UNITED STATES OF AMERICA

DEPARTMENT OF ENERGY

OFFICE OF FOSSIL ENERGY

CAMERON LNG, LLC	)	FE DOCKET NO. 11-162-LNG

ORDER CONDITIONALLY GRANTING LONG-TERM MULTI-CONTRACT AUTHORIZATION TO EXPORT LIQUEFIED NATURAL GAS BY VESSEL FROM THE CAMERON LNG TERMINAL IN CAMERON PARISH, LOUISIANA, TO NON-FREE TRADE AGREEMENT NATIONS

DOE/FE ORDER NO. 3391

FEBRUARY 11, 2014

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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
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
FLEX	Freeport LNG Expansion, L.P. and FLNG Liquefaction, LLC
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GNGM	Global Natural Gas Model
ICF	ICF International
IECA	Industrial Energy Consumers of America
kWh	Kilowatt-Hour
LNG	Liquefied Natural Gas
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
Tcf/yr	Trillion Cubic Feet per Year
TRR	Technically Recoverable Resources
TSA	Terminal Service Agreement

I. INTRODUCTION

On December 21, 2011, Cameron LNG, LLC (Cameron) 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] Cameron seeks to export up to the equivalent of approximately 1.7 billion cubic feet of natural gas per day (Bcf/d), or approximately 12 million metric tons per annum (mtpa) of LNG, for a 20-year period.[4]

The proposed exports would originate from the existing Cameron LNG Terminal (Terminal), located in Hackberry (Cameron Parish), Louisiana. Cameron is requesting this authorization to export LNG on its own behalf or as an agent for other entities who hold title to LNG, after registering each such entity with DOE/FE. For the reasons discussed below, this Order conditionally authorizes Cameron to export LNG in a volume equivalent to 1.7 Bcf/d of natural gas, or 620 Bcf per year (Bcf/yr), for a 20-year term.

Cameron is a limited liability company organized under the laws of Delaware, with its executive offices located in San Diego, California. Cameron is a wholly-owned indirect subsidiary of Sempra Energy, a publicly-traded corporation.

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[1] Application of Cameron LNG, LLC for Long-Term Authorization to Export LNG to Non-Free Trade Agreement Countries, FE Docket No. 11-162-LNG (Dec. 21, 2011) [hereinafter Cameron App.]

[2] 15 U.S.C. § 717b. This authority is delegated to the Assistant Secretary for Fossil Energy pursuant to Redelegation Order No. 00-002.04F (July 11, 2013).

[3] Cameron previously 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 for trade in natural gas (FTA countries). DOE/FE granted that FTA authorization by order dated January 17, 2012. *See infra* Section IV.A.

[4] DOE regulations require applicants to provide requested export volumes in terms of Bcf of natural gas. 10 C.F.R. § 590.202(b)(1). Accordingly, as discussed below, DOE/FE will authorize Cameron's requested export in the equivalent of Bcf/yr of natural gas. *See infra* Sections X.F & XII.A.

Cameron owns the Cameron Terminal, which has an existing interconnection with Cameron Interstate Pipeline LLC (Cameron Interstate), an affiliate of Cameron. Cameron Interstate, an interstate pipeline regulated by the Federal Energy Regulatory Commission (FERC), runs 36.2 miles and connects the Terminal with five other interstate pipelines. Cameron is finalizing the design for natural gas processing and liquefaction facilities to receive and liquefy domestically produced natural gas at the Terminal for export to foreign markets (the Liquefaction Project). Cameron states that the Liquefaction Project will be integrated with existing facilities at the Terminal.

On February 23, 2012, DOE/FE published a Notice of Cameron's Application in the Federal Register.[5] The Notice of Application called on interested persons to submit protests, motions to intervene, notices of intervention, and comments by April 23, 2012. In response to the Notice of Application, DOE/FE received four comments in support of the Application. No comments were filed opposing the Application. DOE/FE also received two timely filed motions to intervene and protest – one motion and protest filed by American Public Gas Association (APGA) and one motion, protest, and comment filed by Sierra Club. Both motions opposed the requested authorization. Additional procedural history is set forth below in Section VII.

On May 20, 2011, approximately seven months before Cameron filed its Application, DOE/FE issued *Sabine Pass Liquefaction, LLC*, DOE/FE Order No. 2961 (*Sabine Pass*), the Department's first order conditionally granting a long-term authorization to export LNG produced in the lower-48 states to non-FTA countries.[6] In that order, DOE/FE conditionally

[5] Cameron LNG, LLC, Application to Export Domestic Liquefied Natural Gas to Non-Free Trade Agreement Nations, 77 Fed. Reg. 10,732 (Feb. 23, 2012) [hereinafter Notice of Application].
[6] *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).

authorized Sabine Pass to export a volume of LNG equivalent to 2.2 Bcf/d of natural gas. Shortly thereafter, in August 2011, DOE/FE determined that further study of the economic impacts of LNG exports was warranted to better inform its public interest review under section 3 of the NGA.[7] By that time, DOE/FE had conditionally granted the *Sabine Pass* order, and 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, Freeport or FLEX)[8] and one from Lake Charles Exports, LLC (Lake Charles Exports).[9] Together, the *Sabine Pass* conditional order, the Freeport application, and the Lake Charles application proposed LNG export authorizations totaling the equivalent of up to 5.6 Bcf/d of natural gas. DOE/FE expected that more non-FTA export applications would be filed imminently. Indeed, by the end of 2011, several more applications had been filed, including a second application by Freeport and the current Application filed by Cameron.[10]

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

[7] 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.

[8] On May 17, 2013, DOE/FE granted FLEX's first non-FTA export application, conditionally authorizing it 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 I*]. Subsequently, DOE/FE granted in part FLEX's second non-FTA export application, authorizing the export of LNG in a volume equivalent to 0.4 Bcf/d of natural gas. *See Freeport LNG Expansion, L.P., et al.*, DOE/FE Order No. 3357, 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 (Nov. 15, 2013) [hereinafter *Freeport II*].

[9] On August 7, 2013, DOE/FE conditionally authorized Lake Charles Exports to export domestically-produced LNG in a volume equivalent to 2.0 Bcf/d of natural gas for a period of 20 years. *See Lake Charles Exports, LLC*, DOE/FE Order No. 3324, 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 (Aug. 7, 2013) [hereinafter *Lake Charles Exports*].

[10] As of the date of this Order (and excluding Cameron's current Application), 25 applications for long-term export of LNG to non-FTA countries, in a volume of LNG equivalent to approximately 27.11 Bcf/d of natural gas, are pending before DOE/FE. The total volume of LNG at issue in the approved and pending non-FTA applications filed with DOE/FE to date is equivalent to approximately 35.58 Bcf/d of natural gas.

LNG exports.[11] 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.[12] 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.[13] 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. DOE published the NERA study, *Macroeconomic Impacts of LNG Exports from the United States*, in December 2012.[14]

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).[15] 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

[11] *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).
[12] 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*.
[13] *See* LNG Export Study – Related Documents, *available at* http://energy.gov/fe/downloads/lng-export-study-related-documents (EIA Analysis (Study - Part 1)).
[14] *See id*. (NERA Economic Consulting Analysis (Study - Part 2)).
[15] 77 Fed. Reg. at 73,627.

thereto.[16] The NOA required initial comments by January 24, 2013, and reply comments between January 25 and February 25, 2013.[17] DOE/FE received over 188,000 initial comments and over 2,700 reply comments, of which approximately 800 were unique.[18] 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 statements 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 proceeding.[19] As discussed below, DOE/FE has carefully examined the comments and has considered them in its review of Cameron's Application. Additional details about Cameron, the Liquefaction Project, and the requested export authorization are discussed in more detail below.

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 Cameron Application have not demonstrated that the requested authorization will be inconsistent with the public interest and finds that the exports proposed in this Application are likely to yield net economic benefits to the United States.

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[16] *Id*. at 73,628.
[17] *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.
[18] 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).
[19] *See* 77 Fed. Reg. at 73,629 & n.4.

DOE/FE further finds that Cameron's proposed exports should be conditionally authorized at a volumetric rate not to exceed the capacity of the facilities to be used in the proposed export operations and subject to satisfactory completion of environmental review and other terms and conditions discussed below.

III. PUBLIC INTEREST STANDARD

Section 3(a) of the NGA sets forth the standard for review of Cameron'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[20]] 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 the application overcome that presumption by making an affirmative showing of inconsistency with the public interest.[21]

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

[20] 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.

[21] *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)).

impacts, among others. To conduct this review, DOE/FE looks to record evidence developed in the application proceeding.[22]

DOE/FE's prior decisions have also looked to certain principles established in its 1984 Policy Guidelines.[23] 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.[24]

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.[25]

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

[22] *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); and *Lake Charles Exports*, DOE/FE Order No. 3324, at 121-27.
[23] New Policy Guidelines and Delegations Order Relating to Regulation of Imported Natural Gas, 49 Fed. Reg. 6684 (Feb. 22, 1984) [hereinafter 1984 Policy Guidelines].
[24] *Id*. at 6685.
[25] *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)).

particular case to be appropriate."[26] In February 1989, the Assistant Secretary for Fossil Energy assumed the delegated responsibilities of the Administrator of ERA.[27]

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

Cameron has applied for a long-term, multi-contract authorization to export up to the equivalent of 1.7 Bcf/d of natural gas (620 Bcf/yr), or approximately 12 mtpa of domestically produced LNG by vessel from the Cameron LNG Terminal for a 20-year term. Cameron requests that its authorization commence on the earlier of the date of first export or seven years from the date of issuance of the requested authorization. Cameron seeks authorization to export LNG from the Cameron LNG Terminal in Cameron Parish, 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. Cameron seeks to export this LNG on its own behalf and as agent for other parties who hold title to the LNG at the time of export.

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

A. Background

1. Description of Applicant and Facility

Cameron states that it is a wholly-owned indirect subsidiary of Sempra Energy, Inc., a publicly-traded corporation. Cameron also states that it owns the existing Cameron Terminal and that it has an existing interconnection with Cameron Interstate. Cameron Interstate, an affiliate of Cameron, is an interstate pipeline regulated by FERC. Cameron Interstate's facilities consist primarily of a 36.2 mile pipeline connecting the Cameron Terminal with five other interstate pipelines. According to Cameron, the construction and operation of the Cameron Terminal was initially authorized in 2003.[28] In that order, FERC authorized the Cameron Terminal to send out up to 1.5 Bcf/d of regasified LNG to domestic markets. In a subsequent order, issued in 2007, FERC authorized Cameron to construct and operate additional facilities expanding the maximum send-out capacity to 1.8 Bcf/d.[29] Cameron states that it completed construction of the Cameron Terminal and placed it into service in July 2009.

Initially, according to Cameron, the Terminal was used for the sole purpose of receiving and storing foreign-sourced LNG, re-gasifying such LNG, and sending it out for delivery to domestic markets. In January 2011, FERC authorized Cameron to operate the Cameron Terminal for the additional purpose of exporting previously imported (*i.e.*, foreign sourced) LNG on behalf of its customers.[30]

On January 17, 2012, DOE/FE granted Cameron's request to export domestically-produced LNG to FTA countries in DOE/FE Order No. 3059, authorizing the export of the

[28] *Cameron LNG, LLC*, 104 FERC ¶ 61,269 (2003).
[29] *Cameron LNG, LLC*, 118 FERC ¶ 61,019 (2007).
[30] *Cameron LNG, LLC*, 134 FERC ¶ 61,049 (2011).

equivalent of 1.7 Bcf/d of natural gas.[31] The export volume authorized in both the FTA order and the proposed export volume in Cameron's current Application mirror the liquefaction capacity of the Liquefaction Project estimated at the time each application was submitted, and thus are not additive.

2. Cameron's Notice of Execution of LNG Tolling Agreements and Joint Agreements

On May 23, 2013, Cameron filed a Notice of Execution of LNG Tolling Agreements and Joint Agreements.[32] First, Cameron states that it has signed a LNG tolling capacity agreement for a 20-year term with each of the following customers:

- GDF SUEZ S.A.,
- Affiliates for Mitsubishi Corporation (Mitsubishi), and
- Affiliates of Mitsui & Co., Ltd. (Mitsui).

According to Cameron, each agreement is for 4 mtpa of LNG, and therefore subscribes the full nameplate capacity of the Liquefaction Project, which will have an export capability of 12 mtpa (approximately 1.7 Bcf/d of natural gas) from its three trains. It states that the tolling capacity agreements[33] are subject to a final investment decision to proceed by each party, which it states should occur by early 2014.

Second, Cameron states that GDF SUEZ, Mitsubishi (through a related company jointly established with an affiliate of Nippon Yusen Kabushiki Kaisha), and Mitsui have signed a joint agreement whereby each will acquire an indirect 16.6 percent share in Cameron LNG Holdings,

[31] *Cameron LNG, LLC*, DOE/FE Order No. 3059, Order Granting Long-Term Multi-Contract Authorization to Export Liquefied Natural Gas by Vessel from the Cameron LNG Terminal to Free Trade Agreement Nations (Jan. 17, 2012).

[32] Notice of Cameron LNG, LLC of Execution of LNG Tolling Agreements and Joint Agreements and Comments Regarding Sequencing of Application Review, FE Docket No. 11-162-LNG (May 23, 2013). In the Notice, Cameron also provides comments urging DOE/FE to reconsider the order of precedence in which it reviews pending non-FTA export applications. Specifically, Cameron urges DOE/FE to "prioritize [those non-FTA export] applications that can demonstrate an ability to reach market reality." *Id*. at 4 (section title).

[33] References to contracts and agreements are synonymous for purposes of this Order.

LLC, which in turn will own a 100 percent equity interest in Cameron (the owner and operator of the existing regasification facilities and the proposed Liquefaction Project).

Cameron states that Sempra Energy, Cameron's indirect parent company, will retain a 50.2 percent indirect interest in Cameron LNG Holdings, LLC through its ownership of Sempra LNG Holdings II, LLC. Cameron will be an independent company owned by Cameron LNG Holdings, LLC. According to Cameron, the owners will staff the company to manage the construction of the Liquefaction Project, as well as the Project's operation after commercial operations begin.

Like the tolling capacity agreements, Cameron states that the joint agreement is subject to a final investment decision to proceed by each party and other events expected to occur by early 2014. Cameron recognizes, and DOE/FE notes, that the effectiveness of the joint agreement is subject to satisfaction of a number of conditions, including DOE/FE's approval of the partial change in Cameron's ownership. Cameron states that it will file an application under Section 590.405 of DOE/FE's regulations, 10 C.F.R. § 590.405, to obtain such approval at the appropriate time, and that Cameron's joint ownership will not become effective until such approval is obtained.

B. Liquefaction Project

In the Application, Cameron states that it is finalizing the design of the Liquefaction Project, and that subsequently it will submit an application with FERC for approval of the Project. On May 9, 2012, FERC granted Cameron's request to utilize the pre-filing process, the first step in FERC's environmental review of the Project. On December 7, 2012, Cameron submitted a formal application with FERC in Docket No. CP13-25-000 for authorization to site,

construct, and operate the proposed liquefaction facilities. FERC's review of the Liquefaction Project is ongoing.[34]

Cameron states that the Terminal presently consists of two marine berths, three full containment LNG storage tanks, LNG vaporizing systems, and associated utilities. The newly proposed facilities would include natural gas pre-treatment, liquefaction, and export facilities with a capacity up to 12 mpta of LNG, plus upgrades to the existing equipment and additional utilities.

Cameron states that the Project facilities will permit gas to be received by pipeline at the Terminal, liquefied, and loaded from the Terminal's storage tanks onto vessels berthed at the existing marine facility. The Liquefaction Project will be designed to allow bi-directional service but, according to Cameron, will not increase the number of ship transits currently authorized for the Terminal. The total amount of LNG processed would not exceed the current maximum authorized send-out rate of 1.8 Bcf/d from the Terminal to the interstate pipeline system.

C. Business Model

Cameron requests authorization to export LNG on its own behalf and as agent for others. In those instances in which Cameron exports LNG on its own behalf, Cameron states that it will either take title to the gas at a point upstream of the Cameron Terminal, or it will purchase LNG from a customer of the Terminal prior to export. In other cases, Cameron anticipates that it will act as agent for the customers of the Terminal, without taking title.

To ensure that its proposed exports are lawful, Cameron states that it will comply with all DOE/FE requirements for an exporter or agent. To comply with DOE/FE requirements for an

[34] *See* Cameron LNG, LLC and Cameron Interstate Pipeline, LLC, Docket No. CP13-25-000, *et al*., Notice of Application (Dec. 26, 2012).

agent, Cameron states that it will register with DOE/FE each LNG title holder for whom Cameron seeks to export as agent, and will provide DOE/FE with a written statement by the title holder acknowledging and agreeing to (i) comply with all requirements in Cameron's long-term export authorization, and (ii) include those requirements in any subsequent purchase or sale agreement entered into by the title holder. Cameron also states it will file under seal with DOE/FE any relevant long-term commercial agreements that it enters into with the LNG title holders on whose behalf the exports are performed.

At the time it submitted its Application, Cameron had not yet entered into any long-term commercial agreements for the LNG it proposes to export. As noted above, however, Cameron has notified DOE/FE that it has executed 20-year tolling capacity agreements with GDF SUEZ, Mitsubishi, and Mitsui. According to Cameron, the contracted amount represents 100 percent of the total volume of LNG conditionally authorized for export in this Order (as well as in Cameron's FTA order, DOE/FE Order No. 3059). *See supra* Section IV.A.2.

D. Source of Natural Gas

Cameron states that natural gas will be delivered to the Cameron Terminal through the Cameron interstate pipeline grid from five major interstate pipelines, thereby allowing access to a variety of supply options. Cameron states that the source of the natural gas will include the vast supplies of natural gas available from the Texas and Louisiana producing regions. Cameron further states that the Barnett, Haynesville and Eagle Ford shale gas formations will serve as additional sources of natural gas for the Liquefaction Project.

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 the lead agency for purposes of review of the Liquefaction Project in FERC Docket No. CP13-25-

000 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.

Cameron 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[35] and precedent[36] support such an approach, and we find good cause for granting Cameron's request for a conditional order. Accordingly, this conditional Order makes preliminary findings on all issues except the environmental issues in this proceeding.

DOE/FE is attaching a condition to this export authorization ordering that Cameron's authorization is contingent on both its satisfactory completion of the environmental review process and its on-going compliance with any and all preventative and mitigating measures imposed at the Cameron Terminal by federal or state agencies. When the environmental review is complete, DOE/FE will reconsider this conditional authorization in light of the information gathered as part of that review.

V. APPLICANT'S PUBLIC INTEREST ANALYSIS

Cameron states that section 3(a) creates a rebuttable presumption that proposed exports of natural gas are in the public interest. According to Cameron, DOE/FE has repeatedly reaffirmed the continued applicability of its 1984 Policy Guidelines, holding that they apply to export applications, even though originally written to apply to imports. The goals of the Policy Guidelines, according to Cameron, are to minimize federal control and involvement in energy markets and to promote a balanced and diverse energy resource system. Cameron states that

[35] 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").
[36] *See*, *e.g.*, *Sabine Pass*, Order No. 2961, at 40-41, 43 (Ordering Paragraph F); *Freeport LNG*, Order No. 3282, at 120-21, 123 (Ordering Paragraph F); & *Lake Charles Exports*, Order No. 3324 at 15-16, 135-36 (Ordering Paragraph F).

DOE/FE's prior decisions have also been guided by DOE Delegation Order No. 0204-111, which stated that exports of natural gas are to be reviewed based on a consideration of the domestic need for the gas to be exported; whether the proposed exports pose a threat to the security of domestic natural gas supplies; and any other issue determined to be appropriate in specific cases. Other factors for consideration cited by Cameron include whether the exports will be beneficial for regional economies, the extent to which the exports will foster competition and mitigate trade imbalances with recipient nations, and the degree to which the exports will encourage efficient management of U.S. domestic natural resources. Cameron contends that its Application satisfied these standards of evaluation.

In further support of the Application, Cameron addresses the following six factors in detail: (i) domestic natural gas supplies; (ii) domestic natural gas demand; (iii) impact of the proposed exports on domestic prices of natural gas; (iv) local, regional, and national economic benefits of the proposed exports; (v) increased exports and international trade; and (vi) environmental benefits. Cameron has appended two studies in support of the Application—one it commissioned by Black & Veatch and one that it prepared:

(1) Appendix C—*Price Response to Incremental LNG Export Demand (Based on DOE/EIA Annual Energy Outlook 2011 Forecasts)* (Dec. 1, 2011) prepared by Black & Veatch (Black & Veatch report); and

(2) Appendix D—*Economic Impact Assessment – LNG Exports from Cameron Terminal* (Dec. 2011) (Economic Assessment), prepared by Cameron LNG, LLC.

Cameron asserts that these studies help to demonstrate that its proposed exports will be consistent with the public interest.

A. Domestic Natural Gas Supplies

Cameron contends that due to substantial additions to domestic gas resources in recent years and comparatively minor increases in natural gas demand, there are more than sufficient

natural gas resources to accommodate both domestic demand and the exports proposed in the Application throughout the 20-year term of the requested authorization. Cameron cites an EIA report, entitled *Natural Gas Reserves Summary as of December 31, 2010* that, according to Cameron, stated that natural gas proved reserves increased by 61 trillion cubic feet (Tcf) (29 percent) between 2006 and 2009 and estimates of recoverable natural gas resources increased by 849 Tcf (64 percent) between 2006 and 2010.[37]

Cameron offers additional argument to support its claim that natural gas production and reserves[38] collectively provide for an abundant domestic supply of natural gas. In support of this proposition, Cameron refers to the recent successes in domestic gas production, particularly unconventional gas production.[39] Referring to an EIA report, entitled *Natural Gas Gross Withdrawals and Production*, Cameron states that U.S. dry gas production increased 6.2 percent from 59.5 Bcf/d in August 2010 to 63.2 Bcf/d in August 2011.[40] Cameron also points to EIA projections in AEO 2011 indicating that the rapid rate of growth in U.S. shale gas production is projected to continue through the year 2035, when shale gas production is expected to comprise 47 percent of total domestic gas production, as compared to a 16 percent share in 2009.

Cameron states that the growth in shale gas production has been accompanied by an increase in the overall volume of U.S. natural gas resources. Cameron states that in 2011, the EIA substantially increased its estimate of technically recoverable resources (TRR) in the United States to 2,543 Tcf.

[37] Cameron App. at 14.
[38] DOE/FE takes note that Cameron LNG frequently uses the term "reserves" when the quantities of natural gas resources identified are, in fact, "technically recoverable resources" (TRR). *See also infra* at Section VIII.C.2. (DOE/FE analysis addressing TRR).
[39] Cameron App. at 15.
[40] *Id*.

According to Cameron, other academic and industry evaluations reaffirm the growth in domestic supplies of natural gas. Cameron refers to an April 2011 determination by the Potential Gas Committee that the United States possesses 2,170 Tcf (687 Tcf of which is shale gas), and a study from the Massachusetts Institute of Technology (MIT), entitled *The Future of Natural Gas*, which estimates that the United States has a mean remaining resource base of approximately 2,100 Tcf (650 Tcf of which is shale gas and 400 Tcf of which could be economically developed with a gas price at or below $6/MMBtu at the wellhead).

Cameron also refers to a 2011 estimate by the James A. Baker III Institute for Public Policy at Rice University, entitled *Shale Gas and U.S. National Security*, indicating that North America has mean technically recoverable shale gas resources of 937 Tcf, including 637 Tcf located in the United States. Cameron states that this report assigned a weighted mean break-even price for U.S. shale gas resources of $5.43/MMBtu. This break-even price, Cameron states, is the average price needed for development of up to 60 percent of the identified TRR.

According to Cameron, a July 2011 report commissioned by the EIA estimated U.S. onshore lower-48 state shale gas resources at 750 Tcf, a subset of the 862 Tcf of technically recoverable lower-48 shale gas estimated in AEO 2011. Cameron states that AEO 2011 also estimated an additional 35 Tcf of proved reserves, 20 Tcf of reserves not included in the July 2011 report, and 56 Tcf of undiscovered resources estimated by the U.S. Geological Survey.

Cameron claims that these studies and reports indicate that the United States has an inventory for recoverable natural gas resources ranging from 90 to more than 100 years. According to Cameron, this inventory is expected to continue to grow as further advancements in drilling technology are deployed to exploit additional shale gas opportunities.

B. Domestic Natural Gas Demand

Cameron states that, over the past decade, there has been essentially no growth in the demand for natural gas in the United States. To support this claim, Cameron cites data published by the EIA, which states that natural gas demand in 2010 was only 3.2% higher than in 2000.

Cameron notes that in AEO 2011 the EIA projected long-term annual U.S. demand to grow only 0.6%, with demand projected to reach 26.6 Tcf in 2035 (compared to 22.7 Tcf of actual demand in 2009). Cameron further maintains that the consensus of projections by the EIA, academic, and industry experts is that the United States has between 2,000 and 2,543 Tcf of recoverable natural gas resources. Therefore, according to Cameron, even at 100% utilization, the Project would result in maximum natural gas requirements of 13.4 Tcf over the 20-year term of the requested authorization. Cameron states that this represents only 0.5% to 0.7% of total estimated recoverable U.S. natural gas resources.

C. Impact of the Proposed Exports on Domestic Prices of Natural Gas

Cameron states that the Black & Veatch report shows that the exports it proposes will have a minimal impact on domestic natural gas prices. Black & Veatch analyzed the underlying long-run supply and demand curves used in EIA's AEO 2011. Cameron states that this approach utilized the latest market intelligence underlying the NEMS model and approximated the results of running the NEMS model using EIA's AEO 2011 assumptions. The estimates of domestic supply and demand in AEO 2011 extend to 2035, allowing a long-term view of price impacts. Cameron further states that this approach allows the results of the Black & Veatch report to be compared to those of other demand and supply case studies published in AEO 2011.

According to Cameron, Black & Veatch first estimated the AEO 2011 natural gas supply and demand curves at five-year intervals using reference and sensitivity case results as reflected in AEO 2011. The 48 case study results were sorted into three groups: (1) where the natural gas

demand curve is held constant (10 cases); (2) where the natural gas supply curve is held constant (29 cases); and (3) where both the supply and demand curves are concurrently shifted (nine cases).

Cameron states that, after constructing the demand and supply curves, Black & Veatch calculated the reference price and quantity at the intersection of the supply and demand curves. According to Cameron, Black & Veatch next estimated the delivered price impacts of increasing the natural gas demand curve by 1.0 Bcf/d of natural gas, thereby simulating 1.0 Bcf/d of gas needed for LNG exports. Black & Veatch found that an incremental 1.0 Bcf/d increase in demand would increase U.S. average delivered natural gas prices by $0.085/Mcf in 2020, $0.088/Mcf in 2025, $0.078/Mcf in 2030, and $0.064/Mcf in 2035. This analysis reportedly is accurate up to approximately 2.0 Bcf/d of incremental demand in 2020 and approximately 7.0 Bcf/d of incremental demand in 2035, although there are indications that the supply curve begins to flatten at a level well below 7.0 Bcf/d (*i.e.*, lower price impacts per Bcf/d at higher volumes).

According to Cameron, a 12 mpta LNG export operation (approximately equivalent to 620 Bcf per year) would create 1.9 Bcf/d of incremental natural gas demand (consisting of 1.7 Bcf/d of exports and 0.2 Bcf/d of fuel consumption). Consequently, the effect on average delivered U.S. natural gas prices (in 2009 dollars) of a 12 mpta LNG export facility, as implied by the AEO 2011 model, is $0.161/Mcf in 2020, $0.167/Mcf in 2025, $0.148/Mcf in 2030 and $0.122/Mcf in 2035.

Based on this analysis, Cameron asserts that proposed exports will have a minimal impact on domestic natural gas prices. Cameron further argues that any upward pressure on prices due to increased demand for exports would likely be offset by a reduction in domestic price volatility.

Cameron notes that any increased production and reserves are not irrevocably dedicated to foreign destinations. If, for example, demand and market prices indicate a need for incremental supplies, customers of the Project will have flexibility to reduce their exports and redirect gas to the domestic market. Cameron anticipates that market signals in the United States will play a key role in determining whether the LNG will be consumed in the United States or delivered to foreign markets.

Cameron also contends that supplemental natural gas production initially expected to be liquefied and exported likely will reduce volatility in the U.S. natural gas market by, among other things, providing an additional source of supply during periods of high domestic demand. Cameron believes this supply will reduce the likelihood and magnitude of sudden and significant increases in domestic gas prices.

D. Local, Regional, and National Economic Benefits

Cameron states that the requested authorization is in the public interest because the export of domestically produced LNG will substantially benefit the local, regional, and national economy. Cameron asserts that this conclusion is supported by the Economic Assessment. The Economic Assessment is derived from price forecasts from the EIA and regional input-output multipliers from the United States Bureau of Economic Analysis (BEA).

Cameron states that the Project has an estimated capital cost in excess of $4 billion, and that annual LNG exports will average $8.6 billion. Cameron asserts that the Project will stimulate local, regional, and national economies through direct and indirect job creation, increased economic activity, and tax revenues. Cameron claims that the benefits attributable to the project will include: (1) the creation of an estimated 2,900 jobs during the peak 12-month construction period, with a total of 5,200 direct job-years created during construction; (2) the creation of an average of over 1,300 on-site engineering and construction jobs over a four-year

period; (3) the creation of hundreds of additional off-site jobs to support the design, fabrication and construction of the Project facilities; and (4) substantial indirect economic impacts, including a total economy-wide impact of 63,000 job-years over the 48 month construction period. Cameron cites the Economic Assessment in stating that the design, engineering, and construction of the Project will result in a total economic impact of $7.6 billion over the 48-month construction period.

Cameron asserts that an even greater number of jobs, and greater overall economic benefits, will result from the exploration and production of the natural gas required for the Project. Cameron states that 4,600 jobs are expected in the natural gas industry, and that the exploration and production of natural gas has a very strong multiplier or ripple effect on job creation and other economic activity. According to Cameron, independent studies examining the economic impact of shale gas development in Pennsylvania and West Virginia have estimated that, for every dollar spent by natural gas producers, at least one additional dollar of economic activity was generated within that state. This, in turn, benefits local businesses and other vendors and suppliers.

Cameron states that, for the U.S. economy as a whole, the Economic Assessment finds that, in addition to the 63,000 job-years created during construction, the Project would generate an average of 53,000 jobs during the ensuing 20-year operations period with a total impact during the periods of construction and operation of 1.1 million job-years. Cameron states that in order to confirm the reasonableness of this result, the Economic Assessment identified three relevant studies that suggested economy-wide job gains from the Cameron facility ranging from 46,000 to 95,000 (a total impact of 920,000 to 1,900,000 job-years) over the term of the export permit.

In sum, Cameron states that the total economic benefits of the Project to the U.S. economy will average $2 billion per year during the period of construction, and $14 to $18 billion per year during the 20-year term of the requested authorization. The total increase in U.S. output is estimated at $336 billion over the proposed 20-year term, which does not include additional economic benefits to the local, state, and federal governments associated with new tax revenue generated by the Project.

E. Balance of Trade

Cameron estimates that the Project's customers will export an average of approximately $8.6 billion in LNG per year. In addition, Cameron anticipates that associated oil and natural gas liquids production resulting from the Project will average $2.2 billion per year, bringing the average total trade balance benefits to $10.8 billion per year in 2011 dollars. Cameron asserts this will have a positive and significant impact on the U.S. balance of trade. Cameron notes that, in 2010, the U.S. trade deficit was $646 billion, with over 40 percent of this deficit attributable to imports of petroleum products. Cameron states that, while the Liquefaction Project alone will not eliminate this imbalance, it will make a significant contribution to reducing it for a sustained period.

Cameron notes that increasing exports to address the trade imbalance is a key element of President Obama's efforts to spur economic recovery. Cameron quotes from President Obama's National Export Initiative (NEI) in highlighting the federal government's emphasis on "the promotion of exports," including allowing U.S. businesses to "actively participate in international markets by increasing their exports."[41] Cameron maintains that approval of the Application would represent a significant step toward achieving the President's goal by

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

generating $173 billion of new exports from the United States over the 20-year term of the requested authorization, plus $43 billion of displaced imports.

F. International Benefits

Cameron argues that LNG exports will enhance the diversity of global supply and contribute to the security interests of the United States and its allies. According to Cameron, exporting domestically produced LNG also will promote liberalization of the global gas market by fostering increased liquidity and trade at prices established at market forces. With respect to enhancing the security interests of the United States and its allies, Cameron further asserts that current global LNG supply shortages are having adverse impacts for the United States' closest allies in Asia and Europe, citing Japan as one ally that is being burdened by LNG imports with a cumulative price premium relative to U.S. gas prices of over one trillion United States dollars through 2035. Cameron posits that, by introducing market based price structures, the Project will reduce the premiums charged to economies that have few economic energy supply alternatives, and will help to reduce gas price volatility around the world. Cameron also asserts that restrictions on exports of domestically produced LNG to other member countries of the World Trade Organization (WTO) would be inconsistent with the United States's obligations under WTO agreements.

VI. LNG EXPORT STUDY

DOE/FE recognized in *Sabine Pass* that the cumulative impact of *Sabine Pass* and additional future LNG export authorizations could affect the public interest. To address this issue, DOE/FE undertook a two-part study of the cumulative economic impact of LNG exports. The first part of the study was conducted by EIA and looked at the potential impact of additional natural gas exports on domestic energy consumption, production, and prices under several export scenarios prescribed by DOE/FE. The EIA study did not evaluate macroeconomic impacts of

LNG exports on the U.S. economy. The second part of the study, performed by NERA Economic Consulting, assessed the potential macroeconomic impact of LNG exports using its energy-economy model (the "N_{ew}ERA" model). NERA built on the EIA Study requested by DOE/FE by calibrating the NERA U.S. natural gas supply model to the results of the study by EIA. The EIA study was limited to the relationship between export levels and domestic prices without considering whether those quantities of exports could be sold at high enough world prices to support the calculated domestic prices. NERA used its Global Natural Gas Model (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.[42] 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.[43]

[42] 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.

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

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

- The NEMS model is not a world energy model, and therefore does not address the interaction between the potential for additional U.S. natural gas exports and developments in world natural gas markets;
- 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,[44] gross domestic product (GDP), aggregate consumption, aggregate investment, natural gas export revenues, sectoral output,[45] 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

[44] 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.

[45] 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.

expansion outweigh the losses from reduced capital and wage income to U.S. consumers, and hence LNG exports have net economic benefits in spite of higher domestic natural gas prices.

Net benefits to the United States would be highest if the United States is able to produce large quantities of gas from shale at low cost, if world demand for natural gas increases rapidly, 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.[46] 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 as usual Reference Case. The second assumed an international demand shock with increased

[46] 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.

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.[47] 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 trade in the major gas producing or consuming regions.[48] The model attempts to maximize the difference between surplus and cost, constrained by various factors including liquefaction

[47] 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.
[48] 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.

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 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.[49] 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
- 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,

[49] 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

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.[50] First, the GNGM model produced information 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:

[50] 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.

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

- **Macroeconomic impacts of LNG exports are positive in all cases.** NERA found that the United States would experience net economic benefits from increased LNG exports in all cases studied. Only three cases had U.S. exports greater than the 12 Bcf/d maximum exports allowed in the cases analyzed by EIA.[51] 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 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

[51] 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.

transfer from overseas received in the form of payments for liquefaction services. The net result is an increase in U.S. households' real income and welfare. NERA noted, however, that net benefits to the U.S. economy could be larger if U.S. businesses were to take more of a merchant role. NERA assumed that foreign purchasers would take title to LNG when it is loaded at a U.S. port, so that any profits that could be made by transporting and selling in importing countries accrue to foreign entities. In cases where exports are constrained to maximum permitted levels, this business model sacrifices additional value from LNG exports that could accrue to the United States.

- **Sources of income would shift.** NERA states that at the same time that LNG exports create higher total income in the United States, exports would shift the composition of income so that both wage income and income from capital investment decline. NERA's measure of total income is GDP measured from the income side, that is, by adding up income from labor, capital, and natural resources and adjusting for taxes and transfers. According to NERA, expansion of LNG exports would have two major effects on income: it raises energy costs and, in the process, depresses both real wages and the return on capital in all other industries, but it also creates two additional sources of income. First, additional income would come in the form of higher export revenues and wealth transfers from incremental LNG exports at higher prices paid by overseas purchasers. Second, U.S. households also would benefit from higher natural gas resource income or rents. These benefits differentiate market-driven expansion of LNG exports from actions that only raise domestic prices without creating additional sources of income. According to NERA, the benefits that come from export expansion would more than outweigh the losses from reduced capital and wage income to U.S. consumers, and hence LNG exports would have

net economic benefits in spite of higher natural gas prices. According to NERA, this is the outcome that economic theory describes when barriers to trade are removed.

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

- **Peak natural gas export levels (as specified by DOE/FE for the EIA study) and resulting price increases are not likely.** The export volumes selected by DOE/FE for the EIA Study define the maximum exports allowed in each scenario for the NERA macroeconomic

analysis. Based on its analysis of global natural gas supply and demand, NERA projected achievable levels of exports for each scenario. The NERA scenarios that found a lower level of exports than the limits specified by DOE/FE are shown in Figure 5 of the NERA study, as modified from Tcf/yr to Bcf/d below.

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

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

The cells in bold italics indicate the years in which the model's limit on exports is binding. All scenarios hit the export limits in 2015 except the NERA export volume case with Low/Rapid exports. In no case does the U.S. wellhead price increase by more than $1.11/Mcf due to market-determined levels of exports. Even in cases in which no limits were placed on exports, competition between the United States and competing suppliers of LNG limits increases in both U.S. LNG exports and U.S. natural gas prices.

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

- **Serious competitive impacts are likely to be confined to narrow segments of U.S. industry.** NERA gave special attention to the potential impact of LNG exports on EITE industries. NERA examined impacts on manufacturing industries where energy expenditures are greater than 5 percent of the value of the output created and the industries face serious exposure to foreign competition. Such industries, according to NERA, comprise about 10 percent of U.S. manufacturing and employment in these industries is one-half of one percent of total U.S. employment. NERA did not project that such energy-intensive industries as a whole would sustain a loss in employment or output greater than one percent in any year in any of the cases

examined and pointed out that such a drop in employment would be less than normal rates of turnover of employees in the relevant industries.

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

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

A. Overview

As noted above, DOE/FE received four comments in support of the Application and two motions to intervene and protest – one motion and protest filed by APGA and one motion,

protest, and comment filed by Sierra Club.

B. Comments Supporting the Application

The comments submitted in support of Cameron's Application generally address the benefits that the commenters anticipate from a grant of the requested authorization. For example, U.S. Senator Mary Landrieu states that the expansion of Cameron LNG to include a liquefaction facility represents an investment by Sempra in an environmentally sound facility that plays a key role in the world energy markets. Senator Landrieu also notes that Sempra's operations in Louisiana have provided long-time investment and employment in the state and are critical for U.S. energy security. Similarly, U.S. Representative Charles W. Boustany, Jr. highlights Sempra's and Cameron LNG's role as an investor, employer, and outstanding corporate citizen in Louisiana. Governor Bobby Jindal of Louisiana states that Sempra's initial investment in the Cameron LNG facility produced hundreds of construction jobs and significant economic development for Louisiana. Governor Jindal states that the proposed Liquefaction Project will represent nearly $3 billion in additional private investment in the state, with the related jobs and benefits being of great importance to Louisiana families. Finally, State Senator Dan Morrish of the Louisiana State Senate expresses his view that the Liquefaction Project will produce hundreds of new construction jobs and other permanent jobs in the state, and praises Sempra for its efforts in restoring wetlands and undertaking other corporate initiatives.

C. APGA's Motion to Intervene and Protest

APGA is an association of municipal gas distribution systems, public utility districts, and other public agencies. APGA states that Cameron's request for authority to export domestically produced LNG is inconsistent with the public interest. APGA cites the EIA study released in January 2012 for the proposition that exporting domestic LNG will significantly increase domestic natural gas prices. APGA also refers to EIA's *Annual Energy Outlook 2012* (AEO

2012 Early Release Overview)—a preliminary, abridged version of EIA's then-forthcoming final AEO 2012—which, according to APGA, substantially reduced the level of estimated technically recoverable natural gas in the Marcellus Shale. APGA argues these assessments undermine the premise of the Application that vast recoverable reserves will keep domestic gas prices low despite LNG exports. To the contrary, APGA contends that price increases associated with exports of LNG will jeopardize the viability of natural gas as a "bridge-fuel" in the transition away from carbon-intensive and otherwise environmentally problematic coal-fired electricity generation. APGA states:

> Inflated natural gas prices will also inhibit efforts to foster natural gas as a transportation fuel, which is important to wean the U.S. from its historic, dangerous dependence on foreign oil. Furthermore, high natural gas and electricity prices will reverse the nascent trend toward renewed domestic manufacturing before it gains momentum.[52]

APGA maintains that Cameron's plan to export LNG will not be economically viable because recoverable domestic natural gas resources may be less robust than projected, especially given looming environmental costs and regulations, and because foreign alternatives will eventually remove the price arbitrage opportunity that Cameron seeks to use to its advantage.

Cameron's Application, according to APGA, is one of nine similar applications submitted to DOE/FE within a short time span. APGA argues that the quantity of domestic natural gas at issue in this and related proceedings, approximately 14 Bcf/d, is roughly 21 percent of the total marketed production in the United States in 2011 (66 Bcf/d). APGA contends that authorization of this large quantity for export will have a substantial impact on natural gas demand, will increase domestic natural gas and electricity prices, and will limit natural gas supply at a time when the nation has an opportunity to forge a path toward energy

[52] Motion for Leave to Intervene and Protest of the American Public Gas Association (Apr. 23, 2012), at 3 [hereinafter APGA Mot.].

independence. As a consequence, APGA contends, the proposed exports are inconsistent with the public interest.

APGA argues that, ultimately, exports by Cameron will fail to compete with natural gas exports by other nations. APGA also argues that "DOE/FE should not pursue policies that directly increase natural gas commodity prices for American consumers, thereby making natural gas less competitive in this country as a replacement for foreign-sourced fuels or for fuels that are less clean and more carbon-intensive."[53] APGA maintains that high gasoline prices in the face of increased domestic oil production makes apparent the dangers and downsides of the United States becoming part of a global natural gas market.

APGA further contends that the study commissioned by Cameron does not accurately forecast the impact of exports on domestic gas prices. APGA asserts that the Black & Veatch Report is based on outdated and likely inflated projections of technically recoverable gas in the Marcellus Shale, and fails to consider other factors that will inflate domestic natural gas prices if exports continue to expand. APGA argues that the Black & Veatch Report only considered the effect on natural gas commodity prices of 1.0 Bcf/d of incremental demand due to LNG exports and thus failed to analyze the total volume of incremental demand at issue in the instant proceeding of 1.9 Bcf/d. APGA also asserts that Black & Veatch neglected to analyze the cumulative impact of the total volume of LNG exports that would be permitted if all of the similar pending applications were granted (estimated at that time to be approximately 14 Bcf/d of natural gas).

APGA further maintains that Cameron failed to consider the possibility of reduced gas reserves because it employed outdated estimates in the Application. According to APGA, Cameron based the Application on a total TRR of more than 2,000 to 2,543 Tcf of natural gas, an

[53] *Id*. at 6.

estimate drawn from AEO 2011 and other published sources. But, APGA contends, the AEO 2012 estimate for unproved TRR from shale gas for the United States is 482 Tcf. This reduction in the TRR estimate, APGA states, is due to a greater than 65 percent reduction in the estimate for the Marcellus Shale. APGA notes that the reduction resulted in part from lower estimates from the United States Geological Service (USGS).

APGA asserts that DOE/FE must take a harder look at natural gas export applications given the recently revised estimates by EIA and USGS. Based on these factors, APGA argues the Black & Veatch Report cannot be used to accurately gauge the impact of LNG exports on domestic prices of natural gas and contends that DOE/FE instead should consider the analysis contained in the study conducted by the EIA as part of the LNG Export Study discussed below. APGA points out that under all of the scenarios analyzed in the EIA study, EIA forecast that LNG exports will increase domestic natural gas prices.

According to APGA, EIA "concluded that 'rapid increases in export levels lead to large initial price increases,' but that slower increases in export levels will 'eventually produce higher average prices during the decade between 2025 and 2035.'"[54] Given the number of export applications that DOE/FE has received to date and the total export capacity requested of roughly 14 Bcf/d, APGA submits that the "high/rapid" export scenario analyzed by EIA is the most realistic scenario. According to APGA, the "high/rapid" scenario produces price increases of 36 to 54 percent by 2018. On the other hand, given the reduction in TRR discussed above, APGA states that the AEO 2011 may be the most accurate scenario considered in the EIA report. APGA states that the high/rapid scenario in the Low Shale EUR case projects that natural gas prices will increase by 54 percent in 2018 and that, even under the slow/low scenario in the Low Shale EUR case, exports will increase domestic wellhead prices by 20 percent in 2020.

[54] *Id*. at 9 (quoting EIA study at 6).

APGA also asserts that future natural gas prices may be even higher than projected in the EIA report because the EIA assumed that domestic prices would only be affected by domestic supply/demand factors and because other factors may limit economically recoverable domestic supplies. These other factors, according to APGA, include increased regulation of non-conventional gas production and less demand elasticity due to growing reliance on natural gas for electric generation. APGA asserts that the Black & Veatch report shares the same defects.

APGA states that the relatively low natural gas prices currently being experienced in the United States give the nation an opportunity to end its dependence on foreign oil, to attract renewed domestic manufacturing, and to stimulate displacement of gasoline with compressed natural gas (CNG) fueled vehicles. APGA argues that increased prices due to exports jeopardize each of these prospects and, ultimately, national security and national wellbeing.

In particular, APGA maintains that increased natural gas prices will decrease the viability of natural gas as a bridge-fuel from carbon-intensive coal. APGA contends that pending environmental regulations will soon force coal retirement and further greenhouse gas regulation may cause additional retirements in the future. Sustained low prices for natural gas, according to APGA, will help to keep electricity prices from spiking higher during this transition. A spike in electricity prices, APGA adds, will have rippling effects on the U.S. economy.

APGA also contends that, although Cameron's application cites the jobs that the proposed exports will create, it does not acknowledge the many jobs in other sectors of the economy that may be destroyed. According to APGA, economic data show that when domestic energy prices increase, the country loses manufacturing jobs, especially in the fertilizer, plastics, chemicals, and steel industries.

APGA indicates that these alleged negative impacts will stifle a nascent manufacturing

renaissance in the United States.

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. APGA claims that gas rich shale deposits are a global phenomena that are just now beginning to be tapped. APGA argues:

> As other nations develop their resources and export capacity and as U.S. natural gas prices increase due to the very exports Cameron proposes, international and domestic prices will converge, leaving the U.S. with the worst of all worlds, i.e., higher (and likely more volatile) domestic prices that thwart energy independence and that undermine the competitiveness of the manufacturing sector that relies heavily on natural gas as a process fuel.[55]

APGA also argues that domestic natural gas is at a disadvantage in the world market compared to gas from certain other countries, including Canada and Qatar, and asserts that higher fixed costs places LNG at a disadvantage compared to gas transported by pipeline. APGA states that LNG from the United States will likely find itself competing with shale gas piped into Western Europe from Poland and Ukraine. All of the above factors, according to APGA, mean that LNG exports from the Cameron Terminal will not prove economical over the long-term, especially if domestic gas prices converge with the higher prices paid in international markets. While APGA states that the customers at the Cameron Terminal may have flexible contracts that allow for the higher priced gas to be consumed domestically instead of exported, it complains that the rest of the nation will have to bear the burden of the higher and more volatile natural gas prices.

D. Sierra Club's Motion to Intervene and Protest

As indicated above, Sierra Club has filed a motion to intervene and protest. Sierra Club states that "its many thousands of members have a direct interest in ensuring that domestic

[55] APGA Mot. at 13.

natural gas production is conducted safely, and that any exports do not adversely affect domestic consumers."[56] Sierra Club states that, as of April 2012, it had 2,899 members in Louisiana and 22,412 members in Texas, areas that it claims will be directly affected by the operations of Cameron's proposed LNG export facility. Additionally, Sierra Club states it has 608,095 total members, all of whom will be affected by increased gas prices caused by Cameron's plan.

Sierra Club contends Cameron's application is inconsistent with the public interest because it will produce significant environmental harm and negative economic consequences that outweigh the proposal's benefits. As discussed below, DOE/FE will address claims of environmental impacts following the completion of the review of the proposed LNG export facility by FERC. With regard to economic consequences, Sierra Club contends that Cameron has overstated the likely benefits of increased shale gas production and understates the impact of exports on domestic gas prices. According to Sierra Club, the increased gas prices will cause environmentally harmful increases in coal-fired electricity production, increased prices for domestic consumers, and harm to manufacturing industries and the jobs they support.[57]

Sierra Club claims that the results of the EIA study, the first part of the LNG Export Study, demonstrate that Cameron's proposal will significantly increase demand for natural gas, thereby driving increased gas prices and the elimination of domestic jobs. Based on EIA's reference case and a range of export scenarios, Sierra Club charges that over the 20 year period, residential consumers would face annual gas expenditure increases of 3.2 percent to 7.0 percent despite consuming less gas.

Sierra Club maintains that Cameron's reliance on the Black & Veatch report is misplaced

[56] Sierra Club's Motion to Intervene, Protest, and Comments (Feb. 6, 2012), at 1 [hereinafter Sierra Club Mot.]
[57] Sierra Club additionally requested that DOE/FE not conduct its public interest review of the Application until the results of the then-pending LNG Export Study were known. Sierra Club Mot. at 13. As discussed herein, DOE/FE's public interest review in this proceeding includes an analysis of that Study's conclusions.

because the report did not consider cases in which demand increased by more than 1.7 Bcf/d by 2020. Sierra Club suggests that the 1.7 Bcf/d of increased demand may be reasonable if one only considered the demand that will be occasioned by the Cameron Application. But Sierra Club insists that DOE/FE must evaluate the public interest in light of other reasonably foreseeable developments, *i.e.* the cumulative impacts of previously approved and all reasonably foreseeable proposals.

Sierra Club argues that the economic benefits of Cameron's proposed liquefaction project are overstated in the Application, that most of the thousands of jobs Cameron purports its project will create are temporary or indirect, and only 65 persons will be permanently employed by the facility. In this regard, Sierra Club contends that the claim of economic benefit rests on an outdated input-output methodology, which Sierra Club presumes to be the IMPLAN methodology.

Sierra Club maintains that input-output models overstate spending and overstate the benefit of spending that does not occur. Sierra Club further charges that input-output models fail to consider counterfactuals and foregone opportunities, *i.e.*, the models map the consequences of a particular expenditure, but do not ask how the economy might have grown had investors and regulators made different choices. Nor, according to Sierra Club, does the model consider how the particular choice at issue might displace other economic activity."[58] In this regard, Sierra Club asserts that input-output studies cannot determine how many jobs are created because the models employed do not consider whether the jobs, particularly jobs associated with natural gas production activities, might have been created even in the absence of the spending associated with the Cameron proposal.

Additionally, Sierra Club contends that input-output studies may not reflect actual

[58] *Id*. at 47.

spending patterns or other distributional effects. For example, Sierra Club maintains that landowners with gas production leases may elect to save their money rather than spend it. In this connection, Sierra Club charges that input-output models "are static, in that they provide a series of one-year economic snapshots. Sierra Club maintains that Cameron's study measures 'job-years' but not jobs held continuously year to year."[59] Furthermore, an input-output model, Sierra Club states, is not readily able to evaluate rapid or large changes to the economy (such as may be associated with the "boom" in shale gas production) or to deal with the complicated series of individual choices and community disruptions associated with a boom in economic activity.

Sierra Club's analysis of available data allegedly show that the economic benefit of the Cameron proposal will be much smaller than Cameron has projected and there will be offsetting economic harms. Relying on a study conducted by Weinstein and Partridge,[60] Sierra Club claims that fewer jobs have been created by the shale gas boom in Pennsylvania than the industry claims. From 2004 to 2010, according to Sierra Club, Bureau of Labor statistics show that only 10,000 jobs in the oil and gas sector were added within the state.

According to Sierra Club, the boom-bust cycle is typically characterized by a period of rapid growth in economic activity followed by a rapid decrease. Sierra Club states that even during the boom, few jobs will be created because the natural gas extraction industry is capital intensive. The boom cycle, Sierra Club also states, will cost local communities in expenditures for everything from road maintenance and public safety to schools. Sierra Club asserts that when the bust follows due to depletion of commercially recoverable resources, local communities will suffer because population and jobs will depart the region and there will be fewer people to

[59] *Id*.
[60] Weinstein and Partridge, *The Economic Value of Shale Natural Gas in Ohio*, Ohio State University (December 2010) (Weinstein study).

support the boomtown infrastructure.[61] Relying on the Cristopherson study, Sierra Club adds that the boom-bust cycle will be exacerbated due to the long-term industrialization associated with the large and geologically complex development of the Marcellus Shale. Other factors, according to Sierra Club, that undercut the economic benefits of Cameron's proposal include the difficulty in converting technical natural gas field jobs directly into sustainable, well-paying local employment; the uneven employment patterns and high turnover rates in the natural gas industry; a panoply of development and environmental issues; and threats to the tourism industry for many parts of the Marcellus region, including New York's Southern Tier. Sierra Club concludes:

> [A] simple economic model, like the input-output model Cameron offers here, cannot reliably capture the consequences of transforming an entire region of the country…a transformation [that] will benefit some discrete actors considerably, and some communities, if they are able to navigate the durable challenges of boom and bust economics.[62]

Sierra Club further asserts that the record in this proceeding is not adequate to support a decision to approve Cameron's proposal. Sierra Club also asserts that DOE/FE may not approve Cameron's proposal without a proper NEPA analysis that fully analyzes the direct, indirect, and cumulative impacts of increased natural gas production linked to the proposed exports. Such an analysis, according to Sierra Club, is required by the public interest standard of the NGA and not solely due to NEPA's requirements. Sierra Club maintains that this analysis should involve a full environmental impact statement (EIS) and consideration of a full range of alternatives, including a no-action alternative. Because Cameron's proposal is one of several proposals to export natural gas, Sierra Club asserts that DOE/FE should prepare a programmatic EIS that

[61] Sierra Club states that it relies on detailed studies from Cornell University's Department of City and Regional Planning. Sierra Club specifically cites Cristopherson, CaRDI Reports, *The Economic Consequences of Marcellus Shale Gas Extraction: Key Issues* (Cristopherson study).
[62] *Id*. at 53.

considers the cumulative impacts of all of the gas export proposals at once. Additionally, if DOE/FE grants Cameron's Application, Sierra Club contends that DOE/FE must impose rigorous monitoring conditions that cover (1) regional and national economic dislocations and disruptions caused by natural gas extraction, including by the industry's boom-and-bust cycle; (2) increases in gas and electricity prices and resulting shifts to more polluting fuels; and (3) environmental impacts. Sierra Club states that in setting forth these monitoring conditions, DOE/FE must provide specific monitoring terms and thresholds which will trigger agency actions of various types. Failure to provide such monitoring conditions, Sierra Club argues, would violate the NGA.

E. Answers of Applicant and Replies of Protestors

On May 8, 2012, Cameron filed a response to the motions of APGA and Sierra Club to intervene in this proceeding. On May 23, 2012, Sierra Club filed a motion to reply and reply comments to the response of Cameron. On June 7, 2012, Cameron filed an answer to Sierra Club's motion to reply and reply comments.

1. Cameron Response to Sierra Club and APGA

Cameron opposes the motions of Sierra Club and APGA to intervene. Cameron maintains that these organizations have not set out facts establishing their interest in the proceeding. Cameron further contends that even if Sierra Club and APGA are granted intervener status, their arguments fail to rebut the presumption that the export authority Cameron seeks in this case is in the public interest.

Cameron asserts that the arguments of Sierra Club and APGA focus largely on matters that are irrelevant to this proceeding. For example, Cameron states that Sierra Club devotes much of its arguments to generalized environmental and other concerns concerning the exploration and production of shale gas rather than the specifics of the current Application.

Cameron claims that DOE is not required to conduct an environmental review as part of its public interest review under NGA section 3 and that environmental impacts are properly analyzed under NEPA, a process in which FERC has lead agency status. Cameron further disputes Sierra Club's contention that DOE may not lawfully issue a conditional authorization prior to the completion of the two-part study of the economic impacts of LNG exports.

Cameron restates its position, based on the Black & Veatch report, that the proposed exports will have only a minimal impact on natural gas prices domestically. In this regard, Cameron maintains that use of the low/slow scenario from the EIA study is more realistic than the high/rapid scenario. The low/slow scenario, Cameron states, assumes that exports will grow by 6 Bcf/d over a six year period. According to Cameron, the high/rapid scenario assumes that every export project seeking approval will receive it, that all will be built and rapidly put into operation, that all will be fully subscribed, that all of the authorized facilities will operate at 100 percent utilization rates for 365 days per year, and that in no more than four years the United States will be the world's leading exporter of LNG.

Cameron further argues that the minimal projected price impact of granting its requested authorization is confirmed when consideration is given to the likelihood that natural gas producers will respond to increased demand for natural gas. Cameron cites to a study conducted by the Deloitte Center for Energy Solutions and the Deloitte Market Point (collectively, Deloitte), entitled *Made in America: The Economic Impact of LNG Exports from the United States* (2011) (Deloitte study). Cameron states that the Deloitte study, unlike the EIA study, factored in the likely producer response to LNG exports and concluded that the response of producers, midstream players, and consumers will mitigate the price impact of LNG exports. Cameron indicates that the Deloitte study concluded that LNG exports in a volume equivalent to

6 Bcf/d of natural gas will result in a $0.12 per MMBtu, or 1.7 percent city-gate price increase from 2016 to 2035.

Cameron additionally contends that EIA's AEO 2012 Early Release Overview does not contradict the projected minimal price impact of the requested authorization. Cameron points out that, notwithstanding a projected decline in production from the Marcellus shale, the AEO 2012 Early Release Overview projects a seven percent increase in cumulative gas production over AEO 2011 for the years 2010 through 2035. Cameron insists that its position on the minimal price impact of its proposed authorization is also confirmed by a study by the Energy Security Initiative at the Brookings Institute, entitled *Liquid Markets: Assessing the Case for U.S. Exports of Liquefied Natural Gas* (May 2, 2012) (Brookings Report). Nor, according to Cameron, do Sierra Club and APGA recognize that approval of exports, by incentivizing additional natural gas production, will reduce price volatility in domestic markets.

Cameron also addresses challenges by Sierra Club and APGA to Cameron's claim of significant economic benefits. First, Cameron contends that Sierra Club wrongly assumed that Cameron used an IMPLAN input-output model in conducting its Economic Impact Statement. Therefore, according to Cameron, to the extent that Sierra Club's arguments rely on use of an IMPLAN model, such arguments are without merit.

Second, Cameron contends that Sierra Club's assertion that an input-output model fails to consider counterfactual and foregone opportunities should be rejected. According to Cameron, an economic analysis need not consider every hypothetical possibility. Further, Cameron notes that Sierra Club did not present analysis or data to support an assertion that the Project is inconsistent with the public interest due to hypothetical counterfactuals or foregone opportunities. Cameron also maintains that the studies on which Sierra Club relies shows that

the jobs effect of natural gas production activities in producing regions is not statistically significant and does not rebut the statutory presumption that the proposed exports is consistent with the public interest.

Third, in response to the contention by Sierra Club that resource extraction industries are characterized by boom and bust cycles, Cameron counters that "such a conclusion does not rebut a presumption that the Project is in the public interest …[because] the considerations of the studies on which Sierra Club relies do not relate specifically to the Project, but are instead general and theoretical in nature."[63] According to Cameron, to rebut a public interest presumption, Sierra Club must provide analysis or data to rebut the benefits asserted by Cameron regarding the benefits of LNG export activity.

Cameron also claims that Sierra Club's arguments regarding job creation and economic benefits directly contradict established government policies and assertions. Cameron points to President Obama's 2012 State of the Union speech, noting that the President stated that "experts believe [natural gas] will support more than 600,000 jobs by the end of the decade."[64] To further support President Obama's comments, Cameron points to an IHS Global study, *The Economic and Employment Contributions of Shale Gas in the United States* (Dec. 6, 2011), that allegedly estimates that shale production alone supported more than 650,000 jobs in 2010 and may support nearly 870,000 by 2015.

3. Sierra Club Motion to Reply and Reply Comments

On May 23, 2012, Sierra Club filed a Motion to Reply and Reply Comments in response to Cameron's May 8, 2012 Response. Sierra Club states that although DOE/FE rules do not automatically provide parties the right to reply, they allow a party to file a request for additional

[63] Response of Cameron LNG, LLC to Motions to Intervene, Comments, and Protests, at 19.
[64] *Id*. at 19.

procedures. Sierra Club states that it requested the right to file a reply motion in its initial protest filing, and that it now timely renews that request, which there is good cause to grant. Sierra Club posits it should be allowed to file this reply because Cameron attacked Sierra Club's motion to intervene and the arguments in its protest. According to Sierra Club, these attacks are misguided. To ensure a fair hearing, Sierra Club argues that it should be allowed to respond to Cameron's arguments.

Sierra Club asserts that Cameron failed to oppose within 15 days Sierra Club's Motion to Intervene of April 23, 2012, and therefore Sierra Club should be granted leave to intervene pursuant to DOE/FE regulations. Sierra Club further argues that Cameron is incorrect in arguing that Sierra Club's motion to intervene should be denied because the motion does not specifically relate to the Project. According to Sierra Club, it identified environmental impacts, including effects resulting from induced drilling, which would specifically result from the proposed project. Further, Sierra Club contends that it has plainly set out the facts upon which its claimed interest is based, which is all DOE/FE regulations require.

Sierra Club argues that Cameron's position that environmental concerns are only pertinent to the NEPA analysis is a misunderstanding of the Natural Gas Act and NEPA. Sierra Club contends that the NGA's public interest standard requires consideration of environmental impacts, and that NEPA facilitates that decision-making process by providing environmental information to inform the NGA's required public interest analysis. Therefore, Sierra Club argues the NEPA process cannot be deferred to a time after the public interest determination has been made.

Sierra Club rejects Cameron's argument that environmental impacts need not be considered as part of the public interest determination under NGA section 3. Sierra Club

maintains that Cameron cites no authority contrary to Sierra Club's position that environmental impacts must be assessed as part of the public interest determination. Sierra Club maintains that the only case cited by Cameron on this point, *North Baja Pipeline, LLC*, 123 FERC ¶ 61073 (Apr. 24, 2008) (citing *Office of Consumer's Counsel v. FERC*, 665 F.2d 1132, 1143 (D.C. Cir. 1980)), does not support Cameron's position. According to Sierra Club, this is because FERC considered environmental impacts as part of its public interest analysis in the administrative proceeding in that case.

Sierra Club further argues that because environmental impacts factor into the public interest determination, DOE/FE must logically assess environmental impacts before making any public interest determination. Sierra Club asserts that to make any public interest determination without NEPA analysis is incoherent because it will inhibit, if not preclude, incorporation of any environmental impacts into the public interest calculus.

Sierra Club maintains that the only argument Cameron offers as to the NEPA analysis speaks to the question of who will perform the environmental review, rather than when the review will be performed. Sierra Club does not dispute that FERC may act as the lead agency for purposes of Cameron's project, but claims that this policy cannot subvert the requirement that NEPA review precede decision-making. Sierra Club contends that, if DOE/FE chooses to coordinate with FERC for purposes of NEPA review, DOE/FE must wait for FERC to complete the NEPA process before making a public interest determination.[65]

Sierra Club states that Cameron fails to rebut Sierra Club's critique of Cameron's claimed price and economic impacts. First, Sierra Club asserts that, instead of countering Sierra Club's criticism of the IMPLAN model, Cameron simply responded that it used a different input-

[65] Sierra Club argues that Cameron also fails to address the environmental impacts of its proposed LNG export project. As noted previously, the question of potential environmental impacts will be considered in a future order.

output model. Sierra Club claims that this is irrelevant, because Sierra Club's criticisms pertain to input-output models generally, rather than to features unique to IMPLAN. Sierra Club notes that Cameron has not identified any methodological differences between the specific model it used and input-output models generally, which are the subject of Sierra Club's criticisms.

Second, Sierra Club contests Cameron's assertion that Sierra Club did not present analysis or data to support its claim that the Liquefaction Project is inconsistent with the public interest due to hypothetical counterfactuals or foregone conclusions. Sierra Club argues that it demonstrated that, when flaws in Cameron's input-output model and empirical data are considered, it is clear that incremental natural gas production induced by the demand for natural gas for export will have little economic benefit. According to Sierra Club, Cameron's minimal showing of economic benefit must be weighed against Sierra Club's significant showing of environmental harm, which requires DOE/FE to conclude that the project is contrary to the public interest.

Third, Sierra Club contends that Cameron's criticism that the studies cited by Sierra Club do not relate specifically to the Project—and instead are general and theoretical—misses the point. According to Sierra Club, there is no logical or legal requirement for studies to be particular to this project. Sierra Club argues that the studies it cites show general trends under which natural gas production does not leave communities economically better than they would have been otherwise. Sierra Club asserts that, because Cameron provides no reason to believe that production induced by its export proposal will be any different than production in general, these general studies are relevant evidence to the limited economic impacts of gas production associated with Cameron's proposal.

As to gas prices, Sierra Club contends that the EIA's January 2012 study demonstrated

that Cameron's proposed export would harm the public interest by increasing domestic gas prices. Sierra Club contends that, contrary to Cameron's assertion that the study did not consider natural gas producer responses to increased natural gas demand, the EIA Study concluded that producers would respond to exports by increasing production, and that this increased production would supply the majority of the gas exported. Further, Sierra Club claims that Cameron seeks to minimize the effect of the EIA Study by urging DOE/FE to adopt the low range of estimates included therein. Sierra Club notes that the EIA Study's high export scenarios only include export levels of 12 Bcf/d, while pending applications seek the export of over 16 Bcf/d. Therefore, Sierra Club asserts, DOE/FE should use, at minimum, the EIA Study's high export scenarios.

Sierra Club next seeks to refute Cameron's introduction of the Brookings Report. According to Sierra Club, the report offers little insight on economic issues and contains no meaningful data on environmental concerns. Further, Sierra Club asserts that the Brookings Report only compiles existing economic analyses, many of which are prepared by gas industry consultants. Sierra Club claims that the Brookings Report relies on outdated information that estimated lower-end volumes of exports with correspondingly relatively low price impacts. Instead, Sierra Club asserts, LNG export proposal volumes have steadily increased, and are now far above even the high-end estimates used in the Brookings Report.

Further, Sierra Club contends that the Brookings Report offers little support for the inflated job figures offered by export proponents, and does not address the weaknesses of those figures. Sierra Club points out that the Brookings Report states that outside upstream sectors, the net impact of LNG exports producing jobs is likely to be minimal. Sierra Club argues that because the Brookings Report does not consider jobs displaced by increased hydraulic fracturing,

it should be seen as an optimistic description of LNG export's effects on the job market.

Finally, Sierra Club notes that the Brookings Report is essentially silent as to environmental issues. According to Sierra Club, the Brookings Report gives minimal treatment to environmental issues, contains no environmental data or modeling results, and fails to discuss many types of environmental impacts. It therefore does not reflect an effort to assess the environmental impacts of increased fracking associated with LNG exports. Therefore, Sierra Club contends, DOE/FE may not rely on the Brookings Report to draw conclusions.

Sierra Club concludes that the record before DOE/FE shows that LNG exports will: (1) raise gas prices, (2) cause significant economic disruption and support fewer jobs than Cameron claims, and (3) come with major environmental and resultant economic costs. Therefore, Sierra Club argues, DOE/FE can only rationally conclude that Cameron's proposed exports are not in the public interest.

4. Cameron Answer to Sierra Club's Motion to Reply and Reply Comments

On June 7, 2012, Cameron submitted its answer to Sierra Club's Motion to Reply and Reply Comments filed on May 23, 2012. Cameron argues that Sierra Club's motion should be denied because the DOE's rules do not contemplate such a submission, and Sierra Club should not be permitted to file what amounts to an improper supplemental protest.

Cameron maintains that Sierra Club fails to overcome the rebuttable presumption that proposed exports of natural gas are in the public interest. According to Cameron, Sierra Club's objections do not credibly show that natural gas exports are inconsistent with the public interest, but instead are characterized by the organization's hostility to fossil fuels. Further, Cameron states that Sierra Club's arguments are largely irrelevant to DOE/FE's public interest determination.

Cameron argues that by asserting that DOE must consider detailed environmental issues regarding shale gas production as part of the public interest determination, Sierra Club confuses the roles and responsibilities of DOE and FERC. According to Cameron, the Energy Policy Act of 2005 added a new section 15(b)(1) to the Natural Gas Act, which mandated that FERC act as the lead agency for the purposes of coordinating all applicable Federal authorizations and for the purposes of complying with NEPA. Therefore, Cameron argues, FERC, and not DOE, is the agency that will perform the NEPA analysis and before which any environmental arguments will need to be made.

Cameron states that, given this statutory division of labor, it has requested an order conditioned on the successful completion of the NEPA process at FERC. Cameron points out that there will be no final DOE order for purposes of the environmental question until after the NEPA review is completed, in which DOE will take part as a cooperating agency. Therefore, in Cameron's view, there is no conflict with NEPA regulations.

Cameron disputes Sierra Club's contention that DOE must consider the potential environmental effects of increased shale gas production, citing several factors. First, according to Cameron, FERC has on at least three occasions rejected similar arguments that a NEPA analysis must take into account general effects of increased shale gas production.[66] In each case, according to Cameron, FERC determined that shale gas development and associated potential environmental impacts were not sufficiently causally related to the natural gas project to warrant the type of review that Sierra Club seeks here. Cameron states that FERC reached this determination because the projects did not require shale gas development as a predicate and because state agencies, not FERC, regulate the siting and production of natural gas.

Second, Cameron states that FERC has found that the environmental effects of the type

[66] *See* Cameron Response at 6.

invoked by Sierra Club were not reasonably foreseeable under the Council on Environmental Quality's regulation because impacts from specific new well sites are highly speculative and cannot be estimated in any meaningful way. Cameron asserts that the same concerns are present here: shale gas production is neither causally related to the Cameron project, nor are the impacts from shale gas production "reasonably foreseeable" under NEPA.

Finally, Cameron addresses Sierra Club's argument that Cameron relies on the benefits of increased natural gas production for its conclusion that the Project is in the public interest, but does not consider cumulative and indirect effects of increased production in a NEPA analysis. Cameron argues that, in making this argument, Sierra Club confuses DOE/FE's statutory obligations. According to Cameron, a public interest analysis under the NGA and an environmental review under NEPA are distinct and should not be conflated.

Cameron next addresses Sierra Club's criticism of Cameron's use of an input-output model that (in Sierra Club's view) fails to consider sufficient counterfactuals and foregone opportunities. Cameron states that it explained in detail how it implemented a customized economic analysis using regional input-output multipliers prepared for Cameron by the Bureau of Economic Analysis. Cameron maintains that its analysis does not need to take into account every hypothetical and is more than sufficient to support a finding that the Liquefaction Project is in the public interest. Cameron further asserts that Sierra Club's position conflicts with U.S. government policies and assertions, which assumes that increased natural gas exports will increase the number of U.S. jobs and bring wealth to the United States. Cameron argues that, even if job creation is neutral, this is not enough for Sierra Club to overcome the presumption that natural gas exports are not inconsistent with the public interest.

Cameron contends that Sierra Club's arguments regarding the effect of exports on price

are founded on wildly unlikely factual scenarios. Cameron reiterates that the EIA Report did not take into account producers' response to increasing natural gas prices. Cameron points to a dynamic model used by Deloitte, which estimates only a 1.7% city gate price increase by 2035 based on LNG exports totaling 6 Bcf/d of natural gas.

Cameron disputes Sierra Club's assertion that DOE must rely on the "high/rapid" scenario in EIA's January 2012 study. According to Cameron, this position is inconsistent with the fundamentals of the global natural gas markets. Cameron argues that it is not plausible that U.S. exports would grow to the magnitude and at the pace reflected in the high/rapid scenario. Therefore, Cameron asserts, DOE should not rely on the extreme scenarios contained in the EIA report and should look instead to the most likely effect on prices given the world market for natural gas and the ability of other countries to ramp up LNG exports to compete against those of the United States. Cameron argues that, of the scenarios presented by EIA, the low/slow scenario is the most likely, and is not inconsistent with Cameron's conclusion that the Liquefaction Project will not result in significant price increases.

Cameron responds to Sierra Club's criticism of the Brookings Report by arguing that Sierra Club does not actually attempt to show that Brookings is incorrect. Cameron points out that Sierra Club merely argues that export proposals are higher than such estimates. Cameron argues that, although there may be several non-FTA export applications pending, whether any particular export facility will be constructed depends entirely on market forces. In Cameron's view, it is unlikely that all proposed export facilities will be built. Cameron disputes Sierra Club's argument that DOE/FE must make its determinations on the assumption that all proposed export facilities will be built, stating that Sierra Club fails to cite any authority for that proposition.

Finally, Cameron argues that Sierra Club's criticism of the Brookings Report on the grounds that the Report does not sufficiently take into account environmental considerations is irrelevant. Cameron asserts that environmental issues will be considered in the NEPA review at FERC with DOE participating as a cooperating agency. For these reasons, Cameron argues that Sierra Club's motion to reply should be denied.

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."[67] 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."[68]

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.[69]

[67] 77 Fed. Reg. at 73,629.
[68] *Id.*
[69] *See, e.g., Public Citizen v. F.A.A.*, 988 F.2d 186, 197 (D.C. Cir. 1993).

A. Data Inputs and Estimates of Natural Gas Demand

1. Comments

Several commenters, including Sierra Club,[70] Dow Chemical Company (Dow), along with U.S. Representative Edward Markey, U.S. Senator Ron Wyden, Alcoa, Save Our Supplies, 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

[70] 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 manufacturing sector.[71] Dow claims that there has been a manufacturing renaissance since completion of AEO 2011 involving announcements of approximately 100 capital investments representing some $95 billion in new spending and millions of jobs driven largely by the supply and price outlook for natural gas. These investments, according to Dow, will add about 5 million new jobs and 6 Bcf/d of industrial gas demand by 2020, which Dow states is nearly a 30 percent increase in industrial demand relative to 2009, the baseline year for AEO 2011.

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

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

[71] During the time of the comment period on the LNG Export Study, the AEO 2013 Early Release Overview 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].

changes in carbon policy, renewables policy, and nuclear policy favoring the use of natural gas in the power sector.

In addition to criticizing the projections of demand based on AEO 2011, Dow maintains that the level of exports authorized to date and additional exports that may be authorized in the future will drive up demand levels even higher. Specifically, Dow asserts that NERA's conclusion that prices will not increase by more than $1.11/Mcf is based on a faulty assumption that natural gas exports will never rise above 6.72 Tcf/yr, or roughly 18.5 Bcf/d by 2025. Dow points out that authorized exports to FTA nations as of January 1, 2013 had already reached approximately 28 Bcf/d. Dow complains that NERA did not consider what would happen if exports attained the authorized levels. In that event, Dow asserts that domestic gas prices undoubtedly would spike. Other commenters, such as Citizens Against LNG, make similar arguments. Citizens Against LNG alleges that the NERA study is flawed because it failed to estimate the impact of the full potential volume of exports of approximately 31.41 Bcf/d to FTA nations and 24.80 Bcf/d to non-FTA nations.

Contrary to the above arguments, several commenters, such as Dominion Cove Point LNG, LP (Dominion Cove Point), Lake Charles Exports, 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 data from the AEO 2013 Early Release Overview show higher production of natural gas and a more elastic supply of natural gas than the AEO 2011 data used by NERA, indicating that the domestic resource base could more easily accommodate increasing domestic demand as well as demand from new LNG export projects.

With respect to Dow's claim that there is $95 billion of new investment in domestic manufacturing, Lake Charles Exports and Secretary Abraham argue that many of the projects listed by Dow are currently under consideration and not projected to commence operation until far into the future. These commenters assert that Dow provided no information as to when or whether these projects will materialize. The commenters conclude that there is no reasonable basis to believe that these domestic manufacturing investments will lead to an additional 6 Bcf/d in domestic natural gas demand as claimed by Dow.

2. DOE/FE Analysis

a. Use of AEO 2011 Projections

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

Although some commenters have asserted that DOE should have required EIA and NERA to use newer projections than those in AEO 2011, this argument does not acknowledge

either the timing of the AEO publication cycles, or the lead time required of EIA and NERA to conduct their work. Using the final AEO 2011 projections, EIA published its study on January 19, 2012. Only four days later, on January 23, 2012, EIA published the 2012 AEO Early Release Overview, which (as noted above) was a preliminary, abridged version of EIA's forthcoming AEO 2012. It would not have been possible for EIA to use the AEO 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."[72] Requiring DOE to start over with new data "would lead to significant costs and potentially endless delays."[73] Moreover, under the commenters' rationale,

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

DOE's LNG Export Study and administrative process would run indefinitely, as DOE would have to start over with new AEO projections whenever they became available. As the Supreme Court has observed, if an agency were required to rehear new evidence before it issues a final administrative decision, "there would be little hope that the administrative process could ever be consummated in an order that would not be subject to reopening."[74]

No material change using post-AEO 2011 projections. Further, we are not persuaded that using post-AEO 2011 EIA 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 the 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 AEO 2013 assumptions actually indicate the beneficial market impacts that come from LNG exports.[75]

Using the later-published final AEO 2013 Reference Case (shown in Table 4 below) illustrates that, although total natural gas consumption projected for 2035 was projected to increase by 6 Bcf/d between AEO 2011 and 2013 (from 72.7 Bcf/d to 78.7 Bcf/d), total domestic

[74] *Vermont Yankee Nuclear Power Corp. v. Natural Res. Def. Council*, 435 U.S. 519, 554-55 (1978).
[75] Comments of Navigant Consulting, Inc., at 6 (attached to Initial Comments of Jordan Cove Energy Project, L.P.).

dry gas production was projected to increase by more than twice that amount, increasing by 13.8 Bcf/d (from 72.1 Bcf/d to 85.9 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 EIA's projections in the AEO 2013 Early Release Overview. As the table shows, the final AEO 2013 Reference Case projects domestic supply and demand conditions that are more, not less, favorable to exports.

On December 16, 2013, EIA issued its most recent projections for 2035 in the AEO 2014 Early Release Overview.[76] As depicted in Table 4, projections from that report reflect net LNG exports from the United States in a volume equivalent to 9.2 Bcf/d of natural gas.[77] Of this projected volume, 7.4 Bcf/d are exports from the lower-48 states, 0.4 Bcf/d are imports to the lower-48 states, and 2.2 Bcf/d are exports from Alaska.[78] This estimate compares with projected net LNG imports of 0.4 Bcf/d in the lower-48 for 2035 in the AEO 2011 Reference Case. The 2035 Henry Hub price in the AEO 2014 Early Release Reference Case is $6.92/MMBtu, down from $7.31/MMBtu in the AEO 2011 Reference Case (both in 2012 dollars).

Table 4 also compares the AEO 2014 Early Release Reference Case to the AEO 2013 Reference Case, indicating that:

- Total natural gas consumption for 2035 is projected to increase by 4.7 Bcf/d, from 78.7 Bcf/d to 83.4 Bcf/d;

[76] U.S. Energy Information Administration, *AEO 2014 Early Release Overview* (Dec. 16, 2013), *available at* http://www.eia.gov/forecasts/aeo/er/?src=home-b4 [hereinafter AEO 2014 Early Release Overview].
[77] *See* AEO 2014 Early Release Overview Table, "Natural Gas Imports and Exports," *available at* http://www.eia.gov/oiaf/aeo/tablebrowser/#release=AEO2014ER&subject=8-AEO2014ER&table=76-AEO2014ER&region=0-0&cases=ref2014er-d102413a & AEO 2014 Early Release Overview at 2 (Fig. 4), *available at* http://www.eia.gov/forecasts/aeo/er/pdf/0383er(2014).pdf.
[78] *Id*.

- Net exports (including both pipeline and LNG exports, including 2.2 Bcf/d of LNG exports from Alaska) are projected to increase by 8.1 Bcf/d, from 7.0 Bcf/d to 15.1 Bcf/d; and

- The projected 2035 Henry Hub price is projected to increase by $0.49/MMBtu, from $6.43/MMBtu to $6.92/MMBtu (in 2012 dollars).

Indeed, in comparing the AEO 2014 Early Release and AEO 2013 Reference Case projections, total domestic dry gas production is projected to rise by 13 Bcf/d of natural gas, from 85.9 Bcf/d to 98.9 Bcf/d (although this increase includes Alaska natural gas production). We also note EIA's projection in the AEO 2014 Early Release Overview that domestic prices of natural gas will rise due to both increased domestic demand and exports, but that these price increases will be followed by "[a] sustained increase in production … leading to slower price growth over the rest of the projection period."[79] These post-AEO 2011 projections in no way undermine our conclusion regarding the consistency of the proposed exports with the public interest.

[79] AEO 2014 Early Release Overview at 7, *available at* http://www.eia.gov/forecasts/aeo/er/pdf/0383er(2014).pdf.

Table 4: Comparison of AEO Cases

Projections for 2035	AEO 2011 Reference Case	AEO 2012 Reference Case	AEO 2013 Reference Case	AEO 2014 Early Release Reference Case	AEO 2011 High Shale EUR Case
Total Natural Gas Consumption (Bcf/d)	72.7	73.0	78.7	83.4	81.2
Electric Power Sector Consumption (Bcf/d)	21.6	24.5	25.9	29.2	26.4
Transportation Sector Consumption (Bcf/d)	0.4	0.4	1.6	1.3	0.7
Domestic Dry Gas Production (Bcf/d)	72.1	76.5	85.9	98.9	82.5
Net Natural Gas Exports by Pipeline (Bcf/d)	-0.1	1.9	3.0	5.9	1.9
Net Natural Gas Exports as LNG (Bcf/d)	-0.4	1.8	4.0	9.2	-0.4
Henry Hub Price, $/MMBtu (Reference Basis)	$7.07 (2009$)	$7.37 (2010$)	$6.32 (2011$)	$6.92 (2012$)	$5.35 (2009$)
Henry Hub Price (2012$ Basis)	$7.31/MMBtu	$7.62/MMBtu	$6.43/MMBtu	$6.92/MMBtu	$5.53/MMBtu

Note: AEO 2011 through AEO 2013 did not include Alaska LNG exports. As stated above, in the AEO 2014 Early Release Overview, EIA's projection of LNG exports from the lower-48 states in 2035 is 7.4 Bcf/d, LNG imports from the lower-48 states are 0.4 Bcf/d, and LNG exports from Alaska are 2.2 Bcf/d—for projected net LNG exports from the United States of 9.2 Bcf/d of natural gas.

As explained above, 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.[80] 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 Lake Charles Exports[81] and Secretary Abraham,[82] 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.[83] 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.[84] Indeed, while many of the FTA authorizations have been

[80] NERA study at 6.
[81] Reply Comments of Lake Charles Exports, LLC at 12-13.
[82] Reply Comments of Secretary Spencer Abraham at 8.
[83] As of the date of this Order, DOE/FE has authorized the export of 34.68 Bcf/d of natural gas to FTA countries.
[84] 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

in place for several years, DOE/FE is not aware of any application submitted to date in which a liquefaction facility was planned with the sole purpose of exporting LNG to FTA countries. 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/d 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/d case was found to be infeasible and was not included in the macroeconomic analysis.

United States imported 244 cargoes of LNG at the four terminals existing at that time. By comparison, in 2012, only 64 cargoes were imported at seven of the 12 terminals then in existence. Five of the 12 existing terminals did not receive any cargoes in 2012. *See* http://www.marad.dot.gov/ports_landing_page/deepwater_port_licensing/deepwater_port_licensing.htm; http://www.ferc.gov/industries/gas/indus-act/lng.asp; *Natural Gas Imports and Exports Fourth Quarter Report 2004*, DOE/FE-0485, Office of Natural Gas Regulatory Activities, Office of Fossil Energy, U.S. Department of Energy; *Natural Gas Imports and Exports Fourth Quarter Report 2012*, DOE/FE-0563, Office of Natural Gas Regulatory Activities, Office of Fossil Energy, U.S. Department of Energy; http://www.fe.doe.gov/programs/gasregulation/publications/LNG_2012_rev.pdf.

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.[85] 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.[86] 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."[87] 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 LNG exports will be short-lived and potentially of lower value to the U.S. economy. In this

[85] NERA study at 6.
[86] *Id*.
[87] *Id*. at 56.

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 ….[88]

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."[89]

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 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

[88] Initial Comments of Dow Chem. Co. at 27.
[89] *Id*. at 28.

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.[90]

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.[91] 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 & 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.

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

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,[92] 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 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

[92] 110 members of the U.S. House of Representatives filed a single set of comments in support of LNG exports.

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.[93]

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.

[93] 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.[94]

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

[94] *Id*. at 69.

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 Cameron, 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. Commenters including FLEX, the Independent Petroleum Association of America, and scores of local, state, and federal political leaders—including 110 Members of the U.S. House of Representatives and several U.S.

Senators[95]—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. The case-specific issue of regional impacts is discussed *infra* at Section IX.B.1 (Cameron's Application).

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

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

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.[96] These commenters are largely concerned that NERA has overestimated domestic supplies and that having lower supplies than estimated will exacerbate the likely price increases due to exports.

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

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

> There would need to be rapid deployment of new drilling rigs, increased steel pipe manufacturing and an expanded work force throughout the value chain to be able to service such unprecedented growth in [natural gas] production. With an already well-documented skills shortage in the labor market, basic supply and demand economics will prevail and drive labor prices higher, which would in turn have a chilling impact on investment in the manufacturing sector.[97]

[96] In his comments, Senator Wyden stated 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. DOE/FE notes that, earlier this year, Canada approved the third LNG export project mentioned by Senator Wyden—the Royal Dutch Shell Plc project.

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

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.

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 Cameron'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 26.8 Bcf/d) in the AEO 2014 Early Release Overview compared with AEO 2011. Likewise, projections of domestic natural gas consumption in 2035 increased (by 10.7 Bcf/d) in the AEO Early Release Overview, as compared with AEO 2011. Even with increased gas production and consumption, the 2035 projected natural gas market price in the Reference Case declined from $7.31/MM Btu (2012$) in AEO 2011 to $6.92/MM Btu (2012$) in the AEO 2014 Early Release Overview. EIA's latest projection is for a significantly greater quantity of natural gas to be available at a lower market price than estimated just three 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 14.2 years of production in 2011, the latest year statistics are available. Notably, since 2000, proved reserves have increased 88 percent to 334,067 Bcf, while production has increased only 23 percent, demonstrating the growing supply of natural gas available under existing economic and operating conditions.

Table 5: U.S. Dry Natural Gas Proved Reserves[98]

	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
2011	334,067	88	23,555	23	14.2

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 reserves and unproved resources.[99]

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, the latest data available.[100] 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.

[98] EIA, *U.S. Dry Natural Gas Proved Reserves* (Aug. 1, 2013), *available at* www.eia.gov/dnav/ng/ng_enr_dry_dcu_nus_a.htm (additional calculations conducted to produce percentage change and R/P ratios).

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

[100] *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.

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 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.[101] NERA thus assumed no changes specific to existing law governing production tax credits. EIA did the same. On the other hand, at DOE/FE direction, NERA and EIA accounted for potential variability in domestic natural gas supply such as would occur due to changes in environmental regulation and other factors, including changes to production tax credits. They did so by incorporating the High EUR and Low EUR scenarios into their model.[102]

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

[101] NERA study at 110.
[102] *Id.* at 25.

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 that: (1) exports of LNG from the United States would cease if the gap in prices between domestic and foreign supplies is closed; and (2) a foreign 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 Lake Charles Exports argue that foreign financing of LNG export projects is beneficial. These commenters argue that foreign direct investment in the U.S. LNG industry frees up domestic capital for other investments. These commenters conclude that, as a result, NERA's results likely underestimate the benefits to the U.S. economy that will result from LNG exports.

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

the international price of natural gas in certain markets, makes it impossible for the international market in natural gas to be perfectly competitive; and (3) NERA erroneously assumed that natural gas is a "perfect substitute" for oil in all circumstances.[103] Based on these comments, Save Our Supplies challenges the NERA study for allegedly assuming that Qatari and Russian suppliers of natural gas will cut their prices to compete with the lower priced supplies available from the United States. Save Our Supplies argues that such price competition will not be significant and, therefore, that there will be greater demand for U.S.-exported LNG. According to some commenters, NERA's asserted underestimate of international demand for natural gas was also exacerbated by its failure to account for the construction of natural gas infrastructure on a global basis. According to these commenters, NERA appears to underestimate both the supply cost of international LNG projects and the magnitude and trajectory of global LNG demand. NERA also appears to underestimate U.S. natural gas demand and potentially the elasticity of the U.S. natural gas supply curve.

A number of commenters take an opposing position by arguing that the domestic natural gas resource base is sufficient to meet both the domestic and international demand for U.S. natural gas. Center for LNG, Cheniere, and others go further by arguing that EIA and NERA underestimated the size of the resource base, and therefore overestimated the potential domestic price impacts of LNG exports. Dominion Cove Point, 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

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

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 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.[104] Moreover, Sierra Club and other commenters have not provided any evidence to suggest a lack of competition in the market for U.S. natural gas production.

b. Contract Terms

We disagree with the contention that NERA erred in the assumptions it used to model the export contracts that will be used by authorization holders. NERA assumed that these contracts will include payments to the exporting facility in the form of a tolling charge that is fixed based on the total export capacity reserved under the tolling agreement plus 115% of the Henry Hub price for each unit of gas that is liquefied. These assumptions correspond closely with the 20-year tolling agreement filed publicly with DOE by Sabine Pass on April 2, 2013. In that filing,

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

the tolling agreement carries a tolling fee (or "reservation charge") with a per unit liquefaction charge of 115% of the Henry Hub price.[105]

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

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

c. Foreign Direct Investment

As described above, several commenters charge that the NERA study incorrectly assumed that the financing of investments in natural gas supplies for export and in LNG liquefaction and export facilities would come from domestic sources. An examination of the

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

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.[106]

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.[107]

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

> NERA thus acknowledged the possibility that investment necessary for LNG exports may come from foreign sources. The NERA model's assumption of domestic investment explicitly fails to capture the macroeconomic benefits that will result from the injection of any foreign investment into natural gas production and infrastructure.

[106] NERA study at 6-7.
[107] *Id.* at 211.

> 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.[108]

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

d. International Natural Gas Markets

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

[108] Reply Comments of Lake Charles Exports at 31 (citations omitted).

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."[109] 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."[110] We find this to be a reasonable simplifying assumption and note further that even imperfectly competitive markets are not static. The arrival of new entrants, such as U.S.-based LNG exporters, may well have a disruptive impact on markets where competition may presently be constrained.

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

[109] NERA study at 34.
[110] *Id*. at 34-35.

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.[111]

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,[112] do not furnish a reliable basis for drawing inferences regarding transportation costs for LNG exports to Asia. Further, NERA provided a detailed description of the assumed transportation cost buildup, which is based on a daily charter rate of $65,000, and other reasonable assumptions.[113] 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

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[111] *Id.* at 84-90.

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

[113] NERA study at 87.

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

- Environmental costs associated with producing more natural gas to support LNG exports, including the costs, risks, and impacts associated with hydraulic fracturing and drilling to produce natural gas;

- Opportunity costs associated with the construction of natural gas production, transport, and export facilities, including the costs of investing in shale gas infrastructure to support LNG exports, as opposed to investing in renewable or sustainable energy infrastructure;

- Costs and implications associated with eminent domain necessary to build new pipelines to transport natural gas; and

- Potential for switching from natural gas-fired electric generation to coal-fired generation, if higher domestic prices cause domestic electric generation to favor coal-fired generation at the margins.

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

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 Cameron's proposed modifications to the Cameron LNG Terminal under NEPA in FERC Docket No. CP13-25-000 and on issuance by DOE/FE of a finding of no significant impact or a record of decision pursuant to NEPA.[115]

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

F. Prices and Volatility

1. Natural Gas Price Volatility

a. Comments

Several commenters, such as Huntsman Corporation, address potential natural gas price volatility associated with LNG exports. Janette Barth, Dow, Sierra Club, and Save Our Supplies, among others, state that NERA did not account for price volatility. Sierra Club points to the results of the LNG Export Study, which project higher domestic natural gas price impacts when exports phase in rapidly. Additionally, Sierra Club argues that, pending the pace of DOE/FE

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

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, Lake Charles Exports argues that Dow's analysis of domestic natural gas exports is incorrect, and the additional investment in domestic natural gas reserve development associated with increases in LNG exports will insulate the United States from natural gas price volatility.

The Bipartisan Policy Center, through its own analysis, forecasts that LNG exports are unlikely to result in large domestic price impacts. The Bipartisan Policy Center states that the results of its analysis indicate that LNG exports are likely to have only modest impacts on domestic natural gas prices—and that LNG export levels will adjust as domestic prices rise or fall.

b. DOE/FE Analysis

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

To the extent commenters are concerned about the risk of large upward price spikes sustained over longer periods, such as those that occurred in 2005 and 2008, we do not agree that LNG exports will necessarily exacerbate this risk. First, as noted above, when domestic wholesale gas prices rise above the LNG netback price, LNG export demand is likely to diminish, if not disappear altogether. Therefore, under some international market conditions, LNG export facilities are likely to make natural gas demand in the United States more price-elastic and less conducive to sustained upward spikes. Second, in light of our findings regarding domestic natural gas reserves explained above, we see no reason why LNG exports would interfere with the market's supply response to increased prices. In any capital intensive industry, investments are made based on observed and anticipated market signals. In natural gas markets, if prices or expected prices rise above the level required to provide an attractive return on investment for new reserves and production, industry will make that investment 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."[116] 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

[116] Reply Comments of Sierra Club at 20.

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 Management and Budget's (OMB) guidance entitled, "Final Information Quality Bulletin for Peer Review" (OMB Bulletin).[117] 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

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

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 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."[118] "Scientific information" does not include opinions where the presentation makes it clear the information is "opinion rather than fact or the agency's views."[119] Further, the OMB Bulletin, while applicable to rulemakings, provides that "official disseminations that arise in adjudications and permit proceedings" are exempt from peer review, unless "the agency determines that peer review is practical and appropriate …."[120]

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

[118] *Id*. at 2675.
[119] *Id*.
[120] *Id*. at 2677.

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."[121] 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.[122]

Further, the procedures followed by DOE/FE in this proceeding have allowed numerous commenting parties and third-party experts to offer differing analyses. The comments included several expert studies critiquing the LNG Export Study. For example, Professor Wallace Tyner of Purdue University, submitted results from a study that shows different results from NERA's. Sierra Club submitted a study by Synapse Energy Economics, Inc., that examined NERA's study and pointed out alleged "problems and omissions" in NERA's analysis.[123] 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.[124]

[121] EIA study at ii.
[122] *See, e.g.*, NERA study at 25-26.
[123] Synapse Energy Economics, Inc., *Will LNG Exports Benefit the United States Economy?* (Jan. 23, 2013), at 1, submitted with Initial Comments of Sierra Club.
[124] *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.

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.[125] The major purpose motivating the OMB Bulletin—to ensure that the government is well-informed by independent, expert analysis—was accomplished in this proceeding without the need for peer review.

I. Procedural Arguments

1. Comments

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

Dow, Sierra Club, Save Our Supplies, and other commenters contend that DOE/FE should conduct a public hearing regarding the applicable public interest standard in light of the cumulative impacts of LNG exports. Additionally, several commenters request that DOE/FE

[125] *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.")

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. Cameron's Notice of Application, published in the Federal Register on February 23, 2012, contained a detailed description of Cameron's Application, and invited the public to submit protests, motions to intervene, notices of intervention, and comments.[126] As required by DOE regulations, similar notices of application have been published in the Federal Register in each of the other non-FTA export application proceedings. Additionally, in December 2012, DOE/FE published the NOA in the Federal Register.[127] 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

[126] 77 Fed. Reg. at 10,732.
[127] 77 Fed. Reg. at 73,627.

each individual docket proceeding.[128] 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,[129] 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

To avoid repetition, the following discussion focuses on arguments and evidence presented by the applicant and intervenors to the extent that DOE/FE has not already addressed the same or substantially similar arguments in its response to comments on the LNG Export Study (Section VIII *supra*).

A. Motions to Intervene

As discussed above, APGA and Sierra Club filed motions to intervene and protests. Cameron opposed each motion, arguing that neither movant had specified an interest in the Liquefaction Project sufficient to warrant status as an intervenor.

The evidence presented by Cameron and the movants, as well as the LNG Export Study, indicate that the economic consequences of granting the Application could be far-reaching and

[128] *Id*. at 73,628.
[129] *See, e.g.*, *Process Gas Consumers v. FERC*, 930 F.2d 926, 929 (D.C. Cir. 1991).

could affect the interests of the movants and their members. This fact alone is good cause to permit their intervention. In addition, the movants have raised a number of environmental issues that, as discussed herein, we intend to address at a later date. For these reasons, the two pending motions to intervene are granted.

Additionally, DOE/FE is granting Sierra Club's Motion to Reply to Cameron's Response to Sierra Club's Protest and Motion to Intervene. Cameron responded to Sierra Club's Reply Comments, and we have factored Cameron's response into our decision. We do not believe that granting Sierra Club's Motion to Reply will substantially prejudice the rights of other parties, whereas the arguments contained in Sierra Club's Reply Comments are relevant to the issues in this proceeding.

B. Cameron's Application

Cameron introduced two studies to support its Application: (1) the Black & Veatch Report, analyzing the price response to generic incremental demand of 1.0 Bcf/d of natural gas attributable to LNG exports based on AEO 2011 data; and (2) the Economic Assessment, examining the economic impact from the anticipated production and export of LNG associated with the Cameron Terminal.

As summarized above, APGA and Sierra Club challenged the reliability of the studies used by Cameron to support its Application and argued that the proposed exports would not yield economic benefits but, in fact, would increase natural gas prices and result in other deleterious economic and societal impacts. APGA and Sierra Club maintained that the data from 2011 was outdated and that more recent data indicated that exports of LNG would result in significantly higher prices to the long-run detriment of the United States economy. Sierra Club additionally raised concerns over Cameron's use of an input-output model in the Economic Assessment, challenged the sustainability of economic benefits in regions tied to resource extraction

industries, and insisted that DOE/FE may not lawfully issue a conditional authorization in advance of the completion of environmental review of the Project.

We have considered the comments and protests presented in opposition to the Application and, for the reasons discussed below, find that those comments and protests do not overcome the rebuttable presumption that the proposed exports are consistent with the public interest.

1. Regional Impacts

Cameron asserts that the Project will stimulate local, regional, and national economies through direct and indirect job creation, increased economic activity, and tax revenues. These claimed benefits are largely based on the analysis contained in the Economic Assessment, described above in Section V.D.

Sierra Club faults the Economic Assessment principally because it is an input-output analysis that, by its nature, is based on a series of economic "snapshots" in time, does not provide a continuous picture of economic impacts, and does not consider a full range of counterfactual scenarios. Sierra Club additionally challenges Cameron's claimed regional benefits. Sierra Club focuses principally on the durability of economic benefits in producing regions and is concerned specifically about impacts in the areas in Pennsylvania and New York where Marcellus Shale drilling is occurring. Sierra Club asserts that any "boom" in economic activity will be followed by a bust, and that the prospect of such an event demonstrates that a grant of the requested authorization is inconsistent with the public interest.

We find that the record contains substantial evidence of regional economic benefits from a grant of the Application. We further find that the Economic Assessment submitted by Cameron is not inherently flawed simply because it is based on a series of snapshots of the

effects of certain predicted inputs or because all of the potential counterfactuals raised by Sierra Club were not factored into the analysis. These characteristics of the study do not mean that the results are unreasonable. Moreover, the results of the Economic Assessment are confirmed on a national scale by the NERA study.

Further, we reject Sierra Club's claims that exports will have a negative impact on employment. Sierra Club points to the Weinstein study to support its position. However, we considered the analysis contained in the Weinstein study in several recent orders and found that the Weinstein Study showed only a statistically insignificant decline in employment in the regions studied in the years before a drilling boom (2001 to 2005) compared to the years during the drilling boom (2005 to 2009) and that small decline could have been the result of other factors, particularly since the years of the drilling boom coincided with a national economic recession.[130] On the other hand, comparing the same time periods, we also found that the Weinstein study showed substantial gains in economic growth rates in counties with drilling operations as opposed to those without. For the same reasons provided in *Dominion Cove Point* and *Freeport II*, we reject Sierra Club's arguments here.

Sierra Club also contends more broadly that extractive industries suffer from boom-bust cycles and therefore provide little lasting benefit to local communities. To the extent Sierra Club is claiming that the exports proposed by Cameron will physically exhaust existing resources, we refer to Section VIII.C in which we conclude that record evidence indicates that there will be substantial supply into the foreseeable future. To the extent that the "bust" cycles Sierra Club envisions are brought on by price declines that render existing resources uneconomic to produce, we do not see compelling evidence that the exports will exacerbate this risk. If anything, it seems more likely that Cameron's ability to export to non-FTA countries will deepen and

[130] *See Dominion Cove*, DOE/FE Order No. 3331, at 136-38; *Freeport II*, DOE/FE Order No. 3357, at 148-51.

diversify the market for U.S.-produced natural gas, making the potential for a precipitous price-driven downturn in production activities less likely, not more likely.

2. Price Impacts

As discussed above, the LNG Export Study projected the economic impacts of LNG exports in a range of scenarios, including scenarios that equaled and exceeded the current amount of LNG exports authorized in the final and conditional non-FTA export authorizations to date (6.77 Bcf/d of natural gas) plus the additional 1.7 Bcf/d volume of exports proposed by Cameron in this proceeding. The LNG Export Study concluded that LNG exports at these levels (*e.g.*, 6 Bcf/d of natural gas and higher) would result in higher U.S. natural gas prices, but that these price changes would remain in a relatively narrow range across the scenarios studied. 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) depending on the market-determined level of exports. However, even with these estimated price increases, NERA found that the United States would experience net economic benefits from increased LNG exports in all cases studied. *See supra* Section VI.B.1, 8.

Both APGA and Sierra Club contend that Cameron relied on outdated EIA data from AEO 2011. This is the same data source used in the LNG Export Study, and was the most recent, final projections available at the time. For several of the same reasons that we reject arguments that the LNG Export Study was based on outdated data, we reject similar arguments raised by APGA and Sierra Club in this proceeding. As discussed in Section VIII.A above, the updated AEO 2014 Early Release Reference Case projections from EIA suggest domestic supply and demand conditions that are more favorable, not less favorable, to exports. Specifically, the most recent outlook in the AEO 2014 Early Release Reference Case for 2035 reflects LNG

exports of 7.4 Bcf/d in the lower-48, net natural gas pipeline exports of 5.9 Bcf/d, and market prices $0.39/MMBtu below the AEO 2011 Reference Case price, in constant 2012 dollars. It should be noted that in 2035, the AEO 2011 Reference Case had forecasted 0.5 Bcf/d of net imports, not exports, of natural gas plus LNG. Accordingly, we reject the intervenors' arguments and find that, as to the impact of these LNG exports on domestic gas prices, intervenors have not overcome the statutory presumption that the requested authorization is consistent with the public interest.

3. Conditional Authorization

Sierra Club contends that DOE/FE may not lawfully issue a conditional authorization until a full EIS has been issued, on the theory that a conditional authorization may limit the choice of reasonable alternatives or determine subsequent development. We disagree with Sierra Club's contention. As we have explained elsewhere, we are attaching a condition to this export authorization ordering that Cameron's authorization is contingent on both its satisfactory completion of the environmental review process and its on-going compliance with any and all preventative and mitigative measures imposed at the Cameron Terminal by federal or state agencies. When the environmental review is complete, DOE/FE will reconsider its public interest determination in light of the information gathered as part of that review. This procedure will not foreclose the choice of reasonable alternatives or influence subsequent development.

C. 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 Cameron's Application in this proceeding. The conclusion of the LNG Export Study is that the United States will experience net economic benefits from issuance of authorizations to export

domestically produced LNG. We have evaluated the initial and reply comments submitted in response to the LNG Export Study. Various commenters have criticized the data used as inputs to the LNG Export Study and numerous aspects of the models, assumptions, and design of the Study. As discussed above, however, we find that the LNG Export Study is fundamentally sound and supports the proposition that the proposed authorization will not be inconsistent with the public interest.

D. 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."[131]

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.

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

E. 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. Further, we note that it is far from certain that all or even most of the proposed LNG export projects will ever be realized because of the time, difficulty, and expense of commercializing, financing, and constructing LNG export terminals, as well as the uncertainties inherent in the global market demand for LNG. On balance, we find that the potential negative impacts of Cameron's proposed exports are outweighed by the likely net economic benefits and by other non-economic or indirect benefits.

More generally, DOE/FE continues to subscribe to the principle set forth in our 1984 Policy Guidelines[132] that, under most circumstances, the market is the most efficient means of allocating natural gas supplies. However, agency intervention may be necessary to protect the public in the event there is insufficient domestic natural gas for domestic use. There may be other circumstances as well that cannot be foreseen that would require agency action.[133] Given

[132] 49 Fed. Reg. at 6684.

[133] 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,

these possibilities, DOE/FE recognizes the need to monitor market developments closely as the impact of successive authorizations of LNG exports unfolds.

F. Conclusion

We have reviewed the evidence in the record and have not found an adequate basis to conclude that Cameron's export of LNG to non-FTA countries will be inconsistent with the public interest. For that reason, we are authorizing Cameron's proposed exports to non-FTA countries subject to the limitations and conditions described in this Order.

We have considered the cumulative impacts of past 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 authorizing exports of LNG in a volume equivalent to 1.7 Bcf/d of natural gas (620 Bcf/yr) in this proceeding, DOE/FE will have cumulatively authorized non-FTA exports totaling 8.47 Bcf/d of natural gas, or 3.091 Tcf/yr, for the one final and five conditional export authorizations granted to date—Sabine Pass (2.2 Bcf/d), Freeport I (1.4 Bcf/d), Lake Charles Exports (2.0 Bcf/d), Dominion Cove Point (0.77 Bcf/d),[134] Freeport II (0.4 Bcf/d),[135] and the current authorization (1.7 Bcf/d). This total export volume is within the range of DOE/FE-prescribed scenarios analyzed in the EIA and NERA studies. NERA found that in all such scenarios—assuming either 6 Bcf/d or 12 Bcf/d of export volumes—the United States would experience net economic benefits. As discussed above, the arguments of APGA and Sierra Club do not undermine the reasonableness of the findings in the LNG Export Study. We also note that EIA's most recent projections, set forth in the AEO 2014 Early Release Overview, continue to show market

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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*).

[134] *Dominion Cove Point, LNP, LP*, DOE/FE Order No. 3331, Order Conditionally Granting Long-Term Multi-Contract Authorization to Export Liquefied Natural Gas by Vessel from the Cove Point LNG Terminal to Non-Free Trade Agreement Nations (Sept. 11, 2013).

[135] *See supra* at 3, n.8.

conditions that will accommodate increased exports of natural gas. As explained in Section VIII.A., when compared to the AEO 2013 Reference Case, the AEO 2014 Early Release Reference Case projects marked increases in domestic natural gas production—well in excess of what is required to meet projected increases in domestic consumption.

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

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 Cameron. In connection with the LNG Export Study, 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.[136] 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. Cameron must abide by each term and condition or face rescission of its authorization or other appropriate sanction.

A. Term of the Authorization

Cameron has requested a 20-year term for the authorization commencing from the date export operations begin, which is consistent with our practice in the final and conditional non-

[136] 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.

FTA export authorizations issued to date.[137] 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.

B. Commencement of Operations Within Seven Years

Cameron requested this conditional authorization to commence on the earlier of the date of first export or seven years from the date of the issuance of this Order. Consistent with the final and conditional non-FTA authorizations granted to date,[138] DOE/FE will impose the condition that Cameron must commence commercial LNG export operations 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.

C. Transfer, Assignment, or Change in Control

DOE/FE's natural gas import/export regulations prohibit authorization holders from transferring or assigning authorizations to import or export natural gas without specific authorization by the Assistant Secretary for Fossil Energy.[139] 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,

[137] *See, e.g.*, *Freeport II*, DOE/FE Order No. 3357, at 157-58; *Sabine Pass*, DOE/FE Order No. 2961-A, at 29.
[138] *Sabine Pass*, DOE/FE Order No. 2961-A, at 33; *Freeport LNG*, DOE/FE Order No. 3282, at 122; *Lake Charles Exports*, DOE/FE Order No. 3324, at 128; *Freeport II*, DOE/FE Order No. 3357, at 158.
[139] 10 C.F.R. § 590.405.

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, 10 percent or more of the voting securities of such entity.

D. Agency Rights

As described above, Cameron requests authorization to export LNG on its own behalf and as agent for other entities who themselves hold title to the LNG. DOE/FE previously addressed the issue of agency rights in Order No. 2913,[140] 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-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.[141] 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*

[140] *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).
[141] *Dow Chem. Co.*, DOE/FE Order No. 2859, at 7-8, *discussed in Freeport LNG*, DOE/FE Order No. 2913, at 7-8.

Export, LLC.[142] 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.[143]

To ensure that the public interest is served, the authorization granted herein shall be conditioned to require that where Cameron proposes to export LNG as agent for other entities who hold title to the LNG (Registrants), Cameron must register with DOE/FE those entities on whose behalf it will export LNG in accordance with the procedures and requirements described herein.

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

DOE/FE's regulations require applicants to supply transaction-specific factual information "to the extent practicable."[144] 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.[145]

DOE/FE will require that Cameron file or cause to be filed with DOE/FE any relevant long-term commercial agreements pursuant to which Cameron exports LNG as agent for a Registrant. We note that Cameron has filed a Notice with DOE/FE stating that it has executed

[142] *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).
[143] *See id*. at 7-8.
[144] 10 C.F.R. § 590.202(b).
[145] *Id*. § 590.202(e).

LNG tolling capacity agreements with GDF SUEZ, Mitsubishi, and Mitsui. *See supra* Sections IV.A.2 and IV.C.

DOE/FE finds that the submission of all such agreements or 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 a Terminal Service Agreement (TSA) (an agreement to provide gas processing or liquefaction services) at the Cameron LNG Terminal, a long-term sales contract involving natural gas or LNG stored or liquefied at the Cameron LNG Terminal, or an agreement to provide export services from the Cameron LNG Terminal.

In addition, DOE/FE finds that section 590.202(c) of DOE/FE's regulations[146] requires that Cameron file, or cause to be filed, all long-term contracts associated with the long-term supply of natural gas to the Cameron LNG Terminal, whether signed by Cameron or the Registrant, within 30 days of their execution.

DOE/FE recognizes that some information in Cameron's or a Registrant'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 Cameron LNG Terminal, may be commercially sensitive. DOE/FE therefore will provide Cameron the option to file or cause to be filed either unredacted contracts, or in the alternative (A) Cameron 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

[146] *Id*. § 590.202(c).

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

As explained in Section IV.A.2, Cameron has sought export authorization in a volume equivalent to 1.7 Bcf/d of natural gas. As set forth herein, this Order authorizes the export of LNG in the full amount requested by Cameron, up to the equivalent of 620/Bcf/yr of natural gas.

G. Combined FTA and Non-FTA Export Authorization Volume

As stated above, Cameron is currently authorized to export LNG to FTA countries in an amount equivalent to 620 Bcf/yr of natural gas, as authorized in DOE/FE Order No. 3059. In this proceeding, Cameron seeks authorization to export the same volume to non-FTA countries under NGA section 3(a). Because the source of LNG proposed for both export authorizations is from the same facility (Cameron LNG Terminal), Cameron may not treat the volumes authorized for export in the two proceedings as additive to one another.

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. The authorization issued in this Order will be conditioned on Cameron's satisfactory completion of the environmental review process.[147]

[147] 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 the present 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.[148]

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.

[148] *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. Cameron is authorized to export domestically produced LNG by vessel from the Cameron LNG Terminal in Cameron Parish, Louisiana, up to the equivalent of 620 Bcf/yr of natural gas for a term of 20 years to commence on the earlier of the date of first commercial export or seven years from the date that this Order is issued. Cameron is authorized to export this LNG on its own behalf and as agent for other entities who hold title to the natural gas, pursuant to one or more long-term contracts (a contract greater than two years).

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

C. The LNG export quantity authorized in this Order is equivalent to 620 Bcf/yr of natural gas. This quantity is not additive to Cameron's FTA authorization, set forth in DOE/FE Order No. 3059.

D. This LNG may be exported to any country with which the United States does not have a 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. Cameron shall ensure that all transactions authorized by this Order are permitted and lawful under U.S. laws and policies, including the rules, regulations, orders, policies, and other determinations of the Office of Foreign Assets Control of the 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 Cameron's satisfactory completion of the environmental review process under NEPA in FERC Docket No. CP13-25-000

and on issuance by DOE/FE of a finding of no significant impact or a record of decision pursuant to NEPA. Additionally, the authorization is conditioned on Cameron's on-going compliance with any and all preventative and mitigative measures at the Cameron LNG Terminal imposed by federal or state agencies.

G. (i) Cameron shall file, or cause others to file, with the Office of Oil and Gas Global Security and Supply a non-redacted copy of all executed long-term contracts associated with the long-term export of LNG on its own behalf or as agent for other entities from the Cameron Terminal. The non-redacted copies may be filed under seal and must be filed within 30 days of their execution. Additionally, if Cameron has filed the contracts described in the preceding sentence under seal or subject to a claim of confidentiality or privilege, within 30 days of their execution, Cameron shall also file, or cause others to file, for public posting either: i) a redacted version of the contracts described in the preceding sentence, or ii) major provisions of the contracts. In these filings, Cameron shall state why the redacted or non-disclosed information should be exempted from public disclosure.

(ii) Cameron shall file, or cause others to file, with the Office of Oil and Gas Global Security and Supply a non-redacted copy of all executed long-term contracts associated with the long-term supply of natural gas to the Cameron Terminal. The non-redacted copies may be filed under seal and must be filed within 30 days of their execution. Additionally, if Cameron has filed the contracts described in the preceding sentence under seal or subject to a claim of confidentiality or privilege, within 30 days of their execution, Cameron shall also file, or cause others to file, for public posting either: i) a redacted version of the contracts described in the preceding sentence, or ii) major provisions of the contracts. In these filings, Cameron shall state why the redacted or non-disclosed information should be exempted from public disclosure.

H. Cameron, or others for whom Cameron acts as agent, shall require others for whom Cameron acts as agent to 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. 3391, issued February 11, 2014, in FE Docket No. 11-162-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 Cameron LNG, 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 Cameron LNG, LLC is made aware of all such actual destination countries."

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

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, Cameron shall ensure that all persons required by this Order to register with DOE/FE have done so. Any failure by Cameron 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 Cameron LNG Terminal in Cameron Parish, Louisiana, Cameron shall provide written notification of the date that the first export of LNG authorized in Ordering Paragraph A above occurred.

M. Cameron 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, Cameron 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 Cameron, 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, Cameron 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. The motions to intervene filed by Sierra Club and APGA are granted.

R. The motion to reply filed by Sierra Club on April 23, 2012, is granted.

Issued in Washington, D.C., February 11, 2014.

Christopher A. Smith
Principal Deputy Assistant Secretary
Office of Fossil Energy