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Before the House Committee on Foreign Affairs
Subcommittee on Terrorism, Nonproliferation and Trade
April 25, 2013

Hearing on "Natural Gas Exports: Economic and Geopolitical Opportunities"

Thank you Chairman Poe, Ranking Member Sherman and members of the Subcommittee. My name is Rob Bryngelson, and I am the President and CEO of Excelerate Energy. I appreciate the opportunity to appear before the Subcommittee today to share Excelerate's views on 1) the current status of the natural gas industry, relating specifically to liquefied natural gas (LNG) exports; 2) the positive economic impacts, both to Texas and to the nation, associated with LNG exports; 3) and finally, Excelerate's views on the Department of Energy (DOE) approval process to export LNG.

Excelerate Energy, LP

Excelerate Energy, LP (Excelerate) is a Texas-based energy company engaged in the development of LNG transportation and regasification infrastructure, a provider of LNG storage and regasification services, and an importer of LNG. The company operates a fleet of eight purpose-built LNG carriers capable of regasifying LNG on board the vessel for delivery as gaseous natural gas to downstream customers worldwide. Excelerate also operates as a global LNG Marketing and Trading organization.

Established in 2003 and headquartered in the Woodlands, Texas, Excelerate also has facilities in London, Dubai, Kuwait City, Buenos Aires, Israel, and Rio de Janeiro.

In 2009, Excelerate Liquefaction Solutions, LLC (ELS), a wholly-owned subsidiary of Excelerate, initiated Front End Engineering and Design (FEED) efforts to construct the world's first floating liquefaction, storage, and offloading unit (FLSO) capable of taking US domestically produced natural gas and processing it into LNG for export. The project will be referred to herein as the Lavaca Bay LNG Project.

Lavaca Bay LNG Project

ELS proposes to design, construct, and operate a Floating Liquefaction Storage Offloading (FLSO) unit to be located on the Gulf Coast in Port Lavaca, Texas in two phases. The first phase of the project will consist of one FLSO unit with a storage capacity of 250,000 cubic meters of LNG, and a liquefaction capacity of up to 5 million tons per annum (MTPA) or the equivalent of 0.665 billion cubic feet per day (Bcf/day) of natural gas. Phase 1 has a target commercial operation date of the first quarter of 2018. Phase 2 of the project, which would commence approximately 6 to 9 months later if sanctioned, will add a second FLSO unit , essentially doubling the LNG production capacity of the facility .

On October 28, 2012, ELS filed its application with the DOE for export to non-Free Trade Agreement (FTA) countries. ELS remains in the queue with 18 other companies, awaiting DOE approval. In its non-FTA application to DOE, Excelerate Energy included two independent economic studies focused on the specific project area and the U.S. as a whole. The conclusions from each of these independent studies concurred with the findings of both studies commissioned by the DOE. The independent studies concluded that the project would have a positive impact on the project site (Calhoun and Jackson Counties), Texas and nationally.

Project Location – Calhoun County, Texas

The Lavaca Bay LNG project is strategically located, allowing LNG shipments from the facility to reach international markets efficiently. Shipments can be made to Brazil in 10 days, to England in 13 days, and to East Asian markets through the Panama Canal in 24 to 26 days. The 85 acre project site was previously permitted by the FERC as an LNG import terminal and lies in an already industrialized area. In choosing this location, ELS sought to take advantage of the previous project's positive NEPA review and outcome. Since initiating the project development, ELS has met with key stakeholders in the area and has been met with enthusiasm for the project.

Local Area Benefits

Upon receipt of its Section 3 authorization to proceed from FERC, ELS will begin the nearly four-year construction process to complete Phase 1 of the Lavaca Bay LNG Project. Phase 1 is expected to become operational by the beginning of 2018 and will involve total construction expenditures of approximately $2.4 billion, of which $1.5 billion will go towards the LNG vessel which will be built in South Korea (all figures are in 2012 dollars). The project will have annual operation and maintenance

(O&M) costs of approximately $67 million (rounding up) during its operating life. These Phase 1 expenditures are broken down further in Table ES-1. Phase 2 construction will benefit from some of the infrastructure elements as well as deepening and widening of the Matagorda Channel included with the Phase 1 capital expenditures. Overall cost of Phase 2 is estimated to be approximately $2.0 billion, approximately 15% less than Phase 1

The Phase 1 analysis further divided construction and O&M expenditures according to the assumed sector of expenditure, and according to the geographic region in which expenditures were expected to occur. Geographical areas in the study include several counties near the project site (called the Primary Impact Area), the state of Texas (other than the Primary Impact Area counties) and the U.S. (other than Texas and the Primary Impact Area). Economic impacts were estimated for each of these areas and combined to derive the cumulative impact of the project.

Table ES-1 Early Feed Estimates of Phase 1 Direct Construction and Operational Expenditures on the Lavaca Bay LNG Project (2012 Dollars)

CONSTRUCTION PHASE		OPERATIONAL PHASE (YEARLY EXPENDITURES)	
FLSO Vessel*	$1,300 million	Supervisors/engineering/ terminal labor & expenses	$12.2 million
Pipeline	$170 million	Operations	$8.6 million
On-Shore and Dredging Expenditures		FLSO maintenance	$3.1 million
Jetty/Site structures and processing	$275 million	On-shore facility maintenance	$7.5 million
Dredging	$400 million	Administration & General	$10.1 million
		Other O&M	**$3.3 million**

Includes $13.5 million estimate for front end engineering and $12 million in estimated permitting costs. Source *Black & Veatch Economic Impacts of the Lavaca Bay Project , 2013.

The cumulative impact of project construction includes:

- Construction expenditures are projected to support or create 21,367 jobs, or an average of 7,122 jobs per year during the three year construction period.
- Construction expenditures are estimated to create more than $1.37 billion in labor income at an average of $64,163 per job across all impacted industries.
- Construction expenditures are estimated to contribute more than $2.06 billion in value added to the local economy from labor expenses, services created to support the project construction, i.e. housing, consumables, etc.
- Construction expenditures are estimated to account for nearly $3.32 billion in total economic output, which is the total value of production from all industries impacted by the investment.
- Construction expenditures are projected to generate more than $154 million in state and local taxes and nearly $242 million in total federal tax revenues.

Phase 1 operational expenditures will also generate long term economic benefits. The studies focused primarily on the economic impacts of O&M expenditures (estimated to be nearly $67 million per year) during the operational period and found the impacts from these expenditures to be significant.

The total expected impacts during each year of operation are projected to include the following:

- O&M expenditures are projected to support or create 696 jobs.
- O&M expenditures are estimated to create nearly $50 million in labor income.
- O&M expenditures are estimated to contribute nearly $66 million in value added to the local economy from added spending by permanent labor 0 housing, consumables, etc., services brought in to support the facility, i.e., engine manufacturers, training center, etc.
- O&M expenditures are estimated to account for more than $102 million in total economic output.
- O&M expenditures are projected to generate more than $3.7 million in state and local taxes each year and nearly $6.0 million in total federal tax revenues.

Status of the U.S. Natural Gas Industry

From the formation of Excelerate in 2003 to the present, Excelerate has monitored the domestic and international natural gas industry, and has developed and implemented technology to address changing

industry trends. In 2005, Excelerate commissioned the first offshore LNG import facility in the world to bring additional natural gas into the U.S. By 2009, the price of natural gas decreased to levels that made importing foreign-sourced natural gas into the US uneconomic. Importation of LNG into the U.S. was restricted to facilities that had long-term contracts executed before the fall in natural gas prices. Today, Excelerate has been motivated by the improved overall outlook for domestic natural gas production resulting from drilling productivity gains which have enabled rapid growth in supplies in South Texas and elsewhere in the U.S.[1] U.S. residential, commercial and industrial consumption is not expected to increase quickly enough to offset growth in production, which has led to projections of sustained low prices for natural gas in the U.S. Rapid growth in U.S. natural gas production has driven wellhead prices to historically low levels,[2] resulting in decreased investment by the natural gas industry[3] and a reduction in associated economic activity. Low wellhead prices also have encouraged increased flaring of natural gas that otherwise would have been recovered.[4] It is our belief that the export of domestically produced LNG represents a market driven path toward deploying the country's vast energy reserves in a manner meaningfully contributing to the public interest in a variety of ways:

- More jobs, greater tax revenues, and increased economic activity;
- New competitive supplies introduced into world gas markets, leading to improved economies among America's trading partners, and providing better opportunities for U.S. products and services abroad;
- Promote greater national security through a larger role in international energy markets, and assisting our allies to reduce dependence on foreign oil through co-production of oil and natural gas liquids that might otherwise be uneconomic;

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[1] Domestic wellhead natural gas production in 2011 totaled 28.57 Tcf, the highest in U.S. history. *See U.S. Energy Information Administration ("EIA"), Natural Gas Gross Withdrawals and Production*, http://www.eia.gov/dnav/ng/ng_prod_sum_dcu_NUS_a.htm.

[2] Henry Hub natural gas futures on the New York Mercantile Exchange ("NYMEX") have traded at times during 2012 at the lowest price levels seen since 2002. *See David Bird, US Gas: Futures Slip to Fourth-Straight New Decade Low on Glut*, Dow Jones Energy Service, Apr. 13, 2012.

[3] For example, earlier last year, Chesapeake Energy announced that it in response to low natural gas prices, it "plans to … reduce its operated dry gas drilling activity by 50%." It also stated that "Chesapeake's operated dry gas drilling capital expenditures in 2012, net of drilling carries, are expected to decrease to $0.9 billion, a decrease of approximately 70% from similar expenditures of $3.1 billion in 2011."

[4] A total of 165.9 Bcf was vented or flared in 2010, an increase of 72.1% from vented and flared volumes of 96.4 Bcf in 2004. The World Bank-led Global Gas Flaring Reduction Partnership estimates that natural gas flaring in the U.S. increased 7.1 billion cubic meters in 2011, equivalent to an increase of 250 Bcf. *See EIA, Natural Gas Gross Withdrawals and Production, supra note 13; Press Release, World Bank Sees Warning Sign in Gas Flaring Increase* (July 3, 2012), http://www.worldbank.org/en/news/2012/07/03/world-bank-sees-warning-sign-gas-flaring-increase.

- Increased production capacity that will better adjust to varying domestic demand scenarios;
- Less volatile domestic natural gas prices;
- Improve the U.S. balance of payments by between $2.4 billion and $4.4 billion annually per terminal, through the export of natural gas and the displacement of imports of other petroleum liquids;[5] and
- Increase economic trade and ties with foreign trading partners and hemispheric allies, and displace environmentally damaging fuels in those countries.

As of March 7, 2013, the DOE has approved 23 long-term applications to export domestically produced LNG (does not include Alaska) to FTA countries, and is currently evaluating 19 applications for long-term export authorization to non-free trade agreement countries. The number of proposed export facilities actually constructed, will be primarily driven by the market, but will also be influenced by the DOE decision making process on the non-FTA applications. Further delays in authorizing the U.S. to export domestically produced LNG will be detrimental to the growth of the natural gas industry. As increased international supplies of LNG become available from areas such as Australia, non-FTA countries will no longer have to wait on the U.S. for supply, and the U.S. will be the loser.

DOE Approval Process

DOE is required to authorize exports to a foreign country unless there is a finding that such exports "will not be consistent with the public interest."[6] In 1984, DOE issued a set of Policy Guidelines delineating the criteria that it should utilize in reviewing applications for natural gas imports,[7] and the agency has applied these criteria to its review of applications for natural gas exports as well.[8] We concur with the DOE *Policy Guidelines* which emphasize free market principles and promote limited government involvement in federal natural gas regulation:

[5] B&V Report at 12 (based on $1.2 - 2.2 billion for Phase I alone, exporting 4 MPTA). Other studies have found even greater benefits for individual LNG export terminals. B&V Report at 14-15.
[6] 15 U.S.C. § 717b(a) (2012).
[7] *Policy Guidelines and Delegation Orders Relating to the Regulation of Imported Natural Gas*, 49 Fed. Reg. 6,684 (Feb. 22, 1984), hereinafter "*Policy Guidelines*".
[8] *See Phillips Alaska Natural Gas Corp. and Marathon Oil Co.*, FE Docket No. 96-99-LNG, Order No. 1473, at 14 (Apr. 2, 1999) (citing *Yukon Pacific*, Order No. 350, 1 FE ¶ 70,259, at 71,128), hereinafter "*Phillips Alaska*, DOE/FE Order No. 1473".

> The market, not government, should determine the price and other contract terms for imported [and exported] gas. U.S. buyers [and sellers] should have full freedom - along with the responsibility - for negotiating the terms of trade arrangements with foreign sellers [and buyers].
>
> The government, while ensuring that the public interest is adequately protected, should not interfere with buyers' and sellers' negotiation of the commercial aspects of import [and export] arrangements. The thrust of this policy is to allow the commercial parties to structure more freely their trade arrangements, tailoring them to the markets served.[9]

The *Policy Guidelines* provided some insight into the public interest standard for evaluating potential import and export applications, emphasizing that the "policy cornerstone of the public interest standard is competition."[10] Competitive import/export arrangements are therefore an essential element of the public interest, and so long as the sales agreements are set in terms that are consistent with market demands, they should be considered to "largely" meet the public interest standard.[11] The *Policy Guidelines* also provide that "[t]his policy approach presumes that buyers and sellers, if allowed to negotiate free of constraining governmental limits, will construct competitive import [and export] agreements that will be responsive to market forces over time."[12]

ELS has recognized the importance that DOE places on its consideration of the domestic need for gas to be exported, stating: "the review of export applications in decisions under current delegated authority [focuses] the domestic need for the gas to be exported; whether the export poses a threat to the security of domestic natural gas supplies; [as well as] any other issue determined to be appropriate, including 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."[13] Previously, other issues considered in making the public interest determination have included local interests, international effects and the environment.

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[9] *Policy Guidelines*, *supra* note 33, at 6685.
[10] *Id.* at 6687.
[11] *Id.*
[12] *Id.* (referencing "exports" inserted to reflect DOE policy that "the principles are applicable to exports as well" as enunciated in *Phillips Alaska*, DOE/FE Order No. 1473, supra note 34, at 14).
[13] *Sabine Pass*, DOE/FE Order No. 2961, *supra* note 22, at 29.

ELS believes that it has met the DOE criteria for approval of the project's non-FTA Application. ELS recognizes that the projections are estimates of the future, and as such, the accuracy of the forecasting methodology, projections of supply, cost of supply, demand, and future technological innovation offered are estimates as well. Nonetheless, these projections represent the best measures available for determining whether a future export would be in the public interest or not.

Domestic Need for U.S. Gas to be Exported

We believe the export of U.S. gas to FTA countries, as well as to non-FTA countries, is in the public interest because it (i) would not impair the ability of domestic natural gas consumers to obtain adequate supplies at appropriate prices; (ii) would promote a stable domestic gas industry during times when domestic demand for natural gas is depressed; and (iii) would enhance domestic natural gas production capacity which can provide greater elasticity of supplies to meet domestic demand on short notice under a variety of conditions, in lieu of relying heavily on increases in domestic prices to bring demand in line with less elastic supplies.

Drilling productivity and extraction technology improvements have enabled rapid growth in the overall U.S. gas supply. Proven natural gas reserves have increased by 97.2 Tcf (44%) between 2006 and 2010.[14] As U.S. natural gas resources and production have increased, U.S. natural gas prices have fallen markedly. The annual average Henry Hub price for natural gas fell from over $10.00 per MMBtu in late 2005 to $3-3.50 in late 2011.[15] In its most recently calculated *Annual Energy Outlook 2012* reference case, EIA estimates that the annual average wellhead price for natural gas, stated in 2010 U.S. dollars, will remain under $5.00 per MMBtu through at least 2025, and rise to only $6.48 by 2035.[16] Prices for natural gas in the U.S. market are now substantially below those of most other major gas-consuming countries. While U.S. gas prices have fallen, prices for LNG in other major gas consuming countries have increased sharply over the past decade. The result is that domestic gas can be liquefied and exported to foreign markets on a very competitive basis. As discussed below, such exports can be expected to have only a nominal effect on U.S. prices.

[14] Energy Information Administration, *Natural Gas Reserves Summary as of Dec. 31 ,2010*, available at http://www.eia.gov/dnav/ng/ng_enr_sum_a_epg0_r11_bcf_a.htm

[15] EIA statistics available at http://www.eia.gov/dnav/ng/hist/rngwhhdd.htm (September 2012).

[16] Energy Information Administration, *2012 Annual Energy Outlook, Reference Case* (Aug, 2012).

National Supply – Overview

Domestic gas production and reserves collectively provide an abundant domestic supply of natural gas. Domestic gas production has been on a significant upward trend in recent years as rapid growth in supply from unconventional discoveries has more than compensated for declines in production from conventional onshore and offshore fields. EIA estimates that U.S. dry natural gas production was 63.2 Bcf/d in August 2011, a 6.2% increase over August 2010 dry natural gas production of 59.5 Bcf/d.[17] Increased drilling productivity in certain prolific shale gas formations, including the Marcellus and Haynesville shales, has enabled domestic production to continue expanding despite a reduction in the number of wells drilled.

In its *Annual Energy Outlook 2011*, EIA noted that U.S. shale gas production grew at an average rate of 17% between 2000 and 2006. The rate of growth accelerated substantially during the period from 2006 to 2010, with an annual growth rate averaging 48%. EIA expects this increase in shale gas production to continue through 2035, when it will make up an estimated 47% of total U.S. natural gas production, up considerably from a 16% share in 2009.

EIA has significantly increased its estimate of shale gas production for 2015, 2020, 2025, 2030, and 2035 compared with EIA's projections in the *Annual Energy Outlook 2011*. For example, EIA revised its projected shale gas production for 2015 from 3.85 Tcf to 8.24 Tcf. [18] Similarly, EIA revised its projection of shale gas production for 2035 from 6.00 Tcf to 13.63 Tcf.[19]

The growth in shale gas production has been accompanied by an increase in the overall volume of U.S. natural gas resources. In 2011, EIA substantially increased its estimate of technically recoverable natural gas resources in the U.S. to 2,543 Tcf.[20]

This growth in U.S. natural gas resources is reflected in other recent academic and industry evaluations. In April 2011, the Potential Gas Committee of the Colorado School of Mines determined that the U.S. possesses a future available gas supply of 2,170 Tcf, the highest resource evaluation in the group's 46-

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[17] Energy Information Administration *Natural Gas Gross Withdrawals and Production*, available at http://www.eia.gov/dnav/ng/hist/n9070us2m.htm

[18] Energy Information Administration *Annual Energy Outlook 2012* at Table A-14; Energy Information Administration, *Annual Energy Outlook 2011* at Table A-14, (Apr. 2011).

[19] *Id.*

[20] Energy Information Administration *Assumptions to the Annual Energy Outlook 2011*, Table 9.2, *available at http://www.eia.gov/forecasts/aeo/assumptions/pdf/0554(2012).pdf*

year history, and enough to satisfy 90 years of domestic market needs based on 2010 consumption. [21] This assessment included 687 Tcf of shale gas resources, which is 32% of the total available supply.[22]

In its recently published study, The Future of Natural Gas ("MIT Report"), the Massachusetts Institute of Technology estimates that the U.S. has a mean remaining resource base of approximately 2,150 Tcf.[23] This estimate includes approximately 1,000 Tcf of recoverable shale gas resources,[24] and approximately 400 Tcf of which could be economically developed with a gas price at or below $6/MMBtu at the well-head.[25]

According to the July 2011 report titled "Shale Gas and U.S. National Security" by the James A. Baker III Institute for Public Policy at Rice University, North America has a mean technically recoverable shale gas resource of 937 Tcf, with 637 Tcf of that located in the U.S. The report assigns a weighted mean break-even price for U.S. shale gas resources of $5.42/MMBtu.[26] This report indicates that the break-even price is the average price needed for development of up to 60 percent of the identified technically recoverable resource.[27]

A July 2011 report commissioned by EIA, estimates U.S. onshore lower 48 states shale gas resources to be 750 Tcf.[28] These studies and reports indicate that the U.S. has a 90- to an over 100-year inventory of recoverable natural gas resources. This inventory is expected to continue growing as further advancements in drilling technology are deployed to exploit additional shale gas opportunities.

Regional Supply

The proposed ELS terminal will be located in an area with robust access to natural gas supplies due to a highly integrated and well developed natural gas pipeline system. ELS expects the project to directly interconnect with interstate pipelines with an existing capacity of at least 3.6 Bcf per day and up to

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[21] Potential Gas Committee, "Potential Supply of Natural Gas in the United States: Report of the Potential Gas Committee (Dec 31,2010)," *available at* http://www.potentialgas.org/PGC%20Press%20Conf%202011%20slides.pdf (Apr. 2011).
[22] *Id.*
[23] Massachusetts Institute of Technology, *The Future of Natural Gas,* at 24 (Fig. 2.8), *available at* http://web.mit.edu/mitei/research/studies/documents/natural-gas-2011/NaturalGas_Report.pdf (2011).
[24] *Id*.
[25] *Id*. at 31 (Fig. 2.14(b).
[26] The weighted mean break-even price for United States shale gas resources was calculated based on break-even price estimates presented in the MIT Report.
[27] Baker Institute, *Shale Gas and U.S. National Security* at pp. 24-25 (July 2011).
[28] Energy Information Administration, *Review of Emerging Resources: U.S. Shale Gas and Shale Oil Plays*, at p. 5, *available at* http://www.eia.gov/analysis/studies/usshalegas/pdf/usshaleplays.pdf (July 2011).

approximately 4.6 Bcf per day.[29] In addition to substantial existing gas transportation capacity in the region, the area is blessed with large quantities of natural gas resources. All of the gas used as feedstock to run the facility (1.2 Bcf/d) can come from Texas production.[30] This increased demand is not expected to result in a large increase in production by the shale deposits in South Texas because these deposits are of sufficient quality to be developed regardless of the ELS terminal. Instead, most of the demand associated with the ELS Terminal will be satisfied through displacement with only about one-third of the needed supply coming from incremental production within Texas.[31]

National Natural Gas Demand

Over the past decade, there has been essentially no growth in the demand for natural gas in the U.S. According to data published by EIA, natural gas demand in 2011 was only 4.2% higher than in 2000.[32] In its *Annual Energy Outlook 2012*, EIA estimated long term annual U.S. demand growth of only 0.4%, with demand expected to reach 26.6 Tcf in 2035 (compared to 22.8 Tcf of actual demand in 2009).[33]

The table below presents a comparison of actual demand and prices in 2011 and forecasted demand and prices in the year 2020, based on information presented in the *Annual Energy Outlook 2012*.[34]

	2011	**2020**
Natural Gas Demand (Bcf/day)	67.2	69.8
Henry Hub Spot Price ($/MMBtu)	3.94	4.58
Average Lower 48 Wellhead Price ($/MMBtu)	3.72	4.10

The consensus of estimates by EIA and academic and industry experts is that the U.S. has between 2,000 and 2,543 Tcf of recoverable natural gas resources. Even at 100% utilization, the Project would

[29] B&V Report at 9.
[30] Deloitte MarketPoint, *Analysis of Economic Impact of LNG Exports from the United States*, at p. 14.
[31] Id.
[32] Energy Information Administration, *Natural Gas Consumption by End Use available at* http://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm.
[33] Energy Information Administration, *Annual Energy Outlook 2012,* Table A13.
[34] Energy Information Administration, *Annual Energy Outlook 2012* Table 13, *available at* http://www.eia.gov/oiaf/aeo/tablebrowser/#release=AEO2012&subject=0-AEO2012&table=13-AEO2012&region=0-0&cases=ref2012-d020112c. Volumes state in Tcf per year in the *Annual Energy Outlook 2012* were converted Bcf per day. In addition, 2010 volumes and prices were updated to 2011 actual volumes and prices, based on EIA Natural Gas Summary available at: http://www.eia.gov/dnav/ng/ng_sum__lsum_dcu_nus_a_htm.

result in maximum natural gas requirements of 10.7 Tcf over the 20-year term of the requested authorization[35]. This represents only 0.42% to 0.53% of total estimated recoverable U.S. natural gas resources.

Supply-Demand Balance Demonstrates Weak National and Regional Need

As discussed above, the enormous available domestic supply of natural gas dwarfs current U.S. demand, and even under the extreme case of operating at 100% utilization, the natural gas to be exported from the ELS Terminal is substantially less than 1% of the available resources. The current low price of natural gas is a consequence of a buyer's market due to plentiful supply and limited domestic need. The interest in exporting gas from the U.S. despite the billions of dollars of investment to develop a single LNG export terminal is a reflection of these market conditions.

As more fully described in the Deloitte MarketPoint Analysis, the issue is not merely one of volume, but also of price impact. "In a free market economy, price is one of the best measures of scarcity, and if price is not significantly affected, then scarcity and shortage of supply typically do not occur. A key determinant to the estimated price impact is the supply response to increased demand including LNG exports."[36] The Deloitte MarketPoint Analysis's modeling approach accounts for this supply-demand dynamic and considers how producers will change their production in response to demand, rather than simply assuming that supply will be brought into equilibrium with increase demand through a change in price.[37] The result of this modeling "indicates that the projected level of exports is not likely to induce scarcity on domestic markets."[38]

Price Impacts – Natural Gas

The two studies commissioned by ELS in conjunction with its Application address the subject of price impacts related to the export of natural gas from the U.S. via the ELS terminal. The Deloitte MarketPoint Analysis considers LNG exports ranging from 1.33 Bcf/d (ELS Terminal exports only) to 12 Bcf/d (ELS Terminal plus 9.67 additional Bcf/d of exports from other Gulf of Mexico terminals plus

[35] This number was calculated by multiplying 1.33 Bcf/d by 365 days/year times 20 years and increasing the result by 10% to allow for losses and gas to operate the ELS Terminal.
[36] Deloitte MarketPoint, *Analysis of Economic Impact of LNG Exports from the United States*, at p. 1.
[37] Id. at p. 2
[38] Id. at p. 4

1 Bcf/d of Cove Point exports).[39] The results of the Deloitte MarketPoint Analysis are reflected in Figure 2 of that study, which are set forth below:

Export Case	Average U.S. Citygate	Henry Hub	New York
1.33 Bcf/d	0.4%	0.4%	0.3%
3 Bcf/d	1.0%	1.7%	0.9%
6 Bcf/d	2.2%	4.0%	1.9%
9 Bcf/d	3.2%	5.5%	3.2%
12 Bcf/d	4.3%	7.7%	4.1%

In no case did the impacts on average U.S. Citygate prices for the assumed years of operation of the ELS terminal (2018-2037) reach even 5% and Henry Hub, which experiences a greater impact due to its proximity to the modeled location of most of the exports, is expected to have only a 7.7% increase. This equates to a maximum price increase of 30 cents per MMBtu at the U.S/ Citygate and 50 cents at Henry Hub[40] -- a change smaller than that frequently experienced by the natural gas industry due to other causes. As the price of natural gas rises, the industry is able to produce more natural gas than had to be consumed to cause the initial price increase. Thus, natural gas becomes more abundant and it takes ever larger jumps in demand to produce additional price increases of a similar magnitude, muting the price impacts of changing demand.[41]

The benefits associated with the Lavaca Bay Project compellingly demonstrate that the project is consistent with DOE's public interest criteria.

[39] *Id.* at p. 3.
[40] For example, as reported by the EIA, the average monthly Henry Hub spot price for natural gas in 2011 ranged from $3.17 to $4.54 per MMBtu (a change of $1.37 per MMBtu) and the average January Henry Hub spot price during the period 2008 to 2012 ranged from $2.67 to $7.99 per MMBtu (a change of $5.32 per MMBtu. http://www.eia.gov/dnav/ng/hist/rngwhhdm.htm (September 25, 2012).
[41] B&V Report at p. 8.

Promote Long-Term Stability in Natural Gas Markets

Lower U.S. natural gas prices have led to decreased capital spending on drilling and development activities.[42] Exporting natural gas would create increased demand for domestically produced gas, and would contribute to a small increase in domestic natural gas prices. Both of these factors would help encourage investment and would stabilize the natural gas industry.[43] Of broader importance is the stabilizing affect increased exports would have on both the price and availability of natural gas for domestic uses.

The stabilizing effects would stem from several causes;

First, simply by increasing the size and diversity of the demand for natural gas to include consumers in other nations, volatility in demand decreases, which will contribute to more stable prices in the U.S.

Second, a greater domestic production base and upgraded gas transmission capabilities present an opportunity for rapid, voluntary diversion of gas supply to domestic purposes should domestic demand change rapidly. Consider the possibilities if the U.S. were to have a catastrophic event at a U.S. nuclear plant, leading to the shutdown of a large portion of the U.S. nuclear generating fleet. In such a situation, an expanded U.S. natural gas industry could respond quickly through a global least cost solution. Exporters could chose to cancel export shipments and divert gas for use in domestic natural gas generating facilities, while foreign counter parties were made economically whole under the terms of their contracts. In contrast, a smaller U.S. natural gas industry would not have the option to redeploy foreign bound gas, and production and transportation capabilities would be more limited. Simply producing more gas immediately would not be an option and trying to expedite the drilling of new

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[42] See, *e.g.*, *The American Shale Gas Revolutions: Fundamental Winners and Losers,* by Marcus V. McGregor, in Asset Management Viewpoint, Volume 16, #2 (April 2012) (Noting: "Operators have been allocating more capital to exploration and production of liquids in order to mitigate the recent decline in natural gas spot prices ….) Available at https://www.conning.com/uploadedFiles/Asset_Management/Point_of_View/Viewpoint/04-2012%20Shale%20Gas%20Revolution%20FINAL.pdf as of September 26, 2012. Chesapeake Energy operated 100 natural gas rigs in January of 2010; as of August 2012 its rig counted was 10. Chesapeake Energy September 2012 Investor Presentation, available at http://www.chk.com/investors/documents/latest_ir_presentation.pdf as of September 26, 2012.

[43] In the February 2012 issue (Vol 233 No. 2) of World Oil Online James C. West, Anthony Walker, Zachary Sadow and Rachel Nabatoan of Barclays Capital reported on the results of a survey of 351 oil and gas operating companies. "Roughly 27% of companies surveyed plan on increasing spending [on natural gas exploration and production activities] if natural gas prices average $4.50/MMbtu in 2012, and 70% would do so if they average $5.00/MMbtu. Nearly half of surveyed companies would cut back spending if gas averaged $3.50/MMbtu, while $3.00/MMbtu was the most popular threshold for companies to reduce budgets." http://www.worldoil.com/February-2012-EP-spending-to-reach-record-600-billion.html, as of September 26, 2012.

wells on an emergency basis would increase the level of environmental risk. The only immediately available course of action would involve establishing a new short-term equilibrium in a domestic-only market with fewer options, leading to much higher prices and a greater potential for scarcity of natural gas for electricity generation.

Finally, in the natural gas industry, increased production moves production to a flatter part of the supply curve. Such a situation means that futures increases (or decreases) in demand of a given increment result in smaller change in price and increased amounts of available supply. In such an environment, both supply and prices are less volatile.

Benefits to Local, Regional and U.S. Economies

The construction and operation of the ELS Project will stimulate the local, regional, and national economies through job creation, increased economic activity and tax revenues. Much of the technology, equipment, and material needed to construct the ELS Project will be obtained from U.S. sources. Moreover, the national economy will benefit from the ELS Project's role in supporting the E&P value chain for natural gas extraction. This stimulus will have a profound multiplier effect due to the wages, taxes and lease payments involved in the natural gas supply chain.

The economic benefits of the ELS Project are broken down into the primary and secondary economic impacts of the construction and operation of the first phase of the ELS Project on the local project area, Texas, and the nation. [44]

Primary Economic Impacts

The ELS Project will provide a significant source of employment, economic activity and tax revenues to the regional and national economies. The estimated Phase 1 direct expenditures will be $1.36 billion with $319 million of that amount occurring within the "Primary Impact Area" (a defined region around the ELS Terminal). Additionally, $493 million will be spent outside of the Primary Impact Area in Texas, with the remaining $522 million spent nationally. [45]

[44] Black and Veatch Report, *supra* note 11.
[45] Black & Veatch Report, *supra* note 11, at section 6, page 1.

Secondary Economic Impacts

Other benefits of the ELS Project will not be limited to the primary impacts discussed above because the direct expenditures ripple through the economy. The primary impact area construction expenditures are estimated to account for more than $526 million in total production from all industries impacted by those expenditures (total economic output), and generate $17.2 million in state and local taxes, as well as $32.2 million in total federal tax revenues.[46] The operational impacts over the first 20 years are estimated to be $870 million (in 2012 dollars), generating $26 million in state and local taxes, and an additional $40 million in federal taxes.[47]

Estimated positive impacts for the U.S. as a whole are considerably greater. The ELS Project's construction related contribution to total economic output in the U.S. is projected to be nearly $3.32 billion, with tax revenues for state and local authorities of more than $154 million, and federal tax revenues of nearly $242 million.[48] Similarly, the ELS Project's operations related contribution to total economic output in the U.S. is estimated to exceed $2.04 billion, with state and local tax revenues in excess of $74 million and federal taxes of nearly $120 million[49]. As noted previously, these estimates are just for Phase 1. For the full project, the impacts will be roughly two-thirds greater.[50]

Jobs

Unemployment is a huge concern at present and both studies have shown the positive impact the ELS Project will have on the job market. Construction of Phase 1 of the Project is projected to support the employment of an average of 7,122 workers each year for three years.[51] The construction of Phase 2 would increase the total number of jobs created in certain years, as well as extend the period of job creation. A mix of skilled and unskilled labor would be required, resulting in an average labor income associated with each of these 7,122 jobs of $64,163.[52] The operation of the ELS Project is anticipated to result in the employment of an additional 696 workers each year over the entire life of the project.[53]

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[46] Id., at p. 6 [second page 6 in Section 6.2].
[47] Id., at p. 11 [second page 11 in Section 7.2].
[48] Id. at p. 7
[49] Id., at p. 12.
[50] Id. at p. 1.
[51] Id. at p. 2.
[52] Id. at p. 6 [second page 6 in Section 6.2]
[53] Id.

The average wages and benefits associated with the portion of these jobs falling in the Primary Impact Area are even higher than the construction related work -- $75,833/job.[54]

International Considerations

Recent world events, such as the continuing weakness of certain European Union economies, have served as ample reminders that the welfare of U.S. citizens is interdependent on the health of the world economy. In May 2012, the Brookings Institution's Energy Security Initiative released its Policy Brief 12-01 "Liquid Markets: Assessing the Case for U.S. Exports of Liquefied Natural Gas", by Charles Ebinger, Kevin Massy and Govinda Avasarala ("Brookings Study"), and in analyzing the international implications of LNG exports, the authors broke the subject down into three components: pricing, geopolitics, and the environment.

With respect to pricing, the Brookings Study observes: " LNG exports will help to sustain market liquidity in what looks to be an increasingly tight LNG market beyond 2015."[55] Looser or more liquid markets help place downward pressure on the pricing terms of oil-linked contracts, which are common in the world markets for LNG. This has resulted, in the renegotiation of some contracts, particularly in Europe.[56] Lower prices for energy in Europe and elsewhere can contribute to an uptick in the world economy, fueling increased trade with the U.S.

With respect to geopolitics, the Brookings Study concludes: "A large increase in U.S. LNG exports would have the potential to increase U.S. foreign policy interests in both the Atlantic and Pacific basins."[57] "The addition of a large, market-based producer [*i.e.*, the U.S.] will indirectly serve to increase gas supply diversity in Europe, thereby providing European consumers with increased flexibility and market power. … Increased LNG exports will provide similar assistance to strategic U.S. allies in the Pacific Basin. By adding supply volumes to the global LNG market, the U.S. will help Japan, Korea, India, and other import-dependent countries in South and East Asia to meet their energy needs. … As U.S. foreign policy undergoes a 'pivot to Asia,' the ability of the U.S. to provide a degree

[54] Id. Operational jobs associated with the ELS Project over the entirety of the U.S. have a similar per job value of $71,840.
[55] Brookings Study at p. 39.
[56] Id. at p. 38.
[57] Id. at p. 41.

of increased energy security and pricing relief to LNG importers in the region will be an important economic and strategic asset."[58]

Finally, as to the environment, the Brooking Study states:

> "According to the [International Energy Agency], natural gas in general has the potential to reduce carbon dioxide emissions by 740 million tonnes in 2035, nearly half of which could be achieved by the displacement of coal in China's power-generation portfolio. Natural gas—in the form of LNG—also has the potential to displace more carbon-intensive fuels in other major energy users, including across the EU and in Japan, which is being forced to burn more coal and oil-based fuels to make up for the nuclear generation capacity lost in the wake of the Fukushima disaster. In addition to its relatively lower carbon-dioxide footprint, natural gas produces lower emissions of pollutants such as sulfur dioxide nitrogen oxide and other particulates than coal and oil."[59]

The Brookings Study also notes that some have expressed concern that lower gas prices may lead to increased carbon dioxide emissions due to the displacement of nuclear and renewable energy by cheap natural gas.[60] ELS asserts that such concerns are misplaced. First, as the Brookings Study concludes, export of U.S. natural gas would not have a substantial impact on the need for other energy sources to generate electricity.[61] Second, U.S. LNG exports are driven by the price differential between the destination markets and the U.S. natural gas market. Destination markets must command a significant price premium in order to cover the cost of liquefaction, transportation and regasification. Such considerations all favor the use of nuclear and renewable energy sources overseas relative to their competitiveness against natural gas in the U.S. Moreover, any tendency on the part of LNG exports to raise the cost of U.S domestic gas supplies not only tends to reduce the volume of exports, it also contributes to the increased use of alternative forms of generation in the U.S., making nuclear and renewable energy more affordable. Thus, any loss of competitiveness of such generating technologies

[58] Id. at p. 43.
[59] Id. at p. 44.
[60] Id.
[61] Id.

abroad would be at least partially mitigated by increased competitiveness of these technologies in the U.S.

There is yet another area in which exports of LNG will be beneficial to the U.S. The export of LNG from the U.S. directly improves the U.S. balance of trade:

> "Even at a market natural gas price of $3/MmBtu and 80 percent utilization, the project will result in added exports in the range of $1.35 billion each year when including a tolling and project pipeline transport fee of approximately $3.5/MmBtu. This annual impact increases to approximately $1.78 billion at a natural gas price of $5/MmBtu and approximately $2.2 billion at a market price of $7/MmBtu."[62]

Conclusion

The overall outlook for domestic natural gas production is promising. The rapid growth of natural gas supplies in South Texas and nationally has driven the discussions regarding the export of LNG. Without a significant increase in U.S. residential, commercial and industrial demand, the current rate of consumption is not enough to offset growth in production, and may contribute to sustained low prices for natural gas in the U.S. This rapid growth, without increased demand, is already resulting in decreased investment by the natural gas industry and a reduction in associated economic activity. Low wellhead prices have also encouraged increased flaring of natural gas that otherwise could have been economically recovered. It is our belief that the export of domestically produced LNG represents a market driven path toward deploying the country's vast energy reserves in a manner that meaningfully contributes to the public interest in a variety of ways:

- More jobs, greater tax revenues, and increased economic activity;
- New competitive supplies introduced into world gas markets, leading to improved economies among America's trading partners, and providing better opportunities to market U.S. products and services abroad;
- Greater national security through a larger role in international energy markets, assisting our allies, and reducing dependence on foreign oil through co-production of oil and natural gas liquids that might otherwise be uneconomic;

[62] B&V Report at p. 17 [Second p. 17, Section 7]

- Increased production capacity able to better adjust to varying domestic demand scenarios;
- Less volatile domestic natural gas prices;
- Improved U.S. balance of payments by between $2.4 billion and $4.4 billion annually per terminal through the export of natural gas and the displacement of imports of other petroleum liquids;[63] and
- Increased economic trade and ties with foreign trading partners and hemispheric allies, and displacement of environmentally damaging fuels in those countries.

[63] B&V Report at 12 (based on $1.2 - 2.2 billion for Phase I alone, exporting 4 MPTA). Other studies have found even greater benefits for individual LNG export terminals. B&V Report at 14-15.