UNITED STATES OF AMERICA

DEPARTMENT OF ENERGY

OFFICE OF FOSSIL ENERGY

FREEPORT LNG EXPANSION, L.P. AND FLNG LIQUEFACTION, LLC	)	FE DOCKET NO. 10-161-LNG

ORDER CONDITIONALLY GRANTING LONG-TERM MULTI-CONTRACT AUTHORIZATION TO EXPORT LIQUEFIED NATURAL GAS BY VESSEL FROM THE FREEPORT LNG TERMINAL ON QUINTANA ISLAND, TEXAS TO NON-FREE TRADE AGREEMENT NATIONS

DOE/FE ORDER NO. 3282

May 17, 2013

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FREQUENTLY USED ACRONYMS

AEO	Annual Energy Outlook
APGA	American Public Gas Association
Bcf/d	Billion Cubic Feet per Day
CO_2	Carbon Dioxide
DOE	U.S. Department of Energy
EIA	U.S. Energy Information Administration
EITE	Energy Intensive, Trade Exposed
EPA	U.S. Environmental Protection Agency
EUR	Estimated Ultimate Recovery
FE	Office of Fossil Energy, U.S. Department of Energy
FERC	Federal Energy Regulatory Commission
FLEX	Freeport LNG Expansion L.P. and FLNG Liquefaction, LLC
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GNGM	Global Natural Gas Model
IECA	Industrial Energy Consumers of America
kWh	Kilowatt-hour
LNG	Liquefied Natural Gas
LTA	Liquefaction Tolling Agreement
Mcf	Thousand Cubic Feet
MMBtu	Million British Thermal Units
NEI	National Export Initiative
NEMS	National Energy Modeling System
NEPA	National Environmental Policy Act
NERA	NERA Economic Consulting
N_{ew}ERA	NERA's Macroeconomic Model
NGA	Natural Gas Act
NGLs	Natural Gas Liquids
NOA	Notice of Availability
Tcf/yr	Trillion Cubic Feet per Year
TRR	Technically Recoverable Resources

I. INTRODUCTION

On December 17, 2010, Freeport LNG Expansion L.P. and FLNG Liquefaction, LLC (collectively, FLEX) filed an application (Application) with the Office of Fossil Energy of the U.S. Department of Energy (DOE/FE) under section 3 of the Natural Gas Act (NGA)[1] for long-term, multi-contract authorization to export domestically produced liquefied natural gas (LNG) by vessel to nations with which the United States has not entered into a free trade agreement (FTA) providing for national treatment for trade in natural gas (non-FTA countries). FLEX seeks to export LNG in a volume equivalent to 1.4 billion cubic feet per day (Bcf/d) of natural gas for 25 years. The exports, if authorized, would originate from the Freeport LNG Terminal on Quintana Island, Texas, southeast of the City of Freeport in Brazoria County, Texas. FLEX seeks to export this LNG on its own behalf and as agent for third parties.

Freeport LNG Expansion L.P. is a Delaware limited partnership and a wholly owned subsidiary of Freeport LNG Development, L.P. FLNG Liquefaction, LLC is a Delaware limited liability company and a wholly owned subsidiary of Freeport LNG Expansion, L.P. Both Freeport LNG Development, L.P. and FLNG Liquefaction, LLC have their principal place of business in Houston, Texas. The export authorization requested by FLEX is described in more detail below.

On January 27, 2011, DOE/FE published a Notice of Application in the Federal Register.[2] The Notice of Application called on interested persons to submit protests, motions to intervene, notices of intervention, and comments no later than March 28, 2011. In response to the Notice of Application, DOE/FE received 13 letters and four resolutions passed by local

[1] 15 U.S.C. § 717b. This authority is delegated to the Assistant Secretary for Fossil Energy pursuant to Redelegation Order No. 00-002.04E (Apr. 29, 2011).
[2] Freeport LNG Expansion, L.P. and FLNG Liquefaction, LLC, Application for Long-Term Authorization to Export Liquefied Natural Gas, 76 Fed. Reg. 4885 (Jan. 27, 2011).

entities in support of FLEX's Application.[3] No letters opposed the Application. DOE/FE also received four timely filed motions to intervene. Three of the four motions to intervene took no position on the Application. The fourth, filed by the American Public Gas Association (APGA), was also a protest that opposed the requested authorization. FLEX filed an answer to AGPA's protest on April 12, 2011.

One month later, in May 2011, DOE/FE issued its first order granting a long-term authorization to export domestically produced LNG to non-FTA countries when it issued a conditional authorization to Sabine Pass Liquefaction, LLC, authorizing export of 2.2 Bcf/d (*Sabine Pass*).[4] By August 2011, DOE/FE had received two additional applications for authorization to export LNG to non-FTA countries—the current Application and an application filed by Lake Charles Exports, LLC.[5] Together, these three applications proposed LNG export authorizations for the equivalent of up to 5.6 Bcf/d of natural gas. At the same time, DOE/FE expected that more applications would be filed imminently.[6] Recognizing the potential cumulative impact of the pending and anticipated LNG export applications, DOE/FE determined

[3] Two days after the close of the comment period, DOE/FE received comments in a letter submitted by Bill Cooper, President of the Center for Liquefied Natural Gas. DOE/FE finds that acceptance of the letter two days out of time will not prejudice other parties to this proceeding, and therefore accepts Mr. Cooper's letter for filing. *See* Section XII.R *infra*.

[4] *Sabine Pass Liquefaction, LLC*, DOE/FE Order No. 2961, Opinion and Order Conditionally Granting Long-Term Authorization to Export Liquefied Natural Gas From Sabine Pass LNG Terminal to Non-Free Trade Agreement Nations (May 20, 2011). In August 2011, DOE/FE granted final authorization. *Sabine Pass Liquefaction, LLC*, DOE/FE Order No. 2961-A, Final Opinion and Order Granting Long-Term Authorization to Export Liquefied Natural Gas From Sabine Pass LNG Terminal to Non-Free Trade Agreement Nations (Aug. 7, 2011). DOE/FE subsequently denied rehearing of that order in January 2013. *Sabine Pass Liquefaction, LLC*, DOE/FE Order No. 2961-B, Opinion and Order Denying Request for Rehearing of Order Denying Motion for Late Intervention, Dismissing Request for Rehearing of Order No. 2961A, and Dismissing Motion for a Stay Pendente Lite (Jan. 25, 2013).

[5] *See* FE Docket 11-59-LNG.

[6] As of the date of this order, 20 applications for long-term export of LNG to non-FTA countries, in an amount totaling approximately 26 Bcf/d, are pending before DOE/FE.

that further study of the economic impacts of LNG exports was warranted to better inform its public interest review under section 3 of the NGA.[7]

Accordingly, DOE/FE engaged the U.S. Energy Information Administration (EIA) and NERA Economic Consulting (NERA) to conduct a two-part study of the economic impacts of LNG exports.[8] First, in August 2011, DOE/FE requested that EIA assess how prescribed levels of natural gas exports above baseline cases could affect domestic energy markets. Using its National Energy Modeling System (NEMS), EIA examined the impact of two DOE/FE-prescribed levels of assumed natural gas exports (at 6 Bcf/d and 12 Bcf/d) under numerous scenarios and cases based on projections from EIA's 2011 Annual Energy Outlook (AEO 2011), the most recent EIA projections available at the time.[9] The scenarios and cases examined by EIA included a variety of supply, demand, and price outlooks. EIA published its study, *Effect of Increased Natural Gas Exports on Domestic Energy Markets*, in January 2012.[10] Second, in October 2011, DOE/FE asked NERA to incorporate the forthcoming EIA case study output from the NEMS model into NERA's general equilibrium model of the U.S. economy. NERA analyzed the potential macroeconomic impacts of LNG exports under a range of global natural gas supply and demand scenarios, including scenarios with unlimited LNG exports. NERA published its study, *Macroeconomic Impacts of LNG Exports from the United States*, in December 2012.[11]

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[7] DOE separately evaluates the environmental impacts of LNG export applications. *See* Section IV.E *infra.*
[8] *See* 2012 LNG Export Study, 77 Fed. Reg. 73,627 (Dec. 11, 2012), *available at* http://energy.gov/sites/prod/files/2013/04/f0/fr_notice_two_part_study.pdf (Federal Register Notice of Availability of the LNG Export Study).
[9] The Annual Energy Outlook presents long-term projections of energy supply, demand, and prices. It is based on results from EIA's NEMS model. *See* discussion of the AEO 2011 projections at Section VIII.A *infra*.
[10] *See* LNG Export Study – Related Documents, *available at* http://energy.gov/fe/downloads/lng-export-study-related-documents (EIA Analysis (Study - Part 1)).
[11] *See id*. (NERA Economic Consulting Analysis (Study - Part 2)).

On December 11, 2012, DOE/FE published a Notice of Availability (NOA) of the EIA and NERA studies (collectively, the 2012 LNG Export Study or Study).[12] In the NOA, DOE/FE invited the public to submit comments on the Study, and stated that its disposition of the present case and 14 other LNG export applications then pending would be informed by the Study and the comments received in response thereto.[13] The NOA required the submission of initial comments by January 24, 2013, and reply comments between January 25 and February 25, 2013.[14] In response, DOE/FE received over 188,000 initial comments and over 2,700 reply comments. Of these, approximately 800 were unique comments.[15] The comments also included 11 economic studies prepared by commenters or organizations under contract to commenters.

The public comments represent a diverse range of interests and perspectives, including those of federal, state, and local political leaders; large public companies; public interest organizations; academia; industry associations; foreign interests; and thousands of U.S. citizens. While the majority of comments are short letters expressing support or opposition to the LNG Export Study or to LNG exports in general, others contained detailed articulations of differing points of views. The comments were posted on the DOE/FE website and entered into the public records of the 15 LNG export proceedings identified in the NOA, including the present

[12] 77 Fed. Reg. at 73,627.
[13] *Id*. at 73,628.
[14] *Id*. at 73,627. On January 28, 2013, DOE issued a Procedural Order accepting for filing any initial comments that had been received as of 11:59 p.m., Eastern time, on January 27, 2013.
[15] Because many comments were nearly identical form letters, DOE/FE organized the initial comments into 399 docket entries, and the reply comments into 375 entries. *See* http://www.fossil.energy.gov/programs/gasregulation/authorizations/export_study/export_study_initial_comments.html (Initial Comments – LNG Export Study) & http://www.fossil.energy.gov/programs/gasregulation/authorizations/export_study/export_study_reply_comments.html (Reply Comments – LNG Export Study).

proceeding.[16] As discussed below, DOE/FE has carefully examined the comments and has considered them in its review of the FLEX Application.

II. SUMMARY OF FINDINGS AND CONCLUSIONS

Based on a review of the complete record and for the reasons set forth below, DOE/FE has concluded that the opponents of the FLEX Application have not demonstrated that the requested authorization would be inconsistent with the public interest. As further described below, we find that the exports proposed in this Application are likely to yield net economic benefits to the United States. We further find that granting the requested authorization is unlikely to affect adversely the availability of natural gas supplies to domestic consumers or result in natural gas price increases or increased price volatility such as would negate the net economic benefits to the United States. Accordingly, for these and other reasons set forth herein, we are conditionally granting the FLEX Application, subject to satisfactory completion of environmental review and the other terms and conditions discussed below.

III. PUBLIC INTEREST STANDARD

Section 3(a) of the NGA sets forth the standard for review of FLEX's Application:

> [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 of Energy[17]] authorizing it to do so. The [Secretary] shall issue such order upon application, unless after opportunity for hearing, [he] finds that the proposed exportation or importation will not be consistent with the public interest. The [Secretary] may by [the Secretary's] order grant such application, in whole or part, with such modification and upon such terms and conditions as the [Secretary] may find necessary or appropriate.

[16] *See* 77 Fed. Reg. at 73,629 & n.4.

[17] The Secretary's authority was established by the Department of Energy Organization Act, 42 U.S.C. § 7172, which transferred jurisdiction over imports and export authorizations from the Federal Power Commission to the Secretary of Energy.

15 U.S.C. § 717b(a). This provision creates a rebuttable presumption that a proposed export of natural gas is in the public interest. DOE/FE must grant such an application unless opponents of the application overcome that presumption by making an affirmative showing of inconsistency with the public interest.[18]

While section 3(a) establishes a broad public interest standard and a presumption favoring the issuance of export authorizations, the statute does not define "public interest" or identify criteria that must be considered. In prior decisions, however, DOE/FE has identified a range of factors that it evaluates when reviewing an application for export authorization. These factors include economic impacts, international impacts, security of natural gas supply, and environmental impacts, among others. To conduct this review, DOE/FE looks to record evidence developed in the application proceeding.[19]

DOE/FE's prior decisions have also looked to certain principles established in its 1984 Policy Guidelines.[20] The goals of the Policy Guidelines are to minimize federal control and involvement in energy markets and to promote a balanced and mixed energy resource system. The Guidelines provide that:

> The market, not government, should determine the price and other contract terms of imported [or exported] natural gas. The federal government's primary responsibility in authorizing imports [or exports] will be to evaluate the need for the gas and whether the import [or export] arrangement will provide the gas on a competitively priced basis for the duration of the contract while minimizing regulatory impediments to a freely operating market.[21]

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[18] *See, e.g., Sabine Pass*, Order No. 2961, at 28; *Phillips Alaska Natural Gas Corp. & Marathon Oil Co.*, DOE/FE Order No. 1473, Order Extending Authorization to Export Liquefied Natural Gas From Alaska, 2 FE ¶ 70,317, at 13 (1999), *citing Panhandle Producers & Royalty Owners Ass'n v. ERA*, 822 F.2d 1105, 1111 (D.C. Cir. 1987).
[19] *See, e.g., Sabine Pass*, DOE/FE Order No. 2961, at 28-42 (reviewing record evidence in issuing conditional authorization).
[20] New Policy Guidelines and Delegations Order Relating to Regulation of Imported Natural Gas, 49 Fed. Reg. 6684 (Feb. 22, 1984) [hereinafter 1984 Policy Guidelines].
[21] *Id*. at 6685.

While nominally applicable to natural gas import cases, DOE/FE subsequently held in Order No. 1473 that the same policies should be applied to natural gas export applications.[22]

In Order No. 1473, DOE/FE stated that it was guided by DOE Delegation Order No. 0204-111. That delegation order, which authorized the Administrator of the Economic Regulatory Administration to exercise the agency's review authority under NGA section 3, directed the Administrator to regulate exports "based on a consideration of the domestic need for the gas to be exported and such other matters as the Administrator finds in the circumstances of a particular case to be appropriate."[23] In February 1989, the Assistant Secretary for Fossil Energy assumed the delegated responsibilities of the Administrator of ERA.[24]

Although DOE Delegation Order No. 0204-111 is no longer in effect, DOE/FE's review of export applications has continued to focus on: (i) the domestic need for the natural gas proposed to be exported, (ii) whether the proposed exports pose a threat to the security of domestic natural gas supplies, (iii) whether the arrangement is consistent with DOE/FE's policy of promoting market competition, and (iv) any other factors bearing on the public interest described herein.

IV. DESCRIPTION OF REQUEST

FLEX has applied for a long-term, multi-contract authorization to export domestically produced LNG up to the equivalent of 9 million metric tons per year not to exceed a total of 225 million metric tons over the 25-year term of the requested authorization. FLEX states that the requested authorization is equivalent to 1.4 Bcf/d of natural gas over the requested 25-year term.

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[22] *Phillips Alaska Natural Gas*, DOE/FE Order No. 1473 at 14, citing *Yukon Pacific Corp.*, DOE/FE Order No. 350, Order Granting Authorization to Export Liquefied Natural Gas from Alaska, 1 FE ¶ 70,259, at 71,128 (1989).
[23] DOE Delegation Order No. 0204-111, at 1, 49 Fed. Reg. 6684, 6690 (Feb. 22, 1984).
[24] *See* Applications for Authorization to Construct, Operate, or Modify Facilities Used for the Export or Import of Natural Gas, 62 Fed. Reg. 30,435, 30,437 n.15 (June 4, 1997) (citing DOE Delegation Order No. 0204-127, 54 Fed. Reg. 11,436 (Mar. 20, 1989)).

FLEX requests that the authorization commence on the earlier of the date of first export or five years from the date the requested authorization is granted. FLEX seeks to export the LNG by vessel from the Freeport LNG Terminal on Quintana Island near Freeport, Texas, to any non-FTA country that currently has or in the future develops the capacity to import LNG via ocean-going carrier and with which trade is not prohibited by United States law or policy. FLEX seeks to export this LNG on its own behalf and also as agent for third parties.

A. Background

FLEX states that, in June 2004, the Federal Energy Regulatory Commission (FERC) issued an order authorizing Freeport LNG Development, L.P. to site, construct, and operate what is now known as Phase I of the Freeport Terminal.[25] Two years later, in September 2006, FERC authorized the Phase II expansion of the Freeport LNG Terminal, which included an expansion of the Freeport Terminal's send-out capacity.[26] FLEX completed the Phase I facilities in June 2008, but states that it has not yet commenced the Phase II expansion. As described below, the Liquefaction Project facilities include some of the Phase II expansion facilities authorized by FERC in September 2006.

Also in December 2010, FLEX states that it filed two applications, including the current Application, to export LNG from the proposed Liquefaction Project capable of producing LNG from domestic resources up to the equivalent of 1.4 Bcf/d of natural gas. The first of these applications requested long-term authorization to export LNG to FTA countries. DOE/FE granted that authorization in February 2011.[27] The current Application requests long-term

[25] *Freeport LNG Development, L.P.*, 107 FERC ¶ 61,278 (2004) (order granting rehearing and clarification); 108 FERC ¶ 61,523 (2004) (order amending NGA section 3 authorization,); 112 FERC ¶ 61,194 (2005) (order issuing authorization).
[26] *Freeport LNG Development, L.P.*, 116 FERC ¶ 61,290 (2006).
[27] *Freeport LNG Expansion L.P. and FLNG Liquefaction, LLC*, DOE/FE Order No. 2913, Order Granting Long-Term Authorization to Export LNG from Freeport LNG Terminal to Free Trade Nations (Feb. 10, 2011).

authorization to export LNG to non-FTA countries. The proposed export volumes identified in the two applications mirror the 1.4 Bcf/d liquefaction capacity of the Project and thus are not additive. The authorization issued in this proceeding is conditioned to reflect this fact.

B. Liquefaction Project

FLEX proposes to develop, own, and operate natural gas liquefaction facilities to receive and liquefy domestic natural gas for export. The request to site, construct, and operate the Liquefaction Project is subject to ongoing FERC review in FERC Docket No. CP12-509. FLEX states that the Liquefaction Project will be integrated into the existing Freeport Terminal and contained within the operational area of the Freeport LNG Terminal authorized by FERC.

According to FLEX, the Freeport Terminal consists of a marine berth, two 160,000 cubic meter full containment LNG storage tanks, LNG vaporization systems, associated utilities, and a 9.6-mile pipeline and meter station. FLEX proposes to expand the terminal to provide natural gas pretreatment, liquefaction, and export capacity up to 9 million metric tons per year of LNG, which, FLEX states, equates to approximately 1.4 Bcf/d of natural gas. The proposed expansion will include the following facilities: (i) a second marine berthing dock; (ii) a third LNG storage tank; and (iii) transfer pipelines between the second marine dock and LNG storage tanks. FLEX states that 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.

C. Business Model

FLEX states that rather than enter into long-term natural gas supply or LNG export contracts, its business model will be based primarily on Liquefaction Tolling Agreements (LTAs). Individual customers who hold title to natural gas will deliver that gas to FLEX and receive LNG. FLEX states that, like long-term supply contracts, LTAs will provide stable commercial arrangements between companies involved in natural gas services.

FLEX proposes to export LNG on its own behalf or as agent for others. FLEX anticipates that the title holder at the point of export[28] may be: (i) FLEX, (ii) one of FLEX's LTA customers, or (iii) another party that has purchased LNG from an LTA customer pursuant to a long-term contract. FLEX requests authorization to register as agent for each LNG title holder for whom FLEX seeks to export LNG. FLEX proposes that this registration include a written statement by the title holder acknowledging and agreeing to comply with all applicable requirements included in FLEX's export authorization, and to insert those requirements in any subsequent purchase or sale agreement entered into by that title holder. FLEX further proposes to file under seal with DOE/FE any relevant long-term commercial agreements between FLEX and an LNG title holder, including LTAs, once those agreements have been executed.

At the time it submitted its Application, FLEX had not yet entered into any long-term LTAs or other commercial off-take arrangements for the LNG it proposes to export. However, FLEX has subsequently executed long-term LTAs with Osaka Gas Company, Ltd., Chubu Electric Power Company, Inc., and BP Energy Company. These three LTAs in total will permit the export of 1.26 million MMBtu of natural gas per year, representing approximately 1.23 Bcf/d—or approximately 88 percent of the export authorization requested in this proceeding.[29]

D. Source of Natural Gas

FLEX anticipates that each LTA customer will rely on its own sources for natural gas. FLEX further anticipates that the source of natural gas supply for its proposed exports will come primarily from the Texas market, but may draw from the interconnected U.S. natural gas market.

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[28] Export occurs when the LNG is delivered to the flange of the LNG export vessel. *See Dow Chem. Co.*, DOE/FE Order No. 2859, Order Granting Blanket Authorization to Export Liquefied Natural Gas (Oct. 5, 2010).

[29] DOE/FE estimates are based on the most recent annual data used by EIA in AEO 2013, which show that, in 2011, the gross heat content of domestic dry natural gas consumption was estimated at 1,022 Btu per cubic foot. *See EIA Natural Gas Annual*, Table B2 for 2011, *available at* http://www.eia.gov/naturalgas/annual/pdf/appendix_b.pdf.

FLEX asserts that the Texas natural gas market is one of the largest in the world, and is highly liquid because it is connected to other major U.S. markets through a vast pipeline network. FLEX states that, although some of the proposed export supply may be secured through long-term contracts, it expects to draw large volumes of natural gas for itself and for its LTA customers from the spot market. In support of its requested authorization, FLEX cites the size, liquidity, and expanding development of the natural gas markets in close proximity to the Freeport Terminal, as well as growth in domestic pipeline capacity both within Texas and in the United States generally.

E. Environmental Review

FERC is responsible for ensuring that the siting, construction, and operation of LNG facilities are consistent with the public interest under section 3 of the NGA. FERC is also serving as the lead agency for purposes of review of the Liquefaction Project under the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. § 4321 *et seq*. DOE/FE is participating in that environmental review as a cooperating agency, and will independently review FERC's conclusions when FERC's review is complete.

Because the environmental review is on-going, FLEX requested that DOE/FE issue a conditional order approving its export authorization pending satisfactory completion of the environmental review. DOE/FE's regulations[30] and precedent[31] support such an approach, and we therefore find good cause for granting FLEX's request for a conditional order. Accordingly, this conditional order makes preliminary findings on all issues except the environmental issues in this proceeding. Additionally, DOE/FE is attaching a condition to this export authorization

[30] 10 C.F.R. § 590.402 (authorizing the Assistant Secretary to "issue a conditional order at any time during a proceeding prior to issuance of a final opinion and order").
[31] *See, e.g.*, *Sabine Pass*, Order No. 2961, at 40-41.

ordering FLEX to comply with the environmental review process and with any and all preventative and mitigative measures imposed by other federal or state agencies.

When the environmental review is complete, DOE/FE will reconsider this conditional order in light of the information gathered as part of that review. The results of DOE/FE's environmental analysis will be reflected in any final opinion and order.

V. APPLICANT'S PUBLIC INTEREST ANALYSIS

FLEX states that its proposed export of domestically produced LNG is not inconsistent with the public interest, and therefore meets the standard under NGA section 3(a). Citing DOE/FE precedent,[32] FLEX states that DOE/FE's public interest review focuses principally on the domestic need for natural gas proposed for export, as well as any other factors shown to be relevant to the public interest. FLEX summarizes its view that the proposed exports are not inconsistent with the public interest as follows:

> 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 export 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, U.S. natural gas reserves will meet demand for 100 years. The Liquefaction Project allows the United States to benefit now from the natural gas resources that may not otherwise be produced for many decades, if ever.[33]

FLEX addresses the following seven factors in detail: (i) the impact of the proposed exports on natural gas prices; (ii) domestic natural gas supplies and resource base; (iii) domestic natural gas demand; (iv) benefits to the local, regional, and national economy; (v) balance of trade; and (vi) global environmental benefits; and (vii) national security benefits.

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[32] 1984 Policy Guidelines, 49 Fed. Reg. 6684.

[33] 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, FE Docket No. 10-161-LNG (Dec. 17, 2010), at 14 [hereinafter FLEX App.].

A. Impact of the Liquefaction Project on Natural Gas Prices

FLEX asserts that the proposed exports will have minimal impact on U.S. natural gas prices. In 2010, prior to filing its current Application, FLEX commissioned a report by Altos Management Partners to analyze the effects of the proposed exports on domestic natural gas markets. FLEX states that the Altos Report, entitled *Analysis of Freeport LNG Export Impact on U.S. Markets,*[34] concluded that the United States has sufficient natural gas resources available both to meet projected domestic needs, and to supply natural gas for export through the Liquefaction Project, without materially increasing prices over the requested 25-year export term.[35]

According to FLEX, the domestic natural gas market in recent years has been characterized by increased production and flat demand. Citing EIA data, FLEX states that domestic consumption of natural gas declined from 23.2 trillion cubic feet per year (Tcf/yr) in 2008 to 22.7 Tcf/yr in 2009. FLEX states that this decline in consumption, coupled with what it refers to as the dramatic increase in economically recoverable supplies, has caused the price of natural gas to decrease significantly. As one example, FLEX notes that the average annual spot price for natural gas at Henry Hub located in southern Louisiana dropped from $9.10 per MMBtu in 2005 to $4.10 per MMBtu in 2010, and further declined to an average of $3.71 as of November 2010. FLEX also notes that, in 2010, EIA projected that the annual average lower-48 wellhead price for natural gas will remain under $5.00 per MMBtu through at least 2020, rising to $6.37 by 2035.[36]

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[34] Thomas Choi, Dale Nesbitt, & Brad Barnds, *Analysis of Freeport LNG Export Impact on U.S. Markets* (Altos Mgmt. Partners, Inc. 2010), *cited in* FLEX App. at 10 n.22 [hereinafter Altos Report].
[35] FLEX App. at 16 (citing Altos Report at 5-7).
[36] "Lower-48" refers to the 48 contiguous states, excluding Alaska and Hawaii. Because there is no natural gas pipeline interconnection between Alaska and the lower 48 states, those LNG export markets generally are viewed as

Turning to the impact of the proposed exports, FLEX states that the Liquefaction Project is well-publicized and will be anticipated by the market prior to operation. More generally, FLEX believes that market participants can adapt to known or announced changes in demand by changing incremental production to meet it. According to FLEX, the Altos Report assumed gas supply to the Liquefaction Project of 1.5 Bcf/d during the projected 25-year export term of 2015 to 2040. Of this amount, 0.1 Bcf/d will be used for fuel in the Liquefaction Project, leaving 1.4 Bcf/d available for export.[37] FLEX states that any price impact will be determined by the marginal cost of supply required to meet the 1.5 Bcf/d of additional demand created by the Liquefaction Project, which represents the difference in cost of producing 61.5 Bcf/d versus 60 Bcf/d.

Under that analysis, FLEX asserts that the projected price impact of the incremental demand created by the proposed exports will be small in the Houston Ship Channel market and insignificant in other domestic markets. Specifically, the Altos Report stated that the price in the local Houston Ship Channel market will increase, on average, by approximately 1.2 percent, or $0.09/MMBtu. In the New York, Boston, Chicago, and Henry Hub markets, FLEX states the price impact will be even less—approximately 0.2 percent to 0.5 percent relative to the baseline prices for those markets (or roughly $0.01 to $0.04 per MMBtu). For comparison, FLEX notes that the spot market price for one MMBtu of natural gas moved a daily average of $0.16 per MMBtu at the Henry Hub, Houston Ship Channel, and Katy Hub during the period between 2007 and 2010.

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distinct. *See* 77 Fed. Reg. at 73,627 n.1 (explaining that the LNG Export Study did not consider the impact of exports of Alaska natural gas production).

[37] FLEX App. at 18 n.45 (citing Altos Report at 6).

FLEX maintains that the price impact of the Liquefaction Project is small because the United States' total domestic natural gas reserves are so large. FLEX states that total U.S. recoverable reserves are estimated to meet domestic demand for the next 100 years. Moreover, FLEX believes that Texas, where the Liquefaction Project will be located, is well-positioned to meet additional demand for the Project without a material impact on domestic prices.

B. Domestic Natural Gas Supplies and Resource Base

FLEX states that the proposed exports will not materially impact the availability of natural gas supply within Texas or the United States. First, FLEX states that, as a result of technological advances in horizontal drilling and hydraulic fracturing, huge reserves of domestic shale gas that were previously infeasible or uneconomic to develop are now being profitably produced in many regions of the United States. According to FLEX, the United States is now estimated to have more natural gas resources than it can use in 100 years, which—combined with continued low production costs—will enable the United States to export LNG while also meeting domestic demand for decades to come. To support its position, FLEX cites the following data on natural gas reserves:

- Estimates discussed in the *Interim Report on the Future of Natural Gas*, a report published in 2010 by the Massachusetts Institute of Technology's Energy Initiative,[38] stating that estimates of recoverable gas resources in the United States currently range between 1,500 to almost 2,850 Tcf/yr;

- The MIT Interim Report's conclusion that the United States has approximately 2,100 Tcf/yr of natural gas reserves, about 92 times the total domestic consumption of 22.8 Tcf/yr in 2009;

- Estimates by IHS CERA Inc. that the total natural gas resource base in the United States is more than 3,000 Tcf/yr, sufficient to supply current consumption for over 100 years; and

[38] MIT Energy Initiative, *Interim Report on the Future of Natural Gas* 68 (2010), *cited in* FLEX App. at 10 n.21 [hereinafter MIT Interim Report].

- The Colorado School of Mines Potential Gas Committee's assessment that the United States has a total resource base of 1,836 Tcf/yr, with the Gulf Coast being the country's richest resource area.

Second, FLEX states that the United States is producing substantial quantities of natural gas from multiple sources, with production from unconventional resources, specifically shale gas, increasing in recent years. Citing EIA data, FLEX notes that production from these resources increased from 1.2 Tcf/yr in 2007 to 2.0 Tcf/yr in 2008. Other data referenced by FLEX shows similar trends in shale gas production:

- EIA's AEO 2010 forecast 5.3 percent annual growth in shale gas production from 2008 to 2035, representing an increase to 3.9 Tcf/yr by 2015 and to 6.0 Tcf/yr by 2035;

- EIA's AEO 2011 Early Release Overview more than doubled EIA's previous estimate for shale production—increasing it from 6.0 to 12.0 Tcf/yr by 2035, in light of updated shale gas resources in existing plays and an assumption of increased well productivity for newer plays; and

- The MIT Interim Report estimates that total domestic gas production may grow by up to 45 percent through 2050, with production of natural gas at the top five U.S. shale plays (Marcellus, Haynesville, Woodford, Fayetteville, and Barnett) expected to grow rapidly over the next decade.

FLEX also points to similar findings in the Altos Report, which estimates the growth of shale gas production outpacing the average annual growth rate of natural gas production. According to that report, U.S. gas production will increase to approximately 27.8 Tcf/yr in 2040, an average annual growth rate of 0.8 percent, whereas over the same period, shale gas production is expected to increase to approximately 21.4 Tcf/yr, an average annual growth rate of 6.2 percent.

Third, FLEX considers the potential for the Liquefaction Project to impact the availability of natural gas supply locally and nationwide. FLEX states that, because the U.S. natural gas market is large, well-integrated, and liquid, "economic dispatch pressure" will operate to meet the demand for natural gas that otherwise would have been satisfied by natural

gas from Texas. Specifically, FLEX references the Altos Report in stating that increased production from the Midcontinent basin and from the Marcellus shale basin in the Northern Appalachian region will compensate for reduced flows out of Texas.

Based on the analysis conducted by Altos, FLEX anticipates that much of the 1.5 Bcf/d of feed gas proposed for the Liquefaction Project will be incremental production within Texas, largely from the Eagle Ford shale in South Texas. In addition, FLEX states that some gas produced in Texas that normally would be routed out of state will be routed to the Liquefaction Project. FLEX concludes that Texas is well-positioned to absorb the increased demand without materially impacting the availability of gas supply within Texas or elsewhere.

C. Domestic Natural Gas Demand

FLEX asserts that, as U.S. natural gas reserves and production have grown, U.S. natural gas prices have fallen and are among the lowest in the developed world. FLEX points out that, a decade ago, per capita energy consumption was rising and expected to continue to rise. At that time, domestic natural gas supplies were believed inadequate to meet near-term future demand, to such a degree that DOE/FE was processing applications for LNG import authorization requests. FLEX states that these assumptions turned out to be misplaced. FLEX also refers to EIA projections that the energy intensity of the U.S. economy will decline by 40 percent from 2009 to 2035 and that per capita energy consumption will decline by an average of 0.2 percent per year over the same period.

Relying on data from EIA, FLEX states that domestic natural gas consumption declined from 23.2 Tcf/yr in 2008 to 22.7 Tcf/yr in 2009. In AEO 2010, EIA predicted that domestic natural gas consumption will rise to only 24.9 Tcf/yr by 2035. FLEX further states that the Liquefaction Project is projected to require approximately 13.7 Tcf of natural gas over the requested 25-year export term (the total of 1.5 Bcf/d over 25 years), which it states (citing the

MIT Interim Report) is 0.48 percent to 0.91 percent of the total estimated U.S. recoverable reserves, even assuming that no new gas reserves are identified.

FLEX predicts that the natural gas produced and exported from the Liquefaction Project will not be needed to meet domestic demand for decades, if ever. To support this statement, FLEX points to alternate sources of energy that may reduce (or already have reduced) the need for existing natural gas reserves. These potential sources include methane hydrates and renewable energy sources, such as wind and solar energy. FLEX refers to EIA data in stating that there has been an enormous influx of capital for alternative energy development. FLEX believes that this investment will increase both the near-term and long-term contributions of alternative energy, while reducing future U.S. demand for natural gas and other fossil fuels.

FLEX asserts that 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. According to FLEX, if this downward pressure on natural gas demand occurs as anticipated, it is reasonable to expect that the amount of natural gas proposed to supply the Liquefaction Project over the next 25 years will never be needed in the United States, and thus might not be produced but for this project.

D. Benefits to Local, Regional, and National Economy

FLEX states that the Liquefaction Project will allow the United States to realize the economic benefits of natural gas resources that would not otherwise be realized for decades to come, if ever. FLEX maintains that the proposed exports will stimulate the local, regional, and national economies by directly and indirectly creating between 17,000 and 21,000 new jobs and by providing total economic benefits ranging from $3.6 and $5.2 billion per year from 2015 to 2040. Specifically, FLEX states that these benefits will include:

- Over its two to three year design and construction period, the creation of more than 1,000 on-site engineering and construction jobs, hundreds of off-site jobs, and approximately 20 to 30 permanent operational jobs;

- The indirect creation of between 17,000 and 21,000 new jobs in the United States resulting from the increase in natural gas exploration and production;

- Substantial tax revenue to state and local governments;

- Increased economic activity related to exploration, production, and infrastructure construction, which is expected to benefit local businesses and result in additional community services, such as health care; and

- Increased indirect benefits throughout the natural gas exploration and production supply chain, including high-wage jobs, taxes, royalties, lease payments, expanded natural gas infrastructure, and increased state and federal tax revenue.

Citing findings in the Altos Report and in studies examining the economic benefits of the Marcellus shale gas industry in Pennsylvania, FLEX states that the Liquefaction Project will have a "multiplier effect" that will create improvements across the U.S. economy. For every $1.00 of direct natural gas expenditure for the Liquefaction Project, FLEX estimates that the Project will generate between $1.34 and $1.90 of gross economic benefits. This multiplier effect means that the Project's estimated $2.7 billion in direct expenditures per year could yield total economic benefits between $3.6 and $5.2 billion per year, or $90 to $130 billion over the requested 25-year export term. In sum, FLEX maintains that the Liquefaction Project will have direct economic benefits for local and regional economies, while also indirectly creating significant improvements across the U.S. economy at large.

E. Benefits of International Trade

FLEX also asserts that the Liquefaction Project will provide a material improvement in the U.S. balance of trade. FLEX states that, assuming exports of 1.4 Bcf/d valued at $7.50 per thousand cubic feet (Mcf), the Liquefaction Project will improve the U.S. balance of payments

by approximately $3.9 billion per year, which equates to more than one percent of the U.S. trade deficit.

FLEX cites the National Export Initiative (NEI), created by Executive Order in March 2010, as supporting the need for greater exports of domestically produced LNG.[39] FLEX states that the NEI is intended to "'enhance and coordinate Federal efforts to facilitate the creation of jobs in the United States through the promotion of exports,'" with a "'goal of doubling exports'" by 2015.[40] FLEX maintains that the Liquefaction Project would materially advance these export goals and, in particular, would reduce the trade imbalance in the petroleum products sector, which it states is heavily skewed towards imports. FLEX further contends that approval of the Liquefaction Project will be a significant catalyst for creating exports and export-related jobs in the United States, and will promote federal policies to reduce trade barriers.

F. Global Environmental Benefits

FLEX claims that natural gas is the cleanest-burning fossil fuel. FLEX states that, when natural gas substitutes for coal or fuel oil, it significantly reduces total greenhouse gas emissions. FLEX cites data from the U.S. Environmental Protection Agency (EPA) in stating that, compared to the average coal-fired plant, natural gas-fired plants emit half as much carbon dioxide (CO_2), less than a third of the nitrogen oxides, and one percent of the sulfur oxides. According to FLEX, natural gas also produces approximately 25 to 30 percent less CO_2 than gasoline or diesel when used in vehicles, and is not a significant contributor to acid rain or smog formation.

As countries look for alternate sources of power generation beyond coal or oil, FLEX predicts that demand for LNG will continue to grow world-wide. FLEX states that the

[39] National Export Initiative, Exec. Order No. 13,534, 75 Fed. Reg. 12,433 (Mar. 16, 2010) [hereinafter NEI].
[40] FLEX App. at 30 (quoting NEI, 75 Fed. Reg. at 12,433).

Liquefaction Project is poised to offer significant global environmental benefits by supplying cleaner energy to help meet this increased world-wide demand in a safe, environmentally-friendly way.

G. Benefits to National Energy Security

FLEX asserts that the Liquefaction Project will not adversely affect, and indeed will support, American energy security. FLEX notes that the proposed LNG exports will not degrade U.S. energy security because the natural gas resource base in the United States is sufficient to supply domestic demand for more than 100 years, even with significant exports of LNG.

Additionally, FLEX maintains that LNG exports under the Liquefaction Project will serve to increase U.S. economic trade and bolster U.S. ties with foreign nations by providing the global market with access to a reliable supply of alternative, clean fuel. FLEX quotes the MIT Interim Report in stating that "'U.S. freedom of action in foreign policy is tied to global energy supply.'"[41] FLEX also emphasizes the importance of "a global 'liquid' natural gas market" to promote "'diversity of supply and resilience to disruptions'" in the natural gas market world-wide.[42] FLEX asserts that almost half of the natural gas currently imported into the European Union is conveyed via pipeline from Russia and North Africa. It states that the European Union's dependence on these long supply chains creates significant security concerns for America's allies. Quoting from the MIT Interim Report, FLEX notes that "'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.'"[43]

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[41] FLEX App. at 34 (quoting MIT Interim Report at 70).
[42] *Id*.
[43] *Id*.

Finally, FLEX states that the Liquefaction Project offers the United States an additional security advantage by selling exports into the international market using market-based pricing structures, which may offset those sources that seek to monopolize the natural gas industry.

VI. MOTIONS TO INTERVENE, COMMENTS, AND PROTEST IN RESPONSE TO THE NOTICE OF APPLICATION

A. Overview

In response to the January 2011 Notice of Application, DOE/FE received 17 letters and resolutions in support of the Application, as well as four timely motions to intervene. Letters in support were submitted by Joan Huffman, Senator for the State of Texas; Jim Keffer and Dennis Bonnen, Representatives for the State of Texas; John Cornyn and Kay Bailey Hutchinson, U.S. Senators from the State of Texas; Ron Paul, U.S. Representative from the State of Texas; Randy Eresman, President and Chief Executive Officer of Encana Corporation; Justin Furnace, President of the Texas Independent Producers & Royalty Owners Association; Patrick J. Nugent, Executive Director for the Texas Pipeline Association; Rob Looney, President of the Texas Oil & Gas Association; Bruce Northcutt, President and Chief Executive Officer of Copano Energy, L.L.C.; Graham Davis, Professor at the Colorado School of Mines; and Bill Cooper, President of the Center for Liquefied Natural Gas. Four resolutions in support of FLEX's project were submitted by the following local entities: the Port Commission of Port Freeport; the Economic Development Alliance for Brazoria County; the Commissioner's Court of Brazoria County; and the Executive Board of Directors of the Brazosport Area Chamber of Commerce.

In addition to these non-party commenters, the following four parties submitted timely motions to intervene: Macquarie Energy LLC, Shell US Gas & Power LLC, Cheniere Energy, Inc., and APGA. Of these, only APGA opposed FLEX's requested authorization. The other intervenors took no position.

B. Non-Intervenor Letters in Support of the Application

The non-intervenor letters submitted in support of FLEX's Application generally address the benefits that the commenters anticipate from a grant of the requested authorization. Mr. Looney of the Texas Oil & Gas Association states, for example, that a grant of the Application will assist in creating a new market for domestic resources without significantly impacting the price or availability of natural gas to domestic consumers. He maintains that exporting LNG as sought in FLEX's Application would enhance job creation and other economic developments associated with what he calls the shale gas revolution. Mr. Northcutt of Copano Energy, L.L.C., likewise emphasizes the importance of bringing new shale gas to market. He states that FLEX's proposed project would create new markets for natural gas that, in turn, would provide positive benefits in investment, employment, and state tax revenues. As one example, Mr. Northcutt states that the "midstream industry" would be required to build or expand pipelines and processing plants, which he asserts would create skilled employment opportunities and require capital investments across the country.

Encana points out that this is only the second case (after *Sabine Pass*) in which DOE/FE is asked to address whether the supply needs of consumers in the lower-48 states can be protected if the markets to which domestically produced gas can be exported are expanded to include non-FTA countries. Encana submits that DOE/FE should answer this question in the affirmative. Encana maintains that allowing FLEX to export LNG will provide producers such as Encana with an incentive to expand their natural gas production activities in the United States. According to Encana, this expansion will provide a variety of benefits to the local, regional, and national economy. Encana states that it specifically supports FLEX's business proposal, in which FLEX requests authority to export LNG on its own behalf and as agent for others under the LTA business model. Encana believes that FLEX's ability to act as an agent for others will

provide producers with an additional mechanism to export LNG, particularly when they lack their own export authorization.

Encana maintains that the U.S. and North American natural gas markets have reached a state of maturity where there should be little fear on the part of regulators that the needs of U.S. consumers will be compromised if market access is open. According to Encana, reserve studies show that gas supplies are available from a variety of sources to meet U.S. needs for natural gas for the foreseeable future, including over the 25-year proposed term of the requested export authorization. Stating that FLEX's Application meets the standard in NGA section 3(a), Encana urges approval.

Ms. Huffman, a Texas State Senator, and Mr. Keffer and Mr. Bonnen, Texas State Representatives, also emphasize the potential for job creation and direct financial investment. They assert that FLEX's Application would advance the NEI and would contribute to the displacement of coal and fuel oil around the world.

Professor Davis of the Colorado School of Mines notes that, although natural gas-using industries in the United States have claimed that higher domestic prices will hurt them, he believes that prohibiting LNG exports on this ground would serve only as a form of trade protection for these industries. Professor Davis maintains that such industries should be required to pay the "true" price of natural gas reflecting its global scarcity.

The other non-intervenor letters received in response to the January 2011 Notice of Application largely restate claims contained in both the letters summarized above and in FLEX's Application addressing the potential benefits that would allegedly follow upon a grant of the Application.

C. APGA's Motion to Intervene and Protest

On March 28, 2011, APGA filed a motion to intervene and a protest opposing FLEX's Application. APGA states that it is a national, non-profit association of publicly-owned natural gas distribution systems across 36 states. According to APGA, its members include municipal gas distribution systems, public utility districts, and other public agencies that purchase natural gas—usually as captive customers of a single interstate pipeline—at rates and under terms and conditions regulated by FERC. APGA contends that export of substantial quantities of natural gas, such as that proposed by FLEX, may have significant adverse implications for domestic natural gas consumers, domestic energy supply, and national security. For these reasons, APGA states that FLEX's Application is inconsistent with the public interest and should be denied.

According to APGA, the export of natural gas is inconsistent with a policy of energy independence. In APGA's opinion, the current availability of domestically produced natural gas has created "a previously unimaginable opportunity" for U.S. energy independence that should not be missed. APGA asserts that the use of domestic natural gas should be "maximized" to displace imported petroleum and coal—ideally by replacing gasoline-powered vehicles with natural gas-powered vehicles. APGA submits that this change in transportation fuel would enhance U.S. security and strategic interests and reduce the U.S. trade deficit.

APGA further states that exporting natural gas will tie domestic natural gas prices to international gas markets that often have higher prices. APGA challenges FLEX's assertion that the introduction of domestically produced LNG into international markets will help European and Asian markets become more liquid and less sensitive to fluctuations in the price of oil:

> [T]he amount of natural gas proposed to be exported from the U.S., while significant on the domestic scale, would be a proverbial "drop in the bucket" compared to the global natural gas markets and would have little effect in

> changing those markets, which are often less transparent and less competitive, divided by national boundaries, and regularly indexed to crude oil.[44]

APGA posits that "it seems far more likely that exporting natural gas from the United States would tie domestic commodity prices to international fluctuations rather than tame international fluctuations."[45] As an example, APGA points to Italy's dependence on natural gas supplies from Libya for approximately 10 percent of its natural gas needs, and contends that:

> It is unrealistic to think that U.S. LNG exports could significantly dampen the impact of current events in Libya on Italian energy markets, let alone broader European or global markets. Meanwhile, exports would tie U.S. natural gas prices to prices and demand abroad, to the detriment of the U.S. consumer.[46]

APGA also asserts that FLEX ignores the fact that the domestic natural gas market is competitive, liquid, and transparent because it benefits from the security and stability in North America. According to APGA, tying U.S. natural gas prices to international volatility would make the domestic natural gas market more susceptible to "unstable regimes, rapacious cartels, and distant events."[47] APGA therefore argues that U.S. policymakers should preserve rather than undermine current domestic stability, while adopting policies that expand domestic demand.

APGA further asserts that LNG exports would inflate demand and prices by forcing U.S. consumers to compete with foreign consumers. According to APGA, a price increase in the domestic market would make natural gas less competitive in this country as a replacement fuel for higher carbon-content fuels. APGA submits that DOE/FE should support the use of domestic supplies at the current low price to wean the country off gasoline for transportation and coal for

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[44] Motion for Leave to Intervene and Protest of the American Public Gas Association, Mar. 28, 2011, at 6 [hereinafter APGA Mot.].
[45] *Id*.
[46] *Id*.
[47] *Id*. at 7.

electricity generation. APGA contends, moreover, that DOE/FE has a duty to ensure market efficiency for the benefit of domestic consumers:

> [T]he Department of Energy owes a duty to the American people to ensure that U.S. energy markets function efficiently, not a duty to try to invigorate a global market for natural gas by encouraging exports of domestically produced gas …. The U.S. should pursue policies aimed at keeping domestic gas prices in line with domestic demand, relatively stable and less susceptible to international events by preventing substantial exports of domestically produced natural gas.[48]

Moving to domestic supply concerns, APGA cautions that there are uncertainties associated with future gas production, including opposition to hydraulic fracturing and related safety, environmental, and regulatory issues. They also reference moratoria on drilling activities that prevent or delay offshore production. APGA points out that predictions concerning gas supply have not always proved out. According to APGA, miscalculations in the past concerning natural gas supplies (albeit in the context of LNG imports) are reflected in FLEX's submission of its Application. APGA also points to a recent decision by owners of a natural gas liquefaction facility in Alaska to terminate exports sooner than expected because drilling activity had not offset production rates, making it infeasible to continue natural gas exports. APGA cautions that if the United States ultimately has less recoverable gas than projected, a grant of FLEX's Application could exacerbate that domestic supply situation.

APGA closes by observing, first, that most electric generation built since 2000 is fueled with natural gas, a trend that APGA states has "obvious significance" for natural gas demand in the immediate and long-term future, and second, that the increased domestic use of natural gas in lieu of oil imports will benefit the U.S. economy by reducing the U.S. trade deficit.[49]

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[48] *Id*. at 8.
[49] APGA Mot. at 10.

D. FLEX'S Answer

In its answer, FLEX asserts that, among other alleged deficiencies, APGA's protest "consists of unsupported speculation about the effect of global oil prices on the domestic price of natural gas and vague notions about 'energy independence' predicated on protectionist export restrictions that are inconsistent with the stated policies of the United States."[50] FLEX states that APGA's protest should be rejected for three principal reasons:

First, FLEX argues that APGA fails to show that the FLEX Application is inconsistent with the public interest under NGA section 3(a), and thus fails to overcome the statutory presumption favoring a grant of the Application. Responding to APGA's arguments concerning alleged environmental and regulatory uncertainty over shale gas extraction, FLEX cites the history of hydraulic fracturing worldwide and the work being done at local, state, and national levels to ensure that extraction and production occurs in an environmentally responsible manner. FLEX acknowledges that new regulations governing hydraulic fracturing may be required to address local concerns in areas with no recent history of oil or gas drilling. FLEX stresses, however, that APGA has not provided evidence to show either that the proposed exports are needed to meet domestic demand or to achieve American energy independence. FLEX points instead to the public and private sector research provided in support of its Application, including the independent analyses conducted by EIA. In particular, FLEX cites estimates provided in the MIT Interim Report, to support its conclusion that the proposed Liquefaction Project will require less than one percent of total estimated U.S. technically recoverable resources of natural gas over the proposed 25-year term, even assuming that no new gas resources are identified.

[50] Answer of Freeport LNG Expansion, L.P. and FLNG Liquefaction, LLC to Protest of the American Public Gas Association (Apr. 12, 2011), at 2-3 [hereinafter FLEX Answer].

Second, FLEX argues that a denial of its Application, as advocated by APGA, would require DOE/FE to contravene national policy and interfere with energy markets, whereas granting the Application would promote federal policies favoring free and open trade,[51] energy security,[52] and job creation in the United States through the promotion of exports, as called for under the NEI discussed above. To demonstrate that its Application is consistent with these goals, FLEX points to the direct and indirect economic benefits that it alleges will accrue in the United States from the Liquefaction Project, including permanent job creation.

FLEX also takes issue with APGA's claim that the proposed exports will make natural gas less competitive as a replacement fuel for other fossil fuels. According to FLEX, "APGA provides zero evidence that the proposed exports would deprive the United States of gas needed to convert from coal to gas-fired power plants, or to fuel hypothetical fleets of NGVs [natural gas vehicles]."[53] FLEX counters that "[d]omestic natural gas supplies are more than adequate to supply FLEX's proposed exports while meeting all existing demand, and any realistic projected future demand, associated with transportation and electric power generation."[54]

Third, FLEX disputes APGA's contention that the proposed exports will not only drive up domestic natural gas prices, but also cause gas prices to become more volatile. FLEX characterizes the Liquefaction Project as a "well-publicized endeavor," which "market participants will adapt to … by increasing production to meet incremental demand."[55] FLEX estimates that the change in the domestic price of natural gas, if any, "will be determined by the

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[51] FLEX Answer at 6 (citing Office of United States Trade Representative, *2011 Trade Policy Agenda and 2010 Annual Report of the President of the United States on the Trade Agreements Program* (Mar. 2011), *available at* http://www.ustr.gov/webfm_send/2597).
[52] *Id*. at 8 (citing the White House Blueprint for a Secure Energy Future, at 17 (Mar. 30, 2011), *available at* http://www.whitehouse.gov/sites/default/files/blueprint_secure_energy_future.pdf).
[53] *Id*. at 7.
[54] *Id*. at 8.
[55] *Id*. at 9.

marginal cost of producing 61.5 Bcf/d instead of 60 Bcf/d."[56] FLEX further states that APGA neither cites its own data for this claim regarding price impacts nor refutes FLEX's empirical data, as set forth in the Altos Report and discussed above.

Finally, FLEX maintains that APGA has not contested the various economic and tax benefits associated with the Liquefaction Project, or the "significant" beneficial impact that FLEX predicts the proposed exports will have on the U.S. trade balance.[57] For these and other reasons, FLEX asks DOE/FE to deny AGPA's protest.

VII. LNG EXPORT STUDY

DOE/FE recognized in *Sabine Pass* that the cumulative impact of *Sabine Pass* and additional future LNG export authorizations could affect the public interest. To address this issue, DOE/FE undertook a two-part study of the cumulative economic impact of LNG exports. The first part of the study was conducted by EIA and looked at the potential impact of additional natural gas exports on domestic energy consumption, production, and prices under several export scenarios prescribed by DOE/FE. The EIA study did not evaluate macroeconomic impacts of LNG exports on the U.S. economy. The second part of the study, performed by NERA Economic Consulting, assessed the potential macroeconomic impact of LNG exports using its energy-economy model (the "N_{ew}ERA" model). NERA built on the EIA Study requested by DOE/FE by calibrating the NERA U.S. natural gas supply model to the results of the study by EIA. The EIA study was limited to the relationship between export levels and domestic prices without considering whether those quantities of exports could be sold at high enough world prices to support the calculated domestic prices. NERA used its Global Natural Gas Model

[56] FLEX Answer at 9.
[57] *Id*. at 10.

("GNGM") to estimate expected levels of U.S. LNG exports under several scenarios for global natural gas supply and demand. A more detailed discussion of each study follows.

A. EIA Study, *Effect of Increased Natural Gas Exports on Domestic Energy Markets*

1. Methodology

DOE/FE asked EIA to assess how four scenarios of increased natural gas exports could affect domestic energy markets, particularly consumption, production, and prices. The four scenarios assumed LNG exports of:

- 6 Bcf/d, phased in at a rate of 1 Bcf/d per year (low/slow scenario);
- 6 Bcf/d phased in at a rate of 3 Bcf/d per year (low/rapid scenario);
- 12 Bcf/d phased in at a rate of 1 Bcf/d per year (high/slow scenario); and
- 12 Bcf/d phased in at a rate of 3 Bcf/d per year (high/rapid scenario).

According to EIA, total marketed natural gas production in 2011 was approximately 66 Bcf/d. Thus, exports of 6 Bcf/d and 12 Bcf/d represent roughly 9 percent and 18 percent of natural gas production in 2011, respectively.

DOE/FE also requested that EIA consider the above four scenarios of increased natural gas exports in the context of four cases from EIA's AEO 2011. These four cases are:

- The AEO 2011 Reference Case;
- The High Shale Estimated Ultimate Recovery (EUR) case (reflecting optimistic assumptions about domestic natural gas supply, with the EUR per shale gas well for new, undrilled wells assumed to be 50 percent higher than in the Reference Case);
- The Low Shale EUR case (reflecting pessimistic assumptions about domestic natural gas supply, with the EUR per shale gas well for new, undrilled wells assumed to be 50 percent lower than in the Reference Case); and
- The High Economic Growth case (assuming the U.S. gross domestic product will grow at an average annual rate of 3.2 percent from 2009 to 2035, compared to 2.7 percent in the Reference Case, which increases domestic energy demand).

Taken together, the four scenarios with different additional export levels imposed from the indicated baseline case (no additional exports) presented 16 case scenarios:

Table 1: Case Scenarios Considered By EIA in Analyzing Impacts of LNG Exports

	AEO 2011 Cases	Export Scenarios
1	AEO 2011 Reference	Low/Slow
2	AEO 2011 Reference	Low/Rapid
3	AEO 2011 Reference	High/Slow
4	AEO 2011 Reference	High/Rapid
5	High EUR	Low/Slow
6	High EUR	Low/Rapid
7	High EUR	High/Slow
8	High EUR	High/Rapid
9	Low EUR	Low/Slow
10	Low EUR	Low/Rapid
11	Low EUR	High/Slow
12	Low EUR	High/Rapid
13	High Economic Growth	Low/Slow
14	High Economic Growth	Low/Rapid
15	High Economic Growth	High/Slow
16	High Economic Growth	High/Rapid

EIA used the final AEO 2011 projections issued in April 2011 as the starting point for its analysis and applied the NEMS model. Because NEMS did not generate a projection of LNG export demand, EIA specified additional natural gas demand levels as a proxy for projected export levels consistent with the scenarios prescribed by DOE/FE.

EIA assigned these additional exports to the West South Central Census Division. This meant that EIA effectively assumed that the incremental LNG exports would be shipped out of the Gulf Coast states or Texas.

EIA also counted any additional natural gas consumed during the liquefaction process within the total additional export volumes specified in the DOE/FE scenarios. Therefore the net volumes of LNG produced for export were roughly 10 percent below the gross volumes

considered in each export scenario. By way of illustration, the cases where cumulative export volumes are 6 Bcf/d, liquefaction would consume 0.6 Bcf/d and net exports of 5.4 Bcf/d.

EIA made other changes in modeled flows of gas into and out of the lower-48 United States where necessary to analyze the increased export scenarios.[58] Additionally, EIA assumed that a pipeline transporting Alaskan natural gas into the lower-48 states would not be built during the forecast period, thereby isolating the lower-48 states' supply response.

2. Scope of EIA Study

In the Preface to its study, EIA identifies several limiting factors governing use of the study results:

> The projections in this report are not statements of what *will* happen but of what *might* happen, given the assumptions and methodologies used. The Reference case in this report is a business-as-usual trend estimate, reflecting known technology and technological and demographic trends, and current laws and regulations. Thus, it provides a policy-neutral starting point that can be used to analyze policy initiatives. EIA does not propose, advocate, or speculate on future legislative and regulatory changes.[59]

Additionally, the EIA study recognizes that projections of energy markets over a 25-year period are highly uncertain, and that many events—such as supply disruptions, policy changes, and technological breakthroughs—cannot be foreseen. Other acknowledged limitations on the scope of the EIA study include:

- The NEMS model is not a world energy model, and therefore does not address the interaction between the potential for additional U.S. natural gas exports and developments in world natural gas markets;

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[58] U.S. natural gas exports to Canada and U.S. natural gas imports from Mexico are exogenously specified in all the AEO 2011 cases. U.S. imports of natural gas from Canada are endogenously set in the model and continue to be so for this study. However, U.S. natural gas exports to Mexico and U.S. LNG imports that are normally determined endogenously within the model were set to the levels projected in the associated AEO 2011 cases for this study. EIA Study at 2-3.

[59] EIA study at ii (emphasis in original).

- Global natural gas markets are not integrated, and their nature could change substantially in response to significant changes in natural gas trading patterns;

- Macroeconomic results were not included in the analysis because energy exports are not explicitly represented in the NEMS macroeconomic module; and

- The domestic focus of the NEMS model makes it unable to account for all interactions between energy prices and supply/demand in energy-intensive industries that are globally competitive.

3. Natural Gas Markets

The EIA study recognized that natural gas markets are not integrated globally and natural gas prices span a wide range. EIA stated that the current large disparity in natural gas prices across major world regions is likely to narrow as markets become more globally integrated. However, key questions remain as to how quickly and to what extent convergence might occur.

U.S. market conditions are also variable, according to EIA, and lower or higher U.S. natural gas prices would tend to make additional exports more or less likely. EIA pointed out that prospects for LNG exports depend greatly on the cost-competitiveness of liquefaction projects in the United States relative to those at other locations.

EIA observed that relatively high shipping costs from the United States may add a cost disadvantage compared to exporting countries closer to key markets, such as in Asia. EIA notes that LNG projects in the United States would frequently compete not just against other LNG projects, but also against pipeline projects from traditional natural gas sources or projects to develop shale gas in Asia or Europe.

4. Results of EIA Study

EIA generally found that LNG exports will lead to higher domestic natural gas prices, increased domestic natural gas production, reduced domestic natural gas consumption, and

increased natural gas imports from Canada via pipeline. The impacts of exports, according to EIA, included:

- **Increased natural gas prices at the wellhead.** EIA stated that larger export levels would lead to larger domestic price increases; rapid increases in export levels would lead to large initial price increases that moderate somewhat in a few years; and slower increases in export levels would lead to more gradual price increases but eventually would produce higher average prices during the decade between 2025 and 2035.

- **Increased natural gas production and supply.** Increased exports would result in a supply response, *i.e.*, increased natural gas production that would satisfy about 60 to 70 percent of the increase in natural gas exports, with a minor additional contribution from increased imports from Canada. Across most cases, EIA stated that about three-quarters of this increased production would come from shale sources.

- **Decreased natural gas consumption.** Due to higher prices, EIA projects a decrease in the volume of gas consumed domestically. EIA states that the electric power sector, by switching to coal and renewable fuels, would account for the majority of this decrease but indicates that there also would be a small reduction in natural gas use in all sectors from efficiency improvements and conservation.

- **Increased end-user natural gas and electricity delivered prices.** EIA states that even while consuming less, on average, consumers will see an increase in their natural gas and electricity expenditures.

Additional details regarding these conclusions are discussed in the following sections.

5. Wellhead Price Increases

EIA projects that natural gas prices will increase in the Reference Cases even absent

expansion of natural gas exports. This baseline increase in natural gas prices bears an inverse relationship to projected increases in the volumes of natural gas produced from shale resources. Thus, in the high shale EUR Reference Case, the long-term natural gas price is lower than it is in the low shale EUR case.

While EIA projected a rising baseline price of gas without exports, EIA also found that the price of gas will increase over the rising baseline when exports occur. Exports are projected to impact natural gas prices in two ways. First, the export scenarios that contained rapid growth in exports experienced large initial price increases that moderated in the long run, while cases projecting a slow growth in exports experienced more gradual price increases. Second, cases with larger cumulative exports resulted in higher prices in the long-term relative to those cases with lower overall export levels. The largest price increase over the baseline exists in the Low Shale EUR case. The High Shale EUR case yields the smallest price response.

6. Increased Natural Gas Production and Supply

EIA projected that most of the additional natural gas needed for export would be provided by increased domestic production with a minor contribution from increased pipeline imports from Canada. The remaining portion of the increased export volumes would be offset by decreases in consumption resulting from the higher prices associated with the increased exports.

7. Decreased Natural Gas Consumption

EIA projected that greater export levels would lead to decreases in natural gas consumption. Most of this projected decrease would occur in the electric power sector. Increased coal-fired generation accounts for about 65 percent of the projected decrease in natural gas-fired generation. However, EIA also noted that the degree to which coal might be used in

lieu of natural gas depends on what regulations are in place. As noted above, EIA's projections reflected the laws and regulations in place at the time AEO 2011 was produced.

EIA further projected that small increases in renewable generation would contribute to reduced natural gas-fired generation. Relatively speaking, the role of renewables would be greater in a higher-gas-price environment (*i.e.*, the Low Shale EUR case) when renewables can more successfully compete with coal, and also in a higher-generation environment (*i.e.*, the High Economic Growth case), particularly in the later years.

EIA projected that increased natural gas exports would result in reductions in industrial natural gas consumption. However, the NEMS model does not capture the link between energy prices and the supply/demand of industrial commodities in global industries. To the extent that the location of production is sensitive to changes in natural gas prices, EIA acknowledged that industrial natural gas demand would be more responsive than shown in its analysis.

8. Increased End-User Natural Gas and Electricity Delivered Prices

EIA projected that, with increased natural gas exports, consumers would consume less and pay more on both their natural gas and electricity bills, and generally pay a little less for liquid fuels.

EIA projected that the degree of change to total natural gas bills with added exports varies significantly among economic sectors. This is because the natural gas commodity charge represents significantly different portions of each natural gas consuming sector's bill. However, EIA projected that natural gas expenditures would increase at the highest percentages in the industrial sector, where low transmission and distribution charges constitute a relatively small part of the delivered natural gas price.

EIA projected that average electricity prices would increase between 0.14 and 0.29 cents per kilowatt-hour (kWh) (between 2 and 3 percent) when gas exports are added. The greatest projected increase in electricity prices occurs in 2019 under the Low Shale EUR case for the high export/rapid growth export scenario, with an increase of 0.85 cents per kWh (9 percent).

EIA projected that, on average between 2015 and 2035, total U.S. end-use electricity expenditures as a result of added exports would increase between $5 billion to $10 billion (between 1 to 3 percent), depending on the export scenario. The High Macroeconomic Growth case shows the greatest average annual increase in natural gas expenditures over the same time period, with increases over the baseline (no additional exports) scenario ranging from $6 billion to $12 billion.

9. Impact on Natural Gas Producer Revenues

As part of its analysis, EIA considered the impact of natural gas exports on natural gas producer revenues. According to EIA, total additional natural gas revenues to producers from exports would increase from 2015 to 2035 between $14 billion and $32 billion over the AEO 2011 Reference Case, depending on the export scenario. These revenues reflect dollars spent to purchase and move the natural gas to the export facility, but do not include any revenues associated with the liquefaction and shipping process.

EIA cautioned that these projected increases in natural gas producer revenues do not represent profits and a large portion of the additional revenues would be expended to cover the costs associated with increased production, such as for equipment (*e.g.*, drilling rigs) and labor. In contrast, the additional revenues resulting from the higher price of natural gas that would have been produced and sold to largely domestic customers even in the absence of the additional

exports posited in the analysis would preponderantly reflect increased profits for producers and resource owners.

10. Impacts Beyond the Natural Gas Industry

EIA stated that, other than impacts on their energy expenditures, impacts on non-energy sectors were generally beyond the scope of its study. However, EIA did project impacts on total energy use and energy-related CO_2 emissions. EIA projected that annual primary energy consumption in the AEO 2011 Reference Case will average 108 quadrillion Btu between 2015 and 2035, with a growth rate of 0.6 percent. Also, cumulative CO_2 emissions are projected to total 125,000 million metric tons for that 20-year period.

According to EIA, the changes in overall energy consumption would largely reflect changes in the electric power sector. While additional exports would result in decreased natural gas consumption, changes in overall energy consumption would be relatively minor as much of the decrease in natural gas consumption would be replaced with increased coal consumption.

While lower domestic natural gas deliveries resulting from added exports are projected to reduce natural gas related CO_2 emissions, EIA projected that the increased use of coal in the electric sector would generally result in a net increase in domestic CO_2 emissions. Exceptions occur in scenarios where renewables are better able to compete against natural gas and coal. However, when also accounting for emissions related to natural gas used in the liquefaction process, EIA projected that additional exports would increase domestic CO_2 levels under all cases and scenarios, particularly in the earlier years of the projection period. EIA did not evaluate the effect of U.S. LNG exports on global CO_2 emissions.

B. NERA Study, *Macroeconomic Impacts of LNG Exports from the United States*

Because the NEMS model used by EIA did not account for the impact of energy price changes on global energy utilization patterns and did not include a full macroeconomic model,

DOE/FE commissioned NERA to provide such an analysis. NERA developed a two-step approach. First, it modeled energy markets by drawing on several of the scenarios that EIA had developed and adding global market scenarios developed through its GNGM model. Second, using its "N_{ew}ERA" energy-economy model, NERA drew conclusions regarding the domestic macroeconomic impacts of LNG exports. The impacts measured using the N_{ew}ERA macroeconomic model included price, welfare,[60] gross domestic product (GDP), aggregate consumption, aggregate investment, natural gas export revenues, sectoral output,[61] and wages and other household incomes. In addition, NERA identified impacts that would affect certain energy intensive, trade exposed (EITE) industries, as discussed below.

1. Overview of NERA's Findings

NERA's key findings include the following:

- **Net economic benefits across all scenarios.** Across all the scenarios studied, NERA projected that the United States would gain net economic benefits from allowing LNG exports. For every market scenario examined, net economic benefits increased as the level of LNG exports increased. Scenarios with unlimited exports had higher net economic benefits than corresponding cases with limited exports. In all cases, the benefits that come from export expansion outweigh the losses from reduced capital and wage income to U.S. consumers, and hence LNG exports have net economic benefits in spite of higher domestic natural gas prices.

Net benefits to the United States would be highest if the United States is able to produce large quantities of gas from shale at low cost, if world demand for natural gas increases rapidly,

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[60] According to NERA, the measure of welfare used in its study is known as the "equivalent variation" and is the amount of income a household would be willing to give up in the case without LNG exports to achieve the benefits of LNG exports. NERA states that it measured welfare in present value terms, and therefore captures in a single number benefits and costs that might vary year by year over the period. NERA study at 6 n.5 & 55.

[61] NERA evaluated seven key sectors of the U.S. economy: agriculture, energy intensive sector, electricity, natural gas, motor vehicle, manufacturing, refined petroleum products, and services. *Id*. at 9.

and if LNG supplies from other regions are limited. If the promise of shale gas is not fulfilled and costs of producing gas in the United States rise substantially, or if there are ample supplies of LNG from other regions to satisfy world demand, the United States would not export LNG. Under these conditions, allowing exports of LNG would cause no change in natural gas prices and do no harm to the overall economy.

- **Natural gas price increases.** U.S. natural gas prices would increase if the United States exports LNG. However, the global market limits how high U.S. natural gas prices can rise under pressure of LNG exports because importers will not purchase U.S. exports if U.S. wellhead price rises above the cost of competing supplies.

Natural gas price changes attributable to LNG exports remain in a relatively narrow range across the entire range of scenarios. Natural gas price increases at the time LNG exports could begin range from zero to $0.33 (2010$/Mcf). Price increases that would be observed after five more years of potentially growing exports could range from $0.22 to $1.11 (2010$/Mcf). The higher end of the range is reached only under conditions of ample U.S. supplies and low domestic natural gas prices, with smaller price increases when U.S. supplies are more costly and domestic prices higher.

- **Socio-economic impacts.** How increased LNG exports will affect different socioeconomic groups will depend on their income sources. Like other trade measures, LNG exports will cause shifts in industrial output and employment and in sources of income. Overall, both total labor compensation and income from investment are projected to decline, and income to owners of natural gas resources will increase. Different socioeconomic groups depend on different sources of income; workers with retirement savings that include shares of natural resource companies will benefit from higher incomes to those companies. Nevertheless,

impacts will not be positive for all groups in the economy. Households with income solely from wages or government transfers, in particular, might not participate in these benefits.

- **Competitive impacts and impact on employment.** Serious competitive impacts are likely to be confined to narrow segments of industry. About 10 percent of U.S. manufacturing, measured by value of shipments, has both energy expenditures greater than 5 percent of the value of its output and serious exposure to foreign competition. Employment in these energy-intensive industries is about one-half of one percent of total U.S. employment.

LNG exports are unlikely to affect the overall level of employment in the United States. There will be some shifts in the number of workers across industries, with those industries associated with natural gas production and exports attracting workers away from other industries. In no scenario is the shift in employment out of any industry projected to be larger than normal rates of turnover of employees in those industries.

Additional discussion of the above key findings is offered below and in the NERA study itself.

2. Overview of NERA's Methodology

NERA states that it attempted to answer two principal questions:

- At what price can various quantities of LNG exports be sold?
- What are the economic impacts on the United States of LNG exports?

To answer these questions, NERA used the GNGM model to estimate expected levels of U.S. LNG exports under several scenarios for global natural gas supply and demand. NERA also relied on the EIA study to characterize how U.S. natural gas supply, demand, and prices would respond if the specified level of LNG exports were achieved. Further, NERA examined the same 16 scenarios for LNG exports analyzed by EIA but added additional scenarios to reflect

global supply and demand. These additional scenarios were constructed on the basis of NERA's analytical model of global natural gas markets, as described below.

The resulting scenarios ranged from Reference Case conditions to stress cases with high costs of producing natural gas in the United States and exceptionally large demand for U.S. LNG exports in world markets. The three scenarios chosen for the U.S. resource outlook were the EIA Reference Case, based on AEO 2011, and two cases assuming different levels of EUR from new gas shale development. Outcomes of the EIA high demand case fell between the High and Low EUR cases and, therefore, would not have changed the range of results. The three different international outlooks were: (1) a Reference Case, based on EIA's International Energy Outlook 2011; (2) a Demand Shock case with increased worldwide natural gas demand caused by shutdowns of some nuclear capacity; and (3) a Supply/Demand Shock case that added to the Demand Shock a supply shock that assumed key LNG exporting regions did not increase their exports above current levels.

When the global and U.S. scenarios were combined with seven scenarios specifying limits on exports and export growth, NERA's analysis covered 63 possible scenarios. From these 63 scenarios, 21 scenarios resulted in some level of LNG export from the United States. Of these 21 scenarios, the GNGM model identified 13 "N_{ew}ERA scenarios" that spanned the range of economic impacts from all of the scenarios and eliminated scenarios with essentially identical outcomes. The 13 scenarios included:

Table 2: N_{ew}ERA Scenarios Analyzed by NERA

	U.S. Scenarios	International Demand and Supply Scenarios	Export Scenarios
1	Reference	Supply and Demand Shock	Low/Rapid
2	Reference	Supply and Demand Shock	Low/Slow
3	Reference	Supply and Demand Shock	High/Rapid
4	Reference	Supply and Demand Shock	High/Slow
5	Reference	Demand Shock	Low/Rapid
6	Reference	Demand Shock	Low/Slow
7	Reference	Demand Shock	Low/Slowest
8	High EUR	Supply and Demand Shock	High/Rapid
9	High EUR	Supply and Demand Shock	High/Slow
10	High EUR	Supply and Demand Shock	Low/Rapid
11	High EUR	Supply and Demand Shock	Low/Slow
12	High EUR	Supply and Demand Shock	Low/Slowest
13	Low EUR	Supply and Demand Shock	Low/Slowest

To project the macroeconomic impacts of the above scenarios, NERA used its N_{ew}ERA model to compare the impacts of each of the 13 export scenarios to baselines with no LNG exports. NERA thus derived a range of projected impacts on the U.S. economy, including impacts on welfare, aggregate consumption, disposable income, GDP, and loss of wage income.

3. Scope of the NERA Study

NERA started its analysis with the domestic economic AEO 2011 cases and the export scenarios present in the EIA study.[62] In addition to the export scenarios used by EIA, NERA added two export cases, including the "low/slowest case" and a "no restraints" case in which no regulatory restraints on exports existed. The low/slowest case assumed exports of 6 Bcf/d, with a growth rate of 0.5 Bcf/d per year, which is half the growth rate in the slow scenarios used by EIA.

Because NERA, unlike EIA, modeled the international gas market, NERA also created three international gas market scenarios not contained in the EIA study. The first was a business

[62] For a full discussion of the scope, see pages 3-15 of the NERA study, http://energy.gov/sites/prod/files/2013/04/f0/nera_lng_report.pdf.

as usual Reference Case. The second assumed an international demand shock with increased worldwide natural gas demand caused by shutdowns of some nuclear capacity. Finally, NERA created an international scenario that added to the demand shock a supply shock that assumed key LNG exporting regions did not increase their exports above current levels.

While these additional aspects of the analysis expanded the scope of the NERA study relative to the study conducted by EIA, significant elements of the dynamics of the global natural gas trade and its domestic economic implications were outside the scope of the NERA study or beyond the reach of the modeling tools used.[63] NERA expressly excluded the following factors from its analysis:

- The extent to which an overbuilding of liquefaction capacity could affect the ability to finance the projects and profitably export natural gas;
- The extent to which engineering or infrastructure limitations would impact the rate at which liquefaction capacity would come online, potentially impacting the cost of that capacity;
- The locations of the liquefaction facilities, or alternatives;
- The impacts of the liquefaction and exportation of natural gas on various regions within the United States;
- The extent to which the impacts of LNG export vary among different socio-economic groups; and
- The extent to which macroeconomic impacts to the United States would vary if the liquefaction projects were funded through foreign direct investment.

4. NERA's Global Natural Gas Model

The GNGM model is designed to estimate natural gas production, consumption, and

[63] For a full discussion of the unexplored factors, see Appendix E of the NERA study, http://energy.gov/sites/prod/files/2013/04/f0/nera_lng_report.pdf.

trade in the major gas producing or consuming regions.[64] The model attempts to maximize the difference between surplus and cost, constrained by various factors including liquefaction capacity and pipeline constraints. The model divides the world into 12 regions and specifies supply and demand curves for each region. The regions are: Africa, Canada, China/India, Central and South America, Europe, Former Soviet Union, Korea/Japan, Middle East, Oceania, Sakhalin, Southeast Asia, and the United States. The GNGM model's production and consumption assumptions for these regions are based on projections contained in the Reference Cases of EIA's AEO 2011 and International Energy Outlook 2011. NERA ran the GNGM model in five-year increments between 2015 and 2035.

According to NERA, the characteristics of a regional market will affect LNG trading patterns and the pricing of natural gas within the region. With respect to trading patterns, NERA observed that a significant portion of LNG, such as LNG moving to Europe, is traded on a long-term basis using dedicated supplies and dedicated vessels moving to identified markets. On the other hand, NERA stated that some LNG markets, particularly those in Asia, operate on the basis of open market competitive bids in which LNG is delivered to those who value it the most. NERA also found that Southeast Asian and Australian suppliers most often market LNG to Asian markets; African suppliers deliver LNG most often to Europe; and Middle Eastern suppliers deliver LNG both to Europe and Asia.

With respect to the pricing of LNG in global markets, NERA states that the price differential, or "basis," between two regions reflects the difference in the pricing mechanism for each regional market. If pricing for two market hubs were set by the same mechanism and there were no constraints in the transportation system, the basis would simply be the cost of

[64] For a full discussion of GNGM, see page 20 of the NERA study, http://energy.gov/sites/prod/files/2013/04/f0/nera_lng_report.pdf.

transportation between the two market hubs. NERA asserts, however, that different pricing mechanisms set the price in each regional market, so the basis is often not set by transportation differences alone.

NERA offers the following example: Japan depends on LNG as its source for natural gas and indexes LNG prices to crude oil prices. For Europe, on the other hand, NERA states that LNG is only one of three potential sources of supply for natural gas. The others are interregional pipelines and indigenous production. According to NERA, the competition for market share between these alternative sources of supply will establish the basis for LNG prices in Europe. NERA further states that within North America, pricing at Henry Hub has been for the most part set by competition between different North American supply sources and has been independent of pricing in Japan and Europe.

5. The N_{ew}ERA Macroeconomic Model

NERA developed the N_{ew}ERA model to forecast how, under a range of domestic and international supply and demand conditions, U.S. LNG exports could affect the U.S. economy.[65] Like other general equilibrium models, N_{ew}ERA is designed to analyze long-term economic trends. NERA explained that, in any given year, actual prices, employment, or economic activity may differ from the projected levels.

The version of N_{ew}ERA used in NERA's analysis considered all sectors of the U.S. economy. In short, the model:

- Contains supply curves for domestic natural gas,
- Accounts for imports of Canadian pipeline gas and other foreign imports,
- Recognizes the potential for increases to U.S. liquefaction capacity, and

[65] For a full discussion of the N_{ew}ERA macroeconomic model, see pages 20 to 22 of the NERA study, http://fossil.energy.gov/programs/gasregulation/reports/nera_lng_report.pdf

- Recognizes changes in international demand for domestically produced natural gas.

As discussed below, the results of the N_{ew}ERA model address changes in demand and supply of all goods and services, prices of all commodities, and impacts from LNG exports to U.S. trade, including changes in imports and exports. As with the GNGM model, NERA ran the N_{ew}ERA model in five-year increments for 2015 through 2035.

6. Relationship to the EIA Study

As explained above, EIA's study focused on potential impacts of natural gas exports to domestic energy markets. Specifically, the study considered impacts to natural gas supply, demand, and prices within the United States. To provide a fuller scope of analysis, DOE asked NERA to examine the net macroeconomic impact of domestic LNG exports on the U.S. economy. To conduct this analysis, NERA first modeled international demand for U.S. LNG utilizing its GNGM model. NERA then incorporated the results from the GNGM model into its N_{ew}ERA model, using the same parameters governing natural gas supply and demand that EIA used in the NEMS model.

NERA concluded that, in many cases, the global natural gas market would not accept the full amount of exports assumed in the EIA scenarios at export prices high enough to cover the U.S. wellhead prices calculated by EIA. In these cases, NERA replaced the export levels and price impacts found in the EIA scenarios with lower levels of exports (and prices) estimated by the GNGM model. These lower export levels were applied to the N_{ew}ERA model to generate projected impacts to the U.S. economy from LNG exports.

7. Key Assumptions and Parameters of the NERA Study

NERA implemented the following key assumptions and parameters, in part to retain consistency with EIA's NEMS model:

i. All scenarios were derived from the AEO 2011 and incorporated EIA's assumptions about energy and environmental policies, baseline coal, oil and natural gas prices, economic and energy demand growth, and technology availability and cost in the corresponding AEO cases.

ii. U.S. exports compete with LNG exports from other nations, who are assumed to behave competitively and to adjust their export quantities in response to prevailing prices. The single exception to this assumption is that the export decisions of the global LNG market's one dominant supplier, Qatar, were assumed to be independent of the level of U.S. exports.

iii. Prices for natural gas used for LNG production were based on the Henry Hub price, plus a 15 percent markup (to cover operating costs of the liquefaction process).

iv. The LNG tolling (or reservation) fee—paid by the exporter to the operator of the liquefaction terminal for the right to reserve capacity—was based on a return of capital to the operator.

v. All financing of investment was assumed to originate from U.S. sources.

vi. The United States is assumed to have full employment, meaning that U.S. unemployment rates and the total number of jobs in the United States will not change across all cases.

8. Results of the NERA Study

As a result of its two-step analysis, the NERA study yielded two sets of results, reported in five-year intervals beginning with 2015.[66] First, the GNGM model produced information

[66] These calendar years are not actual, but represent modeling intervals after exports begin. For example, if the United States does not begin LNG exports until 2016, one year should be added to the dates for each year that exports commence after 2015.

regarding the conditions that will support exports of natural gas from the United States. Second, the N_{ew}ERA model provided information about the domestic macroeconomic impacts of natural gas exports. NERA found:

- **LNG exports would result in higher U.S. natural gas prices.** NERA found that the United States would only be able to market LNG successfully with higher global demand or lower U.S. costs of production than in the Reference Cases. According to NERA, the market limits how high U.S. natural gas prices can rise under pressure of LNG exports because importers will not purchase U.S. exports if the U.S. wellhead price rises above the cost of competing supplies. In particular, under NERA's modeling, the U.S. natural gas price does not become linked to oil prices in any of the cases examined.

- **Macroeconomic impacts of LNG exports are positive in all cases.** NERA found that the United States would experience net economic benefits from increased LNG exports in all cases studied. Only three cases had U.S. exports greater than the 12 Bcf/d maximum exports allowed in the cases analyzed by EIA.[67] NERA estimated economic impacts for these three cases with no constraint on exports, and found that even with exports reaching levels greater than 12 Bcf/d and associated higher prices than in the constrained cases, there were net economic benefits from allowing unlimited exports in all cases.

Across the scenarios, NERA projected that U.S. economic welfare would consistently increase as the volume of natural gas exports increased, including in scenarios with unlimited exports. The reason given was that even though domestic natural gas prices are pulled up by LNG exports, the value of those exports also rises so that there is a net gain for the U.S. economy

[67] The first case combined U.S. Reference natural gas production with an international supply and demand shock. The second combined the High EUR domestic case with an international demand shock. The third combined the High EUR domestic case with an international supply and demand shock. NERA study at 6.

measured by a broad metric of economic welfare or by more common measures such as real household income or real GDP. Although there are costs to consumers of higher energy prices and lower consumption and producers incur higher costs to supply the additional natural gas for export, these costs are more than offset by increases in export revenues along with a wealth transfer from overseas received in the form of payments for liquefaction services. The net result is an increase in U.S. households' real income and welfare. NERA noted, however, that net benefits to the U.S. economy could be larger if U.S. businesses were to take more of a merchant role. NERA assumed that foreign purchasers would take title to LNG when it is loaded at a U.S. port, so that any profits that could be made by transporting and selling in importing countries accrue to foreign entities. In cases where exports are constrained to maximum permitted levels, this business model sacrifices additional value from LNG exports that could accrue to the United States.

- **Sources of income would shift.** NERA states that at the same time that LNG exports create higher total income in the United States, exports would shift the composition of income so that both wage income and income from capital investment decline. NERA's measure of total income is GDP measured from the income side, that is, by adding up income from labor, capital, and natural resources and adjusting for taxes and transfers. According to NERA, expansion of LNG exports would have two major effects on income: it raises energy costs and, in the process, depresses both real wages and the return on capital in all other industries, but it also creates two additional sources of income. First, additional income would come in the form of higher export revenues and wealth transfers from incremental LNG exports at higher prices paid by overseas purchasers. Second, U.S. households also would benefit from higher natural gas resource income or rents. These benefits differentiate market-driven expansion of LNG exports from

actions that only raise domestic prices without creating additional sources of income. According to NERA, the benefits that come from export expansion would more than outweigh the losses from reduced capital and wage income to U.S. consumers, and hence LNG exports would have net economic benefits in spite of higher natural gas prices. According to NERA, this is the outcome that economic theory describes when barriers to trade are removed.

- **Some groups and industries will experience negative effects of LNG exports.** NERA concluded that, through retirement savings, an increasingly large number of workers will share in the higher income received by natural resource companies participating in LNG export-related activities. Nevertheless, impacts will not be positive for all groups in the economy. According to NERA, households with income solely from wages or transfers, in particular, might not participate in these benefits. NERA stated that higher natural gas prices can also be expected to have negative effects on output and employment, particularly in sectors that make intensive use of natural gas, while other sectors not so affected could experience gains. There clearly would be greater activity and employment in natural gas production and transportation and in construction of liquefaction facilities. Overall, NERA projected that declines in output in other sectors would be accompanied by similar reductions in worker compensation in those sectors, indicating that there will be some shifting of labor between different industries. However, even in the year of peak impacts, the largest projected change in wage income by industry would be no more than one percent, and even if all of this decline were attributable to lower employment relative to the baseline, NERA concluded that no sector analyzed in its study would experience reductions in employment more rapid than normal turnover. In fact, NERA asserted that most of the changes in real worker compensation are likely to take the form of lower than expected real wage growth, due to the increase in natural gas prices relative to nominal wage growth.

- **Peak natural gas export levels (as specified by DOE/FE for the EIA study) and resulting price increases are not likely.** The export volumes selected by DOE/FE for the EIA Study define the maximum exports allowed in each scenario for the NERA macroeconomic analysis. Based on its analysis of global natural gas supply and demand, NERA projected achievable levels of exports for each scenario. The NERA scenarios that found a lower level of exports than the limits specified by DOE/FE are shown in Figure 5 of the NERA study, as modified from Tcf/yr to Bcf/d below.

Table 3: NERA Export Volumes in Bcf/d, Adapted from Figure 5 of the NERA Report

NERA Export Volumes (in Bcf/d)	2015	2020	2025	2030	2035
U.S. Reference Case with International Demand Shock and lower than Low/Slow export levels	***1.02***	2.69	3.92	3.27	***6.00***
U.S. Reference Case with International Demand Shock and lower than Low/Rapid export levels	2.80	2.69	3.92	3.27	3.76
U.S. Reference Case with International Supply/Demand Shock and lower than High/Slow export levels	***1.02***	6.00	10.77	***12.00***	***12.00***
U.S. Reference Case with International Supply/Demand Shock and lower than High/Rapid export levels	***3.02***	***8.00***	10.77	***12.00***	***12.00***
U.S. High Shale EUR with International Supply/Demand Shock at Low/Slowest export levels	***0.50***	2.69	3.92	3.27	3.76

The cells in bold italics indicate the years in which the model's limit on exports is binding. All scenarios hit the export limits in 2015 except the NERA export volume case with Low/Rapid exports. In no case does the U.S. wellhead price increase by more than $1.11/Mcf due to

market-determined levels of exports. Even in cases in which no limits were placed on exports, competition between the United States and competing suppliers of LNG limits increases in both U.S. LNG exports and U.S. natural gas prices.

To match the characterization of U.S. supply and demand for natural gas in EIA's NEMS model, NERA calibrated its macroeconomic model so that for the same level of LNG exports assumed in the EIA Study, the NERA model reproduced the prices projected by EIA. Thus natural gas price responses were similar in scenarios where NERA export volumes were at the EIA export volumes. However, NERA determined that the high export limits were not economical in the U.S. Reference Case and that in these scenarios there would be lower exports than assumed by EIA. Because NERA estimated lower export volumes than were specified by DOE/FE for the EIA study, U.S. natural gas prices do not reach the highest levels projected by EIA. NERA states that this implies no disagreement with the EIA study. Instead, it reflects the fact that at the highest wellhead prices estimated by EIA, world demand for U.S. exports would fall far short of the levels of exports assumed in the EIA Study. Additionally, NERA found that U.S. wellhead prices would not become linked to oil prices in the sense of rising to oil price parity in any of the cases analyzed, even if the United States were exporting to regions where natural gas prices are presently linked to oil. NERA asserts that costs of liquefaction, transportation, and regasification would keep U.S. prices well below those in importing regions.

- **Serious competitive impacts are likely to be confined to narrow segments of U.S. industry.** NERA gave special attention to the potential impact of LNG exports on EITE industries. NERA examined impacts on manufacturing industries where energy expenditures are greater than 5 percent of the value of the output created and the industries face serious exposure to foreign competition. Such industries, according to NERA, comprise about 10 percent of U.S.

manufacturing and employment in these industries is one-half of one percent of total U.S. employment. NERA did not project that such energy-intensive industries as a whole would sustain a loss in employment or output greater than one percent in any year in any of the cases examined and pointed out that such a drop in employment would be less than normal rates of turnover of employees in the relevant industries.

- **Even with unlimited exports, there would be net economic benefits to the United States.** NERA estimated economic impacts associated with unlimited exports in cases in which even the High, Rapid limits were binding. In these cases, both LNG exports and prices were determined by global supply and demand. Even in these cases, NERA found that U.S. natural gas prices would not rise to oil parity or to levels observed in consuming regions, and net economic benefits to the U.S. increased over the corresponding cases with limited exports. To examine U.S. economic impacts under cases with even higher natural gas prices and levels of exports than in the unlimited export cases, NERA also estimated economic impacts associated with the highest levels of exports and U.S. natural gas prices in the EIA analysis, regardless of whether those quantities could actually be sold at the assumed netback prices. The price received for exports in these cases was calculated in the same way as in the cases based on NERA's GNGM model, by adding the tolling fee plus a 15 percent markup over Henry Hub to the Henry Hub price. Even with the highest prices estimated by EIA for these hypothetical cases, NERA found net economic benefits to the United States, with the net economic benefits growing as export volumes rise. Addressing this finding, NERA explained that LNG export revenues from sales to other countries at those high prices would more than offset the costs of freeing that gas for export.

VIII. COMMENTS ON THE LNG EXPORT STUDY AND DOE/FE ANALYSIS

In the NOA, DOE/FE sought public comment on the EIA and NERA studies, including the modeling scenarios used in both studies. DOE/FE specifically invited comment on "the impact of LNG exports on: domestic energy consumption, production, and prices, and particularly the macroeconomic factors identified in the NERA analysis, including Gross Domestic Product (GDP), welfare analysis, consumption, U.S. economic sector analysis, and … any other factors included in the analyses."[68] DOE noted that, "[w]hile this invitation to comment covers a broad range of issues, the Department may disregard comments that are not germane to the present inquiry."[69]

As explained in the Introduction, DOE/FE has spent several months reviewing the more than 188,000 initial and 2,700 reply comments received in response to the NOA. Given the volume of comments, it is neither practical nor desirable for DOE/FE to summarize each of them. Therefore, DOE/FE identifies below both: (i) the pertinent arguments by topic, with reference to representative comments, and (ii) DOE/FE's basis for the conclusions that it drew in reviewing those comments. In so doing, DOE/FE will respond to the relevant, significant issues raised by the commenters.[70]

A. Data Inputs and Estimates of Natural Gas Demand

1. Comments

Several commenters, including Sierra Club,[71] Dow Chemical Company (Dow), along with U.S. Representative Edward Markey, U.S. Senator Ron Wyden, Alcoa, Save Our Supplies,

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[68] 77 Fed. Reg. at 73,629.
[69] *Id.*
[70] *See, e.g., Public Citizen v. F.A.A.*, 988 F.2d 186, 197 (D.C. Cir. 1993).
[71] Sierra Club filed comments on behalf of itself and a coalition of non-profit organizations, including Catskill Citizens for Safe Energy, Center for Biological Diversity, Clean Air Council, Columbia Riverkeeper, Delaware Riverkeeper, Lower Susquehanna Riverkeeper, Shenandoah Riverkeeper, and Upper Green River Alliance [hereinafter Sierra Club].

the Industrial Energy Consumers of America (IECA), and Jannette Barth, challenge the data used as inputs to the LNG Export Study. Most of these commenters assert that NERA should have used projections from AEO 2012 or AEO 2013, rather than from AEO 2011, to produce a more accurate picture of the current and likely future state of the natural gas market and the likely macroeconomic impacts of LNG exports. These commenters assert that the AEO 2011 projections significantly underestimate actual and future demand for natural gas, especially in the U.S. electric, manufacturing, and transportation sectors, and in international markets. Some commenters identify additional factors, other than the vintage of the AEO 2011 data, to support their arguments that NERA underestimated present and future demand for natural gas. For example, Save Our Supplies argues that NERA underestimated international demand because the GNGM model did not appear to account for the continued growth of international LNG import infrastructure. Together, these commenters assert that the NERA study underestimated future demand for natural gas and, consequently, underestimated the likely increases to natural gas prices from LNG exports.

A number of commenters, including Sierra Club, Dow, Senator Wyden, Representative Markey, Jannette Barth, and Save Our Supplies maintain that, as compared to AEO 2011, the AEO 2013 Early Release Overview projects a substantial increase in demand for natural gas in the industrial manufacturing sector. Dow claims that there has been a manufacturing renaissance since completion of AEO 2011 involving announcements of approximately 100 capital investments representing some $95 billion in new spending and millions of jobs driven largely by the supply and price outlook for natural gas. These investments, according to Dow, will add about 5 million new jobs and 6 Bcf/d of industrial gas demand by 2020, which Dow states is

nearly a 30 percent increase in industrial demand relative to 2009, the baseline year for AEO 2011.

Dow also asserts that projections of future natural gas demand by industry are more than double the demand predicted in AEO 2011's High EUR case, which includes significantly higher demand than the Reference Case. In addition to significantly higher projections of demand for manufacturing, Dow refers to projections from Wood Mackenzie, CERA, and others that indicate a potential increase of transportation demand from 0.2 to 1.5 Bcf/d from 2013 to 2020. This compares to AEO 2011's projection of a modest increase for natural gas demand in the transportation sector of 0.1 to 0.2 Bcf/d. Dow states that the higher level of demand derived from Wood Mackenzie and CERA is the result of a projection of fleet vehicles converting to LNG and compressed natural gas.

According to Dow, AEO 2011 projects that natural gas demand for power generation will decrease through the end of the decade, whereas Wood Mackenzie and CERA predict that natural gas use in the power sector will increase 14 percent by 2020, ultimately resulting in 24.7 Bcf/d of power sector demand. This projected increase is due to unidentified, anticipated changes in carbon policy, renewables policy, and nuclear policy favoring the use of natural gas in the power sector.

In addition to criticizing the projections of demand based on AEO 2011, Dow maintains that the level of exports authorized to date and additional exports that may be authorized in the future will drive up demand levels even higher. Specifically, Dow asserts that NERA's conclusion that prices will not increase by more than $1.11/Mcf is based on a faulty assumption that natural gas exports will never rise above 6.72 Tcf/yr, or roughly 18.5 Bcf/d by 2025. Dow points out that authorized exports to FTA nations as of January 1, 2013 had already reached

approximately 28 Bcf/d. Dow complains that NERA did not consider what would happen if exports attained the authorized levels. In that event, Dow asserts that domestic gas prices undoubtedly would spike. Other commenters, such as Citizens Against LNG, make similar arguments. Citizens Against LNG alleges that the NERA study is flawed because it failed to estimate the impact of the full potential volume of exports of approximately 31.41 Bcf/d to FTA nations and 24.80 Bcf/d to non-FTA nations.

Contrary to the above arguments, several commenters, such as Dominion Cove Point LNG, LP, Lake Charles Exports, LLC, and Gulf LNG Liquefaction Company, LLC (Gulf LNG), argue that NERA reasonably relied on data from AEO 2011. These commenters state that NERA used the AEO 2011 data because the EIA portion of the LNG Export Study used that data, and DOE/FE sought to ensure consistency across both parts of the LNG Export Study. Further, a number of commenters, including America's Natural Gas Alliance, Exxon Mobil Corporation (ExxonMobil), Golden Pass Products LLC, American Petroleum Institute, former Secretary of Energy Spencer Abraham, Carl Foster, and the Western Energy Alliance, argue that NERA's use of the AEO 2011 data does not undermine the results of the LNG Export Study. These commenters contend that the AEO 2013 Early Release data show higher production of natural gas and a more elastic supply of natural gas than the AEO 2011 data used by NERA, indicating that the domestic resource base could more easily accommodate increasing domestic demand as well as demand from new LNG export projects.

With respect to Dow's claim that there is $95 billion of new investment in domestic manufacturing, Lake Charles Exports and Secretary Abraham argue that many of the projects listed by Dow are currently under consideration and not projected to commence operation until far into the future. These commenters assert that Dow provided no information as to when or

whether these projects will materialize. The commenters conclude that there is no reasonable basis to believe that these domestic manufacturing investments will lead to an additional 6 Bcf/d in domestic natural gas demand as claimed by Dow.

2. DOE/FE Analysis

a. Use of AEO 2011 Projections

DOE's basis for relying on AEO 2011. The LNG Export Study was based on AEO 2011 projections, which were the most recent, final projections available in August 2011 when DOE commissioned the EIA study, and also in October 2011 when DOE commissioned the NERA study. As explained above, the NERA study was designed so that NERA would use the results from the EIA study as inputs to the NERA model to ensure congruence between the two studies, which together formed the single LNG Export Study. If both studies had not relied on the same data, meaningful comparison and cross-analysis of the two studies would have been impossible.

Although some commenters have asserted that DOE should have required EIA and NERA to use newer projections than those in AEO 2011, this argument does not acknowledge either the timing of the AEO publication cycles, or the lead time required of EIA and NERA to conduct their work. Using the final AEO 2011 projections, EIA published its study on January 19, 2012. Only four days later, on January 23, 2012, EIA published the 2012 AEO "Early Release Overview," which was a preliminary, abridged version of EIA's forthcoming AEO 2012. It would not have been possible for EIA to use the 2012 Early Release projections in its study without starting over once that data had been published.

Indeed, EIA did not publish the final AEO 2012 until June 2012, six months after EIA had published its study for this proceeding. By that time, the NERA study was well underway.

NERA published its final report in December 2012—the same month that EIA released the AEO 2013 Early Release Overview. The final AEO 2013 projections were not published until earlier this month, on May 2, 2013.

In an undertaking of this scope and magnitude, it was perfectly reasonable to base the LNG Export Study on AEO 2011, which contained the best, most authoritative economic projections available when DOE/FE commissioned the EIA and NERA studies. Once both studies were underway, a decision to use AEO 2012 or AEO 2013 Early Release projections would have required EIA and NERA to abandon their existing work and redo much, if not all, of their analyses.

Courts have repeatedly recognized that agencies are not required to redo a study simply because newer data become available, "particularly given the many months required to conduct full [analysis] with … new data."[72] Requiring DOE to start over with new data "would lead to significant costs and potentially endless delays."[73] Moreover, under the commenters' rationale, DOE's LNG Export Study and administrative process would run indefinitely, as DOE would have to start over with new AEO projections whenever they became available. As the Supreme Court has observed, if an agency were required to rehear new evidence before it issues a final administrative decision, "there would be little hope that the administrative process could ever be consummated in an order that would not be subject to reopening."[74]

No material change using post-AEO 2011 projections. Further, we are not persuaded that using the AEO 2012 final projections, or the AEO 2013 Early Release projections, would

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[72] *Theodore Roosevelt Conserv. P'ship v. Salazar*, 616 F.3d 497, 511 (D.C. Cir. 2010) (quotations and citations omitted) (alteration in original).
[73] *Sierra Club v. U.S. Envtl. Prot. Agency*, 356 F.3d 296, 308 (D.C. Cir. 2004) (upholding EPA's decision to use an existing computer model in lieu of a newly-released version).
[74] *Vermont Yankee Nuclear Power Corp. v. Natural Res. Def. Council*, 435 U.S. 519, 554-55 (1978).

have materially affected the findings of the LNG Export Study. Commenters point to the fact that AEO 2012 and the AEO 2013 Early Release Overview forecast greater domestic natural gas consumption in the years ahead than did AEO 2011. The commenters are correct in this observation, but it is also true that AEO 2012 and AEO 2013 Early Release Overview projected much greater domestic natural gas production than did AEO 2011. An analysis from Navigant Consulting, Inc. (Navigant), appended to the initial comments submitted by Jordan Cove Energy Project, L.P., correctly notes the increasing gas production projections in the later EIA analyses:

> For the period of 2013-2035, there was an average percentage increase in forecast total domestic natural gas consumption between AEO 2011 and AEO 2013 of 5.6 percent, while the increase in forecast total natural gas production was 16 percent. This important context helps explain why the more recent AEO 2013 assumptions actually indicate the beneficial market impacts that come along with LNG exports.[75]

Below, Table 4 illustrates that, although total natural gas consumption projected for 2035 increased by 6 Bcf/d (from 72.7 Bcf/d to 78.7 Bcf/d) between AEO 2011 and the AEO 2013 Early Release Overview, total domestic dry gas production increased by more than twice that amount, increasing by 13.8 Bcf/d (from 72.1 Bcf/d to 85.9 Bcf/d). Further, the projected 2035 Henry Hub price declined from $7.07/MMBtu to $6.32/MMBtu, despite net exports (including both pipeline and LNG exports) rising from -.5 Bcf/d in AEO 2011 to +7.0 Bcf/d in the AEO 2013 Early Release Overview. In short, the updated projections suggest domestic supply and demand conditions that are more favorable, not less favorable, to exports.

[75] Comments of Navigant Consulting, Inc., at 6 (attached to Initial Comments of Jordan Cove Energy Project, L.P.).

Table 4: Comparison of AEO Results

Projections for 2035	AEO 2011 Reference Case	AEO 2012 Reference Case	AEO 2013 Early Release Reference Case	AEO 2011 High Shale EUR Case
Total Natural Gas Consumption (Bcf/d)	72.7	73.0	78.7	81.2
Electric Power Sector Consumption (Bcf/d)	21.6	24.5	25.9	26.4
Transportation Sector Consumption (Bcf/d)	0.4	0.4	1.6	0.7
Domestic Dry Gas Production (Bcf/d)	72.1	76.5	85.9	82.5
Net Natural Gas Exports by Pipeline (Bcf/d)	-0.1	1.9	3.0	1.9
Net Natural Gas Exports as LNG (Bcf/d)	-0.4	1.8	4.0	-0.4
Henry Hub Price	$7.07/MMBtu (2009$)	$7.37/MMBtu (2010$)	$6.32/MMBtu (2011$)	$5.35/MMBtu (2009$)

We again note that NERA modeled a wide range of possible future supply and demand conditions, thereby reducing the dependence of its results on the accuracy of the AEO 2011 Reference Case. The AEO 2011 High Shale EUR case, for example, is represented in the table above showing EIA's AEO 2011 assumption of no new LNG exports. The AEO 2011 High Shale EUR case projected natural gas consumption growth that was even greater than the AEO 2013 Early Release Overview and domestic natural gas production growth that was less than the AEO 2013 Early Release Overview. Using the AEO 2011 High Shale EUR as a baseline, NERA modeled LNG exports across a range of international market conditions and found positive economic benefits to the U.S. economy in all cases where LNG exports were economically

viable.[76] The inclusion of the AEO 2011 High Shale EUR case in NERA's analysis reinforces our conclusion that there is no reason to believe that using AEO 2013 Early Release projections would have altered the central conclusion of the LNG Export Study.

Further, as reflected in the comments submitted by Lake Charles Exports[77] and Secretary Abraham,[78] Dow does not substantiate its claim that $95 billion of new investment in the manufacturing sector has led (or will lead) to an increase of 6 Bcf/d in incremental domestic consumption of natural gas by 2020. In making these estimates, Dow includes many projects that merely have been announced or are under consideration with start dates far into the future. Dow provides no information as to when or whether these projects will be constructed or will begin operations.

b. Significance of Prior FTA Authorizations

Dow argues that the 28 Bcf/d of exports presently authorized to FTA countries shows that the LNG Export Study underestimated future demand for natural gas. However, the volume of authorized exports to FTA countries is by no means a reliable predictor of the number and capacity of LNG export facilities that will ultimately be financed, constructed, and placed in operation.[79] Indeed, while many of the FTA authorizations have been in place for several years,

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[76] NERA study at 6.
[77] Reply Comments of Lake Charles Exports, LLC at 12-13.
[78] Reply Comments of Secretary Spencer Abraham at 8.
[79] As America's Natural Gas Alliance explains, when domestic gas supply was forecast to be insufficient to meet domestic demand, many LNG import facilities were proposed, but few were constructed. Specifically, from 2000 through 2010, over 40 applications to build new LNG import facilities were submitted to federal agencies, but only eight new facilities were built. The increase in domestic natural gas production had reduced the need for imported LNG. Further, of those import facilities constructed, public records show their use has declined. In 2004, the United States imported 244 cargoes of LNG at the four terminals existing at that time. By comparison, in 2012, only 64 cargoes were imported at seven of the 12 terminals then in existence. Five of the 12 existing terminals did not receive any cargoes in 2012. *See* http://www.marad.dot.gov/ports_landing_page/deepwater_port_licensing/deepwater_port_licensing.htm; http://www.ferc.gov/industries/gas/indus-act/lng.asp; *Natural Gas Imports and Exports Fourth Quarter Report 2004*, DOE/FE-0485, Office of Natural Gas Regulatory Activities, Office of Fossil Energy, U.S. Department of Energy; *Natural Gas Imports and Exports Fourth Quarter Report 2012*, DOE/FE-0563, Office of Natural Gas

DOE/FE is aware of only one application submitted to date, totaling 0.54 Bcf/d of export capacity, in which a liquefaction facility was planned with the sole purpose of exporting LNG to FTA countries.[80] Therefore, we are not persuaded that the existence of 28 Bcf/d in FTA authorizations undermines the assumptions of the LNG Export Study.

We note also that applicants typically request both FTA and non-FTA export authorizations for the entire output capacity of their proposed export facilities. Thus, as we explained above, the FTA and non-FTA authorizations are not additive. Citizens Against LNG contends that the NERA study failed to consider the full potential volume of exports of 31.41 Bcf/d to FTA nations and 24.80 Bcf/d to non-FTA nations, but this argument is incorrect insofar as Citizens Against LNG is claiming that FTA and non-FTA authorization volumes must be added to calculate demand caused by LNG exports. Nevertheless, it bears mention that NERA did remove export constraints in its model for several of the cases evaluated. NERA found that, at the price required in the United States to free up 55 Bcf/day for export, there would be zero global demand for U.S. exports under any combination of domestic and international supply and demand conditions evaluated. Thus, the 55 Bcf/day case was found to be infeasible and was not included in the macroeconomic analysis.

Regulatory Activities, Office of Fossil Energy, U.S. Department of Energy; http://www.fe.doe.gov/programs/gasregulation/publications/LNG_2012_rev.pdf.

[80] *Magnolia LNG, LLC*, DOE/FE Docket No. 12-183-LNG (application filed Dec. 18, 2012); *see also Magnolia LNG, LLC*, DOE/FE Order No. 3245, Order Granting Long-Term Multi-Contract Authorization to Export Liquefied Natural Gas by Vessel from the Proposed Magnolia LNG Terminal in Lake Charles, Louisiana, to Free Trade Agreement Nations (Feb. 27, 2013) (granting application).

B. Distributional Impacts

1. GDP Versus Welfare

a. Comments

Several commenters, including Sierra Club, allege that the NERA study overstated the likely macroeconomic benefits from LNG exports. The National Resources Defense Council (NRDC), Sierra Club, and Clean Ocean Action, among others, maintain that NERA incorrectly conflated growth in GDP with growth in welfare. By concluding that LNG exports would create a net benefit to the economy, NERA also allegedly relied too much on the fact that exports would increase GDP and failed to give adequate weight to projected natural gas price increases and to deleterious socio-economic, sectoral, and regional impacts on consumers, households, and the middle class, including wage-earners.

A number of other commenters, including American Petroleum Institute, Paul Eikelboom, Gary Lambert, and Helen Rice, however, assert that LNG exports will create jobs and boost the economy. For example, American Petroleum Institute states that a report by ICF International shows that LNG exports will result in a net gain in employment in the United States and that the job impacts of LNG exports will grow larger as export volumes rise.

b. DOE/FE Analysis

The NERA study presented the macroeconomic impacts of LNG exports using the different statistical measures noted above—price, welfare, GDP, aggregate consumption, aggregate investment, natural gas export revenues, sectoral output, and wages and other household incomes. NERA did not confuse the concepts of welfare growth and GDP growth. The study clearly shows that NERA distinguished these concepts and separately examined the

macroeconomic impacts of LNG exports using both measures.[81] Welfare is a term of art in economics that measures the well-being of consumers and reflects changes in the value placed on consumption and leisure by individuals. NERA calculated welfare in the study as the "equivalent variation," which measures the amount of money that, if taken away from the average household, would make the household no better off with LNG exports than without.[82] GDP, as NERA explained, is "another economic metric that is often used to evaluate the effectiveness of a policy by measuring the level of total economic activity in the economy."[83] NERA thus acknowledged the distinction between GDP and welfare, yet used both metrics, among others, to ensure that its conclusions were robust across various measures.

2. Sectoral Impacts

a. Comments

Numerous commenters debate whether LNG exports will impact the domestic EITE sectors disproportionately, at too high of a cost to the U.S. economy to justify exporting LNG. Specifically, Dow, the Fertilizer Institute, Alcoa, and other commenters assert that higher natural gas prices caused by the demand for LNG exports will make it difficult for U.S. manufacturing to compete in global markets, reversing the gains these industries have made in recent years due to low domestic gas prices. According to these commenters, LNG exports will lead to lost jobs and lower wages in the EITE sectors—such as the chemical, fertilizer, and primary metal manufacturing sectors. These commenters, together with the Aluminum Association, the American Iron and Steel Institute, and others, contend that EITE jobs tend to be high-paying, highly-skilled, and of strategic national importance, whereas they allege that jobs created due to

[81] NERA study at 6.
[82] *Id*.
[83] *Id*. at 56.

LNG exports will be short-lived and potentially of lower value to the U.S. economy. In this regard, Alcoa, Representative Markey, and IECA, among others, charge that NERA failed to analyze the unique tradeoffs between the domestic natural gas industry—which obviously stands to benefit from LNG exports—and EITE industries, which they argue will feel the brunt of higher gas prices and price volatility brought on by LNG exports.

In addition, Dow argues that the NERA model should have addressed industry-specific impacts. Dow submits that NERA erred by positing that the impact of expanded natural gas exports will affect the chemical, paper, and plastic industries in the same ways. It contends that the single bundled sector represented in the NERA model as the energy intensive sector is actually comprised of five sectors, and that NERA mistakenly assumed that average behavior from the EITE sector is representative of each of the five sectors:

> By bundling these industries, NERA applies the same labor, capital, fuel, and other material inputs in the same way across industries. Such an aggregation mutes the true impact to the industries, especially the chemical products industry. The chemical products subsector varies significantly from the other four industries in terms of value added to the economy (GDP) and energy consumption by fuel source ….[84]

According to Dow, the chemical industry is composed of dozens of different business models with different inputs and outputs. Consequently, Dow contends that "[s]hoe horning the chemical industry into an aggregated EIS [energy intensive sector] is not appropriate for studying the impact of LNG exports on the economy."[85]

More broadly, Dow maintains that NERA gave significant weight to a narrow economic benefit from LNG exports, but did not consider the greater economic value (the "value-added multiplier effect") when natural gas is used in the United States to manufacture finished goods

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[84] Initial Comments of Dow Chem. Co. at 27.
[85] *Id*. at 28.

for export, instead of being exported as LNG. Similarly, the Fertilizer Institute offers a study prepared at its request by Charles Rivers Associates to support its claim that NERA underestimated the economic value of the fertilizer industry to the broader economy. Dow also contends that "take-or-pay" contracts used in the international trade of LNG will cause export activities to continue even if not economically warranted, thereby prolonging higher domestic gas prices.[86]

Senator Wyden, Representative Markey, Dow, and others contend that NERA misinterpreted a government-prepared 2009 Interagency Report that evaluated the effects of proposed greenhouse gas cap-and-trade legislation on EITE industries. According to these commenters, the findings in the Interagency Report led Congress to conclude that it was unacceptable to raise energy prices on EITE manufacturers because of the adverse employment implications across the economy. These commenters charge that the NERA study, while borrowing heavily from the Waxman-Markey congressional debate, did not address the predictions of adverse employment impacts. Dow cites statistics from the Bureau of Economic Analysis indicating that, in 2011, total employment in the oil and gas industry was 171,000 while the chemical industry employed 785,000, the plastic and rubber industry employed 635,000, and the paper industry employed 388,000.[87] In addition, the Fertilizer Institute claims that the NERA study should have assumed that the fertilizer industry directly supported 7,565 jobs while the NERA study states that there were 3,920 jobs directly supported by the fertilizer industry.

On the other hand, a number of commenters, including ExxonMobil, American Petroleum Institute, the Energy Policy Research Foundation, Inc., and General Electric Oil &

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[86] *Id*. at 16-17.
[87] *Id*. at 28 (Dow table citing figures from the U.S. Bureau of Economic Analysis, *Gross Domestic Product by Industry Data*).

Gas, dispute these arguments. They specifically challenge the notion that an LNG export industry cannot co-exist with a growing domestic manufacturing base, and that EITE industries should be given priority, whether directly or indirectly, over the LNG industry.

ExxonMobil supports NERA's conclusion that exports will yield net economic benefits to the United States, and states that, in fact, NERA understated those benefits because (among other reasons) NERA did not factor in the greater supply of natural gas liquids (NGLs) that will be produced in conjunction with increased natural gas production due to exports. The Institute for 21st Century Energy (an affiliate of the U.S. Chamber of Commerce) and the American Petroleum Institute, among others, note that additional production of NGLs will benefit chemical companies with U.S. plants because NGLs, such as ethane, are critical feedstock in chemical manufacturing processes. These commenters state that an increase in the supply of NGLs will exert downward price pressure on the cost of manufactured goods that use NGLs as a feedstock, thereby at least in part offsetting for those industries (primarily EITE industries) any increases in domestic natural gas prices associated with LNG exports.

ExxonMobil, American Petroleum Institute, Shell Oil Company, and many other commenters emphasize the size and productivity of the U.S. natural gas resource base, stating that there is an abundance of natural gas to support both LNG export demand and continued growth in the EITE industries. According to ExxonMobil, Western Energy Alliance, Energy Policy Research Foundation, Inc., and others, the vast supply of natural gas in the United States will continue to support current gains in domestic manufacturing, even as LNG exports take place. They state that LNG exports will both sustain and increase domestic production of natural gas, which, in turn, will provide EITE industries with a greater supply of natural gas at more stable prices, allowing them to stay globally competitive. According to these commenters,

opponents of LNG exports are incorrect in speculating that natural gas used for export otherwise would be used for domestic manufacturing when, in fact, the natural gas likely would not be extracted if there is not increased demand created by LNG exports.

Further, 110 members of the U.S. Congress,[88] ExxonMobil, and others maintain that there would be serious consequences to hindering the export of LNG. If exports are prohibited or constrained, they believe the United States will lose economic benefits that other countries will capture as those countries begin extracting their shale gas resources and competing in the global LNG export market. Numerous commenters, including ExxonMobil, the National Association of Manufacturers, and the Energy Policy Research Foundation, Inc., similarly assert that it would not be in the public interest for DOE to limit LNG exports, in contravention of U.S. free trade principles. As noted above, these commenters state that restricting exports of natural gas would subsidize domestic manufacturing at the expense of the larger U.S. economy. They contend that the U.S. Government should not suppress trade in one industry to benefit other industries.

b. DOE/FE Analysis

With respect to the argument that natural gas confers greater value on the U.S. economy when used in manufacturing than when produced for export, we observe that more natural gas is likely to be produced domestically if LNG exports are authorized than if they are prohibited. There is no one-for-one trade-off between gas used in manufacturing and gas diverted for export. Although commenters are correct that such a trade-off may exist at the margin, this competition between the demand for natural gas for domestic consumption and the demand for natural gas for export is captured in the N_{ew}ERA model. The model projected that under the majority of

[88] 110 members of the U.S. House of Representatives filed a single set of comments in support of LNG exports.

scenarios examined, no exports would occur, thereby indicating that, for those scenarios, the gas was of greater value to domestic consumers than to foreign ones. On the other hand, in supply and demand conditions where exports were projected to occur and were not prohibited or limited, the model found that greater economic value was being placed on the LNG by foreign markets and, at the same time, greater economic benefits, both in terms of welfare and GDP accrued to the U.S. economy due to those exports.

NERA grouped the U.S. economy into a workable number of supply and demand sectors as appropriate for a macroeconomic model of this nature. NERA divided the EITE industries into five categories: paper and pulp manufacturing, chemical manufacturing, glass manufacturing, cement manufacturing, and primary metal manufacturing, including iron, steel and aluminum. NERA projected that the overall impact across these categories will be relatively muted, with no individual industry experiencing a dramatic negative impact:

> Serious competitive impacts are likely to be confined to narrow segments of industry. About 10% of U.S. manufacturing, measured by value of shipments, has both energy expenditures greater than 5% of the value of its output and serious exposure to foreign competition. Employment in industries with these characteristics is about one-half of one percent of total U.S. employment. LNG exports are not likely to affect the overall level of employment in the U.S. There will be some shifts in the number of workers across industries, with those industries associated with natural gas production and exports attracting workers away from other industries. In no scenario is the shift in employment out of any industry projected to be larger than normal rates of turnover of employees in those industries.[89]

Some commenters contend that NERA grouped the EITE industries too broadly and assert that greater economic harms could have been identified by focusing more narrowly on the most gas-dependent industries. While we take these concerns seriously, ultimately we are guided by the principle that the public interest requires us to look to the impacts to the U.S. economy as a whole, without privileging the commercial interests of any industry over another.

[89] NERA study at 2.

Similarly, with respect to the argument that some industries derive greater economic value from natural gas than others, we continue to be guided by the long-standing principle established in our Policy Guidelines that resource allocation decisions of this nature are better left to the market, rather than the Department, to resolve.

The Fertilizer Institute charges that the industry-specific employment data used by NERA is erroneous. The Fertilizer Institute claims that NERA underestimated employment directly supported by the nitrogen fertilizer industry and should have used a figure of 7,565 positions. However, NERA drew industry-specific employment data from the U.S. Census Bureau's Economic Census for 2007, which remains the most recent Economic Census data available. In estimating 3,920 positions directly supported by the nitrogen fertilizer industry, NERA selected a figure that is reasonably supported by an authoritative source.[90]

With respect to the Interagency Report prepared for the Waxman-Markey bill, we note that NERA used that report solely as a means of identifying industry segments that would be most acutely affected by higher energy costs, not as a way of determining the magnitude of such impacts. Therefore, although we acknowledge that the Interagency Report was prepared in a different context, we find nothing unreasonable in NERA's use of the Interagency Report.

3. Household and Distributional Impacts

a. Comments

Several commenters maintain that, for most citizens, the macroeconomic benefits of LNG exports, if any, will be minimal. These commenters contend that the main beneficiaries of LNG exports will be a narrow band of the population, chiefly wealthy individuals in the natural gas

[90] *Id*. at 69.

industry, foreign investors, and those holding stock or having retirement plans invested in natural gas companies.

Other commenters assert that a majority of Americans will experience negative economic impacts, such as higher gas and electric bills, due to LNG exports. Senator Wyden, Dow, and Sierra Club, among others, contend that the NERA study examined impacts on the labor market in terms of wages but failed to consider employment levels in terms of job equivalents or employment income. According to Clean Ocean Action, Dow, and Sierra Club, NERA also incorrectly assumed full employment and overestimated the positive job impacts associated with LNG exports. Dow, among others, charge that the NERA study failed to adequately consider the cost of LNG exports in terms of lost jobs in the manufacturing sector and the cost of retraining workers for the LNG industry.

Several commenters support the LNG Export Study and argue that the macroeconomic impacts of LNG exports favor the public interest. ExxonMobil, the Center for Liquefied Natural Gas, and others, including several applicants for LNG export authorizations, submit that the NERA study is comprehensive and rigorous and that LNG exports are in the public interest. ExxonMobil supports NERA's conclusion that exports will yield net economic benefits but asserts that the study understates the potential employment benefits from LNG exports. ExxonMobil argues that, because the NERA model assumed full employment, it did not identify the positive impact LNG exports would have on jobs. ExxonMobil observes that the economy is far from full employment, with forecasts prepared by the Congressional Budget Office in 2012 showing the unemployment rate above a full employment level through most of this decade. By exporting LNG, ExxonMobil argues, the U.S. economy can reach full employment faster than it can without exports. ExxonMobil also contends that the lingering effects of the recession mean

that capital is underutilized today; and that, where there is significant slack in the economy, there is no necessary trade-off between jobs in one sector versus another.

b. DOE/FE Analysis

NERA examined three components of household income directly affected by natural gas exports: income from wages, income from capital holdings (stocks, etc.), and income from resource ownership (royalties, rents, etc.). The NERA study projected that for the economy as a whole, increases in resource income earned in the natural gas production process more than offset reductions in wage and capital income earned from all other activities outside of the natural gas production process. The NERA study acknowledged, however, that exports would be accompanied by a shifting of income sources, and stated that some segments of the economy are likely not to participate in the benefits of LNG exports but are likely to face increased energy costs.

DOE believes that the public interest generally favors authorizing proposals to export natural gas that have been shown to lead to net benefits to the U.S. economy. While there may be circumstances in which the distributional consequences of an authorizing decision could be shown to be so negative as to outweigh net positive benefits to the U.S. economy as a whole, we do not see sufficiently compelling evidence that those circumstances are present here. None of the commenters advancing this argument has performed a quantitative analysis of the distributional consequences of authorizing LNG exports at the household level. Given the finding in the LNG Export Study that exports will benefit the economy as a whole, and absent stronger record evidence on the distributional consequences of authorizing the exports proposed by FLEX, we cannot say that those exports are inconsistent with the public interest on these grounds.

4. Regional Impacts

a. Comments

Many commenters addressed the issue of regional impacts potentially associated with LNG exports, both negative and positive. Commenters including Alice Zinnes, Keith Schue, Jannette Barth, APGA, Alex Bomstein, and Sierra Club assert that shale gas production associated with increasing LNG exports will trap local communities in a "boom-and-bust" cycle associated with extractive natural gas drilling. In a phenomenon they refer to as the "resource curse," they argue that natural gas production will cause long-term economic damage to local communities, leaving the communities poorer once the gas resource is depleted. Jennifer Davis, Dina DeWald, Andrew Goff, and others agree that shale gas development and production will have a negative impact on local industries that are incompatible with extraction-related activities, such as agriculture and tourism. Numerous commenters, including Hope Punnett, Robert M. Ross, the Environmental Working Group, Citizens Against LNG, and Sierra Club, enumerate specific ways in which they allege local communities near shale gas production areas or pipelines could be adversely affected if LNG exports lead to increased natural gas production. They cite increased noise, property devaluation, degradation of infrastructure, environmental and public health issues, and safety risks, among other issues.

Many other commenters seek to rebut these concerns by identifying the positive regional benefits associated with LNG exports, both in regions where shale development and production occur, and the regions in which LNG export terminals may be located. Commenters including FLEX, the Independent Petroleum Association of America, and scores of local, state, and federal political leaders—including 110 Members of the U.S. House of Representatives and several U.S.

Senators[91]—cite regional economic benefits associated with each LNG project, including the potential for thousands of new jobs, substantial direct and indirect business income, and millions of dollars in new tax revenue. Further, U.S. Representative Charles W. Boustany, Jr., 14 members of the Ohio House of Representatives, and numerous other commenters assert that authorizing exports of LNG will help to sustain natural gas exploration and production efforts, which will mitigate any local "boom-bust" cycle.

Finally, several other commenters, including Southern LNG Company, L.L.C., and Gulf LNG, assert that any general consideration of regional impacts is outside the scope of the NERA study and is most appropriately considered by DOE/FE in reviewing individual export applications.

b. DOE/FE Analysis

We agree with the commenters who contend that a general consideration of regional impacts is outside of the scope of the LNG Export Study, and that regional impacts are appropriately considered by DOE/FE on a case-by-case basis during the review of each LNG export application.

In this proceeding, FLEX has adduced substantial evidence of the positive economic benefits that would accrue to the local and regional economies in and around Brazoria County, Texas, from construction and operation of the proposed Liquefaction Project. *See* Section V.D. FLEX cites benefits including (but not limited to) direct and indirect job creation, substantial new tax revenue, benefits to local businesses and community services, and indirect benefits such as royalties and lease payments.

[91] U.S. Senators James Inhofe, Lisa Murkowski, David Vitter, Mary Landrieu, Heidi Heitkamp, and John Cornyn submitted comments generally supporting LNG exports.

Numerous commenters in the FLEX proceeding—including the Texas Oil and Gas Association, Copano Energy, L.L.C., and Encana Corporation—discussed this issue and urged DOE/FE to authorize the Liquefaction Project in light of the local and regional benefits that will be realized. Indeed, several federal and state political leaders, as well as four local municipal entities, submitted letters or resolutions emphasizing the importance of the FLEX project in creating jobs and financial investment in the region.

In its response to APGA, FLEX noted that APGA did not contest FLEX's evidence and argument as to the various local economic and tax benefits associated with the Liquefaction Project. DOE/FE accordingly finds that authorizing the Liquefaction Project is likely to have positive local and regional economic impacts. As explained above, the comments submitted in response to the LNG Export Study do not support a different conclusion. As also explained above, however, local or regional environmental impacts that fall within the scope of the NEPA review presently being performed by FERC will be addressed in a subsequent order.

C. Estimates of Domestic Natural Gas Supplies

1. Comments

Several commenters assert that, in addition to underestimating the demand for domestically produced natural gas, the NERA study overestimated future domestic supplies of natural gas. Representative Markey, for example, argues that current projections provide for only 20 to 40 years of domestic natural gas supplies but NERA did not adequately consider these projections. Senator Wyden, the Fertilizer Institute, and others maintain that the NERA study purports to treat the United States and Canada as a single North American market, but its

assumptions ignore the potential effect of Canadian LNG exports to international markets.[92] These commenters are largely concerned that NERA has overestimated domestic supplies and that having lower supplies than estimated will exacerbate the likely price increases due to exports.

Contrary to these arguments, many commenters, such as American Petroleum Institute and Shell, argue that the United States has abundant domestic natural gas reserves. Center for LNG and Cheniere Energy argue that EIA and NERA underestimated the domestic natural gas resource base and, therefore likely overestimated the price impacts of LNG exports.

Dow, however, is concerned about certain indirect impacts that could arise if domestic supplies are exported. It asserts that domestic gas production would be unable to keep up with the demand required to meet unlimited LNG exports and that one-third of new shale gas production will be required to replace a decline in conventional gas production. Dow maintains that, as a consequence, gas production will have to ramp up significantly and this development will mean that gas supply will be diverted away from domestic industrial and other sectors of the economy:

> There would need to be rapid deployment of new drilling rigs, increased steel pipe manufacturing and an expanded work force throughout the value chain to be able to service such unprecedented growth in [natural gas] production. With an already well-documented skills shortage in the labor market, basic supply and demand economics will prevail and drive labor prices higher, which would in turn have a chilling impact on investment in the manufacturing sector.[93]

Other commenters take a somewhat longer view of the potential indirect impacts of LNG exports on domestic energy supplies. These commenters contend that, to become energy

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[92]Senator Wyden notes that Canada's National Energy Board has approved two LNG export projects in British Columbia and is considering a third. According to Senator Wyden, these projects could begin in 2014 and result in LNG exports totaling 9 Bcf/d.

[93] Initial Comments of Dow Chem. Co. at 16.

independent, the United States must preserve its supply of finite domestic energy resources, not export them. They argue that authorizing LNG exports will hasten the depletion of this country's natural gas resource base, the size of which is uncertain. Moreover, they assert, investment in LNG exports will take away from potential investment in renewable energy supplies, which will compound this country's dependency on fossil fuels.

Some commenters, such as Dow, IECA, and Citizens Against LNG, maintain that the NERA study does not address significant policy changes that could impact domestic natural gas supply. These comments are focused in two areas: availability of energy production tax credits and uncertainty surrounding future environmental regulation regarding hydraulic fracturing. Specifically, Dow points to the possible elimination of energy production tax credits and states that elimination of this tax credit could result in a 5 percent decline in natural gas production and the loss of nearly 60,000 barrels per day of oil production. Dow, along with Jannette Barth, IECA and Citizens Against LNG, argue that potential state and federal environmental regulations pertaining to hydraulic fracturing should have been considered by NERA. These commenters assert that these potential additional regulatory costs and could lower supply, increase demand, and raise prices of natural gas.

2. DOE/FE Analysis

a. Measures of Supply

Before turning to a consideration of the specific comments, it is important to clarify the various measures of supply used by commenters. DOE/FE notes that by three measures of supply, there are adequate natural gas resources to meet demand associated with the FLEX application. Because these supply estimates have changed over time, however, DOE/FE will continue to monitor them to inform future decisions. These estimates include:

i) AEO natural gas estimates of production, price, and other domestic industry fundamentals. As shown in Table 4, the Reference Case projection of dry natural gas production in 2035 increased significantly (by 13.8 Bcf/d) in AEO 2013 Early Release compared with AEO 2011, while projections of domestic natural gas consumption in 2035 also increased in AEO 2013 Early Release compared with AEO 2011 (by 6.0 Bcf/d). Even with higher production and consumption, the 2035 projected natural gas market price in the Reference Case declined from $7.07/MM Btu (2009$) in AEO 2011 to $6.32/MM Btu (2011$) in AEO 2013 Early Release. Further, as Table 4 shows, the AEO 2013 Early Release Reference Case has many similarities with the AEO 2011 High EUR case in which shale gas resources produced per well are 50% higher than in the AEO 2011 Reference Case. The implication of the latest EIA projections is that a greater quantity of natural gas is projected to be available at a lower cost than estimated just two years ago.

ii) Proved reserves of natural gas. Proved reserves of natural gas have been increasing. Proved reserves are those volumes of oil and natural gas that geologic and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions. The R/P ratio measures the number of years of production (P) that proved reserves (R) represent at current production rates. Typically industry maintains proved reserves at about 10 years of production, but as the table below demonstrates, reserves have increased from 9.2 years of production in 2000 to 13.7 years of production in 2010, the latest year statistics are available. Of particular note is that, since 2000, proved reserves have increased 72 percent to 304,625 Bcf, while production has increased only 16 percent, demonstrating the growing supply of natural gas available under existing economic and operating conditions.

Table 5: U.S. Dry Natural Gas Proved Reserves[94]

	Proved Reserves (R)		U.S. Dry Natural Gas Estimated Production (P)		
Year	**(Bcf)**	**Percent change versus year 2000**	**(Bcf)**	**Percent change versus year 2000**	**R/P Ratio - Years**
2000	177,427	--	19,219	--	9.2
2005	204,385	15	18,458	-4	11.1
2010	304,625	72	22,239	16	13.7

iii) Technically recoverable resources (TRR). TRR have also increased significantly. FLEX cites the MIT Interim Report in stating that estimates of U.S. natural gas resources range from 1,500 Tcf to almost 2,850 Tcf, and concludes that the resource base is approximately 2,100 Tcf.

DOE/FE notes that EIA's natural gas TRR estimates have varied from below 2,000 Tcf in AEO 2010 to more than 2,500 Tcf in AEO 2011 and 2,327 Tcf in the AEO 2013 Early Release. These TRR estimates include proved and unproved TRR shale gas resources, which have fluctuated in recent AEOs, as the EIA continues to monitor and estimate this resource base. For example, in AEO 2010 unproved shale gas TRR was estimated at 347 Tcf, which increased to 827 Tcf in AEO 2011, and was revised to 543 Tcf in the AEO 2013 Early Release.

b. Supply Impacts

While the AEO 2011 TRR estimates were higher than AEO 2013 Early Release estimates, we do not agree that NERA employed overly optimistic projections of domestic gas supply. The EIA and NERA studies conclude that for the period of the analysis, the United States is projected to have ample supplies of natural gas resources that can meet domestic needs

[94] EIA, *U.S. Dry Natural Gas Proved Reserves* (Aug. 2, 2012), *available at* http://www.eia.gov/dnav/ng/ng_enr_dry_dcu_nus_a.htm (additional calculations conducted to produce percentage change and R/P ratios).

for natural gas and the LNG export market. Additionally, most projections of domestic natural gas resources extend beyond 20 to 40 years. While not all TRR is currently economical to produce, it is instructive to note that EIA's recent estimate of TRR equates to over 90 years of natural gas supply at the 2012 domestic consumption level of 25.63 Tcf. Moreover, given the supply projections under each of the above measures, we find that granting the requested authorization is unlikely to affect adversely the availability of natural gas supplies to domestic consumers such as would negate the net economic benefits to the United States.

We further find that, given these estimates of supply, the projected price increases and increased price volatility that could develop in response to a grant of the requested LNG export authorization are not likely to negate the net economic benefits of the exports. This issue is further discussed below. With regard to the adequacy of supply, however, it bears noting that while Dow contends that U.S. natural gas production would not be able to meet unlimited LNG exports and domestic demand, the NERA study supports a different conclusion. The NERA study included scenarios in which LNG exports were unconstrained. In these cases, LNG exports from the United States compete with LNG exports from all other international natural gas sources. Should the U.S. resource base be less robust and more expensive than anticipated, U.S. LNG exports would be less competitive in the world market, thereby resulting in lower export levels, and, in some instances, no exports, from the United States. By way of example, NERA modeled a number of Low EUR scenarios, which had U.S. resources that were less robust and more expensive than other cases. In these Low EUR scenarios, U.S. wellhead natural gas prices were driven up by higher production costs to meet domestic demand, and in those cases prices increased to a level that choked off demand for exports so that LNG exports were limited or disappeared, leaving the available natural gas for domestic use. In other unconstrained cases

evaluated with the High EUR scenarios, domestic natural gas production was able to keep up with the demand required to meet the unconstrained LNG export scenario. In this case, the EIA scenarios reflect the changes that would occur in the domestic market and reflect the limitations, as modeled in the NEMS model, of domestic natural gas production and consumption by different sectors of the economy. In all of these cases, the supply and price response to LNG exports did not negate the net economic benefit to the economy from the exports.

c. Supply Impacts Related to Alternative Energy Sources

To the degree that natural gas prices may increase, alternative sources of energy will become more attractive to consumers and investors. Accordingly, in nearly every year in which natural gas exports were reflected in the EIA study, electricity from renewable energy resources increased compared to the no export case. Therefore, we do not agree with the suggestion that LNG exports would diminish investment in renewable energy.

d. Supply Impacts Related to Canadian LNG Exports

DOE/FE also disagrees with the argument that the NERA study erred in its treatment of potential Canadian LNG exports to international markets. Although DOE/FE did not ask NERA to evaluate potential LNG exports from Canada, we note that LNG exports from Canada would compete with U.S. exports, thereby most likely reducing U.S. exports. Therefore, treating U.S. and Canadian LNG exports as those from a single market is a reasonable assumption, and would be consistent with the unconstrained LNG export cases evaluated by NERA, with the price impact more or less in line with the cases evaluated by NERA. DOE/FE would expect that benefits estimated to accrue to the United States from U.S. LNG exports likely would be similar to the benefits that would accrue to Canada resulting from Canadian LNG exports.

The LNG Export Study did not evaluate the steps to become energy independent, as that was not part of the criteria evaluated. However, the NERA study concluded that the United States has ample supplies of natural gas resources that can both meet domestic needs for natural gas *and* allow for participation in the LNG export market, without a significant impact on supplies or prices for the period of the analysis under the assumptions made.

e. Supply Impacts Related to Tax Law and Environmental Policy

NERA stated that the NewERA macroeconomic model includes a simple tax representation in which indirect taxes are included in the output values and not explicitly modeled.[95] NERA thus assumed no changes specific to existing law governing production tax credits. EIA did the same. On the other hand, at DOE/FE direction, NERA and EIA accounted for potential variability in domestic natural gas supply such as would occur due to changes in environmental regulation and other factors, including changes to production tax credits. They did so by incorporating the High EUR and Low EUR scenarios into their model.[96]

We find that it was reasonable for EIA and NERA to use the High EUR and Low EUR cases to capture a range of factors that may impact domestic natural gas supply. We further find that, given the range of scenarios studied, the decision not to specifically model the possible revocation of production tax credits or changes to environmental regulation does not lessen the reliability of the EIA or NERA studies. As a practical matter, EIA and NERA were required to establish certain key assumptions as a foundation for their studies. They reasonably evaluated alternative scenarios that would capture possible changes that would affect natural gas supplies.

[95] NERA study at 110.
[96] *Id.* at 25.

D. Modeling the LNG Export Business

1. Comments

Some commenters complain that NERA failed to capture accurately the business model being employed by those involved in the business of LNG exports. Sierra Club states that NERA erroneously modeled the fossil fuel industry by assuming a zero-profit condition. Some commenters, including NRDC, maintain that NERA failed to consider that LNG exports will take place pursuant to long-term, *e.g.*, 25-year, contracts containing take-or-pay provisions, rather than contracts containing flexible or market-sensitive pricing provisions. IECA makes a similar argument in its reply comments. According to these commenters, the take-or-pay provisions in long-term contracts will inhibit the free flow of price signals. The commenters argue that NERA incorrectly assumed (1) that exports of LNG from the United States would cease if the gap in prices between domestic and foreign supplies is closed; and (2) that a foreign country will cease purchases of U.S.-sourced LNG if the country gains access to less expensive supplies. These commenters further maintain that take-or-pay provisions in long-term contracts will have the effect of driving LNG exports even under circumstances when it would be more economical for the same natural gas to be sold in the domestic market. In this regard, Dow criticizes NERA's assertion that the global market for natural gas will limit how high U.S. natural gas prices can rise as a result of export activity because importing nations will not purchase U.S. supplies if U.S. wellhead prices rise above the cost of competing supplies. Dow contends that this arbitrage phenomenon may occur in competitive markets but does not make sense in the global LNG market due to the broad use of long term take-or-pay contracts.

Additionally, several commenters, including Representative Markey, NRDC, Sierra Club, Citizens Against LNG, and Alcoa, charge that NERA incorrectly assumed that the financing of investments in natural gas supplies for export and in the LNG export projects that will be used

for export operations would originate from U.S. sources. These commenters assert that, in fact, a substantial portion of the investment is being made by foreign entities and these foreign entities, not domestic corporations, will reap the benefits of export activity in the form of royalties, tolling fees, income, and tax proceeds from the resale of LNG overseas. Contrary to these arguments, FLEX and Lake Charles Exports argue that foreign financing of LNG export projects is beneficial. These commenters argue that foreign direct investment in the U.S. LNG industry frees up domestic capital for other investments. These commenters conclude that, as a result, NERA's results likely underestimate the benefits to the U.S. economy that will result from LNG exports.

Another commenter, Save Our Supplies, contends that the structure of international markets for natural gas and LNG and the high cost of building international LNG export infrastructure will give a cost advantage to U.S. LNG exports. This cost advantage, coupled with greater international demand than projected by NERA, allegedly will exacerbate the projected price increases within the United States due to LNG exports. More generally, Save Our Supplies claims that NERA made a series of incorrect assumptions concerning the structure of international natural gas markets. These include erroneously assuming that international natural gas markets are competitive. Save Our Supplies identifies the following three considerations: (1) the international market is not perfectly competitive because there are barriers to entry, trade, and foreign investment due in part to the participation of state-sponsored enterprises; (2) there is an international oligopoly in oil that, because of a link between the international price of oil and the international price of natural gas in certain markets, makes it impossible for the international market in natural gas to be perfectly competitive; and (3) NERA erroneously assumed that

natural gas is a "perfect substitute" for oil in all circumstances.[97] Based on these comments, Save Our Supplies challenges the NERA study for allegedly assuming that Qatari and Russian suppliers of natural gas will cut their prices to compete with the lower priced supplies available from the United States. Save Our Supplies argues that such price competition will not be significant and, therefore, that there will be greater demand for U.S.-exported LNG. According to some commenters, NERA's asserted underestimate of international demand for natural gas was also exacerbated by its failure to account for the construction of natural gas infrastructure on a global basis. According to these commenters, NERA appears to underestimate both the supply cost of international LNG projects and the magnitude and trajectory of global LNG demand. NERA also appears to underestimate U.S. natural gas demand and potentially the elasticity of the U.S. natural gas supply curve.

A number of commenters take an opposing position by arguing that the domestic natural gas resource base is sufficient to meet both the domestic and international demand for U.S. natural gas. Center for LNG, Cheniere, and others go further by arguing that EIA and NERA underestimated the size of the resource base, and therefore overestimated the potential domestic price impacts of LNG exports. Dominion Cove Point LNG, America's Natural Gas Alliance and others argue that the international market will constrain the total volume of natural gas exported from the United States.

Several commenters, including Sierra Club and Dow, argue that NERA overestimated LNG transaction costs (*e.g.*, costs of liquefaction, transportation, and insurance). Sierra Club argues that NERA overstated the transportation costs associated with the export of U.S. gas by assuming all LNG would be exported from the Gulf Coast. Sierra Club states that several export

[97] Initial Comments of Save Our Supplies at 34, 41.

terminals are planned for the West Coast, where it will be less expensive to transport gas to the Asian market than it would be from the Gulf Coast. Dow states that NERA's estimate of transportation and insurance costs for shipping LNG to Asia would be on the order of $2.60/Mcf. Dow claims that official trade statistics published by the U.S. Census Bureau, however, establish that these costs would be closer to $0.50/Mcf. Commenters such as Dow and Sierra Club state that had NERA properly accounted for LNG transaction costs, the foreseeable volumes of LNG exports would have exceeded those predicted by NERA, thereby intensifying the impact of LNG exports on U.S. natural gas prices. For this reason Sierra Club and Dow argue that NERA's projected price ceiling on domestic natural gas is too low. In addition, numerous individual members of the Sierra Club contend that NERA appears to have misrepresented the amount of natural gas used by LNG terminals in the liquefaction process, which understates the demand associated with exports.

2. DOE/FE Analysis

As explained below, we find that the NERA study reflects an accurate understanding of the contractual terms and market environment affecting the fossil fuel industry and, more narrowly, provides a plausible future scenario of international trade in LNG with U.S. exports. It is DOE/FE's view also that NERA's conclusions of the impact of LNG exports would not have materially changed with alternative international market assumptions. In this regard, we note that NERA included one scenario in which LNG exports reached 23 Bcf/d, with a positive impact on the U.S. economy. We find as follows:

a. Zero Profit Condition

Sierra Club's charge that NERA erroneously modeled the fossil fuel industry by assuming a zero-profit condition appears to reflect a misunderstanding of the term "zero-profit"

as used by NERA. The "zero-profit condition" assumed in the NERA study does not mean that firms in the natural gas industry will not make a "profit" as that word is ordinarily used. Rather, the zero-profit condition means only that firms will not make a profit above the risk-adjusted cost of capital. The assumption of a zero-profit condition is another way of saying that the model assumes a competitive market for natural gas, because in competitive markets new firms can enter and drive any profits above a risk-adjusted cost of capital down to zero. The assumption of a competitive market for natural gas production in the United States is valid given that natural gas wellhead prices have been deregulated for over thirty years.[98] Moreover, Sierra Club and other commenters have not provided any evidence to suggest a lack of competition in the market for U.S. natural gas production.

b. Contract Terms

We disagree with the contention that NERA erred in the assumptions it used to model the export contracts that will be used by authorization holders. NERA assumed that these contracts will include payments to the exporting facility in the form of a tolling charge that is fixed based on the total export capacity reserved under the tolling agreement plus 115% of the Henry Hub price for each unit of gas that is liquefied. These assumptions correspond closely with the 20-year tolling agreement filed publicly with DOE by Sabine Pass on April 2, 2013, the sole entity authorized to export to non-FTA countries to date. In that filing, the tolling agreement carries a tolling fee (or "reservation charge") with a per unit liquefaction charge of 115% of the Henry Hub price.[99]

[98] Natural Gas Policy Act of 1978, 15 U.S.C. § 3301, *et seq.* (establishing a policy for phasing out the regulation of wellhead prices).

[99] *Sabine Pass Liquefaction LLC*, Docket No. 13-42-LNG (Apr. 2, 2013), LNG Sale and Purchase Agreement with Centrica PLC, at 51-52.

Because there is neither a throughput obligation nor a fixed commodity price in the commercial arrangements assumed by NERA (or in the publicly filed Sabine Pass contract), the supplies of natural gas or LNG subject to the contracts are not locked up for the export market. Instead, as NERA has properly assumed for purposes of its model, foreign and U.S. purchasers will compete for domestically produced supplies and, if the domestic price rises, the owners of the gas (in most cases, either the authorization holder or the foreign purchasers that are party to the export-related contracts) will have an incentive to sell the gas into the domestic market rather than the international market.

Commenters criticizing NERA's model on these assumptions have not submitted evidence to support their position that contracts will lock up natural gas for export. Moreover, we find it unlikely that a broad cross-section of commercial parties would lock themselves permanently into arrangements whereby LNG will be exported from the United States even when it is uneconomical to do so. Even contracts entered improvidently may be amended when there is a possibility for mutual benefit in doing so, as there would be in a case where domestic gas prices exceed netback prices.

c. Foreign Direct Investment

As described above, several commenters charge that the NERA study incorrectly assumed that the financing of investments in natural gas supplies for export and in LNG liquefaction and export facilities would come from domestic sources. An examination of the NERA study indicates that claim is not valid as to natural gas supplies. Early in the study, NERA noted as follows:

> Net benefits to the U.S. economy could be larger if U.S. businesses were to take more of a merchant role. Based on business models now being proposed, this study assumes that foreign purchasers take title to LNG when it is loaded at a United States port, so that any profits that could be made by transporting and

> selling in importing countries accrue to foreign entities. In the cases where exports are constrained to maximum permitted levels, this business model sacrifices additional value from LNG exports that could accrue to the United States.[100]

On the other hand, the commenters are correct to the extent they argue that the NERA study assumed that the financing for the liquefaction and export facilities associated with LNG exports would come solely from domestic sources. The NERA study indicates that the timing of macroeconomic effects could be affected as a consequence:

> In this report it is assumed that all of the investment in liquefaction facilities and in increased natural gas drilling and extraction come from domestic sources. Macroeconomic effects could be different if these facilities and activities were financed by foreign direct investment ("FDI") that was additional to baseline capital flows into the U.S. FDI would largely affect the timing of macroeconomic effects, but quantifying these differences would require consideration of additional scenarios in which the business model was varied.[101]

In the above statement, NERA has indicated that the timing of the impacts of LNG exports could change due to FDI. On the other hand, NERA has not stated that the nature of the impacts will change and no commenter has introduced evidence that FDI will produce negative economic benefits. Indeed, Lake Charles Exports explains why FDI may enhance the economic benefits to the United States:

> NERA thus acknowledged the possibility that investment necessary for LNG exports may come from foreign sources. The NERA model's assumption of domestic investment explicitly fails to capture the macroeconomic benefits that will result from the injection of any foreign investment into natural gas production and infrastructure.
>
> The United States has the leading economy in the world in part because the US is the leading destination of international flows of capital. Each dollar of new foreign investment capital into the US results in an equivalent increase in US GDP. The main positive components of GDP are private consumption, investment, government expenditures, and exports. Any foreign direct investment stemming from the development of a US LNG industry would not decrease

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[100] NERA study at 6-7.
[101] *Id.* at 211.

> domestic capital investment, but would merely free up such domestic capital for other investments. Therefore the total amount of investment in the US would increase, dollar-for-dollar, with foreign investment, increasing US GDP by the same amount. If that foreign investment earns a return and, after taxation by US local, state and federal governments, some of that return is repatriated, this reflects a small countervailing outflow (which seems to be what, for example, Representative Markey is focusing on). Nonetheless, foreign direct investment remains a major net contributor to the US economy. The 2012 LNG Export Study's simplifying assumption regarding the source of investment in LNG production infrastructure fails to capture the benefits of any capital provided from foreign sources and thus understates the impact of such investment on US GDP.[102]

Accordingly, while FDI may be used to finance purchases of natural gas for export as LNG and the construction of LNG liquefaction and export facilities, we are not persuaded that the inflow of foreign capital for these purposes would be inconsistent with the public interest or would lessen the net economic benefits projected in the LNG Export Study.

d. International Natural Gas Markets

We are not persuaded by Save Our Supplies' claim that a projected cost advantage to exports of LNG from the United States as opposed to exports from other gas producing nations will necessarily exacerbate projected price increases within the United States due to LNG exports. This argument assumes that LNG will be available for export at a landed price overseas that is competitive with the international price set by foreign competitors. But NERA concluded that in many cases, the world natural gas market would not accept the full amount of exports assumed in the EIA scenarios at prices high enough to cover the U.S. wellhead domestic prices calculated by the EIA. Alternatively, foreign competitors supplying natural gas and LNG in international markets may match or, possibly, undercut the landed price of LNG exported from the United States.

[102] Reply Comments of Lake Charles Export, LLC at 31 (citations omitted).

With respect to the competitiveness of global LNG markets, NERA assumed that the production decisions of the world's dominant producer, Qatar, would be fixed no matter what the level of U.S. exports and that, generally, "there is a competitive market with exogenously determined export limits chosen by each exporting region and determined by their liquefaction capacity."[103] NERA described these assumptions as a "a middle ground between assuming that the dominant producer will limit exports sufficiently to maintain the current premium apparent in the prices paid in regions like Japan and Korea, or that dominant exporters will remove production constraints because with U.S. entry their market shares fall to levels that do not justify propping up prices for the entire market."[104] We find this to be a reasonable simplifying assumption and note further that even imperfectly competitive markets are not static. The arrival of new entrants, such as U.S.-based LNG exporters, may well have a disruptive impact on markets where competition may presently be constrained.

Finally, we note that NERA also modeled a "supply shock" case that assumed key LNG exporting regions did not increase their exports above current levels. NERA found positive economic benefits to the United States in each supply shock scenario in which the United States exports LNG. These results strengthen our conclusion that the prospect of non-competitive behavior in global LNG markets is unlikely to have a material impact on the central conclusions of the LNG Export Study.

e. Estimates of LNG Transaction Costs

We disagree with the comments from Sierra Club and Dow arguing that NERA overestimated LNG transaction costs, including liquefaction, transportation, insurance, and the like. NERA based its liquefaction, shipping costs and regasification costs on a review of

[103] NERA study at 34.
[104] *Id*. at 34-35.

publicly available literature, including the International Group of LNG Importers 2010 LNG Industry report and other sources referenced in the NERA study.[105]

With respect to transportation costs, Dow states that NERA's estimate of shipping cost to Asia was on the order of $2.60/Mcf, while statistics presented by Dow claim these to be $0.50/Mcf. In presenting this figure, Dow relies on trade statistics reported by the U.S. Census Bureau based on the average cost of insurance and freight expenses associated with U.S. *imports* of LNG in 2010 and 2011. As NERA points out, however, LNG transportation costs in large measure are a function of the distance traveled. Therefore, data on LNG imports, which largely travel shorter distances,[106] do not furnish a reliable basis for drawing inferences regarding transportation costs for LNG exports to Asia. Further, NERA provided a detailed description of the assumed transportation cost buildup, which is based on a daily charter rate of $65,000, and other reasonable assumptions.[107] Dow does not provide evidence challenging the accuracy of the information used by NERA or NERA's method of calculating transportation costs. Nor does Dow provide other evidence of daily charter rates.

As for the cost of natural gas consumed in the liquefaction process, NERA's model assumes a consumption level equal to 9 percent of the natural gas feedstock, a cost that is included in the NERA model. NERA based this assumption on publicly available information of liquefaction costs. Similarly, EIA assumed that 10 percent of feedstock was consumed in the liquefaction process.

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[105] *Id.* at 84-90.
[106] DOE/FE statistics show that the majority of LNG imports to the United States for 2010 and 2011 came from Atlantic Basin/North African sources. More than one-third of U.S. LNG imports in 2010 and 2011 came from Trinidad and Tobago, and none came from East Asia. *See* DOE/FE 2010 LNG Import Annual Report and DOE/FE 2011 LNG Import Annual Report, *available at* http://fossil.energy.gov/programs/gasregulation/publications/.
[107] NERA study at 87.

Therefore, we find that NERA's cost build-up is appropriate and that the estimated costs for delivering LNG to end users considered in the NERA study are reasonable.

E. Cost of Environmental Externalities

1. Comments

Sierra Club, along with Delaware Riverkeeper Network,[108] Jannette Barth, NRDC, Dow, and Save Our Supplies, among others, maintain that LNG exports will increase demand for natural gas, thereby increasing negative environmental and economic consequences associated with natural gas production. These commenters assert that NERA failed to consider the cost of environmental externalities that would follow such exports. The externalities identified by these commenters include:

- Environmental costs associated with producing more natural gas to support LNG exports, including the costs, risks, and impacts associated with hydraulic fracturing and drilling to produce natural gas;
- Opportunity costs associated with the construction of natural gas production, transport, and export facilities, including the costs of investing in shale gas infrastructure to support LNG exports, as opposed to investing in renewable or sustainable energy infrastructure;
- Costs and implications associated with eminent domain necessary to build new pipelines to transport natural gas; and
- Potential for switching from natural gas-fired electric generation to coal-fired generation, if higher domestic prices cause domestic electric generation to favor coal-fired generation at the margins.

2. DOE/FE Analysis

DOE/FE intends to complete its NEPA review of FLEX's application in this proceeding as a cooperating agency in tandem with FERC's review of the Liquefaction Project in FERC

[108] Delaware Riverkeeper Network filed comments on behalf of itself and more than 80 other organizations.

Docket No. CP12-509. Accordingly, the authorization issued in the instant proceeding will be conditioned on the satisfactory completion of the environmental review process at FERC.[109]

As further explained below, persons wishing to raise questions regarding the environmental review of the present Application are responsible for doing so within the FERC proceedings. Insofar as a participant in the FERC proceeding actively raises concerns over the scope or substance of environmental review but is unsuccessful in securing that agency's consideration of its stated interests, DOE/FE reserves the right to address the stated interests within this proceeding. However, absent a showing of good cause for a failure of interested persons to participate in the FERC environmental review proceeding, DOE/FE may dismiss such claims if raised out of time in this proceeding.

F. Prices and Volatility

1. Natural Gas Price Volatility

a. Comments

Several commenters, such as Huntsman Corporation, address potential natural gas price volatility associated with LNG exports. Janette Barth, Dow, Sierra Club, and Save Our Supplies, among others, state that NERA did not account for price volatility. Sierra Club points to the results of the LNG Export Study, which project higher domestic natural gas price impacts when exports phase in rapidly. Additionally, Sierra Club argues that, pending the pace of DOE/FE approvals, demand for domestic natural gas may increase more rapidly than production, leading to periods of scarcity and price spikes. Sierra Club also contends that there is little evidence that domestic natural gas price volatility will be reduced by LNG exports.

[109] *See* 10 C.F.R. § 590.402 (authorizing DOE/FE to issue a conditional order prior to issuance of a final opinion and order).

America's Natural Gas Alliance argues that there is no evidence that LNG exports will increase volatility. According to the Alliance, LNG exports will lead to increased investment in domestic gas production, which will help protect against price volatility. American Petroleum Institute contends that the NERA and Brookings studies project natural gas prices to remain in a narrow, low range through 2030 in all scenarios. Further, American Petroleum Institute points out that in October 2009, a Dow representative testified before the Senate Energy and Natural Resources Committee that the U.S. chemical industry could operate successfully if natural gas prices remain in the $6-8 MMBtu range. American Petroleum Institute asserts that recent studies projecting natural gas prices—even with high, unconstrained levels of LNG export—do not forecast natural gas prices higher than that range. Several commenters, including America's Natural Gas Alliance and American Petroleum Institute, further assert that the market will have significant advanced notice of LNG export facilities. As a result, natural gas producers will be able to adjust supply to meet anticipated increases in demand. American Petroleum Institute also argues that, because the facilities and liquefaction trains at each facility will be built in sequence, a market buffer will be created where supply will grow incrementally and supply shocks will not be created in the market. Additionally, Lake Charles Exports argues that Dow's analysis of domestic natural gas exports is incorrect, and the additional investment in domestic natural gas reserve development associated with increases in LNG exports will insulate the United States from natural gas price volatility.

The Bipartisan Policy Center, through its own analysis, forecasts that LNG exports are unlikely to result in large domestic price impacts. The Bipartisan Policy Center states that the results of its analysis indicate that LNG exports are likely to have only modest impacts on

domestic natural gas prices—and that LNG export levels will adjust as domestic prices rise or fall.

b. DOE/FE Analysis

Natural gas price volatility can be measured in terms of short term changes—daily or monthly volatility—or over longer periods. Short term volatility is largely determined by weather patterns, localized service outages, and other factors that appear unlikely to be affected substantially by DOE export authorization decisions. Moreover, NERA's study was a long-term analysis covering a 20-year period that correctly did not focus on short term shocks or volatility.

To the extent commenters are concerned about the risk of large upward price spikes sustained over longer periods, such as those that occurred in 2005 and 2008, we do not agree that LNG exports will necessarily exacerbate this risk. First, as noted above, when domestic wholesale gas prices rise above the LNG netback price, LNG export demand is likely to diminish, if not disappear altogether. Therefore, under some international market conditions, LNG export facilities are likely to make natural gas demand in the United States more price-elastic and less conducive to sustained upward spikes. Second, in light of our findings regarding domestic natural gas reserves explained above, we see no reason why LNG exports would interfere with the market's supply response to increased prices. In any capital intensive industry, investments are made based on observed and anticipated market signals. In natural gas markets, if prices or expected prices rise above the level required to provide an attractive return on investment for new reserves and production, industry will make that investment in order to capture the anticipated profit. These investments spur development of reserves and production and increase availability of natural gas, exerting downward pressure on prices. This is part of the normal business cycle that has been captured in EIA's supply curves and, consequently, in

NERA's analysis. On balance, we are not persuaded that LNG exports will substantially increase the volatility of domestic natural gas prices.

2. Linking the Domestic Price of Natural Gas to World Prices

a. Comments

Several commenters, including APGA, Dow, and IECA, argue that LNG exports could link domestic natural gas prices to the price of natural gas in the world market, and that this could exacerbate the potential increase in domestic natural gas prices as well as increase price volatility. A number of other commenters, however, contend that domestic prices would not become linked to world prices. Citing the importance of the domestic natural gas price in determining the level of exports, the Bipartisan Policy Center and Southern LNG Company argue that domestic natural gas prices will remain independent of international prices.

In its reply comments, Dow expands on its argument that domestic natural gas prices will become linked to international prices. Dow argues that exports to Asia, where natural gas prices are "oil-indexed" will invariably lead to increases in domestic price. Dow also argues that it is incorrect to assume liquefaction, transportation and regasification costs will act as a buffer against world prices, pointing to the experience in Australia in which LNG exports resulted in a tripling of domestic natural gas prices. In reply comments, American Petroleum Institute and several LNG export applicants argue that natural gas prices will not rise to global prices because the market will limit the amount of U.S. natural gas that will be exported, since liquefaction, transportation and regasification costs act as a cushion. These commenters argue that if this cushion disappears and the U.S. export price rises to the global LNG price, market forces will bring U.S. exports to a halt. Several LNG export applicants also contend that the availability of bi-directional terminals will serve to limit domestic price increases.

b. DOE/FE Analysis

The NERA study examined whether LNG exports from the United States will cause domestic prices to rise to the level of international prices and found that such a result is unlikely. NERA asserts that there will always be a difference between the international LNG price and the U.S. market price. That difference will be represented by the cost of inland transportation, liquefaction, shipping, and regasification. NERA's model assumes competition among different suppliers such that Asian buyers would have no incentive to buy natural gas from the United States if the delivered price after liquefaction and transportation is higher than the alternative delivered LNG price from other sources. DOE/FE agrees that a competitive market would behave in this manner and U.S. natural gas prices would be lower than international LNG prices in such a market by at least the costs previously described. Further, the introduction of LNG exported from the United States into the international market would tend to exert downward pressure on the prevailing higher delivered price for LNG in those foreign markets and could weaken the "oil-indexed" pricing terms.

In addition, all proposed LNG exports from the United States in applications DOE/FE has received to date would be pursuant to long-term contracts. To the extent that these contracts supply end-users in foreign markets, these exports represent a base-load demand for U.S. natural gas. As a base load, the United States market would adjust to this increased demand through increases in production, and plan for its delivery utilizing the significant production and storage infrastructure that exists. On average, prices would rise to levels that provide incentives for full marginal cost recovery for the incremental production of natural gas needed to meet this demand.

Hence we agree with those commenters, such as the Bipartisan Policy Center, that maintain that LNG exports from the United States will have difficulty competing with LNG

exports from other countries unless domestic U.S. natural gas can be produced much cheaper. They point out that the international supply of natural gas is growing, and the mobility of that supply is increasing as other countries develop their own LNG export capabilities. Further, there is no evidence before us that demonstrates that the prices of natural gas or LNG in the international market are more volatile than the prices in the U.S. domestic market.

G. Integrity of the LNG Export Study

1. Comments

Several commenters, such as Clean Ocean Action and Sierra Club, argue that DOE/FE cannot rely on the NERA report unless DOE/FE discloses more details about the process by which DOE/FE selected NERA to conduct the study, DOE/FE's funding mechanism for paying NERA, and DOE/FE's involvement (if any) in guiding the study or reviewing drafts of the study prior to publication. In addition to Sierra Club, commenters Eugene Bruce, Ellen Osuna, Dow, and IECA assert that DOE/FE cannot rely on the study because NERA has not disclosed all technical details of its proprietary N_{ew}ERA model to the public. According to Sierra Club, DOE/FE "has refused to make [all of] this information available for review during the public comment period."[110] Further, Sierra Club, Save Our Supplies and several other commenters argue that, due to this alleged lack of transparency, DOE/FE should conduct a new study of the potential cumulative impacts of granting LNG export licenses for shipment to non-FTA countries. Sierra Club and other commenters also contend that NERA and/or NERA's Vice President (and the principal author of the NERA study) Mr. David Montgomery may be biased in favor of LNG exports, which they argue necessitates a new study by a different contractor.

[110] Reply Comments of Sierra Club at 20.

2. DOE/FE Analysis

DOE has evaluated all submissions in this proceeding on their own merits, including the LNG Export Study and the arguments and analyses submitted by commenters. NERA conducted the study within DOE/FE's requested parameters (which are included as Appendix F to the NERA study) and provided detailed information regarding its assumptions, model design and methodology, and results. This information is set forth at length in the NERA study and is discussed in Section VII.B.2 and 5 of this order. As evidenced by the number of detailed comments received, including additional studies offered by several of the commenters, NERA's explanation of its modeling design, methodology, and results has provided a sufficient basis both for the public to provide meaningful comments and for the Department to evaluate NERA's conclusions.

H. Peer Review

1. Comments

Dow, along with Eugene Bruce, IECA, and others, charge that the NERA study is invalid because NERA failed to validate its proprietary N_{ew}ERA model by means of technical peer review. These commenters argue that technical peer review is required by the Office of Management and Budget's (OMB) guidance entitled, "Final Information Quality Bulletin for Peer Review" (OMB Bulletin).[111] The OMB Bulletin establishes that "important scientific information shall be peer reviewed by qualified scientists before it is disseminated by the Federal government." Dow asserts that the NERA study should be considered "highly influential scientific information," subject to the highest standards outlined in the OMB Bulletin, and/or subject to internal DOE peer review guidelines. Due in part to these concerns, several

[111] Final Information Quality Bulletin for Peer Review, 70 Fed. Reg. 2664 (Jan. 14, 2005).

commenters, including Sierra Club and Save Our Supplies, urge that DOE/FE commission a new study by another independent contractor.

Cameron LNG, LCC, in its reply comments, counters that the OMB Bulletin does not apply to adjudications or permit proceedings such as this one. Cameron LNG therefore asserts that the public comment period held by DOE/FE on the LNG Export Study is more than adequate for DOE/FE to obtain constructive review of both the EIA and NERA studies.

2. DOE/FE Analysis

The OMB Bulletin establishes a framework for independent, expert review of influential scientific information before the information is publicly disseminated. It defines "scientific information" as "factual inputs, data, models, analyses, technical information, or scientific assessments based on the behavioral and social sciences, public health and medical sciences, life and earth sciences, engineering, or physical sciences."[112] "Scientific information" does not include opinions where the presentation makes it clear the information is "opinion rather than fact or the agency's views."[113] Further, the OMB Bulletin, while applicable to rulemakings, provides that "official disseminations that arise in adjudications and permit proceedings" are exempt from peer review, unless "the agency determines that peer review is practical and appropriate …."[114]

We have considered commenters' request for peer review in light of the OMB Bulletin. Because this proceeding is an adjudication, peer review is not required unless DOE/FE determines that such review is appropriate. After consideration, we find that peer review is not required because the conclusions reached in the LNG Export Study are in the nature of expert

[112] *Id*. at 2675.
[113] *Id*.
[114] *Id*. at 2677.

opinion, not scientific fact, and also because the principal purpose of peer review of government-sourced documents—ensuring the government is well-informed by independently produced expert analyses—was accomplished in this proceeding.

Both the EIA and NERA studies use market assumptions to project a range of possible future results. No claim is made by the authors of either study that the studies contain scientific fact. To the contrary, both studies caution the reader on the limits to their economic projections. The EIA study states: "The projections in this report are not statements of what *will* happen but of what *might* happen, given the assumptions and methodologies used."[115] Similarly, the NERA study was developed around assumptions of future scenarios and repeatedly acknowledges the uncertainties that could shift the results within the range of likely outcomes.[116]

Further, the procedures followed by DOE/FE in this proceeding have allowed numerous commenting parties and third-party experts to offer differing analyses. The comments included several expert studies critiquing the LNG Export Study. For example, Professor Wallace Tyner of Purdue University, submitted results from a study that shows different results from NERA's. Sierra Club submitted a study by Synapse Energy Economics, Inc., that examined NERA's study and pointed out alleged "problems and omissions" in NERA's analysis.[117] Conversely, Southern LNG Company, Gulf LNG, and Jordan Cove Energy Project each submitted a study by Navigant that concluded that NERA's analyses were sound.[118]

DOE/FE has carefully weighed these competing analyses and viewpoints, and has conducted its own internal review of the LNG Export Study. In so doing, DOE/FE has

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[115] EIA study at ii.
[116] *See, e.g.*, NERA study at 25-26.
[117] Synapse Energy Economics, Inc., *Will LNG Exports Benefit the United States Economy?* (Jan. 23, 2013), at 1, submitted with Initial Comments of Sierra Club.
[118] *See, e.g.*, Navigant Consulting, Inc. and Navigant Economics, Analysis of the Department of Energy's LNG Export Study (Jan. 24, 2013), App. A of Initial Comments of Gulf LNG.

recognized that its ultimate decision on the pending export applications would benefit from a public exchange of judgments and expert opinions.[119] The major purpose motivating the OMB Bulletin—to ensure that the government is well-informed by independent, expert analysis—was accomplished in this proceeding without the need for peer review.

I. Procedural Arguments

1. Comments

Several commenters, including Sierra Club, Senator Wyden, NRDC, and others argue that the current public interest standard, which focuses on meeting the nation's "essential domestic needs" for natural gas, is too narrow and that DOE/FE must undertake a rulemaking to establish criteria for making such a determination under the NGA. Similarly, Sierra Club, Alcoa, IECA, and CarbonX Energy Company, Inc., argue that DOE/FE should articulate, in the context of a separate rulemaking proceeding, the framework it will use in making its public interest determinations for individual export applications. Dow makes a related comment, stating that each of the individual LNG export dockets contains an insufficient record on which to base a public interest determination on the cumulative impact of LNG exports, and therefore DOE/FE is required to conduct a notice and comment rulemaking before it decides on any of the pending LNG export applications.

Dow, Sierra Club, Save Our Supplies, and other commenters contend that DOE/FE should conduct a public hearing regarding the applicable public interest standard in light of the cumulative impacts of LNG exports. Additionally, several commenters request that DOE/FE reopen the dockets of LNG export applicants in order to solicit additional public comment. Commenter Mary Altmann argues that DOE/FE should invite public comment on individual

[119] *See* 77 Fed. Reg. at 73,628 ("The LNG Export Study and the comments that DOE/FE receives … will help to inform our determination of the public interest in each case.")

LNG applications before approving exports. IECA argues that many commenters could not reasonably have been expected to intervene in individual license proceedings at the time license applications were filed, since they had no way of anticipating that more than 20 applications would eventually be filed. IECA argues that DOE/FE, therefore, has no alternative other than to allow every interested party to intervene in each proceeding. Along these same lines, CarbonX requests that its comment on the LNG export study be incorporated into the dockets for each pending LNG export applications.

Several commenters raise issues associated with their ability to comment on economic studies conducted by third parties and whether DOE/FE may rely on such studies in making a determination. Regarding DOE/FE's request for public comment in the NOA, Sierra Club, IECA, and others argue that DOE/FE narrowly instructed parties to address only the EIA and NERA studies. Proponents of this argument assert that DOE/FE cannot assess whether it is in the public interest to issue additional LNG export permits by addressing only one aspect of the public interest analysis (*i.e.*, potential impacts on energy costs). Similarly, Sierra Club, IECA, CarbonX, and others, assert that citations to third-party studies in the record do not discharge DOE/FE's responsibility to evaluate the public interest because the studies are based on undisclosed proprietary data and models with limited information regarding their development and age.

Other commenters, such as Lake Charles Exports, Cameron LNG, and Golden Pass, argue that DOE/FE should act now to decide each pending export application. These commenters contend additional administrative process is neither necessary nor appropriate as DOE/FE has already provided the "opportunity for hearing" required under NGA section 3(a) to make its public interest determination. Commenters such as ExxonMobil and the Center for

Liquefied Natural Gas argue that the initial and reply comments submitted in response to the LNG Export Study do not change the NGA statutory and regulatory requirements that place the burden of proof on opponents to demonstrate, with sufficient evidence, that each application is inconsistent with the public interest. These commenters argue that the record before DOE/FE regarding each individual application is sufficient for DOE/FE to determine whether LNG exports have been shown to be inconsistent with the public interest.

2. DOE/FE Analysis.

Fundamentally, all of the above requests for procedural relief challenge the adequacy of the opportunity that we have given to the public to participate in this proceeding and the adequacy of the record developed to support our decision in this proceeding.

With respect to opportunity for public participation, we find that the public has been given ample opportunity to participate in this proceeding, as well as the other pending LNG export proceedings. Within this proceeding, the Notice of Application, published in the Federal Register on January 27, 2011, contained a detailed description of FLEX's Application and invited the public to submit protests, motions to intervene, notices of intervention, and comments.[120] As required by DOE regulations, similar notices of application have been published in the Federal Register in each of the other non-FTA export application proceedings. Additionally, last December, DOE/FE published the NOA in the Federal Register.[121] As explained above, the NOA described the content and purpose of the EIA and NERA studies, invited the public to submit initial and reply comments, and stated that these comments will be part of the record in each individual docket proceeding.[122] DOE/FE thus has taken appropriate

[120] 76 Fed. Reg. at 4885-88.
[121] 77 Fed. Reg. at 73,627.
[122] *Id*. at 73,628.

and necessary steps by offering the public multiple opportunities to participate in the non-FTA LNG export proceedings.

We also find the record is adequate to support the action we are taking in this order. DOE/FE has reviewed all of the submissions made in this proceeding. Moreover, this order sets out the reasons that support each of the determinations contained herein. Consequently, we do not find it is necessary or appropriate to delay issuance of this order to augment the record, either through a rulemaking or public hearing. In this regard, we note that DOE/FE retains broad discretion to decide what procedures to use in fulfilling its statutory responsibilities under the NGA,[123] and our view is that the record is sufficient to support the actions that we are taking. The requests for additional procedures summarized above are denied.

IX. DISCUSSION AND CONCLUSIONS

A. FLEX's Application

In the submissions that accompanied its Application, FLEX introduced substantial evidence projecting a future supply of domestic natural gas sufficient to support both the proposed export authorization and domestic natural gas demand. No commenters or intervenors responding to the Notice of Application submitted contrary studies. The evidence introduced by FLEX indicated a modest increase in the domestic market price for natural gas through 2035. However, the Application also demonstrated significant local and regional economic benefits in terms of employment and income. APGA protested the Application and submitted comments that challenged the claims that the requested authorization would yield substantial benefits, but offered no economic studies or other evidence to support its arguments.

[123] *See, e.g.*, *Process Gas Consumers v. FERC*, 930 F.2d 926, 929 (D.C. Cir. 1991).

Were we to decide this Application solely on the contents of the Application and the comments and protest received in response to the Notice of Application, DOE/FE would be required to grant the Application subject to the terms and conditions discussed below. The protest submitted by APGA, the only protestor that filed in response to the Notice of Application, was not supported by any significant analysis and, to the extent the arguments raised in APGA's protest constituted substantial evidence, that material did not identify meaningful errors or omissions in the studies submitted by FLEX. Nor did APGA's protest provide a basis for rejecting FLEX's claims of numerous economic and non-economic benefits from a grant of the Application. Thus no party to this proceeding submitted evidence solely in response to the Application sufficient to rebut the statutory presumption that the requested authorization is consistent with the public interest.

B. Significance of the LNG Export Study

For the reasons discussed above, DOE/FE commissioned the LNG Export Study and invited the submission of responsive comments. DOE/FE has analyzed this material and determined that the LNG Export Study provides substantial additional support for conditionally granting FLEX'S Application in this proceeding. The conclusion of the LNG Export Study is that the United States will experience net economic benefits from issuance of authorizations to export domestically produced LNG. We have evaluated the initial and reply comments submitted in response to the LNG Export Study. Various commenters have criticized the data used as inputs to the LNG Export Study and numerous aspects of the models, assumptions, and design of the Study. As discussed above, however, we find that the LNG Export Study is fundamentally sound and supports the proposition that the proposed authorization would not be inconsistent with the public interest.

C. Benefits of International Trade

We have not limited our review to the contents of the LNG Export Study but have considered a wide range of other information. For example, the National Export Initiative, established by Executive Order, sets an Administration goal to "improve conditions that directly affect the private sector's ability to export" and to "enhance and coordinate Federal efforts to facilitate the creation of jobs in the United States through the promotion of exports."[124]

We have also considered the international consequences of our decision. We review applications to export LNG to non-FTA nations under section 3(a) of the NGA. The United States' commitment to free trade is one factor bearing on that review. Also, we note that to the extent U.S. exports can counteract concentration within global LNG markets, thereby diversifying international supply options and improving energy security for many of this country's allies and trading partners, authorizing U.S. exports may advance the public interest for reasons that are distinct from and additional to the economic benefits identified in the LNG Export Study.

D. Other Considerations

Our decision is not premised on an uncritical acceptance of the general conclusion of the LNG Export Study of net economic benefits from LNG exports. Both the LNG Export Study and many public comments identify significant uncertainties and even potential negative impacts from LNG exports. The economic impacts of higher natural gas prices and potential increases in gas price volatility are two of the factors that we view most seriously. Yet we also have taken into account factors that could mitigate such impacts, such as the current oversupply situation and data indicating that the natural gas industry would increase natural gas supply in response to

[124] NEI, 75 Fed. Reg. at 12,433.

increasing exports. On balance, we find that the potential negative impacts of FLEX's proposed exports are outweighed by the likely net economic benefits and by other non-economic or indirect benefits.

More generally, DOE/FE continues to subscribe to the principle set forth in our 1984 Policy Guidelines[125] that, under most circumstances, the market is the most efficient means of allocating natural gas supplies. However, agency intervention may be necessary to protect the public in the event there is insufficient domestic natural gas for domestic use. There may be other circumstances as well that cannot be foreseen that would require agency action.[126] Given these possibilities, DOE/FE recognizes the need to monitor market developments closely as the impact of successive authorizations of LNG exports unfolds.

E. Conclusion

We have reviewed the evidence in the record and have not found adequate basis to conclude that the export of LNG by FLEX will be inconsistent with the public interest. To the contrary, the best available evidence supports the conclusion that FLEX's proposed exports will benefit the U.S. economy overall and are consistent with the public interest.

We hasten to add that DOE/FE will take a measured approach in approving the FLEX Application and in reviewing the other pending applications to export domestically produced LNG. Specifically, DOE/FE will assess the cumulative impacts of each succeeding request for

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[125] 49 Fed. Reg. at 6684.

[126] We understand that some commenters, including Jayanta Sinha, President of GAIL Global, Inc., would like DOE to clarify the circumstances under which the agency would exercise its authority to revoke (in whole or in part) previously issued LNG export authorizations. We cannot precisely identify all the circumstances under which such action would be taken. We reiterate our observation in *Sabine Pass* that: "In the event of any unforeseen developments of such significant consequence as to put the public interest at risk, DOE/FE is fully authorized to take action as necessary to protect the public interest. Specifically, DOE/FE is authorized by section 3(a) of the Natural Gas Act … to make a supplemental order as necessary or appropriate to protect the public interest. Additionally, DOE is authorized by section 16 of the Natural Gas Act 'to perform any and all acts and to prescribe, issue, make, amend, and rescind such orders, rules, and regulations as it may find necessary or appropriate' to carry out its responsibilities." *Sabine Pass*, Order No. 2961, at 33 n.45 (quoting 15 U.S.C. § 717*o*).

export authorization on the public interest with due regard to the effect on domestic natural gas supply and demand fundamentals. In keeping with the performance of its statutory responsibilities, DOE/FE will attach appropriate and necessary terms and conditions to authorizations to ensure that the authorizations are utilized in a timely manner and that authorizations are not issued except where the applicant can show that there are or will be facilities capable of handling the proposed export volumes and existing and forecast supplies that support that action. Other conditions will be applied as necessary.

The reasons in support of proceeding cautiously are several: (1) the LNG Export Study, like any study based on assumptions and economic projections, is inherently limited in its predictive accuracy; (2) applications to export significant quantities of domestically produced LNG are a new phenomena with uncertain impacts; and (3) the market for natural gas has experienced rapid reversals in the past and is again changing rapidly due to economic, technological, and regulatory developments. The market of the future very likely will not resemble the market of today. In recognition of these factors, DOE/FE intends to monitor developments that could tend to undermine the public interest in grants of successive applications for exports of domestically produced LNG and, as previously stated, to attach terms and conditions to the authorization in this proceeding and to succeeding LNG export authorizations as are necessary for protection of the public interest.

We emphasize that the conditional authorization announced in this order applies only to the exports proposed by FLEX in this proceeding. DOE received numerous comments relating to the total volume of LNG exports to non-FTA countries that might ultimately be authorized, as

well as comments relating to the timing and sequencing of possible future authorizations.[127] All comments related to the LNG Export Study will become part of any export proceeding for which the LNG Export Study is used to inform DOE's public interest determination. Comments relating to the total volume of LNG exports ultimately authorized or the timing or sequencing of possible future authorizations may be relevant to later proceedings but need not be decided in this proceeding. In issuing this order, DOE makes no decisions regarding any future cases.

X. TERMS AND CONDITIONS

To ensure that the authorization issued by this order is consistent with the public interest, DOE/FE has attached the following terms and conditions to the authorization. The reasons for each term or condition are explained below. FLEX must abide by each term and condition or face rescission of its authorization or other appropriate sanction.

A. Term of the Authorization

FLEX has requested a 25-year term for the authorization commencing from the date export operations begin. However, because the NERA study contains projections over a 20-year period beginning from the date of first export,[128] we believe that caution recommends limiting this conditional authorization to no longer than a 20-year term beginning from the date of first export. In imposing this condition, we are mindful that LNG export facilities are capital intensive and that, to obtain financing for such projects, there must be a reasonable expectation

[127] Several commenters, including Susan Sakmar, Leny Mathews, Alcoa Energy, IECA, and Citizens Against LNG, advocate against unlimited LNG exports. These and other commenters urge DOE/FE to limit the total volume of LNG to be exported, assert that DOE/FE should issue a policy detailing its plan for granting LNG export licenses and for monitoring cumulative impacts, and propose that DOE/FE "phase in" the approval of LNG export projects to minimize potential price impacts. Although DOE/FE is not taking any of these actions at this time, it is monitoring the LNG export landscape as it evolves, as explained above. Because these comments are now part of the record in each individual docket proceeding, *see* 77 Fed. Reg. at 73,629, DOE/FE will consider them in the course of reviewing each application and the cumulative impact of prior authorizations.

[128] NERA study at 5 ("Results are reported in 5-year intervals starting in 2015. These calendar years should not be interpreted literally but represent intervals after exports begin. Thus if the U.S. does not begin LNG exports until 2016 or later, one year should be added to the dates for each year that exports commence after 2015.").

that the authorization will continue for a term sufficient to support repayment. We find that a 20-year term is likely sufficient to achieve this result. We base that conclusion on the fact that FLEX has submitted to DOE/FE LTAs with 20-year terms, which is also the length of all LNG export contracts DOE/FE has received to date. We also note that in DOE/FE's only final non-FTA LNG export authorization proceeding, Sabine Pass requested and received a 20-year term for its non-FTA authorization.[129]

B. Commencement of Operations Within Seven Years

As requested by FLEX, this conditional authorization will commence on the earlier of the date of first export or five years from the date of the issuance of this order. However, DOE/FE will require as a condition of the authorization that FLEX commence LNG export operations using the Liquefaction Project facilities to liquefy natural gas no later than seven years from the date of issuance of this order. The purpose of this condition is to ensure that other entities that may seek similar authorizations are not frustrated in their efforts to obtain those authorizations by authorization holders that are not engaged in actual export operations. A seven-year operations commencement date has been selected as a reasonable accommodation given FLEX's representation that it plans to be ready to commence operations within five years, if not sooner.

C. Transfer, Assignment, or Change in Control

DOE/FE's natural gas import/export regulations prohibit authorization holders from transferring or assigning authorizations to import or export natural gas without specific authorization by the Assistant Secretary for Fossil Energy.[130] As a condition of the similar authorization issued to Sabine Pass in Order No. 2961, DOE/FE found that the requirement for prior approval by the Assistant Secretary under its regulations applies to any change of effective

[129] *Sabine Pass*, DOE/FE Order No. 2961-A, at 29.
[130] 10 C.F.R. § 590.405.

control of the authorization holder either through asset sale or stock transfer or by other means. This condition was deemed necessary to ensure that, prior to any transfer or change in control, DOE/FE will be given an adequate opportunity to assess the public interest impacts of such a transfer or change.

To clarify its interpretation of its regulations, DOE/FE will construe a change of control to mean a change, directly or indirectly, of the power to direct the management or policies of an entity whether such power is exercised through one or more intermediary companies or pursuant to an agreement, written or oral, and whether such power is established through ownership or voting of securities, or common directors, officers, or stockholders, or voting trusts, holding trusts, or debt holdings, or contract, or any other direct or indirect means. A rebuttable presumption that control exists will arise from the ownership or the power to vote, directly or indirectly, ten percent or more of the voting securities of such entity.

D. Agency Rights

As described above, FLEX requests authorization to export LNG on its own behalf or as agent for others. DOE/FE previously addressed the issue of agency rights in Order No. 2913,[131] which granted FLEX authority to export LNG to FTA countries. In that order, DOE/FE approved a proposal by FLEX to register each LNG title holder for whom FLEX sought to export LNG as agent. This proposal was an acceptable alternative to the non-binding policy adopted by DOE/FE in *Dow Chemical,* which established that the title for all LNG authorized for export must be held by the authorization holder at the point of export.[132] We find that the same policy considerations that supported DOE/FE's acceptance of the alternative registration proposal in Order No. 2913 apply here as well. DOE/FE reiterated its policy on Agency Rights

[131] *Freeport LNG Expansion L.P. and FLNG Liquefaction, LLC*, DOE/FE Order No. 2913.
[132] *Dow Chem. Co.*, DOE/FE Order No. 2859 at 7-8.

procedures in *Gulf Coast LNG Export, LLC*.[133] In *Gulf Coast*, DOE/FE confirmed that in LNG export orders in which Agency Rights have been granted that it shall require registration materials filed for, or by, an LNG title-holder (Registrant) to include the same company identification information and long-term contract information of the Registrant as if the Registrant had filed an application to export LNG on its own behalf.

To ensure that the public interest is served, the authorization granted herein shall be conditioned to require that where FLEX proposes to export as agent for others, FLEX must register the other entity with DOE/FE in accordance with the procedures and requirements described herein.

E. Contract Provisions for the Sale or Transfer of LNG to be Exported

DOE/FE's regulations require applicants to supply transaction-specific factual information "to the extent practicable."[134] Additionally, DOE/FE regulations allow confidential treatment of the information supplied in support of or in opposition to an application if the submitting party requests such treatment, shows why the information should be exempted from public disclosure, and DOE/FE determines it will be afforded confidential treatment in accordance with 10 C.F.R. § 1004.11.[135]

DOE/FE will require that FLEX file with DOE/FE any relevant long-term commercial agreements, including LTAs, between FLEX and a third party, including a Registrant, once they have been executed. In addition, DOE/FE will require that FLEX will cause to be filed with DOE/FE any subsequent relevant long-term commercial agreements entered into by a Registrant, once they have been executed. DOE/FE finds that the submission of these contracts within 30

[133] *Gulf Coast LNG Export, LLC*, DOE/FE Order No. 3163, Order Granting Long-Term Multi-Contract Authority to Export LNG by Vessel from the Proposed Brownsville Terminal to Free Trade Agreement Nations (Oct. 16, 2012).
[134] 10 C.F.R. § 590.202(b).
[135] *Id*. § 590.202(e).

days of their execution using the procedures described below will be consistent with the "to the extent practicable" requirement of section 590.202(b). By way of example and without limitation, a "relevant long-term commercial agreement" would include an agreement with a minimum term of two years such as an LTA, an agreement to provide gas processing or liquefaction services at the Freeport LNG Terminal, a long-term sales contract involving natural gas or LNG stored or liquefied at the Freeport LNG Terminal, or an agreement to provide export services from the Freeport LNG Terminal.

DOE/FE also will require FLEX to file any long-term contracts FLEX enters into providing for the long-term export of LNG on its own behalf from the Freeport LNG Terminal. DOE/FE finds that the submission of these contracts within 30 days of their execution using the procedures described below will be consistent with the "to the extent practicable" requirement of section 590.202(b).

In addition, DOE/FE finds that section 590.202(c) of DOE/FE's regulations[136] requires that FLEX file, or cause to be filed, all long-term contracts associated with the long-term supply of natural gas to the Freeport LNG Terminal within 30 days of their execution that either FLEX or the Registrant enters into.

DOE/FE recognizes that some information in FLEX's or a Registrant's long-term commercial agreements associated with the export of LNG, and long-term contracts associated with the long-term supply of natural gas to the Freeport LNG Terminal may be commercially sensitive. DOE/FE therefore will provide FLEX the option to file or cause to be filed either unredacted contracts, or in the alternative (A) FLEX may file, or cause to be filed, long-term contracts under seal, but it also will file either: i) a copy of each long-term contract with

[136] *Id*. § 590.202(c).

commercially sensitive information redacted, or ii) a summary of all major provisions of the contract(s) including, but not limited to, the parties to each contract, contract term, quantity, any take or pay or equivalent provisions/conditions, destinations, re-sale provisions, and other relevant provisions; and (B) the filing must demonstrate why the redacted information should be exempted from public disclosure.

In order to ensure that DOE/FE destination and reporting requirements included in this order are conveyed to subsequent title holders, DOE/FE will include as a condition of this authorization that future contracts for the sale or transfer of LNG exported pursuant to this Order shall include an acknowledgement of these requirements.

F. Export Quantity

The Application requests authorization to export up to 9 million metric tons per year of natural gas that FLEX states is equivalent to 1.4 Bcf/d, or 511 Bcf per year. DOE/FE believes that any uncertainty in the volumes subject to the export authorization needs to be clarified. Having a clear understanding of the volumes authorized for export in this and other proceedings could affect the review of future export applications where a public interest determination is based, at least in part, on the availability of sufficient supplies to meet domestic need. Consistent with DOE/FE regulations, applications are to provide volumes of natural gas in Mcf or Bcf, and their Btu equivalents.[137] DOE/FE authorizes LNG exports in volumetric units, typically Bcf, and requires reporting of monthly exports in Mcf. DOE/FE maintains all natural gas and LNG import and export statistics for the United States and provides these data to the U.S. Energy Information Administration and publishes official statistics. To allow for standardized reporting, compilation of national statistics, and to ensure DOE/FE can verify compliance with the

[137] *Id*. § 590.202(b)(1).

authorized volumes, DOE/FE will authorize LNG exports in an annual quantity equivalent to natural gas volume of 1.4 Bcf/d, or 511 Bcf per year, that was set forth in FLEX's Application.[138]

G. Combined FTA and Non-FTA Export Authorization Volume

In December 2010, FLEX filed two contemporaneous, separate applications with DOE/FE, both seeking to export LNG from domestic resources from the proposed Liquefaction Project up to the equivalent of 1.4 Bcf/d of natural gas. The first of these applications requested long-term authorization to export LNG to FTA countries, which DOE/FE granted in February 2011, pursuant to NGA section 3(c).[139] The current Application requests long-term authorization to export LNG to non-FTA countries under NGA section 3(a). The source of LNG proposed for export for both applications is from the same proposed facility, the capacity of which FLEX stated in both applications is equivalent to 1.4 Bcf/d (511 Bcf/yr) of natural gas. DOE/FE therefore will conditionally authorize the LNG export quantity in this authorization to be up to the equivalent of 511 Bcf/yr of natural gas on both a standalone basis and also when combined the authorized exports pursuant to DOE/FE Order No. 2913.

H. Environmental Review

DOE/FE intends to complete its NEPA review as a cooperating agency in tandem with FERC's review of the Liquefaction Project. Accordingly, the authorization issued in the instant

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[138] In FLEX's Application to export LNG to FTA countries in FE Docket No. 10-160-LNG, FLEX requested export authority of the same quantity as in this Application. In a letter to DOE/FE dated March 9, 2011, and required by DOE/FE Order No. 2913 granting FLEX's authorization, FLEX clarified: "FLEX requests that DOE/FE disregard any Reference in the Application to export volumes calculated in metric tons. FLEX requested and was granted authorization to export 1.4 Bcf/d, or 511 Bcf per year, of LNG and these numbers remain accurate."

[139] *Freeport LNG Expansion L.P. and FLNG Liquefaction, LLC*, DOE/FE Order No. 2913.

proceeding will be conditioned on the satisfactory completion of the environmental review process at FERC.[140]

Accordingly, this conditional order makes preliminary findings and indicates to the parties DOE/FE's determination at this time on all but the environmental issues in this proceeding. All parties are advised that the issues addressed herein regarding the export of natural gas will be reexamined at the time of the DOE's review of the FERC environmental analysis. Inasmuch as DOE/FE is a cooperating agency in the FERC environmental review, persons wishing to raise questions regarding the environmental review of the present Application are responsible for doing so within the FERC proceedings. As explained in our orders in *Sabine Pass*, DOE/FE's participation as a cooperating agency in the FERC proceeding is intended to avoid duplication of effort by agencies with overlapping environmental review responsibilities, to achieve early coordination among agencies, and to concentrate public participation in a single forum.[141] Insofar as a participant in the FERC proceeding actively raises concerns over the scope or substance of environmental review but is unsuccessful in securing that agency's consideration of its stated interests, DOE/FE reserves the right to address the stated interests within this proceeding. However, absent a showing of good cause for a failure of interested persons to participate in the FERC environmental review proceeding, DOE/FE may dismiss such claims if raised out of time in this proceeding.

XI. FINDINGS

On the basis of the findings and conclusions set forth above, we find that it has not been shown that a grant of the requested authorization will be inconsistent with the public interest, and

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[140] 10 C.F.R. § 590.402 (authorizing DOE/FE to issue a conditional order prior to issuance of a final opinion and order).
[141] *Sabine Pass*, DOE/FE Order No. 2961 at 40-41.

we further find that the Application should be granted subject to the terms and conditions set forth herein.

XII. ORDER

Pursuant to section 3 of the Natural Gas Act, it is ordered that:

A. FLEX is authorized to export domestically produced LNG by vessel from the Freeport LNG Terminal on Quintana Island, Texas, up to the equivalent of 511 Bcf/yr of natural gas for a term of 20 years to commence on the date of first export. FLEX is authorized to export this LNG on its own behalf or as agent for others pursuant to one or more long-term contracts (a contract with a term greater than two years).

B. FLEX must commence export operations using the planned liquefaction facilities no later than seven years from the date of issuance of this order.

C. The combined total LNG export quantity authorized in this Order and DOE/FE Order No. 2913 is the equivalent of 511 Bcf/yr of natural gas.

D. This LNG may be exported to any country with which the United States does not have an FTA requiring the national treatment for trade in natural gas, which currently has or in the future develops the capacity to import LNG, and with which trade is not prohibited by United States law or policy.

E. FLEX shall ensure that all transactions authorized by this order are permitted and lawful under United States laws and policies, including the rules, regulations, orders, policies, and other determinations of the Office of Foreign Assets Control of the United States Department of the Treasury and FERC. Failure to comply with this requirement could result in rescission of this authorization and/or other civil or criminal remedies.

F. The authorization granted by this Order is conditioned on the satisfactory completion of the environmental review of the Liquefaction Project under NEPA in FERC Docket No. CP12-509 and on issuance by DOE/FE of a record of decision pursuant to NEPA.

G. FLEX shall file, or cause others to file, with the Office of Natural Gas Regulatory Activities all executed long-term contracts associated with the long-term export of LNG on its own behalf or as agent for or on behalf of others, from the Freeport LNG Terminal on Quintana Island, Texas. FLEX shall file, or cause others to file, a non-redacted copy of each contract for public posting. Alternatively, FLEX shall file, or cause others to file, both a non-redacted copy of the contract filed under seal and either: i) a redacted version of the contract, or ii) major provisions of the contract, for public posting, within 30 days of their execution. Applying the same procedures, FLEX also shall file, or cause others to file, with the Office of Natural Gas Regulatory Activities all executed long-term contracts associated with the long-term supply of natural gas to the Freeport LNG Terminal on Quintana Island, Texas. FLEX shall file, or cause others to file, a non-redacted copy of each contract for public posting. Alternatively, FLEX shall file, or cause others to file, both a non-redacted copy of the contract filed under seal, and either: i) a redacted version of the contract, or ii) major provisions of the contract, for public posting within 30 days of their execution. In these filings, FLEX shall show why the redacted or non-disclosed information should be exempted from public disclosure.

H. FLEX, or others for whom FLEX acts as agent, shall include the following provision in any agreement or other contract for the sale or transfer of LNG exported pursuant to this Order:

> "Customer or purchaser acknowledges and agrees that it will resell or transfer LNG purchased hereunder for delivery only to countries identified in Ordering Paragraph C of DOE Order No. 3282, issued May 17, 2013, in FE Docket No. 10-161-LNG, and/or to purchasers that have agreed in writing to limit their direct or

> indirect resale or transfer of such LNG to such countries. Customer or purchaser further commits to cause a report to be provided to Freeport LNG Expansion L.P. and FLNG Liquefaction, LLC that identifies the country of destination, upon delivery, into which the exported LNG was actually delivered, and to include in any resale contract for such LNG the necessary conditions to insure that Freeport LNG Expansion L.P. (FLNG Expansion) and FLNG Liquefaction, LLC are made aware of all such actual destination countries."

I. FLEX is permitted to use its authorization in order to export LNG on behalf of or as agent for others, after registering the other party with DOE/FE. Registration materials shall include an acknowledgement and agreement by the registrant to supply FLEX with all information necessary to permit FLEX to register that person or entity with DOE/FE, including: (1) the registrant's agreement to comply with this Order and all applicable requirements of DOE/FE's regulations at 10 C.F.R. part 590, including but not limited to destination restrictions; (2) the exact legal name of the registrant, state/location of incorporation/registration, primary place of doing business, and the registrant's ownership structure, including the ultimate parent entity if the registrant is a subsidiary or affiliate of another entity; (3) the name, title, mailing address, e-mail address, and telephone number of a corporate officer or employee of the registrant to whom inquiries may be directed; (4) within 30 days of execution, a copy, of any long-term contracts, not previously filed with DOE/FE, described in Ordering paragraph (F) of this Order, including either a non-redacted copy for public posting, or alternatively both a non-redacted copy for filing under seal and either: i) a redacted version of the contract, or ii) major provisions of the contract, for public posting.

J. Each registration submitted pursuant to this Order shall have current information on file with DOE/FE. Any changes in company name, contact information, change in term of the long-term contract, termination of the long-term contract, or other relevant modification, shall be filed with DOE/FE within 30 days of such change(s).

K. As a condition of this authorization, FLEX shall ensure that all persons required by this Order to register with DOE/FE have done so. Any failure by FLEX to ensure that all such persons or entities are registered with DOE/FE shall be grounds for rescinding in whole or in part the authorization.

L. Within two weeks after the first export of domestically produced LNG occurs from the Freeport LNG Terminal on Quintana Island, Texas, FLEX shall provide written notification of the date that the first export of LNG authorized in Order Paragraph A above occurred.

M. FLEX shall file with the Office of Natural Gas Regulatory Activities, on a semi-annual basis, written reports describing the progress of the proposed liquefaction facility project. The reports shall be filed on or by April 1 and October 1 of each year, and shall include information on the progress of the Liquefaction facilities on Quintana Island, Texas, the date the facility is expected to be operational, and the status of the long-term contracts associated with the long-term export of LNG and any long-term supply contracts.

N. Prior to any change in control of the authorization holder, FLEX must obtain the approval of the Assistant Secretary for Fossil Energy. For purposes of this ordering paragraph N, a "change of control" shall include any change, directly or indirectly, of the power to direct the management or policies of Freeport LNG Expansion L.P. or FLNG Liquefaction, LLC, whether such power is exercised through one or more intermediary companies or pursuant to an agreement, written or oral, and whether such power is established through ownership or voting of securities, or common directors, officers, or stockholders, or voting trusts, holding trusts, or debt holdings, or contract, or any other direct or indirect means.

O. Monthly Reports: With respect to the LNG exports authorized by this Order, FLEX shall file with the Office of Natural Gas Regulatory Activities, within 30 days following the last

day of each calendar month, a report indicating whether exports of LNG have been made. The first monthly report required by this Order is due not later than the 30th day of the month following the month of first export. In subsequent months, if exports have not occurred, a report of "no activity" for that month must be filed. If exports of LNG have occurred, the report must give the following details of each LNG cargo: (1) the name(s) of the authorized exporter registered with DOE/FE; (2) the name of the U.S. export terminal; (3) the name of the LNG tanker; (4) the date of departure from the U.S. export terminal; (5) the country of destination; (6) the name of the supplier/seller; (7) the volume in Mcf; (8) the price at point of export per million British thermal units (MMBtu); (9) the duration of the supply agreement; and (10) the name(s) of the purchaser(s).

(Approved by the Office of Management and Budget under OMB Control No. 1901-0294)

P. All monthly report filings shall be made to U.S. Department of Energy (FE-34), Office of Fossil Energy, Office of Natural Gas Regulatory Activities, P.O. Box 44375, Washington, D.C. 20026-4375, Attention: Natural Gas Reports. Alternatively, reports may be e-mailed to ngreports@hq.doe.gov or may be faxed to Natural Gas Reports at (202) 586-6050.

Q. Following the convention used by the applicants, the above order, including ordering paragraphs A through O, uses the term "FLEX" to refer to Freeport LNG Expansion L.P. and FLNG Liquefaction, LLC, collectively. DOE/FE, however, is issuing a single conditional authorization in this order to be managed jointly by Freeport LNG Expansion L.P. and FLNG Liquefaction, LLC. All obligations arising under this conditional authorization apply equally to Freeport LNG Expansion L.P. and FLNG Liquefaction, LLC.

R. Good cause having been shown, the late-filed comments submitted by Bill Cooper, President of the Center for Liquefied Natural Gas, are accepted for filing.

Issued in Washington, D.C., May 17, 2013.

Christopher A. Smith
Assistant Secretary for Fossil Energy (Acting)