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10-161-LNG

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December 17, 2010

VIA COURIER

Mr. John Anderson
Office of Fossil Energy [FE-34]
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

RE: In the Matter of Freeport LNG Expansion, L.P.
FLNG Liquefaction, LLC
FE Docket No. 10___LNG
Application for Long-Term Authorization to Export Liquefied Natural Gas
To Non-Free Trade Agreement Countries

Dear Mr. Anderson:

Enclosed for filing on behalf of Freeport LNG Expansion L.P. and FLNG Liquefaction, LLC (collectively, "FLEX"), please find an original and five (5) copies of Freeport's application for long-term, multi-contract authorization to engage in exports up to the equivalent of 9 million metric tons per year of liquefied natural gas ("LNG"), up to a total of 225 million metric tons. Authorization is sought for a 25-year period, to commence on the date of first export or 5 years from the date of issuance of the authorization requested by this application, whichever is sooner.

FLEX proposes to export LNG from Quintana Island near Freeport, Texas to any country with which the United States does not have a free trade agreement ("FTA") requiring national treatment for trade in natural gas and LNG, which has or in the future develops the capacity to import LNG via ocean-going carrier, and with which trade is not prohibited by U.S. law or policy.

This application is filed in parallel with FLEX's contemporaneous, separate application to DOE/FE requesting long-term, multi-contract authorization to export LNG to any country which has developed or in the future develops the capacity to import LNG via ocean-going carrier, and with which the United States has an FTA requiring national treatment for trade in natural gas and LNG.

FLEX respectfully requests that DOE/FE issue an order pursuant to Section 3(c) of the Natural Gas Act, as amended by Section 201 of the Energy Policy Act of 1992, for long-term, multi-contract authorization to export LNG to non-FTA countries.

Respectfully submitted,

Les Lo Baugh
Attorneys for
Freeport LNG Expansion, L.P.
FLNG Liquefaction, LLC

UNITED STATES OF AMERICA
BEFORE THE
DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY

In the Matter of:
Freeport LNG Expansion, L.P.
FLNG Liquefaction, LLC

Docket No. 10-161 LNG

APPLICATION OF FREEPORT LNG EXPANSION, L.P. AND FLNG LIQUEFACTION, LLC FOR LONG-TERM AUTHORIZATION TO EXPORT LIQUEFIED NATURAL GAS TO NON-FREE TRADE AGREEMENT COUNTRIES

Communications with respect to this Application should be addressed to:

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December 17, 2010

UNITED STATES OF AMERICA
BEFORE THE
DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY

Freeport LNG Expansion, L.P.
FLNG Liquefaction, LLC

DOCKET NO. 10-161 LNG

APPLICATION OF
FREEPORT LNG EXPANSION, L.P. AND FLNG LIQUEFACTION, LLC
FOR LONG-TERM AUTHORIZATION TO EXPORT LIQUEFIED NATURAL GAS
TO NON-FREE TRADE AGREEMENT COUNTRIES

Freeport LNG Expansion, L.P. ("FLNG Expansion") and FLNG Liquefaction, LLC ("FLNG Liquefaction") (collectively, "FLEX") request that the Department of Energy ("DOE") Office of Fossil Energy ("FE"), grant a long-term, multi-contract authorization for FLEX to export up to the equivalent of 9 million metric tons per annum ("mtpa")[1] of liquefied natural gas ("LNG"), up to a total of 225 million metric tons. Authorization is sought for a 25-year period, to commence on the date of first export or 5 years from the date of issuance of the authorization requested by this application, whichever is sooner. FLEX proposes to export LNG from Quintana Island near Freeport, Texas to any country with which the United States does not have a free trade agreement ("FTA") requiring national treatment for trade in natural gas and LNG, which has or in the future develops the capacity to import LNG via ocean-going carrier, and with which trade is not prohibited by U.S. law or policy.

[1] 9 mtpa of LNG is equivalent to 1.4 billion cubic feet per day ("Bcf/d") of LNG, which is equivalent to approximately 1.4 trillion BTUs per day. When operating at full capacity, the Liquefaction Project will consume approximately 0.1 Bcf/d to power the liquefaction facilities, resulting in a total natural gas volume requirement of 1.5 Bcf/d.

This application is filed in parallel with FLEX's contemporaneous, separate application to DOE/FE requesting long-term, multi-contract authorization to export LNG to any country which has developed or in the future develops the capacity to import LNG via ocean-going carrier, and with which the United States has an FTA requiring national treatment for trade in natural gas and LNG.

This application is submitted pursuant to Section 3 of the Natural Gas Act ("NGA"),[2] Part 590 of the Regulations of the DOE,[3] and Section 201 of the Energy Policy Act of 1992.[4] In support of this application, applicants respectfully show as follows:

I.
COMMUNICATIONS AND CORRESPONDENCE

Correspondence and communications regarding this application should be addressed to the following:

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II.
DESCRIPTION OF THE APPLICANT

The exact legal name of FLNG Expansion is Freeport LNG Expansion, L.P., a Delaware limited partnership and a wholly owned subsidiary of Freeport LNG Development, L.P. ("FLNG Development"). The exact legal name of FLNG Liquefaction is FLNG Liquefaction, LLC, a

[2] 15 U.S.C. § 717b (2010).

[3] 10 C.F.R. § 590 (2010).

[4] Pub. L. No. 102-486, § 201, 106 Stat. 2776. 2866 (1992) (codified as amended at 15 U.S.C. § 717b(c) (2010)).

Delaware limited liability company and a wholly owned subsidiary of FLNG Expansion. The principal place of business for both FLNG Expansion and FLNG Liquefaction is located at 333 Clay Street, Suite 5050, Houston, Texas 77022. FLNG Expansion and FLNG Liquefaction are authorized to do business in the State of Texas.

FLNG Development is a Delaware limited partnership with four limited partners: (1) Freeport LNG Investments, LLLP, a Delaware limited liability limited partnership, which owns a 20% limited partnership interest in FLNG Development; (2) ZHA FLNG Purchaser LLC, a Delaware limited liability company and wholly owned subsidiary of Zachry American Infrastructure, LLC, which owns a 55% limited partnership interest in FLNG Development; (3) Texas LNG Holdings LLC, a Delaware limited liability company and wholly owned subsidiary of The Dow Chemical Company, which owns a 15% limited partnership interest in FLNG Development; and (4) Turbo LNG, LLC, a Delaware limited liability company and wholly owned subsidiary of Osaka Gas Co., Ltd., which owns a 10% limited partnership interest in FLNG Development.

In addition to the limited partners, FLNG Development has one general partner that manages the company, Freeport LNG-GP, Inc., a Delaware corporation, which is owned 50% by an individual, Michael S. Smith, and 50% by ConocoPhillips Company.

On March 28, 2003, FLNG Development filed an application with the Federal Energy Regulatory Commission ("FERC") under Section 3 of the Natural Gas Act requesting authority to site, construct and operate what is now known as Phase I of the Freeport Terminal on Quintana Island, southeast of the City of Freeport in Brazoria County, Texas.[5] The Phase I

[5] *See Freeport LNG Development, L.P.*, 107 FERC ¶ 61,278, (2004), *order granting rehearing and clarification*, 108 FERC ¶ 61,253 (2004), *order amending Section 3 authorization*, 112 FERC ¶ 61,194 (2005), *order issuing authorization*, 116 FERC ¶ 61,290 (2006).

facilities, authorized by FERC on June 18, 2004 and completed in June 2008, include an LNG ship marine terminal and unloading dock, LNG transfer lines and storage tanks, high-pressure vaporizers, and a 9.6-mile send-out pipeline extending to the Stratton Ridge meter station.

FLNG Development filed a second application with FERC on May 26, 2005 requesting authorization to expand the Phase I facilities. Phase II, as the expansion is known, would increase the Freeport Terminal's send-out capacity by adding a second marine berthing dock and additional vaporization and storage capacity. Phase II was authorized by FERC on September 26, 2006, but expansion under this order has not commenced.

On January 15, 2008 the DOE/FE granted FLNG Development blanket authorization to import LNG, in a total amount up to the equivalent of 30 billion cubic feet (Bcf) from various international sources pursuant to transactions that have terms of up to two years.[6] On December 4, 2009, FLNG Development filed another application with the DOE/FE under Section 3 of the NGA, for blanket authorization to import LNG for an additional two-year term. On December 15, 2009 DOE/FE granted FLNG Development authorization to import LNG in an amount up to the equivalent of 30 Bcf of natural gas from various international sources for a second two-year term beginning on March 1, 2010 and ending February 29, 2012.[7]

Also in 2008, FLNG Development filed an application with FERC requesting authorization to modify the Freeport Terminal to enable the loading and export of foreign-source LNG from the Freeport Terminal. In an order dated May 6, 2009, FERC authorized certain equipment modifications at the Freeport Terminal as required to engage in such export

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[6] *Freeport LNG Development, L.P.*, FE Docket No. 07-136-LNG, Order No. 2457 (Jan. 15, 2008). 15 U.S.C. §717b. This authority is delegated to the Assistant Secretary for FE pursuant to Redelegation Order No. 00.002.04D (November 6, 2007).

[7] *Freeport LNG Development, L.P.*, FE Docket No. 09-130-LNG, Order No. 2737 (Dec. 15, 2009).

activities.[8] While seeking authorization from FERC, FLNG Development sought parallel authorization from DOE/FE to export foreign-sourced LNG on a short-term basis, which was granted on May 28, 2009 under DOE/FE Order No. 2644.[9] Under that order, FLNG Development was authorized to export, on its own behalf or as an agent for others, up to a total quantity of 24 Bcf of foreign-source LNG from the Freeport Terminal over a two-year period to customers in the U.K., Belgium, Spain, France, Italy, Japan, South Korea, India, China and/or Taiwan. This authorization was later amended to permit export to Canada, Mexico, and any other country with the capacity to import LNG via ocean-going carrier and with which trade is not prohibited by U.S. law or policy.[10]

On November 19, 2010, FLNG Expansion filed an application for blanket authorization to export up to a combined total of 876 Bcf of LNG to Canada and Mexico for a two-year term. This request was granted by DOE/FE in Order No. 2884 on December 1, 2010.[11]

III.

LIQUEFACTION PROJECT DESCRIPTION

FLEX, through one or more of its subsidiaries, proposes to develop, own and operate natural gas liquefaction facilities to receive and liquefy domestic natural gas for export to foreign markets (the "Liquefaction Project"). The Liquefaction Project facilities will be integrated into the existing Freeport Terminal. The Freeport Terminal presently consists of a marine berth, two 160,000 m^3 full containment LNG storage tanks, LNG vaporization systems, associated utilities and a 9.6-mile pipeline and meter station.

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[8] *Freeport LNG Development, L.P.*, 127 FERC § 61,105 (May 6, 2009).

[9] *Freeport LNG Development, L.P.*, FE Docket No. 08-70-LNG, Order No. 2644 (May 28, 2009).

[10] *Freeport LNG Development, L.P.*, FE Docket No. 08-70-LNG, Order Nos. 2644-A (September 22, 2009) and 2644-B (May 11, 2010).

[11] *Freeport LNG Expansion, L.P.*, FE Docket No. 10-150-LNG, Order No. 2884 (Dec. 01, 2010).

FLEX now proposes to expand the terminal to provide natural gas pretreatment, liquefaction, and export capacity of up to 9 mtpa of LNG. The facility will be designed so that the addition of liquefaction capability will not preclude the Freeport Terminal from operating in vaporization and send-out mode. The proposed Liquefaction Project facilities will include the following facilities that were previously authorized by FERC in its order dated September 26, 2006[12]:

- A second marine berthing dock;
- A third LNG storage tank; and
- Transfer pipelines between the second marine dock and LNG storage tanks.

Contemporaneous with the filing of this application, FLEX is requesting that FERC initiate its mandatory National Environmental Policy Act ("NEPA") pre-filing review process for the Liquefaction Project. FLEX anticipates filing a formal application with FERC in the fourth quarter of 2011 requesting that FERC issue an Order authorizing the siting, construction and operation of the Liquefaction Project.

IV.

AUTHORIZATION REQUESTED

In this application, FLEX requests that DOE/FE grant a long-term, multi-contract authorization for FLEX to export LNG from the Freeport Terminal on Quintana Island, Texas, to any country with which the United States does not have an FTA requiring national treatment for trade in natural gas and LNG, which has developed or in the future develops the capacity to import LNG via ocean-going carrier, and with which trade is not prohibited by U.S. law or policy. FLEX requests this authorization for up to 9 mtpa of LNG, up to a total of 225 million

[12] *Freeport LNG Development, L.P.*, 116 FERC § 61,290, Docket No. CP05-361-000 (Sep. 6, 2006).

metric tons, over a 25-year term beginning on the date of first export or 5 years from the date of issuance of the authorization requested by this application, whichever is sooner.

Rather than enter into long-term natural gas supply or LNG export contracts, FLEX contemplates that its business model will be based primarily on Liquefaction Tolling Agreements ("LTA"), under which individual customers who hold title to natural gas will have the right to deliver that gas to FLEX and receive LNG. In the current natural gas market, LTAs fulfill the role previously performed by long-term supply contracts, in that they provide stable commercial arrangements between companies involved in natural gas services. The Liquefaction Project described above will require significant capital expenditures on fixed assets. Although FLEX has not yet entered into long-term LTAs or other commercial arrangements, long-term export authorization is required to attract prospective LTA customers willing to make large-scale, long-term investments in LNG export arrangements. Both are required to obtain necessary financing for the Liquefaction Project.

FLEX requests long-term, multi-contract authorization to engage in exports of LNG on its own behalf or as agent for others. FLEX contemplates that the title holder at the point of export[13] may be FLEX or one of FLEX's LTA customers, or another party that has purchased LNG from an LTA customer pursuant to a long-term contract. FLEX requests authorization to register each LNG title holder for whom FLEX seeks to export as agent, and proposes that this registration include a written statement by the title holder acknowledging and agreeing to comply with all applicable requirements included by DOE/FE in FLEX's export authorization, and to include those requirements in any subsequent purchase or sale agreement entered into by that title holder. In addition to its registration of any LNG title holder for whom FLEX seeks to

[13] LNG exports occur when the LNG is delivered to the flange of the LNG export vessel. *See The Dow Chemical Company*, FE Docket No. 10-57-LNG, Order No. 2859 at p. 7 (Oct. 5, 2010).

export as agent, FLEX will file under seal with DOE/FE any relevant long-term commercial agreements between FLEX and such LNG title holder, including FTAs, once they have been executed.[14]

FLEX is aware of DOE/FE's desire to ensure that all authorized exports are permitted and lawful under U.S. laws and policies, including the rules, regulations, orders, policies and other determinations of the Office of Foreign Assets Control of the U.S. Department of the Treasury.[15] Each of these goals of DOE can be efficiently and fully achieved through the arrangements proposed by FLEX. Whether FLEX acts on its own behalf or as agent for others, all parties involved in LNG export through the Liquefaction Project will have notice of all requirements in the export authorization order. As a result, DOE/FE will have each of the items of information it requires to fulfill its regulatory mandate.[16] This approach is responsive to real world market conditions and is fully compliant with the goals and intent of requirements of the applicable DOE regulations.

The source of natural gas supply for the Liquefaction Project will be the general United States natural gas market, including natural gas produced from shale deposits. As discussed in Section V below, the domestic market for natural gas is robust and liquid. Service contracts such as LTAs will fulfill the role historically played by long-term supply agreements, and each LTA customer will rely on their own sources within the general United States gas market. As noted above, FLEX has not yet entered into LTAs or other long-term supply or export contracts, but FLEX and its LTA customers will file their commercial arrangements under seal with DOE/FE

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[14] The practice of filing of contracts after the DOE/FE has granted export authorization is well-established. *See Yukon Pac. Corp.*, ERA Docket No. 87-68-LNG, Order No. 350 (Nov. 16, 1989); *Distrigas Corp.*, FE Docket No. 95-100-LNG, Order No. 1115, at 3 (Nov. 7, 1995).

[15] *See The Dow Chemical Company*, FE Docket No. 10-57-LNG, Order No. 2859 at 7-8 (Oct. 5, 2010).

[16] *Id.*, at 7.

once they have been executed.[17] DOE/FE has previously found that this commitment conforms to the requirements of 10 C.F.R. § 590.202(b), which calls upon applicants to supply transaction-specific information "to the extent practicable."[18]

Pursuant to NEPA, FERC will be the lead agency for environmental review and DOE will act as a cooperating agency. Such conditional orders are routinely issued by DOE/FE, which may review an application to determine whether a proposed authorization is in the public interest concurrent with FERC's review of environmental impacts.[19] FLEX requests that DOE/FE authorize the requested export of LNG produced from domestically sourced natural gas conditioned upon completion of applicable environmental review of the Liquefaction Project by FERC.[20]

V.

EXPORT SOURCES

The gas supply underlying the proposed exports will come primarily from the highly liquid Texas market, but may draw upon the interconnected general U.S. natural gas market.

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[17] The practice of filing of contracts after the DOE/FE has granted export authorization is well-established. *See Yukon Pac. Corp.*, ERA Docket No. 87-68-LNG, Order No. 350 (Nov. 16, 1989); *Distrigas Corp.*, FE Docket No. 95-100-LNG, Order No. 1115, at 3 (Nov. 7, 1995).

[18] *Sabine Pass Liquefaction, LLC*, FE Docket 10-85-LNG, Order No. 2833 (September 7, 2010). 10 C.F.R. 590.202(b) requests certain information, "to the extent applicable," and "supported to the extent practicable by necessary data or documents," regarding the source and security of the natural gas supply proposed for export, including contract volume and a description of the specific gas reserves supporting the project during the time of the requested export authorization.

[19] *See, e.g. Import and Export of Natural Gas*, 46 Fed. Reg. 44,696 at 44,700 (Sep. 4, 1081); *Rochester Gas and Electric Corp.*, FE Docket No. 90-05-NG, Order No. 503 (May 16, 1991).

[20] 10 C.F.R. § 590.402 (2010) ("The Assistant Secretary may issue a conditional order at any time during a proceeding prior to issuance of a final opinion and order. The conditional order shall include the basis for not issuing a final opinion and order at that time and a statement of findings and conclusions. The findings and conclusions shall be based solely on the official record of the proceeding.")

While some of the proposed export supply may be secured through long-term contracts, large volumes are likely to be acquired on the spot market.[21] Thus it is difficult—if not impossible—to identify specific gas reserves that will support the Liquefaction Project during the time of the requested export authorization.

Natural gas markets are especially liquid in the Texas and Louisiana producing areas because several key market centers in the area have ready access to incremental gas supplies from a wide variety of sources and readily available price information. The most publicized market hub in North America, the Henry Hub, is located in southern Louisiana. However, the Texas natural gas market is one of the largest in the world, and is highly liquid as it is intricately connected to other major U.S. markets by a vast network of pipelines.[22] The Houston Ship Channel and the Katy Hub, each in southeast Texas, provide flexibility to natural gas shippers near the Freeport Terminal. Year-to-date in 2010, the physical volume of natural gas traded at the Houston Ship Channel alone is over three times the volume traded at the Henry Hub.[23] In recent years, the expanding development of natural gas resources in the Barnett Shale area of the Fort Worth Basin in north Texas, as well as in the Haynesville Shale area that extends from the Texas/Louisiana border to northern Louisiana's Perryville area, has supported the installation of several new intrastate natural gas pipelines in the area and the expansion of others, in addition to new or expanded gathering systems.

Domestic pipeline capacity has grown significantly in recent years, adding more than 80

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[21] *See, e.g.*, MIT ENERGY INITIATIVE, INTERIM REPORT ON THE FUTURE OF NATURAL GAS 68 (2010) (noting that "a robust spot market has developed in the U.S. and Canada, with a price set by the forces of supply and demand") (hereinafter "MIT REPORT").

[22] THOMAS CHOI, DALE NESBITT, AND BRAD BARNDS, ANALYSIS OF FREEPORT LNG EXPORT IMPACT ON U.S. MARKETS 6, 15 (Altos Management Partners, Inc. 2010) (hereinafter "ALTOS REPORT").

[23] PLATTS INSIDE FERC'S GAS MARKET REPORT, MARKET CENTER SPOT GAS PRICES (2010).

Bcf/day of capacity between 2005 and 2008—with more than half of that added in 2008 alone.[24] About 11 percent of all total natural gas pipeline capacity added in the United States in 2008, 4.6 Bcf/d, was built by Texas intrastate pipelines such as Energy Transfer Partners LP, Enbridge Pipelines Company, and Crosstex Energy Services to transport expanding Barnett shale and Haynesville formation production to local markets and to interconnections with the interstate natural gas pipeline network.[25] In turn, several major interstate pipeline projects were constructed to continue the flow of this natural gas beyond east Texas to interstate pipeline interconnections in Louisiana, Mississippi and Alabama.

Although long-term supply contracts still play a role in the U.S. natural gas market, their price clauses typically reference published spot market prices. This is even reflected in the domestic market where state utility commissions frequently emphasize the desirability of short-term or spot purchases of natural gas and treat utility natural gas purchase contracts of two years or less as long-term contracts. As discussed above, DOE/FE has previously held that a commitment to file commercial arrangements under seal with the DOE/FE conforms to the requirements of 10 C.F.R. § 590.202(b), under which applicants are requested to supply transaction-specific information, such as a description of the specific gas reserves supporting the project, "to the extent practicable."

VI.

PUBLIC INTEREST

A. Applicable Legal Standard

The DOE/FE has the power to approve or deny applications to export natural gas

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[24] MIT ENERGY INITIATIVE, *supra* note 21, at 60 (2010).

[25] EIA, NATURAL GAS PIPELINES IN THE SOUTHWEST REGION, *available at* http://www.eia.doe.gov/pub/oil_gas/natural_gas/analysis_publications/ngpipeline/southwest.html

pursuant to specific authorization in Section 3 of the NGA.[26] The general standards for review of export applications to non-FTA countries are established by Section 3(a), which provides that:

> [N]o person shall export any natural gas from the United States to a foreign country or import any natural gas from a foreign country without first having secured an order of the [Secretary] authorizing it to do so. The [Secretary] shall issue such order upon application, unless, after opportunity for hearing, it finds that the proposed exportation or importation will not be consistent with the public interest. The [Secretary] may by its order grant such application, in whole or in part, with such modification and upon such terms and conditions as the [Secretary] may find necessary or appropriate, and may from time to time, after opportunity for hearing, and for good cause shown, make such supplemental order in the premises as it may find necessary or appropriate.

In applying this statute, the DOE/FE has consistently ruled that it creates a rebuttable presumption that proposed exports of natural gas are in the public interest. Unless opponents of an export license make an affirmative showing based on evidence in the record that the export would be inconsistent with the public interest, DOE/FE must grant the export application.[27]

In evaluating whether the proposed exportation is within the public interest, DOE/FE

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[26] 15 U.S.C. §717b. This authority is delegated to the Assistant Secretary for FE pursuant to Redelegation Order No. 00.002.04D (November 6, 2007)

[27] Order No. 1473, note 42 at 13, *citing Panhandle Producers and Royalty Owners Ass'n v. ERA*, 822 F.2d 1105, 1111 (D.C. Cir. 1987).

applies the principles established by the Policy Guidelines,[28] which promote free and open trade by minimizing federal control and involvement in energy markets, and DOE Delegation Order No. 0204-111, which requires "consideration of the domestic need for the gas to be exported." As DOE/FE stated more recently in Order No. 2500, in which it authorized exports of LNG from Alaska to Japan and/or other countries on the Pacific Rim:

> DOE considers domestic need for the gas and 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, as the critical legal considerations to be weighed in reviewing the instant application for export authority.

In determining whether a particular application to export is within the public interest, the principal focus of DOE/FE's review is an analysis of the domestic need for natural gas proposed to be exported, and any other factors to the extent they are shown to be relevant to a public interest determination. As discussed below, FLEX's proposed exportation of domestically produced LNG serves the public interest.

B. Public Interest Analysis

As a result of technological advances, huge reserves of domestic shale gas that were previously infeasible or uneconomic to develop are now profitably producing natural gas in many regions of the United States. The United States is now estimated to have more natural gas

[28] Policy Guidelines and Delegation Orders Relating to the Regulation of Imported Natural Gas, 49 Fed. Reg. 6,684 (Feb. 22, 1984).

resources than it can use in a century.[29] Large volumes of domestic shale gas reserves and continued low production costs will enable the United States to export LNG while also meeting domestic demand for natural gas for decades to come.

As U.S. natural gas reserves and production have risen, U.S. natural gas prices have fallen to the point where they are among the lowest in the developed world.[30] Many natural gas and LNG supply contracts in European and Asian markets are pegged to the price of alternative liquid fuels such as oil,[31] and global LNG prices have increased significantly during the last decade as the price of oil has risen.[32] Domestic natural gas prices are projected to remain low relative to European and Asian markets well into the future, making exports of LNG by vessel a viable long-term opportunity for the United States.

The Liquefaction Project is positioned to provide the Gulf Coast region and the United States with significant economic benefits by increasing domestic natural gas production. The exportation of LNG will also create a material improvement in the United States' balance of trade. These benefits will be obtained with only a minimal effect on domestic natural gas prices. At current and forecasted rates of demand, the United States' natural gas reserves will meet demand for 100 years. The Liquefaction Project allows the U.S. to benefit now from the natural gas resources that may not otherwise be produced for many decades, if ever.

The public interest will be served by:

- Direct and Indirect Job Creation:

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[29] Domestic natural gas reserves, including both Alaska and the Lower 48, are estimated to total about 2,100 Tcf, which is about 92 times the annual U.S. consumption of 22.8 Tcf in 2009. MIT REPORT, *supra note 21*, at 9 (2010).

[30] ALTOS REPORT *supra* note 22, at 4 (2010).

[31] U.S. ENERGY INFORMATION ADMINISTRATION, THE GLOBAL LIQUEFIED NATURAL GAS MARKET: STATUS AND OUTLOOK (2003) *available at* http://www.eia.doe.gov/oiaf/analysispaper/global/lngmarket.html.

[32] U.S. ENERGY INFORMATION ADMINISTRATION, WORLD CRUDE OIL PRICES (DEC. 1, 2010) *available at* http://www.eia.doe.gov/dnav/pet/pet_pri_wco_k_w.htm

- ***Construction Jobs***: Over its 2-3 year design and construction period, the Liquefaction Project will directly create more than 1,000 on-site engineering and construction jobs. Hundreds of off-site jobs will be created to support the facility's design, fabrication and construction.
- ***Operational Jobs***: the ongoing management and operation of the Liquefaction Project will create approximately 20-30 new permanent positions.
- ***Indirect Job Creation***: the Liquefaction Project will indirectly create between 17,000 and 21,000 new American jobs as a result of the increase in drilling for and production of natural gas.[33]

- Significant Economic Stimulus:
  - The total economic benefits of the Liquefaction Project to the American economy are estimated to be between $3.6 and $5.2 billion per year from 2015-2040, or $90 to $130 billion over the requested 25-year export term.[34]
- Material Improvement in the U.S. Balance of Trade:
  - Assuming an average value of $7 per MMBtu, exporting approximately 1.4 Bcf/d of LNG through the Liquefaction Project will improve the United States balance of payments by approximately $3.9 billion per year, or $97.5 billion over the requested 25-year export term.
- Significant Environmental Benefits:
  - As the cleanest-burning fossil fuel, natural gas significantly reduces total greenhouse gas emissions when used as a substitute for coal or fuel oil.
  - If the projected 1.4 Bcf/d of LNG is exported to countries that use it as a substitute for coal and fuel oil, it will significantly reduce global greenhouse emissions over the requested 25-year export term.
- Supports American Energy Security:
  - The United States has developed a massive natural gas resource base that is sufficient to supply domestic demand for a century, even with

[33] ALTOS REPORT *supra* note 22, at 12 (2010).

[34] *Id.*

significant exports of LNG. The Liquefaction Project will not adversely affect U.S. energy security.

- According to The Future of Natural Gas, an interim report published in 2010 by the Massachusetts Institute of Technology's Energy Initiative (the "MIT Report"), "for reasons of both economy and global security, the U.S. should pursue policies that encourage an efficient integrated global gas market with transparency and diversity of supply, and governed by economic considerations."[35]
- The MIT Report concludes that "[t]he U.S. should sustain North American energy market integration and support development of a global "liquid" natural gas market with diversity of supply. A corollary is that the U.S. should not erect barriers to gas imports or exports."[36]

1. The Liquefaction Project Will Have a Minimal Impact on U.S. Natural Gas Prices

In preparation for filing this application, FLEX commissioned Altos Management Partners ("Altos") to analyze the effects of the proposed Liquefaction Project exportation on the domestic natural gas markets. The Altos Report, *Analysis of Freeport LNG Export Impact on U.S. Markets*, concludes that the United States has sufficient natural gas resources available to meet projected domestic needs, as well as supply natural gas for export through the Liquefaction Project, without materially increasing prices over the entire 25-year period for which FLEX has requested export authority.[37] A copy of the Altos Report is attached as Exhibit B.

In recent years, the domestic natural gas market has been characterized by increased production and flat demand.[38] Total domestic consumption of natural gas declined from 23.2

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[35] MIT REPORT, *supra* note 21, at xvii (2010).

[36] *Id.* at 71.

[37] ALTOS REPORT *supra* note 22, at 5-7 (2010).

[38] EIA, NATURAL GAS SUMMARY, (Oct. 29, 2010) *available at* http://www.eia.doe.gov/dnav/ng/ng_sum_lsum_dcu_nus_a.htm. Specifically, from 2007 to 2009, domestic dry

trillion cubic feet ("Tcf") in 2008, to 22.7 Tcf in 2009.[39] Coupled with the dramatic increase in economically recoverable supplies, the price of natural gas has decreased significantly. The average annual Henry Hub spot price for natural gas has dropped from $9.10 per MMBtu in 2005 to $4.10 in 2010, and it averaged a mere $3.71 per MMBtu in November 2010.[40] As of December 13, 2010, the NYMEX futures "strip" over the next 156 months (i.e., through December 2023) reflect Henry Hub prices averaging $5.85 over that period, between a high of $7.34 and a low of $4.37.[41] The EIA's most recently calculated reference case projects that the annual average Lower 48 wellhead price for natural gas will remain under $5.00 per MMBtu through at least 2020, rising to only $6.37 by 2035.[42]

Over the long term, market participants can adapt to known or announced changes in demand by changing incremental production to meet it. The Liquefaction Project is a well-publicized endeavor, and will be fully anticipated by the market – construction alone will take at least two years. Any price impact will be determined by the marginal cost of the supply required to meet the 1.5 Bcf/d of marginal additional demand created by the Liquefaction Project. That is, any change in the domestic price of natural gas will be determined by the difference in the

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natural gas production increased from 19.3 Tcf to 21.0 Tcf; imported LNG decreased from 771 Bcf to 452 Bcf, and net imports of all natural gas decreased from 3.8 Tcf to 2.7 Tcf.

[39] *See* EIA, ANNUAL U.S. NATURAL GAS TOTAL CONSUMPTION, (Oct. 29, 2010) *available at* http://www.eia.doe.gov/dnav/ng/hist/n9140us2a.htm.

[40] EIA, SHORT-TERM ENERGY OUTLOOK (Nov. 9, 2010) *available at* http://www.eia.doe.gov/emeu/steo/pub/contents.html#Natural_Gas_Markets; *and* EIA STEO Table Browser, *available at* http://www.eia.doe.gov/steo/cf_tables/steotables.cfm.

[41] CME Group, Henry Hub Natural Gas Futures (Trade Date Dec. 13, 2010), *available at* http://www.cmegroup.com/trading/energy/natural-gas/natural-gas_quotes_settlements_futures.html

[42] U.S. ENERGY INFORMATION ADMINISTRATION, ANNUAL ENERGY OUTLOOK 2011 EARLY RELEASE OVERVIEW, Table A-13 (2010), *available at* http://www.eia.doe.gov/forecasts/aeo/pdf/tbla13.pdf.

cost of producing 61.5 Bcf/d versus 60 Bcf/d.[43]

The projected price impact of the incremental demand created by the Liquefaction Project is small in the Houston Ship Channel market, which is the closest major market to the project, and insignificant in other domestic markets.[44] According to the Altos Report, which assumed gas supply to the Liquefaction Project of 1.5 Bcf/d[45] during 2015-2040, the Liquefaction Project will result in a barely perceptible price impact averaging between $0.01 and $0.04 per MMBtu over that period in the New York, Boston, Chicago and Henry Hub markets.[46] This represents an average price increase of only 0.2%-0.5% relative to the baseline prices for those markets forecast in the Altos Report. In the local Houston Ship Channel market, the price will increase, on average, by approximately $0.09/MMBtu, or about 1.2%.[47] To put these price impacts in perspective, consider that between 2007 and 2010, the spot market price for one MMBtu of natural gas moved a daily average of $0.16 at the Henry Hub, Houston Ship Channel, and Katy Hub.[48]

The price impact of the Liquefaction Project is so small because the United States' total domestic natural gas reserves are so large. Total U.S. recoverable reserves are currently estimated to be sufficient to meet domestic demand for the next 100 years. The location of incremental demand can affect the magnitude of the price impact on nearby market hubs and the domestic market in general. As discussed below, Texas is well positioned to supply the

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[43] ALTOS REPORT *supra* note 22, at 7 (2010).

[44] *Id.* at 6.

[45] Of the 1.5 Bcf/d of gas supply, 0.1 Bcf/d is used for fuel thereby resulting in an export of the equivalent of 1.4 Bcf/d.

[46] ALTOS REPORT *supra* note 22, at 6 (2010).

[47] *Id.* at 4 and Figure 1, p. 6.

[48] PLATTS GAS DAILY, DAILY PRICE SURVEY (2007 - 2010). The largest single-day spot market price change was $1.15 at the Henry Hub, $1.38 at the Houston Ship Channel, and $1.39 at the Katy Hub.

additional demand for the Liquefaction Project without a material impact on domestic prices at any location.

2. Domestic Natural Gas Supplies and Resource Base

The growth in domestic natural gas production has been made possible by technical advances in horizontal drilling and hydraulic fracturing that allow economical recovery of previously inaccessible reserves. These advances have also prompted a reevaluation of shale-gas plays in the Appalachian basin, the Mid-Continent, the Gulf Coast and Rocky Mountain areas – plays that some believe may make the Unites States "the Saudi Arabia of natural gas."[49] Despite the relative maturity of the United States gas supply, estimates of remaining reserves have continued to grow over time, and have accelerated in recent years.

According to the MIT Report, estimates of remaining recoverable gas resources in the U.S. have grown rapidly, and currently range between 1,500 and almost 2,850 Tcf.[50] IHS CERA Inc. has reported that "North American discovered natural gas resources have increased by more than 1,800 Tcf over the past three years, bringing the total natural gas resource base to more than 3,000 Tcf, a level that could supply current consumption for well over 100 years." [51] In 2009, Robert A. Hefner also suggested that 3,000 Tcf is a "reasonable estimate" of United States domestic natural gas reserves. [52] The MIT Report concludes that the United States has approximately 2,100 Tcf of natural gas reserves, about 92 times the total domestic consumption

[49] Joe Kamalick, *Shale Gas can Meet U.S. Needs for 100 Years – Study*, ICIS News (July 30, 2008) *available at* http://www.icis.com/Articles/2008/07/30/9144315/shale-gas-can-meet-us-needs-for-100-years-study.html.

[50] MIT REPORT, *supra* note 21, at 7, fig.2.2, 9 & 11 (2010).

[51] Source: HIS CERA Inc. The use of this content was authorized in advance by HIS CERA. Any further use or redistribution of this content is strictly prohibited without a written permission by HIS CERA. All rights reserved.

[52] ROBERT A. HEFNER III, THE GRAND ENERGY TRANSITION 95-96 (John Wiley & Sons, Inc. 2009).

of 22.8 Tcf in 2009.[53] Most of the increase in recoverable resources has come from shale gas in the Barnett, Haynesville, South Texas (Eagle Ford), and Marcellus basins.[54]

The Potential Gas Committee's most recent biennial assessment of the nation's natural gas resources concluded that the United States possesses a total resource base of 1,836 Tcf.[55] This was the highest resource valuation in the Committee's 44-year history. Of the seven geographic areas analyzed in the Committee report, "the Gulf Coast, including the Gulf of Mexico continental shelf, slope and deepwater, remains the country's richest resource area"[56]

The United States produces substantial quantities of natural gas from multiple sources. Production from unconventional natural gas resources, specifically shale gas, has increased to 2.0 Tcf in 2008 from 1.2 Tcf in 2007.[57] The *Annual Energy Outlook 2010*, prepared by the U.S. Energy Information Administration ("EIA"), forecasts shale gas production to increase to 3.9 Tcf by 2015 and 6.0 Tcf by 2035, representing 5.3% annual growth from 2008-2035.[58] As a result of updated shale gas resources in existing plays (key additions were in the Marcellus, Haynesville and Eagle Ford plays) and an assumption of increased well productivity for the newer plays, the Early Release Overview of the EIA's Annual Energy Outlook 2011 more than doubles its

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[53] MIT REPORT, *supra* note 21, at 9 (2010). The report's estimate of 2,100 Tcf is a mean value based on a range of estimates from 1,500 Tcf to 2,850 Tcf.

[54] See ALTOS Report, *supra* note 22, at 8.

[55] *Potential Gas Committee Reports Unprecedented Increase In Magnitude of U.S. Natural Gas Resource Base*, Colorado School of Mines Press Release (June 19, 2009).

[56] *Id.*

[57] EIA, SHALE GAS PRODUCTION, *available at* http://www.eia.doe.gov/dnav/ng/ng_prod_shalegas_s1_a.htm.

[58] U.S. ENERGY INFORMATION ADMINISTRATION, ANNUAL ENERGY OUTLOOK 2010 135, Table A-14 (2010), *available at* http://www.eia.doe.gov/oiaf/aeo/pdf/0383(2010).pdf (hereinafter "EIA ANNUAL ENERGY OUTLOOK 2010").

estimate of technically recoverable shale gas reserves[59], and doubles its projected shale gas production to 12.0 Tcf by 2035.[60] In 2009, total domestic natural gas production was 21.9 Tcf, the highest in almost three decades, and EIA data through September 2010 indicate that production will have increased approximately 3% in 2010.[61]

Since the technology of horizontal drilling and hydraulic fracturing was brought to bear in the Barnett Shale in 2005, annual domestic natural gas production has grown from 18.9 Tcf to 21.9 Tcf in 2009.[62] Total natural gas production from the Barnett Shale field in Texas recently passed the milestone level of 8 Tcf, and continues to produce more than 5 Bcf/d.[63] Production at the top five U.S. shale plays—Marcellus, Haynesville, Woodford, Fayetteville, and Barnett—is expected to grow rapidly over the next decade.[64]

The Altos Report includes a projection of U.S. natural gas supplies based on a basin-level analysis of potential gas resources, production costs and local gas prices. The study forecasts that U.S. gas production will increase to approximately 27.8 Tcf in 2040, an average annual growth rate of 0.8%.[65] Over that same period, the study projects that shale gas production will increase to approximately 21.4 Tcf in 2040, an average annual growth rate of 6.2%.[66] Numerous

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[59] U.S. ENERGY INFORMATION ADMINISTRATION, ANNUAL ENERGY OUTLOOK 2011 EARLY RELEASE OVERVIEW, Executive Summary (2010), *available at* http://www.eia.doe.gov/forecasts/aeo/executive_summary.cfm.

[60] *Id.*, at Table A-14 (2010), *available at* http://www.eia.doe.gov/forecasts/aeo/pdf/tbla14.pdf.

[61] *See* EIA, ANNUAL U.S. NATURAL GAS MARKETED PRODUCTION (Nov. 29, 2010) *available at* http://www.eia.gov/dnav/ng/hist/n9050us2a.htm.

[62] *See Id.*

[63] Star-Telegram, *Barnett Shale natural gas field passes a milestone* (Nov. 1, 2010) *available at* http://www.star-telegram.com/2010/11/01/2595223/barnett-shale-natural-gas-field.html.

[64] MIT REPORT, *supra* note 21, at 13 & fig.2.6 (2010). These projections assume that "global gas markets remain fragmented in regional trading blocs." *Id. See also* ALTOS REPORT, *supra* note 22, at 15 & fig. 9.

[65] ALTOS REPORT, *supra* note 22, at 14, fig. 8

[66] ALTOS REPORT, *supra* note 22, at 15, fig. 9

other public and private forecasts of U.S. natural gas production project similar increases. The MIT Report forecasts that total domestic gas production may grow by up to 45% through 2050,[67] with shale gas expected to provide the biggest increase in production.[68]

Because the domestic natural gas market is large, well-integrated, and liquid, economic dispatch pressure will raise production in other states to meet demand that otherwise would have been satisfied by flows out of Texas.[69] For example, a reduction of natural gas flows from Texas to the Midwest will prompt increased production out of the Midcontinent basin. Substantial production increases from the Marcellus shale basin in the Northern Appalachian region will compensate for reduced flows out of Texas as well.[70]

Based on the analysis conducted by Altos, FLEX anticipates that much of the 1.5 Bcf/d of feed gas that will be processed by the Liquefaction Project will be incremental production within Texas, largely from the South Texas (Eagle Ford) shale.[71] In addition, some gas produced in Texas that would otherwise have been conveyed out of the state will be routed to the Liquefaction Project.[72] To put the Liquefaction Project volumes in context, total volume produced in Texas or flowing through Texas from other states is projected to be roughly 18 Bcf/d over the term of the requested authorization.[73] In summary, Texas is well positioned to absorb the increased demand from the Liquefaction Project without materially impacting the availability

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[67] MIT REPORT, *supra* note 21, at 23 (2010). These projections assume that "global gas markets remain fragmented in regional trading blocs."

[68] EIA ANNUAL ENERGY OUTLOOK 2010, *supra* note 54, at 72, fig. 73 (2010).

[69] Economic dispatch describes the method of operating gas production and pipeline facilities to optimize efficient, low-cost production of natural gas to reliably serve demand, while taking into account the operational limits of production and pipeline facilities.

[70] ALTOS REPORT *supra* note 22, at 8 (2010).

[71] ALTOS REPORT, *supra* note 22, at 8, 10.

[72] ALTOS REPORT *supra* note 22, at 11 (2010).

[73] MIT REPORT, *supra* note 21, at 6, 7, fig. 2 (2010).

of gas supply within Texas or elsewhere in the United States.

3. Domestic Natural Gas Demand

The nature of the natural gas market has changed dramatically in recent years. A decade ago, conventional wisdom held that the United States' per capita energy consumption would continue to rise, and that domestic gas supplies were totally inadequate to meet near-term future demand. FERC and the DOE/FE processed a flood of LNG import authorization requests for projects designed to meet a perceived need for foreign LNG supplies. However, experience has shown that those assumptions were misplaced. The EIA's most recently calculated reference case projects that the energy intensity of the U.S. economy, measured as primary energy use (in Btu) per dollar of GDP (in 2005 dollars), declines by 40 percent from 2009 to 2035, and that per capita energy consumption declines by an average of 0.2 percent per year over the same period.[74]

The continued growth of energy-efficiency measures has effectively dampened the per-person demand curve for energy and reduced the pressure on natural gas demand. Utility regulatory commissions across the country have succeeded with various programs encouraging consumers to adopt energy-efficiency measures. Some states, such as California, have achieved a near-flat per capita energy demand during the last decade. The federal government, which is the largest consumer of energy in the United States, has also begun to aggressively reduce its own energy consumption by employing energy efficiency measures and encouraging the development of alternative energy resources.

Total domestic consumption of natural gas declined from 23.2 Tcf in 2008 to 22.7 Tcf in

[74] U.S. ENERGY INFORMATION ADMINISTRATION, ANNUAL ENERGY OUTLOOK 2011 EARLY RELEASE OVERVIEW, Energy Intensity (2010), *available at* http://www.eia.doe.gov/forecasts/aeo/early_intensity.cfm.

2009.[75] In its AEO2010 report, the EIA forecasts that domestic natural gas consumption will rise to only 24.9 TCF per year by 2035.[76] Assuming that the United States has between 1,500 and 2,850 Tcf of recoverable reserves[77], its supply is sufficient to meet all domestic demand at current rates for up to the next 125 years. The Liquefaction Project is projected to require about 13.7 Tcf[78] of natural gas over its 25-year term of requested export authorization, which is 0.48% to 0.91% of total estimated U.S. recoverable reserves, even assuming that no new gas reserves are identified.[79]

Considering the size of natural gas resources discovered in the U.S. and the determination to develop large scale renewable energy sources, the natural gas produced and exported by this Liquefaction Project will not be needed for decades, if ever. For example, methane hydrates, though still at an early stage of development as an energy resource, may represent a significant long-term resource option. According to the MIT Report, while "methane hydrates are unlikely to reach commercial viability for global markets for at least 15 to 20 years ... an estimated 100,000 Tcf may be technically recoverable from high-saturation gas hydrate deposits."[80]

The growth of alternative energy has also reduced the demand for fossil-fuel-generated power. Across the country, utility commissions have promoted renewable energy projects by

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[75] *See* EIA, ANNUAL U.S. NATURAL GAS TOTAL CONSUMPTION, (Oct. 29, 2010) *available at* http://www.eia.doe.gov/dnav/ng/hist/n9140us2a.htm.

[76] EIA ANNUAL ENERGY OUTLOOK 2010, *supra* note 54, at 36 (2010)

[77] MIT REPORT, *supra* note 21, at 9 (2010).

[78] 13.7 Tcf represents the total of 1.5 Bcf/d over 25 years.

[79] Based on reported estimates of remaining recoverable gas resources which currently range between 1,500 and almost 2,850 Tcf. MIT REPORT, *supra* note 21, at 9 (2010).

[80] MIT REPORT, *supra* note 21, at 16-17 (2010).

adopting renewable-energy portfolio standards.[81] These vary from state to state, but the trend is significant and appears to be increasing. California, for example, will require 33% of electricity sold in the state to come from renewable energy sources by 2020.[82] There is even discussion at the federal level for establishing a national minimum alternative-energy requirement.

Technology has also steadily improved. Wind turbines are remarkably more efficient and more environmentally friendly than a decade ago. The United States is now beginning to harvest its offshore wind resources, as evidenced by the recent FERC approval of a major offshore wind project on the East Coast. Solar photovoltaic cells have more than doubled in efficiency in the last couple of years and continue to improve. Concentrated solar techniques are also now being employed on a utility scale. Some states are implementing feed-in tariffs to further encourage alternative energy development. Stimulus programs administered by DOE and Treasury pursuant to the American Recovery and Reinvestment Act have provided billions of dollars for the development of alternative energy technology, complementing private investment.[83] This enormous influx of capital for alternative energy development will further increase the near-term

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[81] *See, e.g.*, EIA ANNUAL ENERGY OUTLOOK 2010, *supra* note 54, at 2-3, 14-17 (2010) *available at* http://www.eia.doe.gov/oiaf/aeo/pdf/0383(2010).pdf. An additional summary of state renewable-energy portfolio standards may be found at http://dsireusa.org/summarytables/rrpre.cfm (last visited Nov. 15, 2010).

[82] *See* CAL. PUB. UTILITIES COMM., *33% Renewables, available at* http://www.cpuc.ca.gov/PUC/energy/Renewables/hot/33+Percent+Renewables.htm (last visited Nov. 15, 2010) (citing Governor Schwarzenegger's Executive Orders S-21-09 and S-14-08).

[83] *See* EIA ANNUAL ENERGY OUTLOOK 2010, *supra* note 54, at 7-11 (2010) for a discussion of numerous energy-related provisions under the American Recovery and Reinvestment Act of 2009 ("ARRA"), Pub. L. No. 111-5 (2009). Current DOE and Treasury funding opportunities available under ARRA may be found at http://www.energy.gov/recovery/funding.htm (last checked Nov. 15, 2010). One example funding opportunity provides up to $8.5 billion in loan guarantees "for projects that employ innovative energy efficiency, renewable energy, and advance transmission and distribution technologies and advanced biofuels." FEDCONNECT, *Opportunity: Solicitation for Employ Innovative Energy Efficie*, https://www.fedconnect.net/FedConnect/?doc=DE-FOA-0000140&agency=DOE (last checked Nov. 15, 2010).

and long-term contributions of alternative energy and equivalently further reduce future U.S. demand for fossil fuel supplies, including natural gas.

Although these measures are desirable, it is also true that they exert downward pressure on the demand curve for natural gas. Downward pressure on demand is not conducive to the development of natural gas supplies, resulting in idle rigs, shut-ins of productive wells, and deployment of capital to other ends.

In conjunction with renewable energy resources such as wind and solar, alternative energy sources are likely to replace the natural gas reserves used to supply the Liquefaction Project by the time domestic demand requires them to be produced. As a result, it is reasonable to expect that the 13.7 Tcf of gas required to supply the Liquefaction Project over the next 25 years will never be needed in the United States and may never be otherwise produced. The economic benefits to the United States derived from the Liquefaction Project may not be a question of "now or later," but rather "now or never."

4. Benefits to Local, Regional and National Economy

The Liquefaction Project allows the United States to realize the economic benefits of natural gas resources that would not otherwise be realized for decades to come, if ever. The Liquefaction Project will stimulate the local, regional, and national economies by creating jobs, growing the tax base, and increasing overall economic activity.

It is estimated that the Liquefaction Project will result in the creation of between 17,000 and 21,000 new jobs and provide a total economic benefit of between $3.6 and $5.2 billion per year.[84]

The design, engineering, and construction of the Liquefaction Project will provide an

[84] ALTOS REPORT, *supra* note 22, at 5, 12 (2010).

immediate boost to the local and regional economies. Between 2010 and 2012, FLEX estimates that over $25 million will be spent on professional services associated with the Liquefaction Project, such as engineering and legal consultants. After construction begins in 2013, total direct expenditures may exceed $2 billion, directly creating over 1,000 on-site design and construction jobs. Hundreds of additional off-site U.S. jobs will be created indirectly by the need to support the facility's design, fabrication and construction work.

The liquefaction facilities are expected to be in operation by 2015, which will require FLEX to increase its permanent staff by 20 to 30 employees. This staffing increase will be dwarfed by the total number of new jobs created by the increased production of natural gas required for the Liquefaction Project. Producing the 1.5 Bcf/d of natural gas required for the Liquefaction Project will require direct expenditures of approximately $2.7 billion per year for exploration, drilling, and production.[85] Assuming that 6.2 to 7.7 jobs are created for every $1 million spent, the Liquefaction Project is expected to generate between 17,000 and 21,000 jobs.[86] Since the Liquefaction Project will have four liquefaction trains, the economic impact may phase in as the market develops for total potential LNG production.

Job creation will start several years before the initial production of LNG in 2015, and it is reasonable to expect significant economic benefits to be realized as soon as 2014. When fully operational, the Liquefaction Project will provide substantial tax revenue to state and local

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[85] *Id.* at 12.

[86] *Id.* Altos's calculations of total economic benefit and job creation rely on the following sources: Baumann, Robert H., D.E. Dismukes, D.V. Mesyanzhinov, and A.G. Pulsipher, *Analysis of the Economic Impact Associated with Oil and Gas Activities on State Leases*, LOUISIANA STATE UNIVERSITY CENTER FOR ENERGY STUDIES (2002); Snead, Mark C., *The Economic Impact of Oil and Gas Production and Drilling on the Oklahoma Economy*, OKLAHOMA STATE UNIVERSITY (2002); Considine, Timothy J., *The Economic Impacts of the Marcellus Shale: Implications for New York, Pennsylvania and West Virginia*, A REPORT TO THE AMERICAN PETROLEUM INSTITUTE (2010).

government, not only from taxes on natural gas itself but also increased economic activity related to exploration, production, and infrastructure construction. Such increased economic activity can be expected to spill over into other areas of the local economy, resulting in employment and income impacts on local business such as restaurants, retailers, hotels, and other service-providers, as well as providing additional resources for community services, such as health care, education, and charities.[87] Additional benefits will spread throughout the United States.

The report generated by Altos analyzing the impacts of the Liquefaction Project utilized a credible range of economic multipliers from 1.34 to 1.90. In other words, for every dollar of direct natural gas expenditure, one can reasonably expect between $1.34 and $1.90 of gross economic benefit. Based on the estimated $2.7 billion in direct expenditures per year, the Liquefaction Project is expected to generate an annual economic benefit of between $3.6 and $5.2 billion.[88] By creating new demand for incremental production of natural gas, the Liquefaction Project will play an essential role in spurring investment and technological development throughout the exploration and production supply chain. The indirect benefits associated with the Liquefaction Project include high-wage jobs created by the natural gas industry, royalty and lease payments paid to landowners, an expansion of the United States' natural gas production infrastructure, and substantial additional revenue to the federal and state treasuries via increased tax revenue. This multiplier effect will create improvements across the entire domestic economy.

The economic multiplier effect is borne out in numerous studies analyzing the economic

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[87] *See, e.g.*, Timothy Considine, Ph.D., M.B.A., Roben Watson, Ph.D., P.E., Rebecca Entler & Jeffrey Sparks, *An Emerging Giant: Prospects and Economic Impacts of Developing the Marcellus Shale Natural Gas Play,* THE PENN. STATE UNIV. DEP'T OF ENERGY & MINERAL ENG'G 18, 23 (2009), *available at* http://www.alleghenyconference.org/PDFs/PELMisc/PSUStudyMarcellusShale072409.pdf.

[88] ALTOS REPORT *supra* note 22, at 12 (2010).

benefits of shale gas development. The ALTOS Report relied on sources using economic multipliers of between 1.34 and 1.9[89] A Pennsylvania State University study analyzing the economic impact of the Marcellus shale gas industry in Pennsylvania estimated that the Marcellus gas industry provided a direct economic stimulus of $2.18 billion dollars to the local economy and a total economic benefit of more than $4.2 billion.[90] Other natural gas studies have used economic multipliers as high as 1.94.[91] A National Energy Technology Laboratory study analyzing the economic impact of Marcellus shale gas development found that in 2008, Marcellus shale gas drilling activity in West Virginia contributed over 2,200 jobs and $371 million in gross economic output.[92] A study analyzing the economic impact of Barnett shale found that the total effects of Barnett shale activity included $11.0 billion in annual output and 111,131 jobs.[93] The Liquefaction Project can be expected to have a significant economic impact, yielding numerous benefits for local and regional economies, as well as the U.S. economy at large.

5. Balance of Trade

The Liquefaction Project, once approved, will increase LNG exports by $3.9 billion per year, more than 1% of the entire U.S. trade deficit, and roughly 2% of the deficit for petroleum

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[89] ALTOS REPORT *supra* note 22, at 12-13 (2010).

[90] Considine et al., *supra* note 82, at 23.

[91] *See* Considine et al., *supra* note 82, at 23; *see also* Nat'l Energy Tech. Laboratory, *Projecting the Economic Impact of Marcellus Shale Gas Development in West Virginia* at 23 (2010), http://www.netl.doe.gov/energyanalyses/pubs/WVMarccllusEconomics3.pdf (finding that every dollar spent in the industry generates $1.39 of total economic activity).

[92] *See* National Energy Technology Laboratory, *supra* note 86, at v, ES-2.

[93] *See* The Perryman Group, *An Enduring Resource: A Perspective on the Past, Present and Future Contribution of the Barnett Shale to the Economy of Fort Worth and the Surrounding Area* at 32 (2009), http://groundwork.iogcc.orgisitesldcfaultlfiles/2009_eco_report.pdf.

goods - a significant beneficial impact on the United States' overall balance of trade.[94]

Increasing exports to address the United States' trade imbalance is a critical element of the U.S. Government's concerted effort to speed the economic recovery, and granting FLEX's application to export LNG is consistent with this goal. On March 11, 2010, the President created the National Export Initiative (the "NEI") by Executive Order.[95] The purpose of the NEI is to "enhance and coordinate Federal efforts to facilitate the creation of jobs in the United States through the promotion of exports."[96] Underpinning this policy is the fact that "[a] critical component of stimulating economic growth in the United States is ensuring that U.S. businesses can actively participate in international markets by increasing their exports."[97] Exports, the NEI explains, "create good high-paying jobs."[98] The Administration's goal, which the Liquefaction Project will help meet, is to double exports by 2015.[99]

The Liquefaction Project will meaningfully impact the trade imbalance for the petroleum products sector—an area where trade is heavily skewed towards imports. According to the U.S. Department of Commerce, the total U.S. trade deficit was $374 billion in 2009.[100] Although the United States exported a total of $1.57 trillion in goods and services last year, it imported over $1.94 trillion during that same period.[101] The United States imported over $253 billion in

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[94] ALTOS REPORT *supra* note 22, at 12 (2010). Assumes export of 1.4 Bcf/d LNG valued at $7.50 per Mcf. In 2009, the total U.S. trade deficit was $380 billion.

[95] National Export Initiative, Exec. Order 13,534, 75 C.F.R. 12433 (March 16, 2010); *available at* http://edocket.access.gpo.gov/2010/pdf/2010-5837.pdf.

[96] *Id.*

[97] *Id.*

[98] *Id.*

[99] *Id.* at 12434.

[100] BUREAU OF ECONOMIC ANALYSIS, U.S. DEPARTMENT OF COMMERCE, *U.S. International Trade in Goods and Services* 1 (2010); *available at* http://www.bea.gov/newsreleases/international/trade/2010/pdf/trad1310.pdf.

[101] *Id.*

petroleum products in 2009, but exported a mere $49 billion, resulting in a net trade deficit of $204 billion for petroleum products alone.[102] Put simply, over half of America's total trade deficit is attributable to the nation's negative balance of trade in petroleum products alone.

The Liquefaction Project would materially advance the stated objective of doubling U.S. exports over the next five years. In the U.S. Government's first progress report on the NEI, issued July 7, 2010, a 17% increase in exports was reported for the first four months of 2010 as compared to the same period from the previous year.[103] The NEI Progress Report identifies specific accomplishments deemed to have a significant impact on the trade balance.[104] For instance, the Progress Report highlights certain trade agreement changes that will lead to increased pork and poultry exports worth over $1 billion.[105] While significant, this represents a mere quarter of the export growth that would result from the Liquefaction Project. Against this backdrop, approval of the Liquefaction Project will be one of the most significant export and export-related job creation catalysts.

As demonstrated by the NEI and other public positions taken by the U.S. Government, it is the policy of the federal government to reduce barriers to trade and to better balance trade and capital flows.[106] Accordingly, in a prior Order authorizing FLNG Development to re-export imported LNG, DOE/FE expressly found that such exports would result in "mitigation of balance

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[102] *Id.* at 11.

[103] *President Obama Provides Progress Report on National Export Initiative, Announces Members of the President's Export Council*, White House Press Release (July 7, 2010); *available at* http://www.whitehouse.gov/the-press-office/president-obama-provides-progress-report-national-export-initiative-announces-membe.

[104] *Progress Report on the National Export Initiative* , July 7, 2010; *available at* http://www.whitehouse.gov/sites/default/files/exports_progress_report.pdf.

[105] *Id.*

[106] *See* Howard Schneider and Scott Wilson, *The "G-2." U.S and China, Will be the Center of the G-20 Debates in Seoul*, THE WASHINGTON POST (Nov. 10, 2010).

of payment issues to the benefit of the United States interests."[107]

6. Global Environmental Benefits

Because it is the cleanest-burning fossil fuel, natural gas offers a number of environmental benefits compared to oil and coal.[108] The combustion of natural gas results in less pollution than the combustion of other fuels.[109] Compared to the average air emissions from coal-fired generation, power plants that burn natural gas produce half as much carbon dioxide, less than a third of the nitrogen oxides, and one percent of the sulfur oxides.[110] Natural gas also produces about 25-30% less CO_2 than gasoline and diesel and virtually none of the other pollutants.[111] Natural gas is not a significant contributor to either acid rain or smog formation, unlike petroleum products and coal.[112]

Not only is natural gas a cleaner fuel, but as the U.S. Energy Information Administration has noted, "new natural-gas-fired plants are much cheaper to build than new renewable or nuclear plants."[113] As more and more nations look for alternate sources of power generation beyond coal or oil – and move to regulate or tax greenhouse gases – demand for LNG will

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[107] *Freeport LNG Development, L.P.*, FE Docket No. 08-70-LNG, Order No. 2644 at 12.

[108] *See* ROBERT A. HEFNER III, THE GRAND ENERGY TRANSITION 49 (John Wiley & Sons, Inc. 2009). ("[Natural gas] is a green fuel. Its use eliminates most all the toxic emissions and carbon particulates that come along with coal and oil use, while significantly reducing CO_2 emissions.") and at 77-107 (discussing the abundance of natural gas).

[109] EIA, NATURAL GAS 1998: ISSUES AND TRENDS at 50 (1998), *available at* http://www.eia.doe.gov/oil_gas/natural_gas/analysis_publications/natural_gas_1998_issues_and_trends/it98.html.

[110] EPA, AIR EMISSIONS, *available at* http://www.epa.gov/cleanenergy/energy-and-you/affect/air-emissions.html.

[111] HEFNER, *supra* note 103, at 209.

[112] EIA, NATURAL GAS 1998: ISSUES AND TRENDS, at 54 (1998), *available at* http://www.eia.doe.gov/oil_gas/natural_gas/analysis_publications/natural_gas_1998_issues_and_trends/it98.html.

[113] EIA, ANNUAL ENERGY OUTLOOK EARLY RELEASE OVERVIEW (2009) *available at* http://www.eia.doe.gov/oiaf/aeo/overview.html.

continue to grow worldwide.[114] Opening new overseas markets for natural gas will require plants, like the Liquefaction Project, that are equipped to liquefy large amounts of the gas in a safe and environmentally friendly manner. The LNG industry has a proven environmental safety record with 40 years of shipping LNG over the Atlantic, Pacific and Indian oceans with no major incidents involving LNG ships or their cargo.[115] Moreover, "LNG tankers are generally less polluting than other shipping vessels because they burn natural gas in addition to fuel oil for propulsion."[116] Thus, the Liquefaction Project will offer significant environmental benefits by supplying cleaner energy to help meet increased global demand.

7. National Security Benefits

The United States has developed massive natural gas reserves that are sufficient to meet all domestic demand for decades, even with significant exports of LNG. As a result, the LNG exports associated with the Liquefaction Project will not degrade U.S energy security. Further, by promoting a global, liquid, and robust market for natural gas, the United States will increase

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[114] *See, e.g.*, IPCC FOURTH ASSESSMENT REPORT: CLIMATE CHANGE 2007: WORKING GROUP III: MITIGATION OF CLIMATE CHANGE § 4.2.3 ("Increased use of natural gas has recently occurred throughout the Asian region . . . . A liquefied natural gas (LNG) market has recently emerged in the region, dominated by Japan, South Korea and Spain . . . ."); HEFNER, *supra* note 103, at 214 (noting that "Singapore is leading the way by fueling more than 80 percent of its power generation with natural gas") and at 215 ("[Natural gas] power generation, supplemented with wind and solar, can solve [China's] demand for cleaner power and quickly begin to reverse China's environmental degradation, while lowering forecast CO_2 emissions substantially, as well as reducing the true costs of energy consumption.").

[115] DOE, FOSSIL ENERGY, *LNG Safety & Security*, *available at* http://www.fossil.energy.gov/programs/oilgas/storage/lng/feature/howsafeisit.html; *see also* SANDIA NAT'L LABS., GUIDANCE ON RISK ANALYSIS AND SAFETY IMPLICATIONS OF A LARGE LIQUEFIED NATURAL GAS (LNG) SPILL OVER WATER at 14 (2004) ("Risks from accidental LNG spills, such as from collisions and groundings, are small and manageable with current safety policies and practices."), *available at* http://www.fossil.energy.gov/programs/oilgas/storage/lng/sandia_lng_1204.pdf.

[116] Michelle Michot Foss, Ph.D., *Introduction to LNG,* THE UNIVERSITY OF TEXAS AT AUSTIN 23 (2007), *available at* http://www.beg.utexas.edu/energyecon/lng/documents/CEE_INTRODUCTION_TO_LNG_FINAL.pdf.

economic trade and ties with foreign nations by providing them with access to a reliable supply of alternative clean fuel.

The United States is recognized as a stable and reliable trading partner. Its participation in creating a liquid, global market for natural gas would promote the security interests of all nations involved. For example, almost half the natural gas currently imported into the European Union is conveyed via pipeline from Russia and North Africa, and its dependence on long supply chains creates significant security concerns for America's allies.[117]

The MIT Report makes the following conclusions regarding the impact of U.S. exports on domestic and global security interests:

- "...even though the U.S. is not significantly dependent on imports, American security interests can be strongly affected by the energy supply concerns of its allies."
- "Overall, a global 'liquid' natural gas market is beneficial to U.S. and global economic interests and, at the same time, advances security interests though diversity of supply and resilience to disruptions."
- "U.S. freedom of action in foreign policy is tied to global energy supply."[118]

Developing a large and flexible export capability will increase the United States' foreign policy options.

By promoting a global, liquid, and robust market for natural gas, the United States will increase economic trade and ties with foreign nations. Beyond the more general security benefits, the Liquefaction Project offers a potential security advantage for the United States by selling into the international market with market-based pricing structures that will offset those

[117] MIT REPORT, *supra* note 21, at 69 (2010).

[118] MIT REPORT, *supra* note 21, at 70 (2010).

that may seek to monopolize the natural gas industry.

VII.

ENVIRONMENTAL IMPACT

FERC has already authorized the Phase II expansion of the Freeport Terminal. The Liquefaction Project improvements will be contained within the previously authorized operational area of the Freeport Terminal on Quintana Island. The potential air impacts of the Liquefaction Project will be reviewed by the Texas Commission on Environmental Quality ("TCEQ") and the Environmental Protection Agency ("EPA"). Other environmental impacts of the Liquefaction Project will be reviewed by FERC under NEPA. FERC authorization will be conditioned upon issuance of air quality permits from TCEQ and EPA. Accordingly, FLEX requests that DOE/FE issue a conditional order authorizing export of domestically produced LNG pending completion of FERC's environmental review.

VIII.

REPORTING REQUIREMENTS

For all imports and exports made pursuant to the authorization requested herein, FLEX will undertake to file reports with the DOE/FE in the month following the close of each calendar quarter indicating by month whether exports have occurred, and if so, the details of each transaction, including the total volumes of exports in Mcf and the average price for exports per MMBtu at the international border.[119] The reports shall include the name of the seller, the name of the purchaser, the estimated or actual duration of the agreements, the name of the U.S. transporter(s), the point of exit, whether the sales are made on an interruptible or firm basis, and,

[119] *See* Procedural Order Eliminating Quarterly Reporting Requirement and Amending Monthly Reporting Requirement for Natural Gas and LNG Import/Export Holders, FE Docket No. 08-01-PO, DOE/FE Order No. 2464 (Feb. 6, 2008).

if applicable, the per unit (MMBtu) demand/commodity/reservation charge breakdown of the contract price. FLEX will notify the DOE/FE in writing of the date of the first delivery of natural gas exported under the requested authorization within two weeks of such delivery.

FLEX's reporting contact is:

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IX.

APPENDICES

Appendix A:	Opinion of Counsel.
Appendix B:	THOMAS CHOI, DALE NESBITT, AND BRAD BARNDS, ANALYSIS OF FREEPORT LNG EXPORT IMPACT ON U.S. MARKETS (2010).
Appendix C:	Verification and Certification

X.

CONCLUSION

FLEX requests long-term, multi-contract authorization to export up to 9 mtpa of LNG, up to a total of 225 million metric tons over the requested 25 year term, from the Freeport Terminal to any country with which the United States does not have an FTA requiring national treatment for trade in natural gas and LNG, which has or in the future develops the capacity to import LNG via ocean-going carrier, and with which trade is not prohibited by U.S. law or policy, is not inconsistent with the public interest. FLEX requests authorization to export LNG on its own behalf or as agent for others, and FLEX requests that it be authorized to register each LNG title

holder for whom FLEX seeks to export as agent.

Based on the reasoning provided in this application, FLEX respectfully requests that the DOE/FE determine that FLEX's request for long-term, multi-contract authorization to export natural gas to non-FTA countries is not inconsistent with the public interest. Accordingly, FLEX requests that DOE/FE issue an order pursuant to Section 3(a) of the Natural Gas Act for authorization to export LNG to non-FTA countries.

Respectfully submitted,

Attorneys for
Freeport LNG Expansion, L.P.
FLNG Liquefaction, LLC

December 17, 2010

APPENDIX A

Brownstein | Hyatt
Farber | Schreck

December 17, 2010

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Mr. John Anderson
Office of Fossil Energy [FE-34]
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

RE: Freeport LNG Expansion, L.P.
FLNG Liquefaction, LLC
Application for Long-Term Authorization to Export Liquefied Natural Gas
To Non-Free Trade Agreement Countries

Dear Sir:

This opinion is submitted pursuant to Section 590.202(c) of the U.S. Department of Energy's regulations. I have examined the Amended and Restated Articles of Incorporation of both Freeport LNG Expansion, L.P. and FLNG Liquefaction, LLC and other authorities as necessary, and have concluded that the proposed exportation of liquefied natural gas from the United States, as described in the application for long-term authorization to export to non-Free Trade Act countries to which this Opinion of Counsel is attached as Appendix A, is within the corporate powers of both Freeport LNG Expansion, L.P. and FLNG Liquefaction, LLC.

Respectfully submitted,

Les Lo Baugh

APPENDIX B

ANALYSIS OF FREEPORT LNG EXPORT IMPACT ON U.S. MARKETS

Thomas Y. Choi
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Submitted to

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Vice President - Commercial
Freeport LNG Development, L.P.
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December 17, 2010

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1 EXECUTIVE SUMMARY

Altos Management Partners (Altos) was retained by Freeport LNG Expansion, LP to analyze the potential impact of a liquefaction project capable of processing the equivalent of 1.5 Bcf/d of feed gas at its Freeport terminal. When fully built-out, the Freeport's liquefaction project (hereafter "the Project") is expected to produce approximately up to 9.0 million tons per annum ("mtpa") of LNG. Using our sophisticated energy models and the EIA's own demand forecast, we analyzed the impact of the Project on domestic natural gas prices and the economic benefits that would result from the incremental natural gas production. We found that the price impact on U.S. natural gas prices is quite minimal, especially when viewed in context of 17,000 to 21,000 new jobs and between $3.6 and $5.2 billion per year of economic benefits created by the incremental production.

Given the huge volumes of domestic shale gas that are now economic to produce, natural gas prices in the United States have fallen to the point where they are among the lowest in the developed world. Domestic shales are estimated to hold more than 2,000 Tcf of technically recoverable gas, more than the United States can consume in a 100 years at current rates. The massive volumes of domestic shale gas have been known to exist for decades, but only in the past several years have technological advancements made them economic to produce at prevailing prices. Indeed, shale gas production surged from practically nothing in 2000 to about 17% of the total domestic production in 2009 and helped drive down domestic prices.

Furthermore, low domestic prices have resulted in low utilization rates at Gulf of Mexico LNG import terminals, which can be converted to export terminals with the addition of liquefaction capability. Shale gas is expected to sustain low domestic prices for decades and provide ample economic incentive to export LNG from the United States. Accordingly, we found that the price impact of the Project's proposed export of 1.5 Bcfd is quite minimal.

During the assumed period of export (2015 to 2040), the Project exports increased projected Henry Hub prices by $0.03/MMBtu, representing only a 0.5% increase in projected prices. Even at the Houston Ship Channel pricing hub, to which the Freeport terminal delivers, the price impact is $0.09/MMBtu, representing only a 1.2% increase in projected prices. The price impact dissipates with distance from the Freeport location. Projected prices in the large consuming Mid-Atlantic region increased only by 0.2%, a barely perceptible amount. Given that the increased domestic production has pushed gas prices significantly lower in 2010, it should be noted that lower gas prices than those used in the study will reduce or leave unchanged the impact of the Project on natural gas prices.

The miniscule price impacts reflect the fact that the incremental demand represented by the Project is quite small, only about 2%, relative to the entire domestic market. Furthermore, the huge domestic resource base including unconventional gas supplies, such as shale gas and coalbed methane, and conventional gas supplies mitigate the price impact of this relatively small

increase in demand. The market will develop incremental supplies in time to minimize their price impacts of clearly anticipated infrastructure projects such as the Project.

Offsetting the minimal price impacts, the Project will provide significant economic stimulus resulting in the creation of 17,000 to 21,000 new jobs and between $3.6 and $5.2 billion per year in total economic benefits for the U.S. economy. Of this economic benefit, $2.7 billion per year is estimated from direct employment and expenditures by companies engaged in natural gas exploration and production (E&P). When indirect benefits enjoyed by other industries are included, the total economic benefits from the Project increase to between $3.6 and $5.2 billion per year. Compared to the economic benefits the Project is expected to generate, the price impacts appear insignificant. Furthermore, LNG exports will improve the U.S. balance of trade by approximately $3.9 billion per year, a full 1% of the 2009 U.S. trade deficit. However, the benefits of improved balance of trade are not factored into our analysis.

Altos performed the analysis using its proprietary MarketBuilder software which uses an approach that has been independently validated by a third party under sponsorship of the Energy Information Administration ("EIA") during the 1980-81 period. (The trade name of the MarketBuilder technology at that time was GEMS, which stood for Generalized Equilibrium Modeling System. The methodology they validated remains largely unchanged to this day and therefore their validation remains valid today.) EIA expended in excess of $1 million (in 1981 dollars) with Oak Ridge National Laboratories to validate the methodology. In particular, EIA endeavored to verify and validate the software, data, results, underlying economic theory, suitability and completeness of documentation, accuracy of forecasts, proper program implementation, sensitivity analysis, and other relevant attributes of the program. In effect, EIA subjected the model to a severe and comprehensive professional peer review in order to ensure that it was operating correctly and was appropriate for EIA's intended needs. As part of the validation, Oak Ridge made a number of suggestions (which were ultimately incorporated into our model and software), and they gave the GEMS approach and software a clean bill of health. To our knowledge, our GEMS model is the only model in existence that has been independently validated to such a degree. The MarketBuilder software is a modern embodiment of the GEMS approach.

2 KEY RESULTS

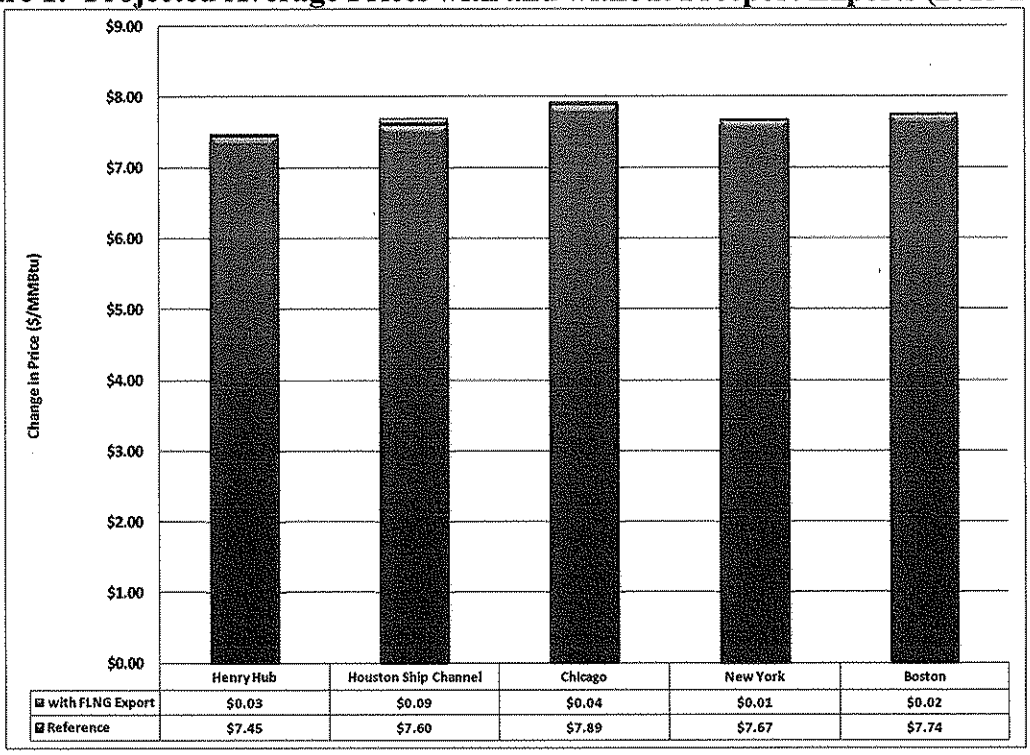
2.1 Price Impact

The primary question we addressed is to what extent LNG exports from the United States will raise domestic natural gas prices. In theory, any increase in demand, whether it comes from increase in domestic consumption or export, will raise domestic prices unless the supply curve is absolutely flat (i.e., abundant and identical cost supplies). However, the real issue is whether the price increase is significant.

Our in-depth analysis shows that the price impact associated with the export of 1.5 Bcfd from the Project, assuming constant year-round utilization, will result in barely perceptible price impacts.

Figure 1 shows the average price impacts relative to projected reference prices for 2015 to 2040, the period in which the Freeport terminal is assumed to be exporting LNG. The price impact in the local Houston Ship Channel market increase is only $0.09/MMBtu and quickly dissipates as you move further away from the point of export. As demonstrated in the following graph, the incremental price increase due to the Project is hardly visible relative to the over projected prices of natural gas. Given that the increased domestic production has pushed gas prices significantly lower in 2010, it should be noted that lower gas prices than those used in the study will reduce or leave unchanged the impact of the Project on natural gas prices.

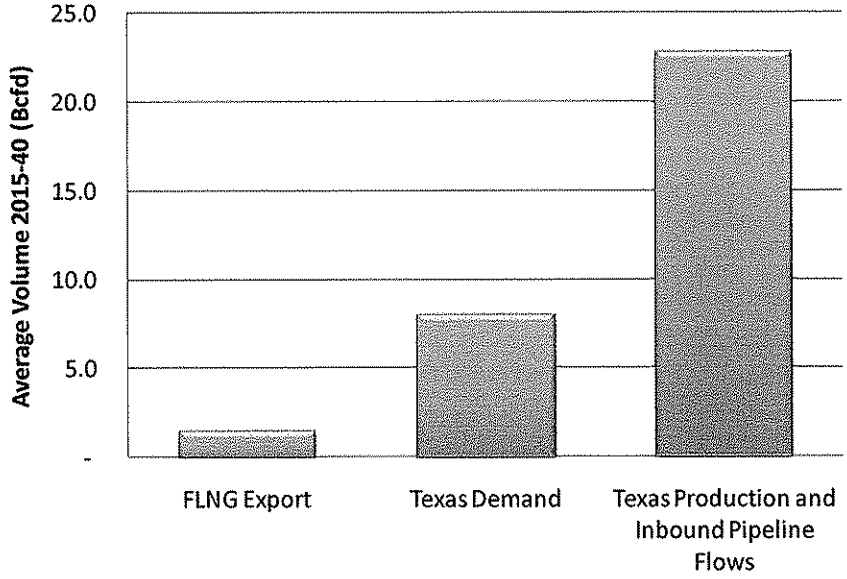
Figure 1: Projected Average Prices with and without Freeport Exports (2015-2040)



	Henry Hub	Houston Ship Channel	Chicago	New York	Boston
with FLNG Export	$0.03	$0.09	$0.04	$0.01	$0.02
Reference	$7.45	$7.60	$7.89	$7.67	$7.74

To understand the price impact of the Project, we examined not just the Texas market but the entire North American market. The domestic United States demand is projected to be about 60 Bcfd (22 Tcf), compared to the Project export volumes of 1.5 Bcfd. Hence, the Project reflects only about a 2% increase total domestic demand. Even relative to the Texas market alone, the Project is still relatively small, as shown in Figure 2. The Texas natural gas market, which includes production in offshore State and Federal waters, is one of the largest gas markets in the world. Texas natural gas demand is comparable in size to the entire German or Japanese market. Furthermore, Texas is intricately connected to other major markets via natural gas pipelines, making it a highly liquid market. The total volume that is produced in Texas or flows through Texas from other states is projected to be about 18 Bcfd, dwarfing the incremental the Project volumes.

Figure 2: Projected Average Volumes with and without Freeport Exports (2015-2040)

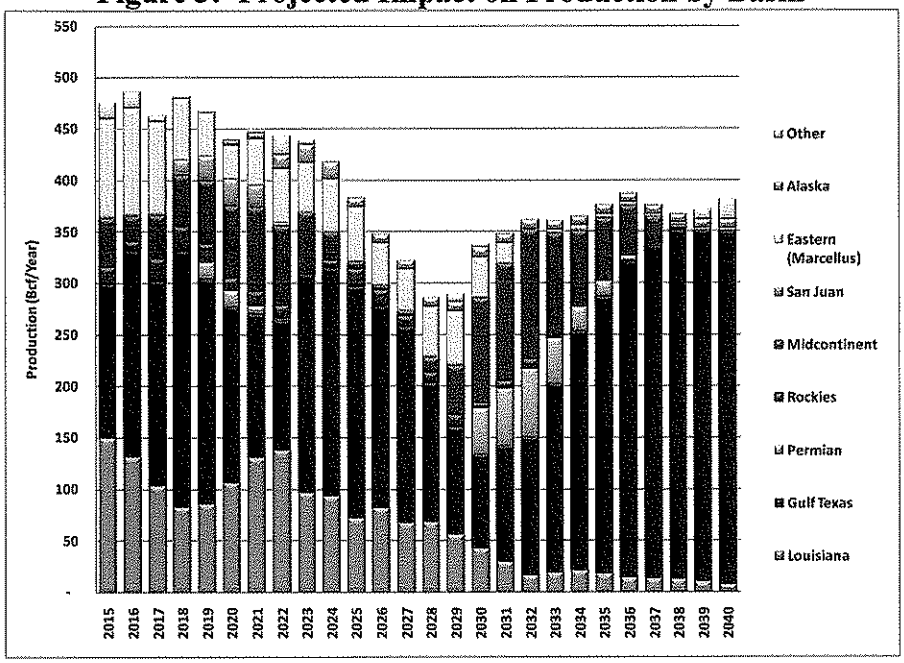


Short term unexpected changes in demand can have significant price impacts because in the short term, supply is relatively inelastic. However, in the long term, the market can make appropriate decisions in anticipation of announced or known supply or demand changes. Since the Project will be fully anticipated by the market (construction alone will take over two years), incremental gas volumes will be developed in advance to supply the Project. Hence, the price impact of the Project will be determined by the difference between the cost of the marginal supply to meet the marginal demand with and without the Project. That is, it will be determined by the difference in cost of producing 61.5 Bcfd versus 60 Bcfd. With the huge volumes of shale gas that are known to exist, the cost difference is slight, as indicated by our price impact projection.

2.2 Sources of Incremental Supply

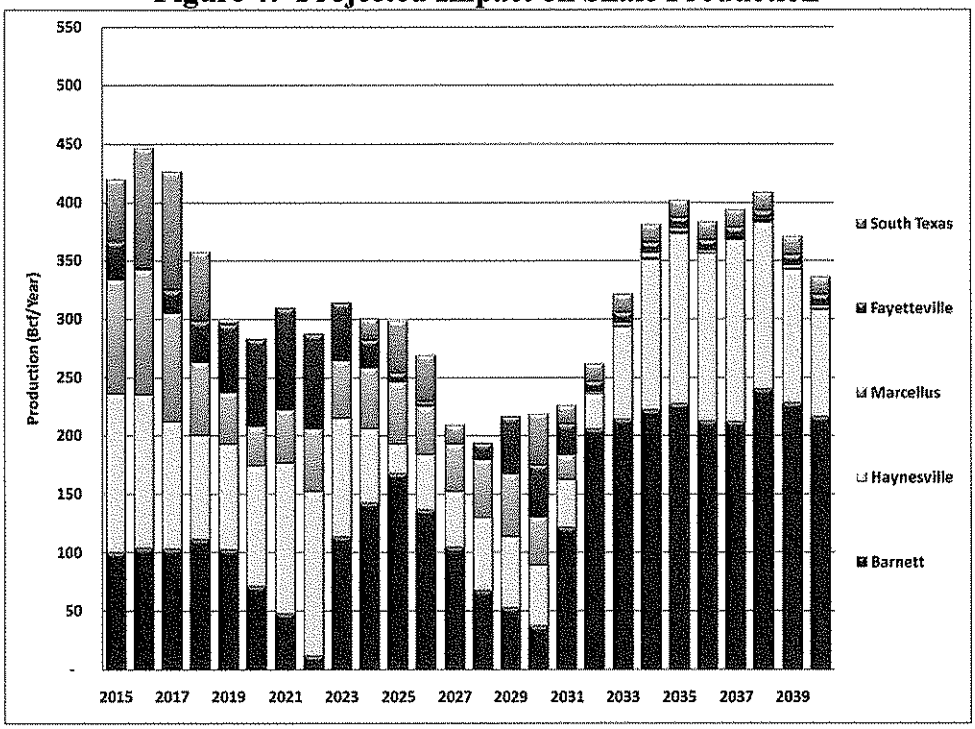
Shale gas will comprise the bulk of the incremental supplies required as feedstock for the Project. Figure 3 shows the additional supplies that would be produced to provide feedstock for the Project. The export volume is assumed to be 547 Bcf/year (1.5 Bcfd x 365 days). Most of the incremental supplies resulting from the Project are in the Gulf of Mexico region with Texas being the largest incremental producer followed by Louisiana. Large supply basins nearest the Freeport terminal see the greatest impact. However, other supply regions also contribute incremental supplies because the Gulf of Mexico region is highly interconnected to the rest of the United States market. Indeed, the natural gas system is highly interconnected and interdependent. A change in one market will reverberate in every other market. This interconnectedness is an important factor in the mitigation of future price impacts. All producers, not just those closest to Freeport, will compete to provide incremental supplies for the Project.

Figure 3: Projected Impact on Production by Basin



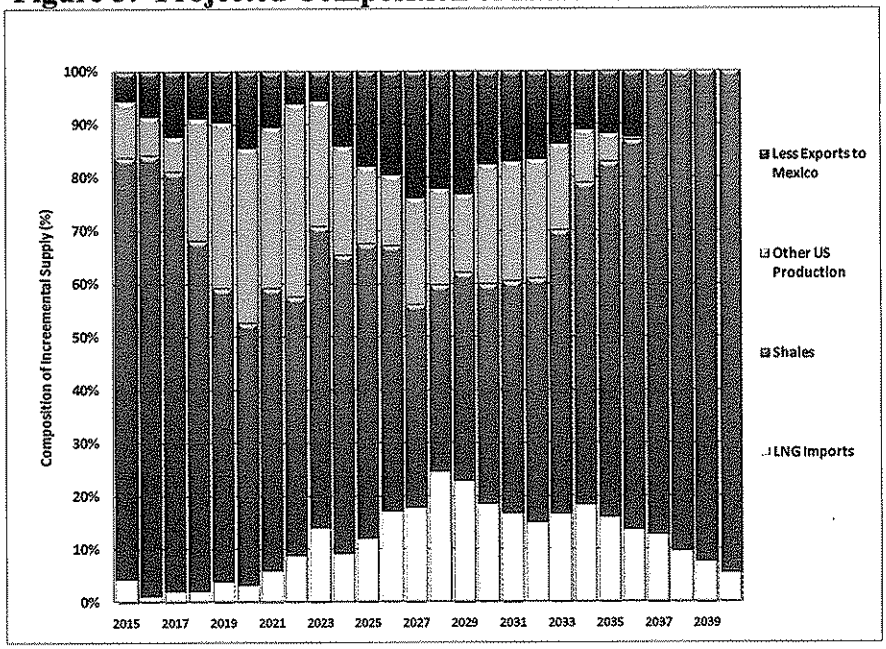
Upon closer examination of supplies, we see that it is production from shale gas basins that provides the bulk of the incremental supplies and is the primary marginal supply in the United States. The estimated shale gas volumes are huge, over 2,000 Tcf are technically recoverable, and several hundred Tcf are economically recoverable with current technologies. This newly economic shale gas has transformed the domestic gas market and provides the impetus for LNG export projects. As noted in Figure 4, the primary shale basins providing incremental supplies for the Project are Barnett, Haynesville, South Texas (Eagle Ford), and Marcellus basins.

Figure 4: Projected Impact on Shale Production



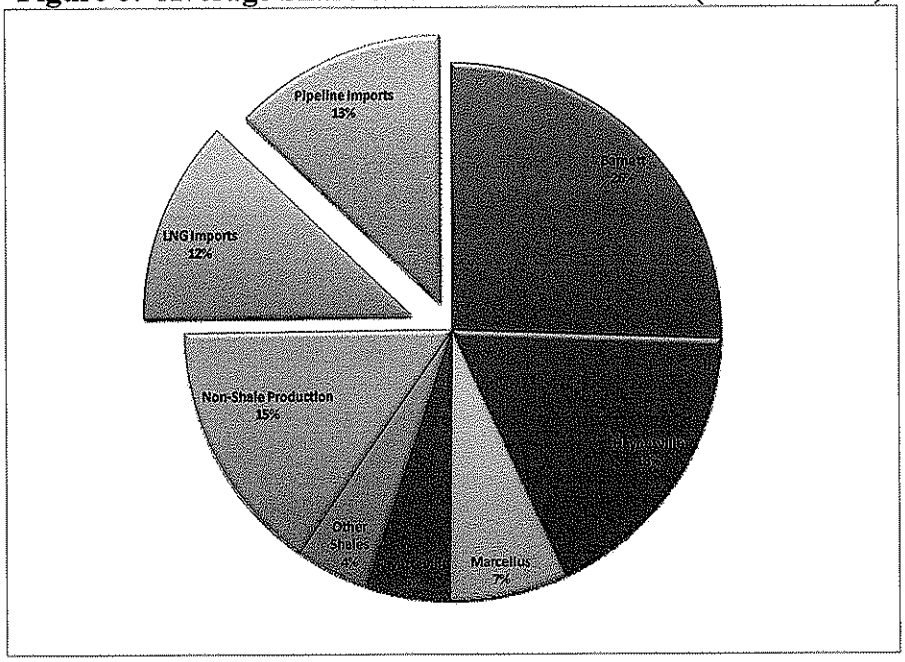
In addition to domestic supplies, the rest of the incremental supplies resulting from the Project will be comprised in effect by LNG imports and diminished exports to Mexico. The composition of incremental volumes by shares is shown in Figure 5. Most of the volume is comprised of domestic production, including shale gas and other unconventional supplies, as well as conventional supplies. There is some increase LNG imports, as will be explained later, and some diversion of supplies that would have been exported to Mexico via export pipelines in Texas.

Figure 5: Projected Composition of Incremental U.S. Volumes



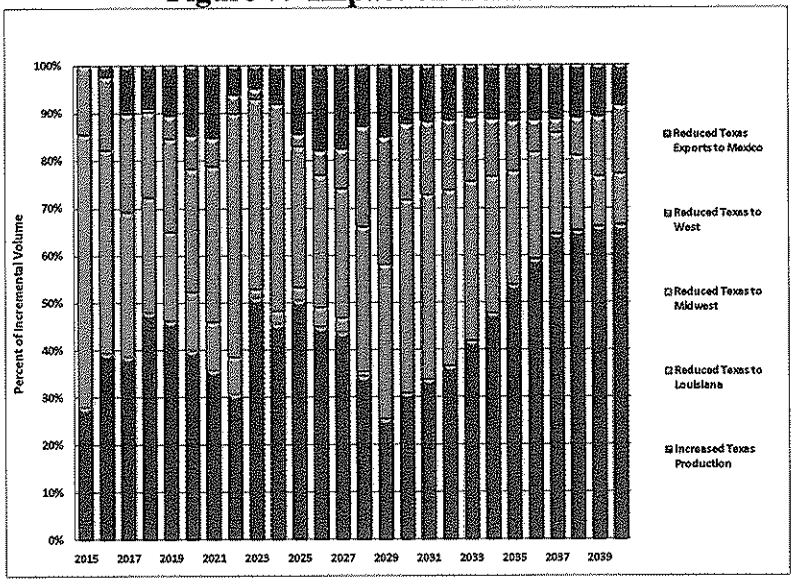
The composition of incremental volumes averaged over the years of the Project operations is shown in Figure 6. Incremental production of shale gas comprises more than 50% of the incremental volume. Including non-shale gas domestic production, which comprises another 19% of the incremental volumes, the domestic production provides 70% of the total incremental volumes. The next largest source comes from reduction in volumes that would have been exported but instead is used for the Project. This volume will not affect domestic prices since it is just a diversion of destinations. Finally, there is a slight increase in LNG imports to the United States. Most of the LNG imports occur during the summer because of the seasonal load attributable to power generation and existence of ample gas storage. It is important to note that our analysis predicts an erosion of oil-parity pricing of LNG contracts as world supply of LNG doubles within a decade. Furthermore, proposed or under construction international pipelines, such as South Stream (or Nabucco), Medgaz, and Trans Asian Pipeline, are poised to deliver new supplies to Europe and Asia and apply additional competitive pressures. Hence, our analysis predicts that future European and Asian prices will be set by gas on gas competition, and LNG supplies will be attracted to U.S. markets by prices below the marginal cost of supply for some domestic U.S. basins.

Figure 6: Average Share of Incremental Volume (2015 to 2040)



Examination of the natural gas flows in Texas yields insights into how the Project feedstock will be provided. Figure 7 shows how the Project affects production and flows in Texas. About half of the Project volumes will be comprised by incremental Texas production and the rest of the volume will be comprised by reduced flows out of Texas. That is, volumes that would have been exported out of the state will be used to provide feedstock for the Project. The displaced volumes would then be made up by increased production in other states or other displacements. For example, there is significant reduction in flows to the Midwest, primarily because increased production out of the Midcontinent basin will displace flows from Texas which will instead be used as feedstock for the Project. Thus, the economic benefit of the Project will extend significantly beyond Texas.

Figure 7: Impact on Texas Flows



2.3 Economic Benefits

The economic benefits from incremental production to provide feedstock for the Project will provide not only direct economic benefits from expenditures for exploring, drilling, and producing the gas, but also indirect benefits arising from expenditures in other industries for goods and services. We quantified a range of potential benefits by making computations based on estimates of economic multipliers found in several published sources. Furthermore, economic expansion stimulates employment so we used estimates of jobs created per $1 million of expenditures on natural gas production.

The estimated average annual benefits and jobs created during 2015 to 2040 are shown in the following table. The average direct expenditures to produce incremental volumes required as a result of the Project equates to $2.7 billion per year. Estimates of economic multipliers for natural gas expenditures by three credible sources range from 1.34 to 1.90. That is, $1 of expenditure results in $1.34 to $1.90 of gross economic benefits. Hence, based on the projected direct expenditures from our analysis, we obtain a range of total economic benefits between $3.6 and $5.2 billion per year. The estimated number of jobs created per $1 million of expenditure ranged from 6.2 to 7.7, implying that the number of new jobs created ranges from 17,000 to 21,000 jobs. Furthermore, LNG exports will improve the U.S. balance of trade to the tune of $3.9 billion per year, a full 1% of the 2009 U.S. trade deficit. However, the benefits of improved balance of trade are not factored into our analysis.

Table 1. Total Economic Benefits and Jobs Created

Source	Economic Multiplier	Jobs created/ $ Million	Direct Expenditures	Gross Economic Output ($ Millions)	Jobs Created
1	1.34	6.7	2,718	3,642	18,211
2	1.55	7.7	2,718	4,213	20,929
3	1.90	6.2	2,718	5,164	16,852

Sources:

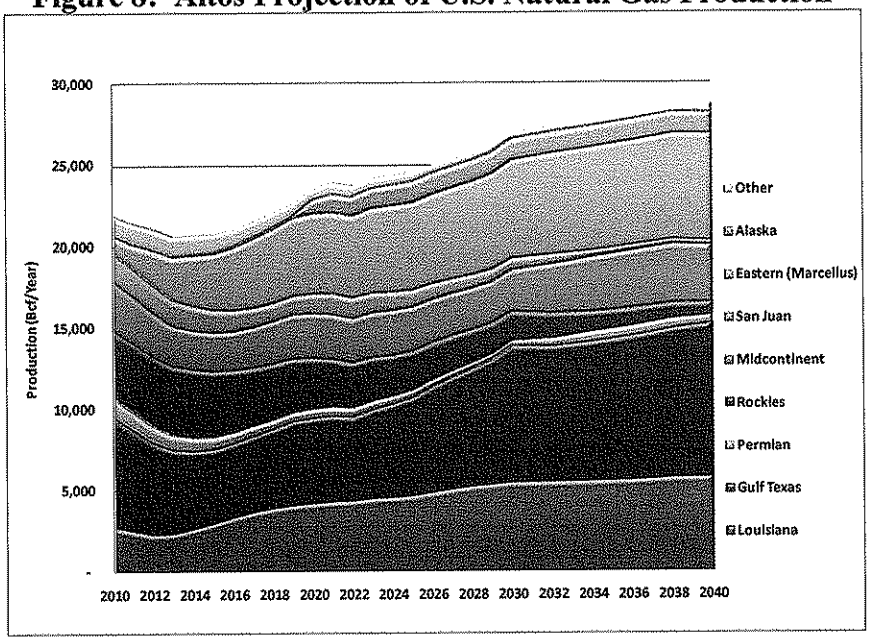
1. Baumann, Robert H., D.E. Dismukes, D.V. Mesyanzhinov, and A.G. Pulsipher (2002) "Analysis of the Economic Impact Associated with Oil and Gas Activities on State Leases," Louisiana State University Center for Energy Studies, Baton Rouge, LA.
2. Snead, Mark C. (2002) "The Economic Impact of Oil and Gas production and Drilling on the Oklahoma Economy." Office of Business and Economic Research, College of Business Administration, Oklahoma State University.
3. Considine, Timothy J., (2010) "The Economic Impacts of the Marcellus Shale: Implications for New York, Pennsylvania, and West Virginia," A Report to The American Petroleum Institute.

3 REFERENCE CASE RESULTS

We ran a Reference case without and with the Project in the WGTM (World Gas Trade Model) to assess its impact on the domestic market. We wanted to know the impact on price and how the market would work to provide feedstock for the Project. We will first examine results of the Reference case which will provide a basis for understanding the impacts of export scenarios.

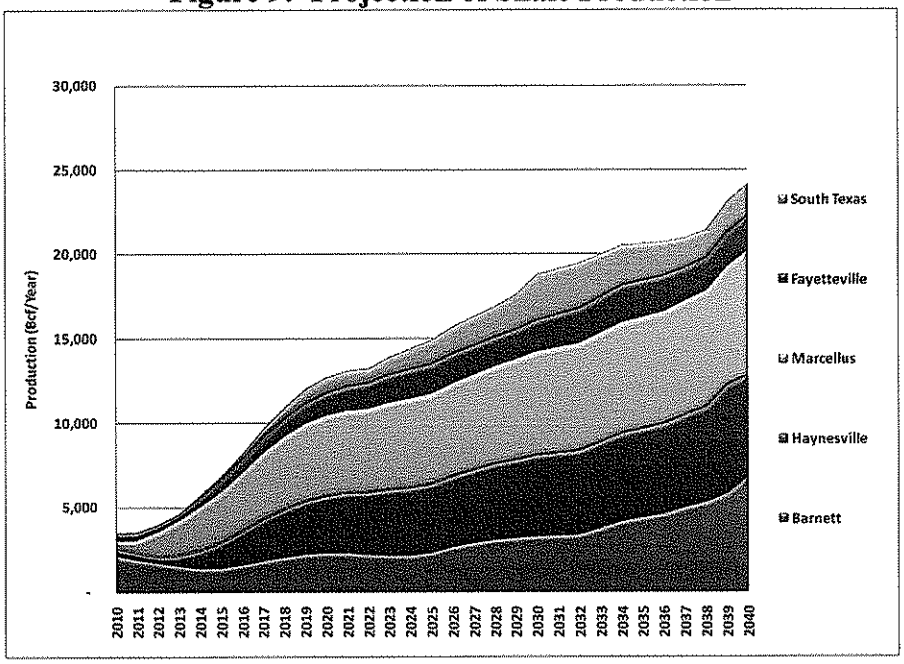
Figure 8 shows the projected production by supply basin. Supply regions have been aggregated for ease of viewing. Production declines in initial years due to a softening of U.S. demand. Total production, led by increases in production in Texas, Louisiana, and Eastern regions, grows with demand starting in 2015. Alaska production jumps in 2020, when the Alaska Gas Pipeline ("Gasline") is projected to come into service. Total production grows beyond 25 Tcf, well in excess of EIA's projected United States demand. WGTM projects that the United States will eventually be a net exporter with pipeline exports to Mexico, which is projected to have rapidly growing natural gas demand, and Canada, where much of the delivered volumes from the Alaska Gas Pipeline will stay. It makes perfect economic sense that the United States, given ample, low cost domestic shale gas supply, would turn into a net exporter.

Figure 8: Altos Projection of U.S. Natural Gas Production



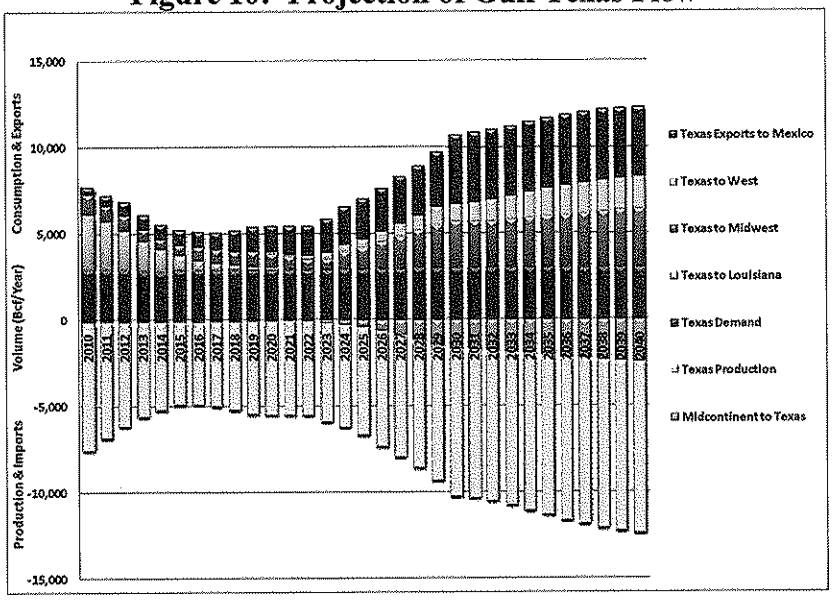
The primary new supply sources are production from shale gas basins. Figure 9 shows the rapid increase in shale gas production. Shale gas is projected to comprise over half of the total domestic production during the analysis period. The potential volumes of shale gas were well known for decades, but only recently have technological advancements made them economic at highly competitive prices. It is the existence of the massive shale resources at competitive costs that provide the basis for LNG exports from the United States.

Figure 9: Projection of Shale Production



Texas is a major natural gas market in its own right, comparable to the entire German or Japanese market. It has major onshore and offshore supply basins, including fast growing shale gas basins. Furthermore, Texas is well connected, both upstream and downstream, to major markets of North America. Figure 10 shows the Gulf Texas (i.e., not including Permian basin) flows including supplies and inbound flows to the state, shown as negative numbers, and demand and outbound flows, shown as positive numbers, in the Reference Case. This figure provides a quick visual of what comes into Texas and how it is used. In the early years, the entire demand and outbound flow is comprised of Texas production. The production declines in the early years, even though Texas demand is fairly flat. The primary reason for the decline is because less gas is exported to Louisiana, which also has rapidly increasing shale gas and is upstream of the rapidly increasing production from the Marcellus shale, which backs out some volumes from the Gulf of Mexico into the Mid-Atlantic market. This indicates that some productive capacity will be available over the next decade. Longer term, Texas supplies grow rapidly, especially with the increase in production of South Texas supplies, including the liquids rich Eagle Ford shale basin. This strong growth enables Texas to export gas to Mexico and the Midwest and West markets.

Figure 10: Projection of Gulf Texas Flow



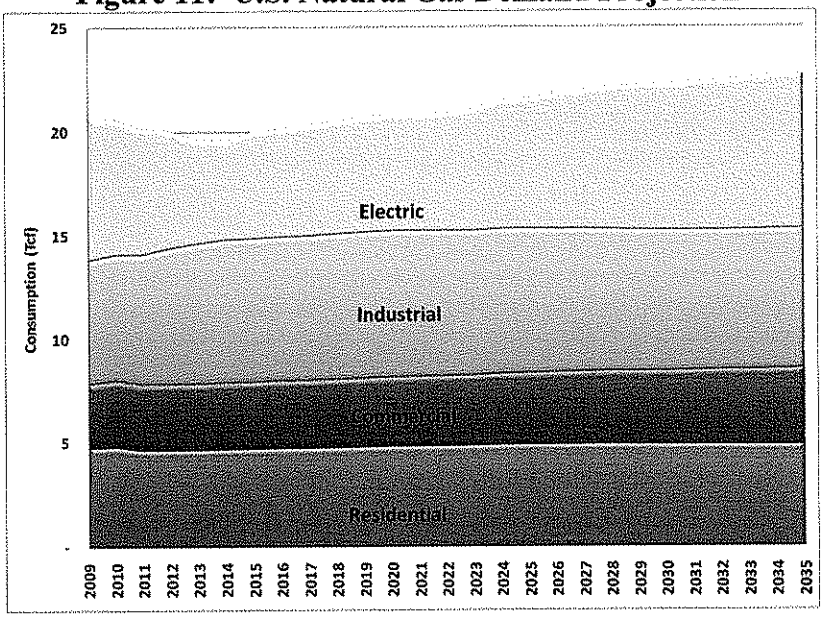
4 ANALYTICAL APPROACH

In order to analyze the impact of LNG exports from the United States on the domestic market, Altos utilized its integrated suite of economic models to provide a comprehensive view of North America with its interconnections with global markets and interconnections with multiple commodities and environmental emissions. Not only is gas connected regionally or temporarily among various regions, gas is regionally or temporarily connected with other fuels—coal, power, tradable emissions allowances, or other fuel forms. Our projections are based on an integrated approach that captures all of the aforementioned factors.

4.1 Key Assumptions

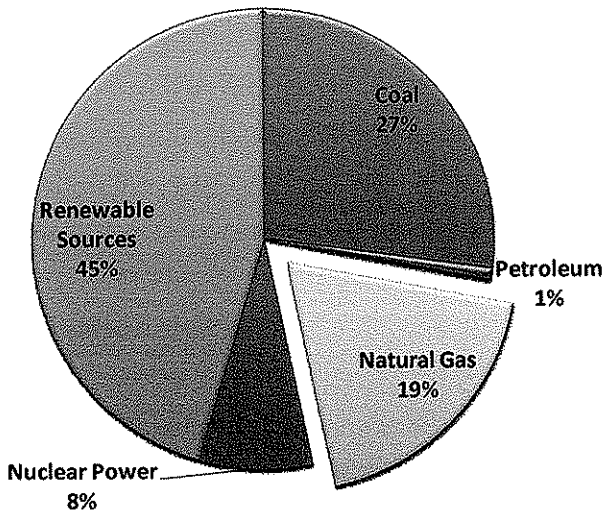
For this analysis, we used the latest demand projections from the EIA's Annual Energy Outlook (AEO) 2010. These demand projections by state and sector are embedded in our WGTM. Figure 11 plots the AEO demand forecast.

Figure 11: U.S. Natural Gas Demand Projection



The EIA did not assume any new environmental regulations in developing its forecast. The electricity sector declines in the near-term before growing steadily because EIA forecasts that renewable sources, much of it mandated by state and federal regulations, and clean coal technologies will provide bulk of the incremental fuel for power generation. Figure 12 shows the shares by fuel for incremental power generation from 2008 to 2035.

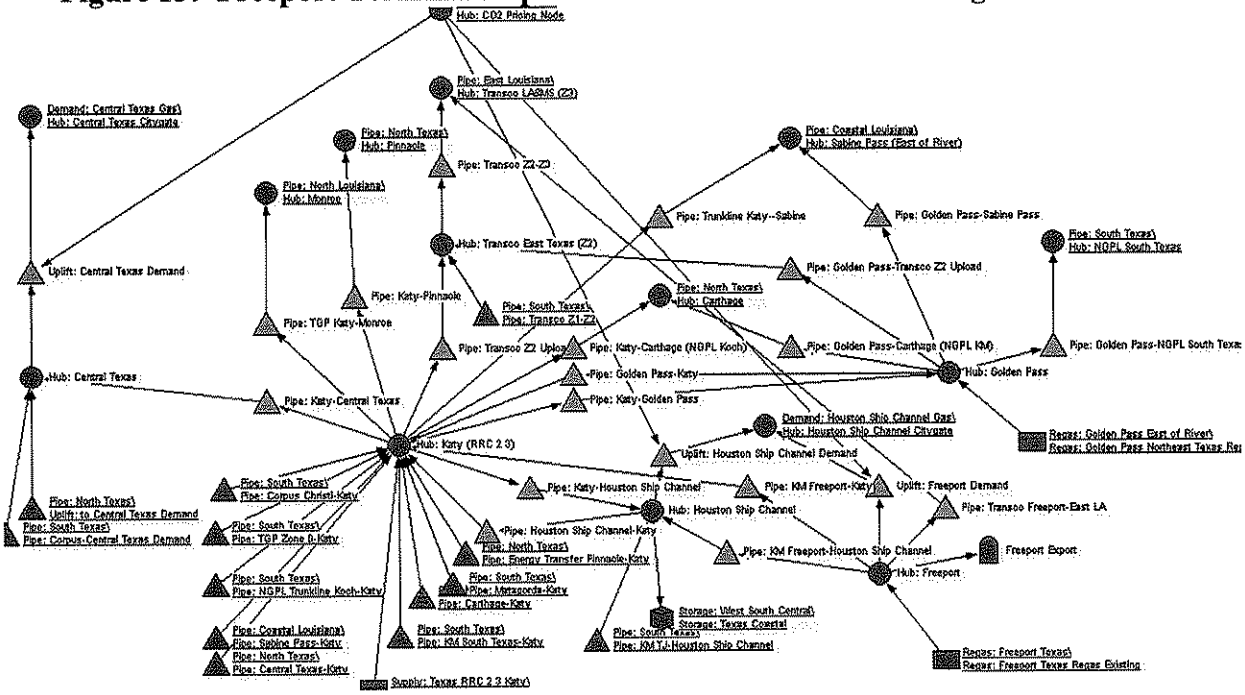
Figure 12: EIA Projection of Incremental Fuel Sources for Power Generation (2008-2035)



We represented the Project terminal as a demand of a constant 1.5 Bcfd from 2015 to 2040. Figure 13 shows the Freeport demand node (in blue) in the Coastal Texas region, just one of hundreds of regions in the WGTM. In the figure, the triangles represent pipelines and circles

represent market hubs or centers. As the figure shows, the Project is connected to the regional market and the region is connected to hubs in contiguous regions, circles with underlined text.

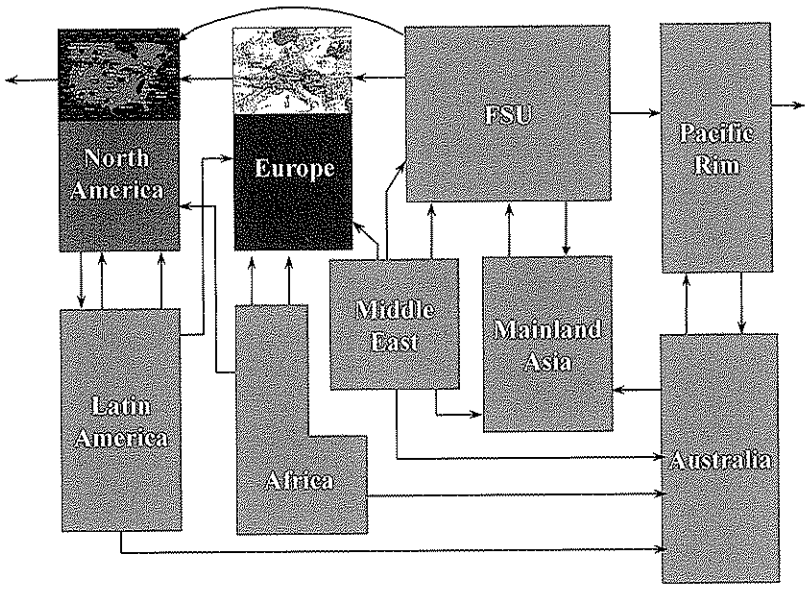
Figure 13: Freeport Terminal Representation in Coastal Texas Region of WGTM



4.2 The Altos World Gas Trade Model (WGTM).

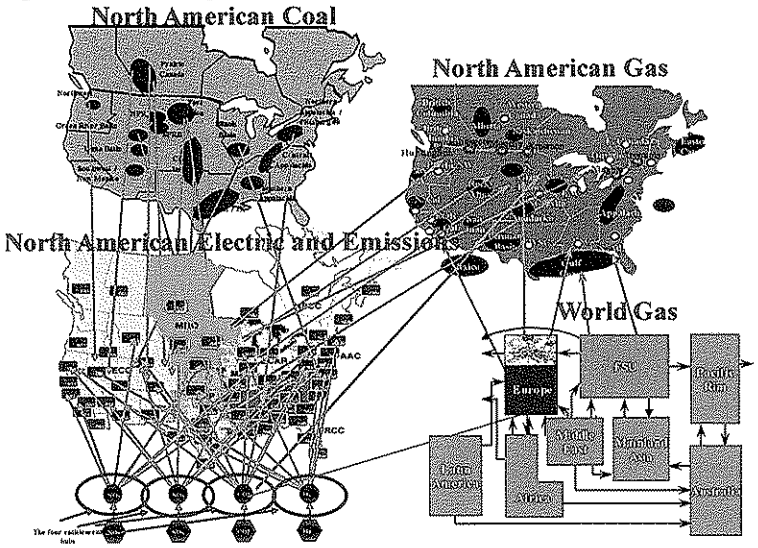
Developed using the MarketBuilder software, WGTM simulates how regional interactions among supply, transportation, and demand interact to determine market clearing prices, flowing volumes, reserve additions, and pipeline entry and exit through 2045. The WGTM, diagramed in Figure 14, divides the world into major geographic regions that are connected by transnational pipelines and LNG cargos. Within each major region are very detailed representations of all market elements: production, liquefaction, transportation, market hubs, regasification and demand by country or sub area. All significant existing and prospective trade routes, LNG liquefaction plants, LNG regasification plants and LNG terminals are represented. Competition with oil and coal is modeled in each region. The ability to model the related markets for emission credits and how these may impact LNG markets is included. Each regional diagram describes how market elements interact internally and with other regions. The North America Regional Gas (NARG) model is embedded in the world model.

Figure 14: Altos World Gas Trade Model



Altos has provided a **fully integrated** view of the energy market, including linkages across commodities, impact of environmental regulations, and temporal tradeoffs. Only Altos has an integrated suite of models, depicted in Figure 15, to provide a complete and consistent view of future markets. For example, our natural gas market forecasts take into account natural gas fuel burn for power generation which in turn takes into account competing fuel prices, including natural gas, oil, and coal, and environmental regulations, especially carbon legislation. Prognosticating gas demand and gas basis without taking explicit, model-based account of the demand-stimulative impact of CO2 regulation is doomed to incorrectness. We take CO2 policy fully into account in our integrated World Gas-North American Power-North American Coal-North American Tradable Emissions model. Very importantly, we do not provide a static analysis in which each sector is kept constant while results of another sector are computed. Rather, we solve for all prices and quantities simultaneously so that we capture the complete feedback loop across commodities and temporalities. Hence, our natural gas forecasts not only include impacts of demand growth, shale production, and LNG imports, but also fully incorporate future developments in the electricity sector and vice versa.

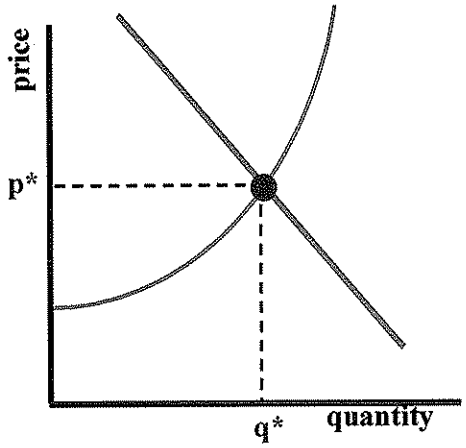
Figure 15: Integrated Gas-Power-Coal-Emissions Model



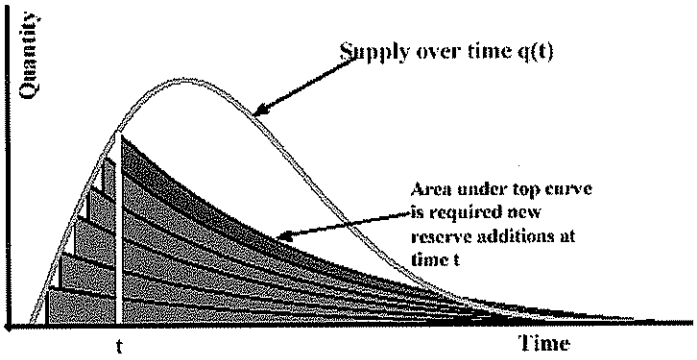
APPENDIX: MARKETBUILDER METHODOLOGY

The Altos suite of models are developed using the MarketBuilder economic software. Some of the key attributes of MarketBuilder are described in the following section.

Agent Based Economic Methodology. MarketBuilder rigorously adheres to accepted microeconomic theory to solve for supply and demand using an "agent based" approach. To understand the unequalled benefits of the agent based approach, suppose you have a market comprised of 1000 agents, i.e., producers, pipelines, refineries, ships, distributors, and consumers. If your model of that market is to be correct, how many optimization problems must there be in your model of that 1000 agent market? The answer is clear—there must be 1000 distinct, independent optimization problems. Every individual agent must be represented as simultaneously solving and pursuing his or her own maximization problem, vying for market share and trying to maximize his or her own individual profits. Market prices arise from the competition among these 1000 disparate, profit-seeking agents. This is the essence of microeconomic theory and competitive markets—people vying in markets for profits—and MarketBuilder scrupulously approaches the problem from this perspective.

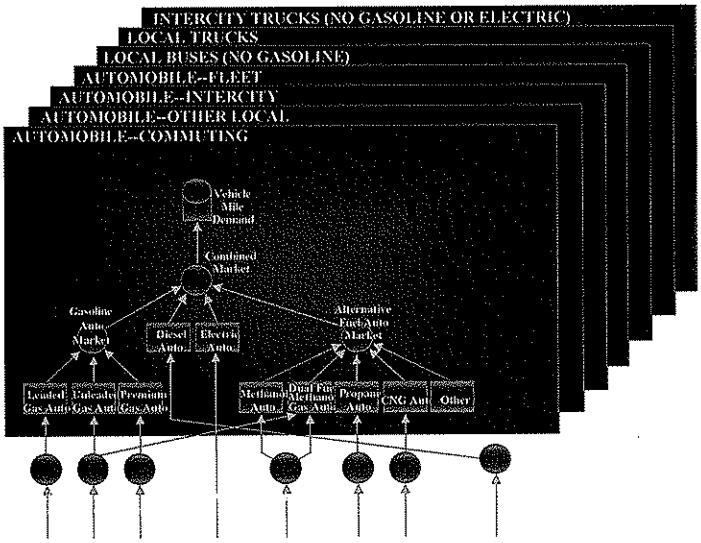


Supply Methodology and Data. MarketBuilder allows the use of sophisticated depletable resource modeling to represent production of primary oil and gas. MarketBuilder embodies the famous Hotelling theory of depletable resource based on a "rational expectations" approach, which assumes that today's drilling affects tomorrow's price and tomorrow's price affects today's drilling. Thus MarketBuilder combines a resource model that approaches resource development the same way real producers do with the best available worldwide supply data from credible sources such as the USGS.

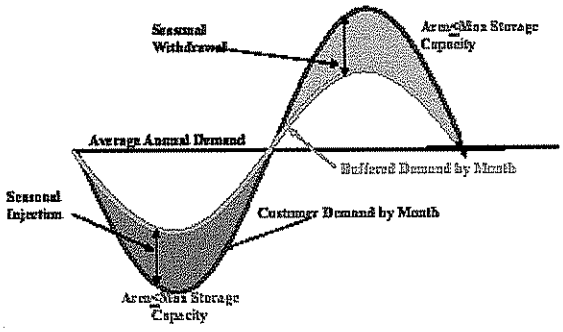


Transportation Data. Altos maintains the best and most current pipeline data and transportation data around the world. Altos and our clients regularly revise and update the transportation data including capacity, tariffs, embedded cost, discounting behavior, dates of entry of prospective new pipelines, and costs of those new pipelines.

Non-Linear Demand Methodology. MarketBuilder allows the use of multi-variate nonlinear representations of demand by sector, without limit on the number of demand sectors. Altos is skilled at performing regression analyses on historical data to evaluate the effect of price, weather, GNP, etc on demand. Using our methodology, Altos systematically models the impact of price change on demand (demand price feedback) to provide much more realistic results than models that use simple exogenous demand projections (e.g. 2% per year increase regardless of price).

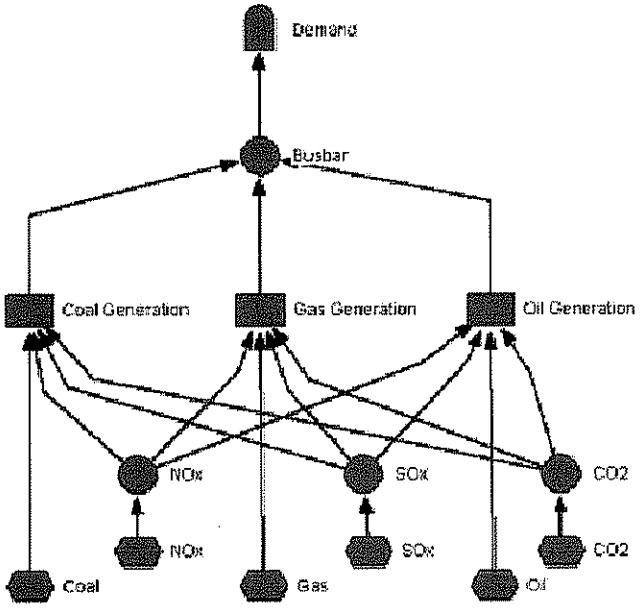


Advanced Storage Methodology. MarketBuilder's storage process represents the profit-maximizing behavior of a storage facility owner (or lessee). A schedule of additions and withdrawals is calculated endogenously by the model for each storage facility so as to maximize the present value of profitability of the storage activity, taking full account of current and full forward price over time, storage cost, interest rates, maximum injection rates, and maximum withdrawal rates (with ratchets). The owner of a storage asset is represented as buying from the market when prices are low (e.g., off peak during the summer for heating oil or natural gas) and sell back to the market when prices are high, i.e. during winter for heating oil or natural gas. In the model as in the real world, buying during low price periods and selling during high price periods moderates both the peaks and valleys in market prices. We believe our model to be the only one in the industry that can properly represent the feedback. Modeling this feedback is absolutely essential if you are to represent markets that have storage assets properly and understand their effect on price.



Automatic, endogenous capacity addition. MarketBuilder allows you to represent capacity addition automatically and endogenously. In this mode, MarketBuilder will add capacity as the market would, taking into account that today's capacity addition depends on the full forward schedule of price and simultaneously the full forward schedule of price depends on today's capacity addition.

Endogenous Model of Emission Credit Markets. MarketBuilder enables modeling of markets for emission credit and pollutant entitlements in simultaneous equilibrium with models of primary energy commodities. The energy commodities affect the entitlement price and the entitlement price affects the energy market. This is the ultimate in interconnecting environmental modeling with primary energy models. In general, it is government action that determines the aggregate amount of available entitlement. We think of this aggregate amount as the supply of emissions credits available to be openly traded in markets. Demand for credits is created by energy conversion activities such as electric generation units or refineries. Both in our model and in the real world, emission credit prices result from the interaction of credit supply and demand, and these credit prices become costs for energy conversion process. Thus, the prices for credits and the commodity prices themselves are interdependent. MarketBuilder offers the only fully closed model of energy and pollution available in the market today.



APPENDIX C

VERIFICATION
and
CERTIFIED STATEMENT

County of Los Angeles

State of California

I, Les LoBaugh, being duly sworn on his oath, do hereby affirm that I am a duly authorized representative of Freeport LNG Expansion, L.P. and FLNG Liquefaction LLC; that I am familiar with the contents of this application; and that the matters set forth therein are true and correct to the best of my knowledge, information and belief.

Les LoBaugh

Sworn to and subscribed before me, a Notary Public, in and for the State of California, this 17th day of December, 2010.

Notary Public

ROBIN L. BRAM
Commission # 1723016
Notary Public - California
Los Angeles County
My Comm. Expires Feb 2, 2011