From:	Erik Milito
To:	LNGStudy
Subject:	2012 LNG Export Study - Comments of the American Petroleum Institute Attached
Date:	Thursday, January 24, 2013 3:03:14 PM
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The attached comments are submitted by the American Petroleum Institute (API) in support of the expeditious approval of pending LNG export applications by the U.S. Department of Energy. API fully agrees with the conclusion of the DOE "2012 LNG Export Study" that, across all scenarios, the U.S. stands to gain net economic benefits from allowing LNG exports.

Best regards,

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January 24, 2013

U.S. Department of Energy (FE-34)
Office of Natural Gas Regulatory Activities
Office of Fossil Energy
P.O. Box 44375
Washington, DC 20026-4375

SUBJECT: **2012 LNG Export Study – Comments of the American Petroleum Institute**

These comments are submitted by the American Petroleum Institute (API) in support of the expeditious approval of pending LNG export applications by the U.S. Department of Energy. API fully agrees with the conclusion of the DOE "2012 LNG Export Study" that, across all scenarios, the U.S. stands to gain net economic benefits from allowing LNG exports. API offers the following comments in response to the DOE's Office of Fossil Energy request for comments on the 2012 LNG Export Study, which consists of two parts: (1) an analysis performed by the Energy Information Administration (EIA) and originally published in January 2012, entitled Effect of Increased Natural Gas Exports on Domestic Energy Markets (EIA Study), and, (2) an evaluation performed by NERA Economic Consulting (NERA), entitled Macroeconomic Impacts of Increased LNG Exports From the United States (NERA Study). The request for comments was set forth in a December 11, 2012 Federal Register notice appearing at 77 Fed. Reg. 29894.

The U.S. oil and natural gas industry supports 9.2 million domestic jobs and comprises more than 7.7% of the U.S. economy. API is a national trade association that represents over 500 members involved in all aspects of the oil and natural gas industry. API represents operators, service companies, and suppliers involved in the exploration and production of the nation's natural gas resources, companies involved in the processing, shipment and marketing of natural gas, and companies involved in the development of facilities for the exportation of liquefied natural gas. API and its members thus have a direct interest in the LNG export issue, and in ensuring that the federal government expeditiously approves pending LNG export applications.

I. Approval of LNG Exports Without Delay and Without Limitation Is Clearly in the Public Interest

API urges DOE to move forward without delay, confirm that LNG exports are in the public interest, and expeditiously approve pending LNG export applications, pursuant to the law. These actions would be consistent with the key finding of the LNG Export Study:

> "Across all these scenarios, the U.S. was projected to gain net economic benefits from allowing LNG exports. Moreover, for every one of the market scenarios examined, net economic benefits increased as the level of LNG exports increases. In particular, scenarios with unlimited exports always had higher net economic benefits than corresponding cases with limited exports."[1]

Furthermore, U.S. LNG Exports will serve to effectively:

- Create and support thousands of jobs
- Contribute to an improvement in the trade deficit
- Generate billions of dollars in national and local economic stimulus
- Enhance U.S. energy security and provide support to strategic allies such as Japan

[1] NERA Economic Consulting, "Macroeconomic Impacts of LNG Exports from the United States," Report prepared for the Office of Fossil Energy, Department of Energy, December 11, 2012, p. 1.

- Promote free trade and the President's National Export Initiative

The Natural Gas Act ("NGA") creates a rebuttable presumption that a request for authorization to export LNG to non-FTA countries is in the public interest.[2] The burden, therefore, is on the party opposing the application to show that the application is not in the public interest – not the other way around. Regardless, there is ample evidence to support a conclusion that increased natural gas exports are in the public interest. The public stands to benefit significantly in various ways, including job creation, revenue generation for national and local economies, and energy security.

A. The U.S. Is Now the Leading Producer of Natural Gas in the World and a Global Leader in Overall Natural Gas Resources

The advancement of proven technologies has led the U.S. to become the largest producer of natural gas in the world and among the world's leaders in natural gas resources. This tremendous abundance of natural gas now places the U.S. in a position to supply the domestic market with affordable supplies of natural gas, while at the same time securing the significant benefits that will accrue from exporting supplies of LNG. The EIA currently estimates technically recoverable shale gas resources at 542 Tcf and total recoverable U.S. natural gas resources at 2,203.3 Tcf.[3] ICF International, a well-known consulting company, estimates technically recoverable shale gas to be 1,942 Tcf and total recoverable gas at 3,505 Tcf.[4] The Potential Gas Committee (PGC) pegs the shale resource estimate at 687 Tcf and total resources at 1,898 Tcf.[5] MIT's mean estimate of the shale gas resource base is projected to be about 650

[2] 15 U.S.C. § 717b, § 3(a).
[3] EIA, "Assumptions to AEO 2012," August 2, 2012, p. 113.
[4] ICF, "The Economics of U.S. LNG Exports: Policy, Process and Politics, Webinar given on February 14, 2012, p.14. The difference in the shale gas resource estimates between the EIA and ICF is partly due to different assumptions, including well spacing, estimated ultimate recovery (EUR), etc., underlying the resource estimate.
[5] See: http://potentialgas.org/press-release and http://potentialgas.org/advance-summary

Tcf.[6] The EIA, the PGC and others have increased their estimate of the resource base tremendously since 2000.[7] The 2011 National Petroleum Council (NPC) Study estimated the total natural gas resource base to be about 1,100 Tcf in 2003 and about 2,200 Tcf in 2011.[8]

With U.S. annual consumption of natural gas running in the 24 Tcf range, there is abundant supply to support both export markets and domestic consumption. Alternatively, 20 years of LNG exports phased in between 2015 and 2020 and reaching 6 bcfd beginning in 2020 through 2035 would generate total cumulative exports of about 41 Tcf. This means that total cumulative exports would consume only 1-2 percent of the total resource base estimated by the ICF and the EIA, demonstrating even greater potential for the U.S. to export LNG. See Fig. 1.

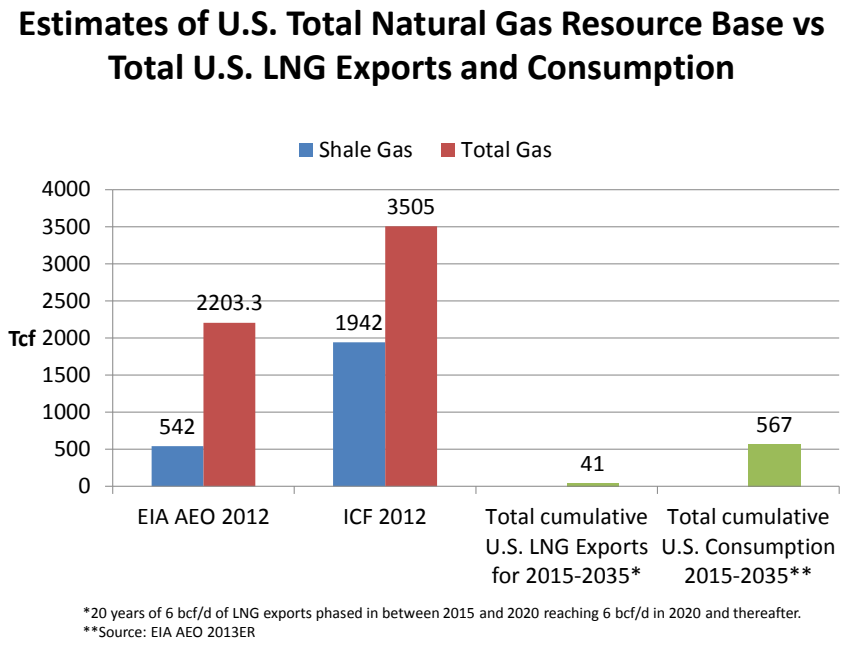

Fig. 1.

[6] MIT, "The Future of Natural Gas," An Interdisciplinary MIT Study, 2011.
[7] See NPC, "Prudent Development Realizing the Potential of North America's Abundant Natural Gas and Oil Resources," A Report of the National Petroleum Council, September 2011, p. 47.
[8] This is NPC's business as usual or mid policy case. The NPC's high supply case estimated more than 3,500 Tcf of resources. See p. 62 of the NPC report.

B. LNG Exports Will Drive Job Growth

LNG exports will create jobs in the oil and natural gas sector, as well as the industries supplying the oil and natural gas sector with materials, equipment and labor. Most studies concur that natural gas production will increase to support export volumes. The NERA study finds that in all three baseline scenarios, natural gas production increases.[9] The EIA has estimated that 60 to 70 percent of LNG exports will be from increased production, with about 75 percent of the increased production coming from shale gas.[10] The production of additional unconventional natural gas will support the creation of many new jobs as highlighted by the series of studies recently released by IHS. For example, an IHS report estimated that in 2012, 36 bcfd of unconventional natural gas production already supports over 900,000 jobs.[11] The production of additional unconventional natural gas will also increase the production of natural gas liquids (NGLs), especially ethane, with concomitant impacts on the petrochemical industry output and jobs. See below for an extended discussion of the ethane issue. So any additional unconventional natural gas production to support export volumes will have a significant overall jobs impact. Construction jobs will also be boosted by the need to build liquefaction capacity, pipelines, and other related infrastructure to support LNG exports. The operation and maintenance of liquefaction facilities will generate incremental long term employment impacts, particularly in the regions where the LNG facilities are located.

Those who oppose LNG exports have argued that increased natural gas exports will inhibit the U.S. manufacturing renaissance. To the contrary, the construction of liquefaction

[9] NERA, pp. 51-52.
[10] U.S. Energy Information Administration, "Effects of Increased Natural Gas Exports on Domestic Energy Markets," Report prepared for the Office of Fossil Energy, Department of Energy, January 2012, p. 6.
[11] IHS, "America's New Energy Future: The Unconventional Oil and Gas Revolution and the U.S. Economy, Volume 1: National Economic Contributions," October 2012.

facilities to serve overseas markets is a manifestation of the US manufacturing renaissance, not an inhibitor. The production of LNG adds value to the economy through the application of labor and capital to a commodity, analogous to production in the manufacturing sector. Producers of U.S. LNG add value to our economy beyond the initial price of the natural gas commodity. Estimates of that value added run from $1 to $2 per Mcf reflecting the production costs of the liquefaction process.[12]

In addition, the supply chain associated with the construction of a liquefaction facility is "deep", stimulating production of billions of dollars of capital equipment from suppliers with impacts that ripple through the economy and support thousands of American jobs. Estimates of capital expenditures for a liquefaction facility run into the billions of dollars and would support tens of thousands of American jobs throughout the construction phase. [13] Such investment will also lead to a significant increase in permanent U.S. jobs as LNG exports support a higher level of domestic natural gas production, lead to higher supplier industry activity and through the operation and maintenance of the LNG and associated facilities. More specifically, it is estimated that 6 bcfd of LNG exports would increase U.S. natural gas production by up to 4.2 bcfd and support approximately 105 thousand jobs associated with unconventional natural gas production – not factoring in investment impacts associated with the LNG facilities.[14]

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[12] http://pipelineandgasjournal.com/issues-facing-us-shale-gas-exports-japan?page=4)

[13] http://www.exim.gov/newsandevents/releases/2012/ExIm-Bank-Provides-1-Billion-in-Export-Financing-for-Natural-Gas-Project-in-Australia.cfm and here: http://www.exim.gov/newsandevents/releases/2012/ex-im-bank-approves-nearly-3-billion-in-export-financing-for-u-s-goods-and-services-to-australia-pacific-lng-project.cfm

[14] IHS October 2012. "America's New Energy Future: The Unconventional Oil and Gas Revolution and the US Economy, Volume 1: National Economic Contributions". Total 2012 employment supported by unconventional gas activity is estimated to be 902,675 (page 7). Total 2012 unconventional gas production is estimated to be 36.12 Bcfd (page 19). Average 2012 employment supported per 1 Bcfd of unconventional natural gas production is 24,992. From the EIA LNG export study (Page 6) "Increased natural gas production satisfies about 60 to 70 percent of the increase in natural gas exports." Therefore, 6 bcfd of LNG exports would increase U.S. production by up to 4.2 Bcfd and support approximately 104,962 additional jobs associated with unconventional natural gas production.

Moving from facility level impacts to the macro level, the NERA Study found that U.S. economic welfare consistently increases as the volume of natural gas exports increases, including scenarios with unlimited exports. NERA found that even though domestic natural gas prices could be marginally pulled up by LNG exports, the value of those exports also rises, in addition to the positive impacts of supplying industries, so that there is a net gain for the U.S. economy measured by a broad metric of economic welfare or by more common measures such as real household income. While some have argued that the NERA report underestimates potential adverse impacts on the manufacturing and other sectors given that it relied upon EIA's Annual Energy Outlook (AEO) 2011 forecast, we show in sub-section C below that using the AEO2013ER (Early Release) would likely result in more modest impacts on these sectors due to much greater supply and lower projected natural gas prices in AEO2013ER relative to the AEO2011 forecast.

The United States can accommodate LNG exports without jeopardizing the U.S. manufacturing renaissance that is occurring as a result of relatively low domestic natural gas prices. Charles Ebinger from the Brookings Institute remarked after the EIA Study issued that "[t]he charge that exports will result in a spike in prices is likely to be an exaggeration."[15] This results from the two cases of "rapid" LNG exports assumed in the EIA study. The implied rate of capacity expansions associated with these rapid export scenarios are totally unrealistic, the labor and capital equipment necessary for such an expansion over such a short time frame would not be available even if the economic environment supported such levels of export. Ebinger also noted, "[a]ccording to the Deloitte study, New England, which traditionally has some of the

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[15] Charles K. Ebinger, *The Full Story on Natural Gas Exports*, THE NATIONAL JOURNAL, Jan. 17, 2012, *available at* http://www.brookings.edu/research/opinions/2012/01/17-natural-gas-ebinger (last visited Jan. 14, 2013).

highest natural gas prices in the country, will likely see only a minimal increase in response because of its proximity to the Marcellus Shale with its giant reserves of unconventional gas."[16]

C. LNG Export Study Finds that Changes in Price Remain in a Narrow Range Across All Scenarios

In order to understand the net impact on the economy, the potential impact of LNG exports on natural gas prices must be first analyzed. Virtually all of the empirical studies that have been published to date indicate that any potential increase in natural gas price due to the increase of LNG exports will be modest. For example, the Brookings Institute examined 5 studies that analyzed the domestic natural gas price impact of LNG exports.[17] The Brookings study concludes that: "While it is clear that domestic natural gas prices will increase if natural gas is exported, most existing analysis indicates that the implications of this price increase are likely to be modest."[18] The NERA study reports a similar conclusion: "Natural gas price changes attributable to LNG exports remain in a relatively narrow range across the entire range of scenarios. Natural gas price increases that at the time LNG exports could begin range from zero to $0.33 (2010$/Mcf).[19] The largest price increases that would be observed after 5 more years of potentially growing exports could range from $0.22 to $1.11 (2010$/Mcf)."[20]

The EIA and other studies cited above, except NERA, do not take into account the potential supply response from competitive international LNG suppliers at different levels of U.S. prices. Since there is a limited amount of U.S. LNG that will be able to be absorbed in

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[16] Charles K. Ebinger, *The Full Story on Natural Gas Exports*, THE NATIONAL JOURNAL, Jan. 17, 2012, *available at* http://www.brookings.edu/research/opinions/2012/01/17-natural-gas-ebinger (last visited Jan. 14, 2013).
[17] Ebinger, Charles; Massy, Kevin; and Avasarala Govinda, "Liquid Markets: Assessing the Case for U.S. Exports of Liqefied Natural Gas," Brookings Institute, Policy Brief 12-01, May 2012.
[18] I*bid*., p.46.
[19] NERA Economic Consulting, "Macroeconomic Impacts of LNG Exports from the United States," Report prepared for the Office of Fossil Energy, Department of Energy, December 11, 2012. P.2
[20] *Ibid*.

world markets given competing international LNG suppliers, market forces will constrain U.S. export volumes further limiting any potential domestic price response.

A Deloitte study that was released in January 2013 using more current information about the cost structure of unconventional gas resources concludes that natural gas prices would rise marginally in the U.S. as a result of LNG exports.[21] The Deloitte study finds that, "The impact of U.S. LNG exports on U.S. city gate prices is projected to be minimal, only an average $0.15/MMBtu from 2016 through 2030. Abundant North American gas resources mitigate the impact of demand changes, including exports."[22] Similarly, a recent Navigant study estimates that LNG exports could lead to a Henry Hub price increase ranging between 1.4 to 8.6 percent.[23]

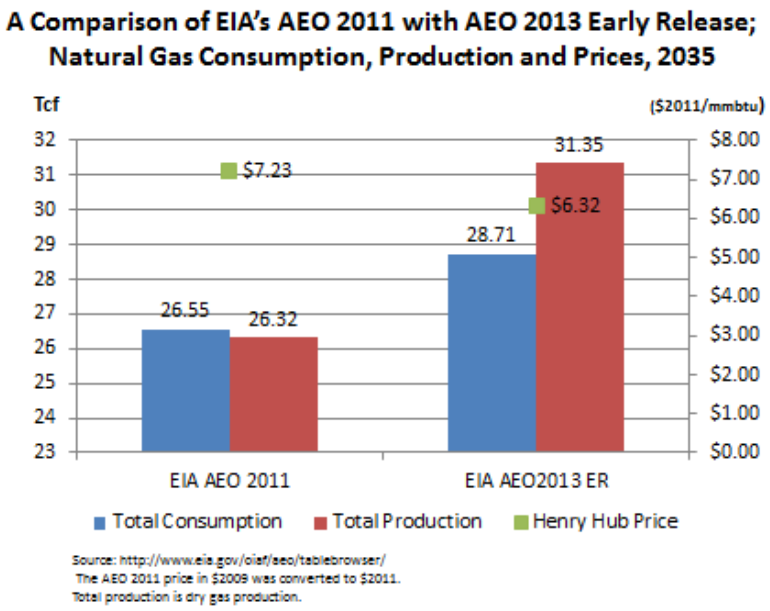
Opponents of LNG exports have contended that higher natural gas prices from LNG exports would increase the cost of doing business in the U.S. thereby reducing output and employment levels. They have argued that since the NERA study uses the EIA's AEO 2011 and EIA's International Energy Outlook (IEO) 2011 as the baseline to compare their various LNG export cases, the adverse impact on the gas intensive manufacturing sectors would be underestimated because the dated nature of the 2011 projection would exclude from the impact calculations the investment that gas intensive manufacturing industries have made in the U.S. to utilize low cost shale gas in 2011 and 2012.

A comparison of AEO 2011 with AEO 2013ER indicates that total U.S. gas demand for 2035 is projected to be more than 2 Tcf higher in AEO2013ER than AEO 2011 due to increases in natural gas consumption by the power generation sector. Greater total natural gas demand for

[21] Deloitte, "Exporting the American Renaissance Global impacts of LNG exports from the United States," January, 2013.
[22] *Ibid*, p. 12.
[23] Navigant, NG Market Notes, April 2012, p.4.

U.S. natural gas, however, does not cause natural gas prices to be higher in AEO 2013ER. Henry Hub natural gas prices in 2035 are projected to be significantly lower at $6.32 ($2011) in AEO 2013ER as compared to $7.23 ($2011) in AEO 2011 because natural gas supply is much more robust in AEO 2013ER.[24] About 31.4 Tcf of dry natural gas is projected to be produced in 2035 in AEO 2013 ER as compared to 26.3 Tcf in AEO 2011. See Fig. 2. The net impact of both higher gas demand and much higher gas supply is lower prices with the implication of a flatter natural gas supply curve. So from this perspective, the results of the NERA study could be interpreted as being an upper bound on the adverse impacts and using the AEO 2013ER as the baseline may generate even smaller price impacts.

Fig. 2.



[24] The $2011 price of $7.23 was calculated by multiplying the ratio of the 2011 nominal price $4.58 with the $2009 real price of $4.48 with the $2009 price of $7.07.

D. Economic stimulus – local and national impacts

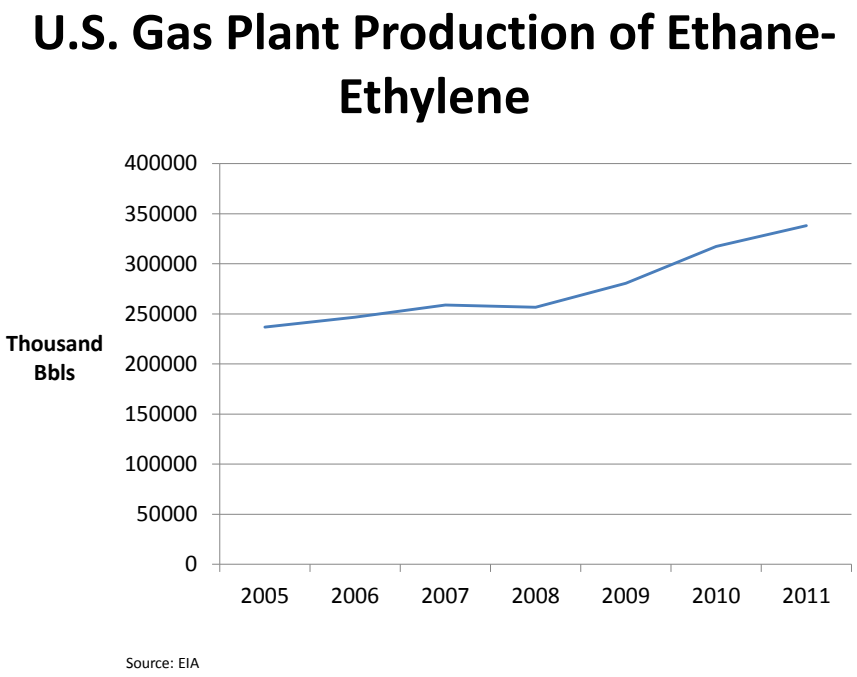
LNG exports will provide a valuable source of economic activity. The U.S. economy will benefit from investment in liquefaction facilities and associated infrastructure. Liquefaction facilities are very expensive to construct running on the order of $10 billion per facility implying significant investment in the U.S. Producers of natural gas will realize additional revenues by selling incremental volumes of gas to export markets. These additional revenues will support future investment in the oil and gas producing sector and benefit all supplying industries. If households or their pensions hold stock in natural gas producers, they will experience an increase in the value of their investment.

To the extent that the NERA study and other studies published thus far do not include the impact of increased natural gas liquids (NGLs) production, as a result of increased natural gas production, to support export markets, these studies will tend to underestimate the total positive economic impact of LNG exports. This is an important omission since incremental LNG exports are likely to apply downward pressure on ethane and other associated Natural Gas Liquids (NGLs) prices. Increases in U.S. domestic natural gas production should increase the production of NGLs especially ethane "which comprises approximately half of all NGLs."[25] It is highly likely that the majority of ethane will be stripped out of the natural gas prior to export and sold in the domestic market since "there are strict limits in quality provisions of pipeline tariffs on how much ethane can be left in the natural gas stream".[26] Natural gas liquids (including ethane) are generally removed from natural gas to reduce the gas stream's calorific value not only to meet pipeline specifications but also to avoid excess liquids that may condense and cause problems in transmission. The recovered NGLs are then processed into their saleable hydrocarbon

[25] NPC, Prudent Development: Realizing the Potential of North America's Abundant Natural Gas and Oil Resources," September 2011, p. 315.
[26] *Ibid*., p. 315.

components – notably ethane. Thus, the emergence of an LNG export market should not only stimulate more ethane production, but should also result in a greater abundance of domestic ethane supply than would occur in the absence of an LNG export market. According to the EIA, ethane production increased 32 percent between 2008 and 2012.[27] See Fig. 3.

Fig. 3.



The NPC in 2011 estimated that "to accommodate increasing levels of ethane production related to the growth in natural gas production, increased investment by the chemical industry will be required. The American Chemistry Council recently estimated that a 25 percent increase in ethane supply could result in $16 billion in capital investment by the chemical industry. This

[27] http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=METFPUS1&f=A

would generate 17,000 new jobs in the U.S. chemical industry and 395,000 additional jobs outside the chemical industry and increase U.S. economic output by $132 billion." [28]

In addition, ethane is a liquid that serves as the primary feedstock for ethylene, a petrochemical product used to produce many different products. A survey of publically announced proposed new ethylene plants by ICF International indicates that between 2013 and 2017, approximately 12.7 to 18.7 million metric tons per year of new capacity will be built requiring approximately 767,000 to 1,127,000 bbls/d of ethane consumption.[29] North American and Middle Eastern manufacturers of ethylene use mostly ethane, while Asian and European petrochemical manufacturers use oil based naphtha as feedstock. Since naphtha prices are correlated to oil prices while ethane prices are correlated to natural gas prices, the combination of increased NGL production because of increased natural gas production to support export markets and projected divergence between oil and natural gas prices will give North American petrochemical manufacturers a competitive edge over their Asian and European counterparts.[30] The American Chemistry Council estimates that the combination of increased ethane utilization to 31 percent and increased use of natural gas as feedstock would increase the output of the chemical industry by $70.2 billion ($2010) in the next 5 years.[31]

The NERA study estimates the macroeconomic impact of increased LNG exports by linking a macroeconomic model of the U.S. with an energy model.[32] The NERA study is the only study that has done this to date and so the only one capable of generating empirical estimates of these macroeconomic impacts, including the potential reduction in output for the gas intensive

[28] *Ibid.,* NPC, Sept. 2011, p. 295.
[29] Industry announcements compiled by ICF International.
[30] See AEO 2013 ER for projections of continued divergence between oil prices and natural gas prices.
[31] American Chemistry Council, "Shale Gas, Competitiveness and New U.S. Investment: A Case Study of Eight Manufacturing Industries," May 2012, p. 14.
[32] *Ibid*., pp. 20-21.

manufacturing sectors. The NERA study is also one of the few studies to date that has incorporated the potential supply response by foreign competing suppliers of LNG that would limit the ability of the U.S. to export volumes of LNG.[33] According to NERA, this addition to the project scope proved to be quite important since in many of the hypothetical LNG export volumes considered in the EIA study, the world market due to strong international competition from foreign LNG and natural gas could not full absorb the export volumes thereby further limiting the potential for domestic price increases.

The NERA study found that: "Across all scenarios, the U.S. was projected to gain net economic benefits from allowing LNG exports. Moreover, for every one of the market scenarios examined, net economic benefits increased as the level of LNG exports increased. In particular, scenarios with unlimited exports always had higher net economic benefits than corresponding cases with limited exports."[34] The NERA study concludes that U.S. gross domestic product (GDP) would increase as a result of LNG exports, rising by $5 billion to $20 billion under the reference case U.S. resource base cases with LNG exports. Based on this finding, NERA concluded that "This is exactly the outcome that economic theory describes when barriers to trade are removed."[35] The NERA study concludes that "…the effects of higher prices do not offset the positive impacts from wealth transfers and result in higher GDP over the model horizon in all scenarios."[36]

The NERA study breaks down the GDP impacts into various other measures of economic performance: aggregate consumption; investment; wage and household income and summarizes

[33] The Deloitte study also analyzes international markets.
[34] *Ibid*., NERA, p. 1.
[35] *Ibid*.
[36] *Ibid., p. 56.*

the impacts.[37] The impact of increased LNG exports on tax revenues and the trade deficit are alluded to in the report and shown aggregated with other variables. So it is difficult to discern the magnitudes. However, there are other estimates available in the literature. Levi estimates that the federal government could see an increase of more than $1 billion each year of additional tax revenues if 6 bcfd of natural gas exports are realized.[38] In addition, increased production to support natural gas exports would create increased corporate and severance tax revenue. Levi also estimates that 6 bcfd of LNG exports would generate export revenues about: "$20 billion. This is equal to about 5 percent of the 2010 and 2011 current account deficit."[39] Depending on the scenario, the NERA study estimates that the average annual increase in revenues from exports can range from about $2.6 billion ($2010) to almost $32.9 billion ($2010).[40]

Thus, the evidence overwhelmingly shows that LNG exports will create jobs, increase GDP, contribute to an improvement in the trade deficit and increase the overall welfare of Americans – in other words, the evidence shows that LNG exports are in the public interest.[41] In the face of this evidence, opponents cannot meet their burden of proof necessary to overcome the rebuttable presumption set forth in the NGA that the proposed LNG exports to non-FTA countries are in the public interest.

[37] *Ibid.*, pp.55-70.
[38] Levi, Michael, "A Strategy for U.S. Natural Gas Exports," The Hamilton Project Policy Brief, 2012-04, June 2012, p.7.
[39] *Ibid.*
[40] *Ibid.*, NERA, p.59.
[41] See for example: NERA Economic Consulting, "Macroeconomic Impacts of LNG Exports from the United States," Report prepared for the Office of Fossil Energy, Department of Energy, December 11, 2012; Levi, Michael, "A Strategy for U.S. Natural Gas Exports," The Hamilton Project Policy Brief, 2012-04, June 2012.

E. Enhancing Energy Security and Free Trade

1. Timeliness in Approval Process Crucial to U.S. Competitiveness in Global Market

The U.S. has the opportunity to continue to demonstrate its strength as a global energy leader by participating in the global LNG export market. Flexibility to export product in times of market imbalance would effectively allow the industry to operate efficiently and maintain production levels, thereby enhancing overall energy security. Furthermore, approval of LNG exports would allow the U.S. to provide support to strategic allies such as Japan.

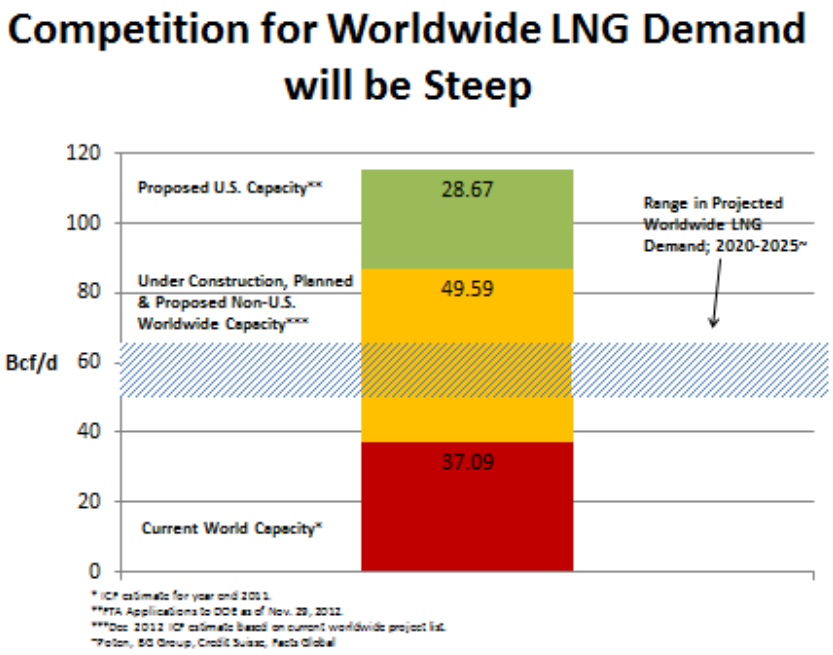
However, DOE must move judiciously and without delay because U.S. projects are currently competing against international projects and there is a limited amount of global demand for LNG. According to ICF International, the current world LNG liquefaction capacity is estimated to be approximately 37 Bcfd.[42] A survey of under construction, planned and proposed facilities around the world indicates approximately 49.6 Bcfd of new liquefaction capacity could come online by 2025 outside of the U.S.[43] Add to that the fact that approximately 28.7 Bcfd of U.S. liquefaction capacity could come online if all FTA applications in the U.S. Department of Energy Docket as of Nov. 21, 2012 become operational and you get a total world LNG capacity of 115 Bcfd. The expected worldwide demand for LNG falls far short of that potential supply. Various projections show that expected world demand for LNG will be in the range of approximately 50 Bcfd to 65 Bcfd by the year 2025.[44] A significant share of the proposed liquefaction capacity may not be built.

Furthermore, some of the new liquefaction capacity outside of the U.S. is already under construction (i.e., Australia, Indonesia), creating an even tighter global competition. It is thus

[42] ICF estimate for year end 2011 figure.
[43] ICF estimate as of Dec. 2012 based on current project list.
[44] Poten, BG Group, Credit Suisse, Facts Global.

imperative that DOE move without delay to approve the pending applications before it, so that the proposed U.S. projects can effectively compete against projects around the world for the incremental growth in worldwide LNG export capacity.

Fig. 4**.**



2. Principles of Free Trade Support the Approval of LNG Exports

By allowing unfettered flow of goods and services across borders, free trade allows nations with comparative advantage in the production of a specific good or service an opportunity to export. The comparative advantage arises from a multitude of reasons, including technological innovation, abundance of a resource, or lower production costs due to economies of scale that impart a competitive advantage in terms of lower price and other factors. If domestic prices of a specific good are lower than prices in other parts of the world, even accounting for transportation and exchange rate costs, increased exports would be of great

benefit to both trading partners. The country with the comparative advantage benefits from trade because another market has been found for its product and production can increase domestically. A country without the comparative advantage also benefits since consumers have more choice and would be able to purchase the traded product at a lower cost than if that product were produced domestically. In a voluntary exchange, both countries benefit.

The U.S. is the world's largest economy and a leader in global trade. The importance of global trade in the U.S. economy has played an important role in the growing prosperity of Americans. Estimates from the literature suggest that income per U.S. household was between $1,299 and $2,080 higher on an annual basis due to trade liberalization over the 1992 to 2002 period.[45] This growth in prosperity has come about in a variety of different ways. Expanding the output of the most competitive industries and products in the U.S. through exports has raised the productivity of the average American worker thereby increasing incomes and compensation. According to the Office of the United States Trade Representative, about 75% of the world's purchasing power and approximately 95% of the world consumers are outside of American borders indicating an increasing importance of trade to the U.S. economy.[46]

Furthermore, LNG exports will help advance the National Export Initiative (NEI). On March 11, 2010, the President signed Executive Order 13534 – the National Export Initiative – which is an Administration initiative "to improve conditions that directly affect the private sector's ability to export." Expeditious approval of pending LNG export applications would effectively serve to meet the objective of improving those conditions that affect the ability to export. Approval of LNG exports will also effectively advance the export goal outlined by the

[45] http://courses.wcupa.edu/rbove/eco338/050Trade-debt/FreeTr/050700benefits.pdf
[46] http://www.ustr.gov/trade-topics/economy-trade.

Executive Order: "The NEI will help meet my Administration's goal of doubling exports over the next 5 years by working to remove trade barriers abroad, by helping firms – especially small business – overcome the hurdles to entering new export markets, by assisting with financing, and in general by pursuing a Government-wide approach to export advocacy abroad."

With regard to small business, LNG exports have the additional effect of benefitting small businesses. And the benefits to small business will accrue not only from the local impacts associated with the construction, operation and maintenance of the specific LNG facilities, but also from the increased exploration and production activities that will occur to produce the natural gas. According to the U.S. Census Bureau, more than 50,000 small businesses and more than 350,000 employees in 2010 (the latest data available), or 45 percent of total employment in the upstream oil and natural gas and support industries is provided by small businesses. The additional natural gas production that would result from LNG exports would help to sustain and expand small business employment.

II. Standards, technologies and regulations are in place to ensure safety in LNG operations and in natural gas production, and DOE should not delay approval of the pending applications

The LNG industry has a history of safe and secure operations. The LNG industry is highly regulated by the Federal Energy Regulatory Commission, the Department of Transportation, the U.S. Coast Guard, the Department of Homeland Security and other federal and state agencies. The regulatory framework works to effectively ensure the safe operations of vessels and facilities, and to provide effective safeguards for the workforce and the public. The LNG industry works closely with federal, state and local authorities to manage, reduce and mitigate any potential risks to vessels and facilities. This includes providing appropriate

security, planning, prevention and risk mitigation measures. Furthermore, there have been more than 135,000 voyages of LNG vessels over several decades without major accidents or safety problems.

In addition, the U.S. stands to benefit from increased production of domestic natural gas. The current energy revolution is directly attributable to the application of the proven technologies in hydraulic fracturing and horizontal drilling. It is only through these proven technologies that the tremendous benefits from increased supplies of natural gas, natural gas liquids and oil can be fully realized in the U.S.

Hydraulic fracturing is a technology that uses water pressure to create fissures—tiny cracks—in deep underground shale rock formations that allow oil and natural gas to flow up the well for collection. First used in the 1940s, hydraulic fracturing has unlocked massive new supplies of oil and clean-burning natural gas from dense deposits of shale—supplies that increase the country's energy security and improve America's ability to generate electricity, heat homes and power vehicles for generations to come. In the United States, around 35,000 wells are hydraulically fractured annually. The upstream production sector has developed robust best practices based on its vast experience in order to minimize potential impacts associated with development. API has developed a series of standards and recommended practices covering all aspects of hydraulic fracturing operations, and promotes their use throughout the industry while making them broadly available by posting these documents for free on the API website.

The process of bringing a well to completion generally takes only a few months for a single well, after which it can produce oil and natural gas for 20 to 40 years. The process for a single horizontal well typically includes four to eight weeks to prepare the site for drilling; four

or five weeks of rig work, including casing, cementing and moving all associated auxiliary equipment off the well site before hydraulic fracturing operations commences; and two to five days for the entire fracturing operation. In a hydraulically fractured well, fracturing fluids consisting primarily of water, sand and a small amount of chemicals are injected under high pressure into the producing formation, creating fissures that allow oil and natural gas to move freely from rock pores where they are trapped. The geology of the earth creates a natural, impermeable barrier of rock between the fissures and the groundwater several thousand feet above.

Typically, steel pipe known as surface casing is cemented into place at the uppermost portion of a well for the explicit purpose of protecting groundwater. The depth of the surface casing is generally determined by the depth needed to ensure groundwater protection, among other factors. As the well is drilled deeper, additional casing is installed to isolate the formation from where oil or natural gas is to be produced. This further protects groundwater from the producing formations. These redundant layers of steel and cement create an effective, protective barrier between oil and natural gas in the well and underground water supplies. Industry well design practices combine with multiple layers of impervious rock to protect sources of groundwater.

In addition to operating safely, the industry is committed to transparency in the hydraulic fracturing process. To meet that commitment, industry companies participate in FracFocus, a website created to publicly disclose the chemicals used in the hydraulic fracturing process. The site provides detailed information about the purpose chemicals serve and how groundwater is protected on a well-by-well basis. FracFocus began in April 2011 and in its first year saw more than 200 energy-producing companies register over 15,000 well sites. Since the first year, the

numbers have continued to grow, with more than 35,000 well sites now listed. Hydraulic fracturing technology has a strong environmental track record and is employed under close supervision by state regulators. The oil and natural gas industry is committed to the continued safe and responsible development of domestic resources.

Tenuous arguments have been asserted to DOE that action on the pending applications should be delayed for the completion of additional analysis of alleged upstream impacts under the National Environmental Policy Act. First and foremost, natural gas production activities are subject to effective regulation by state governments. Second, natural gas production activities have a demonstrated record of performance that is based upon the application of sound and proven technologies and engineering practices. And finally, NEPA does not require DOE to consider alleged upstream environmental impacts of LNG export authorizations because these alleged impacts are neither direct nor indirect effects of DOE's proposed action, as those terms are defined in the Council on Environmental Quality's regulations implementing NEPA.[47] These alleged environmental impacts cannot be the direct effects of DOE's grant of export authorization because they do not occur at the same time and place as an export of LNG.[48] And as the Supreme Court has made clear, indirect effects need only be evaluated for NEPA purposes where there is " 'a reasonably close causal relationship' between the environmental effect and the alleged cause," a relationship that cannot be satisfied by a "but for" causal relationship, and that is instead analogous to the " 'familiar doctrine of proximate cause from tort law.' "[49] DOE is obviously not the proximate cause of these alleged upstream effects because natural gas

[47] 40 C.F.R. § 1508.8.
[48] Sierra Club's argument, in fact, is that these alleged effects are "upstream," indicating that they would not occur in the same time and place as the export, and that they admittedly are the "*indirect effects* of the proposed action." Sierra Club's Motion to Intervene, Comment, and Protest, *Gulf LNG Liquefaction Company, LLC*, FE Docket No. 12-101-LNG, at 26 (emphasis added).
[49] *Dep't of Transp. v. Public Citizen*, 541 U.S. 752, 767 (2004) (citing *Metropolitan Edison Co. v. People Against Nuclear Energy*, 460 U.S. 766, 774 (1983)).

development using hydraulic fracturing is occurring and will continue to occur across the country regardless of whether a single additional export authorization is ever granted. Indeed, without some rational boundary, it would be possible to say that there are an infinite number of indirect effects from an action by an agency, making it impossible to consider all such effects and for the applicant to mitigate all such effects. A boundary must be set, and the Supreme Court has said that boundary is proximate cause.

Moreover, the NGA does not provide DOE with any authority to regulate natural gas production or gathering. In *Public Citizen*, the Court explained that " 'courts must look to the underlying policies or legislative intent in order to draw a manageable line between those causal changes that may make an actor responsible for an effect and those that do not.' "[50] DOE derives its authority to grant authorizations for the import and export of the LNG commodity from the NGA, which explicitly provides that it does *not* apply "to the production or gathering of natural gas."[51] Natural gas production, including permitting of natural gas wells and mitigation of related environmental impacts, is already strictly regulated by the states and under federal statutes enforced by other federal agencies.

III. Conclusion

It is imperative that DOE move without delay to approve the pending LNG export applications, so that the proposed U.S. projects can effectively compete against projects around the world for the incremental growth in worldwide LNG export capacity. Expeditious approval of the pending applications is clearly in the public interest: jobs will be created; local and national economies will get a significant economic boost; the U.S. will enhance its energy

[50] *Public Citizen*, 541 U.S. at 767 (citing *Metropolitan Edison Co. v. People Against Nuclear Energy*, 460 U.S. 766, 774 (1983)).
[51] 15 U.S.C. § 717(b), NGA § 1(b).

security; principles of free trade will be promoted. Under law, exports are already presumed to be in the public interest; the 2012 LNG Export Study and the overwhelming body of evidence support this presumption. Therefore, DOE should ensure that the approvals move forward with urgency so that the U.S. can obtain full advantage of these capital intensive investments.

Respectfully submitted,