UNITED STATES OF AMERICA

DEPARTMENT OF ENERGY

OFFICE OF FOSSIL ENERGY

LNG DEVELOPMENT COMPANY, LLC (d/b/a Oregon LNG)	)	FE DOCKET NO. 12-77-LNG

ORDER CONDITIONALLY GRANTING LONG-TERM MULTI-CONTRACT AUTHORIZATION TO EXPORT LIQUEFIED NATURAL GAS BY VESSEL FROM THE OREGON LNG TERMINAL IN WARRENTON, CLATSOP COUNTY, OREGON TO NON-FREE TRADE AGREEMENT NATIONS

DOE/FE ORDER NO. 3465

JULY 31, 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., *et al*.
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
LTA	Liquefaction Tolling Agreement
Mcf	Thousand Cubic Feet
MMBtu	Million British Thermal Units
mtpa	Million Metric Tons per Annum
NEI	National Export Initiative
NEMS	National Energy Modeling System
NEPA	National Environmental Policy Act
NERA	NERA Economic Consulting
N_{ew}ERA	NERA's Macroeconomic Model
NGA	Natural Gas Act
NGLs	Natural Gas Liquids
NOA	Notice of Availability
Tcf/yr	Trillion Cubic Feet per Year
TRR	Technically Recoverable Resources

I. INTRODUCTION

On July 16, 2012, LNG Development Company, LLC (d/b/a and hereafter Oregon LNG) 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 as liquefied natural gas (LNG) both: (i) natural gas produced in Canada and imported into the United States, and (ii) domestically produced natural gas. Oregon LNG seeks to export this 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] Oregon LNG requests authorization to export approximately 9.6 million metric tons per annum (mtpa) of LNG, a volume equivalent to approximately 456.25 billion cubic feet per year (Bcf/yr) of natural gas (1.25 Bcf per day (Bcf/d)), for a 25-year period commencing on the earlier of the date of first export or eight years from the date the requested authorization is granted.[4]

The proposed exports would originate from a liquefaction and export terminal to be located in Warrenton, Clatsop County, Oregon (Oregon LNG Terminal or Terminal). Specifically, Oregon LNG proposes to convert its pending import receiving terminal and pipeline into a bidirectional LNG terminal and pipeline capable of export (Oregon LNG Export Project or the Project). The pipeline is being developed by Oregon LNG's affiliate, Oregon Pipeline Company, LLC (Oregon Pipeline).

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[1] Application of LNG Development Co., LLC for Long-Term Authorization to Export LNG to Non-Free Trade Agreement Countries, FE Docket No. 12-77-LNG (Jul. 16, 2012) [hereinafter Oregon LNG 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] Oregon LNG 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 May 31, 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 Oregon LNG's requested export in the equivalent of Bcf/yr of natural gas. *See infra* Sections X.F & XII.A.

Oregon LNG is requesting authorization to export the 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 Oregon LNG to export LNG in a volume equivalent to 456.25 Bcf/yr of natural gas for a 20-year term.[5]

On September 7, 2012, DOE/FE published a Notice of Oregon LNG's Application in the Federal Register.[6] The Notice of Application called on interested persons to submit protests, motions to intervene, notices of intervention, and comments by November 6, 2012. In response to the Notice of Application, DOE/FE received three comments opposing the Application either in whole or in part. Additionally, five comments supporting the Application were appended as Appendix D to Oregon LNG's Application.

DOE/FE also received a motion for leave to intervene and protest by the American Public Gas Association (APGA), and a notice of intervention and comments filed by Citizens Against LNG, Inc. Sierra Club and Columbia Riverkeeper (collectively, Sierra Club, except otherwise noted) submitted a late-filed joint motion to intervene, protest, and comment, as well as a motion to reply. Additional procedural history is set forth below in Section VII.

Previously, on May 20, 2011, 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.[7] In that

[5] Oregon LNG states that this Bcf/yr volume is equivalent to 1.3 Bcf/d of natural gas, a volume that was rounded up to one digit. Instead, we find that it is equivalent to 1.25 Bcf/d of natural gas when considering two significant digits, which is the same volume we granted in Oregon LNG's FTA authorization described below.

[6] LNG Development Co. LLC, Application for Long-Term Authorization to Export Liquefied Natural Gas Produced from Canadian and Domestic Natural Gas Resources to Non-Free Trade Agreement Nations for a 25-Year Period, 77 Fed. Reg. 55,197 (Sept. 7, 2012) [hereinafter Notice of Application].

[7] *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).

order, DOE/FE conditionally authorized Sabine Pass to export a volume of LNG equivalent to 2.2 Bcf/d of natural gas. 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.[8] By that time, DOE/FE had received two additional applications for authorization to export LNG to non-FTA countries—one from Freeport LNG Expansion, L.P., *et al.* (collectively, Freeport or FLEX)[9] and one from Lake Charles Exports, LLC (Lake Charles Exports).[10] 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[11] and an application filed by Cameron LNG, LLC.[12]

[8] 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.

[9] 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., et al.*, 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*]; *see also infra* at Section IV.G (discussing amendment to order).

[10] 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*].

[11] On November 15, 2013, DOE/FE granted in part FLEX's second non-FTA export application, conditionally 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*].

[12] On February 11, 2014, DOE/FE conditionally authorized Cameron to export domestically-produced LNG in a volume equivalent to 1.7 Bcf/d of natural gas for a period of 20 years. *See Cameron LNG, LLC*, DOE/FE Order No. 3391, 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 (Feb. 11, 2013) [hereinafter *Cameron*].

In light of these developments,[13] DOE/FE engaged the U.S. Energy Information Administration (EIA) and NERA Economic Consulting (NERA) to conduct a two-part study of the economic impacts of LNG exports.[14] 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.[15] 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.[16] 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.[17]

[13] As of the date of this Order (and excluding Oregon LNG's Application), 26 applications for long-term export of LNG to non-FTA countries, in a volume of LNG equivalent to approximately 24.83 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, including Oregon LNG's Application, is equivalent to approximately 36.02 Bcf/d of natural gas.

[14] *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).

[15] 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 projections at Section VIII.A *infra*.

[16] *See* LNG Export Study – Related Documents, *available at* http://energy.gov/fe/downloads/lng-export-study-related-documents (EIA Analysis (Study - Part 1)).

[17] *See id*. (NERA Economic Consulting Analysis (Study - Part 2)).

On December 11, 2012, DOE/FE published a Notice of Availability (NOA) of the EIA and NERA studies (collectively, the 2012 LNG Export Study or Study).[18] DOE/FE invited public comment on the Study, and stated that its disposition of the present case and 14 other LNG export applications then pending would be informed by the Study and the comments received in response thereto.[19] The NOA required initial comments by January 24, 2013, and reply comments between January 25 and February 25, 2013.[20] DOE/FE received over 188,000 initial comments and over 2,700 reply comments, of which approximately 800 were unique.[21] 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.[22] As discussed below, DOE/FE has carefully examined the comments and has considered them in its review of Oregon LNG's Application.

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[18] 77 Fed. Reg. at 73,627.
[19] *Id*. at 73,628.
[20] *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.
[21] 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).
[22] *See* 77 Fed. Reg. at 73,629 & n.4.

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 Oregon LNG 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. DOE/FE further finds that Oregon LNG'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 Oregon LNG'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[23]] 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.[24]

[23] 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.

[24] *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).

While section 3(a) establishes a broad public interest standard and a presumption favoring export authorizations, the statute does not define "public interest" or identify criteria that must be considered. In prior decisions, however, DOE/FE has identified a range of factors that it evaluates when reviewing an application for export authorization. These factors include economic impacts, international impacts, security of natural gas supply, and environmental impacts, among others. To conduct this review, DOE/FE looks to record evidence developed in the application proceeding.[25]

DOE/FE's prior decisions have also looked to certain principles established in its 1984 Policy Guidelines.[26] 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.[27]

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.[28]

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,

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[25] *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.

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

[27] *Id*. at 6685.

[28] *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).

directed the Administrator to regulate exports "based on a consideration of the domestic need for the gas to be exported and such other matters as the Administrator finds in the circumstances of a particular case to be appropriate."[29] In February 1989, the Assistant Secretary for Fossil Energy assumed the delegated responsibilities of the Administrator of ERA.[30]

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

Oregon LNG states that it is seeking long-term, multi-contract authorization to export LNG produced from Canadian-sourced supplies of natural gas, and to a lesser extent supplies of natural gas produced in the United States. Oregon LNG has applied for authorization to export this LNG in a volume equivalent to 456.25 Bcf/yr of natural gas by vessel to non-FTA countries. The exports would originate from the proposed Oregon LNG Terminal, to be located in Warrenton, Clatsop County, Oregon. Oregon LNG seeks 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. Oregon LNG requests that the authorization commence on the date of first export, with its first export to occur no later than eight years following the grant of the authorization requested.

[29] DOE Delegation Order No. 0204-111, at 1; *see also* 49 Fed. Reg. at 6690.
[30] *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)).

Oregon LNG contends that, because it seeks to export LNG produced primarily from Canadian natural gas resources, its Application is different from other proposed export projects pending before DOE/FE that depend exclusively on domestically produced gas. According to Oregon LNG, its Application "is akin to applications for authorization to export previously imported LNG, which DOE/FE has expeditiously granted[,] reasoning that exporting such LNG could not significantly reduce the availability of domestically produced natural gas."[31] Oregon LNG asserts that DOE/FE should apply the same rationale in evaluating its Application.

A. Background

1. Description of Applicant and Facility

Oregon LNG states that it is a Delaware limited liability company with its principal place of business in Warrenton, Oregon. Oregon LNG states that it is headquartered in Vancouver, Washington, and authorized to do business in the State of Oregon.

Oregon LNG states that it intends to modify Oregon LNG's pending LNG import facilities into bidirectional facilities that will offer both liquefaction and regasification capability. According to Oregon LNG, this modification will enable the Oregon LNG Export Project to: (i) liquefy Canadian-sourced supplies of natural gas for export to higher-price foreign markets, and (ii) export domestically produced LNG, in light of the Project's access to gas supplies in the U.S. Rocky Mountains.

Oregon LNG states that, in 2008, it submitted to the Federal Energy Regulatory Commission (FERC) an application seeking authorization to construct and operate a facility to receive imports of LNG for regasification at the Terminal site (Import Terminal). Also in 2008, Oregon LNG's affiliate, Oregon Pipeline, submitted to FERC an application seeking authorization to construct, own, and operate a natural gas pipeline to transport natural gas from

[31] Oregon LNG App. at 3.

the Terminal. Oregon LNG states that the Import Terminal and Oregon Pipeline projects are pending before FERC in Docket Nos. CP09-6-000 and CP09-7-000, respectively.

In the Application, filed two years ago, Oregon LNG stated that it and Oregon Pipeline "anticipate amending their pending applications with FERC … by the First Quarter of 2013 for authorization to site, construct and operate the [bi-directional facilities]."[32] We take administrative notice that, on June 8, 2013, Oregon LNG amended its FERC application to seek authorization to site, construct, and operate the proposed bi-directional LNG terminal, as discussed below. Likewise, on the same day, Oregon Pipeline amended its FERC application to modify the proposed pipeline route and certain facilities, as well as to enable bi-directional flow of gas on the pipeline. Those applications are still pending before FERC in the above-captioned dockets.

2. Procedural History

On May 31, 2012, DOE/FE issued DOE/FE Order No. 3100, in which it authorized Oregon LNG to export LNG by vessel to FTA countries in a volume equivalent to approximately 456.25 Bcf/yr of natural gas (1.25 Bcf/d) for a 30-year term.[33] In its Application, Oregon LNG states that, in any given year, it expects to export a maximum of 9.6 mtpa of LNG from the Project (the equivalent of approximately 456.25 Bcf/yr of natural gas). Therefore, the proposed export volume in this proceeding is not additive to the volume authorized in DOE/FE Order No. 3100.

Also on May 31, 2012, DOE/FE issued Order No. 3099, in which it authorized Oregon LNG to import up to 912.5 Bcf of natural gas from Canada, pursuant to transactions that have

[32] *Id*. at 9-10.
[33] *LNG Development Co., LLC (d/b/a Oregon LNG)*, DOE/FE Order No. 3100, Order Granting Long-Term Multi-Contract Authorization to Export Liquefied Natural Gas by Vessel from the Proposed LNG Terminal in Warrenton, Clatsop County, Oregon to Free Trade Agreement Nations (May 31, 2012).

terms of no longer than two years, for a two-year term.[34] The import term commenced on May 31, 2012, and expired on May 30, 2014.

B. Liquefaction Project

Oregon LNG states that the proposed Terminal will be located in Warrenton, Oregon, which is in Clatsop County. According to Oregon LNG, the Export Project will be designed with a base-load LNG liquefaction capacity of 9.6 mtpa, which requires approximately 1.3 Bcf/d of pretreated natural gas.[35]

Oregon LNG states that LNG carriers will arrive at the Project site via the Columbia River Navigation Channel. The Project will be designed to accommodate LNG carriers ranging in size from 70,000 to 266,000 m^3. According to Oregon LNG, the LNG carriers will travel between 10 to 12 knots (11.5 to 13.8 miles per hours) on the Lower Columbia River until they reach Hammond, Oregon, at the final turn in the River before meeting tug boats to start docking.

Oregon LNG states that the Project will connect to the Oregon Pipeline, which will extend approximately 86 miles to an interconnect with the interstate natural gas pipeline system of Williams Northwest Pipeline Company (Williams system) near Woodland, Washington.[36] Through this interconnect, Oregon LNG anticipates that the Project will have access to supply basins in both Western Canada and in the U.S. Rocky Mountains. As explained below, however, Oregon LNG states that it "does not expect that the gas feedstock for the Export Project will be derived to any significant degree from Rockies supply given that the market modeling

[34] *LNG Development Co., LLC (d/b/a Oregon LNG)*, DOE/FE Order No. 3099, Order Granting Blanket Authorization to Import Natural Gas from Canada (May 31, 2012).

[35] Oregon LNG states that the Import Project will have base load capacity for regasification of LNG to send out 0.5 Bcf/d of natural gas.

[36] Oregon LNG states that the planned interconnection with the Williams system will require an expansion of the existing Williams system (the Washington Expansion Project). This Expansion Project will require, among other things, the installation of approximately 136 miles of 36-inch diameter pipeline along Williams's existing pipeline system. Oregon LNG states that, in July 2012, FERC granted Williams's request to begin the NEPA pre-filing process for the Washington Expansion Project in Docket No. PF-12-20-000.

commissioned by Oregon LNG demonstrates that Canadian supply is the economically preferred resource for the Project."[37] According to Oregon LNG, the proposed exports are scheduled to commence from the Terminal in late 2017.

C. Business Model

Oregon LNG requests authorization to export LNG on its own behalf and as agent for other entities. Oregon LNG states that, when exporting LNG on its own behalf, it will either take title to the gas at a point upstream of the Project, or it will purchase LNG from a customer of the Project prior to export. In other cases, Oregon LNG anticipates that it will act as agent for the customers of the Project, without taking title.

Oregon LNG states that it will comply with all DOE/FE requirements for exporters and agents, as set forth in recent DOE/FE orders. To comply with DOE/FE requirements for an agent, Oregon LNG states that it will register with DOE/FE each LNG title holder for whom it 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 Oregon LNG's long-term export authorization, and (ii) include those requirements in any subsequent purchase or sale agreement entered into by the title holder. Oregon LNG also states that 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.

According to Oregon LNG, it does not contemplate entering into any long-term gas supply or long-term export contracts in conjunction with the requested authorization. Rather, Oregon LNG anticipates entering into capacity use arrangements with potential Project participants or third-party customers, although it has not yet done so. Oregon LNG further states that it likely will structure its commercial arrangements in a manner that provides for other

[37] Oregon LNG App. at 3.

entities to hold liquefaction capacity in the Project and to bear responsibility for sourcing their own gas supplies.

D. Source of Natural Gas

As noted above, Oregon LNG anticipates that the gas feedstock for the Project will be produced primarily from Canadian resources, with the remainder drawn from domestic resources produced from the U.S. Rocky Mountain supply basin.

Oregon LNG contemplates that a portion of the gas for the Project will be sourced through various market hubs in the Pacific Northwest, primarily the Sumas hub in Washington. Oregon LNG states that the key pipeline systems serving the region are the Spectra BC Pipeline, the Williams Northwest Pipeline, the TransCanada Gas Transmission Northwest System, the Terasen Southern Crossing Pipeline, and the Williams Ruby Pipeline.

The Project will interconnect with the Williams system, which Oregon LNG states will link the Pacific Northwest demand centers with British Columbia and Rockies supplies via the pipeline being developed by Oregon Pipeline. According to Oregon LNG, the Williams system interconnects with the Spectra BC Pipeline system, and thus will provide access to both traditional basins and developing shale basins in British Columbia. Oregon LNG further states that the TransCanada Gas Transmission Northwest System was originally designed to transport Canadian gas from Alberta to the California border, but the pipeline is expected to have excess capacity due to competition from the Ruby Pipeline.

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 Oregon LNG Terminal under the National

Environmental Policy Act of 1969 (NEPA). DOE/FE is participating in that environmental review as a cooperating agency.

Oregon LNG requests that DOE/FE issue a conditional order approving its export authorization pending satisfactory completion of the environmental review and approval of the Terminal. DOE/FE's regulations[38] and precedent[39] support such an approach, and we find good cause for granting Oregon LNG's request for a conditional order. Accordingly, this conditional Order makes preliminary findings on all issues except the environmental issues in this proceeding.[40]

DOE/FE is attaching a condition to this export authorization ordering that Oregon LNG'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 Oregon LNG 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

Oregon LNG states that the proposed exports from the Oregon LNG Terminal are not inconsistent with the public interest under NGA section 3(a). According to Oregon LNG, it has proposed the development of the Oregon LNG Export Project due to the improved outlook for

[38] 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").
[39] *See, e.g.*, *Sabine Pass*, Order No. 2961, at 40-41, 43 (Ordering Para. F); *Freeport I*, Order No. 3282, at 120-21, 123 (Ordering Para. F); and *Lake Charles Exports*, Order No. 3324 at 15-16, 135-36 (Ordering Para. F).
[40] Although not affecting this conditional authorization, we note that, on June 4, 2014, DOE/FE announced a proposal to suspend its existing practice of issuing conditional authorizations, and instead issue only a final authorization decision after the environmental review of a proposed export project has been completed. *See* Dep't of Energy, Notice of Proposed Procedures for Liquefied Natural Gas Export Decisions, 79 Fed. Reg. 32,261 (June 4, 2014). The public comment period on the proposed procedures closed on July 21, 2014. After reviewing the comments received, DOE/FE will issue a decision. *See also infra* at 138 n.140 (discussing two notices related to DOE/FE's environmental review of non-FTA export authorizations, published by DOE/FE in the *Federal Register* on the same day).

North American natural gas production. Oregon LNG cites drilling productivity gains that have enabled rapid growth in supplies from unconventional gas-bearing formations in the United States and Canada. Oregon LNG asserts that improvements in drilling and extraction technologies have coincided with rapid diffusion in the natural gas industry's understanding of the unconventional resource base and best practices in drilling and resource development. Oregon LNG believes these changes have rendered obsolete past concerns of declining future domestic natural gas production.

Oregon LNG asserts that its proposed exports will provide various benefits to the public, including the expansion of market scope and access for North American natural gas producers at times when neither United States nor Canadian gas prices support continued production. According to Oregon LNG, analysts have expressed concern that Canadian gas storage levels could reach capacity, which potentially could affect U.S. natural gas prices as Canadian producers attempt to move surplus gas across the border to the United States. Oregon LNG further asserts that low market prices for natural gas in the United States have resulted in producers shifting drilling activities to oil-rich formations and, in some cases, flaring the associated natural gas.

In support of its Application, Oregon LNG addresses the following six factors: (i) the supply of natural gas in North America; (ii) domestic demand for natural gas; (iii) impact of the proposed exports on domestic prices of natural gas; (iv) a lack of regional or national need for the proposed exports; (v) economic benefits; and (vi) international benefits.

Oregon LNG also commissioned two studies in support of the Application:

(1) *Oregon LNG Export Project Market Analysis Study* (April 13, 2012), prepared by Navigant Consulting, Inc. (Navigant Report), appended to the Application as Appendix B; and

(2) *An Economic Impact Analysis of the Oregon LNG Project in Northwest Oregon* (Apr. 9, 2012), prepared by ECONorthwest (ECONorthwest Report), appended to the Application as Appendix C.

Oregon LNG states that the Navigant Report modeled the potential effect that the Oregon LNG Export Project might have on domestic prices of natural gas, given certain assumptions regarding future supply, demand, infrastructure development, and economic activity. The ECONorthwest Report assessed the economic impacts of the Project in the Pacific Northwest Region. The findings of both studies are discussed below.

A. North American Natural Gas Supply

According to Oregon LNG, the Navigant Report examined three scenarios through 2045, the requested timeframe for its proposed exports:

> (1) The "OLNG Reference case" was developed from Navigant's December 2011 forecast, which assumed that two other North American LNG export facilities—the Sabine Pass LNG facility in Louisiana, and the Kitimat LNG facility in British Columbia, Canada—would be operational by the time the Oregon LNG Export Project comes online.
>
> (2) The "OLNG Export case" expands on the results in the OLNG Reference case. It factors in the impact of Oregon LNG's estimated exports by assuming an additional average of 1.0 Bcf/d of exported natural gas.
>
> (3) The "Aggregate Export case" expands on the OLNG Reference case by including the aggregate estimated exports from North America, which Navigant assumes to be 6.8 Bcf/d of natural gas.[41]

Oregon LNG contends that the Navigant Report and other publicly available information demonstrate that the current natural gas supply in North America is ample, with a large surplus (as compared to demand levels) that is sufficient to meet projected domestic needs and the proposed exports through the requested 25-year term. Oregon LNG maintains that, in light of the positive supply/demand outlook for the United States and the fact that it proposes to export

[41] Oregon LNG App. at 22-23.

primarily Canadian natural gas supplies as LNG, its proposed exports could not significantly reduce the availability of natural gas produced within the United States.

Western Canada. Oregon LNG states that the "vast majority" of the natural gas feedstock for the Project will come from resources in Western Canada.[42] Oregon LNG asserts that the latest production and reserve data from this region show that there will be an abundant supply of natural gas for the Project. According to Oregon LNG, the Navigant Report indicates that the Province of British Columbia has planned an increase in production from 1.2 trillion cubic feet per year (Tcf/yr) of natural gas to more than 3.0 Tcf/yr in 2020 to supply three new proposed LNG export facilities and to accommodate a diversification of its gas markets. Oregon LNG also contends that short-term historical trends show an increase in production. For example, natural gas production in British Columbia was 122.6 Bcf in February 2012, up from 111.5 Bcf in February 2011.

Oregon LNG next asserts that recoverable natural gas reserves in Western Canada can support the Project demand. Citing the Navigant Report, Oregon LNG states that a minimum of 372 Tcf of natural gas resides in Western Canada's largest natural gas reserve, the Horn River Basin. Including the other two major resources on the Horn River (the Cordova Embayment and the Liard Basin), the total natural gas reserves are estimated at 448 Tcf. The Navigant Report found that estimates of marketable gas from the Horn River range from 90 to 200 Tcf, and recoverable estimates from the other major reserve in British Columbia, the Montney play, range from 65 to 221 Tcf of natural gas. Oregon LNG states that, in 2009, British Columbia consumed approximately 386 Bcf of natural gas, and that, assuming a steady level of demand and the most conservative reserve estimates, these two major gas resources could support British Columbia's demand for more than 400 years, even without tapping the tremendous reserves recently

[42] *See id*. at 16.

discovered in the Liard Basin. Oregon LNG asserts that, given the intention of British Columbia to increase exports, this would result in a more than adequate supply of gas for the Project.

United States. Similarly, Oregon LNG asserts that production and reserves within the United States provide for an abundant domestic supply of natural gas. Citing data from EIA's Annual Energy Outlook 2012 Early Release (AEO 2012 Early Release) and/or the Annual Energy Outlook 2012 (AEO 2012),[43] Oregon LNG contends that domestic gas production has been on an upward trend, allowing the United States to transition from a net importer to a net exporter of natural gas. Oregon LNG notes that, according to EIA, shale gas production in the United States reached 4.87 Tcf in 2010, or 23 percent of U.S. dry gas production. Further, by 2035, shale gas is estimated to account for 46 percent of total domestic natural gas production.

Oregon LNG states that estimates of the total amount of technically recoverable shale gas resources available in the United States have ranged from 482 Tcf to 842 Tcf. Citing EIA data, Oregon LNG states that the United States is expected to consume nearly 25.2 Tcf of natural gas in 2012, which suggests that the estimates for the shale gas resource alone would be enough to satisfy between approximately 20 and 35 years of U.S. domestic demand.[44]

According to Oregon LNG, available data project continued growth in domestic production. EIA estimated 2.0 Tcf of U.S. dry gas production in March 2012, an increase of 2.7 Bcf/d over the March 2011 estimate of 1.92 Tcf. Oregon LNG asserts that increased drilling productivity in certain prolific shale formations, particularly the Marcellus and Haynesville shales, has enabled domestic production to continue expanding despite a reduction in upstream industry development.

[43] *See id.* at 18 n.51.
[44] We note that EIA's actual data for 2012 were not materially different from its 2012 projections cited by Oregon LNG.

Oregon LNG next cites estimates by the Potential Gas Committee, which in April 2011 determined that the United States possesses future available supply of 2,170 Tcf of natural gas, an increase of 89 Tcf over its previous evaluation and the highest resource evaluation in the Committee's 46-year history. Oregon LNG indicates that most of the increase arose from the Potential Gas Committee's reevaluation of shale gas plays in the Gulf Coast, Mid-Continent, and Rocky Mountain areas. Oregon LNG also cites a study published in 2011 by the Massachusetts Institute of Technology, entitled *The Future of Natural Gas* (MIT Report),[45] which estimates that the United States has a mean recoverable resource base of approximately 2,100 Tcf of natural gas. Citing the MIT Report, Oregon LNG states that this mean resource estimate includes 650 Tcf of recoverable shale resources, "'approximately 400 Tcf [of which] could be economically developed with a gas price at or below $6/MMBtu at the well-head.'"[46] According to the MIT Report's mean resource estimate, U.S. gas production will rise by 40 percent between 2005 and 2050.

Navigant Report. Turning to Navigant's projections, Oregon LNG states that the three export scenarios contemplated by Navigant would have little effect on the supply of natural gas in the United States. According to Oregon LNG, the decline in net imports in both LNG and pipeline distribution, combined with an increase in unconventional production, will yield greater supply throughout the study period until 2045. Oregon LNG reports that the OLNG Reference case projects supplies of natural gas growing from 71.9 Bcf/d in 2017 to 83.3 Bcf/d in 2045, a 15.9 percent increase. Oregon LNG states that, under the OLNG Export case, supplies will increase at virtually the same rate, with a total production in 2045 of 83.4 Bcf/d of natural gas.

[45] Oregon LNG App. at 19, n.58.
[46] *Id*. (quoting MIT Report at 56) (alteration in original).

According to Oregon LNG, the slight increase in production between the two scenarios is accounted for by an increase in shale production under the OLNG Export case.

Oregon LNG maintains that domestic natural gas supply will see a greater increase when other LNG exports are factored in. For example, Oregon LNG notes that under Navigant's Aggregate Export case, production will grow from 71.8 Bcf/d of natural gas in 2017 to 84.4 Bcf/d in 2045, a modest 1.2 percent increase over the OLNG Export case and 1.3 percent increase over the OLNG Reference case.

From the Navigant Report, Oregon LNG concludes that its proposed Project, and LNG exports in general, would appear to have a minor positive impact on natural gas supplies in the United States. Oregon LNG maintains that, contrary to concerns that LNG exports will deplete domestic resources, the demand induced by such exports will spur production, yielding net positives across all scenarios.

B. Domestic Natural Gas Demand

Oregon LNG asserts that domestic natural gas demand continues to be outpaced by available supply, as evidenced by the decreasing price of natural gas in the United States. According to Oregon LNG, the United States has experienced essentially no growth in demand for natural gas over the past decade. Oregon LNG points out that, in AEO 2012, EIA predicted long-term annual gas demand growth of only 0.4 percent, with the domestic market expected to reach 26.63 Tcf of natural gas (72.9 Bcf/d) in 2035. Oregon LNG states that, according to EIA data, U.S. demand of 25.20 Tcf of natural gas in 2012 represented a mere 8 percent increase from the 23.33 Tcf consumed in 2000.

Focusing on the industrial sector, Oregon LNG reports that consumption of natural gas in the United States by industrial end-users has steadily declined over the last 15 years, from a peak

of 8.51 Tcf in 1997 to 6.7 Tcf in 2011. Oregon LNG states that, in AEO 2012, EIA projected U.S. industrial sector demand to total 7.0 Tcf of natural gas in 2035.

In the residential and commercial sectors, Oregon LNG cites EIA data in stating that gas demand per U.S. residential household has declined by 22 percent on a weather-adjusted basis from 1990 to 2009. Among the reasons for this decline are efficiency gains in heating furnaces, improvements in insulation and building construction codes, and higher commodity prices.

Oregon LNG states that any growth in residential consumption of natural gas will be offset by efficiency gains. Citing EIA data, Oregon LNG asserts that residential natural gas demand in 2035 is forecast to be 4.64 Tcf, a slight decrease from the 2012 forecast of 5.03 Tcf. Oregon LNG further states that natural gas use in the commercial sector will experience modest annual growth of 0.5 percent, reaching 3.6 Tcf in 2035, up from 3.12 Tcf in 2009. Oregon LNG also maintains that natural gas consumed for residential and commercial transportation accounts for only a small portion of domestic demand, as only 32.85 Bcf of natural gas was used in the United States for vehicle fuel in 2011 (approximately 0.1 percent of the total U.S. gas market).

Addressing the electric generating sector, Oregon LNG states that this sector has been the only domestic natural gas consuming sector to experience consistent growth in recent years. Oregon LNG notes that natural gas consumption for electricity generation totaled 7.6 Tcf in 2011, a 45.9 percent gain from the 5.21 Tcf used in 2000. Oregon LNG contends that the outlook for future demand is uncertain, but cites EIA's AEO 2012 Reference Case in predicting that U.S. gas demand by the electric power sector will increase slightly from 7.38 Tcf in 2010 to 7.66 Tcf in 2014. Oregon LNG further notes that EIA's AEO 2012 Reference Case predicts natural gas will increase from 24 percent of total generation in 2010 to 28 percent in 2035, with

natural gas use in the electricity sector growing 0.8 percent annually (from 7.38 Tcf in 2010 to 8.96 Tcf in 2035).

Turning to the Navigant Report, Oregon LNG states that, under Navigant's three scenarios, the difference in impact on domestic demand for natural gas is minimal. According to Oregon LNG, the Navigant Report shows no change in domestic demand between the OLNG Reference and OLNG Export cases. Total demand under both scenarios is estimated at 71.9 Bcf/d of natural gas in 2017 and 83.4 Bcf/d in 2045. Under both scenarios, the largest sector for demand is electric power generation, estimated at 25.8 Bcf/d of natural gas in 2017 and 36.5 Bcf/d in 2045. Oregon LNG states that a minimal impact on demand is seen under the Aggregate Export case, where demand is 0.1 Bcf/d of natural gas less than under the OLNG Export case in 2017. Only in 2045 do the two cases differ significantly, with the Aggregate Export model showing an increase in demand of 1.0 Bcf/d, represented mostly in the electric power generation sector.

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

Oregon LNG states that, under the three scenarios analyzed by Navigant, the price of natural gas in the United States shows only small variation. Oregon LNG states that the Navigant Report considers the price impact at Henry Hub and the Sumas Hub separately. In 2017, the Henry Hub price is $4.42/MMBtu under the Reference Case, $4.47/MMBtu under the OLNG Export case, and $4.66/MMBtu under the Aggregate Export case, resulting in a 5.43 percent price spread among the cases for 2017. In 2045—the last year of the term—the Henry Hub price is $8.07/MMBtu under the Reference case, $8.22/MMBtu under the OLNG Export case, and $8.47 under the Aggregate Export case, resulting in a 4.96 percent price spread among the scenarios.

Oregon LNG states that, based on Navigant's findings, the price differential at Sumas is estimated to follow a similar trend. In 2017, the Sumas price under the Reference case is estimated at $4.03/MMBtu, the OLNG Export price is estimated at $4.12/MMBtu, and the Aggregate Export price is estimated at $4.26/MMBtu, for a total price spread among the scenarios of 5.71 percent for 2017. Oregon LNG reports that in 2045, the estimated price spread at Sumas increases to 8.49 percent, though the price at Sumas remains below the Henry Hub price in all scenarios.

D. Supply/Demand Balance Demonstrates Lack of Domestic Need

Oregon LNG contends that North American supply and demand dynamics show that, given the large magnitude of North American natural gas resources, indigenous supplies of natural gas will be sufficient to meet demand. Oregon LNG further contends that, from a regional perspective, the Navigant Report highlights not only the feasibility, but also the benefit, of the proposed exports.

First, with projections that Canada will maintain its status as a net exporter of natural gas to the United States, a regional analysis indicates that cross-border flows into the Pacific Northwest consist solely of imports from Canada—again confirming the feasibility of sourcing Oregon LNG's proposed exports from Western Canadian supplies.

Second, Oregon LNG states that Eastern Canada is forecast to be a net importer of U.S. supplies for the entire forecast term, as a result of burgeoning U.S. gas production from the Marcellus Shale. According to Oregon LNG, the benefit of this regional supply shift is that Eastern Canadian market imports from the United States will lessen competitive demand for Western Canadian supplies of natural gas. This, in turn, will help to enhance the availability of Western Canada supplies for the Oregon LNG Export Project that otherwise would have been delivered to Eastern Canadian and Northeastern U.S. markets. According to Oregon LNG, the

benefit to the Western Canadian producing sector is that the Project will provide an additional demand needed to support Western Canadian natural gas development, as well as enhance price stability.

E. Local, Regional, and National Economic Benefits

As stated above, Oregon LNG commissioned the ECONorthwest Report to assess the economic impact of the proposed Oregon LNG Export Project (both the LNG Terminal and the Oregon Pipeline). ECONorthwest found that the Project will significantly stimulate local, regional and national economies in both the construction and operation phases, resulting in positive growth in job creation, indirect spending, and tax revenue. According to Oregon LNG, a majority of the labor, materials, and technology to construct and operate the Project will be drawn from Oregon and Washington, with a significant portion coming from Clatsop County, Oregon, where the Terminal will be located.

Construction Impact. Oregon LNG contends that the influx of labor needed to work on the Project will have a major positive impact on the regional economy. According to Oregon LNG, an estimated $400 million is anticipated to be spent on labor costs during the construction of both facilities. Oregon LNG states that, from 2014 until the Project's anticipated completion date in 2018, the construction phase of the Terminal and the Oregon Pipeline will create an average of 3,054 new construction jobs.

Oregon LNG asserts that the positive economic impact of the construction will extend beyond direct benefits (such as job creation) to indirect benefits, such as business to business transactions. Oregon LNG cites the example of a local sheet metal producer contracted to provide sheet metal to the construction efforts, which will hire new workers at its manufacturing facility. Citing the ECONorthwest Report, Oregon LNG states that the regional indirect impact of the Project's construction phase is estimated at $2.79 billion and 2,579 jobs.

Oregon LNG asserts that the Project's construction will result in substantial economic stimulus in the form of induced impacts. Induced impacts occur as a result of consumer spending in the region, such as when workers employed in the construction phase spend their wages in local shops and restaurants. ECONorthwest estimates the induced impact for the Project's construction phase to be $2.9 billion, with approximately 4,805 jobs created.

Oregon LNG concludes by stating that the total regional economic impact of the Project's construction phase over a five-year period will be $12.1 billion. The total average employment impact spread over the anticipated five-year period has been estimated by ECONorthwest to be l0,438 jobs. As a result, Oregon LNG contends that the State of Oregon will experience an increase of $219.8 million in income tax revenue during the construction phase of the Project alone.

Operations Impact. Oregon LNG asserts that the continuing economic impact from the operation of the Project will be significant. Citing the ECONorthwest Report, Oregon LNG states that the Project's operation costs are estimated at $285 million per year. Oregon LNG asserts that this economic impact will yield direct, indirect, and induced benefits to the region, as follows:

- The Project's operation will result in a regional impact totaling approximately $312 million in indirect and induced spending;
- Oregon LNG intends to hire 149 workers for its operations in Oregon, with an estimate of 129 workers residing in Clatsop County;
- Oregon LNG will require the services of numerous contractors and suppliers in the region, thus magnifying indirect and induced impacts;
- In Clatsop County alone, the total value of the indirect and induced labor impact of its ongoing operations will exceed $32 million; and
- On a regional basis, Oregon LNG claims that an estimated 1,591 jobs will be created from the Project's operations, with a valued impact of over $102.5 million.

Turning to the tax benefits associated with the Project, Oregon LNG emphasizes that the State of Oregon will experience a significant increase in income, property, and corporate tax revenue due to the ongoing operations of the Terminal and the Oregon Pipeline. Citing the ECONorthwest Report, Oregon LNG asserts that the annual income tax revenue during the operations phase will total an estimated $809,011 in direct impacts and approximately $3.76 billion in indirect and induced impacts.

Oregon LNG asserts that the Terminal, at an assessed value of $4.11 billion, will generate $51.9 million in annual property taxes in Warrenton, Oregon. Likewise, the Oregon Pipeline, at an assessed value of $386 million, will generate approximately $4.72 million in annual property taxes for counties in Oregon (mostly assessed in Clatsop Country), as well as approximately $194 million in annual property taxes for Cowlitz County, Washington. Oregon LNG further states that, based on estimated output and income, the operation of the Project will yield $7.96 million in annual corporate income and business and occupancy taxes for Oregon, and $263,570 in annual business and occupancy tax for Washington.

Benefits of Infrastructure Expansion. Finally, Oregon LNG asserts that another direct benefit of the Project will be the Washington Expansion Project (described *supra* at 11 n.36), in which Oregon Pipeline will expand the existing pipeline infrastructure to transport Canadian natural gas across the State of Washington to the Oregon LNG Terminal. Oregon LNG reports that expansion of the Williams system, required to accommodate the transportation of large volumes of natural gas to the Project, will involve the construction of approximately $700 million of pipeline upgrades. Further, the Washington Expansion Project will result in the creation of 1,855 total jobs over a three-year period (approximately 616 direct, 570 indirect, and

669 induced jobs). Oregon LNG states that these efforts and related economic benefits are not included in the ECONorthwest Report.

F. International Benefits

Oregon LNG asserts that its requested export authorization is supported by U.S. international trade law, U.S. trade policy, and DOE's longstanding policy that the public interest is best served by the principles of free trade.

Geopolitical Benefits. Oregon LNG asserts that the Oregon LNG Export Project will enhance the diversity of global natural gas supply and contribute to the security interests of the United States and its allies. Oregon LNG argues that a global, liquid natural gas market is beneficial to U.S. and global economic interests. Among other benefits, it advances security interests through diversity of supply and resilience to disruptions.

Oregon LNG maintains that the role of the United States as a supplier in the global LNG market will significantly diversify the global gas market. Oregon LNG anticipates that the proposed exports will be destined primarily for Asian markets, and thus will further America's geopolitical interests in that region. Specifically, Oregon LNG states that the United States will be a stable trading partner for Asian utilities and other international customers, who may be limited by their own energy security vulnerabilities. Oregon LNG further states that, by providing a stable, liquid energy source to the region, the United States can strengthen ties with Japan, South Korea, and India. Oregon LNG emphasizes that it is critical for the United States to include an integrated energy market as part of its foreign policy with Asia.

Benefits to Canada. Oregon LNG states that the Project is uniquely positioned to reinforce the energy trade relationship between the United States and Canada, which is among the closest and most extensive in the world. Oregon LNG notes that Canada is the single largest

foreign supplier of energy to the United States, providing 20 percent of U.S. oil imports and 18 percent of U.S. natural gas imports.

Oregon LNG maintains that development of natural gas resources in Canada will result in tremendous benefits to the Canadian economy at a national scale. Specifically, Oregon LNG contends that the Canadian economy will benefit from the Project's role in supporting the supply chain for natural gas extraction. Oregon LNG maintains that this indirect stimulus will have far-reaching economic impacts due to the wages, taxes and lease payments involved in the natural gas supply chain.

U.S. Balance of Trade. Oregon LNG states that the proposed exports will result in a net improvement in the balance of trade for the United States, even after deducting gas imports from Canada. Oregon LNG maintains that, in 2011, the U.S. trade deficit increased to approximately $560 billion, with petroleum products alone accounting for $326.1 billion (or approximately 58 percent) of that overall deficit. Oregon LNG projects that, if its Application is approved, the U.S. trade deficit would be reduced by $4.5 billion per year over a 25-year period, for an estimated total of $112.5 billion of net deficit reduction over the life of the Oregon LNG Export Project.

In addition, Oregon LNG contends that approving the export authorization would promote President Obama's stated policy goal of doubling exports from the United States as part of the National Export Initiative, as well as increasing U.S. employment.[47] Oregon LNG notes that as part of that initiative, President Obama stated that every $1 billion increase in exports supports more than 6,000 jobs in the United States, while emphasizing the imperative of boosting U.S. exports to ensure the country's long-term prosperity.

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

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 EIA Study. 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.[48] 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.

[48] 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.

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.[49]

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

[49] EIA Study at ii (emphasis in original).

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,[50] gross domestic product (GDP), aggregate consumption, aggregate investment, natural gas export revenues, sectoral output,[51] and wages and

[50] 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.

[51] 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.

other household incomes. In addition, NERA identified impacts that would affect certain energy intensive, trade exposed (EITE) industries, as discussed below.

1. Overview of NERA's Findings

NERA's key findings include the following:

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

Net benefits to the United States would be highest if the United States is able to produce large quantities of gas from shale at low cost, if world demand for natural gas increases rapidly, 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.[52] 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 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.[53] 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;

[52] 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.
[53] 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.

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

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

[54] 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.

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.[55] Like other general equilibrium models, N_{ew}ERA is designed to analyze long-

[55] 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

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, 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.[56] 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:

- **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.[57] NERA estimated economic impacts for these three cases with no constraint on exports, and found that even with exports reaching levels greater than

[56] 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.

[57] 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.

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 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

DOE/FE received timely motions to intervene and protest or comment from APGA and Citizens Against LNG, Inc. on November 6, 2012. On the same date, DOE/FE also received timely comments opposing the Application either in whole or in part from Morgan Myers, Emily E. Krafjack, and Ralph Kisberg. Five comments supporting the Application were appended as Appendix D to Oregon LNG's Application from the following: (i) Christian F. Steinbrecher, President of Ukiah Engineering, Inc., (ii) Douglas J. McCarron, General President of United Brotherhood of Carpenters and Joiners of America, (iii) Raymond J. Poupore, Executive Vice President of the National Construction Alliance II, (iv) Stephen E. Sandherr, Chief Executive Officer of the Associated General Contractors of America, and (v) Jode Guetzloe Parker, Columbia Pacific Building and Construction Trades Council.

Additionally, DOE/FE received a Motion to Intervene, Protest, and Comment from Sierra Club, filed out-of-time on November 6, 2012. On November 20, 2012, Sierra Club submitted a Motion to Intervene Out-of-Time and, on November 21, 2012, Oregon LNG filed the Answer of LNG Development Company, LLC (D/B/A Oregon LNG) to Out-of-Time Intervention, Protests,

and Comments (Answer). Sierra Club submitted a Motion to Reply and Reply on December 6, 2012.

B. Sierra Club's Late-Filed Motion to Intervene, Protest, and Comment

DOE received Sierra Club's Motion to Intervene, Protest, and Comment after 4:30 p.m. on November 6, 2012. Pursuant to DOE/FE regulations codified at 10 C.F.R. § 590.105, the motion was received out of time. In its subsequently filed Motion to Intervene Out-of-Time, Sierra Club contends that it has substantive interests in the outcome of this proceeding, its intervention will not unduly prejudice the rights of other parties, and there is good cause to permit its late intervention. In its Answer, Oregon LNG maintains the Sierra Club has not established good cause for granting the Motion to Intervene Out-of-Time. Oregon LNG contends that Sierra Club is a sophisticated organization with a record of active participation in the natural gas industry regulatory arena. Oregon LNG argues that permitting Sierra Club's late intervention would, in effect, turn regulatory deadlines into nothing more than guidelines that can be ignored when convenient. Oregon LNG adds that the environmental issues raised by Sierra Club are more appropriately raised during FERC's environmental review proceeding.

Upon review, we find that no party will be unduly prejudiced by our consideration of Sierra Club's late-filed Motion to Intervene, Protest, and Comment. Although, as stated above, we have not yet reviewed the environmental issues raised by Sierra Club in this conditional Order, we will review those issues following the completion of FERC's environmental review. Accordingly, Sierra Club's late-filed Motion will be accepted for filing.

C. Comments Supporting the Application

The comments supporting the Application assert that the Oregon LNG Export Project will provide significant economic benefits for both the local Oregon community and the Pacific Northwest region. The commenters assert that the Project will create jobs in the struggling

construction industry and foster both short-term and long-term economic activity in the region. Mr. Sandherr notes, for example, that the Associated General Contractors of America estimates that a $1 billion investment in non-residential construction will support or create 28,500 jobs, and thus the $6 billion project is likely to support or create 171,000 jobs. Similarly, Mr. McCarron contends that the approximately $6 billion spent directly on this Project will lead to more than $6 billion in additional economic activity in the region.

D. Comments Opposing the Application

The comments opposing the Application, either in whole or in part, discuss safety, environmental, and land use concerns; challenge the economic benefits projected for the Project; and criticize the efforts of DOE/FE in seeking public comment on LNG export applications. In particular, Morgan Myers stresses that natural gas is a finite resource that should be kept in America to maintain low natural gas prices and maintain national energy independence. Ms. Myers also questions the employment benefits of the Oregon LNG Export Project, highlighting the temporary nature of the Project's construction jobs. Ms. Myers questions how the Project will reduce the U.S. trade deficit and expresses concern that Oregon LNG will do no more to protect the environment than what is legally required.

Ralph Kisberg asserts that DOE/FE should improve its method of informing the public about applications and comment periods. According to Mr. Kisberg, DOE/FE would have received a vastly greater number of comments from those living in shale gas fields had the opportunity to comment been more well publicized. Mr. Kisberg notes his concern that DOE is considering approving Oregon LNG's Application despite hydraulic fracturing having been linked to negative impacts on human health, the environment, and the economy. Mr. Kisberg expresses doubt that Oregon LNG will abide by the stated intention to export primarily Canadian-sourced natural gas. Mr. Kisberg states that the quality of life for individuals living in

shale gas regions is at stake and that it may be a mistake to rush to export natural gas to non-FTA nations.

Finally, Emily Krafjack asserts that the many shale gas plays in the United States have the potential to strengthen the U.S. economy and make the country energy independent. Ms. Krafjack contends that the United States should not sacrifice its energy independence for the purpose of selling domestic natural gas to non-FTA countries. Next, Ms. Krafjack argues that natural gas prices existing at the time Oregon LNG submitted its Application—which Ms. Krafjack maintains were at a historic low—no longer exist, as gas prices have been rising steadily. Ms. Krafjack further contends that domestic demand for natural gas will continue to rise as new natural gas power plants come online and as personal and fleet vehicles continue to change to natural gas as their primary fuel source. For these reasons, Ms. Krafjack believes that domestic natural gas resources should be kept within the United States. She urges DOE/FE to deny Oregon LNG's Application.

E. APGA's Motion to Intervene and Protest

APGA states that it is an association of municipal gas distribution systems, public utility districts, and other public agencies. APGA maintains that Oregon LNG's request for authority to export domestically produced LNG is inconsistent with the public interest. APGA cites the EIA Study (discussed *infra* in Section VI.A) for the proposition that exporting domestic LNG[58] will significantly increase domestic natural gas prices. APGA also cites EIA's AEO 2012 in stating that EIA has reduced the level of estimated technically recoverable natural gas in the United States. APGA argues these assessments undermine the premise of the Application that vast

[58] APGA states that the Application should be treated as a proposal to export domestically produced natural gas notwithstanding the fact that a portion of the exported volumes will have been produced in Canada. *See* Mot. for Leave to Intervene and Protest of the American Public Gas Association, at 3 n.2 (Nov. 6, 2012) [hereinafter APGA Mot.].

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 prices and resulting increases in the price of electricity will reverse the nascent trend toward renewed domestic manufacturing before it gains momentum.[59]

APGA also maintains that Oregon LNG'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 Oregon LNG seeks to use to its advantage.

Oregon LNG's Application, according to APGA, is one of 19 applications submitted to DOE/FE seeking authority to export LNG to FTA and non-FTA nations. APGA argues that the quantity of domestic natural gas at issue in this and related proceedings, which APGA states is approximately 27.58 Bcf/d for FTA exports and 21.06 Bcf/d for non-FTA exports, is roughly 41 percent of the total marketed production in the United States in 2011 (66 Bcf/d). APGA contends that authorizing this quantity for export will: (i) have a substantial impact on natural gas demand, (ii) increase domestic natural gas and electricity prices, and (iii) limit natural gas supply at a time when the nation has an opportunity to forge a path toward energy independence. As a consequence, APGA contends that the proposed exports are inconsistent with the public interest.

APGA argues that, ultimately, Oregon LNG's exports will fail to compete with natural gas exports by other nations. APGA also argues that "DOE/FE should not pursue policies that

[59] *Id*. at 3.

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."[60]

APGA states that the Navigant Report on which Oregon LNG relies failed to consider the cumulative impact of actual proposed exports for the following reasons:

- Navigant assumed exports of only 6.8 Bcf/d of natural gas for its Aggregate Export Case;
- Navigant included the proposed Kitimat LNG export facility in its analysis but failed to include two other proposed export facilities in British Columbia and a proposed expansion of the Kitimat facility. According to APGA, Canadian facilities are relevant to this proceeding because, like the Oregon LNG Terminal, they would also export gas from Western Canada to Asian markets;
- Navigant failed to consider the possibility of a second LNG terminal on the Oregon coast even though Jordan Cove Energy Project, L.P. hired Navigant to conduct a similar study of the price impact of proposed exports from a terminal near Coos Bay, Oregon, in DOE/FE Docket No. 12-32-LNG.
- The Navigant Report failed to consider the full 1.3 Bcf/d in FTA export authority that Oregon LNG requested.

Finally, APGA argues that, while Navigant projected ample volumes of technically recoverable natural gas, EIA subsequently reduced its estimate of unproved technically recoverable gas in AEO 2012. This reduction, according to APGA, largely reflects a decrease in estimates for the Marcellus Shale from 410 Tcf to 141 Tcf, a 65 percent reduction due to a report from the United States Geological Service (USGS). APGA states that the reduction appeared in the Annual Energy Outlook 2012 Early Release in January 2012. According to APGA, Oregon LNG suggested in the Application that EIA would increase the estimate in its full version of AEO 2012. However, APGA states that EIA stood by its reduced projection in AEO 2012.

APGA next contends that the Navigant Report failed to adequately account for future

[60] *Id*. at 6.

demand for natural gas. APGA contends that the Navigant Report submitted by Oregon LNG did not include a Greenhouse Gas Demand Case, unlike the Navigant Report submitted with Jordan Cove's non-FTA export application in FE Docket No. 12-32-LNG.[61] APGA reports the Greenhouse Gas Demand Case took into account likely future efforts to curb greenhouse gas emissions that will increase demand for natural gas. Instead of including a Greenhouse Gas Demand Case, the three scenarios analyzed by Navigant for Oregon LNG rely on a prediction that domestic natural gas demand will barely increase each year.

APGA notes that the Navigant Report predicts lower Henry Hub prices in 2025 under all of its scenarios, including its Aggregate Export scenario, than EIA predicted in its Annual Energy Outlook. APGA contends that this disconnect between the EIA's analysis and the Navigant Report should prompt DOE/FE to take a harder look at the assumptions underlying Navigant and Oregon LNG's conclusions. APGA argues that, in light of more recent EIA studies, DOE/FE cannot uncritically accept Oregon LNG's projections regarding natural gas supplies and the impact of exports.

APGA points out that all of the scenarios analyzed by EIA forecast that LNG exports will increase domestic natural gas prices. Yet, according to APGA, the Navigant Report considered only one volume of future aggregate exports—6.8 Bcf/d from both the United States and Canada. This volume of exports, APGA charges, is near EIA's low export scenario from the United States only. APGA states that the Navigant Report uses the 6.8 Bcf/d figure as projected export capacity through 2045 without considering potential divergent growth rates in export capacity or an expansion of export capacity. In sum, APGA charges that the Navigant Report failed to account for the slow or rapid development of export capabilities, the potential for different gas

[61] *See Jordan Cove Energy Project, L.P.*, DOE/FE Order No. 3413, Order Conditionally Granting Long-Term Multi-Contract Authorization to Export Liquefied Natural Gas by Vessel from the Jordan Cove LNG Terminal in Coos Bay, Oregon, to Non-Free Trade Agreement Nations, at 18-19 (Mar. 24, 2014) [hereinafter *Jordan Cove*].

reserve scenarios, economic growth trends, or possible greenhouse gas regulations.

APGA further states that 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.'"[62] Given the number of export applications that DOE/FE has received to date, as well as the total export capacity requested for export to FTA and non-FTA nations, APGA submits that the "high/rapid" export scenario analyzed by EIA is the most realistic demand scenario. According to APGA, the high/rapid scenario produces price increases of 36 to 54 percent by 2018. APGA further contends that given the reduction in technically recoverable gas in the AEO 2012 overview report, the Low Shale EUR case may be the most accurate supply scenario considered in the EIA Study. APGA states that the high/rapid demand 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 demand scenario in the Low Shale EUR case, exports will increase domestic wellhead prices by 20 percent in 2020. APGA also asserts that future natural gas prices may be even higher than projected in the EIA Study not only because EIA assumed that domestic prices would only be affected by domestic supply/demand factors , but also because EIA failed to consider other factors that may limit economically recoverable domestic supplies, such as increased regulation of hydraulic fracturing and pending coal plant retirements.

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

[62] *Id*. at 11 (quoting EIA Study at 6).

sustained low prices for natural gas will help to keep electricity prices from spiking higher during the transition to lower-carbon fuels. Such a spike in electricity prices would have rippling effects on the U.S. economy, according to APGA.

APGA notes that power generation in the United States is undergoing a transition that favors natural gas generators over coal. In support of this argument, APGA states that EPA has proposed standards for carbon dioxide emissions from new electric generators that should effectively eliminate the construction of new coal burning plants. Despite this trend, APGA states that Oregon LNG justifies its export plans by claiming the power generation sector in the United States has a growing dependence on coal. APGA contends that if DOE/FE grants Oregon LNG's Application, demand for natural gas will rise, which will drive up the price of natural gas and in turn the price of electricity as power generators will be unable to switch back to coal once coal plants are retired or converted to gas.

APGA states that the United States currently imports billions of dollars of oil, a great deal of which is used for gasoline to fuel vehicles. APGA asserts that the replacement of current gasoline-powered fleets with natural gas vehicles (and support infrastructure) would significantly reduce U.S. dependence on foreign oil, and thereby enhance U.S. security and strategic interests and reduce the U.S. trade deficit. APGA states that Oregon LNG assumes there will be virtually no growth in demand for natural gas as a transportation fuel despite the fact that state governments and businesses are expending resources on infrastructure that would support natural gas as a transportation fuel for automobiles and locomotives. APGA is concerned that if large volumes of LNG exports are approved, domestic natural gas prices will rise and recent investments to expand natural gas as a transportation fuel will have been for naught.

APGA contends that, although Oregon LNG's Application cites the jobs that the

proposed exports will create, it does not acknowledge the jobs in other sectors that may be eliminated. 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 argues that shale gas is a world-wide phenomenon and maintains that the United States, rather than allowing the export of its domestic gas resources, should export its technology and expertise to help other nations develop their own non-conventional natural gas reserves. In this regard, APGA argues that Oregon LNG's proposed exports will not prove economical in the long-run. APGA maintains that Oregon LNG in particular will have to compete against exports of Canadian natural gas from British Columbia. APGA asserts that the exports from Canada's Pacific Coast will not have the added cost faced by Oregon LNG of shipping gas from Canada through the proposed Oregon Pipeline and to the proposed Oregon LNG export Terminal.

APGA also argues that domestic natural gas is at a disadvantage in the world market compared to gas from Qatar and states that Australia hopes to overtake Qatar as the world's largest exporter of LNG. In this environment, APGA doubts the ability of U.S.-sourced LNG to compete internationally because of the high capital costs of building an LNG export facility. APGA refers to an estimate by the Brookings Institution that the price spreads between the United States and potential export markets must remain intact for at least 10 to 12 years for investors to recoup the pre-planning and facility construction costs associated with LNG terminals. APGA notes that the Navigant Report estimates that the United States and Canada can only export a combined 6.8 Bcf/d before the economics turn against exports.

F. Notice of Intervention and Comments of Citizens Against LNG

Citizens Against LNG states that it is a grassroots organization with an interest in Oregon LNG's Application. In its view, the natural gas proposed to supply the Project and several other proposed LNG export projects appears to be coming from the same supply sources. Citizens Against LNG is concerned about the cumulative impacts of these LNG export proposals on gas supply, the domestic price of natural gas, and the environment.

Citizens Against LNG contends that a programmatic economic and environmental impact statement should be completed to determine which proposals, if any, applying for the same market share of natural gas would be in the public interest and the least environmentally damaging. Citizens Against LNG believes that DOE/FE should assess the economic and environmental impacts of all of the proposed LNG export projects as a whole, not only in the West Coast but in other regions of the United States as well. Citizens Against LNG maintains that the programmatic environmental assessment should consider the cumulative environmental impacts of hydraulic fracturing, as well as the cumulative impacts of proposed LNG export projects on water supply and air and water quality. According to Citizens Against LNG, an assessment of alternative ways to meet energy needs should be considered, along with an independent analysis considering the sustainability of current supplies of natural gas. Finally, Citizens Against LNG advises DOE/FE against allowing the "overbuilding" of LNG export facilities if there are not sufficient gas supplies to support them.

G. Joint Motion to Intervene, Protest, and Comments of Sierra Club and Columbia Riverkeeper

In their joint motion to intervene, protest, and comment, Sierra Club and Columbia Riverkeeper state that their "many thousands of members have a direct interest in ensuring that domestic natural gas production is conducted safely, and that any exports do not adversely affect

domestic consumers."[63] Sierra Club states that, as of July 2012, it had 15,525 members in Oregon and 601,141 members overall. Columbia Riverkeeper states that it currently has over 3,000 members, including many members who live in Clatsop County, Oregon. Sierra Club and Columbia Riverkeeper jointly move to intervene in this proceeding to protect their members' interests from the environmental and economic consequences of the proposed Project, which they maintain is not consistent with the public interest.

Sierra Club asserts that DOE/FE may not conditionally approve Oregon LNG's proposal before conducting an analysis under NEPA of the direct, indirect, and cumulative impacts of the proposed natural gas production on the environment and the economy. According to Sierra Club, this analysis must be completed under NEPA before decisions are made and actions taken. Sierra Club further claims that, because Oregon LNG's Application is silent as to the environmental impacts of its proposal, it fails to demonstrate that the Project is in the public interest.

Specifically, Sierra Club identifies three types of significant environmental harm associated with the Project:

- The construction and operation of the terminal, liquefaction facilities, and associated new pipeline will directly impact local water quality, habitats, and air quality;
- The Project will induce additional natural gas production in the United States, primarily involving hydraulic fracturing of unconventional gas sources, causing attendant environmental harm; this inducement will occur notwithstanding Oregon LNG's plan to export gas produced in Canada; and
- The Project will increase domestic gas prices, likely causing an increase in coal fired electricity generation, increasing emissions of greenhouse gas, conventional, and toxic air pollutants.

Next, Sierra Club argues that Oregon LNG's economic arguments are unpersuasive.

[63] Sierra Club and Columbia Riverkeeper's Motion to Intervene, Protest, and Comments (Nov. 6, 2012), at 1 [hereinafter Sierra Club Mot.]

Sierra Club asserts that LNG exports will significantly increase domestic gas prices, harming domestic consumers and increasing coal-fired electricity generation. Sierra Club further maintains that Oregon LNG's predictions of job creation and other economic benefits are overstated because they are derived from flawed IMPLAN input-output models. According to Sierra Club, these models do not consider counterfactual scenarios, and thus are unable to identify which of the "supported" jobs and benefits would have existed regardless of the Project.

Sierra Club asserts that DOE/FE has legal obligations to fulfill before it can authorize Oregon LNG's export proposal. According to Sierra Club, these obligations—created by the Natural Gas Act, the National Environmental Policy Act, the Endangered Species Act, and the National Historic Preservation Act—preclude granting Oregon LNG's request for conditional authorization. In addition, Sierra Club asserts that these statutes require DOE/FE's determination to be informed by the context in which the Project would occur, including indirect and cumulative effects of the Project. Accordingly, Sierra Club contends that NEPA review of the Application must encompass the associated pipeline proposals pending before FERC, as well as the other LNG export proposals pending before DOE/FE and FERC. Finally, Sierra Club contends that NEPA bars DOE/FE from granting conditional authorizations before it completes the NEPA process.

For these reasons, Sierra Club asserts that DOE/FE must prepare a programmatic EIS that considers the cumulative impacts of all applications pending before DOE/FE to export domestically produced LNG. Specifically, Sierra Club argues that it is insufficient for DOE to limit its public interest analysis to the 86-mile Oregon Pipeline associated with the Project, since an additional 136 miles of 36-inch pipe must be added to the Williams pipeline system (the Washington Expansion Project) before gas can be delivered to the Oregon LNG Terminal.

Sierra Club notes that FERC has already concluded that the Washington Expansion Project and Oregon LNG's proposal are "connected actions," such that both will be considered in a single EIS. Therefore, Sierra Club contends that DOE/FE must ensure that it considers both pipelines in its public interest determination.

Sierra Club also argues that both NEPA and the NGA require DOE/FE to consider alternatives to Oregon LNG's proposal. According to Sierra Club, DOE/FE must consider alternatives to the Project that would better serve the public interest, as well as broadly analyze other approaches to structuring LNG exports and gas use, given the sweeping effects of LNG exports on the economy.

Sierra Club states that construction and operation of the Project's facilities will have significant impacts on air, water, landscapes, and wildlife. Specifically, Sierra Club contends that operation of the proposed terminal, pipeline, and other facilities will result in carbon monoxide (CO), nitrogen oxides (NOx), volatile organic chemicals (VOC), greenhouse gases (GHGs), sulfur dioxides (SOx), particulate matter (PM10 and PM2.5), and hydrogen sulfide (H_2S) pollution. Sierra Club also argues that the Project will impact water quality. In this regard, Sierra Club identified potential issues associated with stream crossings for the pipeline, water withdrawals during construction, stormwater runoff from terminal facilities, and discharge and suspension or re-suspension of sediment in the Columbia River as a result of dredging and ship transits.

According to Sierra Club, the Project also faces geologic hazards and will negatively impact wildlife. In Sierra Club's view, the routing of the Oregon Pipeline poses a long-term threat to slope stability in the region. Sierra Club further contends that the Project will impact at least 42 listed or candidate species and their habitat. As an example, Sierra Club states that the

clearing of timber along the pipeline right-of-way removes habitat, provides a conduit for the spread of wildfires, and provides a route for off-highway vehicle users (which, in turn, have the potential to spread noxious weeds, insects, or diseases). Sierra Club also asserts that water intake, whether for ship operations or other uses, risks entraining fish, and that other Project-related impacts to water quality may degrade local habitat.

Sierra Club claims that, in addition to the direct local impacts of the Project, even greater environmental impacts will result from the increased gas production associated with the proposed exports. Sierra Club notes that, notwithstanding Oregon LNG's proposed plan to source gas for export from Canada, Oregon LNG concedes that its export proposal will increase gas production in the United States. Sierra Club states that, although Oregon LNG does not estimate the amount by which its proposal would increase production of natural gas in the United States, other studies have done so. These studies suggest that increases in gas production closely correspond with the volume of exported gas. Citing EIA data, Sierra Club asserts that Oregon LNG's proposed exports would result in increased production of natural gas in North America in a volume of at least 0.78 Bcf/d of natural gas, including an increase of 0.59 Bcf/d from shale gas production. Sierra Club also argues that even if the proposed exports would not induce additional gas production in the United States, they would induce additional production in Canada. Therefore, in Sierra Club's view, DOE/FE is required to consider the effect, if any, of that induced production on the environment in the United States.

Sierra Club states that DOE/FE is obligated by the NGA and by NEPA to consider the environmental effects of the induced natural gas production that would result from the proposed exports. Sierra Club argues that induced drilling is a reasonably foreseeable impact of the Project and, therefore, it is a required component of the NEPA analysis. Sierra Club

acknowledges that it cannot be known with certainty whether the Project will induce additional natural gas production, but states that certainty is not required by NEPA as "'[a]n impact is "reasonably foreseeable" if it is sufficiently likely to occur that a person of ordinary prudence would take it into account in reaching a decision.'"[64] Sierra Club asserts that every available source concludes that it is likely that the majority of exported gas will come from induced additional production and, therefore, an aggregate production increase is unarguably reasonably foreseeable.

Sierra Club also argues that analysis of the environmental impacts of induced gas production is within the scope of NEPA analysis because such an analysis does not require knowledge of the precise sites where additional production will occur. Sierra Club maintains that environmental costs and related economic costs can be determined in aggregate. Sierra Club states, for example, that any net increase in air pollution associated with the number of wells that will be induced may be quantified based on EPA's emissions inventories, and that these impacts can be localized by region (at a minimum). Sierra Club further argues that even if DOE/FE were to wrongfully conclude that NEPA only requires analysis of the impacts of induced drilling if it was possible to predict where that drilling would occur, DOE/FE has the tools to make that prediction and NEPA regulations provide that DOE/FE shall obtain this information unless DOE/FE demonstrates that the costs of obtaining it are exorbitant.[65]

Sierra Club contends that natural gas production, from both conventional and unconventional sources, is a significant air pollution source, can disrupt ecosystems and watersheds, leads to industrialization of entire landscapes, and presents challenging waste disposal issues. Sierra Club notes that Oregon LNG predicts that its gas will primarily come

[64] Sierra Club Mot. at 27-28, citing *City of Shoreacres v. Waterworth*, 420 F.3d 440, 453 (5th Cir. 2005).
[65] *Id.* at 28-29, citing 40 C.F.R. §1502.22.

from British Columbia's Horn River Basin, which is primarily shale gas. Sierra Club also reports that, in 2011, the Shale Gas Production Subcommittee of DOE's Secretary of Energy Advisory Board highlighted the risk of serious environmental consequences resulting from the continued expansion of shale gas production.[66]

Sierra Club asserts that, although EPA's new source performance standards and standards for hazardous air pollutants reduce some of the pollution problems associated with both conventional and unconventional natural gas production, they will not solve them. According to Sierra Club, the new EPA rules will not address important emission effects of LNG, including the tendency of LNG exports to increase the use of coal power. Thus, Sierra Club argues, DOE/FE may not rely upon EPA's rules to avoid weighing and disclosing the Project's impacts.

According to Sierra Club, increased oil and gas production will transform the landscape of regions overlying shale gas plays, bringing industrialization to previously rural landscapes and significantly affecting ecosystems, plants, and animals. Sierra Club asserts that land-use disturbances associated with gas development is widespread and difficult to manage because it causes both direct and indirect habitat loss. Sierra Club contends that these effects will harm rural economies and decrease property values. Sierra Club states that these impacts will also harm endangered species in regions where production increases in response to LNG exports.

Sierra Club further contends that the Project poses risks to ground and surface water as the proposal would induce more hydraulic fracturing, which could overtax the water source or directly contaminate groundwater. Sierra Club reports that the water required to hydraulically fracture a shale well varies, but that one well in the Marcellus shale required between 4 and 5 million gallons of water (80 to 90 percent of which was fresh water). Sierra Club asserts that hydraulic fracturing has resulted in groundwater contamination in at least five documented

[66] *See* Sierra Club Mot. at 29.

instances, and that EPA is investigating groundwater contamination in several different locations.

Sierra Club also asserts that hydraulic fracturing produces a variety of liquid and solid wastes that must be managed and disposed of. According to Sierra Club, these wastes contain contaminants that present environmental hazards with regard to their on-site management and disposal. Sierra Club states that on-site drilling mud, drill cuttings, flowback, and produced water are often stored in open pits which, in turn, can have harmful air emissions, leach into shallow groundwater water, or fail and result in surface discharges. Sierra Club further states that flowback and produced water must ultimately be disposed of off-site, with the most common methods of disposal being water treatment facilities or underground in injection wells. In Sierra Club's view, these methods of disposal also present risks of ground contamination and appear to have induced earthquakes in several regions.

In addition to the environmental impacts of the Project, Sierra Club states that the Project will significantly increase demand for natural gas. According to Sierra Club, this increased demand will increase domestic gas prices, harming American consumers and limiting or eliminating manufacturing and farming jobs. Sierra Club notes that the EIA Study predicts striking price increases from a range of export scenarios. Sierra Club argues that, absent a strong showing that EIA's estimates are inferior to those prepared by Oregon LNG, it would be arbitrary and capricious for DOE/FE to use industry estimates (which are lower than EIA's estimates) instead of EIA's projections.

Sierra Club states that Oregon LNG's estimates must also be excluded because they fail to account for the cumulative impacts associated with the Project. Sierra Club notes that the Navigant Report commissioned by Oregon LNG uses three cases: (i) the status quo, (ii) the

approval of Oregon LNG's proposal but no other pending export proposals, and (iii) an aggregate LNG export scenario under which 6.8 Bcf/d of natural gas is exported. Sierra Club asserts that, in light of the volume of natural gas already proposed for export (which, at that time, Sierra Club stated was 27.58 Bcf/d of natural gas), DOE/FE cannot rest on these low export scenarios. Sierra Club contends that consideration of the cumulative effects of the pending proposals is necessary. In Sierra Club's view, the public will not experience each proposed LNG terminal as an individual project, but rather will experience them cumulatively, through increased gas and electricity prices and environmental damage.

Sierra Club states that EIA's scenarios predict greater price increases than Oregon LNG's estimates, but that even if DOE/FE accepts Oregon LNG's projections, DOE/FE would have to conclude that these projections were significant and contrary to the public interest. Sierra Club argues that industries dependent on natural gas—such as farming, steel production, fertilizer manufacturing, and chemical manufacturing—will be particularly impacted by the price increases resulting from Oregon LNG's proposed exports. Sierra Club contends that increased costs to these industries will result in job losses, or at least stymied job growth, which would offset job growth created in the natural gas production industry.

Sierra Club argues that LNG exports from the United States will result in increased emissions of traditional air pollutants and greenhouse gases not only in the United States, but internationally as well. Sierra Club notes that the EIA Study predicts that exports, by causing natural gas prices to rise, will drive more electricity generation relying on coal instead of renewable fuel sources. This shift, according to Sierra Club, will increase emissions of both traditional air pollutants and greenhouse gases. Additionally, Sierra Club notes that a study conducted by the International Energy Agency in 2012 predicts that international trade in LNG,

and other measures to increase global availability of natural gas, will lead many countries to use natural gas in place of wind, solar, or other renewables, displacing these more environmentally friendly energy sources instead of displacing other fossil fuels.[67] Sierra Club contends that LNG is significantly worse than domestic natural gas in terms of greenhouse gas emissions due to the emissions from the liquefaction, transportation, and gasification processes.

Sierra Club contests Oregon LNG's claim that construction of both the Oregon LNG Terminal and the Oregon Pipeline will deliver over $800 million in annual economic benefit during the construction period, followed by $100 million in annual benefit during operation of the Project. According to Sierra Club, these predictions are based on a flawed analysis that overstates the number and quality of jobs created—an analysis which, Sierra Club maintains, did not consider counterfactual scenarios and foregone opportunities, did not reflect actual spending patterns, did not reflect jobs held from one year to the next, and only predicted jobs supported (as opposed to jobs created).

Sierra Club further contends that record support for Oregon LNG's claimed benefits is thin in contrast with the evidence submitted by those opposing the Application. Sierra Club asserts that DOE/FE cannot approve Oregon LNG's Application on this record. Sierra Club states that if DOE/FE nonetheless approves the Application, DOE/FE must recognize its continuing duty to protect the public interest by providing specific terms as to how DOE/FE will continue to monitor environmental and economic considerations and under what circumstances DOE/FE will take action.

[67] *See* Sierra Club Mot. at 55.

H. Answers of Applicant and Joint Reply of Sierra Club and Columbia Riverkeeper

1. Answer of Oregon LNG to Protests

Oregon LNG contends that the APGA Motion is not supported by relevant studies or or analyses and fails to overcome the statutory presumption in favor of granting the Application. Application. According to Oregon LNG, APGA incorrectly assumed that the Project is like other proposed LNG export projects when, in fact, the Project is different because it will primarily export gas sourced from Canada. This difference, Oregon LNG contends, means that APGA's reliance on domestic supply data is misplaced in two principal respects: (1) neither the EIA Study (which relied on AEO 2011) nor AEO 2012 took into account the demand for natural gas imports from Canada likely to be created by the Project (estimated at up to 1.3 Bcf/d of natural gas); and (2) the EIA Study is limited to the West South Central Census Division, which effectively assumes that incremental LNG exports would occur from the Gulf Coast States of Texas or Louisiana—not the Pacific Northwest (the proposed location of the Project).

To address this alleged gap in the EIA data, Oregon LNG states that it commissioned Navigant to study the price impacts of exporting primarily Canadian-sourced LNG. According to Oregon LNG, Navigant found that Canadian-sourced supplies are ample and sufficient to meet the demand presented by the proposed exports without materially impacting domestic gas supply and natural gas prices. Oregon LNG further contends that the Application is similar to previous applications to re-export foreign-sourced LNG, which DOE/FE granted, reasoning that exporting such LNG would not significantly reduce the availability of domestically-produced natural gas.[68]

Oregon LNG also argues that the principles established by DOE's Policy Guidelines,[69]

[68] Oregon LNG Answer at 5 n.16, citing *ConocoPhillips Company*, DOE/FE Order No. 3038 (Nov. 22, 2011).
[69] *Policy Guidelines and Delegation Orders Relating to the Regulation of Imported Natural Gas*, 49 Fed. Reg. 6,684 (Feb. 22, 1984).

intended to promote free and open trade by minimizing federal control and involvement in energy markets, mean that the economic viability of the Project is outside the scope of DOE's public interest analysis. Consequently, Oregon LNG maintains that DOE/FE should give no weight to APGA's argument that the Project's economic viability should be a factor in its public interest analysis.

Oregon LNG likewise rejects Citizens Against LNG's arguments against the proposed exports. According to Oregon LNG, the Citizens Against LNG Motion expresses vague concerns about the cumulative supply and price impacts of the various LNG export proposals filed with DOE/FE, and urges DOE/FE to prepare a programmatic EIS, as well as an economic study of the proposals. According to Oregon LNG, the Citizens Against LNG Motion calls for: (i) a study of the impacts of hydraulic fracturing; (ii) a study of impacts on water and air quality, as well as water supply; and (iii) an independent assessment of sustainable natural gas supplies. Oregon LNG maintains that Citizens Against LNG's demand for a programmatic EIS should be rejected because the Project is discrete, independent, and not part of a coordinated federal program.[70]

While Oregon LNG does not oppose the timely interventions of APGA and Citizens Against LNG, it challenges Sierra Club's late-filed intervention, protest, and comments on grounds that Sierra Club did not show good cause for filing out-of-time. Oregon LNG argues that Sierra Club is a sophisticated organization of over 600,000 members with a record of active participation in the natural gas industry regulatory arena, and, therefore, Sierra Club should not be allowed to circumvent procedural requirements. Oregon LNG additionally submits that the environmental concerns raised by Sierra Club

[70] Oregon LNG maintains that the same response is applicable to Sierra Club's argument that DOE/FE should prepare a programmatic EIS.

are more appropriately considered within FERC's environmental review of the Project.

Oregon LNG also contests Sierra Club's argument that DOE may not issue a conditional export authorization prior to completion of NEPA review. Specifically, Oregon LNG disputes Sierra Club's claim that issuance of a conditional order will constrain FERC in its consideration of project alternatives. Oregon LNG maintains that Sierra Club cites no legal precedent to support its position, and states that DOE regulations (10 C.F.R. § 590.402) expressly provide authority for conditional orders. Oregon LNG maintains that DOE routinely issues conditional orders subject to satisfactory environmental review in circumstances similar to this proceeding.

Oregon LNG further rejects Sierra Club's argument that DOE must prepare a separate EIS. Oregon LNG points out that DOE/FE will be a cooperating agency in the FERC's NEPA process, thereby avoiding duplicative reviews. Oregon LNG further asserts that there is no reason to believe that the EIS will be inadequate to inform DOE/FE's decision or to discharge its NEPA obligations.

Oregon LNG likewise rejects Sierra Club's contention that the NEPA analysis must consider the impacts of induced natural gas production. Oregon LNG states that this argument has been rejected by both DOE/FE and FERC.[71] According to Oregon LNG, FERC has held that induced production is neither "reasonably foreseeable" nor an "effect" for purposes of a cumulative impacts analysis within the meaning of the Council on Environmental Quality's regulations. This position, according to Oregon LNG, was upheld in *Central New York Oil and Gas Company, LLC,*[72] and other cases cited by Sierra Club to support a different result have been

[71] Oregon LNG Answer at 14 n.48, citing Order No. 2961-A at 11–12, 27–28 (Aug. 7, 2012). *See also Sabine Pass Liquefaction, LLC and Sabine Pass LNG, L.P.*, 139 FERC ¶ 61,039 at P 99 (2012), *reh'g denied* 140 FERC ¶ 61,076 at PP 8 - 22 (2012).

[72] Oregon LNG Answer at 14, 137 FERC ¶ 61,121 (2011), *reh'g denied*, 138 FERC ¶ 61,104 (2012), *aff'd, Coalition for Responsible Growth and Res. Conservation v. FERC*, No. 12-566, 2012 U.S. App. LEXIS 11847 (2d Cir. June 12, 2012) (hereinafter "*Central New York*").

distinguished by the FERC. Oregon LNG submits that the amount of production that might be induced in connection with the proposed exports remains unknowable, as does the location and timing of any such production. Oregon LNG also reiterates that Sierra Club fails to account for the fact that Oregon LNG proposes to export primarily Canadian-sourced LNG.

Oregon LNG responds to Sierra Club's criticisms of the input-output model used in the economic impacts study conducted by ECONorthwest and the alleged failure of that study to consider counterfactuals and foregone opportunities. According to Oregon LNG, Sierra Club fails to provide any relevant studies or economic modeling specific to the Project that would contradict or discredit the ECONorthwest Report. Oregon LNG reiterates that the ECONorthwest Report demonstrates benefits in terms of job creation, increases in domestic economic activity, and increased tax revenues for the Pacific Northwest regional and local economies. Additionally, Oregon LNG submits that Sierra Club's position on the economic benefits of the Project conflicts with the National Export Initiative, as well as other U.S. policies that favor exports.

2. Joint Reply of Sierra Club and Columbia Riverkeeper to Oregon LNG's Answer

Sierra Club notes that, although DOE/FE rules do not provide parties the right to a reply, the rules allow for a wide range of procedural motions, including allowing any party to file a motion requesting additional procedures. Sierra Club states that it requested the right to file a reply motion in its initial protest filing and Oregon LNG did not oppose the request. Sierra Club asserts that DOE/FE should grant its unopposed request because its reply will aid DOE/FE's public interest determination.

In response to Oregon LNG's argument that Sierra Club has not shown good cause for intervening out of time, Sierra Club states that harm to the proceedings is the primary concern in

evaluating motions to intervene out of time. According to Sierra Club, Oregon LNG does not dispute that Sierra Club's two-hour filing delay caused no hardship to these proceedings.

Sierra Club reiterates that although DOE/FE has authority to issue conditional orders, this authority is limited by DOE's and the Council on Environmental Quality's regulations prohibiting action that would limit the scope of available alternatives and requiring that environmental review be performed at the earliest possible time. Sierra Club maintains that DOE/FE cannot perform a public interest analysis—which includes the consideration of environmental impacts—without first completing an environmental review to determine the environmental impacts associated with the proposed exports.

Sierra Club reiterates that DOE/FE must prepare a programmatic EIS to evaluate the cumulative effects of LNG exports, which could then be used by FERC as the lead agency for facility-specific NEPA reviews. In regard to Oregon LNG's assertion that environmental impacts of induced shale gas production are unforeseeable and need not be considered, Sierra Club contends such an assertion is incorrect because EIA's National Energy Modeling System can predict where induced production will occur. Sierra Club further asserts that the NERA Study refutes Oregon LNG's argument about job creation.

Sierra Club emphasizes that the proposed exports will raise gas prices, cause significant economic disruption without delivering the job-creation benefits Oregon LNG asserts, and result in major environmental and economic costs. According to Sierra Club, Oregon LNG's rebuttal does not seriously disturb any of these conclusions, and therefore DOE/FE must conclude that Oregon LNG's proposed exports are not in the public interest under NGA section 3(a).

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."[73] 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."[74]

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.[75]

A. Data Inputs and Estimates of Natural Gas Demand

1. Comments

Several commenters, including Sierra Club,[76] 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

[73] 77 Fed. Reg. at 73,629.
[74] *Id.*
[75] *See, e.g., Public Citizen v. F.A.A.*, 988 F.2d 186, 197 (D.C. Cir. 1993).
[76] For purposes of this discussion, Sierra Club filed comments on the LNG Export Study 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].

more accurate picture of the current and likely future state of the natural gas market and the likely macroeconomic impacts of LNG exports. These commenters assert that the AEO 2011 projections significantly underestimate actual and future demand for natural gas, especially in the U.S. electric, manufacturing, and transportation sectors, and in international markets. Some commenters identify additional factors, other than the vintage of the AEO 2011 data, to support their arguments that NERA underestimated present and future demand for natural gas. For example, Save Our Supplies argues that NERA underestimated international demand because the GNGM model did not appear to account for the continued growth of international LNG import infrastructure. Together, these commenters assert that the NERA Study underestimated future demand for natural gas and, consequently, underestimated the likely increases to natural gas prices from LNG exports.

A number of commenters, including Sierra Club, Dow, Senator Wyden, Representative Markey, Jannette Barth, and Save Our Supplies maintain that, as compared to AEO 2011, the AEO 2013 Early Release Overview projects a substantial increase in demand for natural gas in the industrial manufacturing sector.[77] 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

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

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 of natural gas. Dow states that the higher level of demand derived from Wood Mackenzie and CERA is the result of a projection of fleet vehicles converting to LNG and compressed natural gas.

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

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

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

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

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

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

2. DOE/FE Analysis

a. Use of AEO 2011 Projections

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

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

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

NERA published its final report in December 2012—the same month that EIA released the AEO 2013 Early Release Overview. 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."[78] Requiring DOE to start over with new data "would lead to significant costs and potentially endless delays."[79] Moreover, under the commenters' rationale, DOE's LNG Export Study and administrative process would run indefinitely, as DOE would have to start over with new AEO projections whenever they became available. As the Supreme Court has observed, if an agency were required to rehear new evidence before it issues a final administrative decision, "there would be little hope that the administrative process could ever be consummated in an order that would not be subject to reopening."[80]

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

[78] *Theodore Roosevelt Conserv. P'ship v. Salazar*, 616 F.3d 497, 511 (D.C. Cir. 2010) (quotations and citations omitted) (alteration in original).
[79] *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).
[80] *Vermont Yankee Nuclear Power Corp. v. Natural Res. Def. Council*, 435 U.S. 519, 554-55 (1978).

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. For example, in the LNG Export Study proceeding, Jordan Cove submitted an analysis from Navigant correctly noting 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.[81]

Using the later-published final AEO 2013 Reference Case (see 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 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.

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

Likewise, on May 7, 2014, EIA issued its most recent update, the Annual Energy Outlook 2014 (AEO 2014), with projections to 2040.[82] 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 in 2035.[83] 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.[84] This estimate compares with projected net LNG imports of 0.4 Bcf/d in the lower-48 states for 2035 in the AEO 2011 Reference Case. The 2035 Henry Hub price in the AEO 2014 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 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;
- 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 Reference Case 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). For these and other reasons, these post-AEO 2011 projections in no way undermine our conclusion regarding

[82] U.S. Energy Information Administration, *Annual Energy Outlook 2014* (May 7, 2014), *available at* http://www.eia.gov/forecasts/aeo/ [hereinafter AEO 2014].
[83] *See* AEO 2014 at A-27, Table A13.
[84] *See id* at MT-23; *see also* AEO 2014 table, "Natural Gas Imports and Exports," available at http://www.eia.gov/oiaf/aeo/tablebrowser/#release=AEO2014&subject=0-AEO2014&table=76-AEO2014&region=0-0&cases=ref2014-d102413a.

the consistency of the proposed exports with the public interest.

Table 4: Comparison of AEO Cases

Projections for 2035	**AEO 2011 Reference Case**	**AEO 2012 Reference Case**	**AEO 2013 Reference Case**	**AEO 2014 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 AEO 2014, EIA's projection of LNG exports from the lower-48 states in 2035 is 7.4 Bcf/d, LNG imports to 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.

We again note that NERA also 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.[85] 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 (or the more recent AEO 2014 projections) would have altered the central conclusion of the LNG Export Study.

Further, as reflected in the comments submitted by Lake Charles Exports[86] and Secretary Abraham,[87] 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.[88] 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.[89] Indeed, while many of the FTA authorizations have been

[85] NERA Study at 6.
[86] Reply Comments of Lake Charles Exports, LLC at 12-13.
[87] Reply Comments of Secretary Spencer Abraham at 8.
[88] As of the date of this Order, DOE/FE has authorized the export of 37.63 Bcf/d of natural gas to FTA countries.
[89] 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 aware of only one 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 2013, only 36 cargoes were imported at five of the 12 then-existing terminals (note that the U.S. Department of Transportation's Maritime Administration terminated the license for Gulf Gateway Energy Bridge on June 28, 2013). Seven of the 12 existing terminals did not receive any cargoes in 2013. *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 2013*, DOE/FE-0563, Office of Natural Gas Regulatory Activities, Office of Fossil Energy, U.S. Department of Energy;http://energy.gov/fe/listings/lng-reports.

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.[90] 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.[91] 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."[92] 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

[90] NERA Study at 6.
[91] *Id*.
[92] *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 ….[93]

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."[94]

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

[93] Initial Comments of Dow Chem. Co. at 27.
[94] *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.[95]

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.[96] 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.

[95] *Id*. at 16-17.
[96] *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,[97] 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

[97] 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.[98]

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.

[98] 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.[99]

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.

[99] *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 Oregon LNG, 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[100]—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.

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

[100] 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.[101] 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.[102]

[101] 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 Canada has approved the third LNG export project mentioned by Senator Wyden—the Royal Dutch Shell Plc project.

[102] 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 Oregon LNG'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 AEO 2014 compared with AEO 2011, while projections of domestic natural gas consumption in 2035 also increased in AEO 2014 compared with AEO 2011 (by 10.7 Bcf/d). Even with higher 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 AEO 2014. The implication of the latest EIA projections is that a greater quantity of natural gas is projected to be available at a lower cost than estimated just 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 13.7 years of production in 2010, the latest year statistics are available. Of particular note is that, since 2000, proved reserves have increased 72 percent to 304,625 Bcf, while production has increased only 16 percent, demonstrating the growing supply of natural gas available under existing economic and operating conditions.

Table 5: U.S. Dry Natural Gas Proved Reserves[103]

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

iii) Technically recoverable resources (TRR). Technically recoverable resources have also increased significantly. Technically recoverable resources are resources in accumulations producible using current recovery technology but without reference to economic profitability. They include both proved reserves and unproved resources.[104]

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 2,266 Tcf in AEO 2014.[105] 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 489 Tcf in AEO 2014.

b. Supply Impacts

Although TRR estimates in AEO 2011 were higher than the AEO 2014 estimates, we do not agree that NERA employed overly optimistic projections of domestic gas supply. The EIA

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

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

[105] *See* U.S. Energy Information Administration, *Assumptions to the Annual Energy Outlook 2014* (June 2014), Table 9.2. Technically recoverable U.S. dry natural gas resources as of January 1, 2012, at 114, *available at*: http://www.eia.gov/forecasts/aeo/assumptions/pdf/0554(2014).pdf.

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 nearly 90 years of natural gas supply at the 2013 domestic consumption level of 26.04 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.[106] 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.[107]

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

[106] NERA Study at 110.
[107] *Id.* at 25.

D. Modeling the LNG Export Business

1. Comments

Some commenters complain that NERA failed to capture accurately the business model being employed by those involved in the business of LNG exports. Sierra Club states that NERA erroneously modeled the fossil fuel industry by assuming a zero-profit condition. Some commenters, including NRDC, maintain that NERA failed to consider that LNG exports will take place pursuant to long-term, *e.g.*, 25-year, contracts containing take-or-pay provisions, rather than contracts containing flexible or market-sensitive pricing provisions. IECA makes a similar argument in its reply comments. According to these commenters, the take-or-pay provisions in long-term contracts will inhibit the free flow of price signals. The commenters argue that NERA incorrectly assumed 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.[108] Based on these comments, Save Our Supplies challenges the NERA Study for allegedly assuming that Qatari and Russian suppliers of natural gas will cut their prices to compete with the lower priced supplies available from the United States. Save Our Supplies argues that such price competition will not be significant and, therefore, that there will be greater demand for U.S.-exported LNG. According to some commenters, NERA's asserted underestimate of international demand for natural gas was also exacerbated by its failure to account for the construction of natural gas infrastructure on a global basis. According to these commenters, NERA appears to underestimate both the supply cost of international LNG projects and the magnitude and trajectory of global LNG demand. NERA also appears to underestimate U.S. natural gas demand and potentially the elasticity of the U.S. natural gas supply curve.

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

Several commenters, including Sierra Club and Dow, argue that NERA overestimated LNG transaction costs (*e.g.*, costs of liquefaction, transportation, and insurance). Sierra Club argues that NERA overstated the transportation costs associated with the export of U.S. gas by assuming all LNG would be exported from the Gulf Coast. Sierra Club states that several export terminals are planned for the West Coast, where it will be less expensive to transport gas to the

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

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

2. DOE/FE Analysis

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

a. Zero Profit Condition

Sierra Club's charge that NERA erroneously modeled the fossil fuel industry by assuming a zero-profit condition appears to reflect a misunderstanding of the term "zero-profit" as used by NERA. The "zero-profit condition" assumed in the NERA Study does not mean that

firms in the natural gas industry will not make a "profit" as that word is ordinarily used. Rather, the zero-profit condition means only that firms will not make a profit above the risk-adjusted cost of capital. The assumption of a zero-profit condition is another way of saying that the model assumes a competitive market for natural gas, because in competitive markets new firms can enter and drive any profits above a risk-adjusted cost of capital down to zero. The assumption of a competitive market for natural gas production in the United States is valid given that natural gas wellhead prices have been deregulated for over thirty years.[109] 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, the tolling agreement carries a tolling fee (or "reservation charge") with a per unit liquefaction charge of 115% of the Henry Hub price.[110]

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.

[109] Natural Gas Policy Act of 1978, 15 U.S.C. § 3301, *et seq.* (establishing a policy for phasing out the regulation of wellhead prices).
[110] *Sabine Pass Liquefaction LLC*, LNG Sale and Purchase Agreement with Centrica PLC, FE Docket No. 13-42-LNG at 51-52 (Apr. 2, 2013).

Instead, as NERA has properly assumed for purposes of its model, foreign and U.S. purchasers will compete for domestically produced supplies and, if the domestic price rises, the owners of the gas (in most cases, either the authorization holder or the foreign purchasers that are party to the export-related contracts) will have an incentive to sell the gas into the domestic market rather than the international market.

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

c. Foreign Direct Investment

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

> Net benefits to the U.S. economy could be larger if U.S. businesses were to take more of a merchant role. Based on business models now being proposed, this study assumes that foreign purchasers take title to LNG when it is loaded at a United States port, so that any profits that could be made by transporting and selling in importing countries accrue to foreign entities. In the cases where exports are constrained to maximum permitted levels, this business model sacrifices additional value from LNG exports that could accrue to the United States.[111]

[111] NERA Study at 6-7.

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.[112]

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

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

[112] *Id.* at 211.

> 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.[113]

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

d. International Natural Gas Markets

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

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

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

capacity."[114] 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."[115] We find this to be a reasonable simplifying assumption and note further that even imperfectly competitive markets are not static. The arrival of new entrants, such as U.S.-based LNG exporters, may well have a disruptive impact on markets where competition may presently be constrained.

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

e. Estimates of LNG Transaction Costs

We disagree with the comments from Sierra Club and Dow arguing that NERA overestimated LNG transaction costs, including liquefaction, transportation, insurance, and the like. NERA based its liquefaction, shipping costs and regasification costs on a review of publicly available literature, including the International Group of LNG Importers 2010 LNG Industry report and other sources referenced in the NERA Study.[116]

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

[114] NERA Study at 34.
[115] *Id*. at 34-35.
[116] *Id*. at 84-90.

$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,[117] 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.[118] Dow does not provide evidence challenging the accuracy of the information used by NERA or NERA's method of calculating transportation costs. Nor does Dow provide other evidence of daily charter rates.

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

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

[117] 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/.

[118] NERA Study at 87.

E. Cost of Environmental Externalities

1. Comments

Sierra Club, along with Delaware Riverkeeper Network,[119] Jannette Barth, NRDC, Dow, and Save Our Supplies, among others, maintain that LNG exports will increase demand for natural gas, thereby increasing negative environmental and economic consequences associated with natural gas production. These commenters assert that NERA failed to consider the cost of environmental externalities that would follow such exports. The externalities identified by these commenters include:

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

2. DOE/FE Analysis

As explained herein, the authorization granted by this Order is conditioned (among other things) on the satisfactory completion of the environmental review of the Oregon LNG Terminal under NEPA in FERC Docket No. PF-12-18-000, and on issuance by DOE/FE of findings of no significant impact or records of decision pursuant to NEPA.[120]

[119] Delaware Riverkeeper Network filed comments on behalf of itself and more than 80 other organizations.
[120] *See* 10 C.F.R. § 590.402 (authorizing DOE/FE to issue a conditional order prior to issuance of a final opinion and order).

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

F. Prices and Volatility

1. Natural Gas Price Volatility

a. Comments

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

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 (and/or authorization holders) 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."[121] Further, Sierra Club, Save Our Supplies and several other commenters argue that, due to this alleged lack of transparency, DOE/FE should conduct a new study of the potential cumulative impacts of granting LNG export licenses for shipment to non-FTA countries. Sierra Club and other commenters also contend that NERA and/or NERA's Vice President (and the principal author of the NERA Study) Mr. David Montgomery may be biased in favor of LNG exports, which they argue necessitates a new study by a different contractor.

2. DOE/FE Analysis

DOE has evaluated all submissions in this proceeding on their own merits, including the LNG Export Study and the arguments and analyses submitted by commenters. NERA conducted the study within DOE/FE's requested parameters (which are included as Appendix F to the NERA Study) and provided detailed information regarding its assumptions, model design and methodology, and results. This information is set forth at length in the NERA Study and is discussed in Section VI.B.2 and 5 of this Order. As evidenced by the number of detailed

[121] Reply Comments of Sierra Club at 20.

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).[122] The OMB Bulletin establishes that "important scientific information shall be peer reviewed by qualified scientists before it is disseminated by the Federal government." Dow asserts that the NERA Study should be considered "highly influential scientific information," subject to the highest standards outlined in the OMB Bulletin, and/or subject to internal DOE peer review guidelines. Due in part to these concerns, several commenters, including Sierra Club and Save Our Supplies, urge that DOE/FE commission a new study by another independent contractor.

Cameron LNG, LLC, 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.

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

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."[123] "Scientific information" does not include opinions where the presentation makes it clear the information is "opinion rather than fact or the agency's views."[124] 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 …."[125]

We have considered commenters' request for peer review in light of the OMB Bulletin. Because this proceeding is an adjudication, peer review is not required unless DOE/FE determines that such review is appropriate. After consideration, we find that peer review is not required because the conclusions reached in the LNG Export Study are in the nature of expert opinion, not scientific fact, and also because the principal purpose of peer review of government-sourced documents—ensuring the government is well-informed by independently produced expert analyses—was accomplished in this proceeding.

Both the EIA and NERA studies use market assumptions to project a range of possible future results. No claim is made by the authors of either study that the studies contain scientific fact. To the contrary, both studies caution the reader on the limits to their economic projections. The EIA Study states: "The projections in this report are not statements of what *will* happen but

[123] *Id*. at 2675.
[124] *Id*.
[125] *Id*. at 2677.

of what *might* happen, given the assumptions and methodologies used."[126] 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.[127]

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.[128] 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.[129]

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.[130] 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.

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[126] EIA Study at ii.
[127] *See*, *e.g.*, NERA Study at 25-26.
[128] Synapse Energy Economics, Inc., *Will LNG Exports Benefit the United States Economy?* (Jan. 23, 2013), at 1, submitted with Initial Comments of Sierra Club.
[129] *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.
[130] *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.")

I. Procedural Arguments

1. Comments

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

Dow, Sierra Club, Save Our Supplies, and other commenters contend that DOE/FE should conduct a public hearing regarding the applicable public interest standard in light of the cumulative impacts of LNG exports. Additionally, several commenters request that DOE/FE reopen the dockets of LNG export applicants to solicit additional public comment. Commenter Mary Altmann argues that DOE/FE should invite public comment on individual LNG applications before approving exports. IECA argues that many commenters could not reasonably have been expected to intervene in individual license proceedings at the time license applications were filed, since they had no way of anticipating that more than 20 applications would eventually be filed. IECA argues that DOE/FE, therefore, has no alternative other than to allow every interested party to intervene in each proceeding. Along these same lines, CarbonX

requests that its comment on the LNG export study be incorporated into the dockets for each pending LNG export applications.

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

Other commenters argue that DOE/FE should act now to decide each pending export application. These commenters contend additional administrative process is neither necessary nor appropriate as DOE/FE has already provided the "opportunity for hearing" required under NGA section 3(a) to make its public interest determination. Commenters such as ExxonMobil and the Center for Liquefied Natural Gas argue that the initial and reply comments submitted in response to the LNG Export Study do not change the NGA statutory and regulatory requirements that place the burden of proof on opponents to demonstrate, with sufficient evidence, that each application is inconsistent with the public interest. These commenters argue that the record before DOE/FE regarding each individual application is sufficient for DOE/FE to determine whether LNG exports have been shown to be inconsistent with the public interest.

2. DOE/FE Analysis

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

With respect to opportunity for public participation, we find that the public has been given ample opportunity to participate in this proceeding, as well as the other pending LNG export proceedings. Within this proceeding, Oregon LNG's Notice of Application, published in the Federal Register on September 7, 2012, contained a detailed description of the Application, and invited the public to submit protests, motions to intervene, notices of intervention, and comments.[131] 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.[132] As explained above, the NOA described the content and purpose of the EIA and NERA studies, invited the public to submit initial and reply comments, and stated that these comments will be part of the record in each individual docket proceeding.[133] 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

[131] 76 Fed. Reg. at 34,212-15.
[132] 77 Fed. Reg. at 73,627.
[133] *Id*. at 73,628.

discretion to decide what procedures to use in fulfilling its statutory responsibilities under the NGA,[134] 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, commenters, 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).

A. Motions to Intervene and Motion to Reply

The motions to intervene submitted by APGA and Citizens Against LNG are unopposed and are deemed granted. 10 C.F.R. § 590.303(g). As discussed above, DOE/FE also grants the late-filed motion to intervene and motion to reply submitted jointly by Sierra Club and Columbia Riverkeeper.

B. Oregon LNG's Application

Drawing largely from the Navigant Report, the Application discusses the natural gas resources of both Western Canada and the United States in its assessment of potential supply for the proposed exports. We believe this analysis is reasonable, given that the Project's geographic location suggests that natural gas from Canada will be a likely, and possibly the predominant, source of supply. So viewed, the North American market may well be capable of sustaining the level of exports proposed in the Application over the term of the requested authorization without significant negative price or other impacts. Oregon LNG also submitted evidence, principally the ECONorthwest Report, showing that the Project will yield significant local and regional economic benefits and will generate additional international benefits.

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

Because, however, Oregon LNG seeks authority to export domestically produced natural gas and is *not* seeking authority to export only Canadian production, we will not treat its Application in the same way as an application to export previously imported natural gas, as suggested by Oregon LNG. *See supra* Section IV, at 9. The Navigant Report makes a strong case that the predominant source of supply will be Canadian production. That analysis was a factor considered in our public interest determination, though we recognize that economic conditions may not unfold as Navigant has projected and that future market conditions could favor reliance solely or primarily on domestic production.[135]

In this regard, we find that the evidence of record, including the two-part LNG Export Study, shows that there will be adequate supplies of natural gas domestically to meet domestic demand, including the potential incremental demand created if the export level proposed in the Oregon LNG Application plus the cumulative maximum level of exports previously authorized by DOE/FE were implemented.[136] The potential availability of Canadian supplies reinforces this conclusion but is not essential to our determination.

Although APGA and Sierra Club take issue with the Navigant Report in several respects, we do not find that those criticisms demonstrate that Oregon LNG's proposed exports would be inconsistent with the public interest. We likewise do not agree with APGA that it is necessary to factor in competing demand due to potential exports of Canadian production from the Kitimat LNG Facility or other proposed export facilities in British Columbia. Exports from Canadian facilities may well reduce the supply of Canadian production available for export from the

[135] This approach is consistent with a recent conditional order where the Oregon-based applicant, Jordan Cove Energy Project, L.P., likewise projected that its source of export volumes could be either Canadian production or U.S. production. *See Jordan Cove*, DOE/FE Order No. 3413, at 8-14, 153.

[136] In this regard, we do not rely on the assumption in the Navigant Report that aggregate exports from North America will not exceed 6.8 Bcf/d of natural gas—an assumption that both APGA and Sierra Club criticize. Our analysis does not depend on this assumption. Indeed, the LNG Export Study considered a wide range of possible levels of exports, yet found that, at all levels, exports would yield net economic benefits. *See supra* Section VI.B.1, 8.

Oregon LNG facility, but the evidence does not support the conclusion that Canadian-based exports would draw upon U.S. production, which is our focus here.

For these reasons, we find that domestic supplies alone will be adequate to support the proposed exports, even when considering other demand for natural gas within the United States. Opponents of the Application have not overcome the statutory presumption that the requested export authority is consistent with the public interest. Again, the possible availability of significant volumes of Canadian production lends support, but is not essential, to our determination that the proposed exports are consistent with the public interest.

1. Regional Impacts

Oregon LNG 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 analyses contained in the ECONorthwest Study. The opponents of the Application attempt to counter these claims.

APGA contends that the Navigant Report did not take into account a 65 percent reduction in technically recoverable resource estimates for the Marcellus Shale projected by EIA in the AEO 2012 Early Release, as compared to AEO 2011, which APGA considers to be outdated. APGA also maintains that the Navigant Report did not include a Greenhouse Gas Demand Case showing increased demand due to efforts to reduce GHGs or take into account other likely future initiatives to regulate hydraulic fracturing, pending coal plant retirements, and the potential for increased use of natural gas in the transportation sector, all of which could have the effect of increasing gas prices. According to APGA, economic data shows that manufacturing jobs will be lost as a consequence of increased gas prices.

Sierra Club makes several of the same arguments raised by APGA, raises additional concerns about Oregon LNG's reliance on the input-output model used in the ECONorthwest Study, and challenges the sustainability of economic benefits in regions tied to resource extraction industries. Sierra Club contends that input-output models fail to provide a continuous picture of economic impacts and do not consider a full range of counterfactual scenarios. Sierra Club also challenges Oregon LNG's claimed regional economic benefits by focusing principally on the durability of economic benefits in producing regions 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.

First, we do not agree with APGA and Sierra Club that Oregon LNG's proposed exports will not yield net economic benefits or that the proposed exports will produce deleterious economic and societal impacts. The ECONorthwest Report and the NERA Study show that the proposed exports are likely to generate net economic benefits for the United States. Neither APGA nor Sierra Club offer their own analyses specific to the local and regional economic impacts of the Oregon LNG proposal. We further find that the studies submitted by Oregon LNG are not inherently flawed simply because they are based on a series of snapshots of the effects of certain predicted inputs, or because all of the potential counterfactual scenarios raised by Sierra Club were not factored into the analysis. These characteristics of the studies do not mean that the results are unreasonable. Moreover, the results of the studies have been generally confirmed on a national scale by the NERA Study. *See supra* Section VI.B.

Further, we reject the claims that exports will have a negative impact on employment. Sierra Club points to a study conducted by Weinstein and Partridge (the Weinstein study) to

support its position.[137] However, we have considered the analysis contained in the Weinstein study in several recent conditional 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).[138] This small decline could have been the result of other factors, particularly since the years of the drilling boom coincided with a national economic recession. On the other hand, comparing the same time periods, we 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 those orders, we reject Sierra Club's arguments here.[139]

Sierra Club 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 Oregon LNG 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 Oregon LNG's ability to export to non-FTA countries will deepen and 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.

[137] Sierra Club Mot. at 59-61 (discussing Weinstein and Partridge, *The Economic Value of Shale Natural Gas in Ohio*, Ohio State University, Swank Program in Rural-Urban Policy Summary & Report (Dec. 2010)).
[138] *See, e.g., Freeport II*, DOE/FE Order No. 3359, at 148-51; *Cameron*, DOE/FE Order No. 3391, at 127-29, *Jordan Cove*, DOE/FE Order No. 3413, at 137-38.
[139] *See id*.

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 (9.27 Bcf/d of natural gas) plus the additional 1.25 Bcf/d volume of exports conditionally authorized 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.

APGA contends that Oregon LNG relied on outdated EIA projections from AEO 2011. This is the same set of projections used in the LNG Export Study, and was the most recent, final set of projections available at the time. We reject APGA's arguments concerning this purportedly old data, as well Sierra Club's insistence that more recent data would illustrate that the proposed exports are contrary to the public interest. As discussed above, the AEO 2014 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 Reference Case for 2035 reflects LNG exports of 7.4 Bcf/d in the lower-48 states, net natural gas pipeline exports of 5.9 Bcf/d, and market price $0.39/MMBtu below the AEO 2011 Reference Case price, in constant 2012 dollars. It should be noted that, for 2035, the AEO 2011 Reference Case

forecast 0.5 Bcf/d of net imports 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 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. Citizens Against LNG appears to raise a similar argument in contending that DOE/FE should conduct a programmatic economic and environmental impact study. We disagree with these contentions. As explained above, we are attaching a condition to this export authorization ordering that Oregon LNG'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 Oregon LNG 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.[140] This procedure will not foreclose the choice of reasonable alternatives or influence subsequent development. Further, insofar as Citizens Against LNG has sought an economic impact study of the Project, we find that the LNG Export Study satisfies this request.

[140] We note that DOE/FE issued two additional notices on June 4, 2014, related to the environmental component of its decision-making on applications to export LNG to non-FTA countries. As set forth in those notices, DOE is evaluating: (i) the potential environmental impacts of unconventional natural gas exploration and production activities; and (ii) the lifecycle greenhouse gas perspective on exporting LNG from the United States. *See* Dep't of Energy, Draft Addendum to Environmental Review Documents Concerning Exports of Natural Gas From the United States, 79 Fed. Reg. 32,258 (May 4, 2014); Dep't of Energy, Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas From the United States, 79 Fed. Reg. 32,260 (May 4, 2014). Following its review of public comments on those notices, DOE will make a determination as to how these additional environmental considerations will affect the authorization in this proceeding.

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 Oregon LNG's Application. The conclusion of the LNG Export Study is that the United States will experience net economic benefits from issuance of authorizations to export domestically produced LNG. We have evaluated the initial and reply comments submitted in response to the LNG Export Study. Various commenters have criticized the data used as inputs to the LNG Export Study and numerous aspects of the models, assumptions, and design of the Study. As discussed above, however, we find that the LNG Export Study is fundamentally sound and supports the proposition that the proposed 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."[141]

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. An efficient, transparent international market for natural gas with diverse sources of supply provides both economic and

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

strategic benefits to the United States and our allies. Indeed, increased production of domestic natural gas has significantly reduced the need for the United States to import LNG. In global trade, LNG shipments that would have been destined to U.S. markets have been redirected to Europe and Asia, improving energy security for many of our key trading partners. To the extent U.S. exports can diversify global LNG supplies, and increase the volumes of LNG available globally, it will improve energy security for many U.S. allies and trading partners. As such, 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.

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 Oregon LNG'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[142] 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.[143] Given 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 Oregon LNG's export of LNG to non-FTA countries will be inconsistent with the public interest. For that reason, we are authorizing Oregon LNG'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 1.25 Bcf/d of natural gas (456.25 Bcf/yr) in this proceeding, DOE/FE will have cumulatively authorized non-FTA exports totaling 10.52 Bcf/d of natural gas, or 3.840 Tcf/yr, for the one final and seven conditional export authorizations granted

[142] 49 Fed. Reg. at 6684.

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

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), Freeport II (0.4 Bcf/d), Cameron (1.7 Bcf/d), Jordan Cove (0.8 Bcf/d), and the current authorization (1.25 Bcf/d). This total export volume is within the range of 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 submissions of the intervenors 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 AEO 2014, continue to show market 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 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 Oregon LNG. 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.[144] 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.

[144] Several commenters on the LNG Export Study, including Susan Sakmar, Leny Mathews, Alcoa Energy, IECA, and Citizens Against LNG, advocate against unlimited LNG exports. These 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.

G. New Policy Clarifying the 20-Year Term of Authorization

Beginning with this conditional Order, DOE/FE clarifies the 20-year term of authorization as follows:

- The 20-year export term will begin on the date when the authorization holder commences commercial export of domestically sourced LNG from the first liquefaction train at its LNG Terminal, but not before.

- The authorization holder will be permitted to apply for short-term export authorizations to export Commissioning Volumes[145] prior to the commencement of the first commercial exports of domestically sourced LNG from the Oregon LNG Terminal. The Commissioning Volumes will not be counted against the maximum level of volumes previously authorized in any of the authorization holder's LNG export orders.

- The authorization holder will be permitted to continue exporting for a total of three years following the end of the 20-year term established in the conditional or final Order, solely to export any Make-Up Volume[146] that it was unable to export during the original export period (Make-Up Period).[147]

- The three-year Make-Up Period does not affect or modify the total volume of LNG authorized for export in any of the authorization holder's LNG export orders. Insofar as the authorization holder may seek to export additional volumes not previously authorized for export, it will be required to obtain appropriate authorization from DOE/FE.

DOE/FE initially granted this relief to the FLEX entities (Freeport LNG Expansion, L.P., FLNG Liquefaction, LLC, FLNG Liquefaction 2, LLC, and FLNG Liquefaction 3, LLC) in DOE/FE Order Nos. 3282-B and 3357-A issued on June 6, 2014, in FE Docket Nos. 10-161-LNG and 11-161-LNG.[148] That collective order, which amended DOE/FE Order Nos. 3282 and 3357, details FLEX's requests for relief and the procedural history leading to our amendment of the FLEX

[145] For purposes of this Order, we define "Commissioning Volumes" to mean the volume of LNG that is produced and exported under a short-term authorization during the initial start-up of each LNG train, before each LNG train has reached its full steady-state capacity and begun its commercial exports pursuant to Oregon LNG's long-term contracts.
[146] For purposes of this Order, we define "Make-Up Volume(s)" to mean the difference between the authorized LNG export volume and the actual LNG export volume during the 20-year export term authorized by DOE/FE.
[147] For purposes of this Order, we define "Make-Up Period" to mean the three-year period following the 20-year export term authorized by DOE/FE, during which the Make-up Volume may be exported.
[148] *Freeport LNG Expansion, L.P., et al.*, DOE/FE Nos. 3282-B & 3357-A, Order Amending DOE/FE Order Nos. 3282 and 3357 (June 6, 2014).

orders. Upon consideration, we find that it is appropriate to include these same provisions in all conditional and/or final non-FTA authorizations going forward, as we have done below.

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. Oregon LNG must abide by each term and condition or face rescission of its authorization or other appropriate sanction.

A. Term of the Authorization

Oregon LNG has requested a 25-year term for the authorization commencing on the earlier of the date of first export or the date eight years from the date the requested authorization is granted. However, because the NERA Study contains projections over a 20-year period beginning from the date of first export,[149] we believe that caution recommends limiting this conditional authorization to no longer than a 20-year term beginning from the earlier of the date of first export or the date eight years from the date that a final order authorizing the exports is issued. In imposing this condition, we are mindful that LNG export facilities are capital intensive and that, to obtain financing for such projects, there must be a reasonable expectation that the authorization will continue for a term sufficient to support repayment. We find that a 20-year term is likely sufficient to achieve this result. It is also consistent with the 20-year term authorized by DOE/FE in the final and conditional non-FTA authorizations granted to date. The 20-year term will begin on the date when Oregon LNG commences commercial export of domestically sourced LNG at the Oregon LNG Terminal, but not before.

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

B. Commencement of Operations Within Seven Years

Oregon LNG requested this conditional authorization to commence on the earlier of the date of first export or eight years from the date of the issuance of this Order. Consistent with the final and conditional non-FTA authorizations granted to date, DOE/FE will impose the condition that Oregon LNG 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. Commissioning Volumes

Oregon LNG will be permitted to apply for short-term export authorizations to export Commissioning Volumes prior to the commencement of the first commercial exports of domestically sourced LNG from the Oregon LNG Terminal. "Commissioning Volumes" are defined as the volume of LNG produced and exported under a short-term authorization during the initial start-up of each LNG train, before each LNG train has reached its full steady-state capacity and begun its commercial exports pursuant to Oregon LNG's long-term contracts. Commissioning Volumes will not be counted against the maximum level of volumes authorized in Oregon's FTA order (DOE/FE Order No. 3100) or in this conditional Order.

D. Make-Up Period

Oregon LNG will be permitted to continue exporting for a total of three years following the end of the 20-year term established in this conditional Order, solely to export any Make-Up Volume that it was unable to export during the original export period. The three-year term during which the Make-Up Volume may be exported shall be known as the "Make-Up Period."

The Make-Up Period does not affect or modify the total volume of LNG authorized for export in Oregon LNG's FTA order (DOE/FE Order No. 3100) or in this conditional Order.

Insofar as Oregon LNG may seek to export additional volumes not previously authorized for export, it will be required to obtain appropriate authorization from DOE/FE.

E. 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.[150] As a condition of the similar authorization issued to Sabine Pass in Order No. 2961, DOE/FE found that the requirement for prior approval by the Assistant Secretary under its regulations applies to any change of effective control of the authorization holder either through asset sale or stock transfer or by other means. This condition was deemed necessary to ensure that, prior to any transfer or change in control, DOE/FE will be given an adequate opportunity to assess the public interest impacts of such a transfer or change.

To clarify its interpretation of its regulations, DOE/FE will construe a change of control to mean a change, directly or indirectly, of the power to direct the management or policies of an entity whether such power is exercised through one or more intermediary companies or pursuant to an agreement, written or oral, and whether such power is established through ownership or voting of securities, or common directors, officers, or stockholders, or voting trusts, holding trusts, or debt holdings, or contract, or any other direct or indirect means. A rebuttable presumption that control exists will arise from the ownership or the power to vote, directly or indirectly, 10 percent or more of the voting securities of such entity.

F. Agency Rights

As described above, Oregon LNG requests authorization to export LNG on its behalf and as agent for other entities who themselves hold title to the LNG. DOE/FE previously addressed

[150] 10 C.F.R. § 590.405.

the issue of Agency Rights in Order No. 2913,[151] 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.[152] We find that the same policy considerations that supported DOE/FE's acceptance of the alternative registration proposal in Order No. 2913 apply here as well. DOE/FE reiterated its policy on Agency Rights procedures in *Gulf Coast LNG Export, LLC*.[153] 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.[154]

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

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[151] *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).
[152] *Dow Chem. Co.*, DOE/FE Order No. 2859, at 7-8, *discussed in Freeport LNG*, DOE/FE Order No. 2913, at 7-8.
[153] *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).
[154] *See id*. at 7-8.

G. 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."[155] 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.[156]

DOE/FE will require that Oregon LNG file or cause to be filed with DOE/FE any relevant long-term commercial agreements, including LTAs, pursuant to which Oregon LNG exports LNG as agent for a Registrant. *See supra* Section 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, an agreement to provide gas processing or liquefaction services at the Oregon LNG Terminal, a long-term sales contract involving natural gas or LNG stored or liquefied at the Oregon LNG Terminal, or an agreement to provide export services from the Oregon LNG Terminal.

In addition, DOE/FE finds that section 590.202(c) of DOE/FE's regulations[157] requires that Oregon LNG file, or cause to be filed, all long-term contracts associated with the long-term supply of natural gas to the Oregon LNG Terminal, whether signed by Oregon LNG or the Registrant, within 30 days of their execution.

[155] 10 C.F.R. § 590.202(b).
[156] *Id*. § 590.202(e).
[157] *Id*. § 590.202(c).

DOE/FE recognizes that some information in Oregon LNG'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 Oregon LNG Terminal, may be commercially sensitive. DOE/FE therefore will provide Oregon LNG the option to file or cause to be filed either unredacted contracts, or in the alternative (A) Oregon LNG may file, or cause to be filed, long-term contracts under seal, but it also will file either: i) a copy of each long-term contract with commercially sensitive information redacted, or ii) a summary of all major provisions of the contract(s) including, but not limited to, the parties to each contract, contract term, quantity, any take or pay or equivalent provisions/conditions, destinations, re-sale provisions, and other relevant provisions; and (B) the filing must demonstrate why the redacted information should be exempted from public disclosure.

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

H. Export Quantity

Oregon LNG has sought export authorization in a volume equivalent to 456.25 Bcf/d of natural gas. As set forth herein, this Order authorizes the export of LNG in the full amount requested by Oregon LNG, up to the equivalent of 456.25 Bcf/yr of natural gas.

I. Combined FTA and Non-FTA Export Authorization Volume

In this proceeding, Oregon LNG seeks authorization to export LNG up to equivalent of 456.25 Bcf/yr of natural gas to non-FTA countries under NGA section 3(a). Oregon LNG's proposal for the Oregon LNG Terminal pending before FERC in Docket No. CP09-6-000 is for a total take-away capacity of 9.6 mtpa, which is equivalent to the volumes requested for export in

this proceeding. As stated above, Oregon LNG is currently authorized under DOE/FE Order No. 3100 to export LNG from the same Terminal to FTA countries in an amount equivalent to 456.25 Bcf/yr of natural gas.

The volumes authorized for export in this proceeding to non-FTA nations will not be considered additive to the volumes previously authorized for export to FTA nations. DOE/FE's policy is not to authorize exports that exceed the capacity of a LNG export terminal.[158] The source of LNG proposed for both of Oregon LNG's export authorizations is from the proposed Oregon LNG Terminal. To ensure that Oregon LNG's combined FTA and non-FTA export authorizations do not exceed the capacity of that facility, Oregon LNG may not treat the volumes authorized for export in this proceeding as additive to the volumes authorized for export to FTA nations in Order No. 3100.

J. Environmental Review

As explained above, DOE/FE intends to complete its NEPA review as a cooperating agency in FERC's review of the Oregon LNG Export Project. The authorization issued in this Order will be conditioned on Oregon LNG's satisfactory completion of the environmental review process.[159]

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,

[158] *See Freeport II*, DOE/FE Order No. 3357, at 162 ("There is no basis for authorizing exports in excess of the maximum liquefaction capacity of a planned facility.").
[159] 10 C.F.R. § 590.402 (authorizing DOE/FE to issue a conditional order prior to issuance of a final opinion and order).

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.[160]

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.

XII. ORDER

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

A. Oregon LNG is authorized to export domestically produced LNG by vessel from the Oregon LNG Terminal in Warrenton, Clatsop County, Oregon, up to the equivalent of 456.25 Bcf/yr of natural gas for a term of 20 years to commence on the earlier of the date of first export

[160] *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).

or seven years from the date that this Order is issued. Oregon LNG 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. The 20-year authorization period will commence when Oregon LNG commences commercial export of domestically sourced LNG from the Oregon LNG Terminal, but not before. Oregon LNG may export Commissioning Volumes prior to the commencement of the terms of this Order, pursuant to a separate short-term export authorization. The Commissioning Volumes will not be counted against the maximum level of volumes previously authorized in Oregon LNG's FTA Order (DOE/FE No. 3100) or in this conditional Order.

C. Oregon LNG may continue exporting for a total of three years following the end of the 20-year export term, solely to export any Make-Up Volume that it was unable to export during the original export period. The three-year Make-Up Period allowing the export of Make-Up Volumes does not affect or modify the total volume of LNG authorized for export in any of Oregon's LNG export orders. Insofar as Oregon LNG may seek to export additional volumes not previously authorized for export, it will be required to obtain appropriate authorization from DOE/FE.

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

E. The LNG export quantity authorized in this Order is equivalent to 456.25 Bcf/yr of natural gas. This quantity is not additive to Oregon LNG's FTA authorization, set forth in DOE/FE Order No. 3100.

F. This LNG may be exported to any country with which the United States does not have an FTA requiring the national treatment for trade in natural gas, which currently has or in the

future develops the capacity to import LNG, and with which trade is not prohibited by United States law or policy.

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

H. The authorization granted by this Order is conditioned on Oregon LNG's satisfactory completion of the environmental review process under NEPA in FERC Docket No. CP09-6-000 and CP09-7-000, and on issuance by DOE/FE of findings of no significant impact or a record of decision pursuant to NEPA. Additionally, the authorization is conditioned on Oregon LNG's on-going compliance with any and all preventative and mitigative measures at the Oregon LNG Terminal imposed by federal or state agencies.

I. (i) Oregon LNG 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 Oregon LNG Terminal. The non-redacted copies may be filed under seal and must be filed within 30 days of their execution. Additionally, if Oregon LNG 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, Oregon LNG 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, Oregon LNG shall state why the redacted or non-disclosed information should be exempted from public disclosure.

(ii) Oregon LNG 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 Oregon LNG Terminal. The non-redacted copies may be filed under seal and must be filed within 30 days of their execution. Additionally, if Oregon LNG 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, Oregon LNG 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, Oregon LNG shall state why the redacted or non-disclosed information should be exempted from public disclosure.

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

> Customer or purchaser acknowledges and agrees that it will resell or transfer LNG purchased hereunder for delivery only to countries identified in Ordering Paragraph F of DOE Order No. 3465, issued July 31, 2014, in FE Docket No. 12-77-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 LNG Development Company, LLC (d/b/a Oregon LNG) 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 LNG Development Company, LLC (d/b/a Oregon LNG) is made aware of all such actual destination countries.

K. Oregon LNG 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 Oregon LNG with all information necessary to permit Oregon LNG 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; and (4) within 30 days of execution, a copy of any long-term contracts not previously filed with DOE/FE, described in Ordering Paragraph I of this Order.

L. 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).

M. As a condition of this authorization, Oregon LNG shall ensure that all persons required by this Order to register with DOE/FE have done so. Any failure by Oregon LNG 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.

N. Within two weeks after the first export of domestically produced LNG occurs from the Oregon LNG Terminal, Oregon LNG shall provide written notification of the date that the first export of LNG authorized in Ordering Paragraph A above occurred.

O. Oregon LNG 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 and pipeline 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 and pipeline 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.

P. Prior to any change in control of the authorization holder, Oregon LNG must obtain the approval of the Assistant Secretary for Fossil Energy. For purposes of this Ordering Paragraph, a "change in control" shall include any change, directly or indirectly, of the power to direct the management or policies of Oregon LNG, 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.

Q. Monthly Reports: With respect to the LNG exports authorized by this Order, Oregon LNG 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)

R. 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.

S. The motions to intervene timely submitted in this proceeding by APGA and Citizens Against LNG, Inc. are granted.

T. The late-filed motion to intervene submitted in this proceeding by Sierra Club and Columbia Riverkeeper, filing jointly, is granted.

U. Sierra Club and Columbia Riverkeeper's joint motion to reply is accepted for filing.

Issued in Washington, D.C., on July 31, 2014.

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