

UNITED STATES OF AMERICA

DEPARTMENT OF ENERGY

OFFICE OF FOSSIL ENERGY

JORDAN COVE ENERGY PROJECT, L.P.

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FE DOCKET NO. 12-32-LNG

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

DOE/FE ORDER NO. 3413

MARCH 24, 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., <i>et al.</i>
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GNGM	Global Natural Gas Model
ICF	ICF International
IECA	Industrial Energy Consumers of America
JCLNG	Jordan Cove LNG L.P.
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
PCGP	Pacific Connector Gas Pipeline
Tcf/yr	Trillion Cubic Feet per Year
TRR	Technically Recoverable Resources
TSA	Terminal Service Agreement

I. INTRODUCTION

On March 23, 2012, Jordan Cove Energy Project, L.P. (Jordan Cove) 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 LNG both (i) domestically produced natural gas, and (ii) natural gas produced in Canada and imported into the United States. Jordan Cove 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 Jordan Cove requests authorization to export up to the equivalent of approximately 292 billion cubic feet of natural gas per year (Bcf/yr) (0.8 Bcf per day (Bcf/d), or approximately 6 million metric tons per annum (mtpa) of liquefied natural gas (LNG), for a 25-year period commencing on the earlier of the date of first export or seven 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 Coos Bay, Oregon (Jordan Cove LNG Terminal or Terminal). Jordan Cove 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 Jordan Cove to export LNG in a volume equivalent to 292 Bcf/yr of natural gas, or 0.8 Bcf/d, for a 20-year term.

¹ Application of Jordan Cove Energy Project, L.P. for Long-Term Authorization to Export LNG to Non-Free Trade Agreement Countries, FE Docket No. 12-32-LNG (Dec. 21, 2011) [hereinafter Jordan Cove App.].

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

³ Jordan Cove previously sought authorization to export LNG by vessel up to the equivalent of 438 Bcf/yr of natural gas (1.2 Bcf/d) for a 30-year term to nations with which the United States currently has, or in the future enters into, a FTA requiring national treatment for trade in natural gas and LNG (FTA countries). DOE/FE granted that authorization by order dated December 7, 2011 (Jordan Cove FTA Order). On March 18, 2014, DOE/FE also authorized Jordan Cove to import natural gas from Canada to the Jordan Cove Terminal to support this requested export authorization. See *infra* Section IV.A (procedural history of orders granted to Jordan Cove).

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 Jordan Cove's requested export in the equivalent of Bcf/yr of natural gas. See *infra* Sections X.F & XII.A.

On June 6, 2012, DOE/FE published a Notice of Jordan Cove's Application in the Federal Register.⁵ The Notice of Application called on interested persons to submit protests, motions to intervene, notices of intervention, and comments by August 6, 2012. In response to the Notice of Application, DOE/FE received five timely filed motions to intervene and comment or protest respectively from the American Public Gas Association (APGA); Sierra Club; Citizens Against LNG, Inc.; Landowners United; and, jointly, Rogue Riverkeeper and the Klamath-Siskiyou Wildlands Center (collectively, KS Wild). In addition, DOE/FE received 35 timely filed and five additional late-filed comments in support of the Application; three timely filed and two late-filed comments opposing the Application (without a request to intervene);⁶ and comments from an individual (Derrick Hindery) raising environmental concerns but taking no position on the merits of the Application. 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 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

⁵ Jordan Cove Energy Project, L.P., Application to Export Domestic Liquefied Natural Gas to Non-Free Trade Agreement Nations, 77 Fed. Reg. 33,446 (Feb. 23, 2012) [hereinafter Notice of Application].

⁶ Paula Jones filed both a timely comment against the Application as well as a late-filed comment against the Application. Both submissions are counted above.

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).

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.

to export LNG to non-FTA countries—one from Freeport LNG Expansion, L.P. and FLNG Liquefaction, LLC (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 Freeport¹¹ and an application filed by Cameron LNG, LLC.¹²

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

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*].

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, 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 (May 17, 2013) [hereinafter *Cameron*].

¹³ As of the date of this Order (and excluding Jordan Cove's Application), 24 applications for long-term export of LNG to non-FTA countries, in a volume of LNG equivalent to approximately 26.59 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 Jordan Cove's Application, is equivalent to approximately 35.86 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).

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

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

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)).

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.

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 Jordan Cove's Application. Additional details about Jordan Cove, the liquefaction project, and the requested export authorization are discussed below.

II. SUMMARY OF FINDINGS AND CONCLUSIONS

Based on a review of the complete record and for the reasons set forth below, DOE/FE has concluded that the opponents of the Jordan Cove 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 Jordan Cove'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

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.

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 Jordan Cove'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 Energy²³] 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

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

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).

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, 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

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).

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

Jordan Cove requests authorization to export as LNG natural gas produced in the United States and natural gas produced in Canada and imported into the United States. Jordan Cove has applied for long-term, multi-contract authorization to export this LNG by vessel to non-FTA nations. Jordan Cove seeks authorization to export up to the equivalent of approximately 292 Bcf/yr (0.8 Bcf/d), or approximately six mtpa of LNG, for a 25-year period. The exports would originate from a proposed liquefaction and LNG export Terminal in Coos Bay, Oregon. Jordan Cove is requesting this authorization to export LNG on its own behalf or as an agent for other entities who hold title to LNG, after registering each such entity with DOE/FE. Jordan Cove requests that the authorization commence on the date of first export, with such first export to occur no later than seven years following the grant of the authorization requested. Jordan Cove states that the requested term ties directly to the need for Jordan Cove and its customers to enter into sufficiently long-term contracts both to meet its customers’ needs and to

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)).

finance the construction and operation of its liquefaction project.

A. Background

1. Description of Applicant and Facility

Jordan Cove states that it is a Delaware limited partnership authorized to do business in the State of Oregon and that its principal place of business is Coos Bay, Oregon. Jordan Cove further states that its general partner is Jordan Cove Energy Project L.L.C., a Delaware limited liability company, and that both Jordan Cove and its general partner are owned by two limited partners.

The Application states that the first limited partner is Fort Chicago LNG II U.S.L.P., a Delaware limited partnership. Subsequently, in a different proceeding, DOE/FE was informed that Fort Chicago's name was changed to Jordan Cove LNG L.P. (JCLNG) as of August 19, 2013.³¹ JCLNG owns seventy-five percent of Jordan Cove. JCLNG is wholly owned and controlled, indirectly, by Veresen, Inc., a Canadian corporation based in Calgary, Alberta. Jordan Cove's second limited partner is Energy Projects Development L.L.C., a Colorado limited liability company, which owns twenty-five percent of Jordan Cove. Jordan Cove states that Energy Projects Development is owned by various private individuals, all of whom are U.S. citizens.

In 2009, the Federal Energy Regulatory Commission (FERC) authorized Jordan Cove to construct a facility to receive imports of LNG for regasification³² at the Terminal site, but FERC subsequently vacated that authorization when it became clear that Jordan Cove intended

³¹ See Jordan Cove LNG L.P., Application for Long-Term Authorization to Import Natural Gas from Canada, DOE/FE Docket No. 13-141-000 (Oct. 21, 2013).

³² Jordan Cove's construction and operation of an LNG import terminal at this location was authorized by FERC in Pacific Connector Gas Pipeline, LP; Jordan Cove Energy Project, L.P., 129 FERC ¶ 61,234 (2009), reh. granted in part, 139 FERC ¶ 61,040 (2012).

to use the Terminal for exports of LNG rather than imports.³³ Jordan Cove subsequently applied to FERC to construct and operate an LNG liquefaction export facility at the same site. That application is currently pending FERC review.³⁴

2. Procedural History

As noted above, in DOE/FE Order No. 3041 issued on December 7, 2011, DOE/FE authorized Jordan Cove to export LNG by vessel to FTA countries in a volume equivalent to approximately 438 Bcf/yr of natural gas (1.2 Bcf/d) for a 30-year term. Jordan Cove states in its current Application that the proposed export volume in this proceeding is not additive to its export volume authorized in that FTA order.

On October 21, 2013, JCLNG (Jordan Cove's parent company) submitted an application to DOE/FE for a long-term authorization to import natural gas by pipeline from Canada in a volume of 565.75 Bcf/yr for a 25-year term, commencing on the earlier of the date of first export or the date ten years from the date the requested authorization is granted.

This import application referred also to a September 9, 2013 application by JCLNG for export authorization made to Canada's National Energy Board (NEB). The import application characterized the NEB export application as its twin application, and stated that, if granted, they would afford access to Canadian natural gas supplies for the proposed Jordan Cove LNG Terminal. On February 20, 2014, the NEB issued a Letter Decision in File OF-EI-Gas-GL-J705-2013-01 01 granting JCLNG's application for a License to export natural gas to the United

³³ On rehearing of the order authorizing siting, construction, and operation of an import terminal at Coos Bay, FERC vacated the previous authorizations without prejudice to Jordan Cove prosecuting an application for authorization to site, construct, and operate an LNG export terminal. 139 FERC ¶61,040 (2012).

³⁴ Following a pre-filing proceeding in FERC Docket No. PF12-7-000, Jordan Cove submitted the application for FERC authorization of the export Terminal on May 21, 2013, in FERC Docket No. CP13-483-000. Jordan Cove formally notified DOE/FE of these developments by letter received on May 22, 2013.

States. On March 18, 2014, in DOE/FE Order No. 3412, DOE/FE granted JCLNG's application to import a like volume of natural gas into the United States for delivery to the Terminal.³⁵

B. Liquefaction Project

In the Application, Jordan Cove states that the Terminal will be located on the North Spit of Coos Bay in Coos County, Oregon. Jordan Cove intends to modify the previously authorized import facilities in order to adapt the Terminal for export operations. According to Jordan Cove, the modified facilities that will be used for exports include two 160 cubic meter LNG full-containment storage tanks, a single marine berth capable of accommodating LNG vessels up to Q-flex size, and on-site utilities and services. Jordan Cove's plans also include large diameter LNG piping configured for exports and electrically driven liquefaction equipment. The proposed Terminal facilities will have the capability to allow export of six mtpa. Jordan Cove accordingly proposes to construct four natural gas liquefaction trains, each with the export capacity of 1.5 mtpa. Approximately 90 LNG carriers per year will be required to transport the LNG to locations in the United States and around the world.³⁶ A complete description of the proposed terminal facilities is contained in the application currently pending before FERC in Docket No. CP13-483-000 for authority to site, construct, and operate an LNG export terminal. Once the Terminal facilities are placed in service, Jordan Cove plans to have natural gas delivered to the Terminal through a proposed natural gas pipeline, the Pacific Connector Gas Pipeline (PCGP), described below.

³⁵ *Jordan Cove LNG, L.P.*, DOE/FE Order 3412, Order Granting Long-Term Multi-Contract Authorization to Import Natural Gas From Canada to the Proposed Jordan Cove LNG Terminal in the Port of Coos Bay, Oregon (Mar. 18, 2014).

³⁶ Resource Report 4, dated May 2013, at page 4-1, in FERC Docket No. CP13-483-000.

C. Business Model

Jordan Cove requests authorization to export LNG on its own behalf or as agent for others pursuant to one or more long-term agreements that do not exceed the term of the requested authorization. Jordan Cove plans to execute commercial arrangements in the form of Liquefaction Tolling Agreements (LTAs), under which an individual customer that holds title to natural gas will have the right to deliver that gas to Jordan Cove's Terminal for liquefaction services and to receive LNG in exchange for a processing fee paid to Jordan Cove.

Jordan Cove states that it will file, or cause others to file, under seal executed contracts associated with the long-term supply of natural gas to, or the long-term export of LNG from, the Jordan Cove Terminal, including LTAs, within 30 days of their execution.

Under Jordan Cove's LTA business model, the decision whether to utilize liquefaction capacity will be made by the LTA customer. Thus, according to Jordan Cove, if the marginal cost of producing or purchasing natural gas, liquefying it, and transporting the resulting LNG to a destination market is higher than another competing source of supply in any month, the LTA customer may forego its nomination rights for that month.

The Application states that, when any such agreement is executed and transaction specific information required under 10 C.F.R. § 590.202(b) becomes available, Jordan Cove will comply with that provision. Further, Jordan Cove states that it is prepared to accept conditions on its authorization consistent with the conditions imposed in recent DOE/FE orders, including requirements applicable when the title holder to the LNG at the point of export is not Jordan Cove.

Specifically, Jordan Cove states that it will include in any LTA (or any other contract made by Jordan Cove for the sale or transfer of LNG exported under its authorization) the requisite contract provision by which the customer commits to: (1) resell or transfer the LNG for

delivery only to authorized countries or to purchasers that have agreed to so limit their direct or indirect resale or transfer; (2) cause the provision of a report to Jordan Cove that identifies the country of destination for actual deliveries; and (3) include in any resale contract conditions to insure that Jordan Cove is made aware of all actual destination countries.

Further, when Jordan Cove uses its authorization to export LNG on behalf of or as agent for any other title holder at the point of export, Jordan Cove states that it will register or ensure the registration of such title holder. The registration will include the registrant's acknowledgement and agreement to supply Jordan Cove with all necessary information and copies of contracts, including the registrant's agreement to: (1) comply with the requirements of Jordan Cove's authorization and DOE's regulations; (2) include in any of its contracts the requisite contract provision described above; and (3) file with DOE/FE under seal within 30 days of their execution (or supply to Jordan Cove for such filing) executed contracts associated with the long-term supply of natural gas to, or the long-term export of LNG from, the Jordan Cove Terminal.

D. Source of Natural Gas

Jordan Cove requests authorization to export LNG from natural gas produced in the United States and natural gas produced in Canada and imported into the United States. Jordan Cove proposes to transport natural gas by pipeline to the Terminal over the PCGP, which is currently pending review by the FERC in Docket No. CP13-492-000.³⁷ As planned, the PCGP will consist of a 234-mile-long, 36-inch-diameter natural gas pipeline extending from the outlet of the Jordan Cove LNG Terminal to a point near Malin, in Klamath County, Oregon, on the

³⁷ The FERC issued a certificate of public convenience and necessity for construction of the PCGP under section 7 of the NGA when it authorized the siting, construction, and operation of Jordan Cove's import terminal. 129 FERC ¶ 61,234 (2009). However, when the FERC vacated the authorization for the import terminal, it also vacated the certificate for the PCGP. 139 FERC ¶ 61,040 (2012). The proposal for the PCGP has been renewed in FERC Docket No. CP13-492-000.

Oregon/California border. Jordan Cove proposes that the PCGP will connect to the Northwest United States market hub at Malin, thereby providing access to gas supplies in both the United States and Canada.

Jordan Cove expects the PCGP to interconnect at the Malin Hub with: (i) the Gas Transmission Northwest Pipeline, which delivers gas from western Canada, and delivers gas from the U.S. Rockies via its Stanfield interconnection; (ii) the Ruby Pipeline, which delivers gas from western Wyoming, northwestern Colorado, and northern Utah; and (iii) PG&E Redwood Path, serving northern California. In sum, Jordan Cove states that the LNG to be exported from its Terminal is likely to be sourced from Canadian and U.S. Rocky Mountain supply basins.

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 Jordan Cove Terminal under the National Environmental Policy Act of 1969 (NEPA). DOE/FE is participating in that environmental review as a cooperating agency.

Jordan Cove 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 regulations³⁸ and precedent³⁹ support such an approach, and we find good cause for granting Jordan Cove's request for a conditional order. Accordingly, this conditional

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 Paragraph F); *Freeport LNG*, Order No. 3282, at 120-21, 123 (Ordering Paragraph F); and *Lake Charles Exports*, Order No. 3324 at 15-16, 135-36 (Ordering Paragraph F).

Order makes preliminary findings on all issues except the environmental issues in this proceeding.

DOE/FE is attaching a condition to this export authorization ordering that Jordan Cove'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 Jordan Cove 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

Jordan Cove states that its Application is wholly consistent with the public interest standard, as applied by DOE/FE in prior decisions. In this regard, Jordan Cove refers to DOE/FE's "longstanding position that 'Section 3(a) creates a rebuttable presumption that a proposed export of natural gas is in the public interest, and DOE must grant such an application unless those who oppose the application overcome that presumption by mak[ing] an affirmative showing of inconsistency with the public interest.'"⁴⁰ Jordan Cove refers also to DOE's 1984 Policy Guidelines which indicate that the agency's primary responsibility in authorizing exports will be "to evaluate the need for the gas and whether the [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."⁴¹

Jordan Cove maintains that its Application promotes the goals set forth in the 1984 Policy Guidelines because its export proposal is a market-driven response to the availability of abundant

⁴⁰ Application at 7 (citing *Sabine Pass Liquefaction, LLC*, DOE/FE Order No. 2961, FE Docket No. 10-111-LNG (May 20, 2011)).

⁴¹ *Id.* at 7-8 (citing Policy Guidelines and Delegation Orders Relating to the Regulation of Imported Natural Gas, 49 Fed. Reg. 6684 (Feb. 22, 1984) (DOE Policy Guidelines)).

domestic supply and rising international demand for natural gas. Additionally, Jordan Cove contends that granting its Application will serve the public interest in multiple other ways:

It will permit exports when competitive and otherwise promote healthy domestic and international natural gas markets. Jordan Cove exports will not pose any threat to the security of domestic natural gas supplies. To the contrary, they will result in significant economic benefits. The demand created by the exports will stimulate increased revenues and jobs in upstream industries, which in turn will benefit the overall U.S. economy. The construction and operation of the Jordan Cove Project will also create jobs and produce revenues to the benefit of the local and regional economies. And, Jordan Cove exports will have positive international trade impacts for the United States. In sum, the Jordan Cove Project's economic benefits advance the Administration's efforts to expand exports, create jobs and otherwise stimulate the beleaguered U.S. economy.⁴²

To demonstrate these claimed public interest benefits, Jordan Cove appended six studies to its Application:

- (1) *Jordan Cove LNG Export Project Market Analysis Study* (Jan. 2012) by Navigant Consulting, Inc., analyzing gas supply and demand outlooks and modeling potential price effects of the proposed exports for the North American natural gas market to 2045 (Navigant Study);
- (2) *Whitepaper: Analysis of the EIA Export Report 'Effect of Increased Natural Gas Exports on Domestic Energy Markets,' Dated January 19, 2012* (Feb. 2012), by Navigant Consulting, Inc. on the EIA Report (Navigant Whitepaper);
- (3) *An Economic Impact Analysis of the Construction of an LNG Terminal and Natural Gas Pipeline in Oregon* (Mar. 6, 2012) by ECONorthwest, examining impacts on the states of Oregon and Washington of the construction of the Jordan Cove Project (Construction Study);
- (4) *An Economic Impact Analysis of Jordan Cove LNG Terminal and Pacific Connector Gas Pipeline Operations* (Mar. 23, 2012) by ECONorthwest, examining impacts on the local communities of the operations of the Jordan Cove Project (Operations Study);
- (5) *Upstream Economic Contributions of the Jordan Cove Energy Project* (Feb. 29, 2012) by ECONorthwest, quantifying direct and indirect contributions of the Jordan Cove Project to the United States economy (Upstream Contributions Study); and
- (6) *Effect of the Jordan Cove Energy Project's LNG Exports on United States*

⁴² *Id.* at 9.

Balance of Trade (Mar. 20, 2012) by ECONorthwest, analyzing the impact of the Jordan Cove Project on the nation's balance of trade (Balance of Trade Study).

Below, we discuss these studies in more detail.

A. Domestic Natural Gas Supplies

Jordan Cove asserts that ample natural gas supplies exist to serve this country's domestic gas needs and the proposed LNG exports by Jordan Cove and other exporters. According to Jordan Cove, this claim is supported by the Navigant Study, which identifies shale gas production growth as the biggest contributor to overall gas supply abundance. The consequence, Jordan Cove states, are a 28 percent increase in U.S. total gas production from 2005 (49.7 Bcf per day (Bcf/d)) to 2011 (63.6 Bcf/d) and significantly increased estimates of shale gas resources. Jordan Cove states that Navigant's 2008 study estimated U.S. shale gas and total gas reserves at 842 trillion cubic feet (Tcf) and 2247 Tcf, respectively, not far from the EIA's AEO 2011 estimates of 827 Tcf and 2543 Tcf. Jordan Cove maintains that these reserves constitute sufficient supply at current usage rates for 94 to more than 100 years, well beyond the terms of the proposed export authorizations.

Especially in its initial years, Jordan Cove intends to draw significantly on Canadian as opposed to U.S. natural gas supplies for its export volumes. The Navigant Study, according to Jordan Cove, refers to recent estimates by the British Columbia Ministry of Energy and Mines and the National Energy Board of Canada showing that the marketable gas in place in the Horn River Basin alone is between 61 and 96 Tcf, with total gas in place estimated at 372 Tcf. Jordan Cove states that the other major shale basin in British Columbia, the Montney, is estimated to contain 65 Tcf of recoverable resources and other recent estimates of these resources are even higher and point to a resource base with a reserve life of 350 to 1,000 years based upon current total demand in British Columbia of one Bcf of gas per day.

Jordan Cove maintains that gas reserves and gas production are likely to continue to rise and that North America is in the early phases of discovery of natural gas resources. Based on the Navigant Study, Jordan Cove states that it expects this trend towards a larger resource base will continue in the near term in both the United States and Canada and that gas production will continue to grow steadily throughout the Navigant Study's forecast period to 2045. Jordan Cove further states that Navigant's Spring 2011 Reference Case projects U.S. dry gas production to grow to 81.6 Bcf/d by 2045 and that production could go higher in response to demand from proposed LNG liquefaction facilities and/or independent increases in the robust supply resource base. Jordan Cove adds that the Navigant Study shows that this growth potential is enhanced by the fact that the reduced geologic risk and resulting reliability of shale gas discovery and production makes it responsive to demand and by the fact that the presence of natural gas liquids (NGLs) in some shale formations adds an incentive for development.

B. Domestic Natural Gas Demand

Jordan Cove states that the Navigant Study projects steady growth in natural gas demand, led by electric generation demand, with modest contributions from industrial, residential, commercial and vehicle demand. The Navigant Study, according to Jordan Cove, also projects that natural gas will remain competitive with oil and other fuels. Jordan Cove also states that the Navigant Study concludes that, even as that domestic demand is projected to grow throughout the forecast period to 2045, North American gas resources are adequate to satisfy domestic demand as well as the added demand of the LNG exports proposed by Jordan Cove, even when other LNG exports are also assumed.

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

Jordan Cove asserts that its proposed exports will have a minimal impact on natural gas prices. In support of its position, Jordan Cove refers to four scenarios used in the Navigant Study:

- (1) The Jordan Cove Reference Case, which draws on Navigant's Spring 2011 Reference Case extended to 2045, and assumes that the Louisiana Sabine Pass and the British Columbia Kitimat LNG export facilities will be operational;
- (2) The Jordan Cove Export Case, which assumes exports of 0.9 Bcf/d beginning in 2017 (based on a projected export capacity at the Terminal of 0.9 Bcf/d);⁴³
- (3) The Aggregate Export Case, which adds to the Jordan Cove Export Case generic LNG export capacity of 2.0 Bcf/d in the Gulf and 1.0 Bcf/d on the U.S. Eastern seaboard, for a total of 6.6 Bcf/d of North American LNG export capacity; and
- (4) The GHG Demand Case, which further increases demand using figures from Navigant's Spring 2011 Carbon Case Forecast, reflecting a high rate of coal to gas substitution driven by assumed laws and regulations aimed at lowering greenhouse gas (GHG) impacts.

Jordan Cove states that Navigant projected price impacts for the forecast period under each of the above scenarios at three locations: Henry Hub; Sumas (the United States-Canadian border point that provides a proxy for prices paid in the population centers of the Pacific Northwest (Seattle and Portland)); and Malin (the California-Oregon border point at which gas volumes will enter PCGP for transport to the Jordan Cove facility).

According to Jordan Cove, the price impacts under all of these scenarios and locations are negligible in the national market and minimal in the Pacific Northwest market. In particular:

- Prices do not vary by more than 4 cents from those in the Reference Case.
- Sumas prices are essentially flat in 2025 and 2035 and are only 3.9% higher in 2045; Malin prices are higher by 2.1, 3.1, and 7.2 percent respectively at each interval.
- Jordan Cove Export Case prices and Aggregate Export Case prices at all three locations are below \$8.00 until the end of the forecast period in 2045.

⁴³ See Jordan Cove App. at 13 & Navigant Market Analysis Study at 29.

- Comparing the projected prices under the Aggregate Export Case to the Jordan Cove Export Case, the price increases are larger in 2025 (ranging from 4.9% at Malin to 6.7% at Henry Hub), which reflects the concurrent addition of the other assumed LNG export facilities, but these increases moderate as the market recalibrates (at Henry Hub decreasing from 4.3% in 2035 to 3.0% in 2045 and at both Sumas and Malin decreasing from 3.8% in 2035 to 3.4% in 2045).
- The projected incremental price increases are less moderate in the GHG Demand Case, ranging from 13.6% to 20.6% over the Aggregate Export Case prices at 2025, 2035, and 2045, but these are due to policy-driven growth in demand.

Jordan Cove additionally contends that the price outputs in all scenarios in the Navigant Study would have been lower had Navigant not been as conservative as it was in its modeling assumptions. In particular, Jordan Cove states, Navigant assumed that there will be no new gas supply basins; the empirical production data used by Navigant does not reflect the rapid ramp-up in development; no unannounced pipeline and storage infrastructure projects are assumed; and a high 90 percent load factor for export facilities is assumed.

In response to the EIA Study, Jordan Cove commissioned the Navigant Whitepaper.

According to Jordan Cove, the Navigant Whitepaper explains:

The high price outputs projected in parts of the EIA Study – in particular, a 54% gas price increase in 2018 – result ‘from mixing a baseline case and an export scenario [low supply and high exports] that, by their very nature, do not represent a realistic real-world scenario’ and points out that the EIA Report effectively acknowledged as much. Moreover, the 54% figure is only a maximum single-year metric out of line with the average price changes that more accurately measure sustained impact.⁴⁴

Jordan Cove further states that the Navigant Whitepaper found that the price impact of the High Shale EUR baseline case and the low/slow export scenario is the “least unrealistic” scenario reviewed by EIA. That scenario, Jordan Cove asserts, results in a maximum-year price increase 74% lower than the quoted 54% figure. Yet even that price increase is likely overstated in Jordan Cove’s view because

⁴⁴ Jordan Cove App. at 16 (quoting Navigant Whitepaper at 6).

- EIA's low export scenario of 6 Bcf/d is high; by comparison, the Navigant Study assumed an export level of 5.9 Bcf/d, which was designed as a "high end figure."
- Even though EIA's High Shale EUR baseline case was intended to be the high supply alternative, it understated actual production levels in the U.S. in March of 2011, and was about 19% below actual levels at the end of the year.
- AEO projections historically have understated shale gas production.
- Because the EIA Report only examines exports to be made from Gulf Coast projects, and does not include an East Coast project, it is bound to intensify the price impacts.

Jordan Cove submits that EIA's Low Shale EUR case should not be relied upon because its forecast is much lower than the AEO 2011 Reference Case forecast and is clearly out of line with current developments. Also, Jordan Cove contends that even the High Shale EUR case is problematic because its forecast, while higher than the AEO 2011 Reference Case forecast, was appreciably lower than the conservative forecast in the Navigant Study.

Moreover, Jordan Cove maintains that the EIA Report is not pertinent to the Jordan Cove Project since the EIA Report focuses only on exports from Gulf Coast projects whereas the Jordan Cove proposal involves the exportation of U.S. West Coast gas sourced from Canada and the U.S. Rockies, with Canadian gas constituting the more significant portion initially. On the other hand, Jordan Cove points out that the Navigant Study examines exports from the U.S. Pacific, Atlantic, and Gulf coasts, as well as from British Columbia in Canada, and therefore is the more relevant and accurate measure of the price impacts of the proposed Jordan Cove exports.

D. Impact of LNG Exports on Natural Gas Markets

Jordan Cove states that LNG exports in general and its proposed exports in particular will have a beneficial impact on natural gas markets. According to Jordan Cove, this will come about

because exports will direct gas to new markets and this will support increased production of natural gas from shale formations with the consequence of reduced price volatility.

E. Local, Regional, and National Economic Benefits

Jordan Cove states that the Construction Study measures the economic impact of its proposal, including both the Terminal and the PGCP, on the Oregon and Washington economies during the years 2014 through 2017. After excluding costs such as real estate payments that are not typically sources of construction output, Jordan Cove states that the remaining direct construction costs for these projects, measured in 2011 dollars, will be \$4.494 billion. Jordan Cove further states that this figure is a measure of the direct economic impact of the undertaking and \$1.366 billion of this amount will be spent in the two study area states.

Based on IMPLAN economic modeling software, Jordan Cove states that the indirect impact on economic output in Oregon and Washington over the four-year construction period will be approximately \$1.17 billion and that the induced output over the same period, arising primarily from household spending by workers will be \$973.5 million. Further, measuring the net value of, or value added by, proposed construction, Jordan Cove states that the Construction Study estimates an increase in the regional gross domestic product (GDP) of \$1.738 billion in total for 2014-2017, or an average of \$434.6 million a year.

Jordan Cove maintains that the jobs impact also will be consequential. On average, according to Jordan Cove, implementation of the proposal will employ 1,768 workers a year, and will create 1,530 indirect and 1,838 induced jobs a year. In addition, Jordan Cove maintains that the labor income from the direct and secondary employment associated with the project will average \$182.6 million and \$147.4 million a year, respectively, and will total \$330 million a year. Over the projected 2014-2017 construction period, Jordan Cove asserts that the total contribution to labor income from all associated jobs will exceed \$1.3 billion.

Jordan Cove also states that there will be continuing economic benefits to the local economy in Coos County after liquefaction and export operations commence in 2017.

According to Jordan Cove, the Operations Study measured these benefits in 2018 because that year will be representative of a typical operating year according to Jordan Cove. Jordan Cove states that the source of the impacts will be spending for various payrolls and for contributions (in lieu of property taxes) towards education and urban renewal.

Jordan Cove maintains that these impacts will include 99 direct jobs at the Terminal and the PCGP, 51 indirect jobs paid by Jordan Cove (Sheriff's deputies, firefighters, tugboat crews and emergency planners), 404 other indirect jobs, and 182 induced jobs for a total of 736 jobs in Coos County. The total labor income impact in the typical operating year is projected at \$32.9 million.

The direct GDP impact of the LNG Terminal is projected at \$1.29 billion. The portion of the GDP impact of the PCGP attributed to Coos County is projected to be \$35 million. The net increase in the GDP of Coos County after the indirect and induced impacts are included is projected at \$1.36 billion. Jordan Cove states that the projected GDP impact, which is in line with size of the project, will be of extraordinary importance to Coos County, where the GDP in 2010 was \$1.74 billion.

Jordan Cove states that this impact analysis reflects the downstream impacts of annual contributions by Jordan Cove in the amount of \$20 million for public K-12 education and \$10 million for projects of the Bay Area Urban Renewal Association. Jordan Cove further states that the downstream impact analysis does not include the property taxes to be paid by the PCGP, but it does calculate them. According to Jordan Cove, the PCGP will contribute property taxes of \$2.4 million to Coos County and \$8.8 million to the three other counties along its route.

In addition to the above benefits, Jordan Cove maintains, based on the Upstream Contributions Study, that the project will open new markets for natural gas and new demand for gas in turn will benefit upstream industries. Jordan Cove identifies direct economic contributions to four domestic industries, including interstate natural gas pipeline transportation, natural gas extraction, natural gas exploration and development (E&D), and state and local government activities attributable to state gas severance taxes. These direct impacts are calculated in terms of the value of each industry's economic output over what it would have been without the exports. IMPLAN economic modeling is used also to calculate domestic secondary economic impacts, both indirect and induced. In summary, Jordan Cove states that the Upstream Contributions Study shows that the demand on upstream industries from the Jordan Cove exports will contribute an average of \$3.9 billion in direct, indirect, and induced annual outputs and will create an annual average of 20,359 new jobs.

F. Balance of Trade

Jordan Cove states that its proposal will advance the Administration's agenda to boost exports. Based on the Balance of Trade Study, Jordan Cove asserts that the overall impact of the project will be a net improvement in the balance of trade for the United States. While the importation of gas from Canada for export from the Jordan Cove Terminal will have a negative balance of trade impact, Jordan Cove states that this negative impact will be offset by the value of the LNG exports and by the value of the increased exports of the NGLs that will be a byproduct of the increased domestic gas production. The Balance of Trade Study, according to Jordan Cove, shows that, as the proportion of domestic gas used for Jordan Cove LNG exports grows through the study period, the improvement in the balance of trade will increase from \$2.1 billion in 2020 to \$4.9 billion in 2045.

G. International Benefits

Jordan Cove maintains that there are several “difficult to quantify” international benefits that will be realized from a grant of its Application. These include: (1) promoting international markets and development of additional resources, both domestically and internationally; (2) enabling overseas generators to switch from oil or coal to cleaner natural gas with its environmental benefits; (3) assisting countries with limited resources to broaden and diversify their supply base, which will contribute to transparency, efficiency, and liquidity of international natural gas markets; (4) encouraging liberalized trade and greater diversification of global supplies; and (5) decoupling international natural gas prices from oil prices, thereby leading to lower natural gas prices.

H. Additional Considerations

Jordan Cove identifies several additional considerations in support of a grant of its Application:

- As a terminal on the West Coast of the United States, the Jordan Cove facility is uniquely positioned to source its natural gas from Canadian and U.S. Rockies supply basins and to serve Asian demand without the longer routes necessary from the Gulf Coast.
- Given North America’s enormous shale gas resources and the Asian demand for its production, there is little doubt that Pacific Northwest LNG export facilities will be built. British Columbia is actively promoting export terminals on the Canadian West Coast and has committed to having its first LNG plant up and running by 2015, with a total of three LNG facilities operating by 2020. The proposed Jordan Cove Terminal represents a fungible substitute for a British Columbia export terminal that will bring distinct advantages to the United States beginning with the economic benefits already set forth of creating U.S. infrastructure and expanding U.S. trade. In addition, building the Jordan Cove Terminal and the

PCGP will draw Canadian gas southwards, creating an additional pathway for Canadian supplies to the U.S. Pacific Northwest. If, in the future, U.S. demand grows and U.S. natural gas prices moves higher, Canadian producers will be able to utilize that new pathway to supply the U.S. market. The advantage to the United States will be the dampening price effect of these incremental Canadian supplies.

- The Jordan Cove Terminal could provide access to LNG for the isolated markets in Hawaii (where consumers pay high prices for electricity generated using primarily fuel oil and coal) and the Cook Inlet region of Alaska (where there is dwindling deliverability of natural gas). Jordan Cove states that utilities in both locales have indicated that they are looking to “piggy-back” their small demand quantities on shipments by customers with large enough base-load demand to support the construction of an LNG terminal. Jordan Cove maintains that a West Coast terminal that would offer gas at prices indexed to a North American basis would be able to serve the smaller ships appropriate to their demand quantities.

- Natural gas customers along the route of the PCGP, particularly those west of the Cascades, stand to benefit from the Jordan Cove project. Their growth in demand alone would not be sufficient to justify the investment in a pipeline like the PCGP, but they too will be able to “piggy-back” on the LNG Terminal customers whose contracts with PCGP will underpin its construction. The incremental capacity available on PCGP will bring additional natural gas supplies to their otherwise isolated market areas with beneficial price effects.

VI. LNG EXPORT STUDY

DOE/FE recognized in *Sabine Pass* that the cumulative impact of *Sabine Pass* and additional future LNG export authorizations could affect the public interest. To address this issue, DOE/FE undertook a two-part Study of the cumulative economic impact of LNG exports.

The first part of the Study was conducted by EIA and looked at the potential impact of additional natural gas exports on domestic energy consumption, production, and prices under several export scenarios prescribed by DOE/FE. The EIA Study did not evaluate macroeconomic impacts of LNG exports on the U.S. economy. The second part of the Study, performed by NERA Economic Consulting, assessed the potential macroeconomic impact of LNG exports using its energy-economy model (the “N_{ew}ERA” model). NERA built on the EIA Study requested by DOE/FE by calibrating the NERA U.S. natural gas supply model to the results of the study by EIA. The EIA Study was limited to the relationship between export levels and domestic prices without considering whether those quantities of exports could be sold at high enough world prices to support the calculated domestic prices. NERA used its Global Natural Gas Model (“GNGM”) to estimate expected levels of U.S. LNG exports under several scenarios for global natural gas supply and demand. A more detailed discussion of each study follows.

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

1. Methodology

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

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

According to EIA, total marketed natural gas production in 2011 was approximately 66 Bcf/d.

Thus, exports of 6 Bcf/d and 12 Bcf/d represent roughly 9 percent and 18 percent of natural gas production in 2011, respectively.

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

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

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

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

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

16	High Economic Growth	High/Rapid
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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.⁴⁵ Additionally, EIA assumed that a pipeline transporting Alaskan natural gas into the lower-48 states would not be built during the forecast period, thereby isolating the lower-48 states' supply response.

2. Scope of EIA Study

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

⁴⁵ 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.

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.⁴⁶

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

- The NEMS model is not a world energy model, and therefore does not address the interaction between the potential for additional U.S. natural gas exports and developments in world natural gas markets;
- Global natural gas markets are not integrated, and their nature could change substantially in response to significant changes in natural gas trading patterns;
- Macroeconomic results were not included in the analysis because energy exports are not explicitly represented in the NEMS macroeconomic module; and
- The domestic focus of the NEMS model makes it unable to account for all interactions between energy prices and supply/demand in energy-intensive industries that are globally competitive.

3. Natural Gas Markets

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

U.S. market conditions are also variable, according to EIA, and lower or higher U.S. natural gas prices would tend to make additional exports more or less likely. EIA pointed out

⁴⁶ EIA Study at ii (emphasis in original).

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 CO₂ 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 CO₂ 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 CO₂ emissions, EIA projected that the increased use of coal in the electric sector would generally result in a net increase in domestic CO₂ 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 CO₂ 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 CO₂ 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,⁴⁷ gross domestic product (GDP), aggregate consumption, aggregate investment, natural gas export revenues, sectoral output,⁴⁸ and wages and other household incomes. In addition, NERA identified impacts that would affect certain energy intensive, trade exposed (EITE) industries, as discussed below.

⁴⁷ 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.

⁴⁸ 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.

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.⁴⁹ 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.⁵⁰ 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;

⁴⁹ 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.

⁵⁰ 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.⁵¹ 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

⁵¹ 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.⁵² Like other general equilibrium models, N_{ew}ERA is designed to analyze long-

⁵² 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 2015.⁵³ 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.⁵⁴ NERA estimated economic impacts for these three cases with no constraint on exports, and found that even with exports reaching levels greater than

⁵³ 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.

⁵⁴ 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 sStudy 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	<i>3.02</i>	<i>8.00</i>	10.77	<i>12.00</i>	<i>12.00</i>
U.S. High Shale EUR with International Supply/Demand Shock at Low/Slowest export levels	<i>0.50</i>	2.69	3.92	3.27	3.76

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

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

parity in any of the cases analyzed, even if the United States were exporting to regions where natural gas prices are presently linked to oil. NERA asserts that costs of liquefaction, transportation, and regasification would keep U.S. prices well below those in importing regions.

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

- **Even with unlimited exports, there would be net economic benefits to the United States.** NERA estimated economic impacts associated with unlimited exports in cases in which even the High, Rapid limits were binding. In these cases, both LNG exports and prices were determined by global supply and demand. Even in these cases, NERA found that U.S. natural gas prices would not rise to oil parity or to levels observed in consuming regions, and net economic benefits to the U.S. increased over the corresponding cases with limited exports. To examine U.S. economic impacts under cases with even higher natural gas prices and levels of exports than in the unlimited export cases, NERA also estimated economic impacts associated with the highest levels of exports and U.S. natural gas prices in the EIA analysis, regardless of whether those quantities could actually be sold at the assumed netback prices. The price

received for exports in these cases was calculated in the same way as in the cases based on NERA's GNGM model, by adding the tolling fee plus a 15 percent markup over Henry Hub to the Henry Hub price. Even with the highest prices estimated by EIA for these hypothetical cases, NERA found net economic benefits to the United States, with the net economic benefits growing as export volumes rise. Addressing this finding, NERA explained that LNG export revenues from sales to other countries at those high prices would more than offset the costs of freeing that gas for export.

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

A. Overview

As noted above, DOE/FE received 35 timely filed and five additional late-filed comments in support of the Application; three timely filed and two late-filed comments opposing the Application without motions to intervene; comments from Derrick Hindery raising environmental concerns but taking no position on the merits of the Application; and five timely filed motions to intervene and comment or protest from the APGA, Sierra Club, Citizens Against LNG, Landowners United, and KS Wild.

No party opposed the submission of the late-filed pleadings, and we find that no party will be unduly prejudiced by our consideration of those pleadings. Accordingly, the late-filed comments will be accepted for filing.

B. Comments Supporting the Application

The comments submitted in support of Jordan Cove's Application generally address the benefits the commenters expect to occur if the requested authorization is granted.⁵⁵ Of the 40

⁵⁵ Following the close of the comment period, DOE/FE received five comments in support of the authorization and two comments requesting denial of the authorization. These late-filed comments were submitted by Sandra Geiser-Messerle, Executive Director of the South Coast Development Council, Inc.; Ronald Cox, Vice President of Power Supply, Hawaiian Electric Company; Q.T. Freeman, Chairman of Cardinal Services; Donna Opitz; and Christopher

comments in support, 29 were a single form letter. The 40 comments describe economic benefits the Jordan Cove project allegedly would bring to the Coos Bay region of Oregon. State Representatives Bruce Hanna, Arnie Roblan, Joanne Verger, Dennis Richardson, Sal Esquivel, Wally Wicks, and Tim Freeman highlight the job creation aspects of the project. In particular, they forecast the creation of more than 2,600 construction jobs with an average of more than 900 jobs over three-and-a-half years of construction, as well as 150 permanent jobs with salaries twice the average per capita income in Southern Oregon. Additionally, they note that Jordan Cove and the PCGP will pay between \$25 and 30 million per year in local taxes, and provide needed economic development to the underutilized Coos Bay Port. Twenty-eight other commenters, including Edward Metcalf of the Coquille Indian Tribe, maintain that such benefits will accrue to the Coos Bay area and provide long-term economic growth. Sandra Geiser-Messerle of South Coast Development Council, Inc. and Jon A. Barton explain that the project will greatly help to alleviate poverty in Coos County. Loran Wiese, City Councilor of Coquille, Oregon, notes that any job creation is welcome.

Several entities highlight other economic benefits of the project, such as the ability to supply LNG to Hawaii and the boon to the regional construction trade. Dale Sause of Sause Bros. Ocean Towing Co., Evan J. Griffith of Matanuska Electric Association, Scott L. Vuillemot of American Marine Corp. and Pacific Environmental Corp., and Ronald R. Cox of Hawaiian Electric Co. state that creating a large LNG production facility at Coos Bay would make it possible to ship LNG to Hawaii so it could be used as a fuel source there and throughout the Pacific. Additionally, Patrick B. Smith of Lane, Coos, Curry, Douglas Building Trades Council notes that the construction jobs associated with the Jordan Cove project will allow the Trade

R. Johnson. Comments requesting denial were submitted by Jan Dille and Paula A. Jones. Because these comments were received within 5 days of the close of the comment period, DOE/FE finds that acceptance of these comments will not prejudice other parties to this proceeding, and therefore accepts these comments for filing.

Council's members to work at home for three years instead of traveling for their jobs, and will provide apprenticeship opportunities.

C. Comments Opposing the Application

The comments submitted opposing the Application discuss safety, environmental, and land use concerns, and challenge the economic benefits claimed for the Jordan Cove project. In particular, Paula Jones and Wim de Vriend emphasize that the Terminal will be built in an earthquake and tsunami zone, thereby placing nearby residents in danger of an LNG leak. Russell, Sandra, and Kristofer Lyon state that their family cattle ranch lies in the path of the PCGP and are at risk of losing their land via eminent domain if the pipeline is approved. De Vriend states that taking land when there is no gas shortage in the United States is against the public interest. Jan Dilley contends that the project should not be approved until Jordan Cove fully complies with NEPA. De Vriend concurs and highlights that the project will damage the region's waterways. Regarding the Project's claimed benefits of economic development, de Vriend states that Coos Bay Port has historically mismanaged projects, leading the region to see no economic development or job creation opportunities from the projects. Likewise, Paula Jones argues that any economic benefit from the project will ultimately support Canada and not the United States. Lastly, Derrick Hindery, while not expressly supporting or opposing the project, cautions that the project still requires permits for LNG facility operations and has not conducted an EIS addressing supply chains and any environmental impacts.

D. 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 Jordan Cove'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 LNG⁵⁶ will significantly increase domestic natural gas prices. APGA also refers to an early release version of EIA's Annual Energy Outlook 2012 (AEO 2012) that, it states, substantially reduced the level of estimated technically recoverable natural gas in the Marcellus Shale. APGA argues these assessments undermine the premise of the Application that vast recoverable reserves will keep domestic gas prices low despite LNG exports. To the contrary, APGA contends that price increases associated with exports of LNG will jeopardize the viability of natural gas as a "bridge-fuel" in the transition away from carbon-intensive and otherwise environmentally problematic coal-fired electricity generation. APGA states:

Inflated natural gas prices will also inhibit efforts to foster natural gas as a transportation fuel, which is important to wean the U.S. from its historic, dangerous dependence on foreign oil. Furthermore, high natural gas prices and resulting increases in the price of electricity will reverse the nascent trend toward renewed domestic manufacturing before it gains momentum.⁵⁷

APGA also maintains that Jordan Cove'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 Jordan Cove seeks to use to its advantage.

Jordan Cove's Application, according to APGA, is one of 14 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, approximately 18.70 Bcf/d for FTA exports and 14.61 Bcf/d for non-FTA exports, is roughly 27 percent of the total marketed production in the United States in 2011 (66 Bcf/d). APGA contends that authorization

⁵⁶ 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 (Aug. 6, 2012) [hereinafter APGA Mot.].

⁵⁷ *Id.* at 3.

of this large quantity for export will have a substantial impact on natural gas demand, will increase domestic natural gas and electricity prices, and will limit natural gas supply at a time when the nation has an opportunity to forge a path toward energy independence. As a consequence, APGA contends, the proposed exports are inconsistent with the public interest.

APGA argues that, ultimately, Jordan Cove's exports will fail to compete with natural gas exports by other nations. APGA also argues that "DOE/FE should not pursue policies that directly increase natural gas commodity prices for American consumers, thereby making natural gas less competitive in this country as a replacement for foreign-sourced fuels or for fuels that are less clean and more carbon-intensive."⁵⁸

APGA states that the Navigant Study on which Jordan Cove relies failed to consider the cumulative impact of actual proposed exports, in several respects:

- Navigant assumed 6.6 Bcf/d of exports for its Aggregate Export Case, whereas the total export capacity that is the subject of export applications to date is 18.70 Bcf/d of FTA exports and 14.61 of non-FTA exports.
- 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 Jordan Cove Terminal, they would also export gas from Western Canada to Asian markets.
- The Navigant Study failed to consider the possibility of a second LNG terminal on the Oregon coast even though LNG Development Company, LLC had hired Navigant to conduct a similar study of the price impact of proposed exports from a terminal near Astoria, Oregon, in

⁵⁸ *Id.* at 6.

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- The Navigant Study failed to consider the full 1.2 Bcf/d in FTA export authority received by Jordan Cove in DOE/FE Order No. 3041.

- The Navigant Study projected ample volumes of technically recoverable natural gas but the 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, Jordan Cove 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.

While APGA contends that the Navigant Study ignored the true volume of pending exports and relied on outdated and inflated estimates of technically recoverable natural gas, the Navigant Study still found that prices at the Malin hub will be 26 percent higher under the GHG Demand Case than the Reference Case in the year 2025 and 28 percent higher in the year 2045. APGA insists that the GHG Demand Case is the most realistic scenario considered by Navigant. APGA claims that the switch from coal-fired electricity to natural gas is already occurring and that DOE/FE must consider these trends in its review of the domestic need for the natural gas that Jordan Cove plans to export and also must consider the results of the EIA Study.

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 Study considered only one volume of future aggregate exports—6.6 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 Study uses 6.6 Bcf/d figure as projected export capacity through 2045 without considering the potential of divergent growth rates in export capacity or an expansion of export capacity. APGA charges that the Navigant Study did not account for the slow or rapid development of export capabilities, the potential for different gas reserve scenarios, or economic growth trends. APGA states that even the High Shale EUR scenario was lower than the inflated projected production levels on which Navigant relied.

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.’”⁵⁹ Given the number of export applications that DOE/FE has received to date and the total export capacity requested of roughly 14 Bcf/d and 13.71 Bcf/d to FTA and non-FTA nations respectively, APGA submits that the “high/rapid” export scenario analyzed by EIA is the most realistic scenario. According to APGA, the “high/rapid” scenario produces price increases of 36 to 54 percent by 2018. On the other hand, given the reduction in technically recoverable gas in the AEO 2012 overview report, APGA states that the AEO 2011 Reference Case may be the more accurate scenario considered in the EIA report. APGA states that the high/rapid scenario in the Low Shale EUR case projects that natural gas prices will increase by 54 percent in 2018 and that, even under the slow/low scenario in the Low Shale EUR case, exports will increase domestic wellhead prices by 20 percent in 2020.

APGA also asserts that future natural gas prices may be even higher than projected in the EIA Study because the EIA assumed that domestic prices would only be affected by domestic supply/demand factors and because other factors may limit economically recoverable domestic supplies. These other factors, according to APGA, include increased regulation of hydraulic

⁵⁹ *Id.* at 11 (quoting EIA Study at 6).

fracturing and pending coal plant retirements.

APGA states that the relatively low natural gas prices currently being experienced in the United States give the nation an opportunity to end its dependence on coal and foreign oil (by using natural gas as a bridge-fuel), to attract renewed domestic manufacturing, and to stimulate displacement of gasoline with compressed natural gas (CNG) fueled vehicles. APGA argues that increased prices due to exports will jeopardize each of these prospects and, ultimately, national security and national wellbeing. APGA also contends that sustained low prices for natural gas will help to keep electricity prices from spiking higher during the transition to lower-carbon fuels. A spike in electricity prices, APGA adds, will have rippling effects on the U.S. economy.

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

APGA 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 Jordan Cove's proposed exports will not prove economical in the long-run:

As other nations develop their resources and export capacity and as U.S. natural gas prices increase due to the very exports Jordan Cove proposes, international and domestic prices will converge, leaving the U.S. with the worst of all worlds, *i.e.*, higher domestic prices that thwart energy independence and that undermine the competitiveness of the manufacturing sector that relies heavily on natural gas as a process fuel.⁶⁰

⁶⁰ *Id.* at 15.

APGA maintains that Jordan Cove 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 Jordan Cove of shipping to the Malin hub and through the PCGP.

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.

E. Sierra Club's Motion to Intervene and Protest

Sierra Club filed a motion to intervene and protest. Sierra Club states that its "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."⁶¹ Sierra Club further states that, as of July 2012, it had 15,525 members in Oregon and 601,141 members overall. Sierra Club moves to intervene to protect its members' interests that, it claims, will be put at risk by the environmental and economic consequences of the Jordan Cove proposal and maintains that the Application is not consistent with the public interest.

Sierra Club asserts that DOE/FE may not conditionally approve Jordan Cove's proposal without a proper NEPA analysis that fully analyzes the direct, indirect, and cumulative impacts of increased natural gas production linked to the proposed exports. Such an analysis, according

⁶¹ Sierra Club's Motion to Intervene, Protest, and Comments (Feb. 6, 2012), at 1 [hereinafter Sierra Club Mot.]

to Sierra Club, is required by the public interest standard of the NGA and not solely by NEPA. Sierra Club maintains that this analysis should involve a full EIS that weighs, among other factors, the upstream impacts of the Terminal and the PCGP, and considers a full range of alternatives, including not exporting LNG from Coos Bay and not exporting LNG to any non-FTA country.⁶² Because Jordan Cove's proposal is one of several natural gas export proposals, Sierra Club asserts that DOE/FE should prepare a programmatic EIS that considers the cumulative impacts of all of the proposals.

Sierra Club further contends Jordan Cove's application is not supported by adequate economic analysis and charges that Jordan Cove's predictions of job creation and other economic benefits are uncertain and overstated. According to Sierra Club, these predictions are derived from flawed IMPLAN input-output models. This method of analysis, according to Sierra Club, fails to account for the boom-bust cycles inherent in resource production and is unable to identify which of the predicted jobs and benefits would have occurred anyway.

Sierra Club maintains that the Jordan Cove proposal will increase domestic gas prices and harm manufacturing industries and the jobs they support. Sierra Club claims that the EIA Study demonstrates that Jordan Cove's proposal will significantly increase demand for natural gas, thereby driving up gas prices and limiting or eliminating manufacturing and farming jobs. Sierra Club contends that Jordan Cove's critiques of the EIA Study are mistaken. Additionally, Sierra Club maintains that even if DOE/FE accepted Jordan Cove's predictions of lesser price impacts, those impacts constitute a significant harm to the public interest. Sierra Club maintains that, absent a strong showing that the EIA estimates are inferior to Jordan Cove's estimates, use of the industry (*i.e.*, Jordan Cove) estimates would be arbitrary and capricious. Yet, Sierra Club

⁶² Sierra Club identifies several other alternative possibilities which, it insists, at a minimum should have been considered. *Id.* at 13-15.

states, Jordan Cove has made no such showing.

Sierra Club insists that DOE/FE must evaluate the cumulative impact of Jordan Cove's proposal in light of all other export proposals that have already been approved or are reasonably foreseeable. Sierra Club argues that Jordan Cove is incorrect in contending that only the "low" export scenario of 6 Bcf/d used in the EIA Study is an appropriate measure of the likely impact of granting the Application. For the same reason, Sierra Club criticizes Jordan Cove's independent forecast of the effects of aggregate LNG exports of 6.6 Bcf/d. Sierra Club likewise criticizes the EIA Study's "high" export scenario because it considers only 60 percent of the LNG export applications currently pending. The likelihood that not all of the proposed export operations will come to fruition, according to Sierra Club, does not render the cumulative impacts of all of the proposals (at 100 percent operational levels) so remote and speculative that some lesser quantity would be appropriately studied.

Even apart from the cumulative impact of all pending proposals on natural gas prices, Sierra Club states that Jordan Cove's proposal in isolation will have a significant impact. According to Sierra Club, the Application predicts that gas prices in the Pacific Northwest will increase by 3.9 to 7.2 percent. Sierra Club maintains that the EIA explains that such an increase is detrimental to consumers and Jordan Cove has offered no argument to show why these increases are not contrary to the public interest.

Sierra Club also faults the Jordan Cove's analysis for assuming that (a) the geographical distribution of export operations will be different than proposed in the various applications submitted to DOE/FE; and (b) the geographical distribution of the export operations that will be approved will alter the cumulative price impact of the proposals. In particular, Sierra Club notes that the pending proposals cover a potential of more than 18 Bcf/d of LNG exports from the Gulf

whereas, without justification, Jordan Cove assumes less than 6 Bcf/d of exports from the Gulf.

Sierra Club states that there is a “strong case” that DOE/FE should review the price impact of Jordan Cove’s proposal in light of the “high export/low shale EUR” scenario in the EIA Study.⁶³ This is because, according to Sierra Club: (a) the volume of proposed exports are greater than the EIA Study’s “high” export case; and (b) current estimates of total reserves are much lower than those used in the EIA Study, *i.e.* EIA’s 2012 Annual Energy Outlook cut the estimates of total domestic gas reserves by over 40 percent from the 2011 AEO estimates used in the EIA Study (from 827 Tcf to 482 Tcf).

Sierra Club notes that all of EIA’s scenarios predict greater price increases than Jordan Cove’s Application. According to Sierra Club:

- Natural gas bills paid by residential, commercial, and industrial end-users will increase by 3 to 9 percent over a comparable baseline with no exports; and
- Electricity bills will increase from 1 to 3 percent in the rapid growth cases while the slower growth cases tend to show natural gas bills increasing more towards the end of the projection period.

Sierra states that, due to these price increases, EIA predicts higher gas bills and decreased consumption by all consumer classifications. Sierra Club charges that these price increases will be very large in absolute terms—gas and electricity bills will increase by \$9 billion per year in the low/slow scenario and up to \$20 billion per year in other scenarios. This will, according to Sierra Club, have a deep impact on industries dependent on natural gas, including farming, steel production, fertilizer manufacturing, and chemical manufacturing.

Sierra Club accordingly maintains that the result will be job losses or stymied job growth that will offset job growth projected from the export operations. In this regard, Sierra Club

⁶³ Sierra Club Mot. at 60.

maintains that empirical studies of communities in which the shale gas boom has occurred reveal a boom-bust economic cycle and creation of temporary transient jobs rather than permanent full time jobs.

Further, Sierra Club contends that the IMPLAN model on which Jordan Cove relies and other input-output models fail to consider counterfactuals and foregone opportunities, *i.e.*, the models map the consequences of a particular expenditure, but do not ask how the economy might have grown had investors and regulators made different choices. Nor, according to Sierra Club, do these models consider how the particular choice at issue might displace other economic activity.”⁶⁴ Sierra Club asserts that input-output studies cannot determine how many jobs are created because the models do not consider whether the jobs, particularly jobs associated with natural gas production activities, might have been created even in the absence of the spending associated with Jordan Cove’s proposal.

Additionally, Sierra Club contends that input-output studies may not reflect actual spending patterns or other distributional effects. For example, Sierra Club maintains that landowners with gas production leases may elect to save their money rather than spend it. Sierra Club charges that input-output models “are static, in that they provide a series of one-year snapshots. Thus, Sierra Club maintains that Jordan Cove’s study measures ‘job-years’ but not jobs held year to year.”⁶⁵

Sierra Club further maintains that the input-output model used by Jordan Cove “claims ‘credit’ for every job connected to [the] entire share of the domestic production of 0.8 Bcf/d of gas Jordan Cove seeks to export.”⁶⁶ Sierra Club agrees that new volumes of gas will be produced in response to Jordan Cove’s proposed exports and that this increment of new

⁶⁴ *Id.* at 63.

⁶⁵ *Id.*

⁶⁶ *Id.* at 64.

production will generate new jobs. But Sierra Club maintains that the Jordan Cove analysis is flawed because it did not identify the jobs specifically related to the proposed exports.

Moreover, Sierra Club contends that an input-output model is not readily able to evaluate rapid or large changes to the economy (such as may be associated with the “boom” in shale gas production). Nor, according to Sierra Club, is such an analysis able to deal with the complicated series of individual choices and community disruptions associated with a boom in economic activity.

Sierra Club’s claims that its analysis shows that the economic benefit of the Jordan Cove proposal will be much smaller than Jordan Cove has projected and that there will be offsetting economic harms. Relying on a study conducted by Amanda Weinstein and Mark Partridge,⁶⁷ Sierra Club states that the number of jobs created by the shale gas boom in Pennsylvania were not as large as claimed by industry. From 2004 to 2010, according to Sierra Club, Bureau of Labor statistics show that only 10,000 jobs in the oil and gas sector were added within the state.

According to Sierra Club, the boom-bust cycle is typically characterized by a period of rapid growth in economic activity followed by a rapid decrease. Sierra Club states that even during the boom, few jobs will be created because the natural gas extraction industry is capital intensive. The boom cycle, Sierra Club also states, will cost local communities in expenditures for everything from road maintenance and public safety to schools. Citing a study by Susan Christopherson of the economic impacts associated with Marcellus Shale gas extraction activities,⁶⁸ Sierra Club asserts that when the bust follows due to depletion of commercially recoverable resources, local communities will suffer because population and jobs will depart the

⁶⁷ Amanda Weinstein and Mark Partridge, *The Economic Value of Shale Natural Gas in Ohio*, Ohio State University (December 2010) (Weinstein study). *Id.* at 64-65.

⁶⁸ Sierra Club relies on detailed studies from Cornell University’s Department of City and Regional Planning. Sierra Club specifically cites Susan Christopherson, CaRDI Reports, *The Economic Consequences of Marcellus Shale Gas Extraction: Key Issues* [hereinafter Christopherson study]. Sierra Club Mot. at 66.

region and there will be fewer people to support the boomtown infrastructure. Sierra Club adds that the boom-bust cycle will be exacerbated due to the long-term regional industrialization associated with the large and geologically complex development of the Marcellus Shale.

Other factors, according to Sierra Club, that undercut the economic benefits of Jordan Cove's proposal include the difficulty in converting technical natural gas field jobs directly into sustainable, well-paying local employment; the uneven employment patterns and high turnover rates in the natural gas industry; a panoply of development and environmental issues; and threats to the tourism industry for many parts of the Marcellus region, including New York's Southern Tier. Sierra Club concludes:

[A] simple economic model, like the input-output model, like IMPLAN, cannot reliably capture the consequences of transforming an entire region of the country.... That transformation will benefit some discrete actors considerably, and some communities, if they are able to navigate the durable challenges of boom and bust economics.⁶⁹

Sierra Club further asserts that the record in this proceeding is inadequate to support a decision to approve Jordan Cove's proposal. Additionally, if DOE/FE grants Jordan Cove's Application, Sierra Club contends that DOE/FE must impose rigorous monitoring conditions that cover (1) regional and national economic dislocations and disruptions caused by natural gas extraction, including by the industry's boom-and-bust cycle; (2) increases in gas and electricity prices and resulting shifts to more polluting fuels; and (3) environmental impacts. Sierra Club states that in setting forth these monitoring conditions, DOE/FE must provide specific monitoring terms and thresholds that will trigger agency actions of various types. Failure to provide such monitoring conditions, Sierra Club argues, would violate the NGA.

⁶⁹ *Id.* at 68.

F. Notice of Intervention, Protest, and Comments of Citizens Against LNG

Citizens Against LNG states that it is a grassroots organization formed during FERC's pre-filing phase of the Jordan Cove and PCGP import project review, and that it represents over 4,000 citizens in Southern Oregon that would be negatively affected by the Jordan Cove project.⁷⁰

Citizens Against LNG states that the Jordan Cove Application, if granted, would be detrimental to the public interest. Citizens Against LNG argues that the proposed exports would hurt consumers by raising domestic natural gas prices. Referring to the Low Shale EUR case set forth in the EIA Study, Citizens Against LNG states that natural gas prices would increase as much as 54 percent. Referring as well to a report prepared by the staff of then-Representative Edward J. Markey,⁷¹ Citizens Against LNG asserts that natural gas price increases due to exports would substantially increase energy bills for American consumers and could potentially have catastrophic effects on U.S. manufacturing.

Additionally, Citizens Against LNG argues that potential job gains in manufacturing if exports are not permitted are large compared to the jobs that may be created by natural gas exports. Also, according to Citizens Against LNG, any job gains from the Jordan Cove proposal would be more than offset by job losses in manufacturing. Citizens Against LNG maintains that approval of the Jordan Cove proposal would cause Coos Bay to suffer a devastating level of unemployment after the construction phase of the Terminal and the PCGP is completed.

⁷⁰ Citizens Against LNG Notice of Intervention, Protest, and Comments (Aug. 6, 2012) [hereinafter Citizens Against LNG Mot.]. Although labeled as a "Notice of Intervention," only a state commission may intervene by notice; therefore, the Citizens Against LNG submission will be construed as a motion to intervene under our regulations. See, 10 C.F.R. 590.303.

⁷¹ Democratic Staff of H. Comm. on Nat. Res., *Drill Here, Sell There, Pay More: The Painful Price of Exporting Natural Gas* (2012), available at http://democrats.naturalresources.house.gov/sites/democrats.naturalresources.house.gov/files/2012-03-01_RPT_NGReport.pdf.

Citizens Against LNG points to the construction of a natural gas pipeline in 2003-2004 from Coos Bay to the Williams Northwest Grants Pass lateral pipeline. According to Citizens Against LNG, the developers of that pipeline promised 2,900 jobs for Coos County but “those jobs never materialized and that pipeline currently is only operating at 5 to 7 percent of its capacity.”⁷²

Citizens Against LNG states that Jordan Cove estimates that construction of the Terminal would create 1,100 jobs but those jobs would last only 14 months and that there would be massive unemployment thereafter. Also, Citizens Against LNG maintains that the PCGP would only generate 5 permanent employees and that the 56 to 99 jobs forecast by Jordan Cove would not make a significant dent on the jobs needed in the area, which already suffers from high unemployment. When jobs lost due to the proposed Jordan Cove facilities are taken into account, Citizens Against LNG asserts there would be a net decrease in the number of area jobs.

Citizens Against LNG disputes Jordan Cove’s claim of local tax benefits from the project. Specifically, it maintains that the Terminal will not provide tax revenue to local government because the facility will sit in an Enterprise Zone and will be exempt from paying taxes for 3 or more years.

Citizens Against LNG further contends that supplies of water across the United States are not adequate to sustain the practice of hydraulic fracturing used to produce large quantities of natural gas. Citizens Against LNG contends that the environmental impacts from fracking “could spell a reduction or even a halting of fracking in some areas...”⁷³ Citizens Against LNG maintains that natural gas prices are likely to rise due to water shortages and that the exports proposed by Jordan Cove will drive up prices even further. According to Citizens Against LNG,

⁷² Citizens Against LNG Comment Letter at 4.

⁷³ Citizens Against LNG Comment Letter at 11.

by creating demand for more natural gas, the Jordan Cove project will indirectly exacerbate water scarcity.

Citizens Against LNG argues that Jordan Cove's prediction about sustained Asian demand for natural gas is likely mistaken. Citizens Against LNG bases this statement on a report of the International Energy Agency (IEA) that stated that at the end of 2011, China's remaining recoverable resources of unconventional gas totaled almost 50 trillion cubic meters (TCM) and described China's plans to develop this resource:

These [plans] call for coalbed methane production of more than 30 bcm [billion cubic meters] and for shale gas production of 6.5 bcm in 2015; the targets for shale gas output in 2020 are between 60 and 100 bcm. They are accompanied by the goal to add 1 tcm of coalbed methane and 600 bcm of shale gas to proven reserves of unconventional gas by 2015.⁷⁴

The same IEA report, according to Citizens Against LNG, indicates that Eastern Europe and Eurasia are planning to "vastly increase production" and they can supply natural gas to Asia by pipeline.⁷⁵ Citizens Against LNG maintains that these developments likely will create an oversupply of natural gas in Asia. In turn, according to Citizens Against LNG, the Jordan Cove project will become "economically unviable," and will be mothballed, but only after causing substantial adverse impacts on private landowners and the environment during its construction.

Citizens Against LNG charges that the process of liquefying natural gas and shipping the LNG from the United States to foreign destinations is costly and will have negative environmental impacts in terms of greenhouse gas (GHG) emissions. Citizens Against LNG refers to a report by Jaramillo, *et al.* that examined the amount of LNG consumed as fuel over long distances and found that a "loaded tanker with a rated power of 20MW, and 0.12% daily

⁷⁴ Citizens Against LNG Comment Letter at 7 n.11 (citing International Energy Agency (2012), "Golden Rules for a Golden Age of Gas: World Energy Outlook Special Report on Unconventional Gas," at 115-20).

⁷⁵ *Id.*, citing IEA report at 87.

boil-off rate would consume 3.88 million cubic feet of gas per day....”⁷⁶ The report further found, according to Citizens Against LNG, that LNG could travel distances from 2,700 to 11,700 nautical miles when transported for international delivery. According to Citizens Against LNG, the environmental benefits of natural gas fade away when the GHG emissions associated with the export and import of LNG are taken into account.

Citizens Against LNG contends that the Jordan Cove proposal is also against the public interest because Jordan Cove is owned and controlled by foreign investors and, therefore, the profits from the enterprise will leave the United States. Citizens Against LNG notes that 75 percent of Jordan Cove and its general partner are owned by Fort Chicago LNG II U.S.L.P., which in turn is owned and controlled through a number of intermediaries by Veresen. Citizens Against LNG maintains that Veresen is a Canadian limited partnership in which only Canadians are allowed to invest.

Citizens Against LNG maintains also that the Application failed to analyze the economic impacts of Jordan Cove’s proposal on local tourism and recreation; commercial and recreational fishing; and timber production. Citizens Against LNG refers to the significant economic contributions made to the economy by each of these industries and implies that the approval of the Jordan Cove proposal will have negative economic and environmental impacts. More specifically, Citizens Against LNG raises the following matters:

- Tourism, according to Citizens Against LNG, contributed more than a billion dollars to Coos County from 2007 to 2011 and steadily increased from \$94.5 million in 1991 to \$220.1 million in 2011. Additionally, Citizens Against LNG states that there are 3,090 jobs in

⁷⁶ Citizens Against LNG Comment Letter at 9 n.15 (citing Jaramillo, P., et al. (Sep. 2007) “Comparative Life-Cycle Emissions of Coal, Domestic Natural Gas, LNG, and SNG for Electricity Generation,” *Environ Sci Technol.* 41(17); 6290-96).

Coos County related to the tourism industry and these jobs are “*a direct result of not developing our beaches, dunes, and coastline.*”⁷⁷

- With respect to commercial and recreational fishing, Citizens Against LNG notes that \$20.1 million worth of fish and shell fish were landed at Charleston in 2006 but Jordan Cove’s proposed pipeline construction will destroy restored fish runs in Southern Oregon and damage oyster beds. Citizens Against LNG also states that the ECONorthwest study did not account for the time it would take the Department of Homeland Security to clear Coos Bay before an LNG tanker would transit through the Bay, nor provide an accurate number of potential ship transits. For each transit of an LNG tanker through Coos Bay, according to Citizens Against LNG, a security zone that in some cases would encompass the entire width of Coos Bay will have to be established and other boat traffic will have to be shut down from 90 minutes to 2 hours. According to Citizens Against LNG, this will be an extreme hardship on the commercial fishing fleet that also needs high slack tides in order to transit Coos Bay.

- Timber production also will be negatively affected by the Jordan Cove proposal, according to Citizens Against LNG. Citizens Against LNG identifies several alleged negative environmental impacts but also maintains that the Jordan Cove project will significantly increase the cost of timber production, that timber production is a low profit margin business, and these increased costs are likely to drive some businesses to close. Timber industry jobs will also be lost, Citizens of LNG states, due to the flooding of the market with 144 miles of forestlands that will be clear-cut for pipeline construction.⁷⁸

- Citizens Against LNG charges that the thermal radiation zones and flammable vapor dispersion zones associated with the Terminal will interfere with and preclude other uses

⁷⁷ Citizens Against LNG Comment Letter at 11.

⁷⁸ Insofar as Citizens Against LNG raise other objections relating to the environmental impact of the Jordan Cove proposal, those will be addressed following the completion of the FERC’s review of the project.

of the Port. Citizens Against LNG refers specifically to a plan to develop a wind energy project at the Port and to the Port's proposed Oregon Gateway cargo terminal, which will not be permitted to operate in these hazard zones. Citizens Against LNG maintains that the Coast Guard has established a 150-yard security zone around each LNG tanker berthed at the docking facility, plus a moving 500 yard security/safety zone around each LNG tanker. According to Citizens Against LNG, these security/safety zones mean that, realistically, the Port only will be able to serve LNG terminal purposes. Moreover, Citizens Against LNG state that the ECONorthwest study assumes that there will only be 80 to 90 shipments per year, not the "more realistic" number of 186 to 232.

G. Landowners United Notice of Intervention and Protest

Landowners United, representing itself as a grassroots organization of landowners who will be directly affected by the PCGP, submitted a Notice of Intervention and Protest.⁷⁹ Landowners United maintained that the proposed LNG terminal, storage tanks, and liquefaction facility "is not a well conceived or appropriate industry for the Southern Oregon Coast and that LNG represents an unacceptable risk to the people of the State of Oregon."⁸⁰ Landowners United also asserts that approval of the Jordan Cove project will drive up the price of natural gas domestically to the detriment of the U.S. economy.

H. Comments and Motion to Intervene of KS Wild

KS Wild states that it is a non-profit public interest conservation organization with approximately 3,000 members. It maintains that its members, staff, and board regularly use and enjoy the Rogue River-Siskiyou, Umpqua and Fremont-Winema National Forests, Medford, Roseburg and Coos Bay BLM Districts, and the Rogue River and its tributaries for hiking,

⁷⁹ Landowners United's submission will be construed as a motion to intervene. 10 C.F.R. § 590.303.

⁸⁰ Landowners United Intervention and Protest, at 1.

camping, hunting, fishing, nature study, scientific study, photography, swimming and general recreational and aesthetic purposes. KS Wild states further that its members have been actively involved in oversight of public resource management in these areas. KS Wild asks for intervenor status and seeks to join in Sierra Club's motion to intervene and protest.

I. Answers of Applicant and Citizens Against LNG's Response

On August 29, 2012, Jordan Cove filed an "Answer of Jordan Cove Energy Project, L.P. to Protests." Jordan Cove appended a study, *The Impact of the Jordan Cove Energy Project on Coos Bay Housing and Schools* (Housing and Schools Study)⁸¹ to its Answer.⁸² On September 13, 2012, Citizens Against LNG filed a response to Jordan Cove's Answer.⁸³

1. Answer of Jordan Cove to Protests

Jordan Cove maintains that the opponents of its proposal to export LNG have failed to overcome the statutory presumption that the proposal is consistent with the public interest. Insofar as Sierra Club and other opponents of the proposal have submitted arguments related to the environmental review and potential environmental impacts of the proposal, Jordan Cove submits that the arguments are not properly raised in this proceeding.

Jordan Cove likewise rejects Sierra Club's argument that DOE may not issue a conditional authorization prior to the completion of environmental review. Jordan Cove submits that Sierra Club is incorrect in asserting that the issuance of a conditional order means that DOE/FE has completed its public interest determination. Further, Jordan Cove maintains that

⁸¹ ECONorthwest, *The Impact of the Jordan Cove Energy Project on Coos County Housing and Schools* (May 14, 2012).

⁸² DOE/FE issued a letter order on August 17, 2012 (reissued August 20, 2012) providing Jordan Cove until August 29, 2012 to submit its Answer to the protests.

⁸³ Hereinafter "Citizens Against LNG Response." Neither the Notice of Application in this proceeding nor DOE's regulations provide an opportunity for responses to answers to protests. *See*, 10 C.F.R. 590.304. DOE/FE, however, finds that no party has opposed the submission of the Citizens Against LNG response and no party will be unduly prejudiced by our consideration of the pleading. Accordingly, the Citizens Against LNG Response will be accepted for filing.

the position taken by Sierra Club is contrary to years of established practice (dating to the 1980's) by DOE/FE and, previously, by the Economic Regulatory Administration. DOE/FE's authority to issue conditional orders, according to Jordan Cove, is supported by the language of NGA section 3, which authorizes DOE/FE to impose "such terms and conditions as [it] may find necessary or appropriate."⁸⁴ Jordan Cove submits that the inclusion of identical language in the 2005 amendment of NGA section 3⁸⁵ represents additional affirmation of this authority by Congress. Jordan Cove notes that the authority to issue conditional orders is also expressly set forth in DOE's regulations at 10 C.F.R. § 590.402 and points out that courts have upheld the authority of various regulatory agencies to issue conditional orders. Jordan Cove maintains as well that Sierra Club has not identified any legal authority to support its contrary position.

Jordan Cove further criticizes Sierra Club's contention that issuance of a conditional order prior to completion of environmental review is prohibited because of DOE regulations at 10 C.F.R. § 1021.211 and Council on Environmental Quality NEPA regulations at 40 C.F.R. § 1506.1(a). Jordan Cove asserts that DOE and CEQ regulations prohibit an "action" prior to issuance of a decision on an EIS but that DOE/FE's issuance of a conditional order does not constitute an "action" for these purposes. This is so, argues Jordan Cove, because DOE and CEQ regulations, respectively 10 C.F.R. § 1021.104(b) and 40 C.F.R. § 1508.18(b)(4), define an "action" as approval of a project. Jordan Cove submits that without a final order, there can be no "action" that has an adverse environmental impact or that limits the choice of alternatives. Moreover, Jordan Cove maintains that, given the tremendous investments of time and money and the long lead times involved in export projects, DOE/FE's practice of issuing conditional orders is an important signal to project sponsors and potential customers. This contributes to an

⁸⁴ 15 U.S.C. § 717b(a).

⁸⁵ 15 U.S.C. § 717b(e)(3)(A). This provision was added by section 311 of the Energy Policy Act of 2005 (Pub. L. 109-58 (Aug. 8, 2005)).

efficient regulatory process, according to Jordan Cove, because there would be no reason to complete the EIS process if DOE/FE determines that a proposed export is not consistent with the public interest for non-environmental reasons.

Jordan Cove also defends its reliance on studies that employed the IMPLAN methodology. Jordan Cove maintains that the IMPLAN methodology is transparent and allows the inclusion of data specific to its proposal. In this regard, Jordan Cove states that Sierra Club's general criticisms of IMPLAN do not apply in this case, *i.e.* contrary to Sierra Club's charge: (1) the ECONorthwest analysis accounts for earnings used for taxes, savings, or spending outside of Oregon and Washington; and (2) ECONorthwest measured the number of jobs created in each year by defining one job as 2,080 hours worked and did not count every position on a construction project as a "job" even if the position lasted only a few weeks.

Jordan Cove disputes Sierra Club's charge that the IMPLAN methodology is flawed because it does not consider counterfactuals and foregone opportunities. According to Jordan Cove, Sierra Club's insistence that DOE/FE must consider how the economy might have grown had investors and regulators made different choices is beyond any reasonable jurisdictional scope. Jordan Cove adds that the studies based on the IMPLAN model form only part of the case submitted in support of the proposed exports. Jordan Cove notes that the IMPLAN model is widely used by over 2000 public and private institutions, including many federal and state government agencies. Citing five different economic studies from 2012, Jordan Cove maintains that even Sierra Club frequently relies on IMPLAN analysis when supportive of its cause.⁸⁶

Jordan Cove charges that the opponents of the Application have not carried their burden to show that the proposal is contrary to the public interest. Jordan Cove asserts that Sierra Club did not submit an economic analysis of the proposal in this proceeding but, instead, relied on

⁸⁶ Answer of Jordan Cove at 11 n.32.

studies concerning the economic impacts of the development of the Marcellus Shale. Such information, Jordan Cove states, is irrelevant to the current proceeding where the source of natural gas is Canada and the U.S. Rocky Mountains. Jordan Cove argues as well that the boom-bust cycle described in Sierra Club's submissions is unlikely to occur in respect to the present proposal because the exploration risk is significantly less and the production process is more manageable than conventional gas development. Jordan Cove states: "Thus supply is much more responsive to demand and there is no reason to expect a bust cycle for the predicted employment increase...."⁸⁷ Jordan Cove notes that the benefits documented in the Upstream Contributions Study are domestic U.S. benefits and did not include the benefits in Canada.

Jordan Cove responds as well to Citizens Against LNG's charge that, once construction is completed, the proposal will cause massive unemployment. According to Jordan Cove, Citizens Against LNG relies on outdated construction employment data from the final EIS for the import proposal and ignores the Construction Study in this proceeding. Jordan Cove maintains that direct employment data indicates that the Terminal and PCGP will average 1,768 jobs over a four year period with total direct labor income over that period of \$730 million. Most of these jobs, Jordan Cove asserts, will be in Coos Bay and surrounding areas. Jordan Cove submits that the temporary jobs created by this construction effort are going to be a "lifeline" for workers searching for longer term work. Also, according to Jordan Cove, for post-construction regional unemployment to be higher than current unemployment, temporary construction workers would have to relocate to Coos Bay permanently in large numbers. But Jordan Cove points out that the Housing and School Study estimated an increase of 244 households, not large enough to increase unemployment, and that increase could be absorbed by the permanent jobs that Jordan Cove will create. Jordan Cove claims that there will be 736 permanent jobs, including 150 directly funded

⁸⁷ *Id.* at 13.

by Jordan Cove and PCGP, and an additional 586 indirectly supported.

Jordan Cove disputes Citizens Against LNG's argument that the proposal will have other negative net economic impacts. While Citizens Against LNG quotes from the final EIS in the import project proceeding, Jordan Cove argues that Citizens Against LNG has ignored the overall conclusion in that final EIS that the impacts of the proposed import facility would be "less than significant," provided proper mitigation measures were deployed. Jordan Cove also disputes Citizens Against LNG's claim that the Terminal will not provide tax revenue to local government because the facility will sit in an Enterprise Zone. Jordan Cove states that the tax exemption is of limited duration, and that Jordan Cove has committed to compensate Coos County by making a \$30 million annual contribution, including \$20 million for public K-12 education and \$10 million for projects of the Bay Area Urban Renewal Association.

Jordan Cove asserts that APGA and Sierra Club have erred in criticizing the Navigant Study. With respect to supply projections, Jordan Cove states that the opponents are incorrect in arguing that the relevant export volumes for study are the total volumes of all proposed projects or the sum of requested FTA and non-FTA export volumes. The relevant export volumes for study, according to Citizens Against LNG, are the quantities that are likely to be exported. Jordan Cove accordingly rejects APGA's suggestion that a range of aggregate export capacities needs to be examined. Jordan Cove asserts that most expert opinion indicates that it is unlikely that LNG exports from the United States will exceed 6 Bcf/d. Jordan Cove states that the standard supported by Sierra Club does not relate to economic modeling but solely to NEPA analysis.

Jordan Cove also rejects the APGA/Sierra Club criticism that the Navigant Study was flawed because AEO 2012 projected a reduction in unproved technically recoverable shale gas.

Even with this reduction, Jordan Cove maintains that the total recoverable natural gas resource is ample (representing more than 90 years of supply). Additionally, Jordan Cove states that production is the key relevant statistic for these purposes and EIA recognized that changes in the resource estimate will not have a significant impact on projected natural gas production, consumption, and prices.

Jordan Cove reiterates that the Navigant Study was based on “conservative” estimates of production in that those forecasts incorporate only actual current production and do not incorporate undeveloped plays such as the Utica Shale. On the other hand, drawing from the Navigant Whitepaper, Jordan Cove maintains that the supply forecasts in the EIA Study are too low, some of its scenario combinations are unrealistic, some of its single year effects are not representative, and its focus solely on Gulf Coast exports is not pertinent to Jordan Cove. In particular, Jordan Cove notes the absence of a West Coast facility in the EIA Study: “The salient fact is that the supplies to be exported from the Jordan Cove Terminal will be sourced initially primarily from Canada and otherwise from the U.S. Rockies and, had that fact been reflected in the EIA Study, it would have had a dampening impact on EIA’s price projections.”⁸⁸

Jordan Cove maintains that the price impact of its proposal most likely will be moderate and states that the focus of the opponents of the proposal on EIA’s Low Shale EUR Case and the High/Rapid export scenario is erroneous. This focus, Jordan Cove charges, is premised on the appropriateness of examining the volume of proposed exports or total export capacity requested rather than actual volumes likely to be exported (discussed above). Jordan Cove maintains that EIA’s Low Shale production forecast is extremely low and highly unlikely: “[I]t starts out at less than half of current actual production levels ... and even by 2035 it still lags behind the current

⁸⁸ *Id.* at 23.

production levels.”⁸⁹

Jordan Cove also rejects APGA’s claim that Navigant’s GHG Demand Case is “most realistic” because it factors in the switch from coal-fired electric generation to natural gas that is already occurring. Jordan Cove points out that this fuel-switching phenomenon is reflected in all scenarios in the Navigant Study. The GHG Demand Case, Jordan Cove asserts, is notable because it reflects additional GHG reduction regulation. But Jordan Cove states that legislation to regulate GHGs is losing favor, thereby rendering the GHG Demand Case a less appropriate scenario. Jordan Cove also states that the GHG Demand Case did not factor in a supply response to additional GHG regulation in the form of a general infrastructure build-out.

Jordan Cove argues that DOE/FE should focus on price levels in the more likely scenarios. While the EIA’s High Shale EUR Case has defects, Jordan Cove maintains that it is the most reasonable EIA case. Jordan Cove states that the price levels in the High Shale EUR Case, even for the High/Rapid export scenario, are in line with the \$4 to \$6 price level identified in the Navigant Study as needed to support the development of shale gas. Jordan Cove states that this price range also is within the range for “long-run equilibrium price” estimated by Dr. Kenneth Medlock III in an August 2012 report entitled *US LNG Exports: Truth and Consequence*.⁹⁰

Jordan Cove submits that the best measurement of the price impacts of its proposal is Navigant’s Jordan Cove Export Case. The per MMBtu price levels in this Case average \$5.18 at Sumas, \$5.22 at Malin, and \$5.46 at Henry Hub over the first half of the 29-year forecast period (2017-2045); and \$7.24 at Sumas, \$7.28 at Malin, and \$7.60 at Henry Hub over the second half

⁸⁹ *Id.* at 24.

⁹⁰ *Id.* at 25 n.73 (citing Kenneth Medlock, *US LNG Exports: Truth and Consequence* (2012), available at http://bakerinstitute.org/media/files/Research/da5493d4/US_LNG_Exports_-_Truth_and_Consequence_Final_Aug12-1.pdf).

of the forecast period. In the Aggregate Export Case, which assumes LNG export volumes of 6.6 Bcf/d, the average price levels in the first half of the forecast period are \$5.47 at Sumas, \$5.50 at Malin, and \$5.84 at Henry Hub; in the second half of the forecast period, the respective prices are \$7.51 at Sumas, \$7.56 at Malin, and \$7.92 at Henry Hub. Jordan Cove states that the export volumes of 6.6 Bcf/d in the Aggregate Export Case are in line with the consensus view of a likely export volume of 6.0 Bcf/d and yet, according to Jordan Cove, the price increases are “still relatively minor”⁹¹ (although larger than in the Jordan Cove Export Case). Jordan Cove stresses also that the projected price increases for the second half of the forecast period may be overstated since Navigant assumed no new gas supply basins and no unannounced pipeline and storage projects other than expansions necessary to avoid bottlenecks in modeling.

Jordan Cove disputes APGA’s claim that LNG exports will limit natural gas supply. Instead, Jordan Cove maintains that LNG exports will provide a new market in a currently oversupplied market and will spur exploration and development of shale gas assets in North America, thereby contributing to the long-term sustainability of the gas market and to reduced price volatility.

Jordan Cove also challenges claims by the opponents of its Application that jobs will be lost due to LNG exports. Jordan Cove observes that Citizens Against LNG quotes a letter from Industrial Energy Consumers of America to the Brookings Institution to support its position. Jordan Cove maintains that the letter did not say that manufacturing jobs would be lost, but merely advises that decisions about exports should include an analysis of the potential impact on the domestic economy and job creation. Jordan Cove also notes that the American Chemistry Council does not oppose exports, contrary to reports, and in fact issued a press release criticizing inaccurate reporting and endorsing a free market approach.

⁹¹ *Id.* at 26.

Jordan Cove denies APGA's claim that LNG exports will undermine the use of natural gas as a bridge fuel.⁹² Jordan Cove states that APGA did not submit any economic modeling to support its claim, and points out that Navigant's studies indicate that the ramp up of coal-to-gas switching will mostly have occurred before the price impacts of Jordan Cove's exports begin. Also, Jordan Cove maintains that other factors, including abundant supplies, environmental regulations, and other reasons for generators to abandon inefficient older coal-fired power plants will continue to favor fuel-switching.

Jordan Cove agrees that DOE/FE should to the maximum extent consistent with its statutory obligations allow natural gas markets to operate freely. Insofar as APGA contends that the proposed exports will not prove economical and Citizens Against LNG argues that Asian demand projections may be incorrect, Jordan Cove insists that its decision to take on the market risk of the proposal is not a relevant factor for DOE/FE's public interest analysis.

2. Citizens Against LNG's Response to Jordan Cove's Answer

Citizens Against LNG submitted a response⁹³ to Jordan Cove's Answer in order to argue that DOE/FE should undertake an independent economic analysis of the reports prepared by ECONorthwest and used by Jordan Cove to support its proposal. Citizens Against LNG explains that, in October 2006, the South Coast Development Council relied on another ECONorthwest report when it supported Jordan Cove's application for FERC authorization to construct an import facility. According to Citizens Against LNG, FERC relied on that report in the preparation of its EIS on the import facility proposal. Although Jordan Cove ultimately did not implement the FERC authorization for an import facility, Citizens Against LNG maintains that the ECONorthwest report was incorrect because it did not include negative economic impacts

⁹² *Id.* at 28 n.81.

⁹³ Citizens Against LNG Response at 2.

that would have resulted if the import authorization had been implemented and the import project “obviously” would not have produced the economic benefits and jobs predicted in the report.

Citizens Against LNG also refers to a report prepared by ECONorthwest in 2008 used in support of a proposed expansion of the Salmon Harbor resort in Winchester Bay, Oregon. According to Citizens Against LNG, the United States Department of Agriculture (USDA), after investigating, found that the projections in the ECONorthwest were not feasible and USDA consequently pulled its funding for the expansion.

Based on these developments, Citizens Against LNG maintains that DOE should not rely on the ECONorthwest reports submitted by Jordan Cove in this proceeding, but should undertake its own analysis of the economic benefits and losses from the Jordan Cove proposal. Citizens Against LNG refers to DOE’s 2006 Passamaquoddy Whole Bay Study (Part 1)⁹⁴ as an example of a suitable analysis.

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.”⁹⁵ 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.”⁹⁶

⁹⁴ Yellow Wood Associates, Inc., *Report on Potential Economic and Fiscal Impacts of LNG Terminals on the Whole Passamaquoddy Bay* (2006).

⁹⁵ 77 Fed. Reg. at 73,629.

⁹⁶ *Id.*

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.⁹⁷

A. Data Inputs and Estimates of Natural Gas Demand

1. Comments

Several commenters, including Sierra Club,⁹⁸ Dow Chemical Company (Dow), along with U.S. Representative Edward Markey, U.S. Senator Ron Wyden, Alcoa, Save Our Supplies, the Industrial Energy Consumers of America (IECA), and Jannette Barth, challenge the data used as inputs to the LNG Export Study. Most of these commenters assert that NERA should have used projections from AEO 2012 or AEO 2013, rather than from AEO 2011, to produce a more accurate picture of the current and likely future state of the natural gas market and the likely macroeconomic impacts of LNG exports. These commenters assert that the AEO 2011 projections significantly underestimate actual and future demand for natural gas, especially in the U.S. electric, manufacturing, and transportation sectors, and in international markets. Some commenters identify additional factors, other than the vintage of the AEO 2011 data, to support their arguments that NERA underestimated present and future demand for natural gas. For example, Save Our Supplies argues that NERA underestimated international demand because

⁹⁷ See, e.g., *Public Citizen v. F.A.A.*, 988 F.2d 186, 197 (D.C. Cir. 1993).

⁹⁸ Sierra Club filed comments on behalf of itself and a coalition of non-profit organizations, including Catskill Citizens for Safe Energy, Center for Biological Diversity, Clean Air Council, Columbia Riverkeeper, Delaware Riverkeeper, Lower Susquehanna Riverkeeper, Shenandoah Riverkeeper, and Upper Green River Alliance [hereinafter Sierra Club].

the 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.⁹⁹ Dow claims that there has been a manufacturing renaissance since completion of AEO 2011 involving announcements of approximately 100 capital investments representing some \$95 billion in new spending and millions of jobs driven largely by the supply and price outlook for natural gas. These investments, according to Dow, will add about 5 million new jobs and 6 Bcf/d of industrial gas demand by 2020, which Dow states is nearly a 30 percent increase in industrial demand relative to 2009, the baseline year for AEO 2011.

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

⁹⁹ 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](http://www.eia.gov/forecasts/aeo/pdf/0383(2013).pdf) [hereinafter AEO 2013]. Where appropriate, this Order uses the final projections from AEO 2013, which is the most current information available at this time.

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 DCP, 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.”¹⁰⁰ Requiring DOE to start over with new data “would lead to significant costs and potentially endless delays.”¹⁰¹ 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.”¹⁰²

No material change using post-AEO 2011 projections. Further, we are not persuaded that using post-AEO 2011 EIA projections would have materially affected the findings of the LNG Export Study. Commenters point to the fact that AEO 2012 and the AEO 2013 Early Release Overview forecast greater domestic natural gas consumption in the years ahead than did AEO 2011. The commenters are correct in this observation, but it is also true that AEO 2012 and the AEO 2013 Early Release Overview projected much greater domestic natural gas production than did AEO 2011. 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

¹⁰⁰ *Theodore Roosevelt Conserv. P’ship v. Salazar*, 616 F.3d 497, 511 (D.C. Cir. 2010) (quotations and citations omitted) (alteration in original).

¹⁰¹ *Sierra Club v. U.S. Env’tl. 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).

¹⁰² *Vermont Yankee Nuclear Power Corp. v. Natural Res. Def. Council*, 435 U.S. 519, 554-55 (1978).

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.¹⁰³

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.

On December 16, 2013, EIA issued its most recent projections for 2035 in the AEO 2014 Early Release Overview.¹⁰⁴ 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.¹⁰⁵ Of this projected volume, 7.4 Bcf/d are exports from the lower-48 states, 0.4 Bcf/d are imports to the

¹⁰³ Comments of Navigant Consulting, Inc., at 6 (attached to Initial Comments of Jordan Cove Energy Project, L.P.).

¹⁰⁴ U.S. Energy Information Administration, *AEO 2014 Early Release Overview* (Dec. 16, 2013), available at <http://www.eia.gov/forecasts/aeo/er/?src=home-b4> [hereinafter AEO 2014 Early Release Overview].

¹⁰⁵ See AEO 2014 Early Release Overview Table, “Natural Gas Imports and Exports,” available at <http://www.eia.gov/oiaf/aeo/tablebrowser/#release=AEO2014ER&subject=8-AEO2014ER&table=76-AEO2014ER®ion=0-0&cases=ref2014er-d102413a> & AEO 2014 Early Release Overview at 2 (Fig. 4), available at [http://www.eia.gov/forecasts/aeo/er/pdf/0383er\(2014\).pdf](http://www.eia.gov/forecasts/aeo/er/pdf/0383er(2014).pdf).

lower-48 states, and 2.2 Bcf/d are exports from Alaska.¹⁰⁶ This estimate compares with projected net LNG imports of 0.4 Bcf/d in the lower-48 for 2035 in the AEO 2011 Reference Case. The 2035 Henry Hub price in the AEO 2014 Early Release Reference Case is \$6.92/MMBtu, down from \$7.31/MMBtu in the AEO 2011 Reference Case (both in 2012 dollars).

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

- Total natural gas consumption for 2035 is projected to increase by 4.7 Bcf/d, from 78.7 Bcf/d to 83.4 Bcf/d;
- Net exports (including both pipeline and LNG exports, including 2.2 Bcf/d of LNG exports from Alaska) are projected to increase by 8.1 Bcf/d, from 7.0 Bcf/d to 15.1 Bcf/d; and
- The projected 2035 Henry Hub price is projected to increase by \$0.49/MMBtu, from \$6.43/MMBtu to \$6.92/MMBtu (in 2012 dollars).

Indeed, in comparing the AEO 2014 Early Release and AEO 2013 Reference Case projections, total domestic dry gas production is projected to rise by 13 Bcf/d of natural gas, from 85.9 Bcf/d to 98.9 Bcf/d (although this increase includes Alaska natural gas production). We also note EIA's projection in the AEO 2014 Early Release Overview that domestic prices of natural gas will rise due to both increased domestic demand and exports, but that these price increases will be followed by "[a] sustained increase in production ... leading to slower price growth over the rest of the projection period."¹⁰⁷ These post-AEO 2011 projections in no way undermine our conclusion regarding the consistency of the proposed exports with the public interest.

Moreover, we find that our review of the post-AEO 2011 data is responsive to the Jordan Cove's contention, based on the Navigant Whitepaper submitted in this

¹⁰⁶ *Id.*

¹⁰⁷ AEO 2014 Early Release Overview at 7, available at [http://www.eia.gov/forecasts/aeo/er/pdf/0383er\(2014\).pdf](http://www.eia.gov/forecasts/aeo/er/pdf/0383er(2014).pdf).

proceeding, that the EIA Study was based on outdated and overly modest projections of gas supply. Likewise, it is responsive to the arguments of the opponents of the Application challenging Jordan Cove’s projection of 6.6 Bcf/d of export capacity in the Aggregate Export Case. Our analysis has examined the most recent supply data available, as well as projections of export capacity that exceed 6.6 Bcf/d of natural gas.

Table 4: Comparison of AEO Cases

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

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

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.¹⁰⁸ The inclusion of the AEO 2011 High Shale EUR case in NERA's analysis reinforces our conclusion that there is no reason to believe that using AEO 2013 Reference Case projections would have altered the central conclusion of the LNG Export Study.

Further, as reflected in the comments submitted by Lake Charles Exports¹⁰⁹ and Secretary Abraham,¹¹⁰ 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

¹⁰⁸ NERA study at 6.

¹⁰⁹ Reply Comments of Lake Charles Exports, LLC at 12-13.

¹¹⁰ Reply Comments of Secretary Spencer Abraham at 8.

gas.¹¹¹ 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.¹¹² Indeed, while many of the FTA authorizations have been in place for several years, DOE/FE is not aware of any application submitted to date in which a liquefaction facility was planned with the sole purpose of exporting LNG to FTA countries. Therefore, we are not persuaded that the current FTA authorizations undermine the assumptions of the LNG Export Study.

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

¹¹¹ As of the date of this Order, DOE/FE has authorized the export of 37.96 Bcf/d of natural gas to FTA countries.

¹¹² As America's Natural Gas Alliance explains, when domestic gas supply was forecast to be insufficient to meet domestic demand, many LNG import facilities were proposed, but few were constructed. Specifically, from 2000 through 2010, over 40 applications to build new LNG import facilities were submitted to federal agencies, but only eight new facilities were built. The increase in domestic natural gas production had reduced the need for imported LNG. Further, of those import facilities constructed, public records show their use has declined. In 2004, the United States imported 244 cargoes of LNG at the four terminals existing at that time. By comparison, in 2012, only 64 cargoes were imported at seven of the 12 terminals then in existence. Five of the 12 existing terminals did not receive any cargoes in 2012. *See* http://www.marad.dot.gov/ports_landing_page/deepwater_port_licensing/deepwater_port_licensing.htm; <http://www.ferc.gov/industries/gas/indus-act/lng.asp>; *Natural Gas Imports and Exports Fourth Quarter Report 2004*, DOE/FE-0485, Office of Natural Gas Regulatory Activities, Office of Fossil Energy, U.S. Department of Energy; *Natural Gas Imports and Exports Fourth Quarter Report 2012*, DOE/FE-0563, Office of Natural Gas Regulatory Activities, Office of Fossil Energy, U.S. Department of Energy; http://www.fe.doe.gov/programs/gasregulation/publications/LNG_2012_rev.pdf.

demand conditions evaluated. Thus, the 55 Bcf/d case was found to be infeasible and was not included in the macroeconomic analysis.

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.¹¹³ 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.¹¹⁴ 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.”¹¹⁵ 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

¹¹³ NERA study at 6.

¹¹⁴ *Id.*

¹¹⁵ *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 source¹¹⁶

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 horn[ing] the chemical industry into an aggregated EIS [energy intensive sector] is not appropriate for studying the impact of LNG exports on the economy.”¹¹⁷

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

¹¹⁶ Initial Comments of Dow Chem. Co. at 27.

¹¹⁷ *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.¹¹⁸

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 388,000.¹¹⁹ 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.

¹¹⁸ *Id.* at 16-17.

¹¹⁹ *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,¹²⁰ 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

¹²⁰ 110 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.¹²¹

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.

¹²¹ 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.¹²²

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.

¹²² *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 DCP, 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.

Senators¹²³—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

¹²³ 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.¹²⁴ 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.¹²⁵

¹²⁴ 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.

¹²⁵ 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 DCP's

requested authorization. Because these supply estimates have changed over time, however, DOE/FE will continue to monitor them to inform future decisions. These estimates include:

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

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

only 16 percent, demonstrating the growing supply of natural gas available under existing economic and operating conditions.

Table 5: U.S. Dry Natural Gas Proved Reserves¹²⁶

Year	Proved Reserves (R)		U.S. Dry Natural Gas Estimated Production (P)		R/P Ratio - Years
	(Bcf)	Percent change versus year 2000	(Bcf)	Percent change versus year 2000	
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.¹²⁷

DOE/FE notes that EIA's natural gas TRR estimates have varied from below 2,000 Tcf in AEO 2010 to more than 2,500 Tcf in AEO 2011 and 2,335 Tcf in AEO 2013.¹²⁸ These TRR estimates include proved and unproved TRR shale gas resources, which have fluctuated in recent AEOs, as the EIA continues to monitor and estimate this resource base. For example, in AEO 2010, unproved shale gas TRR was estimated at 347 Tcf, which increased to 827 Tcf in AEO 2011, and was revised to 543 Tcf in AEO 2013.

¹²⁶ 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).

¹²⁷ Unproved resources are generally less well known and therefore less precisely quantifiable than proved reserves, and their eventual recovery is less assured.

¹²⁸ See U.S. Energy Information Administration, *Assumptions to the Annual Energy Outlook 2013* (May 2013), Table 9.2. Technically recoverable U.S. natural gas resources as of January 1, 2011, at 121, available at: [http://www.eia.gov/forecasts/aeo/assumptions/pdf/0554\(2013\).pdf](http://www.eia.gov/forecasts/aeo/assumptions/pdf/0554(2013).pdf).

b. Supply Impacts

While the AEO 2011 TRR estimates were higher than the AEO 2013 estimates, we do not agree that NERA employed overly optimistic projections of domestic gas supply. The EIA and NERA studies conclude that for the period of the analysis, the United States is projected to have ample supplies of natural gas resources that can meet domestic needs for natural gas and the LNG export market. Additionally, most projections of domestic natural gas resources extend beyond 20 to 40 years. While not all TRR is currently economical to produce, it is instructive to note that EIA's recent estimate of TRR equates to over 90 years of natural gas supply at the 2012 domestic consumption level of 25.63 Tcf. Moreover, given the supply projections under each of the above measures, we find that granting the requested authorization is unlikely to affect adversely the availability of natural gas supplies to domestic consumers such as would negate the net economic benefits to the United States.

We further find that, given these estimates of supply, the projected price increases and increased price volatility that could develop in response to a grant of the requested LNG export authorization are not likely to negate the net economic benefits of the exports. This issue is further discussed below. With regard to the adequacy of supply, however, it bears noting that while Dow contends that U.S. natural gas production would not be able to meet unlimited LNG exports and domestic demand, the NERA Study supports a different conclusion. The NERA Study included scenarios in which LNG exports were unconstrained. In these cases, LNG exports from the United States compete with LNG exports from all other international natural gas sources. Should the U.S. resource base be less robust and more expensive than anticipated, U.S. LNG exports would be less competitive in the world market, thereby resulting in lower export levels, and, in some instances, no exports, from the United States. By way of example,

NERA modeled a number of Low EUR scenarios, which had U.S. resources that were less robust and more expensive than other cases. In these Low EUR scenarios, U.S. wellhead natural gas prices were driven up by higher production costs to meet domestic demand, and in those cases prices increased to a level that choked off demand for exports so that LNG exports were limited or disappeared, leaving the available natural gas for domestic use. In other unconstrained cases evaluated with the High EUR scenarios, domestic natural gas production was able to keep up with the demand required to meet the unconstrained LNG export scenario. In this case, the EIA scenarios reflect the changes that would occur in the domestic market and reflect the limitations, as modeled in the NEMS model, of domestic natural gas production and consumption by different sectors of the economy. In all of these cases, the supply and price response to LNG exports did not negate the net economic benefit to the economy from the exports.

c. Supply Impacts Related to Alternative Energy Sources

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

d. Supply Impacts Related to Canadian LNG Exports

DOE/FE also disagrees with the argument that the NERA Study erred in its treatment of potential Canadian LNG exports to international markets. Although DOE/FE did not ask NERA to evaluate potential LNG exports from Canada, we note that LNG exports from Canada would compete with U.S. exports, thereby most likely reducing U.S. exports. Therefore, treating U.S. and Canadian LNG exports as those from a single market is a reasonable assumption, and would

be consistent with the unconstrained LNG export cases evaluated by NERA, with the price impact more or less in line with the cases evaluated by NERA. DOE/FE would expect that benefits estimated to accrue to the United States from U.S. LNG exports likely would be similar to the benefits that would accrue to Canada resulting from Canadian LNG exports.

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

e. Supply Impacts Related to Tax Law and Environmental Policy

NERA stated that the NewERA macroeconomic model includes a simple tax representation in which indirect taxes are included in the output values and not explicitly modeled.¹²⁹ 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.¹³⁰

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

¹²⁹ NERA study at 110.

¹³⁰ *Id.* at 25.

establish certain key assumptions as a foundation for their studies. They reasonably evaluated alternative scenarios that would capture possible changes that would affect natural gas supplies.

D. Modeling the LNG Export Business

1. Comments

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

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

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

the international price of natural gas in certain markets, makes it impossible for the international market in natural gas to be perfectly competitive; and (3) NERA erroneously assumed that natural gas is a “perfect substitute” for oil in all circumstances.¹³¹ 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

¹³¹ Initial Comments of Save Our Supplies at 34, 41.

assuming all LNG would be exported from the Gulf Coast. Sierra Club states that several export terminals are planned for the West Coast, where it will be less expensive to transport gas to the Asian market than it would be from the Gulf Coast. Dow states that NERA's estimate of transportation and insurance costs for shipping LNG to Asia would be on the order of \$2.60/Mcf. Dow claims that official trade statistics published by the U.S. Census Bureau, however, establish that these costs would be closer to \$0.50/Mcf. Commenters such as Dow and Sierra Club state that had NERA properly accounted for LNG transaction costs, the foreseeable volumes of LNG exports would have exceeded those predicted by NERA, thereby intensifying the impact of LNG exports on U.S. natural gas prices. For this reason Sierra Club and Dow argue that NERA's projected price ceiling on domestic natural gas is too low. In addition, numerous individual members of 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.¹³² 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,

¹³² Natural Gas Policy Act of 1978, 15 U.S.C. § 3301, *et seq.* (establishing a policy for phasing out the regulation of wellhead prices).

the tolling agreement carries a tolling fee (or “reservation charge”) with a per unit liquefaction charge of 115% of the Henry Hub price.¹³³

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

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

c. Foreign Direct Investment

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

¹³³ *Sabine Pass Liquefaction LLC*, LNG Sale and Purchase Agreement with Centrica PLC, FE Docket No. 13-42-LNG at 51-52 (Apr. 2, 2013).

NERA Study indicates that claim is not valid as to natural gas supplies. Early in the study, NERA noted as follows:

Net benefits to the U.S. economy could be larger if U.S. businesses were to take more of a merchant role. Based on business models now being proposed, this study assumes that foreign purchasers take title to LNG when it is loaded at a United States port, so that any profits that could be made by transporting and selling in importing countries accrue to foreign entities. In the cases where exports are constrained to maximum permitted levels, this business model sacrifices additional value from LNG exports that could accrue to the United States.¹³⁴

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.¹³⁵

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.

¹³⁴ NERA study at 6-7.

¹³⁵ *Id.* at 211.

The United States has the leading economy in the world in part because the US is the leading destination of international flows of capital. Each dollar of new foreign investment capital into the US results in an equivalent increase in US GDP. The main positive components of GDP are private consumption, investment, government expenditures, and exports. Any foreign direct investment stemming from the development of a US LNG industry would not decrease domestic capital investment, but would merely free up such domestic capital for other investments. Therefore the total amount of investment in the US would increase, dollar-for-dollar, with foreign investment, increasing US GDP by the same amount. If that foreign investment earns a return and, after taxation by US local, state and federal governments, some of that return is repatriated, this reflects a small countervailing outflow (which seems to be what, for example, Representative Markey is focusing on). Nonetheless, foreign direct investment remains a major net contributor to the US economy. The 2012 LNG Export Study's simplifying assumption regarding the source of investment in LNG production infrastructure fails to capture the benefits of any capital provided from foreign sources and thus understates the impact of such investment on US GDP.¹³⁶

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

¹³⁶ Reply Comments of Lake Charles Exports at 31 (citations omitted).

calculated by the EIA. Alternatively, foreign competitors supplying natural gas and LNG in international markets may match or, possibly, undercut the landed price of LNG exported from the United States.

With respect to the competitiveness of global LNG markets, NERA assumed that the production decisions of the world's dominant producer, Qatar, would be fixed no matter what the level of U.S. exports and that, generally, "there is a competitive market with exogenously determined export limits chosen by each exporting region and determined by their liquefaction capacity."¹³⁷ 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."¹³⁸ 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.

¹³⁷ NERA study at 34.

¹³⁸ *Id.* at 34-35.

e. Estimates of LNG Transaction Costs

We disagree with the comments from Sierra Club and Dow arguing that NERA overestimated LNG transaction costs, including liquefaction, transportation, insurance, and the like. NERA based its liquefaction, shipping costs and regasification costs on a review of publicly available literature, including the International Group of LNG Importers 2010 LNG Industry report and other sources referenced in the NERA Study.¹³⁹

With respect to transportation costs, Dow states that NERA's estimate of shipping cost to Asia was on the order of \$2.60/Mcf, while statistics presented by Dow claim these to be \$0.50/Mcf. In presenting this figure, Dow relies on trade statistics reported by the U.S. Census Bureau based on the average cost of insurance and freight expenses associated with U.S. *imports* of LNG in 2010 and 2011. As NERA points out, however, LNG transportation costs in large measure are a function of the distance traveled. Therefore, data on LNG imports, which largely travel shorter distances,¹⁴⁰ 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.¹⁴¹ 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

¹³⁹ *Id.* at 84-90.

¹⁴⁰ 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/>.

¹⁴¹ NERA study at 87.

included in the NERA model. NERA based this assumption on publicly available information of liquefaction costs. Similarly, EIA assumed that 10 percent of feedstock was consumed in the liquefaction process.

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

E. Cost of Environmental Externalities

1. Comments

Sierra Club, along with Delaware Riverkeeper Network,¹⁴² 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.

¹⁴² Delaware Riverkeeper Network filed comments on behalf of itself and more than 80 other organizations.

2. DOE/FE Analysis

As explained herein, the authorization granted by this Order is conditioned (among other things) on the satisfactory completion of the environmental review of the Jordan Cove Terminal under NEPA in FERC Docket No. CP13-483-000 and the PCGP in FERC Docket No. CP13-492-000, and on issuance by DOE/FE of findings of no significant impact or records of decision pursuant to NEPA.¹⁴³

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

¹⁴³ See 10 C.F.R. § 590.402 (authorizing DOE/FE to issue a conditional order prior to issuance of a final opinion and order).

approvals, demand for domestic natural gas may increase more rapidly than production, leading to periods of scarcity and price spikes. Sierra Club also contends that there is little evidence that domestic natural gas price volatility will be reduced by LNG exports.

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

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

b. DOE/FE Analysis

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

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

anticipated profit. These investments spur development of reserves and production and increase availability of natural gas, exerting downward pressure on prices. This is part of the normal business cycle that has been captured in EIA's supply curves and, consequently, in NERA's analysis. On balance, we are not persuaded that LNG exports will substantially increase the volatility of domestic natural gas prices.

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

a. Comments

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

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

cushion disappears and the U.S. export price rises to the global LNG price, market forces will bring U.S. exports to a halt. Several LNG export applicants also contend that the availability of bi-directional terminals will serve to limit domestic price increases.

b. DOE/FE Analysis

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

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

marginal cost recovery for the incremental production of natural gas needed to meet this demand.

Hence we agree with those commenters, such as the Bipartisan Policy Center, that maintain that LNG exports from the United States will have difficulty competing with LNG exports from other countries unless domestic U.S. natural gas can be produced much cheaper. They point out that the international supply of natural gas is growing, and the mobility of that supply is increasing as other countries develop their own LNG export capabilities. Further, there is no evidence before us that demonstrates that the prices of natural gas or LNG in the international market are more volatile than the prices in the U.S. domestic market.

G. Integrity of the LNG Export Study

1. Comments

Several commenters, such as Clean Ocean Action and Sierra Club, argue that DOE/FE cannot rely on the NERA report unless DOE/FE discloses more details about the process by which DOE/FE selected NERA to conduct the study, DOE/FE's funding mechanism for paying NERA, and DOE/FE's involvement (if any) in guiding the study or reviewing drafts of the study prior to publication. In addition to Sierra Club, commenters Eugene Bruce, Ellen Osuna, Dow, and IECA assert that DOE/FE cannot rely on the study because NERA has not disclosed all technical details of its proprietary N_{ew}ERA model to the public. According to Sierra Club, DOE/FE "has refused to make [all of] this information available for review during the public comment period."¹⁴⁴ 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

¹⁴⁴ Reply Comments of Sierra Club at 20.

President (and the principal author of the NERA Study) Mr. David Montgomery may be biased in favor of LNG exports, which they argue necessitates a new study by a different contractor.

2. DOE/FE Analysis

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

H. Peer Review

1. Comments

Dow, along with Eugene Bruce, IECA, and others, charge that the NERA Study is invalid because NERA failed to validate its proprietary N_{ew}ERA model by means of technical peer review. These commenters argue that technical peer review is required by the Office of Management and Budget's (OMB) guidance entitled, "Final Information Quality Bulletin for Peer Review" (OMB Bulletin).¹⁴⁵ 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

¹⁴⁵ Final Information Quality Bulletin for Peer Review, 70 Fed. Reg. 2664 (Jan. 14, 2005).

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.

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.”¹⁴⁶ “Scientific information” does not include opinions where the presentation makes it clear the information is “opinion rather than fact or the agency’s views.”¹⁴⁷ 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”¹⁴⁸

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

¹⁴⁶ *Id.* at 2675.

¹⁴⁷ *Id.*

¹⁴⁸ *Id.* at 2677.

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

Both the EIA and NERA studies use market assumptions to project a range of possible future results. No claim is made by the authors of either study that the studies contain scientific fact. To the contrary, both studies caution the reader on the limits to their economic projections. The EIA Study states: “The projections in this report are not statements of what *will* happen but of what *might* happen, given the assumptions and methodologies used.”¹⁴⁹ 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.¹⁵⁰

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.¹⁵¹ 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.¹⁵²

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

¹⁴⁹ EIA Study at ii.

¹⁵⁰ See, e.g., NERA Study at 25-26.

¹⁵¹ Synapse Energy Economics, Inc., *Will LNG Exports Benefit the United States Economy?* (Jan. 23, 2013), at 1, submitted with Initial Comments of Sierra Club.

¹⁵² See, e.g., Navigant Consulting, Inc. and Navigant Economics, Analysis of the Department of Energy’s LNG Export Study (Jan. 24, 2013), App. A of Initial Comments of Gulf LNG.

recognized that its ultimate decision on the pending export applications would benefit from a public exchange of judgments and expert opinions.¹⁵³ The major purpose motivating the OMB Bulletin—to ensure that the government is well-informed by independent, expert analysis—was accomplished in this proceeding without the need for peer review.

I. Procedural Arguments

1. Comments

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

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

¹⁵³ 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.”)

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, Jordan Cove's Notice of Application, published in the Federal Register on June 6, 2012, contained a detailed description of Jordan Cove's Application, and invited the public to submit protests, motions to intervene, notices of intervention, and comments.¹⁵⁴ 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.¹⁵⁵ 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.¹⁵⁶ DOE/FE thus has taken appropriate and necessary steps by offering the public multiple opportunities to participate in the non-FTA LNG export proceedings.

¹⁵⁴ 76 Fed. Reg. at 34,212-15.

¹⁵⁵ 77 Fed. Reg. at 73,627.

¹⁵⁶ *Id.* at 73,628.

We also find the record is adequate to support the action we are taking in this Order. DOE/FE has reviewed all of the submissions made in this proceeding. Moreover, this Order sets out the reasons that support each of the determinations contained herein. Consequently, we do not find it is necessary or appropriate to delay issuance of this Order to augment the record, either through a rulemaking or public hearing. In this regard, we note that DOE/FE retains broad discretion to decide what procedures to use in fulfilling its statutory responsibilities under the NGA,¹⁵⁷ 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 VI).

A. Motions to Intervene

The five motions to intervene submitted, respectively, by APGA, Sierra Club, Citizens Against LNG, Landowners United, and KS Wild are unopposed. As such, the motions to intervene are deemed granted. 10 C.F.R. § 590.303(g).

B. Jordan Cove's Application

In total, Jordan Cove introduced seven studies to support its Application: (1) the Navigant Study; (2) the Navigant Whitepaper; (3) the Construction Study; (4) the Operations Study; (5) the Upstream Contributions Study; (6) the Balance of Trade Study; and (7) the Housing and Schools Study.

¹⁵⁷ See, e.g., *Process Gas Consumers v. FERC*, 930 F.2d 926, 929 (D.C. Cir. 1991).

As summarized above, APGA and Sierra Club argued that the proposed exports would not yield economic benefits but, in fact, would increase natural gas prices and result in other deleterious economic and societal impacts. APGA and Sierra Club maintained that the data from 2011 was outdated and that more recent data indicated that exports of LNG would result in significantly higher prices to the long-run detriment of the U.S. economy. Sierra Club additionally raised concerns over Jordan Cove's use of an input-output model, challenged the sustainability of economic benefits in regions tied to resource extraction industries, and insisted that DOE/FE may not lawfully issue a conditional authorization in advance of the completion of environmental review of the project.

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

1. Regional Impacts

Jordan Cove 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 Construction Study, the Operations Study, the Upstream Contributions Study, and the Balance of Trade Study.

Sierra Club does not offer its own analysis specific to the local and regional economic impacts of the Jordan Cove proposal, but challenges the economic benefits raised in the Application because Jordan Cove supported them using an input-output analysis allegedly based on a series of economic "snapshots" in time. This type of analysis, according to Sierra Club, fails to provide a continuous picture of economic impacts, and does not consider a full range of

counterfactual scenarios. Sierra Club also challenges Jordan Cove's claimed regional benefits. Sierra Club focuses 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.

We find that the record contains substantial evidence of regional economic benefits from a grant of the Application. As indicated above, Sierra Club did not offer its own analysis of the specific local and regional impacts anticipated from the Jordan Cove proposal. We further find that the studies submitted by Jordan Cove 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 counterfactuals 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 are generally confirmed on a national scale by the NERA Study.

Further, we reject Sierra Club's claims that exports will have a negative impact on employment. Sierra Club points to the Weinstein study to support its position. However, we have considered the analysis contained in the Weinstein study in several recent orders, and found that the Weinstein Study showed only a statistically insignificant decline in employment in the regions studied in the years before a drilling boom (2001 to 2005) compared to the years during the drilling boom (2005 to 2009). Further, 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 also found that the Weinstein study showed substantial gains in economic growth rates in counties with drilling

operations as opposed to those without. For the same reasons provided in *Dominion Cove Point*, *Freeport II*, and *Cameron*, we reject Sierra Club's arguments here.¹⁵⁸

Sierra Club also contends more broadly that extractive industries suffer from boom-bust cycles and therefore provide little lasting benefit to local communities. To the extent Sierra Club is claiming that the exports proposed by Jordan Cove 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 Jordan Cove'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.

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 (8.47 Bcf/d of natural gas) plus the additional 0.8 Bcf/d volume of exports requested by Jordan Cove 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-

¹⁵⁸ See *Dominion Cove*, DOE/FE Order No. 3331, at 136-38; *Freeport II*, DOE/FE Order No. 3359, at 148-51; *Cameron*, DOE/FE Order No. 3391, at 127-29.

determined level of exports. However, even with these estimated price increases, NERA found that the United States would experience net economic benefits from increased LNG exports in all cases studied. *See supra* Section VI.B.1, 8.

Both APGA and Sierra Club contend that Jordan Cove 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. For several of the same reasons that we reject arguments that the LNG Export Study was based on outdated projections, we reject similar arguments raised by APGA and Sierra Club in this proceeding. As discussed above, the updated AEO 2014 Early Release Reference Case projections from EIA suggest domestic supply and demand conditions that are more favorable, not less favorable, to exports. Specifically, the most recent outlook in the AEO 2014 Early Release Reference Case for 2035 reflects LNG exports of 7.4 Bcf/d in the lower-48, net natural gas pipeline exports of 5.9 Bcf/d, and market 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 (not exports) of natural gas plus LNG. Accordingly, we reject the intervenors' arguments and find that, as to the impact of these LNG exports on domestic gas prices, intervenors have not overcome the statutory presumption that the requested authorization is consistent with the public interest.

3. Conditional Authorization

Sierra Club contends that DOE/FE may not lawfully issue a conditional authorization until a full EIS has been issued, on the theory that a conditional authorization may limit the choice of reasonable alternatives or determine subsequent development. We disagree with Sierra Club's contention. As we have explained elsewhere, we are attaching a condition to this export

authorization ordering that Jordan Cove’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 Jordan Cove Terminal by federal or state agencies. When the environmental review is complete, DOE/FE will reconsider its public interest determination in light of the information gathered as part of that review. This procedure will not foreclose the choice of reasonable alternatives or influence subsequent development.

C. Significance of the LNG Export Study

For the reasons discussed above, DOE/FE commissioned the LNG Export Study and invited the submission of responsive comments. DOE/FE has analyzed this material and determined that the LNG Export Study provides substantial support for conditionally granting Jordan Cove’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.”¹⁵⁹

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 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

¹⁵⁹ NEI, 75 Fed. Reg. at 12,433.

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 Jordan Cove'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 Guidelines¹⁶⁰ 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.¹⁶¹ 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 Jordan Cove's export of LNG to non-FTA countries will be inconsistent with the public interest. For that reason, we are authorizing Jordan Cove's proposed exports to non-FTA countries subject to the limitations and conditions described in this Order.

¹⁶⁰ 49 Fed. Reg. at 6684.

¹⁶¹ 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. § 717o).

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 0.8 Bcf/d of natural gas (292 Bcf/yr) in this proceeding, DOE/FE will have cumulatively authorized non-FTA exports totaling 9.27 Bcf/d of natural gas, or 3.384 Tcf/yr, for the one final and six conditional export authorizations granted to date—Sabine Pass (2.2 Bcf/d), Freeport I (1.4 Bcf/d), Lake Charles Exports (2.0 Bcf/d), Dominion Cove Point (0.77 Bcf/d), Freeport II (0.4 Bcf/d), Cameron (1.7 Bcf/d), and the current authorization (0.8 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 the AEO 2014 Early Release Overview, 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 Early Release Reference Case projects marked increases in domestic natural gas production—well in excess of what is required to meet projected increases in domestic consumption.

DOE/FE will continue taking a measured approach in reviewing the other pending applications to export domestically produced LNG. Specifically, DOE/FE will continue to assess the cumulative impacts of each succeeding request for export authorization on the public interest with due regard to the effect on domestic natural gas supply and demand fundamentals. In keeping with the performance of its statutory responsibilities, DOE/FE will attach appropriate

and necessary terms and conditions to authorizations to ensure that the authorizations are utilized in a timely manner and that authorizations are not issued except where the applicant can show that there are or will be facilities capable of handling the proposed export volumes and existing and forecast supplies that support that action. Other conditions will be applied as necessary.

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

We emphasize that the conditional authorization announced in this Order applies only to the exports proposed by Jordan Cove. 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.¹⁶² All comments related to the LNG Export Study will become

¹⁶² 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 any export proceeding for which the LNG Export Study is used to inform DOE's public interest determination. Because we are acting only on the Application before us and make no decisions regarding future cases, comments relating to the total volume of LNG exports ultimately authorized or the timing or sequencing of possible future authorizations need not be decided in this proceeding.

X. TERMS AND CONDITIONS

To ensure that the authorization issued by this Order is not inconsistent with the public interest, DOE/FE has attached the following terms and conditions to the authorization. The reasons for each term or condition are explained below. Jordan Cove must abide by each term and condition or face rescission of its authorization or other appropriate sanction.

A. Term of the Authorization

Jordan Cove has requested a 25-year term for the authorization commencing on the earlier of the date of first export or the date seven 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,¹⁶³ 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 seven 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-

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.

¹⁶³ 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.").

year term is likely sufficient to achieve this result. It is also consistent with the 20-year term authorized by DOE/FE in the four other non-FTA export authorizations issued to date.¹⁶⁴

B. Commencement of Operations Within Seven Years

Jordan Cove requested this conditional authorization to commence on the earlier of the date of first export or seven years from the date of the issuance of this Order. Consistent with the final and conditional non-FTA authorizations granted to date,¹⁶⁵ DOE/FE will impose the condition that Jordan Cove must commence commercial LNG export operations no later than seven years from the date of issuance of this Order. The purpose of this condition is to ensure that other entities that may seek similar authorizations are not frustrated in their efforts to obtain those authorizations by authorization holders that are not engaged in actual export operations.

C. Transfer, Assignment, or Change in Control

DOE/FE's natural gas import/export regulations prohibit authorization holders from transferring or assigning authorizations to import or export natural gas without specific authorization by the Assistant Secretary for Fossil Energy.¹⁶⁶ 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.

¹⁶⁴ See, e.g., *Sabine Pass*, DOE/FE Order No. 2961-A, at 29; *Freeport LNG*, DOE/FE Order No. 3282, at 122; *Lake Charles Exports*, DOE/FE Order No. 3324, at 135; and *Dominion Cove Point*, DOE/FE Order No. 3331, at 151.

¹⁶⁵ See, e.g., *Sabine Pass*, DOE/FE Order No. 2961-A, at 33; *Freeport LNG*, DOE/FE Order No. 3282, at 122; *Lake Charles Exports*, DOE/FE Order No. 3324, at 128; *Freeport II*, DOE/FE Order No. 3357, at 158.

¹⁶⁶ 10 C.F.R. § 590.405.

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

D. Agency Rights

As described above, Jordan Cove 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 the issue of Agency Rights in Order No. 2913,¹⁶⁷ 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.¹⁶⁸ 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*.¹⁶⁹ 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

¹⁶⁷ *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).

¹⁶⁸ *Dow Chem. Co.*, DOE/FE Order No. 2859, at 7-8, *discussed in Freeport LNG*, DOE/FE Order No. 2913, at 7-8.

¹⁶⁹ *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).

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.¹⁷⁰

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

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

DOE/FE's regulations require applicants to supply transaction-specific factual information "to the extent practicable."¹⁷¹ 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. § 1004.11.¹⁷²

DOE/FE will require that Jordan Cove file or cause to be filed with DOE/FE any relevant long-term commercial agreements, including LTAs, pursuant to which Jordan Cove 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

¹⁷⁰ *See id.* at 7-8.

¹⁷¹ 10 C.F.R. § 590.202(b).

¹⁷² *Id.* § 590.202(e).

of two years, an agreement to provide gas processing or liquefaction services at the Jordan Cove Terminal, a long-term sales contract involving natural gas or LNG stored or liquefied at the Jordan Cove Terminal, or an agreement to provide export services from the Jordan Cove Terminal.

In addition, DOE/FE finds that section 590.202(c) of DOE/FE's regulations¹⁷³ requires that Jordan Cove file, or cause to be filed, all long-term contracts associated with the long-term supply of natural gas to the Jordan Cove Terminal, whether signed by Jordan Cove or the Registrant, within 30 days of their execution.

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

¹⁷³ *Id.* § 590.202(c).

F. Export Quantity

Jordan Cove has sought export authorization in a volume equivalent to 0.8 Bcf/d of natural gas. As set forth herein, this Order authorizes the export of LNG in the full amount requested by Jordan Cove, up to the equivalent of 292 Bcf/yr of natural gas.

G. Combined FTA and Non-FTA Export Authorization Volume

In this proceeding, Jordan Cove seeks authorization to export 292 Bcf/yr of natural gas to non-FTA countries under NGA section 3(a). Jordan Cove's proposal for the LNG Terminal now pending before FERC in Docket No. CP13-483-000 is for a total take-away capacity of 6 mtpa, which is roughly equivalent to the volumes requested for export in this proceeding. As stated above, Jordan Cove is currently authorized pursuant to DOE/FE Order No. 3041 to export LNG from the same Terminal to FTA countries in an amount equivalent to 438 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.¹⁷⁴ The source of LNG proposed for both of Jordan Cove's export authorizations is from the proposed Jordan Cove Terminal. To ensure that Jordan Cove's combined FTA and non-FTA export authorizations do not exceed the capacity of that facility, Jordan Cove 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. 3041.

¹⁷⁴ See *Freeport II* at 162 ("There is no basis for authorizing exports in excess of the maximum liquefaction capacity of a planned facility.").

H. Environmental Review

As explained above, DOE/FE intends to complete its NEPA review as a cooperating agency in FERC's review of the Jordan Cove project. The authorization issued in this Order will be conditioned on Jordan Cove's satisfactory completion of the environmental review process.¹⁷⁵

Accordingly, this conditional Order makes preliminary findings and indicates to the parties DOE/FE's determination at this time on all but the environmental issues in this proceeding. All parties are advised that the issues addressed herein regarding the export of natural gas will be reexamined at the time of DOE/FE's review of the FERC environmental analysis. Inasmuch as DOE/FE is a cooperating agency in the FERC environmental review, persons wishing to raise questions regarding the environmental review of the present Application are responsible for doing so within the FERC proceedings. As explained in the *Sabine Pass* orders, DOE/FE's participation as a cooperating agency in the FERC proceeding is intended to avoid duplication of effort by agencies with overlapping environmental review responsibilities, to achieve early coordination among agencies, and to concentrate public participation in a single forum.¹⁷⁶

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.

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

¹⁷⁶ *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).

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. Jordan Cove is authorized to export domestically produced LNG by vessel from the Jordan Cove Terminal on the North Spit of Coos Bay in Coos County, Oregon, up to the equivalent of 292 Bcf/yr of natural gas for a term of 20 years to commence on the earlier of the date of first export or seven years from the date that this Order is issued. Jordan Cove 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. Jordan Cove must commence export operations using the planned liquefaction facilities no later than seven years from the date of issuance of this Order.

C. The LNG export quantity authorized in this Order is equivalent to 292 Bcf/yr of natural gas. This quantity is not additive to Jordan Cove's FTA authorization, set forth in DOE/FE Order No. 3041.

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

E. Jordan Cove shall ensure that all transactions authorized by this Order are permitted and lawful under United States laws and policies, including the rules, regulations, orders,

policies, and other determinations of the Office of Foreign Assets Control of the United States Department of the Treasury and FERC. Failure to comply with this requirement could result in rescission of this authorization and/or other civil or criminal remedies.

F. The authorization granted by this Order is conditioned on Jordan Cove's satisfactory completion of the environmental review process under NEPA in FERC Docket Nos. CP13-483-000 and CP13-492-000, 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 Jordan Cove's on-going compliance with any and all preventative and mitigative measures at the Jordan Cove Terminal imposed by federal or state agencies.

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

(ii) Jordan Cove 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 Jordan Cove Terminal. The non-redacted copies may be filed under seal and must be filed within 30 days of their execution. Additionally, if Jordan Cove

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, Jordan Cove 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, Jordan Cove shall state why the redacted or non-disclosed information should be exempted from public disclosure.

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

Customer or purchaser acknowledges and agrees that it will resell or transfer LNG purchased hereunder for delivery only to countries identified in Ordering Paragraph D of DOE Order No. 3413, issued March 24, 2014, in FE Docket No. 12-32-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 Jordan Cove Energy Project, L.P. 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 Jordan Cove Energy Project, L.P. is made aware of all such actual destination countries.

I. Jordan Cove 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 Jordan Cove with all information necessary to permit Jordan Cove 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 (G) of this Order.

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

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

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

M. Jordan Cove 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.

N. Prior to any change in control of the authorization holder, Jordan Cove must obtain the approval of the Assistant Secretary for Fossil Energy. For purposes of this Ordering Paragraph, a “change of control” shall include any change, directly or indirectly, of the power to direct the management or policies of Jordan Cove, whether such power is exercised through one or more intermediary companies or pursuant to an agreement, written or oral, and whether such power is established through ownership or voting of securities, or common directors, officers, or stockholders, or voting trusts, holding trusts, or debt holdings, or contract, or any other direct or indirect means.

O. Monthly Reports: With respect to the LNG exports authorized by this Order, Jordan Cove shall file with the Office of Oil and Gas Global Security and Supply, within 30 days following the last day of each calendar month, a report indicating whether exports of LNG have been made. The first monthly report required by this Order is due not later than the 30th day of the month following the month of first export. In subsequent months, if exports have not occurred, a report of “no activity” for that month must be filed. If exports of LNG have occurred, the report must give the following details of each LNG cargo: (1) the name(s) of the authorized exporter registered with DOE/FE; (2) the name of the U.S. export terminal; (3) the name of the LNG tanker; (4) the date of departure from the U.S. export terminal; (5) the country (or countries) of destination into which the exported LNG was actually delivered; (6) the name of the supplier/seller; (7) the volume in Mcf; (8) the price at point of export per million British thermal units (MMBtu); (9) the duration of the supply agreement; and (10) the name(s) of the purchaser(s).

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

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

Q. The motions to intervene submitted in this proceeding by Sierra Club; APGA; Citizens Against LNG, Inc.; Landowners United; and, jointly, Rogue Riverkeeper and the Klamath-Siskiyou Wildlands Center are granted.

R. The Citizens Against LNG's Response is accepted for filing.

Issued in Washington, D.C., on March 24, 2014.



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