



Industrial Energy Consumers of America

The Voice of the Industrial Energy Consumers

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May 10, 2017

Patrick Kirwan
Director, Trade Promotion Coordinating Committee Secretariat
Office of the United States Trade Representative
International Trade Administration
U.S. Department of Commerce

Re: Docket Number: DOC 2017-0003; Comments Regarding Causes of Significant Trade Deficits for 2016

I. INDUSTRIAL ENERGY CONSUMERS OF AMERICA

IECA is a association of large natural gas and electricity consuming manufacturing companies with over \$1.0 trillion in annual sales and with more than 1.6 million employees worldwide. Company members are from a diverse set of industries that includes chemicals, plastics, steel, iron ore, aluminum, paper, food processing, fertilizer, glass, industrial gases, pharmaceutical, building products, automotive, brewing, independent oil refining, and cement.

II. COMMENTS

The Obama Administration U.S. Department of Energy (DOE) has already given approval to export LNG amounts equal to 96 percent of U.S. demand. Excessive LNG exports are a major threat to manufacturing products exports, global competitiveness, and jobs.

The stunningly significant amount of natural gas exports raises enormous concerns of future price risk upon trillions of dollars of existing and future U.S. manufacturing facilities and the ability to compete globally. Excessive LNG exports directly and negatively impact manufacturing.

This is a very significant and timely policy issue due to the unique, long-term legal nature of the DOE approval process of LNG export applications, which can be for periods of up to 30 years. DOE decisions made today, which commit LNG exports for up to 30 years, could give the U.S. only up to a 53-year supply, according to the Energy Information Administration (EIA).

The DOE has given final approval for LNG shipments to non-free trade (NFTA) countries equal to 19.2 Bcf/day and to free trade (FTA) countries equal to 52.9 Bcf/day, totaling 72.1 Bcf/day. According to EIA, this amount is equal to 96 percent of 2016 U.S. natural gas demand. And, the Trump Administration DOE has announced that it intends to approve more export applications to NFTA countries.

Excessive LNG exports are inconsistent with President Trump’s agenda to increase U.S. manufacturing jobs.

It is an urgent matter that the Trump Administration develop an LNG export policy that is consistent with long-term economic growth and jobs in the manufacturing sector.

Accelerating LNG exports is inconsistent with President Trump’s “America First” pledge and the desire to build a sustainable manufacturing sector with growing middle class jobs. Instead of a focus on LNG exports, we believe that U.S. natural gas policy should focus on how to use natural gas to maximize job growth.

Figure 9 in the Appendix makes the point that you cannot significantly increase jobs by exporting LNG. If you double the amount of employment in the oil and gas sector – it only creates 180,000 jobs! Doubling manufacturing employment increases to over 12 million jobs. The continued growth of LNG exports does not maximize American jobs or economic growth and it threatens economic welfare and the ability to compete globally. This is what happened from 2001 to 2008 when natural gas prices increased and manufacturing jobs decreased.

A study by Charles River Associates¹ compared the economic benefit of using natural gas in manufacturing versus exporting it (see Figure 1). The study concludes that using natural gas in manufacturing creates eight times more jobs, twice the direct value added per year and 4.5 times the direct construction employment than exporting the natural gas.

We urge the DOE to halt further approvals until the DOE or Congress defines “public interest” and with that determination reconsider the status of applications to export.

Furthermore, it is also prudent to put in place a safety valve for domestic consumers so that LNG exports do not drive up the price to domestic consumers. This is what has happened to Australia. The Australian government failed to put such safe guards in place.²

Approval of LNG exports to NFTA countries rewards them for not having a free trade agreement and undermines U.S. leverage to negotiate fair trade agreements.

Shipping LNG to countries that do not have a free trade agreement with the U.S. rewards them for not having a free trade agreement. This raises the question of whether the Obama Administration application approvals to NFTA countries should be renegotiated. We support renegotiation of all LNG export applications to NFTA countries.

In 2016, over 56 percent of U.S. LNG exports were sent to 12 NFTA countries. China was the fifth largest customer receiving over 9 percent of all shipments. And, 44 percent was shipped to only 6 countries that had an FTA with the U.S. We point to China because it is a country that sets

¹ Charles River Associates: “US Manufacturing and LNG Exports: Economic Contributions to the US Economy and Impacts on US Natural Gas Prices”, February 25, 2013
http://www.crai.com/sites/default/files/publications/CRA_LNG_Study.pdf

² Australia to Restrict Gas Exports to Address Energy Shortage, April 27, 2017, WSJ,
<https://www.wsj.com/articles/australia-to-restrict-gas-exports-to-address-domestic-energy-shortage-1493276848>

price controls for its consumers and includes a history of not passing through the full cost of LNG imports. The U.S. should never allow LNG shipments to countries that subsidize their manufacturing and power sectors.

DOE LNG export studies concluded that LNG exports increase domestic natural gas prices and lower natural gas prices to our foreign manufacturing competitors, especially in Asia.

The Obama Administration DOE LNG export studies failed to accurately address the loss of manufacturing competitiveness, investment, and jobs. Among other things, DOE failed to combine the negative impact of higher domestic natural gas, natural gas feedstock, and natural gas-fired electricity prices, plus the competitive impact of lower prices to our foreign competitors. The combined impact would have resulted in the Obama Administration rejecting further LNG export application approvals to NAFTA countries.

Already approved LNG exports plus domestic demand to 2050 (33 years) would consume upwards of 80 percent of U.S. technically recoverable natural gas resources.

The DOE has approved LNG exports to NAFTA countries equal to 19.2 Bcf/day. Using the EIA AEO 2017 domestic demand, including pipeline exports to Mexico to 2050 only 33 years away, will consume up to 80 percent of U.S. technically recoverable natural gas (see Figures 5 and 6).

The 100-year supply of natural gas is a myth. Only 53 years of supply.

The U.S. oil and gas industry always points to the fact that the U.S. is the largest producer of natural gas in the world. However, they fail to say that we are also the largest consumer in the world. This fact distinguishes the U.S. as an exporter of LNG as compared to other LNG exporters like Qatar, who have relatively small domestic consumption. Qatar can export as much as they want and it does not negatively impact their domestic economy. The reverse is true for the U.S.

Using the EIA AEO 2017 demand and the technically recoverable U.S. natural gas resources (without Alaska), the U.S. has only 9.5 years of proven resources and only a 53-year supply of resources (see Figure 6). Technically recoverable does not mean that it is economically recoverable. In fact, Table 9.2 in the EIA Assumptions to the Annual Energy Outlook 2016³, the resource for the cited data on page 132 warns that, *“Estimates of TRR (Technical Recoverable Resources) are highly uncertain, particularly in emerging plays where few wells have been drilled.”* This uncertainty regarding how much of the natural gas can be economically recovered is of critical importance.

LNG exports are not a job creator – it is a manufacturing job destroyer when natural gas prices rise.

LNG terminals only require a couple of hundred employees to operate as illustrated in Figure 8. And, according to the U.S. Bureau of Labor Statistics (BLS), total oil and gas industry 2016 employment was only 180,000 versus 12,348,000 for the manufacturing sector (see Figure 9). BLS says that U.S. manufacturing employment grew by 820,000 jobs from 2010 to 2016, while

³ Annual Energy Outlook 2016, [https://www.eia.gov/outlooks/aeo/assumptions/pdf/0554\(2016\).pdf](https://www.eia.gov/outlooks/aeo/assumptions/pdf/0554(2016).pdf)

the oil and gas industry created only 21,300 jobs. The point is that exporting LNG is does not create as many jobs as compared to using natural gas in manufacturing.

The EIA AEO 2017 is predicting Henry Hub prices will increase 51 percent by 2020 and 118 percent by 2025.⁴

Low-cost natural gas is the driver behind 264 chemical industry-related projects that represent over \$161 billion in new investment announced since 2010. According to the American Chemistry Council, the projects are estimated to create 426,000 high paying jobs and \$301 billion in economic output.⁵ This can continue long-term, but not without low-cost globally competitive natural gas.

Every additional increment of LNG export volume compounds the threat of future job losses. *This is a very significant and a timely policy issue due to the unique, long-term legal nature of the DOE approval process of LNG export applications for periods of up to 30 years.* DOE decisions made today, committing LNG exports for 30 years, creates significant risk to domestic manufacturers. And, the Obama Administration's DOE failed to conduct appropriate public interest determinations required under the Natural Gas Act. DOE LNG export approvals to non-free trade countries have been made without having defined public interest, according to a Government Accountability Office (GAO) study.⁶

LNG exports accelerate consumption of our low-cost shale natural gas.

It is also important to consider the higher LNG export demand on the availability of economically recoverable shale natural gas resources. Shale gas resources are usually referred to as the lowest cost resources. Figure 7 is from page B-20 of the DOE report "The Macroeconomic Impact of Increasing U.S. LNG Exports."⁷ DOE used this report to justify the approval of applications to export to countries with which the U.S. does not have a free-trade agreement.

The DOE chart illustrates the shale breakeven cost curves for the U.S., Canada, and Mexico. Using the EIA AEO 2017 net U.S. demand as illustrated in Figure 7 from 2016 to 2050, a cumulative volume of 1,227 Tcf of natural gas, and comparing this volume of natural gas to the breakeven cost to produce gas, and without additional LNG exports above the EIA AEO 2017 prediction, would consume all U.S. shale natural gas supply with a breakeven cost of up to \$20/mcf. Importantly, this exercise assumes the EIA prediction of only 4.4 Tcf per year of LNG net exports. The obvious point is that LNG exports greatly speed up the consumption of our lowest cost natural gas.

⁴ EIA AEO 2017, <https://www.eia.gov/outlooks/aeo/pdf/0383%282017%29.pdf>

⁵ American Chemistry Council, 2016, "Economic Impact of Shale Gas Investments and the Chemical Industry"

⁶ "Federal Approval Process for Liquefied Natural Gas Exports," Government Accountability Office, <http://www.gao.gov/assets/670/666177.pdf>

⁷ "The Macroeconomic Impacts of Increasing U.S. LNG Exports," U.S. Department of Energy, October 29, 2015, http://energy.gov/sites/prod/files/2015/12/f27/20151113_macro_impact_of_lng_exports_0.pdf

The above point was made by Ryan Lance who is the CEO of ConocoPhillips in an April 3 Reuters story⁸ that implies that low-cost natural gas will be depleted by mid 2020s.

By the mid-2020s, the existing brownfield supply expansion options will be exhausted both in the U.S. and other countries. New greenfield projects will be needed. To justify those investments, higher energy prices will be required. As supplies grow tighter, the industry will also need to return to longer term contracts that provide security of supply for end-users and security of demand for suppliers.

Failure to do an adequate public interest determination damages all U.S. consumers long-term.

The first EIA report on LNG exports admits on page 5 that the “Macroeconomic results have not been included in the analysis because energy exports are not explicitly represented in the NEMS macroeconomic model.”⁹ This means that the economic cost impact of LNG exports are not reflected in their estimated impact to energy-intensive industries. The report goes on to state:

For energy-intensive industries, the price of energy is particularly important to utilization decisions for existing plants and siting decisions for new ones. Given its domestic focus, however, NEMS does not account for the impact of energy price changes on global utilization pattern of existing capacity or siting of new capacity inside or outside of the United States in energy-intensive industries. Capturing these linkages requires an international model of the particular industry in question, paired with a global macroeconomic model.

The second report, produced by NERA, said that there was net economic benefit, but that net economic gain was only \$20 billion by 2020 at its peak, and would decline every year. Given that the U.S. is a \$19 trillion economy, a \$20 billion gain is less than one hour of GDP work and is within error of the model’s capability. The report also said that the gains were concentrated in the oil and gas industry and losses would affect everyone else. The report concludes that the “expansion of LNG exports has two major effects on income: it raises energy costs and, in the process, depresses both real wages and the return on capital in all other industries.”¹⁰ In our opinion, depressing real wages on the total U.S. population and a reduction of return on capital on all U.S. industries would conclude that increasing LNG exports cannot possibly be in the public interest. Finally, the study used outdated information on energy-intensive industries, the largest consumers of natural gas, our contribution to GDP, and how many people we employ. Because of this, the study underreported the negative impacts to the economy and jobs.

The third report dated October 2015¹¹ also included serious flaws. The report said that LNG exports increase domestic prices and decreases prices to foreign countries, especially in Asia. The report failed to combine the relative loss of manufacturing competitiveness from higher domestic natural gas prices and the lowering of natural gas prices to our competitors in Asia.

⁸ U.S. LNG exports will slow as domestic gas demand grows, April 3, 2017, Reuters <http://www.reuters.com/article/japan-gastech-conocophillips-idUSL3N1HC0PE>

⁹ EIA: Effect of Increased Levels of Liquefied Natural Gas Exports on U.S. Energy Markets

¹⁰ NERA: Macroeconomic Impacts of Increased LNG Exports from the United States

¹¹ Oxford Economics, Rice University: The Macroeconomic Impact of Increased U.S. LNG Exports

This means that the report underreported the negative economic impact of increased LNG exports.

III. IECA REQUEST TO THE TRUMP ADMINISTRATION

Given the importance of this issue to President Trump's "America First" agenda, and to increase U.S. manufacturing jobs, we list several important requests below.

- a. Establish a moratorium on further LNG export approvals until the definition of "public interest" is fully explored, vetted, and agreed upon.

The definition of "public interest" is at the core of this entire discussion. Yet, we cannot find where the DOE has articulated any such definition. More concerning is that the Government Accountability Office (GAO) reached the same conclusion in the September 2014 report.¹² The GAO finds that neither the Natural Gas Act, nor the DOE, has defined "public interest" (page 10). Given the centrality of this term to the public policy decision of approving or not approving LNG export applications, this is a glaring omission, if not a legal issue. If the DOE has not defined "public interest," how is it that they can make informed decisions on behalf of the over 72 million¹³ consumers of natural gas and 145 million¹⁴ consumers of electricity? Without a definition of the "public interest," how does the DOE determine when the export volume from the next LNG export application, and the resulting increase in natural gas and electricity prices, or a slowdown in manufacturing job creation and investment, justifies a "disapproval" of the LNG export application? Without a definition of public interest, how much public hardship has to be inflicted before the DOE denies the next application?

We urge you to establish a rulemaking process that is transparent and provides opportunities for public input on the definition of "public interest." With a definition of public interest, then complete peer reviewed economic studies to determine whether or not further LNG exports, whether already approved or not, are consistent with the public interest.

- b. DOE should implement its authority to establish a process of ongoing monitoring and adjustment to LNG export volumes. Establish a safety valve for U.S. consumers and condition all applications.

The NGA specifically anticipates that adjustments to LNG exports would also be in the public interest when it states that the DOE "may from time to time, after opportunity for hearing, and for good cause shown, make such supplemental order in the premises as it may find necessary or appropriate."¹⁵ Contrary to the NGA, the Obama Administration's DOE did not plan to make any such adjustments. Rather, the DOE has stated that once it issues an order regarding LNG exports, it will not alter them. In fact, by stating that it would make such an adjustment only

¹² "Federal Approval Process for Liquefied Natural Gas Exports," Government Accountability Office, <http://www.gao.gov/assets/670/666177.pdf>

¹³ http://www.eia.gov/dnav/ng/ng_cons_num_dcunus_a.htm

¹⁴ http://www.eia.gov/electricity/sales_revenue_price/pdf/table1.pdf

¹⁵ 15 U.S. Code § 717b - Exportation or importation of natural gas (a) mandatory authorization order.

under “*extraordinary circumstances*”¹⁶ DOE creates an obstacle to the exercise of its authority that is not in the law. Consequently, these DOE orders on LNG export will be fixed for decades.

- c. Establish a national LNG export policy that is consistent with the Trump Administration’s fair-trade policy.

We request the Administration to establish a national LNG export policy that is consistent with the objective of negotiating bilateral trade agreements that result in “fair trade” agreements. Shipping LNG to countries that do not have free trade agreements with the U.S. is inconsistent with fair trade and reduces the Administration’s negotiating leverage and rewards these countries. As stated earlier, 56 percent of all U.S. LNG shipped in 2016 went to countries with which the U.S. does not have a free trade agreement (see Figure 10).

Many of these non-free trade agreement countries impose tariffs on imported U.S. manufactured goods and/or subsidize their manufacturers for unfair advantage. The DOE LNG studies confirm that shipments of U.S. LNG reduce the costs of natural gas, especially to Asian countries and to their manufacturing sectors. Countries should not be rewarded with U.S. LNG before providing fair trade for our manufactured products.

- d. Recognize that LNG public policy needs special treatment due to its unique circumstances.

Long term, excessive LNG exports pose a special risk to the U.S. economy and manufacturing.

- According to the most recent DOE LNG export study, high levels of exports could increase domestic natural gas prices to international natural gas price levels. If this occurs, domestic prices will be subject to the will of international demand by other countries. If domestic prices rise to global levels, the U.S. will have given up what only a few years ago was considered a sustainable competitive advantage for the manufacturing sector.
- Most buyers of LNG are sovereign entities of countries. LNG buyers are “not price sensitive” like U.S. homeowners and manufacturing consumers, they are “countries.” They are state-owned enterprises and fully regulated electric/gas utilities whereby all costs are either paid for directly by the government or automatically passed through to the consumer. And, some countries do not pass the full cost onto their consumers. Because of this, they can be indifferent or insensitive to price, and can and will pay whatever price is needed to supply LNG to keep their country operating. In future times of a tighter market supply, LNG buyers will “buy away” natural gas from U.S. consumers.

On March 23, the three top buyers of LNG, representing 55 percent of LNG purchases globally created a memorandum of understanding (MOU) to exchange information and cooperate in the joint procurement of LNG.¹⁷ They include China National Offshore Oil

¹⁶ DOE Letter to Senator Lisa Murkowski, October 17, 2013.

¹⁷ World's top LNG buyers form alliance to push for flexible contracts: <http://uk.reuters.com/article/asia-lng-markets-idUKL3N1H02FJ>

Corporation, South Korea's KOGAS, and Japan's Jera. This agreement would be illegal in the U.S. Each of these buyers are backed by their government and have automatic cost pass-throughs.

- Almost all major LNG consuming countries are located in the Northern Hemisphere, which means they have winter when we do. This means that peak LNG demand will occur during our winter heating season, spiking prices for U.S. consumers.
- U.S. industry and other consumers do not have an alternative to natural gas and is not renewable. For example, natural gas is a primary raw material for a chemical or fertilizer company and there is no alternative. As such, natural gas must be considered as a preferential resource that requires special consideration as compared to LNG exports.

There is substantial justification for concern. Today's decisions regarding the approval or disapproval of LNG applications have long-term 30-year implications to the competitiveness of the manufacturing sector.

The key question is – will the Trump Administration's LNG export policy default to the failed policy used by the Obama Administration or will the Administration live up to its "America First" policy?

With kind regards,

Paul N. Cicio
President

APPENDIX

Figure 1 – CRA Study: Natural Gas in Manufacturing Creates 8 Times More Jobs than LNG Exports

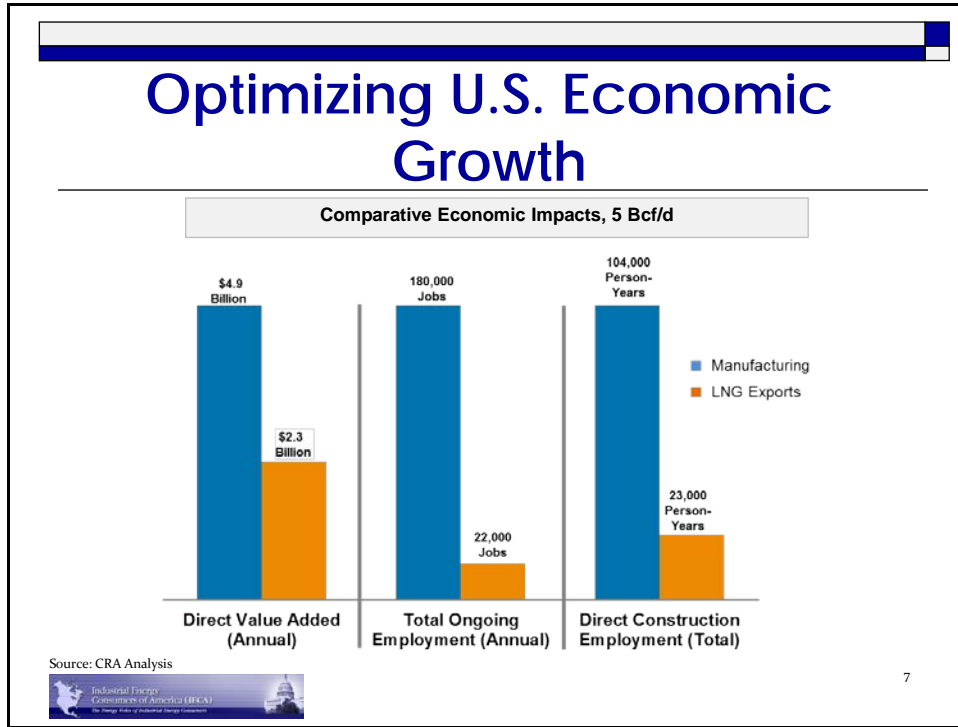


Figure 2 – DOE: FTA

| | Approved |
|---------|----------|
| Bcf/day | 52.9 |
| Tcf | 19.3 |

Source: U.S. Department of Energy (DOE)

Figure 3 – DOE: Non-FTA

| | Approved | Conditionally Approved | Total Volumes |
|---------|----------|------------------------|---------------|
| Bcf/day | 16.2 | 0.8 | 17.0 |
| Tcf | 5.9 | 0.3 | 6.2 |

Source: U.S. Department of Energy (DOE)

Figure 4 – FERC: Non-FTA

| | Approved | Proposed | Under Construction |
|---------|----------|----------|--------------------|
| Bcf/day | 17.1 | 22.5 | 10.4 |
| Tcf | 6.2 | 8.2 | 3.8 |

Source: U.S. Department of Energy (DOE)

Figure 5 – U.S. Natural Gas: EIA AEO 2017 Base Case (Trillion Cubic Feet)

| Year | Dry Production* | U.S. Consumption | Net LNG Exports | Net Exports to Mexico | Net Exports to Canada | Total Consumption |
|------|-----------------|------------------|-----------------|-----------------------|-----------------------|-------------------|
| 2016 | 26.5 | 27.5 | 0.09 | 1.4 | -2.1 | 26.9 |
| 2017 | 27.9 | 27.9 | 0.5 | 1.2 | -1.9 | 27.7 |
| 2018 | 29.1 | 28.1 | 1.0 | 1.6 | -1.8 | 28.9 |
| 2019 | 30.1 | 27.9 | 1.8 | 1.7 | -1.5 | 29.9 |
| 2020 | 30.8 | 27.3 | 2.9 | 1.8 | -1.3 | 30.7 |
| 2021 | 31.0 | 27.2 | 3.0 | 1.8 | -1.2 | 30.8 |
| 2022 | 31.3 | 27.2 | 3.1 | 1.7 | -1.0 | 31.0 |
| 2023 | 31.8 | 27.4 | 3.3 | 1.7 | -0.9 | 31.5 |
| 2024 | 32.4 | 27.8 | 3.5 | 1.8 | -0.8 | 32.3 |
| 2025 | 33.1 | 28.3 | 3.6 | 1.8 | -0.8 | 32.9 |
| 2026 | 33.6 | 28.7 | 3.8 | 1.8 | -0.7 | 33.6 |
| 2027 | 34.0 | 28.8 | 3.9 | 1.8 | -0.6 | 33.9 |
| 2028 | 34.3 | 29.0 | 4.0 | 1.8 | -0.6 | 34.2 |
| 2029 | 34.7 | 29.3 | 4.0 | 1.7 | -0.4 | 34.6 |
| 2030 | 34.9 | 29.5 | 4.0 | 1.7 | -0.4 | 34.8 |
| 2031 | 35.0 | 29.4 | 4.1 | 1.7 | -0.4 | 34.8 |
| 2032 | 35.3 | 29.7 | 4.2 | 1.7 | -0.4 | 35.2 |
| 2033 | 35.5 | 29.8 | 4.3 | 1.7 | -0.3 | 35.5 |
| 2034 | 36.0 | 30.2 | 4.3 | 1.6 | -0.3 | 35.8 |
| 2035 | 36.5 | 30.7 | 4.4 | 1.6 | -0.2 | 36.5 |
| 2036 | 36.7 | 30.8 | 4.4 | 1.6 | -0.2 | 36.6 |
| 2037 | 37.1 | 31.2 | 4.4 | 1.6 | -0.2 | 37.0 |
| 2038 | 37.4 | 31.5 | 4.4 | 1.6 | -0.2 | 37.3 |
| 2039 | 37.6 | 31.7 | 4.4 | 1.6 | -0.2 | 37.5 |
| 2040 | 37.7 | 31.9 | 4.4 | 1.5 | -0.2 | 37.6 |
| 2041 | 38.0 | 32.2 | 4.4 | 1.5 | -0.2 | 37.9 |
| 2042 | 38.2 | 32.4 | 4.4 | 1.5 | -0.2 | 38.1 |
| 2043 | 38.3 | 32.6 | 4.4 | 1.5 | -0.2 | 38.3 |
| 2044 | 38.6 | 32.9 | 4.4 | 1.5 | -0.2 | 38.6 |
| 2045 | 38.9 | 33.2 | 4.4 | 1.4 | -0.2 | 38.8 |
| 2046 | 39.1 | 33.5 | 4.4 | 1.4 | -0.2 | 39.1 |
| 2047 | 39.4 | 33.8 | 4.4 | 1.4 | -0.2 | 39.4 |
| 2048 | 39.6 | 34.0 | 4.4 | 1.4 | -0.2 | 39.6 |
| 2049 | 39.8 | 34.2 | 4.4 | 1.4 | -0.2 | 39.8 |
| 2050 | 40.3 | 34.6 | 4.4 | 1.3 | -0.2 | 40.1 |

Source: Energy Information Administration (EIA), AEO 2017

*The process of producing consumer-grade natural gas. Natural gas withdrawn from reservoirs is reduced by volumes used at the production (lease) site and by processing losses. Volumes used at the production site include (1) the volume returned to reservoirs in cycling, repressuring of oil reservoirs, and conservation operations; and (2) gas vented and flared. Processing losses include (1) nonhydrocarbon gases (e.g., water vapor, carbon dioxide, helium, hydrogen sulfide, and nitrogen) removed from the gas

stream; and (2) gas converted to liquid form, such as lease condensate and plant liquids. Volumes of dry gas withdrawn from gas storage reservoirs are not considered part of production. Dry natural gas production equals marketed production less extraction loss.

Figure 6 – EIA: Technically Recoverable U.S. Natural Gas Resources (Trillion Cubic Feet)

| | Proved Reserves | Unproved Reserves | Total Technically Recoverable Resources |
|---------------------|-----------------|-------------------|-----------------------------------------|
| Lower 48 (Onshore) | 322.2 | 1,548.9 | 1,871.1 |
| Lower 48 (Offshore) | 8.7 | 316.2 | 324.9 |
| TOTAL | 330.9 | 1,865.1 | 2,196.0 |

Source: Technically recoverable U.S. dry natural gas resources as of January 1, 2014, Energy Information Administration (EIA) <https://www.eia.gov/outlooks/aeo/assumptions/pdf/oilgas.pdf>

Note: Data does not include Alaska (onshore and offshore).

Figure 7 – DOE Report “The Macroeconomic Impact of Increasing LNG Exports”

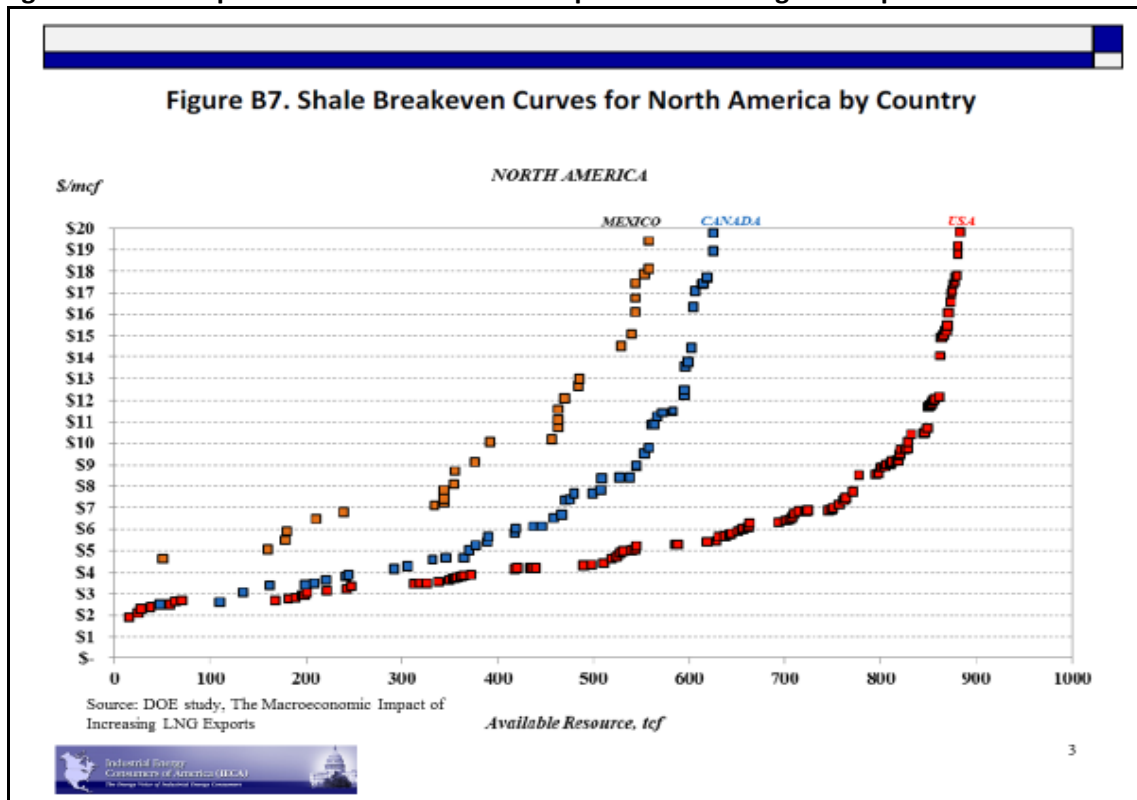


Figure 8 – Stated Future Employment by LNG Export Terminals

| Export Facility | Permanent Jobs |
|----------------------------------------------|----------------|
| Sabine Pass Liquefaction | 580 |
| Freeport LNG Expansion and FLNG Liquefaction | 300 |
| Lake Charles Exports | 250 |
| Dominion Cove Point | 175 |

| Export Facility | Permanent Jobs |
|-----------------------|----------------|
| Jordan Cove Energy | 150 |
| Cameron LNG | 185 |
| Gulf Coast LNG Export | 250 |

Figure 9 – U.S. Employment

| Year | Manufacturing (thousands) | Oil & Gas Extraction (thousands) |
|------------|------------------------------|-------------------------------------|
| 2010 | 11,528 | 158.7 |
| 2011 | 11,726 | 172.0 |
| 2012 | 11,927 | 187.4 |
| 2013 | 12,020 | 193.5 |
| 2014 | 12,185 | 197.7 |
| 2015 | 12,336 | 193.4 |
| 2016 | 12,348 | 180.0 |
| Jobs Added | 820 | 21.3 |

Source: U.S. Bureau of Labor Statistics (BLS)

Figure 10 – EIA U.S. LNG Exports, 2016

| Country (2016) | Volume Shipped (million cubic feet) | % Total | Free Trade Agreement |
|----------------------|----------------------------------------|--------------|-------------------------|
| Chile | 29,405 | 16.0% | Yes |
| Mexico | 27,845 | 15.1% | Yes |
| India | 17,462 | 9.5% | |
| Argentina | 17,273 | 9.4% | |
| China | 17,221 | 9.4% | |
| Japan | 11,137 | 6.1% | |
| Brazil | 10,629 | 5.8% | |
| South Korea | 10,166 | 5.5% | Yes |
| Jordan | 9,870 | 5.4% | Yes |
| Turkey | 8,762 | 4.8% | |
| Kuwait | 7,068 | 3.8% | |
| Egypt | 3,606 | 2.0% | |
| Portugal | 3,700 | 2.0% | |
| Italy | 3,328 | 1.8% | |
| United Arab Emirates | 3,391 | 1.8% | |
| Dominican Republic | 2,945 | 1.6% | Yes |
| Barbados | 100 | 0.1% | |
| Canada | 2 | 0.001% | Yes |
| TOTAL | 183,910 | 100% | 6 |
| Total FTA | 80,233 | 43.6% | |
| Total NAFTA | 103,677 | 56.4% | |

Source: Energy Information Administration (EIA)