UNITED STATES OF AMERICA

DEPARTMENT OF ENERGY

OFFICE OF FOSSIL ENERGY

LAKE CHARLES EXPORTS, LLC	)))	FE DOCKET NO. 11-59-LNG

ORDER CONDITIONALLY GRANTING LONG-TERM
MULTI-CONTRACT AUTHORIZATION TO EXPORT
LIQUEFIED NATURAL GAS BY VESSEL FROM
THE LAKE CHARLES TERMINAL
TO NON-FREE TRADE AGREEMENT NATIONS

DOE/FE ORDER NO. 3324

AUGUST 7, 2013

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FREQUENTLY USED ACRONYMS

AEO	Annual Energy Outlook
APGA	American Public Gas Association
Bcf/d	Billion Cubic Feet per Day
Bcf/yr	Billion Cubic Feet per Year
BG	BG Group plc
BGLS	BG LNG Services, LLC
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
FDI	Foreign Direct Investment
FE	Office of Fossil Energy, U.S. Department of Energy
FERC	Federal Energy Regulatory Commission
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GNGM	Global Natural Gas Model
IECA	Industrial Energy Consumers of America
kWh	Kilowatt-Hour
LCE	Lake Charles Exports, LLC
LNG	Liquefied Natural Gas
LTA	Liquefaction Tolling Agreement
Mcf	Thousand Cubic Feet
MMBtu	Million British Thermal Units
mtpa	Million Metric Tons per Annum
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
SUG	Southern Union Company
Tcf/yr	Trillion Cubic Feet per Year
TLNG Export	Trunkline LNG Export, LLC
TRR	Technically Recoverable Resources

I. INTRODUCTION

On May 6, 2011, Lake Charles Exports, LLC (LCE) filed an application (Application)[1] with the Office of Fossil Energy of the Department of Energy (DOE/FE) under section 3 of the Natural Gas Act (NGA)[2] 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 a free trade agreement (FTA) providing for national treatment for trade in natural gas (non-FTA countries).[3] LCE seeks to export up to 15 million metric tons per annum (mtpa) of LNG, which LCE states is equivalent to approximately 2 billion cubic feet per day (Bcf/d) of natural gas,[4] for a period of 25 years. LCE subsequently amended its Application (Amendment) in two respects—(1) to request authorization to export LNG on its own behalf or as agent for its affiliate, BG LNG Services, LLC (BGLS), and (2) to clarify that its agreement with BGLS will have a 25-year term that will run concurrently with the requested authorization.[5] The exports, if authorized, would originate from the existing LNG import terminal in Lake Charles, Louisiana (Lake Charles Terminal), which is owned by LCE's affiliate Trunkline LNG Company, LLC (Trunkline).

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[1] Application of Lake Charles Exports, LLC for Long-Term Authorization to Export Liquefied Natural Gas, FE Docket No. 11-59-LNG (May 6, 2011) [hereinafter LCE App.]

[2] 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).

[3] In the Application, LCE also sought authorization to export the same quantity of LNG to any country with which the United States has, or in the future may enter into, a FTA requiring national treatment in natural gas (FTA countries). LCE states that the amount of LNG collectively proposed for export to FTA and non-FTA countries will not exceed 2 Bcf/d of natural gas, and thus is not additive. As discussed in Section IV.A.2 below, DOE/FE granted the FTA portion of the Application by order dated July 22, 2011.

[4] As relevant here, DOE's regulations require applicants to provide volumes of requested exports in terms of Bcf of natural gas. 10 C.F.R. § 590.202(b)(1). LCE states that its requested export of 15 mtpa of LNG is the equivalent to approximately 2 Bcf/d of natural gas, or 730 Bcf per year (Bcf/yr). Accordingly, as discussed below, DOE/FE will authorize LCE's requested export of 15 mtpa as the equivalent of 730 Bcf/yr of natural gas. *See infra* Sections X.F & XII.A.

[5] Lake Charles Exports, LLC, Amendment to Application for Long-Term Authorization to Export Liquefied Natural Gas, FE Docket No. 11-59-LNG (May 26, 2011) [hereinafter LCE Amendment].

LCE is a Delaware limited liability company with its principal place of business in Houston, Texas. LCE is a jointly-owned subsidiary of BG Group plc (BG) and Southern Union Company (SUG). As discussed below, BGLS is a wholly-owned subsidiary of BG, and Trunkline is a wholly-owned subsidiary of SUG.

Currently, BGLS and Trunkline are jointly developing plans to modify the existing facilities at the Lake Charles Terminal to permit LNG to be loaded from the terminal's storage tanks onto vessels berthed at the existing marine facility, and to install liquefaction facilities that would permit gas to be received by pipeline at the Terminal and liquefied for export (Liquefaction Project).[6] Following completion of the Liquefaction Project, the Lake Charles Terminal will be bi-directional.

LCE asserts that the proposed liquefaction and export facilities at the Lake Charles Terminal would be the subject of a long-term service agreement between BGLS and Trunkline. LCE intends to purchase LNG produced by the Liquefaction Project from BGLS prior to export, either to export on its own behalf or as agent for BGLS. LCE states that it will enter into a long-term LNG export contract with BGLS on a date closer to the date of first export. LCE's requested export authorization is described in more detail below.

On June 13, 2011, DOE/FE published a Notice of Application in the Federal Register.[7] The Notice of Application called on interested persons to submit protests, motions to intervene, notice of intervention, and comments by August 12, 2011. DOE/FE received 15 comments in

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[6] As explained below, an affiliate of Trunkline and LCE known as Trunkline LNG Export, LLC (TLNG Export) has filed a separate application seeking authorization to export the same amount of LNG as LCE from the Lake Charles Terminal to both FTA and non-FTA countries. TLNG Export's application is not additive, meaning it would not be seeking to export any additional volumes of LNG from the Terminal. *See infra* Section IV.A.1.

[7] Lake Charles Exports, LLC, Application for Long-Term Authorization To Export Liquefied Natural Gas, 76 Fed. Reg. 34,212 (June 13, 2011) [hereinafter Notice of Application].

support of the Application.[8] In opposition to the Application, DOE/FE received one comment submitted by the Industrial Energy Consumers of America (IECA) and one motion to intervene and protest submitted by the American Public Gas Association (APGA). LCE filed an answer to IECA's comment and to APGA's protest on August 25, 2011.

On May 20, 2011, two weeks after LCE filed its Application, DOE/FE issued its first order granting a long-term authorization to export LNG produced domestically from the lower 48 states to non-FTA countries when it conditionally authorized Sabine Pass Liquefaction, LLC to export up to 2.2 Bcf/d of natural gas (*Sabine Pass*).[9] By August 2011, DOE/FE had received two additional applications for authorization to export LNG to non-FTA countries—one from Freeport LNG Expansion, L.P. and FLNG Liquefaction, LLC (collectively, FLEX or Freeport) and the current Application.[10] 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.[11] Recognizing the potential cumulative impact of the pending and anticipated LNG export applications, DOE/FE determined

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[8] Three days after the close of the comment period, DOE/FE received a comment from the Lake Charles Harbor & Terminal District. DOE/FE finds that acceptance of the letter three days out of time will not prejudice other parties to this proceeding, and therefore accepts the letter for filing. *See infra* Section XII.Q.

[9] *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) [hereinafter *Sabine Pass*]. In August 2012, 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, 2012).

[10] On May 17, 2013, DOE/FE granted FLEX's non-FTA authorization in Docket No. 10-161-LNG. DOE/FE conditionally authorized FLEX to export domestically-produced LNG in a volume equivalent to 1.4 Bcf/d of natural gas for a period of 20 years. *See Freeport LNG Expansion, L.P. and FLNG Liquefaction, LLC*, DOE/FE Order No. 3282, 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 (May 17, 2013) [hereinafter *Freeport LNG*].

[11] As of the date of this Order (and excluding LCE's Application), 19 applications for long-term export of LNG to non-FTA countries, in an amount totaling approximately 24 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.[12]

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.[13] 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.[14] 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.[15] Second, in October 2011, DOE contracted with 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.

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[12] Indeed, DOE/FE stated in *Sabine Pass* that it "will evaluate the cumulative impact of the [Sabine Pass] authorization and any future authorizations for export authority when considering any subsequent application for such authority." DOE/FE Order No. 2961, at 33.
[13] *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).
[14] The Annual Energy Outlook (AEO) 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*.
[15] *See* LNG Export Study – Related Documents, *available at* http://energy.gov/fe/downloads/lng-export-study-related-documents (EIA Analysis (Study - Part 1)).

DOE published the NERA study, *Macroeconomic Impacts of LNG Exports from the United States*, in December 2012.[16]

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).[17] DOE/FE invited public comment 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.[18] The NOA required initial comments by January 24, 2013, and reply comments between January 25 and February 25, 2013.[19] DOE/FE received over 188,000 initial comments and over 2,700 reply comments, of which approximately 800 were unique.[20] 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

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[16] *See id*. (NERA Economic Consulting Analysis (Study - Part 2)).
[17] 77 Fed. Reg. at 73,627.
[18] *Id*. at 73,628.
[19] *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.
[20] 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.[21] As discussed below, DOE/FE has carefully examined the comments and has considered them in its review of the LCE 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 LCE Application have not demonstrated that the requested authorization will be inconsistent with the public interest. As described below, we find that the exports proposed in this Application are likely to yield net economic benefits to the United States. Accordingly, for this and other reasons set forth below, we are conditionally granting the LCE 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 LCE'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[22]] 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.

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

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[21] *See* 77 Fed. Reg. at 73,629 & n.4.
[22] 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.

the application overcome that presumption by making an affirmative showing of inconsistency with the public interest.[23]

While section 3(a) establishes a broad public interest standard and a presumption favoring 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.[24]

DOE/FE's prior decisions have also looked to certain principles established in its 1984 Policy Guidelines.[25] 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.[26]

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[23] *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, at 13 (April 2, 1999), *citing Panhandle Producers & Royalty Owners Ass'n v. ERA*, 822 F.2d 1105, 1111 (D.C. Cir. 1987).

[24] *See, e.g.*, *Sabine Pass*, DOE/FE Order No. 2961, at 28-42 (reviewing record evidence in issuing conditional authorization); *Freeport LNG*, DOE/FE Order No. 3282, at 109-14 (discussing same).

[25] New Policy Guidelines and Delegations Order Relating to Regulation of Imported Natural Gas, 49 Fed. Reg. 6684 (Feb. 22, 1984) [hereinafter 1984 Policy Guidelines].

[26] *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.[27]

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."[28] In February 1989, the Assistant Secretary for Fossil Energy assumed the delegated responsibilities of the Administrator of ERA.[29]

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

LCE has applied for a long-term, multi-contract authorization to export domestically produced LNG up to 15 mtpa for 25 years. LCE states that the requested authorization is equivalent to a nominal volume of approximately 2 Bcf/d of natural gas. LCE requests that the authorization commence on the earlier of the date of first export or 10 years from the date of the

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[27] *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).
[28] DOE Delegation Order No. 0204-111, at 1; *see also* 49 Fed. Reg. at 6690.
[29] *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)).

issuance of the authorization. LCE seeks to export the LNG by vessel from the Lake Charles Terminal in Lake Charles, Louisiana, 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. LCE seeks to export this LNG on its own behalf or as agent for its affiliate BGLS.

A. Background

1. Description of Applicant and Facility

As noted above, LCE is a jointly-owned subsidiary of BG and SUG. According to LCE, these parent companies, as well as affiliates BGLS and Trunkline, are active, long-time participants in the global LNG market.

BG. BG is a United Kingdom public limited company with its principal place of business in Reading, Berkshire, United Kingdom. LCE asserts that BG is a producer of LNG from Trinidad, Tobago, and Egypt, and has an LNG portfolio that includes LNG purchased under long-term firm arrangements with LNG producers in Equatorial Guinea and Nigeria. In addition to this market participation, LCE states that BG:

- Has market access to the United Kingdom through its 50% ownership of the Dragon LNG Terminal;
- Has a long-term contract to supply its Quintero LNG plant in Chile with up to 1.7 mtpa of LNG for 21 years;
- Was selected to source and supply LNG to Singapore on an exclusive basis with up to 3 mtpa for up to 20 years, with first deliveries expected in 2013;
- Has made LNG sales to over 40 customers around the globe, including Japan, South Korea, Taiwan, and China;
- Has sold LNG to importers in 22 of the 23 importing countries; and
- Has bought LNG from 11 of the 18 LNG producing countries.

According to LCE, BG is also involved in natural gas production in the United States. In 2009 and 2010, BG purchased major interests in the Haynesville and Marcellus shale plays, as well as other assets in Texas, Louisiana, West Virginia, and Pennsylvania. LCE states that BG's shale gas production has complemented its LNG import activities, and has supported BG's rise to ranking among the top 10 natural gas marketers in the United States.

BGLS. BGLS, a wholly-owned subsidiary of BG, is a Delaware limited liability company with its principal place of business in Houston, Texas. LCE states that BGLS imports LNG from various international sources, and has been the leading importer of LNG in North America for a number of years. Upon importation, BGLS typically sells the LNG and the natural gas resulting from vaporization to various third parties. According to LCE, BGLS currently holds nine active authorizations from DOE/FE to import LNG from various countries at the Lake Charles Terminal and at the LNG terminal at Elba Island, Georgia.[30]

SUG. On April 24, 2012, LCE notified DOE/FE by letter that, on March 26, 2012, Sigma Acquisition Corporation—a wholly-owned subsidiary of Energy Transfer Equity, L.P.—had merged with and into SUG. As a result of the merger, SUG became a wholly-owned subsidiary of Energy Transfer Equity, L.P., a Delaware master limited partnership with its principal place of business in Dallas, Texas. According to LCE, the merger did not impact the representations made in the Application or the export authority that LCE requests in the Application.

Trunkline and TLNG Export. Both Trunkline and TLNG Export are Delaware limited liability companies with their principal place of business in Houston, Texas. Following completion of SUG's merger, Trunkline remains a wholly-owned subsidiary of SUG indirectly

[30] LCE App. at 2 n.2.

owned by Energy Transfer Equity, L.P. (60 percent) and Energy Transfer Partners, L.P. (40 percent). Trunkline's affiliate, TLNG Export, is similarly owned by Energy Transfer Equity, L.P. (60 percent) and Energy Transfer Partners, L.P. (40 percent), and is also an affiliate of LCE.

In a separate application pending in FE Docket No. 13-04-LNG, TLNG Export has sought authority to export LNG to FTA and non-FTA countries from the Lake Charles Terminal in the same amount as currently sought by LCE. TLNG Export explains that it "is not seeking to export any additional volumes of LNG from the Lake Charles Terminal," but "is simply maximizing optionality … to expand the potential customer base for LNG exports from the Lake Charles Terminal."[31] TLNG Export states that, although Trunkline owns and operates the Lake Charles Terminal, TLNG Export will own the proposed liquefaction facility at the Terminal and hold the export authorization, if such authorization is granted in FE Docket No. 13-04-LNG. Accordingly, "the existing Lake Charles Terminal, the proposed liquefaction facility, and the LNG export authorization requested [by TLNG Export] would all be under the same ownership structure"[32]—with LCE's export authorization also within that ownership structure.

On March 7, 2013, in DOE/FE Order No. 3252, DOE/FE granted TLNG Export's request for long-term authorization to export LNG to FTA countries.[33] TLNG Export's request for export authorization to non-FTA countries is still pending.

<u>Lake Charles Terminal.</u> LCE states that the Federal Energy Regulatory Commission (FERC) certificated the Lake Charles Terminal in 1977, with the original construction completed

[31] Trunkline LNG Export, LLC, Application for Long-Term Authorization to Export Liquefied Natural Gas, FE Docket No. 13-04-LNG, at 3-4 (Jan. 9, 2013) [hereinafter TLNG Export App.]
[32] *Id*. at 2.
[33] *Trunkline LNG Export, LLC*, DOE/FE Order No. 3252, Order Granting Long-Term Multi-Contract Authorization to Export Liquefied Natural Gas by Vessel from the Lake Charles LNG Terminal to Free Trade Agreement Nations (March 7, 2013).

in 1981.[34] In 2001, BGLS entered into a firm terminalling services agreement under which it subscribed all the capacity of the Lake Charles Terminal to receive, store, and vaporize LNG. LCE states that, in cooperation with BGLS, Trunkline has expanded and enhanced the terminal through the construction of additional storage capacity, additional gas-fired vaporization capacity, an additional marine berth, ambient air vaporization equipment, and natural gas liquids extraction capability. According to LCE, the Lake Charles Terminal currently has a firm sustained sendout capacity of 1.8 Bcf/d and a peak sendout capacity of 2.1 Bcf/d. The Terminal has four LNG storage tanks with a combined capacity of approximately 2.7 million barrels (425,000 cubic meters) of LNG, or approximately 9.0 Bcf of natural gas. The Terminal's natural gas liquids processing facilities allow the extraction of ethane and other heavier hydrocarbons from the LNG stream. LCE states that BGLS and Trunkline are currently developing plans to install liquefaction and export facilities at the Terminal. As discussed below, the proposed modifications to the Lake Charles Terminal are the subject of an application by TLNG Export, together with its affiliates Trunkline and Trunkline Gas Company, LLC, to FERC for authorization under NGA section 3.[35]

2. Procedural Background

On May 6, 2011, LCE filed the Application seeking long-term authorization to export domestically-produced LNG to both FTA and non-FTA countries, in a total quantity not to exceed 15 million tons per year, which LCE states is the equivalent of approximately 2 Bcf/d of natural gas. In the Application, LCE states that it plans to enter a long-term export contract with BGLS, for a 20-year term, on a date that is closer to the date of first export. Pursuant to that

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[34] *Trunkline LNG Co., et al.*, 58 FPC 726 (Opinion No. 796), *order on reh'g* 58 FPC 2935 (1977) (Opinion No. 796-A).
[35] TLNG Export App. at 4.

agreement, LCE intends to purchase LNG from BGLS at the point of export at the Lake Charles Terminal for delivery to markets around the world.

On May 26, 2011, LCE amended the Application in two respects. First, LCE clarified that it was requesting authorization to export LNG from the Terminal on its own behalf or as agent for BGLS. This issue is discussed in greater detail below in Section IV.C. Second, LCE stated that its anticipated long-term export contract with BGLS will have a 25-year term that will run concurrently with the requested export authorization, not a 20-year term as stated in the Application.

On July 22, 2011, in DOE/FE Order No. 2987, DOE/FE granted LCE's request for long-term authorization to export to FTA countries.[36] This Order addresses LCE's remaining request for non-FTA export authorization. The proposed export volumes for both FTA and non-FTA authorizations mirror the 2 Bcf/d liquefaction capacity of the Lake Charles liquefaction project, and thus are not additive. The authorization issued in this proceeding is conditioned to reflect this fact. *See infra* Section X.G.

B. Liquefaction Project

LCE notes that the Lake Charles Terminal is currently equipped for and authorized to receive LNG imports. LCE proposes to export LNG from the Lake Charles Terminal in conjunction with the plans of Trunkline and BGLS to: (1) modify the existing facilities at the Terminal to permit LNG to be loaded from storage tanks onto vessels berthed at the existing marine facility; and (2) install facilities that would permit gas to be received by pipeline at the

[36] *Lake Charles Exports, LLC*, DOE/FE Order No. 2987, Order Granting Long-Term Authorization to Export Liquefied Natural Gas by Vessel from the Lake Charles Terminal to Free Trade Agreement Nations (July 22, 2011), *available at*: http://www.fossil.energy.gov/programs/gasregulation/authorizations/2011_applications/lake_charles_exports.html [hereinafter LCE FTA Order].

Terminal and liquefied for export.

LCE states that Trunkline's request to modify and expand the Lake Charles Terminal is subject to ongoing FERC review, which DOE/FE notes is in FERC Docket No. PF12-8.[37] *See infra* Section IV.E. In March 2013, FERC issued a Supplemental Notice of Intent for the Liquefaction Project, which provides additional detail about Trunkline's plans to expand and modify the Lake Charles Terminal. Among other features, the Liquefaction Project will consist of a new liquefaction facility consisting of three liquefaction trains; modifications and upgrades at the existing LNG terminal; and approximately 0.5 mile of 48-inch diameter feed gas line in Calcasieu Parish, Louisiana, to supply natural gas to the liquefaction facility from existing gas transmission pipelines.[38]

LCE states that, following completion of the Liquefaction Project, the Lake Charles Terminal will be bi-directional, and its peak and sustained sendout capabilities will not be affected.

C. Business Model

In its Application as amended, LCE seeks authority to export LNG from the Lake Charles Terminal on its own behalf and as agent for BGLS. In the Amendment to its Application, LCE requests a waiver by DOE/FE of the non-binding policy set forth in *Dow Chemical Company*, DOE/FE Order No. 2859, which requires the authorization holder to hold title for all LNG

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[37] LCE's FERC docket number will change to a "CP" (certificate proceeding) number once LCE files its application under NGA section 3 with FERC, ending the pre-filing process. For purposes of any discussion herein concerning modifications to the Lake Charles Terminal or related environmental review, "Trunkline" refers collectively to Trunkline, TLNG Export, and Trunkline Gas Company, LLC, which together seek authority from FERC to site, construct, and operate facilities at the Terminal as part of the Liquefaction Project.

[38] *See* Trunkline LNG Company, LLC *et al.*, Supplemental Notice of Intent to Prepare an Environmental Impact Statement for the Planned Lake Charles Liquefaction Project and Request for Comments on Environmental Issues, FERC Docket No. PF12-8-000, at 2 (Mar. 21, 2013), *available at* http://energy.gov/sites/prod/files/EIS-0491-FERC-SNOI-2013.pdf.

authorized for export at the time of export.[39] LCE states that it would prefer to take title from BGLS at the point of export (*i.e.*, the flange between the Lake Charles Terminal and the offloading LNG tanker).[40] LCE requests this waiver to permit LCE to be the exporter under this arrangement.

LCE further asserts that, if DOE/FE does not waive the non-binding policy, LCE will use its export authorization to export LNG as agent for BGLS, in which case it states it will comply with the requirements set forth in ordering paragraphs J, K, and L of *Sabine Pass*, Order No. 2961, to the extent practicable.[41]

D. Source of Natural Gas

LCE anticipates that it will export natural gas available in the United States natural gas pipeline system. LCE further anticipates the source of natural gas supply for its proposed exports will include the Texas and Louisiana producing regions and the offshore producing regions in the Gulf of Mexico, but that the natural gas may be produced anywhere in the lower 48 states.[42] According to LCE, the lower 48 states are the world's most liquid natural gas market with an unparalleled transportation infrastructure.

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 (FERC Docket No.

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[39] *See* LCE Amendment at 1, *citing Dow Chem. Co.*, DOE/FE Order No. 2859, Order Granting Blanket Authorization to Export Liquefied Natural Gas (Oct. 5, 2010).
[40] *See id*. at 1; *see Dow Chem.*, DOE/FE Order No. 2859, at 7 (recognizing that export occurs when the LNG is delivered to the flange of the LNG export vessel).
[41] Contrary to the statement made by LCE, absent waiver of DOE/FE policy, LCE would not be authorized to export on behalf of others.
[42] Because there is no natural gas pipeline interconnection between Alaska and the lower 48 states, those LNG export markets generally are viewed as distinct. *See* 77 Fed. Reg. at 73,627 n.1.

PF12-8) 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.

Because Trunkline owns the Lake Charles Terminal, Trunkline's proposed modifications of the Terminal as part of the Liquefaction Project are subject to FERC's environmental review. As noted above, that review is ongoing. LCE therefore requests that DOE/FE issue a conditional order approving its export authorization pending satisfactory completion of the environmental review and approval of the Liquefaction Project. DOE/FE's regulations[43] and precedent[44] support such an approach, and we therefore find good cause for granting LCE'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 ordering that LCE's authorization is contingent on both Trunkline's satisfactory completion of the environmental review process and Trunkline's on-going compliance with any and all preventative and mitigative measures imposed at the Lake Charles Terminal by 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.

V. APPLICANT'S PUBLIC INTEREST ANALYSIS

LCE 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). LCE states that DOE/FE's public interest review focuses principally on the domestic need for natural gas

[43] 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").
[44] *See, e.g.*, *Sabine Pass*, Order No. 2961, at 40-41; *Freeport LNG*, Order No. 3282, at 120-21, 123 (Ordering Paragraph F).

proposed for export, as well as any other factors shown to be relevant to the public interest.[45] LCE summarizes its view that the proposed exports are not inconsistent with the public interest as follows:

> It is LCE's view that recoverable natural gas resources in the U.S. are abundant, cheap, and sufficient to meet demand for domestic consumption and LCE's proposed export over the long-term. It is also LCE's belief that exports will not cause a significant increase in domestic natural gas prices. Accordingly, this proposed export authorization will not have a detrimental impact on the domestic supply of natural gas and … is not inconsistent with the public interest.[46]

LCE specifically addresses the following six factors in detail: (i) domestic natural gas supplies and resource base; (ii) domestic natural gas demand; (iii) impact of the Liquefaction Project on U.S. natural gas market prices; (iv) benefits to the local, regional, and national economy; (v) balance of trade; and (vi) global environmental benefits.

A. Domestic Natural Gas Supplies and Resource Base

LCE states that recoverable natural gas resources in the United States are both abundant and sufficient to meet demand for domestic consumption and LCE's proposed exports.

First, LCE asserts that recent improvements in natural gas exploration and production technology have changed the outlook for the U.S. natural gas market. LCE states that improvements in horizontal drilling and hydraulic fracturing have combined to reduce the cost of producing natural gas from shale resources, making shale gas economically viable. According to LCE, production from shale resources has not only offset declines in conventional production, but led to a 20 percent increase in dry gas production between 2005 and 2010. In 2012, shale gas reached 23 percent of total production in the United States, with EIA projecting the share of shale gas production to double to 46 percent by 2035.

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[45] LCE App. at 7-8 (citing, *e.g.*, 1984 Policy Guidelines, 49 Fed. Reg. 6684).
[46] LCE App. at 8.

Second, LCE maintains that, as shale resources have become an increasingly viable source of production, expanded exploration and drilling activity have increased producers' knowledge of known shale reserves. LCE notes that domestic resource estimates have been revised progressively higher since 2008. As support for its position, LCE points to the fact that: (1) EIA's AEO 2011 Early Release Overview doubled EIA's estimate of the technically recoverable unproved shale gas resource and doubled its forecast for shale gas production in 2035, as compared to AEO 2010, and (2) EIA estimated in the AEO 2011 Early Release Overview that the technically recoverable natural gas resource base in the lower 48 states was 2,251 Trillion Cubic Feet (Tcf), nearly double EIA's 2005 estimate.

Finally, LCE predicts that assessments of the recoverable natural gas resource base in the United States will continue to be revised higher, and that uncertainty regarding the total volume of recoverable resources will decrease as technically recoverable resources become proved reserves.

B. Domestic Natural Gas Demand

LCE asserts that supplies of natural gas available in the United States far exceed domestic demand.[47] Citing data from the AEO 2011 Early Release Overview, LCE states that domestic natural gas demand was estimated to grow from 23.9 Tcf per year in 2010 to 26.5 Tcf per year in 2035. EIA further estimated that cumulative domestic gas consumption from 2011 through 2035 would be 629 Tcf. In addition to EIA's estimates, LCE points to IHS CERA Inc.'s estimates that cumulative domestic gas consumption over the same period would be 709 Tcf.[48]

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[47] LCE notes that DOE/FE has historically compared the total volume of natural gas reserves and recoverable reserves available to be produced during the proposed export period to total gas demand during the export period to determine whether there is a domestic need for the gas to be exported. LCE App. at 8 (citing *Phillips Alaska*, DOE/FE Order No. 1473, at 29, 40, 46).

[48] IHS CERA, *North American Gas Market Outlook Data Tables.* Table 7: US Lower-48 Gas Supply and Demand Balance, 2005-2035 (Mar. 2011).

Next, LCE observes that "[n]either the EIA demand projection nor the IHS CERA demand projection includes an estimate of LNG exports."[49] For this reason, LCE conducted its own analysis of LNG exports. LCE states that its proposed exports would increase natural gas demand by a maximum of 2 Bcf/d (0.730 Tcf per year) from 2015 through 2035. LCE recognizes, however, that the Sabine Pass and FLEX export applications were pending before DOE/FE at the time it filed its Application, and that other applicants were likely to seek non-FTA authorizations. LCE therefore estimated "not only the impact of LCE's proposed export but also the potential for LNG exports during the export period of 2015 through 2035."[50]

In describing its analysis, LCE identified the following parameters that it considered in establishing its two export cases—a base export case of 6 Bcf/d and a high (stress) export case of 12 Bcf/d—for the period 2015-2035:

- At the time LCE filed its Application, 12 LNG import terminals were in operation or under construction in the United States, with a total combined import capacity of 18 Bcf/d;

- Authorized expansions to the import capacity of these 12 facilities would bring the total import capacity in the United States to just over 21 Bcf/d;

- The emergence of shale gas as a viable, low-cost domestic gas supply makes it unlikely that any new LNG import terminals will be built in the United States;

- Construction of new, "greenfield" terminals for the purpose of exporting LNG is similarly unlikely because of the high costs of construction, relative to adding liquefaction capability to an existing terminal;

- Of the 12 then-existing import facilities, the offshore facilities cannot practically be converted to export use as a technical matter, and two facilities (at Everett, Massachusetts, and Elba Island, Georgia) are market area terminals that lack access to gas supply for liquefaction; and

- Some portion of the capacity at the remaining 10 import terminals will not be

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[49] LCE App. at 11.
[50] *Id*.

converted to export because these import projects are key components of foreign LNG producers' supply chains.

From these parameters, LCE assumes that, if the remaining available capacity of the import terminals is fully converted to exports, the total export capacity would be 12 Bcf/d (4.38 Tcf per year). LCE therefore established 12 Bcf/d as the high (stress) export case.

Recognizing that some of the existing import terminals are planning to develop as bi-directional facilities—thereby potentially reducing export capacity—LCE established 6 Bcf/d (2.19 Tcf per year) as its base export case. According to LCE, this base export case is represented by four anticipated export terminals in the Gulf of Mexico: Sabine Pass (2 Bcf/d), Freeport (1 Bcf/d),[51] Lake Charles (2 Bcf/d) and one other, undetermined facility (1 Bcf/d).

LCE states that the base export case of 6 Bcf/d from 2015 through 2035 is equivalent to increasing cumulative natural gas demand by 46 Tcf between 2011 and 2035. Likewise, LCE states that the high export case of 12 Bcf/d is equivalent to increasing cumulative demand by 92 Tcf between 2011 and 2035.

Using EIA's demand projections and LCE's base and high export cases, LCE calculated that the total cumulative demand for domestic natural gas would be as follows:

	Demand for Domestic Natural Gas 2011-2035
No Export Case	629 Tcf
Base Export Case	675 Tcf
High Export Case	721 Tcf

Further, LCE contends that EIA's current estimate of 2,251 Tcf of technically recoverable dry gas resources in the lower 48 states indicates that recoverable resources are more

[51] DOE/FE subsequently authorized Freeport to export the equivalent of 1.4 Bcf/d of natural gas, or 511 Bcf/yr. *See Freeport LNG*, DOE/FE Order No. 3282, at 122.

than adequate in the long run to meet domestic demand, as well as LNG exports as high as 12 Bcf/d. LCE states that the recoverable resource base of 2,251 Tcf is equivalent to:

- 94 years of supply based on 2010 consumption (23.9 Tcf per year);
- 85 years of supply based on EIA's projection of 2035 consumption (26.5 Tcf per year); and
- 73 years of supply based on EIA's projection of 2035 consumption, plus LCE's high export case of 12 Bcf/d (30.8 Tcf per year).

Based on these figures, LCE concludes that its proposed export volumes will not be needed to meet demand for natural gas in the United States.

C. Impact on U.S. Natural Gas Prices

LCE cites DOE's Policy Guidelines in stating that the markets, not the U.S. Government, should allocate resources, determine supply and demand, and set prices. LCE nevertheless maintains that its proposed exports, as well as the likely level of total LNG exports during the term of the proposed authorization, will not have a significant impact on domestic natural gas prices.

First, LCE states that the surge in shale gas production and recoverable resource estimates has driven down domestic natural gas prices. LCE contends that, as the amount of shale gas production increased significantly, spot prices at the Henry Hub fell from an average of $8.84 in 2008 to $4.38 in 2010.[52]

LCE notes that forecasts of future prices have also been falling. In AEO 2011, EIA

[52] LCE states that the downward price impact of depressed natural gas usage from 2008 to 2009 (attributed to the 2009 recession) compounded by a 0.7 Bcf/d increase in domestic production caused an oversupply in the market that, in turn, caused prices to fall low enough to stimulate additional demand. LCE states that this pattern continued into 2010 and 2011 due to continued growth in domestic production, even as demand exceeded pre-recession levels. *See* LCE App. at 14 n.28.

lowered its 2011-2030 natural gas price forecast by roughly 30% relative to AEO 2009.[53] LCE quotes EIA in stating that higher estimates of domestic shale gas reserves support increased levels of natural gas production at lower prices.

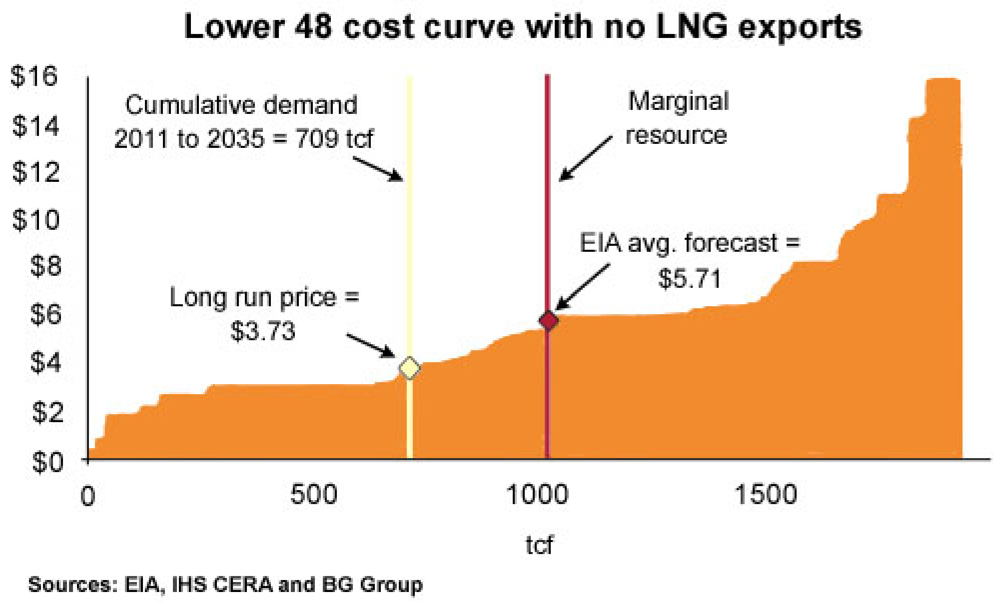
Second, to understand the impact of LNG exports on future long-term gas prices, LCE "analyzed internal and external assessments of recoverable resource potential and production costs by natural gas play."[54] LCE states that, in its analysis, producers are assumed to satisfy cumulative demand from 2011 through 2035 by monetizing resources in order from the lowest cost resource to the highest. LCE assumed that the highest cost of supply needed to meet cumulative demand would set the long-run marginal price. With this approach, LCE states that it was able to identify the "additional resources that must be produced to meet added supply delivered to LNG export terminals and the additional cost needed to produce that gas."[55]

LCE constructed a long-run cost curve using estimates of Henry Hub equivalent breakeven production costs (*i.e.*, adjusted for the cost of transportation to Henry Hub) and volumes of U.S. recoverable resources by play. LCE incorporated data from IHS CERA, Advanced Resources International, Inc, and BG North America's (BGNA) internal analysis. According to LCE, the combined dataset defines 197 plays, totaling roughly 1,950 Tcf. LCE states that this estimate is lower than EIA's 2011 estimate of 2,251 Tcf of recoverable resources in the lower 48 states.

LCE asserts that, assuming the cheapest resources will be produced first, its resource cost curve can be used to analyze prices for a given level of demand over the long-run. LCE's chart entitled "Lower 48 cost curve with no LNG exports" is displayed below, in which the horizontal

[53] EIA, AEO 2011, Executive Summary.
[54] LCE App. at 15.
[55] *Id*. at 15-16.

axis illustrates the volume considered economic to produce for a given Henry Hub equivalent breakeven price (depicted on the vertical axis). LCE states that, for example, more than 1,500 Tcf of natural gas can be produced at prices of approximately $6.50 in the long run.

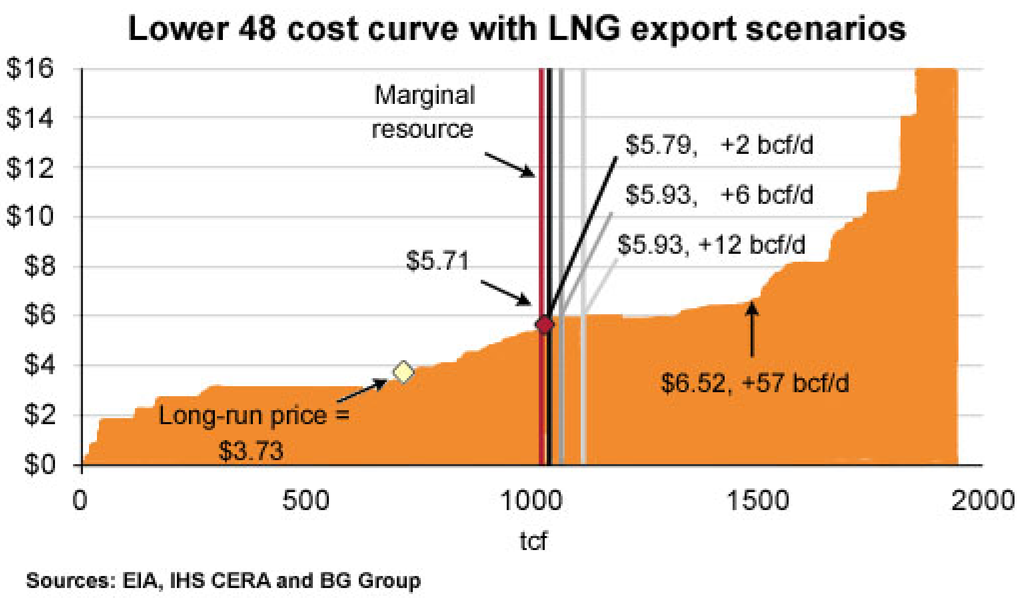


LCE took note of IHS CERA's long-term demand forecast published in March 2011, which projected cumulative U.S. natural gas consumption to total 709 Tcf between 2011 and 2035. LCE's cost curve predicts that 709 Tcf can be produced at a long-run marginal cost of $3.73.

LCE acknowledges, however, that short-term restraints act to restrict the rate at which resources can be developed and produced, preventing the lowest cost resources from being exploited in sequence. LCE states that producers instead monetize a portfolio of resources over time by producing a portion of the lowest cost resource in various plays each year. LCE asserts that this temporal inefficiency has the effect of shrinking the short-term supply curve, causing average annual prices that are higher than the long-run marginal cost of supply. To account for this constraint, LCE used EIA's 2011 average price forecast of $5.71 for the years 2011-2035 to identify the marginal resource that, it states, corresponds to roughly 1000 Tcf of natural gas on

LCE's supply curve.

LCE used the marginal resource implied by EIA's long-run average price estimate to identify the impact on domestic prices from the additional resources that LCE contends must be developed to supply LNG exports. LCE created the chart below to represent the "Lower 48 cost curve with LNG export scenarios":



Using the marginal resource implied by EIA's long-run average price, LCE draws the following conclusions:

- Assuming the Lake Charles Terminal is the only facility exporting LNG with an average sendout of 2 Bcf/d from 2015-2035, the additional 15 Tcf of dry gas that would need to be produced would cause domestic prices to increase to an average of $5.79, an $0.08 increase of slightly more than one percent;

- Under the 6 Bcf/d base export case, production of natural gas would need to increase by 46 Tcf, bringing the marginal price to $5.93—a $0.22 increase of just under four percent; and

- Because the supply curve is "very flat" in the range of 6 Bcf/d, moving from the 6 Bcf/d base export case to the 12 Bcf/d high export case would have "no additional impact on prices."[56]

LCE asserts that even the estimated long-run price of $5.93 in the high export case is low relative to historical prices, which reached an annual average of $8.87 in 2005 before falling to $4.38 in 2010. LCE further asserts that this comparison highlights the structural change in production technology and the cost of domestic natural gas production. In particular, LCE states that the significantly lower cost of supply and higher assessment of technically recoverable resources in the lower 48 states have combined to create a flat cost of supply curve, in which only a small change in price is required to incentivize a large increase in domestic production. Thus, LCE asserts, "the impact of increasing domestic demand or LNG exports [will have] only a limited impact on domestic prices."[57]

LCE acknowledges that the risk to domestic consumers lies with the assessment of resource volumes and the relative cost among plays. LCE notes, however, that it has taken a conservative approach by using a smaller recoverable resource base than EIA's assessment and by relying predominately on supply cost data from IHS CERA, Inc. (an independent third-party) for shale resources, which represent the bulk of supply in the range of current demand forecasts (including LNG export scenarios). LCE notes that its analysis is also conservative because it does not take into account the development of new shale plays in Canada or imports of natural gas from Canada, which have comprised a significant portion of U.S. supply.

Finally, LCE contends that the availability of drilling rigs and crews required to produce unconventional gas will not constrain production. LCE maintains that the long planning horizon for LNG exports leaves ample time to develop shale gas take-away and needed long-haul capacity.

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[56] LCE App. at 18.
[57] *Id*.

D. Benefits to Local, Regional, and National Economy

LCE states that the requested authorization will allow natural gas that might otherwise be "shut-in" to be sold into the global LNG market, spurring the development of new natural gas resources that might not otherwise make their way to market. Accordingly, LCE asserts that the requested authorization will provide a much needed boost to local, regional, and national economies through resource development, an enhanced tax base, job creation, and increased overall economic activity. LCE further contends that an expansion in available markets for natural gas supplies will create additional employment opportunities, leading to a ripple effect throughout the economy.

LCE states that the modifications required to make the Lake Charles Terminal capable of exporting LNG will directly benefit the local economy by supporting construction and engineering jobs. LCE states that:

- The manufacturing and supply of the required equipment and materials for the project will result in an investment of approximately $600 million per LNG train (with three liquefaction trains proposed),[58] most of which will be sourced from the United States;
- The Liquefaction Project will require approximately 4.5 million construction man hours per train, generating wages of approximately $120 million;
- The Liquefaction Project will require approximately 200 supervisors and managerial staff to oversee the construction of each train, adding approximately $140 million in wages; and
- Completion of engineering work for the Liquefaction Project will support approximately 150 jobs, creating an additional $100 million in wages for each train.

E. Benefits of International Trade

LCE asserts that granting the requested authorization will positively impact the U.S.

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[58] *See* Trunkline Supp. NOI, at 2.

balance of trade. LCE states that, assuming exports of 2 Bcf/d at EIA's projected gas price of $5.71, the Liquefaction Project will make a positive impact on the U.S. balance of trade by more than $4 billion per year.

LCE asserts that the requested authorization is consistent with the National Export Initiative (NEI), created by Executive Order in March 2010.[59] According to LCE, exporting natural gas that is not needed in the United States will promote the NEI's pro-export and job growth policies. LCE states that the export of LNG is consistent with the NEI's aims—in particular, improving economic trade and ties between the United States and the destination countries, which may include key industrialized nations in Europe and Asia and developing nations in Asia, South America, the Middle East, and the Caribbean.

F. Global Environmental Benefits

LCE contends that, because natural gas burns cleaner than other fossil fuels, LNG exports can have significant environmental benefits. LCE 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. LCE further states that an increased supply of natural gas made possible through LNG export can help countries break their dependence on less environmentally friendly fuels.

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

A. Overview

In response to the Notice of Application, DOE/FE received 15 comments in support of the Application. Comments in support were submitted by Dan Morrish, Senator for the State of

[59] National Export Initiative, Exec. Order No. 13,534, 75 Fed. Reg. 12,433 (Mar. 16, 2010) [hereinafter NEI].

Louisiana with eight other Representatives and Senators for the State of Louisiana;[60] Robert Adley, Senator for the State of Louisiana; Mary L. Landrieu, United States Senator from the State of Louisiana; Mike Michot, Senator for the State of Louisiana; Henry L. Burns, Representative for the State of Louisiana; Bill Cooper, President of the Center for Liquefied Natural Gas; Sherri Smith Cheek, Senator for the State of Louisiana; Richard Buford, Representative for the State of Louisiana; Jane H. Smith, Representative for the State of Louisiana; James L. Keffer, Representative for the State of Texas; Randy Roach, Mayor of the City of Lake Charles, Louisiana; John Fleming, United States Representative from the State of Louisiana; Stephen F. Smith, President of EXCO Resources, Inc.; Charles W. Boustany, Jr., United States Representative from the State of Louisiana; and the Lake Charles Harbor & Terminal District.

The Industrial Energy Consumers of America (IECA) submitted a comment in opposition and the American Public Gas Association (APGA) filed a timely motion to intervene and protest.

B. Comments in Support of the Application

The non-intervener comments submitted in support of LCE's application largely focus on benefits that the commenters anticipate from a grant of the requested authorization. For example, Louisiana State Senator Dan Morrish, in a comment joined by eight other members of the Louisiana State Legislature, states that LCE's proposed Liquefaction Project is in the public interest because, among other reasons, it will boost Louisiana's local and regional economy through resource development, an enhanced tax base, direct and indirect job creation, and increased overall economic activity. Senator Morrish further states that the project will have a

[60] In addition to Senator Morrish, the comment was signed by Senator Willie Mount, Senator John Smith, Representative Mike Danahay, Representative A. B. Franklin, Representative Brett Geyman, Representative John E. Guinn, Representative Bob Hensgens, and Representative Chuck Kleckley.

ripple effect throughout the regional economy by creating additional employment opportunities from increased markets for shale gas.

Many of the commenters—including U.S Representative John Fleming; Louisiana State Senators Dan Morrish, Robert Adley, and Sherri Smith Cheek; Louisiana State Representatives Mike Michot, Henry L. Burnes, Richard Burford, and Jane H. Smith; Mayor of Lake Charles Randy Roach; and the Lake Charles Harbor & Terminal District—note that LCE's parent companies, BG and SUG, have been longstanding members of the business community in Louisiana and have regularly invested in the Lake Charles community and terminal. They further state that BG has created additional employment and economic investment in Louisiana by significantly investing in shale gas production and exploration within the state.

United States Senator Mary L. Landrieu writes in support of LCE's application, noting that the project will result in investment of $1.5 to $2.0 billion per train. Senator Landrieu states that the project will generate many millions of dollars in wages (including hundreds of millions of dollars associated with construction jobs alone), and that, once complete, the facility will provide 60 to 80 permanent jobs per train. She emphasizes that the project will reduce the U.S. balance of payments by about $4 billion annually. U.S. Representative Charles W. Boustany, Jr., likewise submits comments stressing these direct and indirect economic benefits.

Bill Cooper, President of the Center for Liquefied Natural Gas, writes in support of LCE's requested authorization, asserting that the recent discovery and development of additional natural gas resources in the United States will allow for LNG exports from the United States depending upon market conditions, without adversely affect the domestic need for natural gas. According to Mr. Cooper, the requested authorization will help maintain the

United States' competitive opportunities in energy production and trade, as well as provide for significant investments in the area where LCE's proposed project will be located.

Louisiana State Senator Sherri Smith Cheek maintains that allowing LNG exports will assure price stability to natural gas markets for Louisiana and the United States by putting domestically produced natural gas into the international marketplace. According to Senator Cheek, allowing LNG exports is consistent with DOE's stated policy of promoting competition in the marketplace by allowing commercial parties to freely negotiate their own trade arrangements. Stephen F. Smith, the president of EXCO Resources, Inc. (a producer of natural gas in Louisiana and Texas), similarly comments that LCE's proposed project will help to stabilize the natural gas market, in addition to providing other benefits.

Representative James L. Keffer of the Texas House of Representatives comments that LCE's requested authorization will provide benefits beyond the State of Louisiana. In particular, Mr. Keffer states that the project will benefit Texas exploration and production companies by providing additional markets for the abundant natural gas produced in Texas. According to Mr. Keffer, both of LCE's parent companies are significant employers in Texas, with BG having its global LNG headquarters in Houston and SUG having a presence in Texas since 1929. In his view, LCE's project will generate engineering and management jobs that will benefit Texas, and will support long-term employment at both BG and SUG in Texas.

Finally, the City of Lake Charles, Louisiana, passed a resolution dated August 3, 2011, that is appended to the comment of Mayor Roach. The City expressed support for LCE's Application, emphasizing the direct and indirect jobs that will be associated with the project during its different phases of development, construction, and operation.

The other non-intervener comments largely restate claims contained in the comments summarized above and in LCE's Application addressing the potential benefits that allegedly would follow upon a grant of the Application.

C. Comment of IECA in Opposition to the Application

IECA urges DOE/FE to deny the requested authorization. IECA states that it is a nonpartisan association of leading manufacturing companies with more than 750,000 employees nationwide. Its purpose is to promote the interests of manufacturing companies for which the availability of energy, power, or feedstock play a significant role in their ability to compete in domestic and world markets.

IECA first contends that exporting natural gas will drive up both domestic demand for natural gas and domestic prices for the manufacturing sector and the public:

> Exporting natural gas will result in higher costs to heat and cool homes, run factories and produce electricity than what it would cost without natural gas exports. Exporting natural gas provides minuscule temporary job creation while potentially threatening [the] competitiveness of manufacturing facilities that employ over 10 million people ….[61]

Specifically, IECA asserts that a ten cent increase in the price of natural gas will increase consumer costs by almost $2.5 billion per year. IECA also states that it is not in the public interest for the federal government to spend $4.5 billion of scarce federal dollars to lower the cost of energy to families as part of the Low Income Home Energy Assistance Program (LIHEAP) program, while at the same time supporting the export of LNG that will increase the relative price of natural gas and electricity. Citing the example of manufacturers who rely on natural gas for feedstock and fuel, IECA asserts that, when natural gas prices rise, so too will the cost of plastic and fertilizer for every American consumer and farmer.

[61] Comment of the Industrial Energy Consumers of America (Aug. 12, 2011), at 1.

IECA argues that, even without the impact of increased demand from LNG exports, the domestic prices of natural gas will increase by almost $18 billion per year. IECA points to natural gas futures prices on the Chicago Mercantile Exchange where, in August 2011, the September 2011 Henry Hub contracts traded at $4.00 per MM Btu, whereas the December 2015 price traded at $5.765 per MM Btu—an increase of 44 percent. IECA states that U.S. demand for natural gas increased by 3.4 percent between 2000 and 2010, and that the expected export capacity at the Lake Charles Terminal would comprise roughly 3 percent of current U.S. demand (approximately 0.73 trillion cubic feet per year (Tcf/yr)). IECA thus argues that "the LCE terminal is a new significant demand by itself," which—"coupled with the two other export terminals that have already been approved"—will "drive up relative [natural gas] prices."[62]

IECA next criticizes LCE's reliance on EIA's natural gas supply, demand, and price forecasts. According to IECA, "EIA cannot incorporate proposed regulations or legislation that could have a dramatic impact on supply, demand and price."[63] IECA specifically asserts that EIA's forecasts do not account for proposed Clean Air Act regulations, which it states will create significant new demand for natural gas. IECA cites an estimate by an APGA study in 2011 indicating that approximately 40 gigawatts of coal-fired power capacity will be shut down and replaced with natural gas-fired generation that could increase demand by 1.9 Tcf/yr, the equivalent of about 8 percent of current U.S. demand.

More broadly, IECA contends that:

- EIA forecasts do not account for DOE/FE's recent approval of natural gas export facilities, nor the increased demand that could result if additional LNG export facilities are approved—meaning that EIA's forecasts underestimate demand and price;

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[62] *Id*.
[63] *Id*. at 2.

- EIA forecasts do not account for potential regulations imposed by states or the federal government that may limit or halt the practice of hydraulic fracturing or drilling in particular regions, or increase the cost—meaning that, not only are EIA supply forecasts likely too generous, but EIA price forecasts are likely too low; and
- LCE relies on EIA forecasts as evidence that future potential recoverable reserves of shale gas are adequate for both domestic and export supply, but industry data shows that natural gas rig count is in a downward trend—placing LCE's adequacy of supply in question.

IECA also criticizes LCE for relying on EIA estimates, without providing an independent study from third party experts to prove that its estimates of abundant technically recoverable reserves will result in low relative natural gas prices. Finally, IECA charges that EIA's recent 10-year history of forecasting natural gas prices is very poor, with EIA failing to forecast any of the significant price increases.

IECA also characterizes LCE's claim that exporting natural gas will not impact relative prices as "not realistic" and as "def[ying] the laws of supply and demand."[64] IECA argues that, to the contrary, approving natural gas exports sets the stage for U.S. natural gas prices to be set globally at higher levels. According to IECA, the international LNG markets link the price of natural gas to crude oil, which will guarantee higher gas prices in the United States. IECA states that LCE's Application fails to address this issue of domestic versus international natural gas pricing.

IECA argues that LCE's data illustrates that higher natural gas prices (*e.g.*, increasing marginal costs of production) are necessary to justify new production of natural gas. According to IECA, the "net result is that exporting natural gas sends our lowest cost gas overseas and accelerates the point in time that lower price … natural gas is gone."[65] For this reason, IECA

[64] *Id*. at 3.
[65] *Id*.

contends that exporting natural gas is inconsistent with the public interest and, more specifically, with U.S. energy security and independence. IECA posits that the United States should be exporting the drilling technology to extract natural gas, not the natural gas itself.

IECA next asserts that the U.S. manufacturing sector, which contributes 11 percent or $1.6 trillion to the U.S. Gross Domestic Product, is heavily dependent on the price of energy, especially natural gas. IECA states that exporting natural gas will threaten the manufacturing renaissance taking place in the United States because exports will result in higher natural gas prices.

IECA further charges that LCE fails to address the impact of its marginal short-term increases in demand on the marginal price of natural gas, especially during peak demand periods (*i.e.*, during severe hot and cold temperatures). IECA states that, if LCE's requested authorization is granted, LCE's export volume of 0.73 Tcf/yr (which it states is roughly 3 percent of current U.S. demand) will not be available to U.S. consumers to keep prices from spiking during these high demand periods.

Finally, IECA asserts that LCE's export terminal will provide only minimal temporary job creation, while at the same time threatening both short-term and long-term job creation in the manufacturing sector. According to IECA, the higher relative natural gas prices that would result from natural gas exports would reduce the competitiveness of the manufacturing sector, thereby reducing U.S. exports and affecting the U.S. balance of trade. For all of these reasons, IECA states that it opposes LCE's Application.

D. APGA's Motion for Leave to Intervene and Protest

On August 10, 2011, APGA filed a motion to intervene and protest opposing LCE's

Application.[66] 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. APGA's position is that FLEX's Application is inconsistent with the public interest and should be denied.

APGA first notes that LCE's application is the third of its kind to be submitted to DOE/FE within a short time span, with more expected to follow. APGA argues that the quantity of domestic natural gas at issue in this and related proceedings is substantial, hence the significant policy implications of this Application for the United States. APGA charges that:

> LCE's proposal to export domestically produced LNG … versus exporting the technology to exploit world-wide supplies of shale gas, is inconsistent with the public interest because it will allow exporters to potentially undermine America's best opportunity to foster energy independence, ….[67]

Further, APGA contends that, if DOE/FE approves LCE's Application, the United States will be jeopardizing national security and increasing consumer prices on the basis of "problematic gas supply data."[68]

On the issue of energy independence, APGA asserts that the current availability of domestically produced natural gas has created "a previously unimaginable opportunity" for the United States to achieve energy independence.[69] APGA asserts that, instead of exporting domestic natural gas, the United States should maximize its use domestically 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 significantly

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[66] Motion for Leave to Intervene and Protest of the American Public Gas Association (Aug. 10, 2011) [hereinafter APGA Mot.]
[67] *Id*. at 5.
[68] *Id*.
[69] *Id*.

reduce U.S. dependence on foreign oil, enhance U.S. security and strategic interests, and reduce the U.S. trade deficit.

APGA further states that exporting natural gas could tie domestic natural gas prices to international markets that often have higher, less stable prices. APGA asserts that the current domestic natural gas market is competitive, liquid, and transparent because it benefits from the security and political stability in North America. By contrast, foreign gas markets are tied to the global oil market and are more susceptible to unstable regimes, cartels, and distant events. APGA argues that U.S. policymakers should preserve rather than undermine the stability of domestic commodity markets, while at the same time adopting policies that expand domestic demand.

APGA next asserts that exporting LNG would inflate demand and prices by forcing U.S. consumers to compete with end-users in other nations that must pay more for natural gas. According to APGA, a price increase in the domestic market would make natural gas less competitive in this country as a replacement fuel for less clean, higher carbon-content fuels. APGA takes issue with LCE's claim that a denial of its Application would be tantamount to government price manipulation, and that DOE/FE should approve LCE's application regardless of the impact of the proposed export on domestic prices. To the contrary, APGA argues that DOE/FE's public interest analysis should focus on the domestic need for natural gas and threats to domestic supply. APGA therefore encourages DOE/FE to pursue policies aimed at keeping U.S. gas prices stable, in line with domestic demand, and less susceptible to international events, which it claims DOE/FE may do by "preventing substantial exports" of domestic LNG.[70]

Moving to domestic supply, APGA cautions that there are a number of uncertainties

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[70] *Id*. at 8.

associated with future gas production—and, specifically, with LCE's proposition that recoverable natural gas resources in the United States are sufficiently abundant and cheap to meet demand for both domestic use and LCE's proposed exports. In particular, APGA argues that EIA's reports referenced by LCE contain warning signs concerning the ultimate size of the technically and economically recoverable shale gas resource base in the United States. APGA quotes EIA's statement that "'most shale gas wells are only a few years old, and their long-term productivity is untested.'"[71] APGA also highlights the investigation by the Securities and Exchange Commission into claims made by Marcellus Shale gas producers regarding their production volumes.

In addition to these technical issues, APGA highlights the environmental and safety concerns at both the state and national level concerning the technology associated with hydraulic fracturing. According to APGA, "While these concerns do not affect EIA's projections … they may not be ignored by DOE/FE in making policy decisions on applications that depend *entirely* for their viability on ample future natural gas from shale formations."[72] APGA states that the outcome of ongoing federal investigations of hydraulic fracturing will not be known for some time, and therefore it would be "a mistake of immense proportions" to draw policy conclusions based on the so-called "'shale gas revolution.'"[73]

APGA next points out that predictions concerning gas supply have not always proved out. According to APGA, miscalculations in the past concerning natural gas supplies, in the context of LNG imports, were made by LCE's corporate parents, BG and SUG. APGA also points to a recent decision by owners of a natural gas liquefaction facility in Alaska to terminate

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[71] *Id.* at 10 (quoting AEO 2011 at 37).
[72] APGA Mot. at 11.
[73] *Id*.

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 natural gas than projected, a grant of LCE's Application predicated on a domestic over-supply could exacerbate that domestic supply situation.

Addressing alternatives to exporting natural gas, APGA urges DOE/FE to "aggressively pursue" a policy that focuses on fostering energy independence in the shortest time possible by increasing the current and long-term availability of natural gas.[74] APGA makes several recommendations for U.S. policymakers, including urging them to foster the use of natural gas as a replacement transportation fuel for gasoline, for residential and commercial heating, and for power generation to decrease reliance on coal. APGA observes that an increased use of natural gas domestically, in lieu of oil imports, will benefit the U.S. economy by reducing the trade deficit. As a final policy recommendation, APGA states:

> The United States is at the forefront technologically of the development of shale gas reserves and should export its technology and expertise, instead of spending billions of dollars to build facilities … to export a commodity that should be abundant world-wide before the LNG export facilities can even be completed.[75]

APGA notes that the U.S. State Department is helping countries to identify and develop their unconventional natural gas resources thorough the Global Shale Gas Initiative.

Finally, APGA acknowledges that it made many of the same arguments in its protest to the Sabine Pass and FLEX LNG export applications, both of which DOE/FE has granted (conditionally, in the case of FLEX). As APGA notes, DOE/FE rejected many of the points made by APGA when it issued Order No. 2961, which granted Sabine Pass the authority to export LNG to non-FTA countries. As relevant to LCE's Application, APGA argues that "[t]he

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[74] *Id*. at 12.
[75] *Id*. at 14.

substantial evidence necessary to support the [LCE] application does not exist, and will not exist, if at all, until hearings and studies [into the environmental and safety consequences of shale gas production] by the responsible agencies have been concluded."[76] Further, APGA urges DOE/FE not to approve export applications "without adequate evidence that there is more than ample gas to address growing domestic needs."[77] APGA therefore "implores DOE/FE not to rely on the questionable findings in Order No. 2961 to justify granting [LCE's] application."[78]

E. LCE's Answer to APGA and IECA

In its answer to APGA's protest and IECA's comment,[79] LCE asserts that DOE/FE should reject APGA's and IECA's arguments for three principal reasons:

First, LCE contends that APGA and IECA fail to meet the standard set forth in NGA section 3(a), and, in particular, fail to overcome the statutory presumption favoring applications to export natural gas, as described by DOE/FE in Order No. 2961. LCE also points to the 1984 Policy Guidelines—which, according to LCE, "reject the level of 'federal control and involvement in energy markets' [that] APGA and IECA advocate …."[80]

Turning to the evidence presented in its Application, LCE argues that it cited U.S. government data, government studies, and publicly available third-party studies, and put forth a substantial analysis of the public interest factors weighing in favor of DOE/FE's approval of LCE's proposed exports. By contrast—and quoting DOE/FE's language in Order No. 2961 to suggest that it applies equally here—LCE states that APGA and IECA merely "'have alleged a variety of negative consequences to the public interest[] from a grant of the requested

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[76] APGA Mot. at 16.
[77] *Id*. at 16.
[78] *Id*. at 17.
[79] Answer of Lake Charles Exports, LLC to the Protest of the American Public Gas Association and the Comment of the Industrial Energy Consumers of America (Aug. 25, 2011) [hereinafter LCE Answer].
[80] *Id*. at 3-4 (quoting *Sabine Pass*, DOE/FE Order No. 2961, at 28).

authorization[].”[81] They “‘have not challenged [LCE’s] claims’ regarding the benefits of … authorization.”[82] According to LCE, APGA and IECA fail to support their arguments by factual studies or analyses, and do not show why DOE/FE should reverse course here from the grant of authority it provided to Sabine Pass in Order No. 2961.[83]

Second, LCE reiterates that DOE/FE rejected “a majority” of APGA’s and IECA’s arguments in *Sabine Pass*.[84] LCE asserts that, once again, APGA’s and IECA’s arguments do not “‘demonstrate[] that any potential negative impacts associated with a grant of the requested authorization are likely to outweigh the overall benefits.’”[85] For example, as to anticipated benefits to local, regional, and national economies, LCE counters that IECA’s charts offered in rebuttal, showing increases in natural gas prices from 1999 through 2007 in relation to other macroeconomic statistics, “prove nothing” with respect to harm to manufacturing associated with exporting LNG. LCE dismisses any suggestion of a “causal linkage” between these events, and states that “the only evidence in the record shows that LCE’s proposed exports will not have a material effect on natural gas prices.”[86] LCE further asserts that its estimate of the price impact of exports appears even less material in light of the significant swings in natural gas prices shown in the data submitted by IECA.

In rebutting arguments concerning LCE’s reliance on EIA data, LCE charges that IECA failed to quantify impacts that regulation and proposed legislation might have on natural gas supply or to provide evidence to contradict LCE’s analysis based on data from EIA, IHS CERA, and other sources. LCE points to the “relatively flat long-run cost curve for natural gas

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[81] *Id*. at 4 (quoting Order No. 2961 at 30).
[82] *Id*.
[83] *Id*. at 4 (quoting Order No. 2961 at 42).
[84] LCE Answer at 5.
[85] *Id*. at 6 (quoting Order No. 2961 at 30).
[86] *Id*. at 7.

production" in arguing that, even if IECA's arguments would shift total demand on the cost curve constructed by LCE, such a shift "likely would have little effect on natural gas prices," and would not undermine the curve itself.[87]

As to supplies of natural gas, LCE states that both APGA and IECA "attempt to undermine the natural gas supply data relied upon by LCE in its Application, but present no contrary studies or evidence regarding gas supply."[88] By contrast, LCE points out that it provided detailed analyses of projected natural gas supply and demand, including an analysis of the cumulative effect of LNG exports authorized or potentially authorized by DOE/FE. Moreover, LCE states that "APGA ignores DOE/FE's finding that sufficient evidence does exist regarding the supply of natural gas … [and] puts forth no contradictory evidence regarding gas supply."[89] LCE also reiterates that DOE/FE previously determined there is no "'present or future threat to energy security in relation to the adequacy of domestic natural gas supplies.'"[90]

Third, LCE contends that APGA ignores DOE/FE's findings in Order No. 2961, such as DOE/FE's finding that "sufficient evidence exists regarding the supply of natural gas [in the United States."[91] In LCE's view, APGA's argument—that the actual quantity of recoverable natural gas from shale gas reserves is unknown—"[would turn] the legal standard of NGA section 3(a) on its head and would place a high burden on LCE to prove that the extensive supply data … is completely accurate and thus LNG exports are in the public interest."[92] LCE stresses that the burden is on APGA and IECA to show the proposed exports are not in the public interest, which LCE argues they have failed to do. LCE also endorses DOE/FE's position in

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[87] *Id*. at 8.
[88] *Id*. at 7.
[89] LCE Answer at 9.
[90] *Id*. at 10 (quoting DOE/FE Order No. 2961 at 35).
[91] *Id*. at 12.
[92] *Id*.

Order No. 2961 that, despite any uncertainty concerning the domestic supply of natural gas, "gas supply data coupled with monitoring of future supply and demand is sufficient to ensure [that exporting LNG] is not inconsistent with the public interest."[93]

Finally, LCE disputes APGA's and IECA's contention that, instead of granting LCE's Application, DOE/FE should adopt a policy favoring domestic consumption of natural gas and/or the exportation of shale gas drilling technology. Describing this argument as failing "on both a theoretical and practical level," LCE states that such a position would amount to a new federal policy at odds with NGA section 3(a) and the 1984 Policy Guidelines. "It is not the role of DOE/FE … to restructure how energy resources are consumed in the United States or to advocate for specific technology exports."[94]

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

[93] *Id*.
[94] LCE Answer at 13.

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 ("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.[95] 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.[96]

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:

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[95] 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.

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

- 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;
- 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,[97] gross domestic product (GDP), aggregate consumption, aggregate investment, natural gas export revenues, sectoral output,[98] 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

[97] 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.

[98] 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.

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, 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.[99] 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

[99] 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.[100] 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

[100] 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.[101] 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

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[101] 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.[102] 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

[102] 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.[103] First, the GNGM model produced information

[103] 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:

- **<u>LNG exports would result in higher U.S. natural gas prices.</u>** 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.

- **<u>Macroeconomic impacts of LNG exports are positive in all cases.</u>** 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.[104] 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

[104] 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.

- **<u>Peak natural gas export levels (as specified by DOE/FE for the EIA study) and resulting price increases are not likely.</u>** 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."[105] 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."[106]

As explained in the Introduction, DOE/FE 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.[107]

A. Data Inputs and Estimates of Natural Gas Demand

1. Comments

Several commenters, including Sierra Club,[108] Dow Chemical Company (Dow), along with U.S. Representative Edward Markey, U.S. Senator Ron Wyden, Alcoa, Save Our Supplies,

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[105] 77 Fed. Reg. at 73,629.
[106] *Id.*
[107] *See, e.g., Public Citizen v. F.A.A.*, 988 F.2d 186, 197 (D.C. Cir. 1993).
[108] 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.[109] 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

[109] During the time of the comment period on the LNG Export Study, the AEO 2013 Early Release was the most current AEO available, and is therefore discussed in many of the comments. On May 2, 2013, after the comment period had closed, EIA issued its final AEO 2013 projections. *See* U.S. Energy Information Administration, *Annual Energy Outlook 2013 with Projections to 2040* (April 2013), *available at* http://www.eia.gov/forecasts/aeo/pdf/0383(2013).pdf [hereinafter AEO 2013]. Where appropriate, this Order uses the final projections from AEO 2013, which is the most current information available at this time.

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 LCE, Dominion Cove Point LNG, LP, 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, LCE 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. As stated above, EIA did not publish the final AEO 2013 projections until 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."[110] Requiring DOE to start over with new data "would lead to significant costs and potentially endless delays."[111] 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."[112]

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[110] *Theodore Roosevelt Conserv. P'ship v. Salazar*, 616 F.3d 497, 511 (D.C. Cir. 2010) (quotations and citations omitted) (alteration in original).
[111] *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).
[112] *Vermont Yankee Nuclear Power Corp. v. Natural Res. Def. Council*, 435 U.S. 519, 554-55 (1978).

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 or final projections, would 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.[113]

Further, using the final AEO 2013 Reference Case—now the most recent information available—Table 4 below illustrates that, although total natural gas consumption projected for 2035 increased by 6 Bcf/d between AEO 2011 and 2013 (from 72.7 to 78.7 Bcf/d), total domestic dry gas production increased by more than twice that amount—from 72.1 to 85.9 Bcf/d, an increase of 13.8 Bcf/d. In addition, 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 -0.5 Bcf/d in AEO 2011 to +7.0 Bcf/d in AEO 2013. Although the data used in Table 4 for "AEO 2013 Reference Case" refer to the final AEO 2013 projections, the data are unchanged from the AEO 2013 Early Release projections. As the table shows, the updated 2013

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

projections suggest domestic supply and demand conditions that are more favorable, not less favorable, to exports.

Table 4: Comparison of AEO Results

Projections for 2035	AEO 2011 Reference Case	AEO 2012 Reference Case	AEO 2013 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 Reference Case and domestic natural gas production growth that was less than the AEO 2013 Reference Case. 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.[114] 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 Reference Case projections would have altered the central conclusion of the LNG Export Study.

Further, as reflected in the comments submitted by LCE[115] and Secretary Abraham,[116] 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 that 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 authorized to FTA countries (as of the date of Dow's comment) shows that the LNG Export Study underestimated future demand for natural gas.[117] 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.[118] Indeed, while many of the FTA authorizations have

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[114] NERA study at 6.
[115] Reply Comments of Lake Charles Exports, LLC at 12-13.
[116] Reply Comments of Secretary Spencer Abraham at 8.
[117] As of the date of this Order, DOE/FE has authorized the export of 29.93 Bcf/d of natural gas to FTA countries.
[118] 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

been in place for several years, 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.[119] Therefore, we are not persuaded that the current FTA authorizations undermine 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.

Energy; *Natural Gas Imports and Exports Fourth Quarter Report 2012*, DOE/FE-0563, Office of Natural Gas Regulatory Activities, Office of Fossil Energy, U.S. Department of Energy; http://www.fe.doe.gov/programs/gasregulation/publications/LNG_2012_rev.pdf.

[119] *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). In addition, DOE/FE granted an application from Waller Marine to export 0.16 Bcf/d of natural gas to FTA countries. *Waller LNG Services, LLC d/b/a Waller Point LNG*, Order Granting Long-Term Multi-Contract Authorization to Export Liquefied Natural Gas by Vessel from the Proposed Waller Point LNG Terminal in Cameron Parish, Louisiana, to Free Trade Agreement Nations, FE Docket No. 12-152-LNG (Dec. 20, 2012). *Waller LNG Services, LLC d/b/a Waller Point LNG* has not yet submitted an application or otherwise notified DOE/FE concerning any request for export authorization to non-FTA countries.

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.[120] 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.[121] 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."[122] 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

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[120] NERA study at 6.
[121] *Id.*
[122] *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 ….[123]

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."[124]

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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[123] Initial Comments of Dow Chem. Co. at 27.
[124] *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.[125]

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.[126] 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 &

[125] *Id*. at 16-17.
[126] *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,[127] 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

[127] 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.[128]

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.

[128] 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.[129]

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

[129] *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 LCE, 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 negative and positive regional impacts potentially associated with LNG exports. 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. 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[130]—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, LCE has adduced evidence of the positive economic benefits that would accrue to the local and regional economies in and around Lake Charles, Louisiana, from construction and operation of the proposed Liquefaction Project. *See* Section V.D. LCE cites benefits including (but not limited to) direct and indirect job creation, an enhanced tax base, and an increase in overall economic activity.

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

Several commenters in the LCE proceeding, including the Center for Liquefied Natural Gas, discussed this issue and urged DOE/FE to authorize the Liquefaction Project in light of the substantial investments in the Lake Charles area that will be realized as a result of the Project. Numerous political leaders—including U.S. Senator Mary Landrieu, Louisiana Senator Dan Morrish and other members of the Louisiana Senate and House of Representatives, and City of Lake Charles Mayor Randy Roach—submitted letters emphasizing both the longtime presence of LCE's parent companies (BG and SUG) in the Lake Charles area, and the importance of the LCE project in creating temporary and permanent jobs, contributing significant financial investment, enhancing the tax base, and spurring resource development that will benefit the entire region. In addition, Mayor Roach's letter appended a resolution passed by the Lake Charles City Council expressing support for the LCE Application.

In its response to APGA's protest and IECA's opposition comment, LCE noted that neither APGA nor IECA contested LCE'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.[131] 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

[131] 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.

have a chilling impact on investment in the manufacturing sector.[132]

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 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.

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

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 LCE's requested authorization. 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 above, the Reference Case projection of dry natural gas production in 2035 increased significantly (by 13.8 Bcf/d) in AEO 2013 compared with AEO 2011, while projections of domestic natural gas consumption in 2035 also increased in AEO 2013 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. Further, as Table 4 shows, the AEO 2013 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[133]

	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). Technically recoverable resources have also increased significantly. Technically recoverable resources are resources in accumulations producible using current recovery technology but without reference to economic profitability. They include both proved and unproved reserves.[134] LCE states that, in the AEO 2011 Early Release Overview, EIA doubled its estimate of the technically recoverable unproved shale gas resource as compared to AEO 2010. Citing EIA's data, LCE states that the technically recoverable natural gas resource base in the lower 48 states is approximately 2,251 Tcf, nearly double EIA's 2005 estimate.

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[133] 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).

[134] Unproved resources are generally less well known and therefore less precisely quantifiable than proved reserves, and their eventual recovery is less assured.

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 2,335 Tcf in AEO 2013.[135] 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 AEO 2013.

b. Supply Impacts

While the AEO 2011 TRR estimates were higher than the AEO 2013 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 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

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[135] *See* U.S. Energy Information Administration, *Assumptions to the Annual Energy Outlook 2013* (May 2013), Table 9.2. Technically recoverable U.S. natural gas resources as of January 1, 2011, at 121, *available at*: http://www.eia.gov/forecasts/aeo/assumptions/pdf/0554(2013).pdf.

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.[136] 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

[136] NERA study at 110.

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.[137]

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.

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

[137] *Id.* at 25.

country will cease purchases of U.S.-sourced LNG if the country gains access to less expensive supplies. These commenters 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 LCE 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.[138] 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.

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

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 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.[139] 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.

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

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. 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.[140]

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

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

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.[141]

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.[142]

[141] NERA study at 6-7.
[142] *Id.* at 211.

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, LCE 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 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.[143]

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.

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

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.

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."[144] 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."[145] We find this to be a reasonable simplifying assumption and note further that even imperfectly competitive markets are not static. The arrival

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[144] NERA study at 34.
[145] *Id*. at 34-35.

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 publicly available literature, including the International Group of LNG Importers 2010 LNG Industry report and other sources referenced in the NERA study.[146]

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,[147] do not furnish a reliable basis for drawing inferences regarding

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[146] *Id.* at 84-90.
[147] 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

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.[148] 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.

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,[149] 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:

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/.

[148] NERA study at 87.

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

- 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

As explained herein, the authorization granted by this Order is conditioned (among other things) on the satisfactory completion of the environmental review of Trunkline's proposed modifications to the Lake Charles Terminal under NEPA in FERC Docket No. PF12-8 and on issuance by DOE/FE of a record of decision pursuant to NEPA.[150]

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.

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

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.

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, LCE 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 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."[151] 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.

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

[151] Reply Comments of Sierra Club at 20.

Management and Budget's (OMB) guidance entitled, "Final Information Quality Bulletin for Peer Review" (OMB Bulletin).[152] 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 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."[153] "Scientific information" does not include opinions where the presentation makes it clear the information is "opinion rather than fact or the agency's views."[154] Further, the OMB Bulletin, while applicable to rulemakings, provides that "official disseminations that arise in adjudications and permit proceedings" are

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[152] Final Information Quality Bulletin for Peer Review, 70 Fed. Reg. 2664 (Jan. 14, 2005).
[153] *Id*. at 2675.
[154] *Id*.

exempt from peer review, unless "the agency determines that peer review is practical and appropriate …."[155]

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 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."[156] 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.[157]

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

[155] *Id*. at 2677.
[156] EIA study at ii.
[157] *See, e.g.*, NERA study at 25-26.

and pointed out alleged "problems and omissions" in NERA's analysis.[158] 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.[159]

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 recognized that its ultimate decision on the pending export applications would benefit from a public exchange of judgments and expert opinions.[160] 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

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[158] Synapse Energy Economics, Inc., *Will LNG Exports Benefit the United States Economy?* (Jan. 23, 2013), at 1, submitted with Initial Comments of Sierra Club.
[159] *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.
[160] *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.")

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 to solicit additional public comment. Commenter Mary Altmann argues that DOE/FE should invite public comment on individual 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 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, LCE's Notice of Application, published in the Federal Register on June 13, 2011, contained a detailed description of LCE's Application and Amendment, and invited the public to submit protests, motions to intervene, notices of intervention, and comments.[161] As required by DOE regulations, similar notices of application

[161] 76 Fed. Reg. at 34,212-15.

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.[162] 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.[163] DOE/FE thus has taken appropriate 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,[164] 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. LCE's Application

In its Application, LCE introduced evidence projecting a future supply of domestic natural gas sufficient to support both the proposed export authorization and domestic natural gas demand. Neither APGA nor IECA submitted contrary evidence.

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[162] 77 Fed. Reg. at 73,627.
[163] *Id*. at 73,628.
[164] *See, e.g.*, *Process Gas Consumers v. FERC*, 930 F.2d 926, 929 (D.C. Cir. 1991).

The Application (and commenters supporting the Liquefaction Project) discussed the significant local and regional economic benefits expected from the Liquefaction Project in terms of employment, wages, and economic investment. LCE also discussed the beneficial impact of LNG exports on the U.S. balance of trade.

LCE presented its own analysis of the projected impact of LNG exports on U.S. prices of natural gas. From that analysis, LCE concluded that exports of LNG will have "only a limited"—*i.e.*, "not … material"—impact on the domestic market price for natural gas through 2035.[165] To support this conclusion, LCE explained that, "[b]ecause the supply curve is very flat in this range [of 6 to 12 Bcf/d of natural gas exports], moving from the 6 bcf/d base export case to the 12 bcf/d high LNG export case has no additional impact on prices."[166] As discussed above, NERA similarly concluded that natural gas price changes attributable to LNG exports remain in a relatively narrow range across the range of scenarios studied. NERA, however, determined that LNG exports would result in higher U.S. natural gas prices. Both NERA and EIA models reflect supply cost curves in which natural gas prices increase with increased production. Specifically, NERA's analysis indicates that, after five years of increasing LNG exports, wellhead natural gas price increases could range from $0.22 to $1.11 (2010$/Mcf) due to market-determined levels of exports. Therefore, DOE/FE does not agree with LCE's conclusion that there would be no additional impact on natural gas prices with LNG exports equivalent to 6 Bcf/d to 12/ Bcf/d of natural gas. However, even with NERA's estimated price increase, NERA found that the United States would experience net economic benefits from increased LNG exports in all cases studied. *See infra* Section VII.B.1, 8.

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[165] LCE App. at 20; *see also id*. at 18.
[166] *Id*. at 18.

We note that neither APGA (the only protestor in the proceeding) nor IECA (the only commenter opposing the Application) challenged the expected economic and non-economic benefits cited by LCE, or LCE's price analysis. Further, APGA's protest was not supported by any significant analysis and, to the extent the arguments raised in APGA's protest or IECA's comment constituted substantial evidence, that material did not identify meaningful errors or omissions in LCE's Application. Accordingly, we find that no party to this proceeding submitted evidence sufficient to rebut the statutory presumption that LCE's proposed export of LNG 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 support for conditionally granting LCE's Application. 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 exports will 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."[167]

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

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

More generally, DOE/FE continues to subscribe to the principle set forth in our 1984 Policy Guidelines that, under most circumstances, the market is the most efficient means of allocating natural gas supplies.[168] 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.[169] 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 LCE's export of LNG to non-FTA countries will be inconsistent with the public interest. For that reason we are authorizing LCE's proposed exports to non-FTA countries subject to the conditions described in this order.

We have also considered the cumulative impacts of existing authorizations in our decision. In this case, we do not find that opponents of the Application have overcome the statutory presumption that the proposed export authorization is consistent with the public interest. By granting LCE's Application, DOE/FE will have cumulatively authorized non-FTA exports totaling 5.6 Bcf/d of natural gas, or 2.044 Tcf/yr, for the three final or conditional authorizations granted to date—Sabine Pass (2.2 Bcf/d), Freeport (1.4 Bcf/d), and LCE (2.0

[168] 49 Fed. Reg. at 6684.

[169] 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*).

Bcf/d). We note that, although this total export volume is not insignificant, it remains below the 6 Bcf/d volume of natural gas case evaluated by NERA in its "low" export cases.[170]

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

[170] *See supra* Section VII.B.3. NERA's three "low" cases—"Low/Slow," "Low/Rapid," and "Low/Slowest"—were set at 6 Bcf/d of natural gas, with each having different rates for the phase-in of new exports. NERA Study at 26.

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 LCE. 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.[171] 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. Because we are acting only on the application before us and make no decisions regarding future cases, comments relating to the total volume of LNG exports ultimately authorized or the timing or sequencing of possible future authorizations need not be decided in this proceeding.

X. TERMS AND CONDITIONS

To ensure that the authorization issued by this Order is not inconsistent 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. LCE must abide by each term and condition or face rescission of its authorization or other appropriate sanction.

A. Term of the Authorization

LCE 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

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[171] 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.

beginning from the date of first export,[172] 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 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. It is also consistent with the 20-year term authorized by DOE/FE in the two non-FTA export authorizations issued to date—Sabine Pass's final authorization and FLEX's conditional authorization.[173]

B. Commencement of Operations Within Seven Years

LCE requested this conditional authorization to commence on the earlier of the date of first export or 10 years from the date of the issuance of this Order. However, DOE/FE will require as a condition of the authorization that LCE 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. This provision is also consistent with the seven-year condition imposed by DOE/FE in FLEX's conditional authorization.[174]

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

[172] NERA study at 5, 7 n.6 ("Results are reported in 5-year intervals starting in 2015," with projections made "over the … time horizon from 2105 to 2035."); *see also id.* at 5 (noting that "[t]hese calendar years should not be interpreted literally but represent intervals after exports begin.")
[173] *Sabine Pass*, DOE/FE Order No. 2961-A, at 29; *Freeport LNG*, DOE/FE Order No. 3282, at 122.
[174] *Freeport LNG*, DOE/FE Order No. 3282, at 122.

authorization by the Assistant Secretary for Fossil Energy.[175] 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 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, LCE requests authorization to export LNG on its own behalf or as agent for BGLS. DOE/FE previously addressed the issue of agency rights in Order No. 2913,[176] 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. DOE/FE found that this proposal was an acceptable alternative to the non-

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[175] 10 C.F.R. § 590.405.

[176] *Freeport LNG Expansion, L.P. and FLNG Liquefaction, LLC*, DOE/FE Order No. 2913, Order Granting Long-Term Authorization to Export Liquefied Natural Gas from Freeport LNG Terminal to Free Trade Nations (Feb. 10, 2011).

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.[177] 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 procedures in *Gulf Coast LNG Export, LLC*.[178] In *Gulf Coast*, DOE/FE confirmed that, in LNG export orders in which Agency Rights have been granted, DOE/FE 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.[179]

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

In light of this action, DOE/FE denies LCE's request for a waiver of the non-binding policy set forth in *Dow Chemical*. DOE/FE finds that the above approach is an acceptable alternative to the requested waiver. Moreover, it is consistent with DOE/FE's actions in granting LCE's requested FTA authorization in Order No. 2987.[180]

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[177] *Dow Chem. Co.*, DOE/FE Order No. 2859, at 7-8, *discussed in Freeport LNG*, DOE/FE Order No. 2913, at 7-8.
[178] *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).
[179] *See id*. at 7-8.
[180] *See* LCE FTA Order, at 7-8 (denying waiver of non-binding policy adopted by DOE/FE in *Dow Chemical* where DOE/FE considered the registration proposal set forth in Order No. 2913 as an acceptable alternative for LCE's proposed arrangement with BGLS).

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."[181] 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.[182]

DOE/FE will require that LCE file with DOE/FE any relevant long-term commercial agreements, including LTAs, between LCE and a third party, including BGLS, once they have been executed. This includes filing any long-term contracts LCE enters into providing for the long-term export of LNG on its own behalf from the Lake Charles 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). 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 Lake Charles Terminal, a long-term sales contract involving natural gas or LNG stored or liquefied at the Lake Charles Terminal, or an agreement to provide export services from the Lake Charles Terminal. At this time, LCE has not yet provided DOE/FE with such a contract or agreement.

In addition, DOE/FE finds that section 590.202(c) of DOE/FE's regulations[183] requires that LCE file, or cause to be filed, all long-term contracts associated with the long-term supply of

[181] 10 C.F.R. § 590.202(b).
[182] *Id*. § 590.202(e).
[183] *Id*. § 590.202(c).

natural gas to the Lake Charles Terminal, whether signed by LCE or BGLS, within 30 days of their execution.

DOE/FE recognizes that some information in LCE's or BGLS's long-term commercial agreements associated with the export of LNG, and/or long-term contracts associated with the long-term supply of natural gas to the Lake Charles Terminal, may be commercially sensitive. DOE/FE therefore will provide LCE the option to file or cause to be filed either unredacted contracts, or in the alternative (A) LCE 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 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.

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 15 mtpa of LNG. Consistent with DOE's regulations, LCE states that this volume is equivalent to approximately 2 Bcf/d of natural gas.[184] DOE/FE typically authorizes LNG exports in Bcf and requires reporting of monthly

[184] *Id*. § 590.202(b)(1).

exports in Mcf.[185] DOE/FE maintains all natural gas and LNG import and export statistics for the United States, provides these data to EIA, and publishes official statistics. Accordingly, to allow for standardized reporting and compilation of national statistics, and to ensure DOE/FE can verify compliance with the authorized volumes, DOE/FE will authorize LCE's requested LNG exports in an annual quantity equivalent to natural gas volume of 2 Bcf/d, or 730 Bcf/yr, as set forth in LCE's Application.

G. Combined FTA and Non-FTA Export Authorization Volume

The Application requests long-term authorization to export LNG to both FTA and to non-FTA countries under NGA section 3(a). The source of LNG proposed for export for both export authorizations is from the same proposed facility, the capacity of which LCE stated in the Application is equivalent to approximately 2 Bcf/d (730 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 730 Bcf/yr of natural gas on both a standalone basis and also when combined with LCE's authorized FTA exports pursuant to DOE/FE Order No. 2987.

H. Environmental Review

As explained above, DOE/FE intends to complete its NEPA review as a cooperating agency in FERC's review of the Liquefaction Project. Because Trunkline owns the Lake Charles Terminal, Trunkline's proposed modifications of the Terminal as part of the Liquefaction Project are subject to FERC's environmental review. Accordingly, the authorization issued in this proceeding will be conditioned on Trunkline's satisfactory completion of the environmental review process.[186]

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[185] *See id*.
[186] 10 C.F.R. § 590.402 (authorizing DOE/FE to issue a conditional order prior to issuance of a final opinion and order).

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 DOE/FE'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 LCE's Application are responsible for doing so within the FERC proceedings. As explained in the *Sabine Pass* orders, 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.[187] 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 we further find that the Application should be granted subject to the terms and conditions set forth herein.

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[187] *Sabine Pass*, DOE/FE Order No. 2961, at 40-41; *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. 2961-A, and Dismissing Motion for a Stay Pendente Lite, at 4 (Jan. 25, 2013).

XII. ORDER

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

A. LCE is authorized to export domestically produced LNG by vessel from the Lake Charles Terminal in Lake Charles, Louisiana, up to the equivalent of 730 Bcf/yr of natural gas for a term of 20 years to commence on the date of first export. LCE is authorized to export this LNG on its own behalf or as agent for BGLS pursuant to one or more long-term contracts (a contract with a term greater than two years).

B. LCE 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 LCE's FTA authorization, set forth in DOE/FE Order No. 2987, is the equivalent of 730 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. LCE 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 Trunkline's satisfactory completion of the environmental review process under NEPA in FERC Docket No. PF12-8 (and the subsequent certificate proceeding docket) and on issuance by DOE/FE of a record of decision pursuant to NEPA. Additionally, the authorization is conditioned on Trunkline's on-going compliance with any and all preventative and mitigative measures at the Lake Charles Terminal imposed by federal or state agencies.

G. LCE shall file, or cause others to file, with the Office of Oil and Gas Global Security and Supply all executed long-term contracts associated with the long-term export of LNG on its own behalf or as agent for BGLS, from the Lake Charles Terminal. LCE shall file, or cause others to file, a non-redacted copy of each contract for public posting. Alternatively, LCE 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, LCE also shall file, or cause others to file, with the Office of Oil and Gas Global Security and Supply all executed long-term contracts associated with the long-term supply of natural gas to the Lakes Charles Terminal. LCE shall file, or cause others to file, a non-redacted copy of each contract for public posting. Alternatively, LCE 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, LCE shall show why the redacted or non-disclosed information should be exempted from public disclosure.

H. LCE or BGLS, for whom LCE 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 D of DOE Order No. 3324, issued August 7, 2013, in FE Docket No. 11-59-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 Lake Charles Exports, 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 Lake Charles Exports, LLC is made aware of all such actual destination countries."

I. LCE is permitted to use its authorization in order to export LNG on behalf of or as agent for BGLS, after registering BGLS with DOE/FE. Registration materials shall include an acknowledgement and agreement by BGLS to supply LCE with all information necessary to permit LCE to register BGLS with DOE/FE, including: (1) BGLS'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) BGLS's exact legal name, state/location of incorporation/registration, primary place of doing business, and ownership structure, including any parent entity; (3) the name, title, mailing address, e-mail address, and telephone number of a corporate officer or employee of BGLS 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 (G) 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, LCE shall ensure that all persons required by this Order to register with DOE/FE (e.g., BGLS) have done so. Any failure by LCE 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 Lakes Charles Terminal in Lake Charles, Louisiana, LCE shall provide written notification of the date that the first export of LNG authorized in Ordering Paragraph A above occurred.

M. LCE shall file with the Office of Oil and Gas Global Security and Supply, on a semi-annual basis, written reports describing the progress of the proposed Liquefaction 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 Project, the date the liquefaction 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, LCE must obtain the approval of the Assistant Secretary for Fossil Energy. For purposes of this Ordering Paragraph, a "change of control" shall include any change, directly or indirectly, of the power to direct the management or policies of LCE, 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, LCE shall file with the Office of Oil and Gas Global Security and Supply, 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 (or countries) of destination into which the exported LNG was actually delivered; (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 Oil and Gas Global Security and Supply, 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. Good cause having been shown, the late-filed comment submitted by the Lake Charles Harbor & Terminal District is accepted for filing.

Issued in Washington, D.C., August 7, 2013.

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