

**From:** [Bill Cooper](#)  
**To:** [LNGStudy](#)  
**Subject:** Center for LNG Reply Comments, DOE Study 2012  
**Date:** Monday, February 25, 2013 12:27:11 PM  
**Attachments:** [CLNG DOE reply comments on 2012 LNG export study February 25, 2013.pdf](#)

---

Please find attached and accept for filing the Reply Comments of the Center for Liquefied Natural Gas (CLNG) in response to initial comments filed regarding the DOE commissioned LNG study 2012.

Thank you,

Bill

**Bill Cooper**  
President  
The Center for Liquefied Natural Gas  
1620 Eye Street NW, Suite 700  
Washington, DC 20006  
ph: 202-962-4750  
fax: 202-962-4753

BEFORE THE UNITED STATES DEPARTMENT OF ENERGY

In Re: 2012 LNG Exports Study

REPLY COMMENTS BY THE CENTER FOR LIQUEFIED NATURAL GAS

The Center for Liquefied Natural Gas (CLNG) respectfully files these reply comments in response to the initial comments filed in conjunction with the 2012 LNG Exports Study, commissioned by the U.S. Department of Energy (DOE) and prepared by NERA Economic Consulting. CLNG requests that these reply comments be considered in all pending proceedings before DOE and in subsequent filings in which the various applicants seek authorization from DOE to export liquefied natural gas (LNG) to countries with which the United States has not entered into a free trade agreement providing for the national treatment for the trade in natural gas (non-FTA countries).

Introduction

CLNG is a non-profit trade association whose mission is to promote fact-based discussions on LNG, support public policies that permit LNG exports and imports to be a part of the U.S. energy mix, and to ensure the safe, secure, and environmentally responsible development and operation of LNG facilities in the United States.

Preface

The Federal Register Notice regarding the 2012 LNG Export Study stated: “DOE commissioned the LNG Export Study to inform DOE’s decisions on applications seeking authorization to export LNG from the lower-48 states to non-free trade agreement (FTA) countries.”<sup>1</sup> Further: “DOE invites comments regarding the LNG Export Study that will help to inform DOE in its public interest determinations of the authorizations sought in the 15 pending

---

<sup>1</sup> Federal Register Notice, 2012 LNG Exports Study, Federal Register Vol. 77, No. 238, page 73627

applications. Comments must be limited to the results and conclusions of these independent analyses on the factors evaluated...Reply comments should be directed toward matters specifically addressed in initial comments and should not introduce new issues not previously raised by other commenters.”<sup>2</sup> By inviting comments to the LNG Export Study, and by seeking reply comments to the initial comments, it is clear that DOE seeks input from the various stakeholders as to how much credibility should be given to the study itself. Therefore, the publishing of the study and the soliciting of comments and reply comments are not evidence in the various dockets and do not change the fundamental statutory and regulatory requirements that place the burden of proof on the opponents to the applications to produce evidence that the applications are inconsistent with the public interest. The burden of proof having not been met by any opponents to the applications, DOE should approve the applications and authorize the exports of LNG.

#### Statutory Presumption Unrebutted

It is well recognized that the Natural Gas Act establishes “a rebuttable presumption that a proposed export of natural gas is in the public interest, and DOE must grant such an application unless those who oppose the application overcome that presumption.”<sup>3</sup> Furthermore, it is also well recognized that “in order to overcome the rebuttable presumption favoring export authorizations, opponents of an export license must make an affirmative showing of inconsistency with the public interest.”<sup>4</sup>

To overcome the statutory presumption, it stands to reason that one would seek to introduce evidence in the pending dockets addressing the considerations set forth in the various Federal Register notices in order to prevail. Those considerations, to the extent determined to be relevant, include cumulative impacts on the domestic need, the domestic natural gas supply,

---

<sup>2</sup> *Ibid*, at page 73629.

<sup>3</sup> Order No. 2961, *Sabine Pass Liquefaction, LLC*, FE Docket No. 10-111-LNG, page 28.

<sup>4</sup> *Ibid*, footnote 38, page 28.

energy security, and any other issues such as impacts on the economy, jobs, balance of trade, international considerations, and “whether the arrangement is consistent with DOE’s policy of promoting competition in the marketplace by allowing commercial parties to freely negotiate their own trade arrangements.”<sup>5</sup> To date, no opponent in any proceeding has filed any studies, reports, or analyses to support arguments against the applications, but have merely criticized the NERA study and/or asserted unsubstantiated speculations.

Domestic need/ domestic natural gas supply: The overwhelming weight of evidence introduced by the various applicants shows that the United States has an abundance of natural gas supply, which is more than sufficient to meet the growing domestic demands, including electric power generation, manufacturing and industrial, commercial, and residential, and still support LNG exports.<sup>6</sup> There have been no studies at all introduced to the contrary in any of the proceedings.

Energy security: ICF Resources, LLC, in recent testimony before a Congressional committee, stated: “The assessed remaining recoverable U.S. natural gas resource base of 3,850 trillion cubic feet (Tcf) represents about 155 years of current annual consumption...This assessment should be viewed as conservative in that it assumes current technology and no

---

<sup>5</sup> Federal Register notice, Golden Pass Products, LLC, Federal Register Vol. 77, No. 235, page 72839

<sup>6</sup> *U.S. Natural Gas Resources and Productive Capacity*, Advanced Resources International, Inc., August 26, 2010, Sabine Pass Liquefaction, LLC, FE Docket No. 10-111-LNG; *Market Analysis for Sabine Pass LNG Export Project*, Navigant Consulting, August 23, 2010, Sabine Pass Liquefaction, LLC, FE Docket No. 10-111-LNG; *Analysis of Freeport LNG Export Impact on U.S. Markets*, Altos Management Partners Inc., December 17, 2010, Freeport LNG Expansion, L.P. and FLNG Liquefaction, LLC, FE Docket No. 10-161-LNG; *North American Gas Supply Overview and Outlook to 2040*, Navigant Consulting, Inc., September 19, 2011, Dominion Cove Point LNG, LP, FE Docket No. 11-128-LNG; *Jordan Cove Export Project Market Analysis Study*, Navigant Consulting, January 2012, Jordan Cove Energy Project, L.P., FE Docket No. 12-32-LNG; *Oregon LNG Export Project Market Analysis Study*, Navigant Consulting, April 13, 2012, LNG Development Company, LLC (d/b/a Oregon LNG), FE Docket No. 12-77-LNG; *Southern LNG Export Project Market Analysis Study*, Navigant Consulting, August 27, 2012, Southern LNG Company, LLC, FE Docket No. 12-100-LNG; *Analysis of Economic Impact of LNG Exports from the United States*, Deloitte MarketPoint, Excelerate Liquefaction Solutions I, LLC, FE Docket No. 12-146-LNG; *Economic Impact of LNG Exports from the United States*, Deloitte MarketPoint, Golden Pass Products LLC, FE Docket No. 12-156-LNG; *U.S. Natural Gas Resources and Productive Capacity: Mid-2012*, Advanced Resources International, Inc., August 23, 2012, Cheniere Marketing, LLC, FE Docket No. 12-97-LNG;

major new plays.”<sup>7</sup> In 2011, a study by MIT estimated the remaining U.S. resource base at 2,100 Tcf. “This corresponds to approximately 92 times the annual U.S. consumption of 22.8 Tcf in 2009.”<sup>8</sup> Dr. Daniel Yergin: “Our view is that, owing to the very large resource base, the market in the U.S. is demand-constrained, rather than supply-constrained.”<sup>9</sup> That resource base is accessible by a well-connected natural gas pipeline grid reaching producing regions across the country. From gathering lines (approximately 20,000 miles), to interstate pipelines (approximately 278,000 miles), and to distribution lines (approximately 1.2 million miles),<sup>10</sup> the contiguous United States has the most developed and reliable natural gas infrastructure in the world. Indeed, natural gas can flow from virtually anywhere to everywhere. Such a well-connected system of pipelines delivering natural gas from producing areas across the U.S. is able to adjust to disruptions of supply from any particular area of the country. The vast abundance of natural gas supply and the well-connected system of pipelines is well established. In other words, there has been no evidence introduced in any of the dockets to the contrary. Economy/ jobs/ balance of trade: Studies have been introduced in the various dockets showing the positive impacts the applications will have on the local and state economies and the number of jobs that will be created.<sup>11</sup> Some of these and other studies have shown that LNG exports will have a positive

---

<sup>7</sup> Testimony of Harry Vidas, House of Representatives Committee on Energy and Commerce, Subcommittee on Energy and Power, hearing entitled: “American Energy Security and Innovation: An Assessment of North America’s Energy Resources”, February 5, 2013.

<sup>8</sup> Moniz, Earnest, J., et al, *The Future of Natural Gas, an Interdisciplinary MIT Study*, Massachusetts Institute of Technology, June 6, 2011, page 30.

<sup>9</sup> Dr. Daniel Yergin is the Vice Chairman of IHS and founder of IHS Cambridge Energy Research Associates.

<sup>10</sup> Interstate Natural Gas Association of America, INGAA.org, “Natural Gas Pipelines”

<sup>11</sup> *Economic Impact Study of Construction and Operations*, ICF International, October 3, 2011, Dominion Cove Point LNG, LP, FE Docket No. 11-128-LNG; *An Economic Impact Analysis of the Construction of an LNG Terminal and Natural Gas Pipeline in Oregon*, ECONorhtwest, March 6, 2012, Jordan Cove Energy Project, L.P., FE Docket No. 12-32-LNG; *Up-Stream Economic Contributions of the Jordan Cove Energy Project*, ECONorthwest, February 29, 2012, Jordan Cove Energy Project, L.P., FE Docket No. 12-32-LNG; *Southern LNG Export Project Economic Impact Assessment Study*, Navigant Economics, August 31, 2012, Southern LNG Company, LLC, FE Docket No. 12-100-LNG; *Economic Impacts of the Lavaca Bay LNG Project*, Black & Veatch, October 5, 2012, Excelerate Liquefaction Solutions I, LLC, FE Docket No. 12-146-LNG; *The Socioeconomic Impact of Authorizing Exports of Liquefied Natural Gas (LNG) from the Golden Pass Products Facility in Jefferson County, Texas on Business Activity in Jefferson County, the Primary Impact Area, and the United States*, The Perryman Group, October 2012, Golden Pass Products LLC, FE Docket No. 12-156-LNG; *The Anticipated Impact of Cheniere’s Proposed Corpus Christi Liquefaction Facility on Business Activity in*

impact on the U.S. balance of trade.<sup>12</sup> The Office of the United States Trade Representative asserts: “Trade is critical to America’s prosperity – fueling economic growth, supporting good jobs at home, raising living standards and helping Americans provide for their families with affordable goods and services.”<sup>13</sup> In fact, the NERA study says: “The macroeconomic analysis shows that there are consistent net economic benefits across all the scenarios examined and that the benefits generally become larger as the amount of exports increases.”<sup>14</sup> There has been no evidence introduced in any of the dockets to the contrary.

International considerations: To quote from the comments submitted by the American Council for Capital Formation, “Bigger U.S. presence in the global LNG market will also increase the diversity of supply for major importers, helping our allies with their energy security and energy expenditures. [I]ncreased LNG exports will strengthen the U.S. relations with other countries”<sup>15</sup> In the words of Dr. Daniel Yergin: “For decades, the United States has made the free flow of energy supplies one of the cornerstones of foreign policy. It is a principle we have urged on many other nations. How can the United States, on one hand, say to a close ally like Japan, suffering energy shortages from Fukushima, please reduce your oil imports from Iran, and yet turn around and, on the other, say new natural gas exports to Japan are prohibited?”<sup>16</sup> Adhering to the Natural Gas Act by approving the applications would help ensure that such a question is never asked again.

---

*Corpus Christi, Texas, and the US*, The Perryman Group, May 2012, Cheniere Marketing, LLC, FE Docket No. 12-97-LNG

<sup>12</sup> Brookings Institution, *Liquid Markets: Assessing the Case for U.S. Exports of Liquefied Natural Gas*, May 2, 2012

<sup>13</sup> <http://www.ustr.gov/about-us/benefits-trade>

<sup>14</sup> *Macroeconomic Impacts of LNG Exports from the United States*, NERA Economic Consulting, December 3, 2012, page 76.

<sup>15</sup> *Increased U.S. Exports of Liquefied Natural Gas Will Boost Economic Growth and Improve the U.S. Trade Balance*, by Pinar Cebi Wilber, Ph.D., Senior Economist, American Council for Capital Formation, and Margo Thorning, Ph.D., Senior Vice President and Chief Economist, American Council for Capital Formation

<sup>16</sup> Testimony of Dr. Daniel Yergin, House of Representatives Committee on Energy and Commerce, Subcommittee on Energy and Power, hearing entitled: “American Energy Security and Innovation: An Assessment of North America’s Energy Resources”, February 5, 2013.

“[W]hether the arrangement is consistent with DOE’s policy of promoting competition in the marketplace by allowing commercial parties to freely negotiate their own trade arrangements”:

This is a policy statement made by DOE several years ago.<sup>17</sup> To assert otherwise would hearken the United States back to the ill-conceived command-and-control days of regulating wellhead prices and the Fuel Use Act. The opponents to the applications have not presented any sound reasoning or evidence as to why this policy should be changed. At a recent event hosted by the Center for Strategic and International Studies, former Senate Energy Chairman J. Bennett Johnston, Jr., during the question and answer session, offered “a little caveat about trying to mold that sweet spot [on LNG exports] through government action,” noting that when he was elected to the Congress in 1973, the Federal Power Commission “thought it could regulate natural gas at the right sweet spot...which didn’t quite work out.” Continuing, he said: “Later when we deregulated natural gas, we were told it was going to devastate the consumer, but we found there was a huge outpouring of supply...Later we had the Fuel Use Act, which was designed to protect supply...that didn’t quite work out either, and we had to repeal it...When you try to control supply and price by issuing permission to export – especially when those exports won’t happen for another 3-5 years since it takes that long to build it – it is impossible to predict what supply and demand will be. I would simply urge you [addressing Senators Wyden and Murkowski] to look at the experience we’ve had, which is to realize the huge outpouring of supply that comes from the action of the free market.”<sup>18</sup>

In conclusion, the statutory presumption that the proposed exports of LNG are in the public interest has not been rebutted, nor has there been much more than attempts to make bare allegations against the applications. Therefore, DOE is within its statutory and regulatory rights and obligations to immediately resume processing and approving the pending applications.

---

<sup>17</sup> *Phillips Alaska Natural Gas Corporation and Marathon Oil Company*, DOE/FE Opinion and Order No. 1473 (2 FE ¶ 70,317, April 2, 1999) (Order No. 1473).

<sup>18</sup> Senator J. Bennett Johnston’s comments during the question and answer session, Center for Strategic and International Studies event: “Realizing the Potential of U.S. Unconventional Natural Gas”, February 13, 2013

### Free Trade/ WTO considerations

Restraints on LNG exports run afoul of the U.S.' obligations under WTO and GATT, as well as the long-standing policy of the United States to support exports. As stated in the comments filed with DOE by the Peterson Institute for International Economics:

“If the United States nevertheless does impose restraints [on LNG exports], U.S. actions will certainly be cited in the future by other countries that decide to flout international trade rules and restrict their own exports of natural resources as a means of subsidizing downstream industrial users. What’s more, it is likely that countries that are not FTA partners will either retaliate with their own natural resource restrictions or challenge U.S. policies at the WTO.

It would be hypocritical and contrary to WTO rules for the United States to impose restraints on the export of LNG while permitting unfettered domestic consumption of natural gas.”

As GE stated in its comments filed with the DOE:

“[D]eclining to approve exports of natural gas would be squarely at odds with the United States’ longstanding policy and international trade norms disfavoring export restraints (see GATT Article XI). Indeed the United States has been the vanguard of those challenging such restraints globally. (See US/EU/Mexico Challenge to China’s Export Restraints on Raw Materials – WTO DS 394, 395, 398, successfully challenging China’s export restraints on certain raw materials)...For the United States to now adopt such restrictions itself would fundamentally undermine its own international trade policy, which has served to preserve critical access to raw materials globally.”

Therefore, DOE should expeditiously approve the applications and authorize the exports of LNG.

### Manufacturing Competitiveness and LNG Exports

Some have argued that the U.S. should limit LNG for export because it would be better for the country to use these resources to support new and existing domestic manufacturing industries. But it is a misconception to say that the United States has to choose between domestic natural gas use or LNG exports. It is not an either/or proposition. Numerous studies<sup>19</sup> demonstrate that America’s natural gas supplies are so plentiful that the amount of proposed

---

<sup>19</sup> Brookings Institution, *Liquid Markets: Assessing the Case for U.S. Exports of Liquefied Natural Gas*, May 2, 2012; Deloitte, *Made in America: The Economic Impact of LNG Exports from the United States*, November 2011



exports accounts for only a small fraction of the total resource base. The U.S. can do both: export LNG while maintaining a competitive advantage from lower energy and feedstock costs for domestic manufacturing.

That competitive advantage is because the price of natural gas in the U.S. will be below what competitors will face in Asia, for example, even with U.S. exports. There is a substantial cost to liquefying natural gas and transporting it in specialized tankers to distant markets (ranges from \$8 billion to \$20 billion per project of 2 Bcf/d), and that fact means the U.S. domestic price for natural gas will be several dollars per Mcf lower than the price of natural gas in countries which import our LNG. Rice University professor Ken Medlock notes in his 2012 LNG Export study that these costs will average \$2.92/Mcf for liquefaction and \$2.15/Mcf for transportation to Asia (\$5.07 /Mcf total). Other studies show the cost range to be higher, including the NERA study that has a cost range between \$6.30/Mcf to \$8.39/Mcf. Even in an unlikely situation that there is parity between U.S. LNG prices in Japan with oil-based pricing so that there is no advantage to LNG exports, the netback price, that is the U.S. Henry Hub price is estimated by these studies to be \$5.07 - \$8.39/Mcf lower than what Japanese are paying. Therefore, according to these studies, US manufacturers would still enjoy a \$5 - \$8/Mcf cost advantage over Asian competitors, for example, even if Asian prices and U.S. LNG delivered prices in Japan equalize. That provides a huge competitive advantage to U.S. manufacturers even with LNG exports from the U.S.

The NERA study itself looked at the impacts of higher natural gas prices on manufacturing and energy intensive industries in the United States. NERA found that the industries most exposed to higher natural gas prices included glass manufacturing, metal smelting, paper, and nitrogenous fertilizer. Total energy (not just natural gas) accounted for between 10 and 20% of the total value of these products.<sup>20</sup> The potentially modest increases in natural gas prices predicted by NERA from LNG exports would only modestly increase costs for energy intensive

---

<sup>20</sup> *Macroeconomic Impacts of LNG Exports from the United States*, NERA Economic Consulting, December 3, 2012, page 69, Figure 44.

industries. Assuming a middle range energy intensity of 15% of the value of the end products, a 10% increase in gas price results in only a 1.5% increase in the total cost of manufacturing the product. Michael Levi at Brookings considered steel as an example, “If natural gas exports raised domestic natural gas prices by \$1 per thousand cubic feet, that would raise the cost producing a ton of steel using a new state-of-the-art facility by approximately \$8. That compares to typical steel prices on the order of \$800 per ton.”<sup>21</sup> It would be difficult for opponents of LNG exports to argue that small differences in natural gas and energy costs would prohibit further investment in an energy intensive industry, particularly when newer capital and equipment would likely be more energy efficient than older plants. Also, many of these energy intensive industries compete with facilities in Europe and Asia, the likely target markets for LNG exports. These foreign manufacturing competitors will be purchasing natural gas in their local markets which are currently supplied by gas priced on an oil index. As the NERA study recognized,<sup>22</sup> even with the approval and construction of U.S. LNG exports, U.S. domestic manufacturers should enjoy a continued and substantial energy cost advantage over their Asian and European competitors. As Paul Joskow of MIT has put it: “[L]iquefaction and shipping of LNG is expensive so there will continue to be a significant basis difference in gas prices between the U.S., Asia and Europe.”<sup>23</sup>

Dow Chemical Company, one of the most vocal opponents of LNG exports, is engaged in manufacturing petrochemicals. Dow states that the manufacturing industry has announced some 100 capital investments with spending of over \$90 billion predicated on abundant natural gas supplies. Some estimate of the amount of natural gas required for the proposed investment is required in order to provide context relative to the volumes of LNG exports being considered by the DOE.

---

<sup>21</sup> Levi, Michael, “A Strategy for U.S. Natural Gas Exports”, Discussion Paper 2012-04, June 2012, [www.hamiltonproject.org](http://www.hamiltonproject.org), page 25

<sup>22</sup> *Macroeconomic Impacts of LNG Exports from the United States*, NERA Economic Consulting, December 3, 2012, page 12.

<sup>23</sup> *Natural Gas: From Shortages to Abundance in the U.S.*, presented at the American Economics Association Annual Meeting, Paul Joskow, January 2013, page 14.

However, even without such an estimate as to the amount of natural gas required for the proposed investments, some analysis is useful because a large percentage of the announced 100 projects and \$90 billion in capital investment will come from expansion of the ethylene business in the U.S. Petrochemical expansions are being driven by two factors, the low U.S. NGL (natural gas liquids) feedstock price, and lower energy prices. While LNG exports may or may not increase natural gas prices, producing natural gas for export will increase the supplies of NGLs.

In terms of volumes, ethylene is the largest basic chemical produced in the chemical industry. Ethylene is the building block for a number of chemical intermediates and final products including:

- Polyethylene plastics
- Ethylene oxides and ethylene glycol (polyesters, plastic resins, antifreeze)
- Polyvinylchlorides (PVC plastic)
- Polystyrene and styrenic resins

U.S. ethylene producers have recently announced approximately 10 million metric tons per year of additional capacity at 15 locations primarily in the U.S. Gulf Coast.<sup>24</sup>

<b>Company</b>	<b>Location</b>	<b>Capacity (metric tons/yr)</b>	<b>Gas Demand (mmcf/d)</b>
Chevron Phillips	Baytown, TX	1,500,000	47
Exxon Mobil	Baytown, TX	1,500,000	47
Sasol	Lake Charles, LA	1,400,000	44
Dow	Freeport, TX	1,350,000	43
Shell	Beaver County, PA	1,300,000	41
Formosa	Point Comfort, TX	800,000	25
Occidental/Mexichem	Ingleside, TX	500,000	16

<sup>24</sup> *A Renaissance for US Gas-Intensive Industries?*, Wood Mackenzie, Global Horizons Service, November 2012, page 3

Dow	St. Charles, LA	410,000	13
LyondellBassell	Laporte, TX	390,000	12
Aither Chemicals	Kanawha, WV	250,000	8
Williams/SABIC JV	Geismar, LA	225,000	7
Ineos	Alvin, TX	200,000	6
Westlake	Lake Charles, LA	110,000	3
Westlake	Lake Charles, LA	90,000	3
Williams/SABIC JV	Geismar, LA	88,000	3
<b>TOTALS:</b>		<b>10,113,000</b>	<b>318</b>

These projects when totaled together represent just 318 million cubic feet per day of natural gas required and 450,000 barrels per day of NGL feedstock<sup>25</sup>. This may at first seem to be a substantial amount of natural gas, but in context, the volume is a fraction (0.46%) of the US demand of 69 Bcf/d.<sup>26</sup> Based on EIA data, U.S. natural gas production increased 10 Bcf/d from 2008 to 2012, thus indicating the natural gas industry's demonstrated ability to increase production rapidly. The data is contrasted to the allegations of the critics that the natural gas industry is not able to keep up with the potential growth in natural gas demand by the chemical and manufacturing industries and still export LNG. It is worth repeating: The U.S. can do both: export LNG and maintain a competitive advantage from lower energy and feedstock costs for domestic manufacturing.

Petrochemical manufacturers would also reap an additional benefit from LNG exports. As more natural gas is produced for LNG, additional NGLs are produced as a byproduct of gas development. About one-half of the world's ethylene capacity uses petroleum naphtha as a

---

<sup>25</sup> *Ibid*, page 3.

<sup>26</sup> Testimony of Adam Sieminski, Administrator, EIA, House of Representatives Committee on Energy and Commerce, Subcommittee on Energy and Power, hearing entitled: "American Energy Security and Innovation: An Assessment of North America's Energy Resources", February 5, 2013.

feedstock, therefore the U.S. chemical industry has a competitive advantage against European and Asian companies. According to the March 2011 study by the American Chemistry Council (ACC):

“As a rough rule of thumb, when the ratio of the price of oil to the price of natural gas is more than 7:1, the competitiveness of Gulf Coast-based petrochemicals and derivatives vis-a-vis other major producing regions is enhanced. In the United States, over 85% of ethylene, for example, is derived from natural gas liquids while in Western Europe over 70% is derived from naphtha, gas oil and other light distillate oil-based products.

The price of naphtha, gas oil and other light distillate oil-based products are related to the price of oil, a commodity with prices set by global supply and demand. The price of naphtha (in Western Europe, for example) is highly correlated with the price of oil (Brent)[the reference to the figure is omitted]. As a result, prices for naphtha will parallel the price for oil.

On the other hand, natural gas markets are regional in nature, with the United States and Canada being an integrated regional market. The price of ethane is correlated with US natural gas prices (Henry Hub).<sup>27</sup>

Naphtha is derived from crude oil and is used to make gasoline and petrochemical feedstocks. The biggest factor in determining the price of naphtha is the cost of crude oil. With world crude oil prices hovering at around \$100 per barrel, naphtha has become a very expensive feedstock relative to ethane and propane. On an equivalent heating basis <sup>28</sup>, crude oil at \$100 per barrel sells for \$16/mmbtu while natural gas (and ethane) are priced at around \$4/mmbtu in the US. Increasing supplies of NGLs is the key to giving U.S. petrochemical producers a continued competitive advantage. One way to increase supplies of NGLs is to increase U.S. natural gas production to support LNG exports.

The American Chemistry Council:

“With the development of low cost shale gas resources in the United States, the oil-to-gas ratio has improved from a non-competitive ratio of 5.5:1 in 2003, 6.3:1 in 2005, and 15.9:1 in 2009 to 17.9:1 in 2010. The current ratio is very favorable for US competitiveness and exports of petrochemicals, plastics and derivatives. Abundant availability and economic viability of shale gas at prices suggests a

---

<sup>27</sup> *Shale Gas and New Petrochemicals Investment: Benefits for the Economy Jobs and US Manufacturing*, American Chemistry Council, March 2011, page 12.

<sup>28</sup> There are about 6.2 mmbtu per barrel of crude oil

continued crude oil-natural gas price disconnect. Moreover, forecasters at the EIA and other energy consultants expect high oil-to-gas ratios to continue.”<sup>29</sup>

The Energy Information Administration (EIA) and the NERA projections indicate that the oil-to-gas ratios will stay far above the 7:1 ratio even with LNG exports. For example, using the EIA AEO2013 Early Release for 2030 that includes 4.4 Bcfd of LNG exports, the oil-to-gas ratio is over 24:1. The U.S. chemical industry would still have a large price advantage over foreign chemical companies that rely on naphtha as a feedstock. In fact, the advantage would be even higher than ACC highlighted in 2010 when the ratio was 17.9:1. As stated in the AEO 2013 Early Release: “Specific industries benefit from the greater availability of natural gas at relatively low prices. For example, industrial production grows by 1.7 percent per year from 2011 to 2025 in the bulk chemicals industries – which also benefit from increased production of natural gas liquids [emphasis added] – and by 2.8 percent per year in the primary metals industries...”<sup>30</sup>

In the US, ethane has two main uses, BTU control in natural gas, and as a feedstock for petrochemicals. Ethane is very costly to transport by ship, and few facilities exist for exporting ethane, so the vast majority of the ethane produced in the U.S. is used domestically. Each 1 billion cubic feet of wet natural gas produced in the U.S. per day for LNG exports would generate approximately 62,500 barrels per day of ethane.<sup>31</sup> Producing more natural gas for export as LNG will substantially add to the growing volume of ethane feedstock in the U.S., preserving the competitive advantage for petrochemicals. This situation is likely to remain for the foreseeable future. There are significant costs of \$6-8/MMBtu associated with liquefaction and

---

<sup>29</sup> *Shale Gas and New Petrochemicals Investment: Benefits for the Economy Jobs and US Manufacturing*, American Chemistry Council, March 2011, page 15.

<sup>30</sup> *Annual Energy Outlook 2013 – Early Release*, U.S. Energy Information Administration, Dec. 2012, page 2

<sup>31</sup> Assuming 7.5 gallons of NGL per 1,000 cubic feet of wet gas, and 35% ethane content in the NGL

transportation.”<sup>32</sup> According to ICIS Heren LNG Analyst Simon Ellis: “[these costs] will lock in the competitive advantage enjoyed by the US because of this large fixed cost element.”<sup>33</sup>

The arguments that exports would negatively impact manufacturing, particularly in the petrochemical sector are without merit. To the contrary, the announced petrochemical plants in the U.S. cumulatively would not be a large consumer of natural gas relative to the US natural gas market, and these petrochemical plants will benefit from additional supplies of ethane resulting from LNG exports. Therefore, LNG exports provide a net benefit to U.S. manufacturers, and are consistent with the public interest.

#### General Critique of Comments Filed by Opponents

The various opponents to LNG exports have filed comments during the initial period, but instead of basing those comments on factual studies that can be relied upon as evidence, they use conjecture and speculation, which cannot replace evidence. For instance, they are very critical of the NERA modeling and make several assertions about economic outcomes, but do not provide any documentation to support their claims, nor do they even claim to have done independent modeling. Dow Chemical Company said: “OFE could readily obtain the necessary input for appropriate economic modeling through public comments on the general topic of macroeconomic considerations.”<sup>34</sup> While it may be true that the Office of Fossil Energy could obtain input from the public on macroeconomic considerations, Dow Chemical did not provide what it seems to say DOE needs, even though it had the opportunity to do so. The burden of proof in these proceedings is not with the regulator to prove or disprove whether an application is in the public interest. The burden of proof is on those that oppose the applications.

Dow Chemical said: “The importance and complexity of the issue requires a process that will allow for the reasoned consideration of myriad viewpoints on the question of whether

---

<sup>32</sup> “Think Again on US LNG”, ICIS Publishing, <http://www.ics.com/Articles/2013/02/18/9641275/think-again-on-us-lng.html>

<sup>33</sup> Ibid

<sup>34</sup> Comments filed by Dow Chemical Company, January 24, 2013, re: 2012 LNG Export Study, page 3.

additional exports of natural gas are in the public interest.”<sup>35</sup> We have such a system. Dow Chemical simply chose not to participate.

### Conclusion

CLNG respectfully asserts that the DOE should promptly grant authorizations to all pending applicants to export LNG to non-FTA countries without limitation based upon the following:

1. The Natural Gas Act creates a rebuttal presumption that applications are consistent with the public interest, and no opponent has offered evidence to the contrary;
2. Granting the authorizations is consistent with DOE’s established policies and previous decisions; and
3. The criticisms of the opponents regarding the NERA study go to the credibility of the study and do not constitute evidence. Thus, the statutory presumption still prevails, making the applications not inconsistent with the public interest.

Respectfully submitted,



Bill Cooper  
President  
Center for Liquefied Natural Gas  
1620 Eye Street, NW, Suite 700  
Washington, D.C. 20006  
(202) 962-4750  
[Bill.Cooper@lngfacts.org](mailto:Bill.Cooper@lngfacts.org)  
[www.lngfacts.org](http://www.lngfacts.org)

---

<sup>35</sup> *Ibid*, page 42.