:
    - Business sales in the MSA will rise by nearly $7.4 billion;
    - Over $3 billion will be added to earnings of MSA residents;
    - An average of 5,611 jobs a year will be supported by the construction of the trains. In the peak year of construction (2015) 16,049 jobs in the MSA will be traced back to the construction spending. As a reference point, in the 38 years from 1975-2013 the year of greatest job growth in the MSA was 10,500 in 1990;
    - Local governmental entities in the MSA will pick up an additional $93.1 million in sales taxes.

- The cumulative impact over 2012-2019 of **constructing** the six trains on the **Louisiana** economy is:
    - Business sales in the State will rise by over $8.4 billion;
    - Over $3.3 billion will be added to earnings of Louisianans;
    - An average of 6,391 jobs a year in Louisiana will be supported by the construction of the trains. As a reference point, there are 14 parishes in Louisiana that have fewer people employed than 6,391. In the peak year of construction (2015) 18,300 jobs in the State will be traced back to the construction spending;
    - We estimate that over the 8-year construction period the state treasury will pick up an additional $233.7 million in taxes and fees. As a reference point the state collected $238 million in corporate income taxes in FY12.

- The cumulative impact over 2012-2019 of **constructing** the six trains on the **U.S.** economy is:
    - Business sales in the U.S. will rise by over $46.1 billion;
    - Over $16.8 billion will be added to earnings of U.S. citizens;
    - An average of 30,357 jobs a year in the country will be supported by the construction of the trains.

The Sabine Pass Liquefaction Project involves the construction of six trains, each coming online sequentially. By 2019 all six trains are expected to be operational, and Cheniere Energy estimates it will be spending approximately $190 million a year in **Louisiana** and for support in

Houston to operate the facilities. The impact of this on-going operational spending when all trains are running in 2019 is estimated as follows:

- The impact of operating the six trains in 2019 on the **Lake Charles** economy is estimated to be:
    - Business sales in the MSA will be higher by over three-quarters of a billion dollars---approximately $797.9 million;
    - Earnings of MSA residents will be up by $266.6 million---about a 5% boost in MSA incomes and an amount almost equal to the earnings of all the people who work in the accommodations and food service sectors in the MSA;
    - In 2019, 2,758 new jobs will have been added to the MSA---representing a 3% jump in employment in the MSA, or an amount equal to the present employment level in Cameron Parish. The implied job multiplier for the Cheniere facility is 4.3, i.e., for every new job created at the plant, 3.3 new jobs are created elsewhere in the MSA via the multiplier effect;
    - Local governmental entities in the MSA will experience an additional $8.3 million in sales taxes in their budgets in 2019.

- The impact of operating the six trains in 2019 on the **Louisiana** economy is estimated to be:
    - Business sales in the State will be up by nearly $2.9 billion;
    - Nearly two-thirds of a billion dollars---$616.6 million will be added to earnings of Louisianans. This is a figure almost equivalent to total earnings of all workers in the State's paper manufacturing sector;
    - By 2019, 7,485 new jobs will have been added in the State. There are presently 18 parishes in Louisiana that have fewer people employed than that number. It is a figure about equivalent to the entire workforce of East Feliciana Parish. The implied state job multiplier for the Cheniere facility is 11.7, i.e., for every new job created at the plant, 10.7 new jobs are created elsewhere in the State via the multiplier effect.
    - We estimate that by 2019 the state treasury will be collecting $43.2 million more dollars due to the operations of this facility---a number close to what the State now collects from all its liquor and alcohol taxes ($57 million).

- The impact of operating the six trains in 2019 on the **U.S.** economy is estimated to be:
    - Business sales in the U.S. will be up by over $3.6 billion;
    - Household earnings of U.S. citizens will be nearly $1.1 billion higher;
    - 13,050 new jobs will have been added in the country.

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I. Introduction

The State of Louisiana is in the midst of the largest capital expansion project in its history. Cheniere Energy is spending approximately $20 billion in the state over the 8-year period from 2012-19 to construct the Sabine Pass Liquefaction Project. This project involves constructing six "trains" to convert natural gas into a liquid form called liquefied natural gas (LNG). A "train" is a series of machines that chill natural gas into liquid form as LNG, which is one-six hundredth of its original volume. This LNG can then be placed on a large LNG tanker to be shipped to foreign customers. About 1.1 trillion cubic feet of natural gas will be able to be exported from this site each year. The site is illustrated in Map 1.

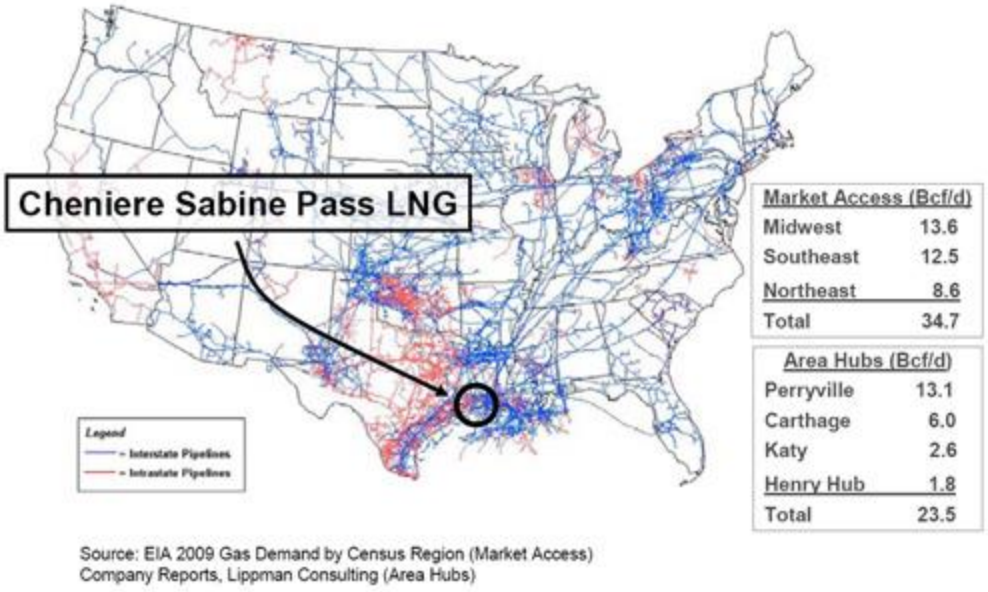
Map 1
Sabine Pass Liquefaction Project

Ideal Site Location

This site is located on 1,000 acres in Cameron Parish, Louisiana at the widest point on the Sabine River Navigation Channel. It is only 3.7 nautical miles from open water in the Gulf, and the Channel is maintained to 40-feet depth. Its terminal has two docks that are recessed into the site so that no part of an LNG tanker protrudes into the channel.

As seen in Map 2, the terminal is also ideally located from another standpoint---its natural gas supply sources. The terminal can receive natural gas from 11 interstate and intrastate pipeline systems in the Gulf Coast.

Map 2
U.S. Pipeline System & Cheniere Sabine Pass LNG



Source: EIA 2009 Gas Demand by Census Region (Market Access)
Company Reports, Lippman Consulting (Area Hubs)

Adding Export Facility to Import Facility

Originally the Sabine Pass site was developed as an LNG **import** facility, which is shown in Map 1 as the "existing operational facility". Such an investment made sense in the early 2000s when the price of natural gas shot up for several years due to a shortage of the fuel. Adoption of horizontal drilling and fracking technologies in shale plays across the U.S. radically changed the country's natural gas economics from shortage to surplus. Once the Liquefaction Project is completed, the Sabine Pass LNG Terminal will be able to both import and export LNG.

At this writing, Sabine Pass Liquefaction is the only LNG export project that is fully permitted and under construction, meaning it has obtained both permits to export LNG from the U.S. as well as a complete environmental and safety review of the project site for Trains 1-4 that are under construction. Trains 5 and 6 are also pending final regulatory approval, which is expected by early 2015. By May 2013, Cheniere had six 20-year contracts in place to take 948 billion cubic feet (Bcf) of its gas annually. For those wondering why there is such a market for LNG exported from this country, it should be pointed out that natural gas prices vary considerably across countries. For example, the price may be $4.50 per million btu (mmbtu) in the U.S., while in Germany the comparable price is $12 and in Japan it is $18.

Report Outline

The purpose of this report is to estimate the economic impact of the Sabine Pass Liquefaction project on (1) the Lake Charles MSA, (2) the State of Louisiana, and (3) the national economies. In Section II, we describe the methodology used to generate these impact estimates. Section III is devoted to estimating the impact of **constructing** the new export facility on these

three regions, and Section IV evaluates the impacts of **operating** the facilities on these three regions. Section V contains a summary and conclusions.

II. Methodology

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 by the construction spending on the new plant and the operational spending at the new plant once it is operational.

The Multiplier Effect

However, these direct impacts alone would significantly understate the role of the new Sabine Pass Liquefaction Project on the economy. The reason is that construction and operation of the project will result in Cheniere also buying from, and selling to, many other firms in the economy. New employees at the plant 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 new rock is dropped called “new Sabine Pass Liquefaction Project”. 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.

I/O tables for the Lake Charles MSA, the State of Louisiana, and the national economy have been constructed by IMPLAN. Essentially, data on construction expenditures at the new facility and projected operating expenditures at the new plant are plugged into the IMPLAN models to estimate separately three impacts of the new facility on the three geographic areas: (1) *new sales* for firms; (2) *new household earnings*; and finally; (3) *new jobs*.

It should be noted that this study only measures the impacts resulting from construction and operation of the Sabine Pass Liquefaction Project. Once Sabine Pass is exporting LNG, additional demand will be created for natural gas produced in Louisiana (the third-largest U.S. natural gas-producing state) and the nation, incentivizing additional production and future investment in the sector. Those impacts on the natural gas sector are not quantified, and therefore we would expect the impacts presented in this study to be conservative.

III. Construction Impacts

Construction began on the new Sabine Pass Liquefaction export facility in 2012. The focus on years 2012-2017 is on building the first four trains at the site. While this construction is on-going, construction (pending final regulatory and commercial approval) is expected to begin on Trains 5 and 6 in 2015 and continue through 2019. The purpose of this section of the report is to estimate the impact of this spending by year on the Lake Charles MSA, the State of Louisiana, and the national economies.

Direct Construction Spending

Table 1 provides data on how much Cheniere will spend in total over the period 2012 through 2019 building the Sabine Pass Liquefaction Project. Construction spending is broken down into spending (1) that takes place in Louisiana, (2) spending in the U.S. but outside Louisiana, and (3) foreign spending. None of the foreign spending is included in our impact estimates since these monies are not injected into the Lake Charles MSA, State or national economies.

Table 1
Cheniere Construction Spending on Sabine Pass LNG Export Terminal
(Millions of Dollars)

Year 2012-19	Louisiana Spend	Non-Louisiana U.S. Spend	Foreign Spend
Total	**$4,991**	**$12,748**	**$2,563**

Source: Cheniere Energy

These numbers give the reader a good sense of the enormity of the Sabine Pass Liquefaction project. First, over the 8-year construction period, Cheniere estimates that it will spend a total of approximately **$20.3 billion** building the six trains. Secondly, almost two-thirds

of these expenditures will be spent in the U.S. but outside of Louisiana. These include not only equipment purchases, but also the great majority of the financing for the project comes from out-of-state, U.S. sources. Thirdly, Louisiana will still enjoy a very hefty infusion of about $5 billion in construction spending over this 8-year period. The largest amount of this spending---in excess of $1 billion---will occur in years 2015-16 when there is an overlap in construction of the six trains. Table 2 shows the estimated start date of each of the six trains.

Table 2
Estimated Startup Date of Each Train

Train	Estimated Startup Date
Train 1	1st Quarter 2016
Train 2	2nd Quarter 2016
Train 3	2nd Quarter 2017
Train 4	3rd Quarter 2017
Train 5	2nd Quarter 2019
Train 6	4th Quarter 2019

Source: Cheniere Energy

Impact of Construction Expenditures on the Lake Charles MSA

To determine the economic impacts of the construction of six trains spanning the period from 2012 through 2019, we must determine (1) how much will be spent in each year and (2) how much of the construction dollars are going to be spent in Louisiana. Cheniere's estimates for the total amount of construction spending that will occur within the state were provided above in Table 1. According to company officials, about $5 billion will be spent within the state between 2012 and 2019.

Table 3 presents the estimates of the economic impacts on the Lake Charles MSA that will result during the construction of the six trains in each year of the construction project. Our

estimates reveal that over the 8-year construction period, the approximately $5 billion projected to be spent within the state on construction will cause **new business sales in the MSA to increase by a cumulative total of about $7.4 billion**, with a peak annual impact on sales of approximately $2.3 billion in year 2015.

Table 3
Construction Impacts on the Lake Charles MSA

Year	Sales	Earnings	Jobs	Taxes
2012	$293.9	$118.2	2,114	$3.7
2013	$845.1	$341.4	5,982	$10.6
2014	$1,332.6	$540.9	9,284	$16.8
2015	$2,340.6	$954.5	16,049	$29.6
2016	$1,671.8	$684.9	11,281	$21.2
2017	$596.9	$245.7	3,964	$7.6
2018	$160.0	$66.1	1,046	$2.1
2019	$121.3	$50.3	779	$1.6
Total	**$7,362.1**	**$3,002.0**	**5,611**	**$93.1**

Source: IMPLAN and author's calculations. Total Jobs represents an average between the nine years of the construction phase. Sales, earnings and taxes are reported in millions$.

To get some idea how these additional business sales will be distributed throughout the economy of the Lake Charles MSA, we report the distribution by industry for 2015—the year in which construction spending is expected to be at its maximum. These impacts of sales by industry sector are reported in Table 4. It is not surprising that firms in the region's construction industry will be the biggest winners, picking up just under $1.6 billion in additional sales to firms in the Lake Charles MSA in 2015. Other significantly large sales impacts will be experienced by firms within the real estate and rental industry ($114.9 million) and firms in the professional-scientific services sector ($108.2 million).

Table 4
Construction Impacts on the Lake Charles MSA by Industry in 2015

Category	Sales	Earnings	Jobs
Ag, Forestry, Fish & Hunting	$0.6	$0.3	7
Mining	$0.9	$0.1	1
Utilities	$14.3	$2.3	15
Construction	$1,596.3	$708.7	10,555
Manufacturing	$90.8	$3.5	37
Wholesale Trade	$46.6	$16.6	228
Retail Trade	$50.8	$22.9	741
Transportation & Warehousing	$14.6	$5.8	88
Information	$51.4	$6.7	156
Finance & Insurance	$41.7	$9.1	182
Real Estate & Rental	$114.9	$9.0	263
Professional- Scientific & Tech Services	$108.2	$60.4	843
Management Of Companies	$2.1	$0.6	16
Administrative & Waste Services	$27.3	$14.9	452
Educational Services	$4.3	$1.9	81
Health & Social Services	$91.4	$52.6	887
Arts, Entertainment & Recreation	$7.6	$2.3	106
Accommodations & Food Services	$39.0	$14.1	656
Other Services	$32.1	$19.8	694
Government & Other	$5.8	$2.9	42
Total	**$2,340.6**	**$954.5**	**16,049**

Source: IMPLAN and author's calculations. Sales, earnings, and taxes are reported in millions$.

The roughly $7.4 billion in new business sales generated during the 8-year construction phase for the six trains will obviously lead to a significant increase of **new earnings** for residents within the MSA. The additional household earnings estimates are shown in column three of Table 3. During the 8 years of construction, an additional **$3.0 billion in new household earnings will be experienced by residents within the MSA**. The largest impact on new household earnings will occur in the year 2015, when earnings are estimated to increase by about $954.5 million.

Table 4 reports the distribution of these new household earnings by industry sector for the year 2015. Not surprisingly, employees in the construction sector will be the largest beneficiaries, with their earnings jumping by over $708.7 million. Employees in the professional-scientific sector will be the second-largest gainers, picking up $60.4 million in new earnings, followed by workers in health care ($52.6 million) and workers in the retail trade ($22.9 million).

Using the I/O tables for the Lake Charles MSA, we can estimate what the impact on **jobs** in the MSA will be from the construction of the six trains of the Sabine Pass Liquefaction Project (see the fourth column of Table 3). These new temporary jobs will be composed of workers employed directly at the construction sites and those jobs that are created through the multiplier effects as construction spending ripples through the region's economy.

We estimate that capital expenditures of roughly $5.0 billion over the 8 years of construction will lead to annual average of about **5,600 new temporary jobs**---a huge number of new jobs for the MSA. For example, over the 3-year period from 2011 to 2013, the MSA's employment increased a total of 5,100 jobs.[1] Obviously, the number of temporary jobs created by construction activity at the Cheniere site will vary from year to year due to the uneven distribution of construction spending that will take place over this 8-year period. The most significant impact on jobs will occur in 2015 when construction spending is expected to peak. In that year, an additional 16,049 new temporary jobs will be created within the Lake Charles MSA. As a reference point, in the 38 years from 1975-2013 the year of greatest growth was 10,500 in 1990.[2] Obviously, this massive investment in the MSA will be huge for jobs in the region.

Table 4 reports how these new temporary jobs will be distributed across the major industry sectors within the region. Obviously, the bulk of these new jobs will be created within the

[1] www.bls.gov
[2] Ibid.

construction sector, with about 10,555 new jobs created in the peak construction year---2015. However, other sectors will also see a significant increase in employment—professional-scientific (843), health and social services (887), retail trade (741), accommodations and food services (656) and other services (694).

Our analysis to this point has estimated the impact of construction spending on new business sales, household earnings and jobs. There are at least two other important contributions that this project will make to the MSA. First, local government entities within the region will **collect taxes directly** from Cheniere. Unfortunately, we have no data on these direct taxes. A second major revenue source for the Lake Charles MSA will result from the **indirect sales tax revenues** generated through the multiplier effects as households spend their new earnings. Our analysis indicates that for every dollar in new earnings generated in the Lake Charles MSA, the local government entities will collect about 3.1 cents in additional sales tax revenues.

These additional sales tax revenues for the Lake Charles MSA are reported in the last column of Table 3. **We estimate that over the 8-year construction phase, local government entities within the MSA will collect a cumulative total of approximately $93 million in new sales taxes**. About 73 percent of those revenues will be collected in just three years (2014 through 2016). It is important to note that these represent very conservative estimates because we do not have information on the direct taxes that will be paid by the company.

Impact of Construction Expenditures on the State

In the previous section we provided estimates of the impacts that Cheniere's capital spending on the Sabine Pass Liquefaction Project will have on the Lake Charles MSA. This section provides the same estimated impacts for the **Louisiana** economy.

Table 5 reports our estimates of the economic impacts on the state that will result during the 8-year construction phase for the six trains. As before, our estimates are reported separately for each year as well as the cumulative impacts over the entire construction phase. Our estimates reveal that over the 8-year construction period, the approximately $5.0 billion to be spent within Louisiana on construction will cause new **business sales in the state to increase by a cumulative total of a little over $8.4 billion**, with a peak annual impact on sales of nearly $2.7 billion in year 2015.

Table 5
Construction Impacts on Louisiana

Year	Sales	Earnings	Jobs	Taxes
2012	$337.1	$132.9	2,382	$9.3
2013	$968.4	$381.7	6,782	$26.7
2014	$1,525.9	$600.9	10,586	$42.1
2015	$2,681.7	$1,060.3	18,300	$74.2
2016	$1,916.6	$760.8	12,864	$53.3
2017	$684.7	$272.9	4,520	$19.1
2018	$183.6	$73.5	1,192	$5.1
2019	$139.1	$55.9	888	$3.9
Total	**$8,437.2**	**$3,338.9**	**6,391**	**$233.7**

Source: IMPLAN and author's calculations. Total Jobs represents an average between the nine years of the construction phase. Sales, earnings, and taxes are reported in millions$.

As discussed above, the roughly $8.4 billion in new business sales generated during the 8-year construction phase for the six trains will obviously lead to a significant increase of new **household earnings** for residents within the state. The additional household earnings estimates are shown in column three of Table 5. During the 8 years of construction, an additional **$3.3 billion**

in new household earnings will be experienced by residents within the state. The largest impact on new household earnings will occur in the year 2015, when earnings are estimated to increase by about $1.1 billion.

As before, using the I/O tables for the state, we can estimate what the impact on **jobs** will be from the construction of the Liquefaction Project's six trains (see the fourth column of Table 5). These new temporary jobs will be composed of workers employed directly at the construction site and those jobs that are created through the multiplier effects as construction spending ripples through the state.

We estimate that capital expenditures of roughly $5.0 billion over the 8 years of construction will lead to an annual average of about **6,391 new temporary jobs**—a significant number of jobs state-wide. As a reference point, there are 14 parishes in Louisiana that have fewer people employed than 6,391. This is slightly more than the total employment in Bienville Parish (6,029) in March 2013.[3] The annual impact on temporary jobs varies significantly during the construction phase due to the uneven year-to-year distribution of construction spending. Since construction spending peaks in 2015, the most significant impact on jobs will occur in that year. An additional 18,300 new temporary jobs are created throughout the state in 2015---a number equivalent to the number of people employed in Louisiana's entire trucking industry.[4]

Our analysis above estimates the impact of construction spending on new business sales, household earnings and jobs in Louisiana. As discussed in Section III, there are at least two other important contributions that the Sabine Pass Liquefaction Project will make to the state. First, Cheniere will directly pay **taxes to the state government** during the 8-year construction phase.

[3] Louisiana Workforce at a Glance, Louisiana Workforce Commission, April 25, 2014, p. 16.
[4] Ibid., p. 9.

Again, we have no data on these direct payments. A second major revenue source for the state will result from the indirect tax and fee revenues attributed to all the household earnings generated through the multiplier effects as households spend their new earnings. Officials in the State Legislative Fiscal Office indicate that for every dollar of new household earnings generated in the state, the state treasury collects about 7 cents in sales taxes, income taxes, and other fees.

These additional tax revenues collected during the construction phase are reported in the last column of Table 5. We estimate that over the 8-year construction phase, the state will collect additional taxes totaling $233.7 million. As a reference point, the state collected $238 million in corporate income tax collections in FY12.[5] About 73 percent of these additional tax revenues will be collected in just three years (2014 through 2016). As mentioned earlier, it is important to note that these represent very conservative estimates because we do not have information on the direct taxes that will be paid by Cheniere.

Impact of Construction Expenditures on the US Economy

Recall, Cheniere intends to spend roughly $20.3 billion over an 8-year period on the construction of six trains in Louisiana to convert natural gas into a liquid form (LNG). Of the $20.3 billion, approximately $17.7 billion is projected to be spent **within the United States**. In this section we present the estimated impacts on business sales, household earnings and temporary jobs that this construction project will have on the U.S. economy for each year between 2012 and 2020.

Table 6 presents the estimates of the economic impacts on the U.S. economy that will result during the construction of the six trains in each year of the construction project. These numbers will be much larger than the impacts on Louisiana because (1) the U.S.-wide construction spending

[5] www.rev.state.la.us

is more than 3 times the spending in Louisiana and (2) the U.S. "economic pond" is considerably larger than just one state, so the ripple effects will extend further and be larger. Our estimates reveal that over the 8-year construction period, the $17.7 billion projected to be spent within the U.S. on construction will cause new **business sales in the nation's economy to increase by a cumulative total of about $46.1 billion**, with a peak annual impact on sales of over $9.8 billion in 2015.

Table 6
Construction Impacts on the United States

Year	Sales	Earnings	Jobs
2012	$3,242.8	$1,170.0	20,287
2013	$7,330.1	$2,653.7	45,076
2014	$6,067.3	$2,203.8	36,672
2015	$9,825.2	$3,580.2	58,364
2016	$9,060.3	$3,311.9	52,891
2017	$5,433.9	$1,992.4	31,172
2018	$2,806.4	$1,032.1	15,818
2019	$2,336.0	$861.6	12,936
Total	**$46,101.9**	**$16,805.6**	**30,357**

Source: IMPLAN and author's calculations. Total Jobs represents an average between the nine years of the construction phase. Sales, earnings, and taxes are reported in millions$.

The roughly $46.1 billion in new business sales generated during the 8-year construction phase for the Sabine Pass Liquefaction Project will obviously lead to an increase of **new household earnings** for residents within the U.S. The additional household earnings estimates are shown in the third column of Table 6. During the 8 years of construction, an additional **$16.8 billion in new household earnings will be experienced by U.S. households**. The largest impact on new household earnings will occur in the year 2015, when earnings are estimated to increase by about $3.6 billion.

Using the I/O tables for the U.S. economy, we can estimate what the impact on **jobs** will be from the construction of the Liquefaction Project's six trains. The number of new temporary jobs created by Cheniere's construction spending is reported in the fourth column of Table 6. These new temporary jobs will be composed of workers employed directly at the construction sites and those jobs that are created through the multiplier effects as construction spending ripples through the US economy.

We estimate that capital expenditures of roughly $17.7 billion over the 8 years of construction will lead to **average annual impact of about 30,357 new temporary jobs**, a significant job impact for the U.S. economy. Again, given the distribution of construction spending over the 8-year period, the most significant impact on jobs will occur in 2015 when the company will spend approximately $3.8 billion on construction within the U.S. In that year, an additional 58,364 new temporary jobs will be created within the U.S. economy.

IV. Operations Impacts

The sales, earnings and job impacts described in the previous section should be considered **one-time injections** into the economies of the Lake Charles MSA, the state and the nation. Therefore, these impacts are felt only as long as construction activities continue at the complex. Also, as reported above, these impacts will vary significantly by year depending on the level of construction spending in each year and they will totally disappear in 2019 when all construction is completed.

However, there is a more stable and larger long-run impact that this complex will have on the Lake Charles MSA, state and national economies. These are the impacts associated with Cheniere's **on-going, daily operations** of the LNG facility. These benefits are **recurring,** and as

such, they will continue to accrue to the MSA, the state and the nation as long as the facility is operating. In this section we estimate the impacts of Cheniere's on-going operational expenditures for its Sabine Pass Liquefaction Project separately for the Lake Charles MSA, the state and national economies. Partial operations at the LNG export facility are scheduled to begin in 2016. Below we estimate the impact on business sales, household earnings and jobs.

As mentioned in the introductory section, Cheniere's Sabine Pass Liquefaction Project will consist ultimately of six trains, each coming on line sequentially (see Table 2). The company estimates that its total annual operating expenditures within Louisiana will exceed $130 million by 2019 after all six trains are fully operational. These expenditures will be used to estimate the economic impacts on the Lake Charles MSA and the state. In addition to the operational spending that occurs within the state, the company estimates there will be additional spending on the LNG facility that takes place in its Houston office. Hence, total operational spending in Houston and Louisiana is projected to rise to approximately $190 million by 2019. These expenditures will be used to estimate the economic impacts on the U.S. economy.

Impacts of Operational Spending on the Lake Charles MSA

Operations are projected to begin in 2016 as Trains 1 and 2 are completed. Trains 3 and 4 are scheduled to be completed in 2017, with Trains 5 and 6 coming on line in 2019. As these trains are brought into service, operational spending will rise commensurately. We first estimate what the sales, earnings and jobs impacts will be on the Lake Charles MSA.

MSA Business Sales Impacts. Table 7 presents the estimates of the economic impacts on the Lake Charles MSA that will result from Cheniere's yearly operations within Louisiana from 2016 through 2021. Our estimates reveal that the Liquefaction Project will contribute enormously

to the **sales** at businesses in the MSA. I/O estimates of the indirect sales (these do not include the direct sales at the LNG facility) generated through the multiplier effects suggests that total **business sales within the Lake Charles MSA will increase by nearly $800 million annually** once the facility is fully operational in 2019.

Table 7
Operations Impacts on the Lake Charles MSA

Year	Sales	Earnings	Jobs	Taxes
2016	$375.9	$125.9	1,385	$3.9
2017	$554.7	$185.6	2,001	$5.8
2018	$566.7	$189.5	2,001	$5.9
2019	$797.9	$266.6	2,758	$8.3
2020	$813.9	$272.1	2,758	$8.4
2021	$830.2	$277.8	2,758	$8.6
Total	**$3,939.2**	**$1,317.6**	**-**	**$40.8**

Source: IMPLAN and author's calculations. Sales, earnings, and taxes are reported in millions$.

Keep in mind this figure does not include Cheniere's sales of liquefied natural gas. **Between 2016, when the facility becomes partially operational, and 2021 firms in the Lake Charles MSA will pick up a cumulative $3.9 billion in business sales as a result of Cheniere's Sabine Pass Liquefaction Project**. Clearly, this represents a fairly significant boost to the local economies.

To get some idea how these additional indirect business sales will be distributed throughout the economy of the Lake Charles MSA, we report in Table 8 the sales distribution by industry for 2019---the first year of operation of all trains. It is important to note that the impact on business sales will continue to be felt in subsequent years as long as the LNG facility continues to operate. The manufacturing sector will be the biggest winner, picking up just over $428.9 million in additional sales every year. Other significantly large sales impacts will be experienced by firms within the mining sector ($93.9 million). Note that over $25 million a year in sales at firms in the MSA are supported in (1) real estate/rentals ($29.5 million), (2) wholesale trade ($26.6 million),

(3) healthcare ($26.6 million) and (4) construction ($26.4 million). Clearly there are major winners in the community from the appearance of this new firm in the region.

Table 8
Operations Impacts on the Lake Charles MSA by Industry in 2019

Category	Sales	Earnings	Jobs
Ag, Forestry, Fish & Hunting	$0.2	$0.1	2
Mining	$93.9	$8.0	98
Utilities	$21.1	$3.1	19
Construction	$26.4	$12.2	169
Manufacturing	$428.9	$158.1	691
Wholesale Trade	$26.6	$10.0	127
Retail Trade	$18.3	$8.5	249
Transportation & Warehousing	$21.4	$8.9	89
Information	$13.2	$1.8	41
Finance & Insurance	$15.0	$3.4	62
Real Estate & Rental	$29.5	$1.6	56
Professional- Scientific & Tech	$22.3	$11.6	152
Management Of Companies	$5.3	$1.3	34
Administrative & Waste Services	$12.5	$6.1	180
Educational Services	$1.3	$0.5	22
Health & Social Services	$26.6	$14.7	229
Arts- Entertainment & Recreation	$2.4	$0.7	32
Accommodation & Food Services	$16.4	$5.9	253
Other Services	$12.6	$7.7	226
Government & Non NAICS	$4.1	$2.3	28
Total	**$797.9**	**$266.6**	**2,758**

Source: IMPLAN and author's calculations. Sales, earnings, and taxes are reported in millions$.

MSA Household Earnings Impacts. The boon to households within the MSA in terms of **additional income** is shown in column three of Table 7. Once the six trains are operational in 2019, the roughly $797.9 million in new business sales will also lead to a significant increase of new earnings for residents within the MSA. Once the facility is fully operational in 2019, the multiplier effects of operational spending should generate an additional **$266.6 million in new household earnings for residents within the MSA**. It may help the reader to put this number into perspective:

- In 2012 (latest data available) total earnings of all workers in the MSA was $5,650 million.[6] An additional $266.6 million in new earnings associated with the Cheniere facility represents almost a 5% boost in MSA earnings.
- $266.6 million is almost equal to all the earnings in the MSA by people who work in the area's accommodations and food services firms ($275.6 million in 2012).[7]

Again, these benefits to households will be recurring—lasting as long as the facility continues to operate. Earnings will tend to grow each year as business sales grow. **Between the first year of operations in 2016 and 2021, the cumulative effect on household earnings will amount to just over $1.3 billion**.

Table 8 reports the distribution of these new household earnings by industry sector for the year 2019. Employees in the manufacturing sector (where the Cheniere facility is located) will be the largest beneficiaries, with their earnings jumping by about $158.1 million. Other significant earnings gains will accrue to employees in the healthcare sector ($14.7 million), the construction sector ($12.2 million), professional/scientific/technical sector ($11.6 million), and wholesale trade ($10 million).

MSA Jobs Impacts. In 2016 Cheniere estimates that it will have a total workforce of about 319. However, once Cheniere's LNG facility is fully operational in 2019, the company anticipates it will directly employ about **640 workers**. The operations of the LNG facility will also lead to the creation of **jobs** in others sectors of the Lake Charles MSA as a result of the multiplier effects. The number of direct and indirect jobs that will be created by the operations of the LNG facility is reported in the fourth column back in Table 7.

[6] www.bea.gov.
[7] Ibid.

In 2016 our estimates suggest that the total number of **new permanent jobs** created by Cheniere's operations will be approximately 1,385. By 2019 permanent jobs created will grow to about **2,758**. Each year additional indirect jobs will be added if the company's sales continue to grow.

How significant is the job number of 2,758? Here are some reference points:

- In March 2014 there were 94,400 non-farm jobs in the Lake Charles MSA.[8] The Cheniere facility would basically boost that number by almost 3%. Since the turn of the century, this MSA has had only one year (2013) when annual employment grew that fast.
- This number is almost equal to the present total employment in Cameron Parish (2,998).[9]
- Since there will be 640 direct jobs at the Cheniere facility, this implies a **job multiplier of 4.3** (2,758/640); that is, for every new job created at the Cheniere facility there are 3.3 jobs created elsewhere in the MSA. Such a large job multiplier is not unexpected from a very capital-intensive, high-wage facility.

MSA Sales Tax Impacts. As was true for construction activity, the operations of the LNG facility will serve as a major source of both direct and indirect **taxes** for the MSA. We do not have information on the amount of direct taxes Cheniere will pay to local jurisdictions in the MSA, but we can estimate the amount of indirect sales taxes that will be generated through the multiplier effects as households spend their new earnings.

These additional sales tax revenues for the Lake Charles MSA are reported in the last column in Table 7. We estimate that between the first year of operations in 2016 and 2021, local government entities within the MSA will collect a cumulative total of **approximately $40.8 million in additional sales taxes** as a result of Cheniere's LNG facility's operations. As mentioned

[8] Louisiana Workforce at a Glance, Louisiana Workforce Commission, April 25, 2014, p. 14.
[9] Ibid. p. 16.

earlier, this is a very conservative estimate because we do not have information on the amount of direct taxes the company will pay.

Impacts of Operational Spending on the State

In the previous section we provided estimates of the impacts Cheniere's operations will have on the Lake Charles MSA. This section provides the same estimated impacts for the **state's economy**.

State Business Sales Impacts. Table 9 presents the estimates of the economic impacts on the state's economy that will result from Cheniere's annual operations at the Sabine Pass facility between 2016 through 2021. Our estimates reveal that the LNG facility will contribute in a significant way to business sales within the state. I/O estimates of the indirect sales generated through the multiplier effects suggests that total business **sales within the state will increase by almost $2.9 billion annually** once the facility is fully operational in 2019. Recall, this figure does not include Cheniere's sales of liquefied natural gas. Between 2016, when the facility becomes partially operational, and 2021 businesses within the state will pick up an additional **$14.2 billion in sales** as a result of Cheniere's LNG facility. Obviously, this represents a sizable boost to the state's economy.

State Household Earnings Impacts. As was true for the MSA, once all six trains are operational in 2019, the roughly $2.9 billion in new business sales in Louisiana will also lead to a significant increase of new earnings for residents within the state. The additional household earnings estimates are shown in column three of Table 9. Once the facility is fully operational in 2019, the multiplier effects of operational spending should generate an additional **$616.6 million in new household earnings for residents within the state**.

Table 9
Operations Impacts on Louisiana

Year	Sales	Earnings	Jobs	Taxes
2016	$1,333.9	$291.2	3,760	$20.39
2017	$1,980.9	$429.4	5,431	$30.1
2018	$2,036.6	$438.3	5,431	$30.7
2019	$2,886.1	$616.6	7,485	$43.2
2020	$2,967.8	$629.4	7,485	$44.1
2021	$3,029.5	$642.5	7,485	$45.0
Total	**$14,234.8**	**$3,047.5**	**-**	**$213.3**

Source: IMPLAN and author's calculations. Sales, earnings, and taxes are reported in millions of dollars.

As a reference point, in 2012 (latest data available) total earnings of all people working in the state's paper manufacturing firms was $632.5 million.[10] To put it another way, adding the Cheniere facility is like doubling the size of the state's paper manufacturing sector.

Again, these benefits to households will be recurring—lasting as long as the facility continues to operate. Earnings will tend to grow each year as business sales grow. Between the first year of operations in 2016 and 2021, the cumulative effect on household earnings will amount to roughly **$3.0 billion**.

State Jobs Impacts. Recall, in 2016 Cheniere estimates that it will have a total workforce of about 319 and once Cheniere's LNG facility is fully operational in 2019, the company anticipates it will employ about 640 workers. As was the case for the MSA, the operations of the LNG facility will also lead to the creation of jobs in others sectors of the state's economy as a result of the multiplier effects.

The number of direct and indirect jobs that will be created by the operations of the LNG facility is reported in the fourth column of Table 9. In 2016 our estimates suggest that the total

[10] Ibid.

number of new permanent jobs created by Cheniere's operations will be approximately 3,760. **In 2019 permanent jobs created will grow to 7,485.** Each year additional indirect jobs will be added if the company's sales continue to grow. Is this number significant? Here are some reference points:

- In March 2014, there were 18 parishes in Louisiana that had fewer than 7,485 people employed.[11] Total employment in the entire parish of East Feliciana was 7,309.
- There were 7,200 people employed in Louisiana's entire paper manufacturing sector.[12]
- This implies the **statewide job multiplier for this facility is 11.7** (7,485/640); that is, for every new job created at Cheniere, there are 10.7 jobs created elsewhere in the state. While this may seem unusually high, it is not out-of-line with independent estimates we have made for the refinery industry as a whole in the state.[13]

State Revenue Impacts. Our analysis above estimated the impact of operational spending on new business sales, household earnings and jobs. As discussed in Section III, there are at least two other important contributions that this project will make to the state. First, Cheniere will directly pay taxes to the state government annually. No data were provided to us on these direct tax payments.

A second major revenue source for the state will result from the indirect sales tax revenues generated through the multiplier effects as households spend their new earnings. Officials in the State Legislative Fiscal Office indicate that for every dollar of new earnings generated in the state, the state treasury collects about 7 cents in sales taxes, income taxes, and other fees.

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[11] Ibid., p. 16.
[12] Ibid., p 9.
[13] In our study of the energy industry in the state, we estimated the job multiplier for all refineries at 9.0. "The Energy Sector: Still a Giant Economic Engine for the Louisiana Economy---An Update", Loren C. Scott & Associates, Inc., for Mid Continent Oil and Gas Association, April 2014.

Estimates of the indirect tax revenues the state will collect as a result of the operations of the LNG facility are reported in the last column of Table 9. The additional tax revenues the state will collect during the first year of operations are estimated to be $20.4 million. **By the time the facility will be fully operational in 2019, the facilities operations will be generating at least $43 million annually for the state treasury**. As a reference point, at the present time the state is collecting about $57 million a year from all of its taxes on liquor, beer and other alcoholic beverage taxes.[14] Between 2016 and 2021, the state will see tax revenues rise by about $213.3 million.

Impacts of Operational Spending on the U.S. Economy

In this section we present the estimated impacts on business sales, household earnings and permanent jobs that operations of the LNG facility will have on the **U.S. economy**. As discussed above, these represent recurring benefits that will persist as long as Cheniere's LNG operations continue at the Sabine Pass terminal.

U.S. Business Sales Impacts. Table 10 presents the estimates of the economic impacts on the nation's economy that will result from Cheniere's annualy operations between 2016 and 2021. Our estimates reveal that the LNG facility will contribute in a significant way to business sales throughout the nation. Our I/O estimates of the indirect sales generated through the multiplier effects suggests that total business sales across the nation's economy will increase by over **$3.6 billion annually** once the facility is fully operational in 2019. Recall, this figure does not include Cheniere's sales of natural gas. Between 2016, when the facility becomes partially operational, and 2021 the nation will pick up an additional $19.8 billion in business sales as a result of Cheniere's LNG facility. Note that this figure is considerably larger than the state impacts because

[14] www.ldr.state.la.us

(1) the "economic pond" is much larger and (2) the Cheniere operations in Houston have been added.

U.S. Household Earnings Impacts. As was true for both the MSA and the state, once all six trains are operational in 2019, the roughly $3.6 billion in new business sales will also lead to a significant increase of new earnings for residents across the U.S. The additional household earnings estimates are shown in column three of Table 10. Once the facility is fully operational in 2019, the multiplier effects of operational spending should generate an additional **$1.1 billion in new household earnings** for residents within the U.S. Again, these benefits to households will be recurring---lasting as long as the facility continues to operate. Earnings will tend to grow each year as business sales grow. **Between the first year of operations in 2016 and 2021, the cumulative effect on household earnings in the U.S. will amount to nearly $6 billion**.

Table 10
Operations Impacts on the United States

Year	Sales	Earnings	Jobs
2016	$2,455.4	$745.6	9,456
2017	$2,976.3	$899.6	11,177
2018	$3,080.0	$926.6	11,278
2019	$3,655.3	$1,094.4	13,050
2020	$3,783.5	$1,127.2	13,050
2021	$3,897.0	$1,161.0	13,050
Total	**$19,847.7**	**$5,954.4**	**-**

Source: IMPLAN and author's calculations. Sales and earnings are reported in millions$.

US Jobs Impacts. As mentioned above, in 2016 Cheniere estimates that it will have a total workforce of about 319 and once Cheniere's LNG facility is fully operational in 2019, the company anticipates it will employ about 640 workers. There will be another 275 people working for this facility out of the Houston office for a total of **915 working for the facility in the U.S.**

As was true for both the MSA and the state, operations of the LNG facility will also lead to the creation of jobs in others sectors of the nation's economy due to the multiplier effects. The number of direct and indirect jobs that will be created by the operations of the LNG facility is reported in the fourth column of Table 10. In 2016 our estimates suggest that the total number of new permanent jobs created by Cheniere's operations will be approximately 9,456. By 2019 permanent jobs created will grow to about **13,050**. Each year additional indirect jobs will be added if the company's sales continue to grow.

V. Summary & Conclusions

The State of Louisiana is in the midst of the largest capital expansion project in its history. Cheniere Energy is spending approximately $20 billion over the 8-year period from 2012-19 to construct the Sabine Pass Liquefaction Project. This project involves constructing six "trains" to convert natural gas into a liquid form called liquefied natural gas (LNG). The purpose of this report is to estimate the impact of both constructing and operating this facility on the economies of (1) the Lake Charles MSA, (2) the State of Louisiana, and (3) the U.S.

Our findings can be summarized as follows:

- The cumulative impact over 2012-2019 of **constructing** the six trains on the **Lake Charles MSA** is:
    - Business sales in the MSA will rise by nearly $7.4 billion;
    - Over $3 billion will be added to earnings of MSA residents;
    - An average of 5,611 jobs a year will be supported by the construction of the trains. In the peak year of construction (2015) 16,049 jobs in the MSA will be traced back

to the construction spending. As a reference point, in the 38 years from 1975-2013 the year of greatest job growth in the MSA was 10,500 in 1990;

- Local governmental entities in the MSA will pick up an additional $93.1 million in sales taxes.

- The cumulative impact over 2012-2019 of **constructing** the six trains on the **Louisiana** economy is:
  - Business sales in the State will rise by over $8.4 billion;
  - Over $3.3 billion will be added to earnings of Louisianans;
  - An average of 6,391 jobs a year in Louisiana will be supported by the construction of the trains. As a reference point, there are 14 parishes in Louisiana that have fewer people employed than 6,391. In the peak year of construction (2015) 18,300 jobs in the State will be traced back to the construction spending;
  - We estimate that over the 8-year construction period the state treasury will pick up an additional $233.7 million in taxes and fees. As a reference point the state collected $238 million in corporate income taxes in FY12.
- The cumulative impact over 2012-2019 of **constructing** the six trains on the **U.S.** economy is:
  - Business sales in the U.S. will rise by over $46.1 billion;
  - Over $16.8 billion will be added to earnings of U.S. citizens;
  - An average of 30,357 jobs a year in the country will be supported by the construction of the trains.

The Cheniere LNG site will involve the construction of six trains, each coming online sequentially. By 2019 all six trains will be operational and the company will be spending

approximately $190 million a year in **Louisiana** and at support operations in **Houston** to operate the facilities. The impact of this on-going operational spending in 2019 when all trains are up and running in 2019 is estimated as follows:

- The impact of operating the six trains in 2019 on the **Lake Charles** economy is estimated to be:
    - Business sales in the MSA will be higher by over three-quarters of a billion dollars---nearly $800 million;
    - Earnings of MSA residents will be up by $266.6 million---about a 5% boost in MSA incomes and an amount almost equal to the earnings of all the people who work in the accommodations and food service sectors in the MSA;
    - In 2019, 2,758 new jobs will have been added to the MSA---representing a 3% jump in employment in the MSA or an amount equal to the present employment level in Cameron Parish. The implied job multiplier for the Cheniere facility is 4.3, i.e., for every new job created at the plant, 3.3 new jobs are created elsewhere in the MSA via the multiplier effect;
    - Local governmental entities in the MSA will experience an additional $8.3 million in sales taxes in their budgets in 2019.
- The impact of operating the six trains in 2019 on the **Louisiana** economy is estimated to be:
    - Business sales in the State will be up by nearly $2.9 billion;
    - Nearly two-thirds of a billion dollars---$616.6 million will be added to earnings of Louisianans. This is a figure almost equivalent to total earnings of all workers in the State's paper manufacturing sector;

- By 2019, 7,485 new jobs will have been added in the State. There are presently 18 parishes in Louisiana that have fewer people employed than that number. It is a figure about equivalent to the entire workforce of East Feliciana Parish. The implied state job multiplier for the Cheniere facility is 11.7, i.e., for every new job created at the plant, 10.7 new jobs are created elsewhere in the State via the multiplier effect.
- We estimate that by 2019 the State treasury will be collecting $43.2 million more dollars due to the operations of this facility---a number close to what the State now collects from all its liquor and alcohol taxes ($57 million).

- The impact of operating the six trains in 2019 on the **U.S.** economy is estimated to be:
  - Business sales in the U.S. will be up by over $3.6 billion;
  - Household earnings of U.S. citizens will be nearly $1.1 billion higher;
  - 13,050 new jobs will have been added in the country.