UNITED STATES OF AMERICA

DEPARTMENT OF ENERGY

OFFICE OF FOSSIL ENERGY

DOMINION COVE POINT LNG, LP	)	FE DOCKET NO. 11-128-LNG

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

DOE/FE ORDER NO. 3331

SEPTEMBER 11, 2013

TABLE OF CONTENTS

I. INTRODUCTION 1

II. SUMMARY OF FINDINGS AND CONCLUSIONS 6

III. PUBLIC INTEREST STANDARD 7

IV. DESCRIPTION OF REQUEST 9

A. Background 9

1. Description of Applicant and Facility 9
2. DCP's Update to Application 11

B. Liquefaction Project 12

C. Business Model 13

D. Source of Natural Gas 13

E. Environmental Review 14

V. APPLICANT'S PUBLIC INTEREST ANALYSIS 14

A. Domestic Natural Gas Supplies 15

B. Domestic Natural Gas Demand 18

C. Relationship Between Projected Supply and Demand 19

D. Impact of the Proposed Exports on Domestic Prices of Natural Gas 21

E. Local, Regional, and National Economic Benefits 25

F. Balance of Trade 29

G. International Benefits 29

VI. MOTIONS TO INTERVENE, COMMENTS, AND PROTEST IN RESPONSE TO THE NOTICE OF APPLICATION 30

A. Overview 30

B. Comments Taking No Position on the Application 30

C. Non-Intervenor Comment by the Trades Council in Opposition to the Application 31

D. Non-Intervenor Comment by Riverkeeper in Opposition to the Application 32

E. APGA's Motion to Intervene and Protest 35

F. Sierra Club's Motion to Intervene and Protest 39

G. Answers of Applicant and Replies of Protestors 44

1. DCP Response to Shell LNG and CRS 44
2. DCP Response to Sierra Club, Riverkeeper, APGA, and the Trades Council 45
3. Sierra Club Reply to DCP Response 51
4. Riverkeeper Reply to DCP Response 55

VII. LNG EXPORT STUDY 56

A. EIA Study, *Effect of Increased Natural Gas Exports on Domestic Energy Markets* 57

1. Methodology 57
2. Scope of EIA Study 59
3. Natural Gas Markets 60
4. Results of EIA Study 60
5. Wellhead Price Increases 61

6. Increased Natural Gas Production and Supply....62
7. Decreased Natural Gas Consumption....62
8. Increased End-User Natural Gas and Electricity Delivered Prices....63
9. Impact on Natural Gas Producer Revenues....64
10. Impacts Beyond the Natural Gas Industry....65
B. NERA Study, Macroeconomic Impacts of LNG Exports from the United States....65
1. Overview of NERA's Findings....66
2. Overview of NERA's Methodology....68
3. Scope of the NERA Study....70
4. NERA's Global Natural Gas Model....71
5. The N_{ew}ERA Macroeconomic Model....73
6. Relationship to the EIA Study....74
7. Key Assumptions and Parameters of the NERA Study....74
8. Results of the NERA Study....75
VIII. COMMENTS ON THE LNG EXPORT STUDY AND DOE/FE ANALYSIS....82
A. Data Inputs and Estimates of Natural Gas Demand....82
1. Comments....82
2. DOE/FE Analysis....86
B. Distributional Impacts....92
1. GDP Versus Welfare....92
2. Sectoral Impacts....93
3. Household and Distributional Impacts....100
4. Regional Impacts....102
C. Estimates of Domestic Natural Gas Supplies....104
1. Comments....104
2. DOE/FE Analysis....106
D. Modeling the LNG Export Business....111
1. Comments....111
2. DOE/FE Analysis....115
E. Cost of Environmental Externalities....121
1. Comments....121
2. DOE/FE Analysis....122
F. Prices and Volatility....123
1. Natural Gas Price Volatility....123
2. Linking the Domestic Price of Natural Gas to World Prices....125
G. Integrity of the LNG Export Study....127
1. Comments....127
2. DOE/FE Analysis....128
H. Peer Review....128
1. Comments....128
2. DOE/FE Analysis....129
I. Procedural Arguments....131
1. Comments....131
2. DOE/FE Analysis....133

IX. DISCUSSION AND CONCLUSIONS 134
A. Motions to Intervene 134
B. DCP's Application 135
1. Regional Impacts 136
2. Price Impacts 138
3. Conditional Authorization 139
C. Significance of the LNG Export Study 140
D. Benefits of International Trade 140
E. Other Considerations 141
F. Conclusion 142
X. TERMS AND CONDITIONS 144
A. Term of the Authorization 144
B. Commencement of Operations Within Seven Years 145
C. Transfer, Assignment, or Change in Control 145
D. Agency Rights 146
E. Contract Provisions for the Sale or Transfer of LNG to be Exported 147
F. Export Quantity 149
G. Combined FTA and Non-FTA Export Authorization Volume 149
H. Environmental Review 150
XI. FINDINGS 151
XII. ORDER 151

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
DCP	Dominion Cove Point LNG, LP
DOE	U.S. Department of Energy
DTI	Dominion Transmission, Inc.
EIA	U.S. Energy Information Administration
EITE	Energy Intensive, Trade Exposed
EPA	U.S. Environmental Protection Agency
EUR	Estimated Ultimate Recovery
FDI	Foreign Direct Investment
FE	Office of Fossil Energy, U.S. Department of Energy
FERC	Federal Energy Regulatory Commission
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GNGM	Global Natural Gas Model
ICF	ICF International
IECA	Industrial Energy Consumers of America
kWh	Kilowatt-Hour
LNG	Liquefied Natural Gas
LTA	Liquefaction Tolling Agreement
Mcf	Thousand Cubic Feet
MMBtu	Million British Thermal Units
mtpa	Million Metric Tons per Annum
NEI	National Export Initiative
NEMS	National Energy Modeling System
NEPA	National Environmental Policy Act
NERA	NERA Economic Consulting
N_{ew}ERA	NERA's Macroeconomic Model
NGA	Natural Gas Act
NGLs	Natural Gas Liquids
NOA	Notice of Availability
Tcf/yr	Trillion Cubic Feet per Year
TRR	Technically Recoverable Resources
TSA	Terminal Service Agreement

I. INTRODUCTION

On October 3, 2011, Dominion Cove Point LNG, LP (DCP) filed an application (Application) [1] with the Office of Fossil Energy of the Department of Energy (DOE/FE) under section 3 of the Natural Gas Act (NGA)[2] for long-term, multi-contract authorization to export domestically produced liquefied natural gas (LNG) by vessel to nations with which the United States has not entered a free trade agreement (FTA) providing for national treatment for trade in natural gas (non-FTA countries).[3] DCP seeks to export up to the equivalent of approximately 1 billion cubic feet of natural gas per day (Bcf/d), or approximately 7.82 million metric tons per annum (mtpa) of LNG, for a 25-year period.[4] DCP requests this 25-year term even though it has executed contracts with 20-year terms, as discussed below. According to DCP, the additional length of the export authorization will ensure that the authorization will remain in place for all initial contracts of 20-years duration, even if the contracts begin sometime after the date that exports are authorized.[5]

The proposed exports would originate from the existing Cove Point LNG Terminal (Terminal), located in Calvert County, Maryland. DCP is requesting this authorization solely to export LNG as 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 DCP to

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[1] Application of Dominion Cove Point LNG, LP for Long-Term Authorization to Export LNG to Non-Free Trade Agreement Countries, FE Docket No. 11-128-LNG (Oct. 3, 2011) [hereinafter DCP App.]

[2] 15 U.S.C. § 717b. This authority is delegated to the Assistant Secretary for Fossil Energy pursuant to Redelegation Order No. 00-002.04E (Apr. 29, 2011).

[3] DCP previously sought authorization to export the same quantity of LNG to any country with which the United States has, or in the future may enter into, a FTA requiring national treatment in natural gas (FTA countries). As discussed in Section IV.A below, DOE/FE granted that FTA authorization by order dated October 11, 2011. The amount of LNG collectively proposed by DCP for export to FTA and non-FTA countries will not exceed 1 Bcf/d of natural gas, and thus is not additive.

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

[5] DCP App. at 7, n.10.

export LNG in a volume equivalent to 0.77 Bcf/d of natural gas (281 Bcf per year (Bcf/yr)) for a 20-year term—an amount that DCP, in an update filed on May 2, 2013,[6] acknowledges is lower than the equivalent of 1 Bcf/d of natural gas requested in its Application, but that is consistent with the planned liquefaction capacity of the Liquefaction Project. *See infra* Section IV.A.2.

DCP is a Delaware limited partnership with its principal place of business in Lusby, Maryland, and offices in Richmond, Virginia. DCP is a subsidiary of Dominion Resources, Inc., which is a Virginia corporation with its principal place of business in Richmond, Virginia.

DCP owns the Cove Point LNG Terminal, as well as an 88-mile pipeline connecting the Terminal to the interstate pipeline grid. DCP is currently developing plans to install facilities to liquefy domestically produced natural gas delivered to the Terminal through the Cove Point pipeline and to load the LNG onto tankers for export from the Terminal (Liquefaction Project). Following completion of the Liquefaction Project, the Terminal will be bi-directional. DCP states that it will provide these LNG export services to customers that will provide their own gas supply. DCP's requested export authorization is described in more detail below.

On December 8, 2011, DOE/FE published a Notice of Application in the Federal Register.[7] The Notice of Application called on interested persons to submit protests, motions to intervene, notice of intervention, and comments by February 6, 2012. Even before DOE/FE published the Notice of Application, however, the Coalition for Responsible Siting of LNG (CRS) and Shell NA LNG, LLC (Shell LNG) separately moved to intervene in the proceeding,

[6] Dominion Cove Point LNG, LP, Update of Dominion Cove Point LNG, LP Concerning Signed LNG Export Contracts, FE Docket No. 11-128-LNG (May 2, 2013) [hereinafter DCP Update].
[7] Dominion Cove Point LNG, LP, Application to Export Domestic Liquefied Natural Gas to Non-Free Trade Agreement Nations, 76 Fed. Reg. 76,698 (Dec. 8, 2011) [hereinafter Notice of Application].

with Shell also providing comments.[8] The Notice of Application set a separate deadline of December 23, 2011, for responses to the filings by CRS and Shell LNG.

In response to the Notice of Application, DOE/FE received comments opposing the Application from (1) the West Virginia State Building and Construction Trades Council, AFL-CIO, and its division, the Affiliated Construction Trades Foundation (collectively, Trades Council); and (2) the Delaware Riverkeeper and seven other Riverkeeper organizations (collectively, Riverkeeper).[9] No comments were filed in support of the Application. DOE/FE also received two additional timely motions to intervene and protests from the American Public Gas Association (APGA) and Sierra Club.[10]

Of the four motions to intervene, APGA and Sierra Club opposed the Application, and CRS and Shell LNG took no position. Additional procedural history is set forth below in Section VI.

On May 20, 2011, approximately five months before DCP filed its Application, DOE/FE issued its first order granting a long-term authorization to export LNG produced in the lower 48 states to non-FTA countries when it conditionally authorized Sabine Pass Liquefaction, LLC to export a volume equivalent to 2.2 Bcf/d of natural gas in DOE/FE Order No. 2961 (*Sabine Pass*).[11] By August 2011, DOE/FE had received two additional applications for authorization to

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[8] CRS filed a motion to intervene on October 19, 2011. Shell LNG filed a motion to intervene and comments on November 15, 2011.

[9] Riverkeeper filed comments on behalf of the Delaware Riverkeeper, the Lower Susquehanna Riverkeeper, the Patuxent Riverkeeper, the Shenandoah Riverkeeper, the Potomac Riverkeeper, the Gunpowder Riverkeeper, the South Riverkeeper, and the Sassafras Riverkeeper.

[10] On February 6, 2012, APGA filed a motion for leave to intervene and Sierra Club filed a motion to intervene, protest, and comments.

[11] *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).

export LNG to non-FTA countries—one from Freeport LNG Expansion, L.P. and FLNG Liquefaction, LLC (collectively, FLEX or Freeport)[12] and one from Lake Charles Exports, LLC (Lake Charles Exports or LCE).[13] Together, these three applications proposed LNG export authorizations for the equivalent of up to 5.6 Bcf/d of natural gas. At the same time, DOE/FE expected that more applications would be filed imminently and, indeed, DCP filed its Application a short time later, on October 3, 2011.[14] Recognizing the potential cumulative impact of the pending and anticipated LNG export applications, 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.[15]

Accordingly, DOE/FE engaged the U.S. Energy Information Administration (EIA) and NERA Economic Consulting (NERA) to conduct a two-part study of the economic impacts of LNG exports.[16] First, in August 2011, DOE/FE requested that EIA assess how prescribed levels of natural gas exports above baseline cases could affect domestic energy markets. Using its National Energy Modeling System (NEMS), EIA examined the impact of two DOE/FE-prescribed levels of assumed natural gas exports (at 6 Bcf/d and 12 Bcf/d) under numerous

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[12] On May 17, 2013, DOE/FE conditionally authorized FLEX to export domestically-produced LNG in a volume equivalent to 1.4 Bcf/d of natural gas for a period of 20 years. *See Freeport LNG Expansion, L.P. and FLNG Liquefaction, LLC*, DOE/FE Order No. 3282, Order Conditionally Granting Long-Term Multi-Contract Authorization to Export Liquefied Natural Gas by Vessel From the Freeport LNG Terminal on Quintana Island, Texas, to Non-Free Trade Agreement Nations (May 17, 2013) [hereinafter *Freeport LNG*].

[13] 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*].

[14] As of the date of this Order (and excluding DCP's Application), 18 applications for long-term export of LNG to non-FTA countries, in an amount totaling approximately 24 Bcf/d, are pending before DOE/FE.

[15] Indeed, DOE/FE stated in *Sabine Pass* that it "will evaluate the cumulative impact of the [Sabine Pass] authorization and any future authorizations for export authority when considering any subsequent application for such authority." DOE/FE Order No. 2961, at 33.

[16] *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).

scenarios and cases based on projections from EIA's 2011 Annual Energy Outlook (AEO 2011), the most recent EIA projections available at the time.[17] 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.[18] 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.[19]

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).[20] 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.[21] The NOA required initial comments by January 24, 2013, and reply comments between January 25 and February 25, 2013.[22] DOE/FE received over 188,000 initial comments and over

[17] The Annual Energy Outlook (AEO) presents long-term projections of energy supply, demand, and prices. It is based on results from EIA's NEMS model. *See* discussion of the AEO 2011 projections at Section VIII.A *infra*.
[18] *See* LNG Export Study – Related Documents, *available at* http://energy.gov/fe/downloads/lng-export-study-related-documents (EIA Analysis (Study - Part 1)).
[19] *See id*. (NERA Economic Consulting Analysis (Study - Part 2)).
[20] 77 Fed. Reg. at 73,627.
[21] *Id*. at 73,628.
[22] *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.[23] 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.[24] As discussed below, DOE/FE has carefully examined the comments and has considered them in its review of DCP's Application.

II. SUMMARY OF FINDINGS AND CONCLUSIONS

Based on a review of the complete record and for the reasons set forth below, DOE/FE has concluded that the opponents of the DCP 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 DCP's proposed exports on behalf of other entities should be conditionally authorized at a volumetric rate not to exceed the capacity of the facilities to be used in the proposed export operations and subject to satisfactory completion of environmental review and other terms and conditions discussed below.

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[23] 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).

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

III. PUBLIC INTEREST STANDARD

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

> [N]o person shall export any natural gas from the United States to a foreign country or import any natural gas from a foreign country without first having secured an order of the [Secretary of Energy[25]] 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.[26]

While section 3(a) establishes a broad public interest standard and a presumption favoring export authorizations, the statute does not define "public interest" or identify criteria that must be considered. In prior decisions, however, DOE/FE has identified a range of factors that it evaluates when reviewing an application for export authorization. These factors include economic impacts, international impacts, security of natural gas supply, and environmental impacts, among others. To conduct this review, DOE/FE looks to record evidence developed in the application proceeding.[27]

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[25] 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.

[26] *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).

[27] *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.

DOE/FE's prior decisions have also looked to certain principles established in its 1984 Policy Guidelines.[28] 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.[29]

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.[30]

In Order No. 1473, DOE/FE stated that it was guided by DOE Delegation Order No. 0204-111. That delegation order, which authorized the Administrator of the Economic Regulatory Administration to exercise the agency's review authority under NGA section 3, directed the Administrator to regulate exports "based on a consideration of the domestic need for the gas to be exported and such other matters as the Administrator finds in the circumstances of a particular case to be appropriate."[31] In February 1989, the Assistant Secretary for Fossil Energy assumed the delegated responsibilities of the Administrator of ERA.[32]

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

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[28] New Policy Guidelines and Delegations Order Relating to Regulation of Imported Natural Gas, 49 Fed. Reg. 6684 (Feb. 22, 1984) [hereinafter 1984 Policy Guidelines].
[29] *Id*. at 6685.
[30] *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).
[31] DOE Delegation Order No. 0204-111, at 1; *see also* 49 Fed. Reg. at 6690.
[32] *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)).

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

DCP has applied for a long-term, multi-contract authorization to export up to the equivalent of 1 Bcf/d of natural gas (365 Bcf/yr), or approximately 7.82 mtpa of domestically produced LNG by vessel from the Cove Point LNG Terminal for a 25-year term. DCP requests that its authorization commence on the earlier of the date of first export or six years from the date of issuance of the requested authorization. DCP seeks authorization to export LNG from the Cove Point LNG Terminal in Calvert County, Maryland, to any non-FTA country that currently has or in the future develops the capacity to import LNG via ocean-going carrier and with which trade is not prohibited by United States law or policy. DCP has requested authority to export solely on behalf of others holding title to the LNG, not on its own behalf.

A. Background

1. Description of Applicant and Facility

DCP states that it is a subsidiary of Dominion Resources, Inc., one of the largest producers and transporters of energy in the United States. DCP also states that it owns both the existing Cove Point LNG Terminal and the 88-mile Cove Point pipeline. According to DCP, the construction and operation of the Cove Point LNG Terminal was initially authorized in 1972 as part of a project to import LNG from Algeria and transport natural gas to U.S. markets. Shipments of LNG to the Terminal began in March 1978, but ceased in December 1980. In 2001, FERC authorized the reactivation of the Terminal and the construction of new facilities to receive imports of LNG. In 2006, FERC authorized the Cove Point Expansion project, which

nearly doubled the size of the Terminal, expanded the import capacity of the Cove Point pipeline, and provided for new downstream pipeline and storage facilities. In 2009, FERC authorized DCP to upgrade, modify, and expand its existing off-shore pier at the Terminal to accommodate the docking of larger LNG vessels.

The Cove Point LNG Terminal currently has peak daily send-out capacity of 1.8 Bcf of natural gas and on-site LNG storage capacity of the equivalent of 14.6 Bcf of natural gas (678,900 cubic meters of LNG). The Cove Point pipeline, which has firm transportation capacity of 1.8 Bcf/d, connects the Terminal to the major Mid-Atlantic gas transmission systems of Transcontinental Gas Pipe Line Company, LLC; Columbia Gas Transmission, LLC; and Dominion Transmission, Inc. (DTI), an interstate gas transmission business unit of Dominion Resources, Inc.

DCP states that this Application is the second part of a two-part LNG export authorization request. As set forth above, DCP's first request involved DCP's application for long-term authorization to export domestically-produced LNG to FTA countries. On October 7, 2011, DOE/FE granted that FTA request in DOE/FE Order No. 3019, authorizing the export of the equivalent of 1 Bcf/d of natural gas.[33] The export volume authorized in both the FTA order and the proposed export volume in DCP's Application mirror the liquefaction capacity of the Liquefaction Project estimated at the time each application was submitted, and thus are not additive. As explained below, however, the export volume authorized in the FTA order remains the equivalent of 1 Bcf/d of natural gas, whereas the export volume authorized in this Order is a

[33] *Dominion Cove Point LNG, LP*, DOE/FE Order No. 3019, Order Granting Long-Term Multi-Contract Authorization to Export Liquefied Natural Gas by Vessel from the Cove Point LNG Terminal to Free Trade Agreement Nations (Oct. 7, 2011).

lower volume, reflecting the revised liquefaction capacity. *See infra* Sections IV.A.2, X.F. and X.G.

2. DCP's Update to Application

On May 2, 2013, approximately 18 months after DCP had filed its Application, it filed an Update to inform DOE/FE of recent developments. *See supra* 2 n.6. In the Update, DCP stated that it had executed terminal service agreements (TSAs) with two customers, each of which will contract for 50 percent of the available capacity. The two customers are Pacific Summit Energy LLC, a U.S. subsidiary of Sumitomo Corporation, a Japanese corporation; and GAIL Global (USA) LNG, LLC, a U.S. subsidiary of GAIL (India), an Indian company. Combined, these customers have contracted for firm capacity to liquefy natural gas and load LNG onto ships in the average annual amount of 240,900,000 decatherms (Dth), which DOE/FE estimates is equivalent to 0.65 Bcf/d of natural gas. In addition, DCP stated that the contracts[34] provide each of the customers with access as "overrun" service to any LNG production capability that may exist in excess of this contracted firm capacity. According to DCP, both Pacific Summit Energy and GAIL Global contracted for a primary term of 20 years, with certain potential extension rights at the end of that term.

DCP also informed DOE/FE that it had submitted its front end engineering and design study to the Federal Energy Regulatory Commission (FERC) for review, based on the proposed Liquefaction Project having a base LNG production capacity of 5.25 million metric tons per annum (mtpa). Once the Liquefaction Project is in operation, however, DCP expects that the actual liquefaction capacity will exceed the base level of 5.25 mtpa by as much as 10 percent. DCP therefore "requested from ... FERC authorization to construct and operate liquefaction

[34] References to DCP's "terminal service agreements" (or TSAs) and "contracts" with its customers are synonymous for purposes of this Order.

facilities with LNG production capacity of up to 5.75 mtpa."[35] DOE/FE estimates that 5.75 mtpa is equivalent to 0.77 Bcf/d, or 281 Bcf/yr, of natural gas.[36] DCP acknowledged that "[t]his expected level of liquefaction capacity is less than the level of export authorization previously requested by DCP [in its Application] of up to the equivalent of approximately [1] Bcf of natural gas per day or approximately 7.82 mtpa."[37] Consistent with this revision of liquefaction capacity by DCP, this Order authorizes DCP to export LNG in a volume equivalent to 0.77 Bcf/d, or 281 Bcf/yr, of natural gas, as set forth below. *See infra* Sections X.F and XII.A.

B. Liquefaction Project

DCP plans to liquefy domestically produced natural gas at its Cove Point LNG Terminal and to load the resulting LNG onto tankers for export. DCP intends that the Terminal will be a bi-directional facility with capability to both import and export LNG. DCP states that its Liquefaction Project will be integrated with existing facilities at the Terminal. Such facilities may include an off-shore pier (with two berths), insulated LNG and gas piping from the pier to the on-shore Terminal and within the Terminal facility, seven LNG storage tanks, on-site power generation, and control systems. In addition, DCP states that it will construct new facilities to liquefy natural gas delivered to the Terminal through the Cove Point Pipeline. The new liquefaction facilities will be located on land owned by DCP.

In the Application, DCP states that it had not yet determined the particular facilities to be constructed, or the amount of liquefaction capacity of those facilities. However, in the Update, DCP stated that the liquefaction capacity of the Liquefaction Project is 5.75 mtpa, which (as

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[35] DCP Update at 4.
[36] DOE/FE used conversion factors of 1.022 MM Btu per thousand cubic feet (Mcf) of dry natural gas and 51.75 Bcf per million metric tons of dry natural gas. This estimate is based on a mixture of methane and ethane with an energy content of 1,022 Btu per cubic foot of natural gas.
[37] DCP Update at 4.

noted above) DOE/FE estimates is equivalent to 0.77 Bcf/d (281 Bcf/yr) of natural gas. DCP also informed DOE/FE that, in its filing with FERC, DCP proposed to commence construction of the Liquefaction Project in the first quarter of 2014, to meet a target in-service date of June 2017.

C. Business Model

In the Application, DCP states that customers will be responsible for procuring their own gas supplies and holding title to both the gas delivered to DCP for liquefaction and the LNG exported from the Cove Point LNG Terminal. According to DCP, these customers may enter into long-term gas supply contracts or procure spot supplies.

In the Update, DCP informed DOE/FE that it has recently signed 20-year TSAs with two customers, Pacific Summit Energy and GAIL Global. DCP states that these contracts will allow DCP to provide Pacific Summit Energy and GAIL Global with options for liquefying natural gas and loading it onto LNG tankers at the Terminal for export, or for importing LNG at the Terminal for vaporization and send-out as regasified LNG into the domestic market.

DCP states that it does not intend to hold title to the LNG itself, and is requesting authorization to act as agent for these two customers (and any other entities) that hold title to the LNG. DCP states that it will register each such LNG title holder with DOE/FE.

D. Source of Natural Gas

DCP states that natural gas will be delivered to the Cove Point Pipeline from the interstate pipeline grid, thereby allowing gas to be sourced broadly. DCP states that the DTI pipeline system provides access to Appalachian (including Marcellus Shale) supply, as well as connections to supplies from the Gulf of Mexico area, the mid-continent, the Rockies, and Canada. DCP states that DTI operates the largest underground natural gas storage system in the country, as well as the Dominion South Point trading hub.

E. Environmental Review

FERC is responsible for ensuring that the siting, construction, and operation of LNG facilities are consistent with the public interest under section 3 of the NGA. FERC is also the lead agency for purposes of review of the Liquefaction Project in FERC Docket No. CP13-113 under the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. § 4321 *et seq*. DOE/FE is participating in that environmental review as a cooperating agency.

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

Additionally, DOE/FE is attaching a condition to this export authorization ordering that DCP'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 Cove Point LNG Terminal by federal or state agencies. When the environmental review is complete, DOE/FE will reconsider this conditional Order in light of the information gathered as part of that review.

V. APPLICANT'S PUBLIC INTEREST ANALYSIS

DCP states that its requested authorization to export LNG is not inconsistent with the public interest, and therefore meets the statutory standard under NGA section 3(a). DCP states that section 3(a) creates a rebuttable presumption that proposed exports of natural gas are in the

[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).

public interest. DCP also states that DOE/FE has repeatedly reaffirmed the continued applicability of its 1984 Policy Guidelines, holding that they apply to export applications, even though originally written to apply to imports. DCP contends that, based on this standard of evaluation, granting its request to export LNG to non-FTA countries will be consistent with and will advance the public interest.

In further support of the Application, DCP appended two studies by Navigant Consulting, Inc. (Navigant) and one by ICF International (ICF) as appendices to its Application:

(1) Appendix A—*North American Gas Supply Overview and Outlook to 2040* (Sept. 19, 2011) prepared by Navigant (Navigant Supply Report);

(2) Appendix B—*North American Gas System Model to 2040* (Sept. 19, 2011), prepared by Navigant (Navigant Price Report); and

(3) Appendix C—*Economic Impact Study of Construction and Operations* (Oct. 3, 2011), prepared by ICF (ICF Economic Benefits Study).

DCP asserts that these studies help to demonstrate that its proposed exports will be consistent with the public interest. DCP also addresses the following seven factors in detail: (i) domestic natural gas supplies; (ii) domestic natural gas demand; (iii) relationship between projected supply and demand; (iv) impact of the proposed exports on domestic prices of natural gas; (v) local, regional, and national economic benefits of the proposed exports; (vi) balance of trade; and (vii) international benefits.

A. Domestic Natural Gas Supplies

DCP contends that sufficient reserves[40] now exist to satisfy domestic demand as well as the proposed LNG exports. In support of this proposition, DCP refers to the recent successes in

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

domestic gas production, particularly shale gas production.[41] DCP also points to EIA's estimates of dry natural gas reserves—specifically, those provided in EIA's 2011 Annual Energy Outlook (AEO 2011). According to DCP, EIA estimated dry natural gas reserves in the United States of 2,543 trillion cubic feet (Tcf). DCP compares this figure to EIA's 2005 estimate of about 1,600 Tcf and observes that the increase of nearly 60 percent in six years has been the result of domestic shale gas that, in turn, is the result of refinement and improvement in drilling technologies. Additionally, DCP states that EIA's estimate of TRR in AEO 2011 included 827 Tcf of shale reserves, compared to 347 Tcf of shale reserves in AEO 2010 and less than 100 Tcf as recently as 2006. Similarly, DCP refers to a 2009 estimate by the Potential Gas Committee of the Colorado School of Mines of recoverable natural gas resources in North America of 2,170 Tcf, allegedly an increase of 89 percent over the previous evaluation. DCP adds that the Potential Gas Committee's 2009 estimate included 687 Tcf of shale gas.

DCP further maintains that the increase in estimated reserves has mirrored the increase in U.S. production levels from approximately 50.5 Bcf/d in May 2005 to approximately 60.9 Bcf/d in May 2011. According to DCP, shale gas production from eight major North American basins under development grew from 3 Bcf/d in the first quarter of 2007 to 16.5 Bcf/d in the first quarter of 2011, an increase of more than 525 percent.

DCP states that Navigant and EIA both expect gas production to continue to grow steadily. As set forth in the Navigant Supply Report, Navigant's Reference Case projects North American-produced supply will reach 105 Bcf/d by 2040, with U.S. production comprising more than 81 Bcf/d—more than half of which is estimated to be from shale gas. According to DCP, the AEO 2011 Reference Case also projects shale gas production to increase almost fourfold

[41] DCP App. at 19.

from 2009 to 2035—increasing from 21.0 Tcf to 26.3 Tcf, with shale gas production growing to 12.2 Tcf in 2035. Such an increase in shale gas production, DCP maintains, means that shale gas production will comprise 47 percent of total U.S. production in 2035 (as compared to 16 percent in 2009).

DCP asserts that EIA's supply predictions have been historically conservative when adding new information about the domestic shale gas resource. For example, DCP maintains that, in AEO 2010, EIA projected shale production for 2035 of about 16.5 Bcf/d, which is less than the actual shale gas production in 2011. DCP also states that AEO 2011 projects shale gas production in 2035 of about 33.5 Bcf/d, which is more than twice what it predicted in AEO 2010. Yet, DCP adds, the current shale gas production levels of 18 Bcf/d already exceed the forecast for 2011 in AEO 2011 of 15 Bcf/d. By contrast, DCP states that Navigant's Supply Report forecasts shale gas production of more than 46 Bcf/d in 2035 and projects that more shale gas production will be brought on by 2020 than is projected in EIA's AEO 2011. DCP indicates that, after 2020, the growth rates projected by Navigant and EIA are roughly the same.

DCP states that the Marcellus Shale formation is particularly important. According to DCP, production from the Marcellus shale has moved from almost nothing in mid-2008 to over 2.5 Bcf/d in June 2011. DCP further states that a recent study conducted at Pennsylvania State University (Penn State) estimates that Marcellus production will grow from 327 million cubic feet of natural gas per day in 2009 to 13.5 Bcf/d by 2020. According to DCP, the Penn State study observed that the Marcellus Shale has the potential to be the second largest natural gas field in the world. DCP states that Dr. Terry Engelder of Penn State similarly has estimated the Marcellus Shale alone has a 50 percent chance of containing 489 Tcf of recoverable gas. Citing the Navigant Supply Report, DCP states that, in 2010, the United States consumed about 24 Tcf,

or less than 5 percent of the Marcellus potential. DCP adds that a recent estimate by the U.S. Geological Survey of the mean undiscovered natural gas resource base for the Marcellus Shale of 84 Tcf is not inconsistent with larger reserve estimates by EIA and others. Indeed, DCP states that the U.S. Geological Survey's estimate seems to be additive to the EIA estimate.

DCP asserts that the Navigant Supply Study makes conservative estimates, which has the effect of underestimating the production of shale plays that are now in the early phase of development. DCP notes, for example, that Navigant did not account for the addition of new gas supply basins, despite the fact that other new shale resource plays are being identified at a high rate. DCP states that the Utica Shale, which underlies portions of the Marcellus Shale and is also situated near the DTI transmission system, could be producing significant amounts of gas by 2040. But, according to DCP, Navigant assumed in its Pricing Study that the Utica Shale will produce only 0.9 Bcf/d of natural gas in 2040 from Canada, with no production at all in the United States. DCP points out that the rapid development of other liquids-rich shales (such as Eagle Ford) and the fact that numerous projects have been announced in the Utica Shale (such as efforts by the Chesapeake Energy Corporation) support the view that the Utica Shale will be a source of significant future production and supplies for LNG exports by DCP. Yet, according to DCP, Navigant conservatively did not include this potential source of supply in its analyses.

B. Domestic Natural Gas Demand

DCP states that U.S. gas demand in 2011 was approximately 65.6 Bcf/d. Describing the Navigant Supply Report, DCP states that Navigant engaged in a sector-by-sector analysis of demand for natural gas. Navigant projects demand to increase steadily over time with the highest annual rate of growth expected to come from the electricity generation sector (4.9 percent through 2015 and 2.1 percent through 2040). Navigant estimates lower annual rates of

demand growth in the industrial sector (0.5 percent) and in gas demand for residential, commercial, and vehicle uses (0.2 percent).

According to DCP, Navigant's Reference Case projects that U.S. consumption of natural gas will increase from 24 Tcf in 2011 to approximately 30.7 Tcf in 2040. DCP states that Navigant concludes that LNG exports from the United States have the potential to provide a steady, reliable baseload market that will underpin on-going supply development and help to keep domestic gas prices stable.

DCP maintains that exports of LNG will not expose U.S. natural gas consumers to overseas LNG prices that historically have been linked to the price of oil. DCP's analysis of the price impact of LNG exports is set forth in greater detail below. DCP also argues that the United States is likely to remain the most liquid natural gas market in the world, supported by its superior infrastructure and dependable demand. DCP contends it is very unlikely that the projected levels of LNG exports will increase the need for significant amounts of imported LNG. These conclusions, according to DCP, are supported by Navigant's modeling and market research and are consistent with DOE's determination in *Sabine Pass*, DOE/FE Order No. 2961.

C. Relationship Between Projected Supply and Demand

DCP asserts that, based on all available evidence and projections, current gas reserves are ample and will support all expected demand, including LNG exports, at least through 2040. Accordingly, DCP argues that there is no "'domestic need' for the gas that DCP proposes to export,"[42] nor do the exports pose any threat to the security of domestic natural gas supplies. DCP states that EIA's current estimate of reserves totaling 2,543 Tcf represents more than 100 years of supply at the current usage rate of approximately 24 Tcf/yr. DCP states that even at the

[42] DCE App. at 27.

2040 rate of consumption estimated by Navigant of 30.7 Tcf/yr, EIA's estimate of 2,543 Tcf of reserves represents 83 years of supply. By contrast, Navigant's Extreme Demand Case—which includes LNG exports totaling 7.1 Bcf/d of natural gas, greenhouse gas regulation, and dramatically increased use of natural gas vehicles—projects annual demand in 2040 at 32.7 Tcf. DCP states that even this aggressive demand estimate represents just 1.3 percent of EIA's estimate of 2,543 Tcf of reserves, leaving about 77 years of supply to meet demands at that level. DCP also points out that such a result is unrealistic because it assumes that the amount of recoverable reserves will not increase over EIA's current estimate by 2040.

DCP argues that the above figures and projections show that its proposed exports are consistent with the public interest. DCP states that DOE/FE has historically focused on the adequacy of reserves compared to expected demand, and has authorized exports based on less robust supply scenarios. DCP cites a 1989 order—*Yukon Pacific*— in which DOE/FE authorized exports of LNG produced on the North Slope of Alaska.[43] DCP states that DOE/FE authorized Yukon Pacific's exports notwithstanding claims that the proved reserves would be depleted by the end of the next decade, reasoning that new reserves would be added over time. DCP also quotes DOE/FE's order in *Sabine Pass* to support the proposition that there is "'an existing and projected future supply of domestic natural gas sufficient to simultaneously support the proposed export and domestic gas demand both currently and over the 20-year term of the requested authorization.'"[44]

[43] *Id*. (citing *Yukon Pacific Corp.*, DOE/FE Order No. 350, Order Granting Authorization to Export Liquefied Natural Gas from Alaska, 1 FE ¶ 70,259 (1989)).
[44] *Id*. (quoting *Sabine Pass*, DOE/FE Order No. 2961, at 29).

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

DCP asserts that the DOE/FE Policy Guidelines establish that the federal government's policy is *not* to manipulate energy prices by approving or disapproving import or export applications, but rather to allow markets to allocate resources and prices without government interference. DCP states that this policy is premised on the understanding that free trade in natural gas on a market-competitive basis benefits consumers and promotes the public interest.

DCP indicates that the impact of LNG exports on domestic prices is outside the scope of DOE/FE's review, but acknowledges that DOE/FE evaluated the projected impact of LNG exports on domestic prices in *Sabine Pass*. According to DCP, DOE/FE concluded that Sabine Pass's proposed export of 2.2 Bcf/d of natural gas would result in a modest increase in domestic gas prices, but that this increase was viewed as "not inconsistent" with the public interest.[45]

DCP contends that the Navigant Price Report lends further support to its position regarding the effect of LNG exports in general and the current proposed exports in particular on natural gas prices. DCP stresses the conservative nature of the assumptions made in the Navigant Price Report, including the assumptions that there will be no new gas supply basins or infrastructure projects that might ameliorate the price impact of LNG exports.

Based on these assumptions, the Navigant Price Report models four scenarios: (1) a Reference Case; (2) the Cove Point Export Case; (3) the Aggregate Export Case; and (4) the Extreme Demand Case. In all scenarios, Navigant studied price impacts through 2040 at Dominion South Point (a major, active trading hub on DTI's system) to focus on the potential price effect on the key market in the vicinity of the Cove Point LNG Terminal, as well as at Henry Hub.

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[45] *Id*. at 28.

DCP states that Navigant's Reference Case reflects steadily increasing demand and assumes the operation of two North American LNG export facilities: the Sabine Pass LNG Terminal in Louisiana and the Kitimat LNG facility in British Columbia, Canada. According to DCP, the Cove Point Export Case adds to the Reference Case 1 Bcf/d of LNG exports from the Cove Point LNG Terminal. The Aggregate Export Case adds another 3.4 Bcf/d of LNG exports, to reflect proposals by the Lake Charles LNG Facility in Louisiana and the Freeport LNG facility in Texas. As stated above, the Extreme Demand Case adds additional gas demand to reflect increased natural gas usage in the transportation sector and increased usage in the electric generation sector resulting from greenhouse gas reduction legislation.

DCP states that Navigant's Reference Case assumes demand will steadily increase from about 24 Tcf in 2011 to 30.7 Tcf in 2040. According to DCP, in this scenario average annual prices at Henry Hub would remain below $5.00 per million British thermal units (MMBtu) through 2020, would remain below $6.00 per MMBtu until 2029, and would reach $8.64 per MMBtu in 2040.[46] Prices at Dominion South Point are projected to be slightly lower in 2015 than 2011, then to rise more slowly than Henry Hub prices throughout the forecast period, "as the abundant Marcellus Shale supply increasingly becomes the dominant supply in the region."[47]

DCP contrasts Navigant's projected prices in the Reference Case to the actual market prices prior to the alleged shale gas boom as well as expectations for the future. DCP points out that Henry Hub spot prices averaged $7.91 per MMBtu in 2005, $6.62 per MMBtu in 2006, $6.20 per MMBtu in 2007, and $8.25 per MMBtu in 2008. DCP also states that, as recently as

[46] DOE/FE notes that these prices are denominated in 2010 dollars and are not adjusted for inflation. *See* DCE App. Appx. B, Navigant Price Report at 16, Fig. 4.
[47] DCE App. at 30.

AEO 2009, EIA projected prices would be $6.96 per MMBtu in 2010, $7.77 per MMBtu in 2020, and $9.68 per MMBtu in 2030.[48]

DCP states that the Cove Point Export Case adds 1 Bcf/d from the Cove Point LNG Terminal starting in 2016, but makes no other changes to the model. According to DCP, Navigant projects Henry Hub prices in the Cove Point Export Case, compared to the Reference Case, will be 5.7 percent higher in 2020, 4.1 percent higher in 2030, and 6 percent higher in 2040. For Dominion South Point, the projected price increases are larger initially, but are smaller over time due to increased Marcellus shale gas supplies.

DCP emphasizes that the Cove Point Export Case's projected price of $6.61 per MMBtu in 2030 is significantly lower for that year than the AEO 2009 Reference Case price of $9.68 per MMBtu. DCP also believes that Navigant's projections likely overstate the price effect resulting from LNG exports from the Cove Point LNG Terminal. DCP argues that the price impacts forecast in Navigant's Cove Point Export Case should be considered the maximum possible impacts. This is due in part to the allegedly conservative assumptions about supply and infrastructure discussed above. It is also due, according to DCP, to the fact that Navigant added the new demand in a block, resulting in price jumps. DCP states that, in practice, producers will be able to plan in advance and add incremental supply to coincide with the onset of LNG export operations, thereby minimizing the initial price increase associated with new LNG export demand.

According to DCP, the Aggregate Export Case assumes that both the Lake Charles and Freeport LNG export projects are built and added into demand between 2017 and mid-2019.[49]

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[48] DOE/FE notes that these AEO forecast prices are in 2010 dollars, which Navigant converted from AEO 2009's price basis of 2007 dollars. *See* DCP App. Appx. B, Navigant Price Report at 5 n.3.
[49] *See id* at 21.

Navigant projects Henry Hub prices to be 11 percent higher in the Aggregate Export Case than the Cove Point Export case in 2020, 3.5 percent higher in 2030, and 5.3 percent higher in 2040. At Dominion South Point, DCP projects price effects of the Aggregate Export Case of 9.9 percent in 2020, 6.5 percent in 2030, and 5.6 percent in 2040. DCP again asserts that the near-term price effects are overstated because Navigant did not project new supply and because producers will most likely increase production to meet the new demand from LNG exports as the LNG export facilities come online, which will lessen the likelihood of any immediate price shocks.[50]

DCP states that, in the Extreme Demand Case scenario, Navigant predicts gas demand would increase from the 2011 level of 65.6 Bcf/d to 74.5 Bcf/d in 2020, 83.4 Bcf/d in 2030, and 90.1 Bcf/d in 2040. As a result, Navigant projects that prices would rise an additional 5.4 percent higher in 2020, 17.4 percent higher in 2030, and 16.2 percent higher in 2040. DCP states that the prices at Dominion South Point would increase by the same 5.4 percent as Henry Hub prices in 2020, but 11.9 percent in 2030, and 4.8 percent in 2040.[51]

Based on the foregoing, DCP argues that Navigant's extensive pricing analysis, even with conservative assumptions, shows that LNG exports from the Cove Point LNG Terminal will have no more than a modest impact on domestic gas prices. Therefore, DCP contends that any price effect would not render the proposed exports contrary to the public interest.

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[50] Navigant also presented a modified Aggregate Export Case, which eliminated LNG exports from Cove Point. DCP submits that this modified scenario, when compared to other scenarios, shows that exports from DCP would affect prices at Dominion South Point more than exports from the Gulf Coast, while exports from the Gulf Coast have a greater effect on Henry Hub prices.

[51] Navigant also presented a modified version of the Extreme Demand Case in which exports from Cove Point are eliminated. According to DCP, this modified scenario shows that while Henry Hub prices are projected to be quite high in 2040 under the unmodified Extreme Demand Case, very little of the price increase would be attributable to DCP's exports from Cove Point.

E. Local, Regional, and National Economic Benefits

DCP states that the requested authorization is in the public interest because the export of domestically produced LNG will provide significant economic benefits, many of which are detailed in the ICF Economic Benefits Study, Appendix C of DCP's Application. The ICF Economic Benefits Study utilizes both proprietary economic analysis and the Impact Analysis for Planning (IMPLAN) model to assess economic impacts of the proposed Terminal construction activities and ongoing export operations. The ICF Economic Benefits Study describes the IMPLAN methodology as follows:

> The IMPLAN model is an input-output model based on a social accounting matrix that incorporates all flows within an economy. The IMPLAN model includes detailed flow information for hundreds of industries. By tracing purchases between sectors, it is possible to estimate the economic impact of an industry's output (i.e., the goods and services purchased by the oil and gas upstream sector) to impacts on related industries.
>
> From a change in industry spending, IMPLAN generates estimates of the direct, indirect, and induced economic impacts. Direct impacts refer to the response of the economy to the change in the final demand of a given industry to those directly involved in the activity, in this case, the direct expenditures associated with an incremental drilled well. Indirect impacts (or supplier impacts) refer to the response of the economy to the change in the final demand of the industries that are dependent on the direct spending industries for their input. Induced impacts refer to the response of the economy to changes in household expenditure as a result of labor income generated by the direct and indirect effects.
>
> After identifying the direct expenditure components associated with upstream development…, the direct expenditure cost components . . . are then used as inputs into the IMPLAN model to estimate the total indirect and induced economic impacts of each direct cost component.[52]

Additional detail regarding the IMPLAN methodology is set forth in the ICF Economic Benefits Study.

[52] DCP App. Appx. C, ICF Economic Benefits Study at 43.

DCP states that ICF's Economic Benefits Study is premised on a project with inlet capacity of 0.75 Bcf/d of natural gas, assumed to be operated at 90 percent of capacity. DCP points out that its proposed LNG export project (even authorized at 0.77 Bcf/d) is larger than the modeled project, and that its economic benefits should therefore be greater. DCP maintains that "[t]hese benefits overwhelm any perceived detriment of modestly increased natural gas prices."[53]

DCP contends that the most basic benefit of the requested authorization will be to encourage and support increased domestic production of natural gas and natural gas liquids (NGLs). DCP asserts that the steady new demand associated with LNG exports will spur the development of new natural gas resources. DCP notes that DOE/FE found in *Sabine Pass* that increased production could be used for domestic requirements if market conditions warranted, and that this production will tend to enhance domestic energy security.

Moreover, DCP states that the development of additional gas resources for export by DCP will also result in the increased production of NGLs. DCP points out that the production of additional NGLs will partially offset the need to import oil. Given the wide use of NGLs by industry, DCP asserts that the availability of additional NGLs will give domestic industries a competitive advantage, will boost economic output, and create jobs. According to DCP, ICF estimates that LNG exports from the Cove Point LNG Terminal will result in the incremental production of approximately 8.5 million barrels of hydrocarbon liquids per year, with a market value of $1.2 billion per year.

DCP contends that the requested authorization will result in new jobs for American workers, consistent with the National Export Initiative, created by Executive Order in March

[53] DCP App. at 35.

2010.[54] Specifically, DCP asserts that, to export LNG from the Cove Point LNG Terminal, DCP will need to make a significant capital investment with additional annual expenditures to operate the new facility over the life of the exports. DCP therefore maintains that the Liquefaction Project has the potential to create significant short-term economic activity in Maryland and regionally during both the construction and operation phases. DCP cites ICF's estimates that industry output in 2015 will be between $355 million and $443 million in Calvert County, with an additional $130 million to $163 million throughout the rest of Maryland. DCP states that the Liquefaction Project will support the region by creating between $183 million and $230 million in value added within Calvert County, and an additional $80 million to $100 million in the rest of Maryland. From 2018 through 2040, DCP projects that annual operations will generate an additional $22 million in value added annually in the local economy. More broadly, DCP estimates that there will be $44 billion in "industry value added" associated with "upstream expenditures" of $32 billion to support LNG exports over a 25-year term.[55]

Based on the ICF Economic Benefits Study, DCP claims that construction and operation of the Liquefaction Project has the potential to create 2,700 to 3,400 jobs in Calvert County at the peak of construction activity and could support over 1,000 more jobs in the rest of Maryland. ICF also estimates that thousands more jobs would be added nationally in the short-run, and that, for the period of project operations from 2018 to 2040, an additional 320 jobs across the nation would be created. DCP states that, over the life of the Project, the ICF Study indicates that an estimated 18,000 jobs will be created annually due to economic activity associated with the long-term upstream supply of natural gas for DCP's proposed LNG exports. The estimated job

[54] National Export Initiative, Exec. Order 13,534, 75 Fed. Reg. 12,433 (Mar. 16, 2010) [hereinafter NEI].
[55] DCP App. at 39 (citing Appx. C at 28, Table 9).

impacts are presented in Table 2 of the ICF Study, as cited on page 39 of DCP's Application and duplicated below.

ICF: Annual Job-Year Impacts, Facility Construction/Operation (Job-years)

	Calvert County		Rest of Maryland		Rest of Nation		U.S. Total	
Year	**Low Case**	**High Case**	**Low Case**	**High Case**	**Low Case**	**High Case**	**Low Case**	**High Case**
2011	60	80	70	90	70	80	200	250
2012	890	1,110	1,000	1,240	910	1,140	2,800	3,490
2013	560	710	640	810	3,460	4,320	4,660	5,840
2014	2,360	2,960	1,020	1,280	3,850	4,820	7,230	9,060
2015	2,730	3,410	710	890	2,760	3,450	6,200	7,750
2016	2,620	3,270	680	853	2,280	2,850	5,580	6,973
2017	340	410	150	180	440	510	930	1,100
2018-40 (yearly)	70	70	60	60	190	190	320	320

(Source: ICF using the IMPLAN model)

Turning to revenues from taxes, DCP alleges that the Liquefaction Project will yield additional tax revenues for federal, state, and local governments. ICF projects total additional tax revenues for the years 2011, 2012, and 2013 of $130 to $160 million. ICF further estimates an average annual increase in tax revenues of nearly $11 million from 2018 to 2040 for the United States as a whole. Additionally, DCP estimates that the long-term operation of the Project will produce up to $40 million per year in property taxes, which would be in addition to the tax revenues estimated by ICF.

More broadly, DCP states that the upstream economic activity resulting from the proposed exports is estimated by ICF to yield over $25 billion in increased government royalty and tax revenues over the proposed 25-year period of operations, with an average of $1 billion in

annual revenues. In addition, another $9.8 billion in royalty income is expected for landowners in the form of mineral leases.

F. Balance of Trade

According to DCP, ICF calculates that the Liquefaction Project (both the proposed exports of LNG and associated NGLs) will result in an improvement in the U.S. balance of trade from $2.8 billion to nearly $7.1 billion per year over the requested 25-year term, thereby reducing the trade deficit by 0.6 to 1.4 percent based on the 2010 deficit. DCP states that DOE/FE has recognized the positive impact that LNG exports can have on the balance of trade with destination countries.[56]

G. International Benefits

DCP also takes the position that LNG exports and increased domestic gas production will produce international benefits for the United States. Relying on DOE/FE's language in *Sabine Pass*,[57] DCP contends that LNG exports will (i) promote new international markets for natural gas, thereby encouraging the development of additional productive resources both domestically and internationally; (ii) support efforts by overseas electric power generators to switch from more carbon intensive fuels to natural gas; (iii) help countries that have limited natural gas supplies to diversify their supply base; and (iv) encourage the decoupling of international natural gas prices from oil prices in some international natural gas markets and exert downward pressure on natural gas market prices in relation to oil prices in those markets.

[56] DCP App. at 42-43 (citing *Sabine Pass*, DOE/FE Order No. 2961, at 31-33).
[57] Quoting *Sabine Pass*, Order No. 2961 at 35-36.

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

A. Overview

As noted above, DOE/FE received non-intervenor comments taking no position on the Application from the Coalition for Responsible Siting of LNG and Shell LNG as well as non-intervenor comments opposing the Application from the Trades Council and a group of Riverkeeper organizations. DOE/FE also received timely motions to intervene and protests from the APGA and Sierra Club.

B. Comments Taking No Position on the Application

The Coalition for Responsible Siting of LNG (CRS) describes itself as a grassroots coalition of 1,300 persons and other sister organizations with the objective of looking out for the betterment and safety of the citizens in communities targeted and affected by the siting of LNG facilities. CRS takes no position as to whether DOE/FE should approve or deny DCP's application.

Shell LNG states that it is a firm capacity holder at DCP's LNG terminal and on its pipeline. It takes no position on whether DOE/FE should approve the application, but asserts that a grant of DCP's application should not be permitted to disrupt, degrade, or impair the services that Shell LNG presently receives from DCP and that DCP's import and related transportation service customers should not be required to subsidize DCP's proposed export services or operations. Shell LNG reserves the right to bring to DOE/FE's attention any issues concerning the disruption, degradation, or impairment of the services Shell LNG currently receives from DCP, or rate subsidization that may be associated with DCP's LNG export operations.

C. Non-Intervenor Comment by the Trades Council in Opposition to the Application

The Trades Council states that it is a labor organization that represents approximately 20,000 construction workers throughout West Virginia and the surrounding states. The Trades Council states that many of its members are employed in the construction of natural gas related facilities similar to the facilities that would be required to be constructed if DCP's application were approved.

The Trades Council argues that DCP's requested authorization to export LNG is not consistent with the public interest because approval would damage the U.S. economy in the form of increased natural gas prices, loss of jobs, increased emission of greenhouse gases, and the weakening of U.S. energy security. The Trades Council takes note of the Navigant Price Report and states DCP has failed to show how the higher domestic gas prices that would result from DCP's LNG exports would benefit the economic future of West Virginia and the Council's members. The Trades Council argues that increased gas prices from LNG exports would threaten economic recovery and job creation in the United States, which has been hastened by the affordability of domestic natural gas since the onset of the shale gas boom. The Trades Council argues that instead of authorizing LNG exports, the Federal Government should be incentivizing the use of natural gas as a primary fuel source in the industrial sector. The Trades Council asserts that such incentives, coupled with a switch to natural gas in the transportation sector, would result in significant reductions in the emissions of greenhouse gases and other hazardous air pollutants. The Trades Council also points out that the extent of the U.S. natural gas resource base is uncertain. Thus, the Trades Council contends, at a time when the United States is trying to break free from dependence on foreign oil, the Federal Government should not consider allowing the export of a potentially important natural resource in terms of U.S. energy

security. The Trades Council urges DOE/FE to exercise patience and to deny the application.

D. Non-Intervenor Comment by Riverkeeper in Opposition to the Application

Riverkeeper opposes DCP's requested authorization to export LNG to countries that do not have an FTA with the United States. Riverkeeper argues that DCP's proposal to export LNG does not satisfy the public interest and, therefore, DOE/FE should deny DCP's application.

More specifically, Riverkeeper argues that DCP's proposed export of domestically produced LNG fails to provide the requisite certainty that it will be competitive for the contract term of 25 years. In support of this argument, Riverkeeper states that the competitiveness of U.S. LNG exports depends on a number of variable factors. Riverkeeper argues that the shifting of any one of these variables could result in harm to the public interest. For example, Riverkeeper asserts that if EIA's low-shale estimate becomes a reality and if all domestic LNG export applications currently pending before DOE/FE are approved, then the public could experience drastic natural gas price increases in a relatively short period of time. Riverkeeper argues that even if the domestic natural gas resource base turns out to be as prolific as some of the higher current estimates, it is a virtual certainty that if LNG exports are approved domestic gas prices will increase, as will coal-fired electricity generation. Riverkeeper argues that neither of these outcomes is consistent with the public interest.

Riverkeeper argues that DCP's application relies heavily on shale gas resources. According to Riverkeeper, EIA's AEO 2012 Early Release estimate of the extent of the Marcellus Shale was down 66% from the AEO 2011 estimate. Riverkeeper also argues that DOE/FE should examine shale gas reserves not in terms of what is technically recoverable but in terms of what is commercially viable. Riverkeeper points to several recent studies that indicate that shale gas wells typically exhibit abrupt catastrophic drops in production levels, and that shale plays in general may not produce the long-term results forecasted by industry.

Riverkeeper further argues that DCP's terminal will rely largely on Mid-Atlantic shale plays for its primary source of LNG, and those plays allegedly are not capable of accurate prediction for the 25 year span of the requested authorization. On top of this uncertainty, Riverkeeper argues the regulatory landscape concerning hydraulic fracturing is not settled and new regulations limiting the practice are likely in several states. For these reasons, Riverkeeper argues there is no way to accurately predict how much gas will be produced in the United States in the coming years.

Riverkeeper points out that natural gas is currently the cheapest option for power generation and the accessibility of shale gas has encouraged investments in natural gas generation while discouraging investments in coal, nuclear, and wind projects. Riverkeeper contends that long-term authorizations to export LNG, while increasing the reliability of demand for domestic gas producers, will delay the transition to clean energy alternatives. Riverkeeper argues that instead of acting to secure an outlet for gas companies to sell their gas, the Federal Government should be prioritizing the development and implementation of clean energy alternatives on appropriate economies of scale.

Riverkeeper argues there is also significant uncertainty regarding whether the current fleet of ocean-going tankers is equipped to handle all of the LNG exports proposed in applications currently pending before DOE/FE. Riverkeeper is concerned there will be sub-standard vessels with unqualified crew members transporting LNG. Riverkeeper argues that the potential hazards that could arise in this scenario are profound and the benefits of rapidly increasing LNG exports do not outweigh the significant risks.

Riverkeeper also argues that the increased gas production resulting from DCP's proposed LNG exports will harm the long-term economic development of regional economies dependent

on resource extraction, and will also jeopardize existing jobs and economic stability. Riverkeeper asserts that DCP overstates the positive long-term job impacts of its proposals. Riverkeeper points to a study of the Marcellus Shale workforce that found the drilling phase of shale gas development accounted for over 98% of the natural gas workforce engaged at the drilling site. Riverkeeper argues LNG exports will lead to an increasingly unstable regional economy in which the size of the workforce goes through frequent boom and bust phases.

Riverkeeper also contends that DCP's proposal ignores the environmental, health, and community ramifications of gas drilling using high volume hydraulic fracturing. Riverkeeper asserts, "[s]hale gas development is an extraordinarily land and water-intensive process that converts agricultural, forest, and range lands to industrial uses, consumes millions of gallons of water per well, and generates huge quantities of hazardous wastes."[58] Riverkeeper argues that contaminants frequently reach shallow water aquifers due to failures in the integrity of well casing that occurs as a result of degradation and faulty construction. Riverkeeper also states its concern with the toxic ingredients found in fracturing fluid and drilling mud, which Riverkeeper argues, pose water contamination and health risks whether they are "buried in pits, applied to land, injected into underground wells, sprayed into the air, spilled, leaked, or intentionally dumped."[59]

Riverkeeper argues that accidents resulting from negligent construction methods and LNG export operations are inevitable and warns against the consequences of a well blowout or a tanker accident. Riverkeeper also expresses concern that increased industrialization of the land overlaying the Marcellus Shale will cause deforestation, contamination of surface water, erosion, and sedimentation. Riverkeeper states that evidence of drinking water contamination from

[58] Riverkeeper, Comments on Application to Export LNG (Feb. 6, 2012), at 18-19.
[59] *Id*. at 20.

hydraulic fracturing is increasing, citing a draft report issued by the EPA in December of 2011 showing drinking water in several Wyoming water wells was likely contaminated as a result of gas drilling. Additionally, Riverkeeper argues that construction and operation of new liquefaction facilities at the Cove Point LNG Terminal will result in increased emissions of hazardous air pollutants and greenhouse gases.

Riverkeeper concludes that DCP's application is distinguishable from DOE/FE's decision to grant Sabine Pass the authority to export LNG to non-FTA nations. Riverkeeper argues that the *Sabine Pass* decision was predicated on the absence of factual studies or analyses contrary to the applicant's contention that LNG exports would not result in an increase of gas and electric prices and that significant economic benefits would result from the export of LNG. Riverkeeper argues that there is now before DOE/FE ample scientific and economic data contrary to DCP's claims of modest price increases and economic benefits. Further, Riverkeeper argues that in *Sabine Pass*, DOE/FE did not consider the cumulative impact of authorizing multiple LNG export facilities. Riverkeeper urges DOE/FE to consider those cumulative impacts when deciding whether to grant or deny DCP's requested authorization.

E. APGA's Motion to Intervene and Protest

APGA is an association of municipal gas distribution systems, public utility districts, and other public agencies. APGA states that DCP's request for authority to export domestically produced LNG is inconsistent with the public interest. APGA cites the EIA study released in January 2012 (discussed *infra* in Section VII.A) for the proposition that exporting domestic LNG will significantly increase domestic natural gas prices. APGA argues these price increases will jeopardize the viability of natural gas as a "bridge-fuel" in the transition away from carbon-intensive and otherwise environmentally problematic coal-fired electricity generation. APGA states:

> Inflated natural gas prices will also inhibit efforts to foster natural gas as a transportation fuel, which is important to wean the U.S. from its historic, dangerous dependence on foreign oil. Furthermore, high natural gas and electricity prices will reverse the nascent trend toward renewed domestic manufacturing before it gains momentum – a direction that is the polar opposite of where the President is trying to take this country, as underscored in his January 24, 2012 State of the Union address.[60]

APGA notes that DCP's application is among nine of its kind to be submitted to DOE/FE within a short time span. APGA argues that the quantity of domestic natural gas at issue in this and related proceedings is substantial and hence the policy implications for the United States are significant.

According to APGA, LNG exports will increase domestic natural gas prices. APGA 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."[61] APGA contends that the studies commissioned by DCP do not accurately forecast the impact of exports on domestic gas prices. APGA asserts that the Navigant Price Study is based on outdated and likely inflated projections of technically recoverable gas in the Marcellus Shale, and fails to consider other factors that will inflate domestic natural gas prices if exports continue to expand. APGA argues the Navigant Price Report neglects to analyze the cumulative impact of the full scope of planned LNG exports. Further, APGA contends the Navigant Price Report failed to consider the possibility of reduced gas reserves. APGA argues that this was a crucial error, especially in light of the fact that in 2012 EIA reduced its estimate for the technically recoverable gas in the Marcellus Shale by over 65 percent. APGA also asserts that

[60] Motion for Leave to Intervene and Protest of the American Public Gas Association (Feb. 6, 2012), at 3-4 [hereinafter APGA Mot.].
[61] *Id*. at 6.

the Navigant Price Report failed to consider the effect of exporting natural gas directly from the Marcellus Shale on future natural gas prices in the constrained Northeast market, which historically has experienced higher prices relative to the rest of the United States. Based on these factors, APGA argues the Navigant Price Report cannot be used to accurately gauge the impact of LNG exports on domestic prices of natural gas.

APGA states that EIA analyzed four scenarios of export-related increases in natural gas demand in the context of four separate cases of potential natural gas supply and economic growth. APGA points out that under any of the scenarios analyzed in the EIA study, EIA forecasts that LNG exports will increase domestic natural gas prices. According to APGA, EIA "concluded that 'rapid increases in export levels lead to large initial price increases,' but that slower increases in export levels will, 'eventually produce higher average prices during the decade between 2025 and 2035.'"[62] APGA also asserts that future natural gas prices may be even higher than projected in the EIA study, pointing to EIA's revised estimates of technically recoverable gas, the increasing regulatory uncertainty regarding the production of unconventional gas, and the potential for increased demand for natural gas in the electric generation sector.

In connection with its environmental concerns, APGA makes an economic argument. It states that drinking water contamination, waste water disposal, and the emissions of volatile organic compounds from fractured oil and gas wells, are examples of the environmental issues that are leading to increased regulatory oversight and public opposition, which in turn could raise production costs and limit the amount of gas that can be recovered in an economically or politically acceptable manner. In regards to demand unforeseen by the EIA study, APGA argues

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

that EPA rules concerning greenhouse gas emissions and mercury and toxics emissions will force the retirement of coal-fired generators and drive-up demand for natural gas in the electric generation sector. APGA contends that because the EIA did not consider these pending regulations, natural gas prices will likely increase by more than projected in the EIA study.

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

APGA further states that exporting natural gas will tie domestic natural gas prices to international gas markets that often have higher and less stable prices. APGA asserts that the current domestic natural gas market is competitive, liquid, and transparent because it benefits from the security and political stability in North America. APGA states that gas rich shale deposits are a global phenomena that are just now beginning to be tapped. APGA contends:

> As other nations develop their resources and export capacity and as U.S. natural gas prices increase due to the very exports [DCP] proposes, international and domestic prices will converge, leaving the U.S. with the worst of all worlds, i.e., higher (and likely more volatile) domestic prices that thwart energy independence and that undermine the competitiveness of the manufacturing sector that relies heavily on natural gas as a process fuel.[63]

APGA also argues that LNG itself is at a disadvantage in the world market compared to pipeline gas due to the higher fixed costs of LNG. APGA states that LNG from the United States will likely find itself competing with shale gas piped into Western Europe from Poland and Ukraine. APGA asserts all of the above factors mean LNG exports from the Cove Point LNG Terminal will prove not economical over the long-term.

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[63] APGA Mot. at 19.

F. Sierra Club's Motion to Intervene and Protest

As indicated above, Sierra Club has filed a motion to intervene and protest. Sierra Club states that "its many thousands of members have a direct interest in ensuring that domestic natural gas production is conducted safely, and that any exports do not adversely affect domestic consumers."[64] Sierra Club states that, as of December 2011, it had 13,443 members in Maryland, 1,561 members in Delaware, 23,289 members in Pennsylvania, 2484 members in Washington DC, and 35,973 members in New York, all areas that it claims will be directly affected by the operations of DCP's proposed LNG export facility. Additionally, Sierra Club states it has 601,904 total members, all of whom it claims will be affected by increased gas prices which Sierra Club argues will be caused by DCP's plan.

Sierra Club contends DCP's application is inconsistent with the public interest because it will produce negative economic consequences and significant environmental harm. Sierra Club argues that these harms will be exacerbated by the cumulative impact of other LNG export projects.

Sierra Club argues that the economic benefits of DCP's proposed liquefaction project are uncertain, that most of the thousands of jobs DCP purports its project will create are indirect, and only 70 jobs will be created for direct employees of the facility while the facility is operating. In this regard, Sierra Club contends that the IMPLAN methodology employed by ICF in its Economic Benefits Study must not be seen as conclusive evidence of economic benefits because:

- The IMPLAN model is "ultimately a fairly mechanical system: Given an initial expenditure, it uses 'accounting tables' to predict how this expenditure will be allocated among sectors and then uses 'local-level multipliers' to conjecture how this allocation will alter employment decisions, among other things";[65]

[64] Sierra Club's Motion to Intervene, Protest, and Comments (Feb. 6, 2012), at 1 [hereinafter Sierra Club Mot.]
[65] *Id*. at 10.

- "IMPLAN is not a continuous model: It gives results for individual years, but does not track jobs or expenditures from year-to-year, meaning that multi-year forecasts are simply a series of snapshots, and that a 'job' in one year may not be the same job in the next year";[66] and

- "IMPLAN does not consider counterfactuals and foregone opportunities. It maps the consequences of a particular expenditure, rather than asking how the economy might have grown had investors and regulators made different choices. Nor does it consider how the particular choice at issue might displace other economic activity."[67]

Sierra Club adds:

> [M]odels like IMPLAN are not designed either to measure the full economic effects of resource extraction, and, critically, do not chart what the future would have looked like under different conditions. They also… produce a somewhat misleading picture of employment effects which they *do* describe, for three reasons: First, the model … is 'static,' … meaning that it does not track employment over time. Second, the model produces an analysis of jobs 'supported' – *not* created – by the original input, which turns out to be an overly generous metric. Third, input-output models may fail to account for 'leakage' – … that some money simply is not passed on through the system or is passed on in other states or regions – and so can overestimate jobs figures.[68]

Based largely on its criticism of the IMPLAN model, Sierra Club questions DCP's claim that the most basic benefit of the liquefaction project will be the project's ability to encourage and support increased domestic production of natural gas. To the contrary, Sierra Club introduces a study by Amanda Weinstein and Mark D. Partridge conducted at Ohio State University [Weinstein study][69] that allegedly shows no statistically significant difference in the income and employment figures in counties in Pennsylvania with significant Marcellus drilling compared to those without significant Marcellus drilling.

Sierra Club also cites a study by Susan Cristopherson, *The Economic Consequences of*

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[66] *Id*.
[67] *Id*.
[68] *Id*. at 11.
[69] Sierra Club Mot. at 10-13 (discussing Amanda Weinstein and Mark D. Partridge, *The Economic Value of Shale Natural Gas in Ohio,* Ohio State University, Swank Program in Rural-Urban Policy (Dec. 2010)).

Marcellus Shale Gas Extraction: Key Issues[70] (Cristopherson study), that—according to Sierra Club—concludes the boom-bust cycle inherent in gas extraction makes employment benefits tenuous and may leave some regions "hurting" if they are unable to convert the temporary boom into permanent growth.[71] Sierra Club maintains that ICF's Economic Benefits Study did not account for the development issues that confront drilling communities, such as sudden population increases, damage to the tourism industry, and damage to roads and the environment from drilling operations. Therefore, Sierra Club submits that DOE/FE cannot approve DCP's application based upon DCP's limited economic benefit analysis, and maintains that DOE/FE must undertake its own independent inquiry into the costs and benefits of DCP's proposed liquefaction project.

Sierra Club further contends that even if ICF's modeling results were sufficient to demonstrate that DCP's proposal would have significant economic benefits, such results are one-sided because DCP's export plans will cause significant economic harm on both a regional and national level irrespective of any such benefits.

More specifically, Sierra Club argues that DCP's proposal will significantly increase natural gas prices. According to Sierra Club, the likelihood of significantly increased prices is reflected both in the Navigant Price Report introduced by DCP and in EIA's AEO 2012 Early Release Overview. Sierra Club presents the following table as Table 2 on page 17 of its Motion, comparing the projected prices of natural gas in EIA's AEO 2012 for the years 2010, 2020, 2035, and 2040 versus the prices projected in the four cases examined in the Navigant Price Report for the same years.

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[70] *Id.* at 13-15 (discussing Susan Cristopherson, CaRDI Reports, *The Economic Consequences of Marcellus Shale Gas Extraction: Key Issues* (Sept. 2011)).
[71] *Id*. at 13.

Sierra Club: Natural Gas Prices Under the Navigant Cases, Compared to the Energy Information Administration's Annual Energy Outlook 2012

	AEO 2012	Navigant Reference Case	Cove Point Export	Aggregate Export	Extreme Demand
Henry Hub Gas Price ($2010/MMBtu) in 2020	$4.80	$4.98	$5.27	$5.85	$6.16
…in 2030	$6.19	$6.35	$6.61	$6.84	$8.03
…in 2035	$7.35	$7.38	$7.77	$8.03	$9.45
…in 2040		$8.64	$9.16	$9.64	$11.20

Regarding the projections of increasing prices in the above table, Sierra Club maintains that neither the Navigant Price Report nor the EIA projections provide a sound basis for analysis. Sierra Club criticizes the Navigant Price Report for its Reference Case, which assumes that by 2017 there will be 2.7 Bcf/d of LNG exports. EIA's AEO 2012 Early Release Overview, on the other hand, allegedly assumes 2.2 Bcf/d of exports by 2019. Sierra Club observes that the projections in the Navigant Price Report are generally consistent with the price increases addressed by EIA in its study, but asserts that DOE either must use the more conservative estimate contained in AEO 2012 Early Release Overview or develop a reference case that assumes a no-exports baseline.

Further, Sierra Club asserts that, in analyzing only a high stress case involving LNG exports totaling 7.1 Bcf/d of natural gas, DCP failed to account for other export proposals that, if approved, would total 15.8 Bcf/d of natural gas, resulting in "commensurately greater" price impacts.[72] Sierra Club argues that gas price increases caused by exports are not in the public interest because, as gas prices increase, so will electric power prices and the prices of consumer goods and services. As these prices rise, Sierra Club asserts that employment may fall as it

[72] Sierra Club Mot. at 19.

becomes more expensive to run a business.

In addition, Sierra Club contends that DOE/FE's authorization in *Sabine Pass* is not contrary to Sierra Club's arguments here. Sierra Club claims that DOE/FE grounded its decision on the lack of factual studies or analyses demonstrating that gas exports would raise domestic gas and electricity prices. Sierra Club argues an abundance of such studies are now available in the record. Sierra Club also argues that DOE/FE based its decision in *Sabine Pass* on a consideration of Sabine Pass's proposed exports alone, whereas now DOE/FE must consider the addition of DCP's proposed exports to the exports already approved for Sabine Pass. Sierra Club urges DOE/FE to "reconsider the course it took in *Sabine Pass* and start afresh, now with the benefit of substantial empirical data which demonstrates that LNG export is not in the public interest."[73]

Sierra Club further argues that DOE/FE may not even conditionally approve DCP's proposal until a full Environmental Impact Statement (EIS) has been issued pursuant to NEPA. Sierra Club argues that DOE/FE's general authority to issue conditional orders[74] does not trump DOE/FE's specific rules[75] barring the agency from taking any action concerning a proposal that is the subject of an EIS, if that action tends to limit the choice of reasonable alternatives, or tends to determine subsequent development. Sierra Club argues that a conditional approval of the application would limit alternatives and subsequent choices in precisely the way prohibited by DOE/FE's rules. Sierra Club additionally points out that, prior to authorizing the requested exports, DOE/FE has a statutory obligation to conduct a biological assessment in compliance with the Endangered Species Act and to initiate a consultation and analysis process pursuant to

[73] *Id.* at 22.
[74] *Id*. at 51 (citing 10 C.F.R. § 590.402).
[75] *Id*. (citing 10 C.F.R. § 1021.211 & 40 C.F.R. § 1506.1).

the National Historic Preservation Act.

Sierra Club concludes by stating that if DOE/FE nonetheless approves DCP's application, it must recognize its continuing duty to protect the public interest by imposing rigorous monitoring conditions. Sierra Club asserts that though DOE/FE imposed such conditions in *Sabine Pass*, DOE/FE has an obligation to further expand those provisions by providing more specific monitoring terms and thresholds that will trigger agency actions of various types, ranging from further study through reductions in export volume or changes in timing to a revocation of DOE/FE's approval.

G. Answers of Applicant and Replies of Protestors

As noted above, on December 23, 2011, DCP filed a response to the motions of CRS and Shell LNG to intervene in this proceeding. On February 21, 2012, DCP also filed a response to the motions to intervene, comments and protests of the Trades Council, Riverkeeper, APGA, and Sierra Club. On February 29, 2012, the Sierra Club filed a motion to reply and reply to the response of DCP. On March 6, 2012, Riverkeeper filed a request to rebut and a "rebuttal" of the response of DCP.[76]

1. DCP Response to Shell LNG and CRS

DCP states that the filings of Shell LNG and CRS do not affect DCP's showing that its request for long-term authorization to engage in exports of domestically produced LNG is in the public interest. In regards to Shell LNG, DCP does not question the right of Shell LNG to intervene in this proceeding. However, DCP states that the issues raised by Shell LNG are within FERC's jurisdiction and are not the kind of issues considered by DOE/FE when

[76] Granting Sierra Club's motion for leave to reply and Riverkeeper's request for leave to rebut DCP's response to Riverkeeper's comments will not be unduly prejudicial to the interests of DCP. Additionally, these two pleadings address matters that will help to inform our decision. Good cause having been shown, the respective motion and request will be granted. *See infra* Section XII.R (same).

evaluating export applications.

In regards to CRS, DCP contends that CRS has not established its interest in this proceeding and argues that its motion to intervene should be denied. DCP states that 10 C.F.R. § 590.303(e) requires any person who seeks to become a party to a DOE/FE proceeding to file a motion to intervene that sets out clearly and concisely the facts upon which the petitioner's claim of interest is based. DCP points out that CRS offers only that it "is a broad based organization fighting against the foolish siting of LNG facilities in heavily populated areas" with the goal "to look out for the betterment and safety of the citizens in communities targeted and affected in the siting of LNG facilities." DCP argues that these generic comments fail to establish that CRS has any interest in this particular proceeding. Further, DCP states that whether or not the motion to intervene of CRS is denied, DCP's proposed project should not be of any concern to CRS because the proposed project will be located on land already owned by DCP in an area of Maryland that is not heavily populated. Therefore, DCP argues the Coalition's apparent interest in the siting of LNG projects in heavily populated areas is not implicated by DCP's proposal.

2. DCP Response to Sierra Club, Riverkeeper, APGA, and the Trades Council

DCP opposes the motions of Sierra Club, Riverkeeper, APGA, and the Trades Council to intervene. DCP maintains that these organizations have not set out facts establishing their interest in the proceeding. DCP acknowledges that APGA and Sierra Club allege their members have a general interest in the environmental and economic consequences of LNG exports. However, DCP asserts that nothing in any of the interests expressed by these four organizations specifically relates to the DCP project, other than the Sierra Club's statement that its Maryland chapter has a long history of engagement with the Cove Point facility. DCP contends that if these organizations are allowed to intervene, it would appear that any interest group or gas

consumer could intervene and express comments. Nevertheless, DCP states that it will respond to the protests submitted by the organizations in case DOE/FE decides to consider them.

DCP contends that the protests of the Trades Council, Riverkeeper, APGA, and the Sierra Club focus largely on matters that are beyond the scope of the issues to be resolved by DOE/FE in this proceeding. For example, DCP states that Sierra Club and Riverkeeper devote much of their protests to a detailed attack on the development of shale gas, which DCP argues is not relevant to this proceeding. DCP states that with respect to issues that are relevant, the protests fall far short of overcoming the presumption that LNG exports are in the public interest.

DCP states that Sierra Club, Riverkeeper, and the Trades Council challenge DCP's showing that its proposed liquefaction project will yield significant economic benefits. DCP argues these protests do not undermine the findings in the ICF Economic Benefits Study and notes that none of the protesting parties have presented any alternative analysis of the benefits of the DCP export project.

In response to the contention by Sierra Club and Riverkeeper that resource extraction industries are characterized by boom and bust cycles, DCP counters that "[t]he protestors' suggestions that the development of shale gas is actually a bad thing surely do not satisfy their burden of making an affirmative showing that exports would be inconsistent with the public interest."[77] The greatest benefit of shale gas development, according to DCP, has been decreased natural gas prices, which has resulted in "tremendous savings for American consumers."[78] So viewed, DCP asserts that "[t]he suggestion that facilitating further gas production to continue this trend is not in the public interest strains credulity."[79] DCP points out

[77] Response of Dominion Cove Point LNG, LP to Motions to Intervene, Comments, and Protests, at 12.
[78] *Id.* at 13.
[79] *Id.* at 14.

that a study released by Wood Mackenzie in February 2012 indicated that the low price of natural gas in fact had prompted reduced drilling and delayed well completion. The implication of this development, according to DCP, is that the incremental demand represented by LNG export markets was needed to underpin future supply development and help keep domestic gas prices stable.

DCP further points out that the economic stimulus, job creation, tax benefits, balance of trade improvements, and other projected benefits of the DCP project also help demonstrate that DCP's proposal is consistent with the public interest. DCP highlights a study by IHS Global that found that shale gas production supported more than 650,000 jobs in 2010 and projects that number will grow to nearly 870,000 jobs by 2015.

With regard to the comment submitted by the Trades Council, which questions DCP's plan to export a key natural resource instead of harnessing the potential of that resource domestically, DCP states that it is a strong supporter of developing the gas resources of West Virginia and the surrounding states. DCP asserts also that regardless of whether natural gas heads out of the country, or just out of state, the economic benefits of gas production will grow as production increases.

As to claims by protestors of higher prices due to a grant of export authorizations, DCP maintains that the evidence supports a conclusion of only a modest price impact. DCP relies principally on three studies for this proposition: (1) the January 2012 EIA study, titled "Effect of Increased Natural Gas Exports on Domestic Energy Markets," which forms part of the LNG Export Study commissioned by DOE/FE (EIA study) (discussed in Section VII.A below); (2) EIA's 2012 AEO Early Release Overview; and (3) a 2011 study by the Deloitte Center for Energy Solutions and Deloitte Market Point (Deloitte), entitled "Made in America: The

Economic Impact of LNG Exports from the United States" (Deloitte Report). DCP states that the findings of all three studies are consistent with the conclusion that the effect of LNG exports on gas prices will be modest.

DCP observes that the EIA study provided four scenarios of LNG export increases in gas demand: 6 Bcf/d phased in over six or two years, and 12 Bcf/d phased in over 12 or four years. APGA claims that, given the number of export applications filed with DOE/FE, EIA's high/rapid scenario of adding 12 Bcf/d of exports over four years is the most realistic scenario modeled by EIA. DCP challenges this claim and states that the high/rapid scenario is unrealistic because the filing of an application does not mean a project will find customers, obtain financing, and get constructed. Further, DCP asserts that even EIA's high/rapid scenario found fairly modest price impacts when applied to its Reference Case, especially when considered in the context of the very low present prices. DCP also argues that lower or higher U.S. natural gas prices would tend to make any given volume of additional exports more or less likely. DCP points out that the EIA study is a static model that essentially assumes a fixed supply at any given time, and thereby tends to overestimate the price impact of demand change. DCP argues that producers are able to anticipate future demand and incorporate it in their production plans, adding supply, and reducing price impacts.

In regards to the 2012 AEO Early Release Overview, DCP argues that the protesters overlook the fact that the report was supportive of the case for LNG exports, and instead focus on EIA's decrease in its estimate of the technically recoverable resource for the Marcellus Shale. DCP contends that the most important conclusions of the AEO 2012 Early Release Overview are the continued recognition of increasing production, driven by shale development, and falling prices, along with recognition of coming exports of LNG. DCP points out that the AEO 2012

Early Release Overview Reference Case shows the United States becoming a net exporter of LNG by 2016 and a net exporter of natural gas by 2021. DCP also stresses that the AEO 2012 Early Release Overview predicts LNG exports will have little effect on gas prices even with LNG export volumes of 2.2 Bcf/d by 2019.

DCP attaches and incorporates the Deloitte Report by reference. According to DCP, while the EIA study uses a static model to project price impacts, Deloitte uses a dynamic model under which producer decisions regarding when and how much reserves to add reflect knowledge of anticipated forward prices. Deloitte's "World Gas Model" also allegedly factors in gas development outside of the United States, which, DCP argues, can influence U.S. prices. DCP reports that Deloitte's World Gas Model estimates that LNG exports of 6 BCF/d will increase city gate prices by $0.12 per MMBtu from 2016 to 2035, an increase of just 1.7 percent. DCP argues the Deloitte Report further shows DCP's LNG export project is consistent with the public interest.

DCP acknowledges that three of the protesting parties have highlighted EIA's reduction in its estimate of the technically recoverable resource base for the Marcellus Shale from 410 TCF in AEO 2011 to 141 TCF in the AEO 2012Early Release Overview. DCP highlights a statement of Acting EIA Administrator Howard Gruenspecht that supports DCP's position that whether the United States has 100 years or 90 years of total recoverable gas resources is immaterial to current 25 year projections of gas production and pricing. Further, DCP argues that the reasons for EIA's reduction in its estimate of Marcellus reserves are not clear, nor is the accuracy. DCP notes that Marcellus researcher Terry Engelder of Penn State has questioned EIA's reduction and continues to estimate Marcellus reserves at more than 500 Tcf. Further, DCP states that the Marcellus reserve estimates provided to investors by Range Resources and Chesapeake Energy

alone are roughly equal to the amount EIA now estimates for the entire Marcellus Shale play. DCP also notes that EIA has a history of underestimating shale development and production. DCP argues that even if EIA's reduction was found to be accurate, EIA's estimate would still recognize Marcellus as one of the largest gas fields in the world. DCP also contends that none of the protesters take into account the largely unexplored Utica Shale that underlies much of the Marcellus Shale and has the potential to be a large producer of gas in the future.

DCP notes that Sierra Club and Riverkeeper devote much of their protests to allegations about the environmental effects of hydraulic fracturing and attacks on the development of Marcellus Shale. DCP argues that a detailed analysis of issues associated with Marcellus Shale production is not appropriate in the environmental review of DCP's project. DCP points to a FERC decision[80] regarding a pipeline project to transport Marcellus Shale supplies in which FERC concluded that Marcellus Shale development and its associated potential environmental impacts are not within the scope of FERC review because FERC has no jurisdiction over Marcellus drilling and because the impacts of Marcellus drilling are not sufficiently causally related to a single pipeline. DCP contends the environmental arguments of the protesters are more properly heard before the state regulatory authorities that have jurisdiction over the production of shale gas.

DCP notes that APGA argues that DCP's export plans will prove uneconomic. DCP states that APGA contends that domestic gas prices will increase and international prices will decrease, making LNG exports from the United States not viable in the long run. DCP argues this theory is not supported by any economic analysis, and is contrary to the conclusions of the studies done by Navigant and Deloitte. Further, DCP asserts that the competitive viability of its

[80] *Central New York Oil and Gas Company, LLC*, 137 FERC ¶ 61,121 (2011), *reh'g*, 138 FERC ¶ 61,104 (2012).

proposed project will be determined by the market and whether DCP can find partners and customers willing to invest billions of dollars over the life of the project. Based on its discussions with a number of sophisticated global energy companies, DCP anticipates that it will obtain such investment.

DCP requests that in the event DOE/FE grants the interventions of the protesting parties and considers their views, that DOE/FE consider DCP's response as well as the Deloitte Report attached to its response. DCP further states that for all of the reasons set forth in its application and in its responses to protesting parties and commenters, DCP's proposal to export domestically produced LNG to non-FTA countries is consistent with the public interest.

3. Sierra Club Reply to DCP Response

On February 29, 2012, Sierra Club filed a Motion to Reply and Reply Comments in response to DCP's February 21, 2012 Response to its Protest and Motion to Intervene. Sierra Club states that although DOE/FE rules do not automatically provide parties the right to reply, DOE/FE rules allow a party to file a request for additional procedures. Sierra Club states that it requested the right to file a reply motion in its initial protest filing, and that it now timely renews that request, which there is good cause to grant. Sierra Club asserts it should be allowed to file this reply because DCP's response introduced substantial new comments as well as an entirely new report that no party has had a chance to respond to. Further, Sierra Club argues DOE/FE should accept its reply in order to ensure the interests of Sierra Club's members get a full and fair hearing as required by the Natural Gas Act and to ensure DOE/FE has been briefed fully on all sides of the issues before it.

Sierra Club asserts that DCP failed to oppose within 15 days Sierra Club's Motion to Intervene of February 6, 2012, and therefore Sierra Club should be granted leave to intervene

pursuant to DOE/FE regulations. Sierra Club further argues that DCP's confusion as to the nature of Sierra Club's interest is misplaced, as there is no requirement that Sierra Club's interest be "particular" and, in any case, Sierra Club described its interests in detail in its original protest.

Sierra Club states that its members live near the DCP plant site and throughout the shale gas plays that DCP proposes to exploit. Sierra Club contests DCP's claim that Sierra Club's interests amount to "generic policy interests" by contending that DCP cannot claim credit for the supposed upstream economic benefits of its project while at the same time suggesting that the communities negatively impacted by shale gas extraction lack sufficient interest in this proceeding. Sierra Club states that even if DCP had properly opposed its motion to intervene, it has plainly expressed sufficient interest in this proceeding to be warranted intervention.

Further, Sierra Club asserts that DCP's response to Sierra Club's initial protest fails to rebut Sierra Club's showing that DCP's claimed economic benefits are uncertain, that gas exports are accompanied by major economic harm, that the increased unconventional gas production from DCP's proposed project will have major environmental impacts, and that DOE/FE cannot approve DCP's proposal without a legally adequate EIS pursuant to NEPA. Sierra Club argues that DCP's position that environmental concerns are only pertinent to the NEPA analysis is a misunderstanding of the Natural Gas Act and NEPA. Sierra Club contends that the NGA's public interest standard requires consideration of environmental impacts, and that NEPA facilitates that decision making process by providing environmental information to inform the NGA's required public interest analysis. Therefore, Sierra Club argues the NEPA process cannot be deferred to a time after the public interest determination has been made.

Sierra Club argues that DOE/FE has an independent duty to rule on DCP's proposal based solely on the record before it. Sierra Club challenges DCP's argument that the legal

standard requires a successful protest to make an affirmative showing of inconsistency with the public interest in order to overcome the NGA's presumption that export applications are in the public interest. Instead, Sierra Club asserts that protestors can only be legally required to offer evidence sufficient to demonstrate that an applicant's public interest claims are unpersuasive. Sierra Club states that it has offered thousands of pages worth of the "contrary studies" that DOE/FE determined were lacking in *Sabine Pass*, including studies by EIA. Sierra Club argues this factual record is more than sufficient to rebut the presumption and to make the case that exports are not in the public interest.

Sierra Club argues that DCP fails to address the environmental impacts of its proposed LNG export project. Sierra Club notes that DCP trumpeted the supposed environmental benefits of its project in DCP's initial application, but once Sierra Club demonstrated in its protest that LNG exports likely have carbon emissions close to those of coal production, DCP has now changed its tune. Sierra Club states that now DCP dismisses the environmental costs of LNG exports as not relevant in these proceedings. However, Sierra Club counters by arguing that the Supreme Court has made clear that environmental concerns are germane to the NGA public interest determination. Sierra Club also points out that DOE/FE's own regulations require applicants to submit information on the potential environmental impact of the project. Sierra Club states that DCP's response failed to rebut the evidence provided in Sierra Club's initial protest that DCP's LNG export project will have major land use, water quality and air quality impacts. Further, Sierra Club argues DCP has not demonstrated that the project's potential to create economic benefits outweighs its potential for environmental and economic harm.

Sierra Club contends that the record before DOE/FE illustrates why an EIS is necessary before DOE/FE can act on DCP's application. Sierra Club argues that NEPA requires DOE/FE

to develop an EIS that considers the reasonably foreseeable environmental impacts of the proposed action. It is Sierra Club's position that increases in the production of natural gas a result of DCP's project are manifestly "reasonably foreseeable," and particularly so in the unconventional Marcellus and Utica shale plays near DCP's site. Sierra Club points out the DCP itself argues much of the economic benefit of their project will come from the increases in domestic gas production that the DCP project will cause. Sierra Club argues it is self-serving to argue that LNG exports will increase domestic gas production and create economic benefits, while simultaneously arguing that any environmental impacts of increased gas production are too tenuously connected to the DCP project to be considered. Sierra Club asserts that the gas DCP proposes to export will have to come from somewhere, and all gas production has significant impacts; impacts that DOE/FE must consider.

Sierra Club states that DCP fails to rebut Sierra Club's critique of DCP's claimed economic benefits. Sierra Club points out that instead of countering Sierra Club's criticism of the IMPLAN model relied on by DCP or Sierra Club's assertion that there is little data showing economic benefits from gas production, DCP simply repeats generic quotes from President Obama and former Secretary Chu supporting gas production. Sierra Club also attacks DCP's argument that LNG exports will keep gas prices stable. Sierra Club contends that LNG exports will not make prices stable and instead will make prices rise to a higher equilibrium than they would otherwise reach. Sierra Club state that DCP's response to its protest has done nothing to change the record before DOE/FE, which according to Sierra Club shows DCP's claimed economic benefits are highly uncertain, and offset by real economic costs.

Sierra Club also contends that DCP fails to show its planned LNG export project will not raise gas prices. First, Sierra Club argues DOE/FE must consider the potential cumulative

impacts on gas prices of all the proposals currently before DOE/FE. Second, Sierra Club argues that even if not all of the proposed facilities are built, EIA's low/slow rate of 6 Bcf/d six years from now still shows consumers will face significant price increases in both gas and electricity. Third, Sierra Club argues that the Deloitte Report cannot rebut the conclusions of the EIA study because the Deloitte Report was issued prior to the EIA study and because the Deloitte Report assumes smaller volumes of LNG exports. Sierra Club notes that DCP criticizes the EIA study for not factoring in changes in producer behavior to reflect future demand. However, Sierra Club contends that this criticism is unwarranted because the National Energy Modeling System, which EIA used for its study, is designed to account for the future demand dynamic. In support of this point, Sierra Club attaches to its reply *The National Energy Modeling System: An Overview* (2009). Sierra Club further asserts that because DCP has not shown that the EIA study is flawed, DCP's criticisms of the study are not entitled to any weight.

4. Riverkeeper Reply to DCP Response

On March 6, 2012 the Riverkeeper filed a rebuttal to the February 21, 2012 Response of DCP. Riverkeeper states that it submits its rebuttal as a supplemental protest for the purpose of rebutting clear misstatements of law and facts alleged in DCP's response. Riverkeeper argues that the Deloitte Report cannot rebut EIA's study because the Deloitte study was issued prior to EIA's more recent determinations. Riverkeeper contends that DCP fails to offer any substantive response to Riverkeeper' detailed examination of the environmental impacts of DCP's proposal, and instead simply claims that NEPA issues are irrelevant. Riverkeeper argues that in doing so, DCP ignores the NGA's consideration of issues relevant to the public interest, which includes issues such as environmental impacts.

Riverkeeper notes that the Supreme Court and DOE/FE regulations require public interest

determinations by DOE/FE to include discussion of the potential environmental impact of a proposed project. Riverkeeper notes it as odd that DCP, in order to further its public interest argument, chooses to highlight the environmental benefits of its project, but otherwise insists discussion of the project's environmental impacts is irrelevant. Riverkeeper states that because the record is devoid of information rebutting the reasonably foreseeable and significant environmental impacts the proposed project will entail, and because there still remains no showing that economic benefits of export outweigh the definite and discrete consequences of unconventional gas production and export, DOE/FE should deny DCP's proposal.

Riverkeeper argues that DOE/FE must conduct an EIS at a time when it retains a maximum range of options. Therefore, Riverkeeper argues that if DOE/FE will not deny DCP's LNG export application based on the record before it, DOE/FE should at least undertake a proper NEPA analysis prior to any determination of DCP's proposal.

VII. LNG EXPORT STUDY

DOE/FE recognized in *Sabine Pass* that the cumulative impact of *Sabine Pass* and additional future LNG export authorizations could affect the public interest. To address this issue, DOE/FE undertook a two-part study of the cumulative economic impact of LNG exports. The first part of the study was conducted by EIA and looked at the potential impact of additional natural gas exports on domestic energy consumption, production, and prices under several export scenarios prescribed by DOE/FE. The EIA study did not evaluate macroeconomic impacts of LNG exports on the U.S. economy. The second part of the study, performed by NERA Economic Consulting, assessed the potential macroeconomic impact of LNG exports using its energy-economy model (the "N_{ew}ERA" model). NERA built on the EIA Study requested by DOE/FE by calibrating the NERA U.S. natural gas supply model to the results of the study by EIA. The EIA study was limited to the relationship between export levels and domestic prices

without considering whether those quantities of exports could be sold at high enough world prices to support the calculated domestic prices. NERA used its Global Natural Gas Model ("GNGM") to estimate expected levels of U.S. LNG exports under several scenarios for global natural gas supply and demand. A more detailed discussion of each study follows.

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

1. Methodology

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

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

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

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

- The AEO 2011 Reference Case;
- The High Shale Estimated Ultimate Recovery (EUR) case (reflecting optimistic assumptions about domestic natural gas supply, with the EUR per shale gas well for new, undrilled wells assumed to be 50 percent higher than in the Reference Case);
- The Low Shale EUR case (reflecting pessimistic assumptions about domestic natural gas supply, with the EUR per shale gas well for new, undrilled wells assumed to be 50 percent lower than in the Reference Case); and

- The High Economic Growth case (assuming the U.S. gross domestic product will grow at an average annual rate of 3.2 percent from 2009 to 2035, compared to 2.7 percent in the Reference Case, which increases domestic energy demand).

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

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

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

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

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

EIA also counted any additional natural gas consumed during the liquefaction process within the total additional export volumes specified in the DOE/FE scenarios. Therefore the net

volumes of LNG produced for export were roughly 10 percent below the gross volumes considered in each export scenario. By way of illustration, the cases where cumulative export volumes are 6 Bcf/d, liquefaction would consume 0.6 Bcf/d and net exports of 5.4 Bcf/d.

EIA made other changes in modeled flows of gas into and out of the lower-48 United States where necessary to analyze the increased export scenarios.[81] Additionally, EIA assumed that a pipeline transporting Alaskan natural gas into the lower-48 states would not be built during the forecast period, thereby isolating the lower-48 states' supply response.

2. Scope of EIA Study

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

> The projections in this report are not statements of what *will* happen but of what *might* happen, given the assumptions and methodologies used. The Reference case in this report is a business-as-usual trend estimate, reflecting known technology and technological and demographic trends, and current laws and regulations. Thus, it provides a policy-neutral starting point that can be used to analyze policy initiatives. EIA does not propose, advocate, or speculate on future legislative and regulatory changes.[82]

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

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

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[81] 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.

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

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

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

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

3. Natural Gas Markets

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

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

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

4. Results of EIA Study

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

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

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

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

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

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

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

5. Wellhead Price Increases

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

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

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

6. Increased Natural Gas Production and Supply

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

7. Decreased Natural Gas Consumption

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

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

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

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

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

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

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

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

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

9. Impact on Natural Gas Producer Revenues

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

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

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

10. Impacts Beyond the Natural Gas Industry

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

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

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

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

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

DOE/FE commissioned NERA to provide such an analysis. NERA developed a two-step approach. First, it modeled energy markets by drawing on several of the scenarios that EIA had developed and adding global market scenarios developed through its GNGM model. Second, using its "N_{ew}ERA" energy-economy model, NERA drew conclusions regarding the domestic macroeconomic impacts of LNG exports. The impacts measured using the N_{ew}ERA macroeconomic model included price, welfare,[83] gross domestic product (GDP), aggregate consumption, aggregate investment, natural gas export revenues, sectoral output,[84] and wages and other household incomes. In addition, NERA identified impacts that would affect certain energy intensive, trade exposed (EITE) industries, as discussed below.

1. Overview of NERA's Findings

NERA's key findings include the following:

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

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

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[83] 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.

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

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

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

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

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

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

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

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

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

2. Overview of NERA's Methodology

NERA states that it attempted to answer two principal questions:

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

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

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

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

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

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

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

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

3. Scope of the NERA Study

NERA started its analysis with the domestic economic AEO 2011 cases and the export scenarios present in the EIA study.[85] 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

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

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

While these additional aspects of the analysis expanded the scope of the NERA study relative to the study conducted by EIA, significant elements of the dynamics of the global natural gas trade and its domestic economic implications were outside the scope of the NERA study or beyond the reach of the modeling tools used.[86] NERA expressly excluded the following factors from its analysis:

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

4. NERA's Global Natural Gas Model

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

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

trade in the major gas producing or consuming regions.[87] The model attempts to maximize the difference between surplus and cost, constrained by various factors including liquefaction capacity and pipeline constraints. The model divides the world into 12 regions and specifies supply and demand curves for each region. The regions are: Africa, Canada, China/India, Central and South America, Europe, Former Soviet Union, Korea/Japan, Middle East, Oceania, Sakhalin, Southeast Asia, and the United States. The GNGM model's production and consumption assumptions for these regions are based on projections contained in the Reference Cases of EIA's AEO 2011 and International Energy Outlook 2011. NERA ran the GNGM model in five-year increments between 2015 and 2035.

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

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

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

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

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

5. The N_{ew}ERA Macroeconomic Model

NERA developed the N_{ew}ERA model to forecast how, under a range of domestic and international supply and demand conditions, U.S. LNG exports could affect the U.S. economy.[88] Like other general equilibrium models, N_{ew}ERA is designed to analyze long-term economic trends. NERA explained that, in any given year, actual prices, employment, or economic activity may differ from the projected levels.

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

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

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

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

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

6. Relationship to the EIA Study

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

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

7. Key Assumptions and Parameters of the NERA Study

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

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

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

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

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

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

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

8. Results of the NERA Study

As a result of its two-step analysis, the NERA study yielded two sets of results, reported in five-year intervals beginning with 2015.[89] First, the GNGM model produced information

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

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

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

- **Macroeconomic impacts of LNG exports are positive in all cases.** NERA found that the United States would experience net economic benefits from increased LNG exports in all cases studied. Only three cases had U.S. exports greater than the 12 Bcf/d maximum exports allowed in the cases analyzed by EIA.[90] NERA estimated economic impacts for these three cases with no constraint on exports, and found that even with exports reaching levels greater than 12 Bcf/d and associated higher prices than in the constrained cases, there were net economic benefits from allowing unlimited exports in all cases.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

In the NOA, DOE/FE sought public comment on the EIA and NERA studies, including the modeling scenarios used in both studies. DOE/FE specifically invited comment on "the impact of LNG exports on: domestic energy consumption, production, and prices, and particularly the macroeconomic factors identified in the NERA analysis, including Gross Domestic Product (GDP), welfare analysis, consumption, U.S. economic sector analysis, and … any other factors included in the analyses."[91] 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."[92]

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.[93]

A. Data Inputs and Estimates of Natural Gas Demand

1. Comments

Several commenters, including Sierra Club,[94] Dow Chemical Company (Dow), along with U.S. Representative Edward Markey, U.S. Senator Ron Wyden, Alcoa, Save Our Supplies,

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[91] 77 Fed. Reg. at 73,629.
[92] *Id.*
[93] *See, e.g., Public Citizen v. F.A.A.*, 988 F.2d 186, 197 (D.C. Cir. 1993).
[94] Sierra Club filed comments on behalf of itself and a coalition of non-profit organizations, including Catskill Citizens for Safe Energy, Center for Biological Diversity, Clean Air Council, Columbia Riverkeeper, Delaware Riverkeeper, Lower Susquehanna Riverkeeper, Shenandoah Riverkeeper, and Upper Green River Alliance [hereinafter Sierra Club].

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

A number of commenters, including Sierra Club, Dow, Senator Wyden, Representative Markey, Jannette Barth, and Save Our Supplies maintain that, as compared to AEO 2011, the AEO 2013 Early Release Overview projects a substantial increase in demand for natural gas in the industrial manufacturing sector.[95] 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

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

largely by the supply and price outlook for natural gas. These investments, according to Dow, will add about 5 million new jobs and 6 Bcf/d of industrial gas demand by 2020, which Dow states is nearly a 30 percent increase in industrial demand relative to 2009, the baseline year for AEO 2011.

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

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

In addition to criticizing the projections of demand based on AEO 2011, Dow maintains that the level of exports authorized to date and additional exports that may be authorized in the future will drive up demand levels even higher. Specifically, Dow asserts that NERA's conclusion that prices will not increase by more than $1.11/Mcf is based on a faulty assumption

that natural gas exports will never rise above 6.72 Tcf/yr, or roughly 18.5 Bcf/d by 2025. Dow points out that authorized exports to FTA nations as of January 1, 2013 had already reached approximately 28 Bcf/d. Dow complains that NERA did not consider what would happen if exports attained the authorized levels. In that event, Dow asserts that domestic gas prices undoubtedly would spike. Other commenters, such as Citizens Against LNG, make similar arguments. Citizens Against LNG alleges that the NERA study is flawed because it failed to estimate the impact of the full potential volume of exports of approximately 31.41 Bcf/d to FTA nations and 24.80 Bcf/d to non-FTA nations.

Contrary to the above arguments, several commenters, such as 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."[96] Requiring DOE to start over with new data "would lead to significant costs and potentially endless delays."[97] 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."[98]

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

No material change using post-AEO 2011 projections. Further, we are not persuaded that using the AEO 2012 final projections, or the AEO 2013 Early Release or final projections, would have materially affected the findings of the LNG Export Study. Commenters point to the fact that AEO 2012 and the AEO 2013 Early Release Overview forecast greater domestic natural gas consumption in the years ahead than did AEO 2011. The commenters are correct in this observation, but it is also true that AEO 2012 and AEO 2013 Early Release Overview projected much greater domestic natural gas production than did AEO 2011. An analysis from Navigant Consulting, Inc. (Navigant), appended to the initial comments submitted by Jordan Cove Energy Project, L.P., correctly notes the increasing gas production projections in the later EIA analyses: For the period of 2013-2035, there was an average percentage increase in forecast total domestic natural gas consumption between AEO 2011 and AEO 2013 of 5.6 percent, while the increase in forecast total natural gas production was 16 percent. This important context helps explain why the more recent AEO 2013 assumptions actually indicate the beneficial market impacts that come along with LNG exports.[99]

Further, using the final AEO 2013 Reference Case—which is now the most recent information available—Table 4 below illustrates that, although total natural gas consumption projected for 2035 increased by 6 Bcf/d between AEO 2011 and 2013 (from 72.7 Bcf/d to 78.7 Bcf/d), total domestic dry gas production increased by more than twice that amount, increasing by 13.8 Bcf/d (from 72.1 Bcf/d to 85.9 Bcf/d). 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

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

data used in Table 4 for "AEO 2013 Reference Case" refer to the final AEO 2013 projections, the data are unchanged from the AEO 2013 Early Release projections. As the table shows, the updated 2013 projections suggest domestic supply and demand conditions that are more favorable, not less favorable, to exports.

Table 4: Comparison of AEO Results

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

We again note that NERA modeled a wide range of possible future supply and demand conditions, thereby reducing the dependence of its results on the accuracy of the AEO 2011 Reference Case. The AEO 2011 High Shale EUR case, for example, is represented in the table above showing EIA's AEO 2011 assumption of no new LNG exports. The AEO 2011 High Shale EUR case projected natural gas consumption growth that was even greater than the AEO 2013 Reference Case and domestic natural gas production growth that was less than the AEO

2013 Reference Case. Using the AEO 2011 High Shale EUR as a baseline, NERA modeled LNG exports across a range of international market conditions and found positive economic benefits to the U.S. economy in all cases where LNG exports were economically viable.[100] The inclusion of the AEO 2011 High Shale EUR case in NERA's analysis reinforces our conclusion that there is no reason to believe that using AEO 2013 Reference Case projections would have altered the central conclusion of the LNG Export Study.

Further, as reflected in the comments submitted by Lake Charles Exports[101] and Secretary Abraham,[102] Dow does not substantiate its claim that $95 billion of new investment in the manufacturing sector has led (or will lead) to an increase of 6 Bcf/d in incremental domestic consumption of natural gas by 2020. In making these estimates, Dow includes many projects that merely have been announced or that are under consideration with start dates far into the future. Dow provides no information as to when or whether these projects will be constructed or will begin operations.

b. Significance of Prior FTA Authorizations

Dow argues that the 28 Bcf/d of exports authorized to FTA countries (as of the date of Dow's comment) shows that the LNG Export Study underestimated future demand for natural gas.[103] 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.[104] Indeed, while many of the FTA authorizations have

[100] NERA study at 6.
[101] Reply Comments of Lake Charles Exports, LLC at 12-13.
[102] Reply Comments of Secretary Spencer Abraham at 8.
[103] As of the date of this Order, DOE/FE has authorized the export of 29.93 Bcf/d of natural gas to FTA countries.
[104] 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

been in place for several years, DOE/FE is aware of only one application submitted to date, totaling 0.54 Bcf/d of export capacity, in which a liquefaction facility was planned with the sole purpose of exporting LNG to FTA countries.[105] 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

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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.

[105] *Magnolia LNG, LLC*, DOE/FE Docket No. 12-183-LNG (application filed Dec. 18, 2012); *see also Magnolia LNG, LLC*, DOE/FE Order No. 3245, Order Granting Long-Term Multi-Contract Authorization to Export Liquefied Natural Gas by Vessel from the Proposed Magnolia LNG Terminal in Lake Charles, Louisiana, to Free Trade Agreement Nations (Feb. 27, 2013). In addition, DOE/FE granted an application from Waller Marine to export 0.16 Bcf/d of natural gas to FTA countries. *Waller LNG Services, LLC d/b/a Waller Point LNG*, Order Granting Long-Term Multi-Contract Authorization to Export Liquefied Natural Gas by Vessel from the Proposed Waller Point LNG Terminal in Cameron Parish, Louisiana, to Free Trade Agreement Nations, FE Docket No. 12-152-LNG (Dec. 20, 2012). *Waller LNG Services, LLC d/b/a Waller Point LNG* has not yet submitted an application or otherwise notified DOE/FE concerning any request for export authorization to non-FTA countries.

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.[106] 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.[107] 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."[108] 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

[106] NERA study at 6.
[107] *Id*.
[108] *Id*. at 56.

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

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

> By bundling these industries, NERA applies the same labor, capital, fuel, and other material inputs in the same way across industries. Such an aggregation mutes the true impact to the industries, especially the chemical products industry. The chemical products subsector varies significantly from the other four industries in terms of value added to the economy (GDP) and energy consumption by fuel source ….[109]

According to Dow, the chemical industry is composed of dozens of different business models with different inputs and outputs. Consequently, Dow contends that "[s]hoe horning the chemical industry into an aggregated EIS [energy intensive sector] is not appropriate for studying the impact of LNG exports on the economy."[110]

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

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[109] Initial Comments of Dow Chem. Co. at 27.
[110] *Id*. at 28.

for export, instead of being exported as LNG. Similarly, the Fertilizer Institute offers a study prepared at its request by Charles Rivers Associates to support its claim that NERA underestimated the economic value of the fertilizer industry to the broader economy. Dow also contends that "take-or-pay" contracts used in the international trade of LNG will cause export activities to continue even if not economically warranted, thereby prolonging higher domestic gas prices.[111]

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.[112] In addition, the Fertilizer Institute claims that the NERA study should have assumed that the fertilizer industry directly supported 7,565 jobs while the NERA study states that there were 3,920 jobs directly supported by the fertilizer industry.

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

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

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

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

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

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

Further, 110 members of the U.S. Congress,[113] 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

[113] 110 members of the U.S. House of Representatives filed a single set of comments in support of LNG exports.

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

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

Serious competitive impacts are likely to be confined to narrow segments of industry. About 10% of U.S. manufacturing, measured by value of shipments, has both energy expenditures greater than 5% of the value of its output and serious exposure to foreign competition. Employment in industries with these characteristics is about one-half of one percent of total U.S. employment. LNG exports are not likely to affect the overall level of employment in the U.S. There will be some shifts in the number of workers across industries, with those industries associated with natural gas production and exports attracting workers away from other industries. In no scenario is the shift in employment out of any industry projected to be larger than normal rates of turnover of employees in those industries.[114]

[114] NERA study at 2.

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. 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.[115]

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.

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[115] *Id*. at 69.

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.

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. FLEX, the Independent Petroleum Association of America, and scores of local, state, and federal political leaders—including 110 Members of the U.S. House of Representatives and several U.S. Senators[116]—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 (DCP's Application).

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

C. Estimates of Domestic Natural Gas Supplies

1. Comments

Several commenters assert that, in addition to underestimating the demand for domestically produced natural gas, the NERA study overestimated future domestic supplies of natural gas. Representative Markey, for example, argues that current projections provide for only 20 to 40 years of domestic natural gas supplies but NERA did not adequately consider these projections. Senator Wyden, the Fertilizer Institute, and others maintain that the NERA study purports to treat the United States and Canada as a single North American market, but its assumptions ignore the potential effect of Canadian LNG exports to international markets.[117] 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

[117]In his comments, Senator Wyden stated that Canada's National Energy Board has approved two LNG export projects in British Columbia and is considering a third. According to Senator Wyden, these projects could begin in 2014 and result in LNG exports totaling 9 Bcf/d. DOE/FE notes that, earlier this year, Canada approved the third LNG export project mentioned by Senator Wyden—the Royal Dutch Shell Plc project.

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.[118]

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,

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

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 Reserves[119]

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

iii) Technically recoverable resources (TRR). Technically recoverable resources have also increased significantly. Technically recoverable resources are resources in accumulations producible using current recovery technology but without reference to economic profitability. They include both proved and unproved reserves.[120]

[119] 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).

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

DOE/FE notes that EIA's natural gas TRR estimates have varied from below 2,000 Tcf in AEO 2010 to more than 2,500 Tcf in AEO 2011 and 2,335 Tcf in AEO 2013.[121] These TRR estimates include proved and unproved TRR shale gas resources, which have fluctuated in recent AEOs, as the EIA continues to monitor and estimate this resource base. For example, in AEO 2010, unproved shale gas TRR was estimated at 347 Tcf, which increased to 827 Tcf in AEO 2011, and was revised to 543 Tcf in AEO 2013.

b. Supply Impacts

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

We further find that, given these estimates of supply, the projected price increases and increased price volatility that could develop in response to a grant of the requested LNG export authorization are not likely to negate the net economic benefits of the exports. This issue is

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

further discussed below. With regard to the adequacy of supply, however, it bears noting that while Dow contends that U.S. natural gas production would not be able to meet unlimited LNG exports and domestic demand, the NERA study supports a different conclusion. The NERA study included scenarios in which LNG exports were unconstrained. In these cases, LNG exports from the United States compete with LNG exports from all other international natural gas sources. Should the U.S. resource base be less robust and more expensive than anticipated, U.S. LNG exports would be less competitive in the world market, thereby resulting in lower export levels, and, in some instances, no exports, from the United States. By way of example, NERA modeled a number of Low EUR scenarios, which had U.S. resources that were less robust and more expensive than other cases. In these Low EUR scenarios, U.S. wellhead natural gas prices were driven up by higher production costs to meet domestic demand, and in those cases prices increased to a level that choked off demand for exports so that LNG exports were limited or disappeared, leaving the available natural gas for domestic use. In other unconstrained cases evaluated with the High EUR scenarios, domestic natural gas production was able to keep up with the demand required to meet the unconstrained LNG export scenario. In this case, the EIA scenarios reflect the changes that would occur in the domestic market and reflect the limitations, as modeled in the NEMS model, of domestic natural gas production and consumption by different sectors of the economy. In all of these cases, the supply and price response to LNG exports did not negate the net economic benefit to the economy from the exports.

c. Supply Impacts Related to Alternative Energy Sources

To the degree that natural gas prices may increase, alternative sources of energy will become more attractive to consumers and investors. Accordingly, in nearly every year in which natural gas exports were reflected in the EIA study, electricity from renewable energy resources

increased compared to the no export case. Therefore, we do not agree with the suggestion that LNG exports would diminish investment in renewable energy.

d. Supply Impacts Related to Canadian LNG Exports

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

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

e. Supply Impacts Related to Tax Law and Environmental Policy

NERA stated that the NewERA macroeconomic model includes a simple tax representation in which indirect taxes are included in the output values and not explicitly modeled.[122] 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

[122] NERA study at 110.

for potential variability in domestic natural gas supply such as would occur due to changes in environmental regulation and other factors, including changes to production tax credits. They did so by incorporating the High EUR and Low EUR scenarios into their model.[123]

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

D. Modeling the LNG Export Business

1. Comments

Some commenters complain that NERA failed to capture accurately the business model being employed by those involved in the business of LNG exports. Sierra Club states that NERA erroneously modeled the fossil fuel industry by assuming a zero-profit condition. Some commenters, including NRDC, maintain that NERA failed to consider that LNG exports will take place pursuant to long-term, *e.g.*, 25-year, contracts containing take-or-pay provisions, rather than contracts containing flexible or market-sensitive pricing provisions. IECA makes a similar argument in its reply comments. According to these commenters, the take-or-pay provisions in long-term contracts will inhibit the free flow of price signals. The commenters argue that NERA incorrectly assumed 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

[123] *Id.* at 25.

country will cease purchases of U.S.-sourced LNG if the country gains access to less expensive supplies. These commenters maintain that take-or-pay provisions in long-term contracts will have the effect of driving LNG exports even under circumstances when it would be more economical for the same natural gas to be sold in the domestic market. In this regard, Dow criticizes NERA's assertion that the global market for natural gas will limit how high U.S. natural gas prices can rise as a result of export activity because importing nations will not purchase U.S. supplies if U.S. wellhead prices rise above the cost of competing supplies. Dow contends that this arbitrage phenomenon may occur in competitive markets but does not make sense in the global LNG market due to the broad use of long term take-or-pay contracts.

Additionally, several commenters, including Representative Markey, NRDC, Sierra Club, Citizens Against LNG, and Alcoa, charge that NERA incorrectly assumed that the financing of investments in natural gas supplies for export and in the LNG export projects that will be used for export operations would originate from U.S. sources. These commenters assert that, in fact, a substantial portion of the investment is being made by foreign entities and these foreign entities, not domestic corporations, will reap the benefits of export activity in the form of royalties, tolling fees, income, and tax proceeds from the resale of LNG overseas. Contrary to these arguments, FLEX and 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.[124] 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.

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

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

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

2. DOE/FE Analysis

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

a. Zero Profit Condition

Sierra Club's charge that NERA erroneously modeled the fossil fuel industry by assuming a zero-profit condition appears to reflect a misunderstanding of the term "zero-profit" as used by NERA. The "zero-profit condition" assumed in the NERA study does not mean that firms in the natural gas industry will not make a "profit" as that word is ordinarily used. Rather, the zero-profit condition means only that firms will not make a profit above the risk-adjusted cost of capital. The assumption of a zero-profit condition is another way of saying that the model assumes a competitive market for natural gas, because in competitive markets new firms can enter and drive any profits above a risk-adjusted cost of capital down to zero. The assumption of a competitive market for natural gas production in the United States is valid given that natural gas wellhead prices have been deregulated for over thirty years.[125] 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.

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

b. Contract Terms

We disagree with the contention that NERA erred in the assumptions it used to model the export contracts that will be used by authorization holders. NERA assumed that these contracts will include payments to the exporting facility in the form of a tolling charge that is fixed based on the total export capacity reserved under the tolling agreement plus 115% of the Henry Hub price for each unit of gas that is liquefied. These assumptions correspond closely with the 20-year tolling agreement filed publicly with DOE by Sabine Pass on April 2, 2013. In that filing, the tolling agreement carries a tolling fee (or "reservation charge") with a per unit liquefaction charge of 115% of the Henry Hub price.[126]

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

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

there is a possibility for mutual benefit in doing so, as there would be in a case where domestic gas prices exceed netback prices.

c. Foreign Direct Investment

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

> Net benefits to the U.S. economy could be larger if U.S. businesses were to take more of a merchant role. Based on business models now being proposed, this study assumes that foreign purchasers take title to LNG when it is loaded at a United States port, so that any profits that could be made by transporting and selling in importing countries accrue to foreign entities. In the cases where exports are constrained to maximum permitted levels, this business model sacrifices additional value from LNG exports that could accrue to the United States.[127]

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.[128]

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[127] NERA study at 6-7.
[128] *Id.* at 211.

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

> NERA thus acknowledged the possibility that investment necessary for LNG exports may come from foreign sources. The NERA model's assumption of domestic investment explicitly fails to capture the macroeconomic benefits that will result from the injection of any foreign investment into natural gas production and infrastructure.
>
> The United States has the leading economy in the world in part because the US is the leading destination of international flows of capital. Each dollar of new foreign investment capital into the US results in an equivalent increase in US GDP. The main positive components of GDP are private consumption, investment, government expenditures, and exports. Any foreign direct investment stemming from the development of a US LNG industry would not decrease domestic capital investment, but would merely free up such domestic capital for other investments. Therefore the total amount of investment in the US would increase, dollar-for-dollar, with foreign investment, increasing US GDP by the same amount. If that foreign investment earns a return and, after taxation by US local, state and federal governments, some of that return is repatriated, this reflects a small countervailing outflow (which seems to be what, for example, Representative Markey is focusing on). Nonetheless, foreign direct investment 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.[129]

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.

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

d. International Natural Gas Markets

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

With respect to the competitiveness of global LNG markets, NERA assumed that the production decisions of the world's dominant producer, Qatar, would be fixed no matter what the level of U.S. exports and that, generally, "there is a competitive market with exogenously determined export limits chosen by each exporting region and determined by their liquefaction capacity."[130] 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."[131] We find this to be a reasonable simplifying assumption and note further that even imperfectly competitive markets are not static. The arrival

[130] NERA study at 34.
[131] *Id*. at 34-35.

of new entrants, such as U.S.-based LNG exporters, may well have a disruptive impact on markets where competition may presently be constrained.

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

e. Estimates of LNG Transaction Costs

We disagree with the comments from Sierra Club and Dow arguing that NERA overestimated LNG transaction costs, including liquefaction, transportation, insurance, and the like. NERA based its liquefaction, shipping costs and regasification costs on a review of publicly available literature, including the International Group of LNG Importers 2010 LNG Industry report and other sources referenced in the NERA study.[132]

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

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

[133] DOE/FE statistics show that the majority of LNG imports to the United States for 2010 and 2011 came from Atlantic Basin/North African sources. More than one-third of U.S. LNG imports in 2010 and 2011 came from

transportation costs for LNG exports to Asia. Further, NERA provided a detailed description of the assumed transportation cost buildup, which is based on a daily charter rate of $65,000, and other reasonable assumptions.[134] Dow does not provide evidence challenging the accuracy of the information used by NERA or NERA's method of calculating transportation costs. Nor does Dow provide other evidence of daily charter rates.

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

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

E. Cost of Environmental Externalities

1. Comments

Sierra Club, along with Delaware Riverkeeper Network,[135] Jannette Barth, NRDC, Dow, and Save Our Supplies, among others, maintain that LNG exports will increase demand for natural gas, thereby increasing negative environmental and economic consequences associated with natural gas production. These commenters assert that NERA failed to consider the cost of environmental externalities that would follow such exports. The externalities identified by these commenters include:

Trinidad and Tobago, and none came from East Asia. *See* DOE/FE 2010 LNG Import Annual Report and DOE/FE 2011 LNG Import Annual Report, *available at* http://fossil.energy.gov/programs/gasregulation/publications/.

[134] NERA study at 87.

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

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

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

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

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

2. DOE/FE Analysis

As explained herein, the authorization granted by this Order is conditioned (among other things) on the satisfactory completion of the environmental review of DCP's proposed modifications to the Cove Point LNG Terminal under NEPA in FERC Docket No. CP13-113 and on issuance by DOE/FE of a finding of no significant impact or a record of decision pursuant to NEPA.[136]

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.

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

F. Prices and Volatility

1. Natural Gas Price Volatility

a. Comments

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

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

argues that, because the facilities and liquefaction trains at each facility will be built in sequence, a market buffer will be created where supply will grow incrementally and supply shocks will not be created in the market. Additionally, 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."[137] Further, Sierra Club, Save Our Supplies and several other commenters argue that, due to this alleged lack of transparency, DOE/FE should conduct a new study of the potential cumulative impacts of granting LNG export licenses for shipment to non-FTA countries. Sierra Club and other commenters also contend that NERA and/or NERA's Vice President (and the principal author of the NERA study) Mr. David Montgomery may be biased in favor of LNG exports, which they argue necessitates a new study by a different contractor.

2. DOE/FE Analysis

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

H. Peer Review

1. Comments

Dow, along with Eugene Bruce, IECA, and others, charge that the NERA study is invalid because NERA failed to validate its proprietary N_{ew}ERA model by means of technical peer review. These commenters argue that technical peer review is required by the Office of

[137] Reply Comments of Sierra Club at 20.

Management and Budget's (OMB) guidance entitled, "Final Information Quality Bulletin for Peer Review" (OMB Bulletin).[138] The OMB Bulletin establishes that "important scientific information shall be peer reviewed by qualified scientists before it is disseminated by the Federal government." Dow asserts that the NERA study should be considered "highly influential scientific information," subject to the highest standards outlined in the OMB Bulletin, and/or subject to internal DOE peer review guidelines. Due in part to these concerns, several commenters, including Sierra Club and Save Our Supplies, urge that DOE/FE commission a new study by another independent contractor.

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

2. DOE/FE Analysis

The OMB Bulletin establishes a framework for independent, expert review of influential scientific information before the information is publicly disseminated. It defines "scientific information" as "factual inputs, data, models, analyses, technical information, or scientific assessments based on the behavioral and social sciences, public health and medical sciences, life and earth sciences, engineering, or physical sciences."[139] "Scientific information" does not include opinions where the presentation makes it clear the information is "opinion rather than fact or the agency's views."[140] Further, the OMB Bulletin, while applicable to rulemakings, provides that "official disseminations that arise in adjudications and permit proceedings" are

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

[139] *Id*. at 2675.

[140] *Id.*

exempt from peer review, unless "the agency determines that peer review is practical and appropriate …."[141]

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

Both the EIA and NERA studies use market assumptions to project a range of possible future results. No claim is made by the authors of either study that the studies contain scientific fact. To the contrary, both studies caution the reader on the limits to their economic projections. The EIA study states: "The projections in this report are not statements of what *will* happen but of what *might* happen, given the assumptions and methodologies used."[142] 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.[143]

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

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[141] *Id*. at 2677.
[142] EIA study at ii.
[143] *See*, *e.g.*, NERA study at 25-26.

and pointed out alleged "problems and omissions" in NERA's analysis.[144] 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.[145]

DOE/FE has carefully weighed these competing analyses and viewpoints, and has conducted its own internal review of the LNG Export Study. In so doing, DOE/FE has recognized that its ultimate decision on the pending export applications would benefit from a public exchange of judgments and expert opinions.[146] The major purpose motivating the OMB Bulletin—to ensure that the government is well-informed by independent, expert analysis—was accomplished in this proceeding without the need for peer review.

I. Procedural Arguments

1. Comments

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

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[144] Synapse Energy Economics, Inc., *Will LNG Exports Benefit the United States Economy?* (Jan. 23, 2013), at 1, submitted with Initial Comments of Sierra Club.
[145] *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.
[146] *See* 77 Fed. Reg. at 73,628 ("The LNG Export Study and the comments that DOE/FE receives … will help to inform our determination of the public interest in each case.")

required to conduct a notice and comment rulemaking before it decides on any of the pending LNG export applications.

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

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

undisclosed proprietary data and models with limited information regarding their development and age.

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

2. DOE/FE Analysis

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

With respect to opportunity for public participation, we find that the public has been given ample opportunity to participate in this proceeding, as well as the other pending LNG export proceedings. Within this proceeding, DCP's Notice of Application, published in the Federal Register on December 8, 2011, contained a detailed description of DCP's Application, and invited the public to submit protests, motions to intervene, notices of intervention, and comments.[147] As required by DOE regulations, similar notices of application have been

[147] 76 Fed. Reg. at 34,212-15.

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.[148] 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.[149] DOE/FE thus has taken appropriate and necessary steps by offering the public multiple opportunities to participate in the non-FTA LNG export proceedings.

We also find the record is adequate to support the action we are taking in this Order. DOE/FE has reviewed all of the submissions made in this proceeding. Moreover, this Order sets out the reasons that support each of the determinations contained herein. Consequently, we do not find it is necessary or appropriate to delay issuance of this Order to augment the record, either through a rulemaking or public hearing. In this regard, we note that DOE/FE retains broad discretion to decide what procedures to use in fulfilling its statutory responsibilities under the NGA,[150] and our view is that the record is sufficient to support the actions that we are taking. The requests for additional procedures summarized above are denied.

IX. DISCUSSION AND CONCLUSIONS

A. Motions to Intervene

The motion to intervene filed by Shell LNG was unopposed. As discussed above, however, DCP opposed the Sierra Club, Riverkeeper, APGA, and Trades Council motions to intervene on grounds that the movants had not demonstrated a substantial interest in the outcome of this proceeding.

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[148] 77 Fed. Reg. at 73,627.
[149] *Id*. at 73,628.
[150] *See, e.g.*, *Process Gas Consumers v. FERC*, 930 F.2d 926, 929 (D.C. Cir. 1991).

We do not agree with the position taken by DCP. The evidence presented by DCP and the other parties, as well as the breadth of the LNG Export Study, indicate that the economic consequences of granting the Application could be far-reaching and could affect the interests of the movants and their members. This fact alone is good cause to permit their intervention. Also, the movants have raised a number of environmental issues that, as discussed herein, we intend to address at a later date. The movants' intervention is thus warranted to preserve their right for review of those environmental issues when appropriate. For these reasons, the four pending motions to intervene are granted.

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

B. DCP's Application

In its Application, DCP introduced evidence projecting a future supply of domestic natural gas sufficient to support both the proposed export authorization and domestic natural gas demand. This evidence included EIA data from AEO 2011, a 2009 estimate by the Potential Gas Committee of the Colorado School of Mines, and the projections contained in the Navigant Supply Report. Additionally, DCP presented evidence from two other studies submitted in support of its Application. Citing the Navigant Price Report, DCP asserted that potential price impacts from exports of LNG would be relatively modest. Based largely on the ICF Economic Benefits Study, DCP produced evidence that significant economic benefits at the local, regional, national, and international levels are likely to occur if the Application is granted.

As summarized above, Sierra Club challenged the reliability of the IMPLAN model used to support the Economic Benefits Study. Sierra Club and other intervenors 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. 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

DCP claims that the Liquefaction Project will create economic benefits including (but not limited to) direct and indirect job creation, an enhanced tax base, and an increase in overall economic activity. DCP asserts that these benefits will accrue both to the region surrounding the Liquefaction Project and to producing regions such as the nearby Marcellus Shale region. Sierra Club and Riverkeeper challenge DCP's claimed regional benefits, focusing principally on the durability of economic benefits in producing regions. Sierra Club and Riverkeeper are concerned specifically about impacts in the areas in Pennsylvania and New York where Marcellus Shale drilling is occurring. They each assert 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.

Sierra Club points to the Weinstein study to critique the claims related to employment supported by Marcellus Shale production activities. Sierra Club maintains that the Weinstein study shows that there are no significant differences in income and employment in counties in Pennsylvania with drilling operations versus counties without such operations. The Weinstein study compares employment and income growth rates between the counties with and without drilling operations for the period before the drilling boom (2001 to 2005) and a period during the drilling boom (2005 to 2009). According to Sierra Club, the Weinstein study shows that

employment in counties without drilling operations grew at a 5.3 percent rate before the drilling boom while employment in counties with drilling operations grew at a 1.4 percent rate during the same period. According to Sierra Club, during the subsequent drilling boom years employment declined by 0.4 percent rate in non-drilling counties, whereas in drilling counties, employment declined at a slightly faster 0.6 percent rate. Sierra Club argues that the fact that the growth rate declined at a slightly faster rate in counties with drilling operations belies the notion that the boom in drilling produces a significant number of jobs.

DOE/FE does not agree with the conclusions Sierra Club appears to draw from the Weinstein study. Sierra Club acknowledges that the finding that employment declined at a 0.2 percent faster rate in counties with drilling operations during the boom years "turns out to be too small to be statistically significant."[151] The small difference in the employment changes could be the consequence of factors unrelated to natural gas production activities.

Additionally, the data from the Weinstein study presented by Sierra Club show that the growth rate for income in the counties with drilling operations increased substantially from 12.8 percent in the 2001-2005 period to 18.2 percent in the 2005-2009 period. By comparison, in the non-drilling counties, income growth increased from 12.6% in the 2001-2005 period to 13.6%, a substantially smaller amount. Sierra Club speculates that the large increase in the income growth rate for counties with drilling operations, when considered alongside the slight decline in the growth rate for jobs in the same counties, shows that the increased incomes likely went to landowners as lease payments for oil production and to some high-income or out-of-state workers but not to local communities in the producing regions. Nevertheless, even taking the findings of the Weinstein study relating to employment and income as Sierra Club presents them,

[151] Sierra Club Mot. at 13.

we do not see substantial evidence of negative regional economic impacts from natural gas drilling operations, much less from the LNG exports proposed by DCP.

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 DCP 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 DCP'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 that equaled and exceeded the 5.6 Bcf/d previously authorized by DOE/FE plus the volume of exports proposed in the current Application. The LNG Export Study concluded that LNG exports at these levels (*e.g.*, 6 Bcf/d of natural gas and higher) would result in higher U.S. natural gas prices, but that these price changes would remain in a relatively narrow range across the scenarios studied. NERA's analysis indicates that, after five years of increasing LNG exports, wellhead natural gas price increases could range from $0.22 to $1.11 (2010$/Mcf) depending on the market-determined level of exports. However, even with these estimated price increases, NERA found that the United States would experience net economic benefits from increased LNG exports in all cases studied. *See supra* Section VII.B.1, 8.

APGA contends that DCP relied on outdated EIA data and should have relied on the January 2012 EIA study that formed the first part of the LNG Export Study. Sierra Club argues that DOE/FE should rely on price estimates contained in the AEO 2012 Early Release Overview. We disagree. As explained in detail in Section VIII.A, the LNG Export Study was based on AEO 2011 estimates, which were the most recent, final projections available at the time. Furthermore, the AEO 2012 and AEO 2013 projections would not have yielded a materially different result. 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.'"[152] We disagree with Sierra Club's contention. As we have explained elsewhere, we are attaching a condition to this export authorization ordering that DCP'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 Cove Point LNG Terminal by federal or state agencies. When the environmental review is complete, DOE/FE will reconsider its public interest determination in light of the information gathered as part of that review. This procedure will not foreclose the choice of reasonable alternatives or influence subsequent development.

[152] Sierra Club Mot. at 51 (quoting 40 C.F.R. § 1506.1).

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 DCP's Application in this proceeding. The conclusion of the LNG Export Study is that the United States will experience net economic benefits from issuance of authorizations to export domestically produced LNG. We have evaluated the initial and reply comments submitted in response to the LNG Export Study. Various commenters have criticized the data used as inputs to the LNG Export Study and numerous aspects of the models, assumptions, and design of the Study. As discussed above, however, we find that the LNG Export Study is fundamentally sound and supports the proposition that the proposed authorization will not be inconsistent with the public interest.

D. Benefits of International Trade

We have not limited our review to the contents of the LNG Export Study but have considered a wide range of other information. For example, the National Export Initiative, established by Executive Order, sets an Administration goal to "improve conditions that directly affect the private sector's ability to export" and to "enhance and coordinate Federal efforts to facilitate the creation of jobs in the United States through the promotion of exports."[153]

We have also considered the international consequences of our decision. We review applications to export LNG to non-FTA nations under section 3(a) of the NGA. The United States' commitment to free trade is one factor bearing on that review. Also, we note that to the extent U.S. exports can counteract concentration within global LNG markets, thereby

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

diversifying international supply options and improving energy security for many of this country's allies and trading partners, authorizing U.S. exports may advance the public interest for reasons that are distinct from and additional to the economic benefits identified in the LNG Export Study.

E. Other Considerations

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

More generally, DOE/FE continues to subscribe to the principle set forth in our 1984 Policy Guidelines[154] 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.[155] Given

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[154] 49 Fed. Reg. at 6684.

[155] We understand that some commenters, including Jayanta Sinha, President of GAIL Global, Inc., would like DOE to clarify the circumstances under which the agency would exercise its authority to revoke (in whole or in part) previously issued LNG export authorizations. We cannot precisely identify all the circumstances under which such action would be taken. We reiterate our observation in *Sabine Pass* that: "In the event of any unforeseen developments of such significant consequence as to put the public interest at risk, DOE/FE is fully authorized to take

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

We have considered the cumulative impacts of past authorizations in our decision. In this case, we do not find that opponents of the Application have overcome the statutory presumption that the proposed export authorization is consistent with the public interest. By authorizing exports of LNG in a volume equivalent to 0.77 Bcf/d of natural gas (281 Bcf/yr) in this proceeding, DOE/FE will have cumulatively authorized non-FTA exports totaling 6.37 Bcf/d of natural gas, or 2.325 Tcf/yr, for the one final and three conditional export authorizations granted to date—Sabine Pass (2.2 Bcf/d), Freeport (1.4 Bcf/d), Lake Charles Exports (2.0 Bcf/d), and the current authorization (0.77 Bcf/d). We note that this total export volume only moderately exceeds the 6 Bcf/d volume evaluated by NERA in its "low" export cases.[156] 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

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action as necessary to protect the public interest. Specifically, DOE/FE is authorized by section 3(a) of the Natural Gas Act … to make a supplemental order as necessary or appropriate to protect the public interest. Additionally, DOE is authorized by section 16 of the Natural Gas Act 'to perform any and all acts and to prescribe, issue, make, amend, and rescind such orders, rules, and regulations as it may find necessary or appropriate' to carry out its responsibilities." *Sabine Pass*, Order No. 2961, at 33 n.45 (quoting 15 U.S.C. § 717*o*).

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

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 DCP. 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.[157] All comments related to the LNG Export Study will become

[157] Several commenters, including Susan Sakmar, Leny Mathews, Alcoa Energy, IECA, and Citizens Against LNG, advocate against unlimited LNG exports. These and other commenters urge DOE/FE to limit the total volume of LNG to be exported, assert that DOE/FE should issue a policy detailing its plan for granting LNG export licenses

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

A. Term of the Authorization

DCP has requested a 25-year term for the authorization commencing from the date export operations begin. However, because the NERA study contains projections over a 20-year period beginning from the date of first export,[158] we believe that caution recommends limiting this conditional authorization to no longer than a 20-year term beginning from the date of first export. In imposing this condition, we are mindful that LNG export facilities are capital intensive and that, to obtain financing for such projects, there must be a reasonable expectation that the authorization will continue for a term sufficient to support repayment. We find that a 20-year

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and for monitoring cumulative impacts, and propose that DOE/FE "phase in" the approval of LNG export projects to minimize potential price impacts. Although DOE/FE is not taking any of these actions at this time, it is monitoring the LNG export landscape as it evolves, as explained above. Because these comments are now part of the record in each individual docket proceeding, *see* 77 Fed. Reg. at 73,629, DOE/FE will consider them in the course of reviewing each application and the cumulative impact of prior authorizations.

[158] 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.").

term is likely sufficient to achieve this result. It is also consistent with the 20-year term authorized by DOE/FE in the three other non-FTA export authorizations issued to date.[159]

B. Commencement of Operations Within Seven Years

DCP requested this conditional authorization to commence on the earlier of the date of first export or six years from the date of the issuance of this Order. Consistent with the final and conditional non-FTA authorizations granted to date,[160] DOE/FE will add a condition that DCP 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.[161] 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.

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[159] *Sabine Pass*, DOE/FE Order No. 2961-A, at 29; *Freeport LNG*, DOE/FE Order No. 3282, at 122; and *Lake Charles Exports*, DOE/FE Order No. 3324, at 135.
[160] *Sabine Pass*, DOE/FE Order No. 2961-A, at 33; *Freeport LNG*, DOE/FE Order No. 3282, at 122; and *Lake Charles Exports*, DOE/FE Order No. 3324, at 128.
[161] 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, DCP requests authorization to export LNG as agent for other entities who themselves hold title to the LNG, but not on its own behalf. DOE/FE previously addressed the issue of agency rights in Order No. 2913,[162] 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.[163] 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*.[164] In *Gulf Coast*, DOE/FE confirmed that, in LNG export orders in which Agency Rights

[162] *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).
[163] *Dow Chem. Co.*, DOE/FE Order No. 2859, at 7-8, *discussed in Freeport LNG*, DOE/FE Order No. 2913, at 7-8.
[164] *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).

have been granted, DOE/FE shall require registration materials filed for, or by, an LNG title-holder (Registrant) to include the same company identification information and long-term contract information of the Registrant as if the Registrant had filed an application to export LNG on its own behalf.[165]

To ensure that the public interest is served, the authorization granted herein shall be conditioned to require that where DCP proposes to export LNG as agent for other entities who hold title to the LNG (Registrants), DCP must register with DOE/FE those entities on whose behalf it will export LNG—including Pacific Summit Energy and GAIL Global—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."[166] 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.[167]

DOE/FE will require that DCP file or cause to be filed with DOE/FE any relevant long-term commercial agreements, including TSAs, pursuant to which DCP exports LNG as agent for a Registrant. We note that DCP has complied with this requirement in connection with its TSAs executed with both Pacific Summit Energy and GAIL Global, as stated in its Update filed with DOE/FE on May 2, 2013.

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[165] *See id*. at 7-8.
[166] 10 C.F.R. § 590.202(b).
[167] *Id*. § 590.202(e).

DOE/FE finds that the submission of all such agreements or contracts within 30 days of their execution using the procedures described below will be consistent with the "to the extent practicable" requirement of section 590.202(b). By way of example and without limitation, a "relevant long-term commercial agreement" would include an agreement with a minimum term of two years (such as a TSA), an agreement to provide gas processing or liquefaction services at the Cove Point LNG Terminal, a long-term sales contract involving natural gas or LNG stored or liquefied at the Cove Point LNG Terminal, or an agreement to provide export services from the Cove Point LNG Terminal.

In addition, DOE/FE finds that section 590.202(c) of DOE/FE's regulations[168] requires that DCP file, or cause to be filed, all long-term contracts associated with the long-term supply of natural gas to the Cove Point LNG Terminal, whether signed by DCP or the Registrant, within 30 days of their execution.

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

[168] *Id*. § 590.202(c).

relevant provisions; and (B) the filing must demonstrate why the redacted information should be exempted from public disclosure.

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

F. Export Quantity

We are not granting the Application in the full export quantity requested in the Application. In addition to the other terms and conditions discussed in this Order, we will grant the requested authorization only to the extent of the liquefaction capacity of the Liquefaction Project. As explained in Section IV.A.2, DCP has sought export authorization in a volume equivalent to 1 Bcf/d of natural gas, but informed DOE/FE on May 2, 2013, that the Liquefaction Project will have a liquefaction capacity of only 5.75 mtpa, which DOE/FE estimates is equivalent to 0.77 Bcf/d, or 281 Bcf/yr, of natural gas. There is no basis for authorizing exports in excess of the maximum liquefaction capacity of a planned facility. Consequently, this Order will authorize the export of LNG up to the equivalent of 281 Bcf/yr of natural gas.

G. Combined FTA and Non-FTA Export Authorization Volume

As stated above, DCP is currently authorized to export LNG to FTA countries in an amount equivalent to approximately 1 Bcf/d of natural gas, as authorized in DOE/FE Order No. 3019. In this proceeding, DCP now seeks authorization to export the same volume to non-FTA countries under NGA section 3(a). For the reasons explained above, however, the authorization issued in this Order will be limited to exports of 281 Bcf/yr (0.77 Bcf/d) of natural gas to non-FTA nations. Because the source of LNG proposed for export for both export authorizations is

from the same facility (Cove Point LNG Terminal), DCP may not treat the volumes authorized for export in the two proceedings as additive to one another.

H. Environmental Review

As explained above, DOE/FE intends to complete its NEPA review as a cooperating agency in FERC's review of the Liquefaction Project. The authorization issued in this Order will be conditioned on DCP's satisfactory completion of the environmental review process.[169]

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.[170]

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

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[169] 10 C.F.R. § 590.402 (authorizing DOE/FE to issue a conditional order prior to issuance of a final opinion and order).

[170] *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).

proceeding. However, absent a showing of good cause for a failure of interested persons to participate in the FERC environmental review proceeding, DOE/FE may dismiss such claims if raised out of time in this proceeding.

XI. FINDINGS

On the basis of the findings and conclusions set forth above, we find that it has not been shown that a grant of the requested authorization will be inconsistent with the public interest, and we further find that the Application should be granted subject to the terms and conditions set forth herein.

XII. ORDER

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

A. DCP is authorized to export domestically produced LNG by vessel from the Cove Point LNG Terminal in Calvert County, Maryland, up to the equivalent of 281 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. DCP is authorized to export this LNG 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. DCP 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 281 Bcf/yr of natural gas. This quantity is not additive to DCP's FTA authorization, set forth in DOE/FE Order No. 3019.

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. DCP 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 DCP's satisfactory completion of the environmental review process under NEPA in FERC Docket No. CP13-113 and on issuance by DOE/FE of a finding of no significant impact or a record of decision pursuant to NEPA. Additionally, the authorization is conditioned on DCP's on-going compliance with any and all preventative and mitigative measures at the Cove Point LNG Terminal imposed by federal or state agencies.

G. DCP shall file, or cause others to file, with the Office of Oil and Gas Global Security and Supply all executed long-term contracts associated with the long-term export of LNG as agent for other entities, from the Cove Point LNG Terminal. DCP shall file, or cause others to file, a non-redacted copy of each contract for public posting. Alternatively, DCP shall file, or cause others to file, both a non-redacted copy of the contract filed under seal and either: i) a redacted version of the contract, or ii) major provisions of the contract, for public posting, within 30 days of their execution. Applying the same procedures, DCP also shall file, or cause others to file, with the Office of Oil and Gas Global Security and Supply all executed long-term contracts associated with the long-term supply of natural gas to the Cove Point LNG Terminal. DCP shall file, or cause others to file, a non-redacted copy of each contract for public posting.

Alternatively, DCP shall file, or cause others to file, both a non-redacted copy of the contract filed under seal, and either: i) a redacted version of the contract, or ii) major provisions of the contract, for public posting within 30 days of their execution. In these filings, DCP shall show why the redacted or non-disclosed information should be exempted from public disclosure.

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

> "Customer or purchaser acknowledges and agrees that it will resell or transfer LNG purchased hereunder for delivery only to countries identified in Ordering Paragraph D of DOE Order No. 3331, issued September 11, 2013, in FE Docket No. 11-128-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 Dominion Cove Point LNG, LP 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 Dominion Cove Point LNG, LP is made aware of all such actual destination countries."

I. DCP 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 DCP with all information necessary to permit DCP to register that person or entity with DOE/FE, including: (1) the Registrant's agreement to comply with this Order and all applicable requirements of DOE/FE's regulations at 10 C.F.R. Part 590, including but not limited to destination restrictions; (2) the exact legal name of the Registrant, state/location of incorporation/registration, primary place of doing business, and the Registrant's ownership structure, including the ultimate parent entity if the Registrant is a subsidiary or affiliate of another entity; (3) the name, title, mailing address, e-mail address, and telephone number of a corporate officer or employee of the registrant to whom inquiries may be directed; (4) within 30 days of execution, a copy of any long-term contracts, not previously filed

with DOE/FE, described in Ordering Paragraph (G) of this Order, including either a non-redacted copy for public posting, or alternatively both a non-redacted copy for filing under seal and either: i) a redacted version of the contract, or ii) major provisions of the contract, for public posting.

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

K. As a condition of this authorization, DCP shall ensure that all persons required by this Order to register with DOE/FE have done so. Any failure by DCP 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 Cove Point LNG Terminal in Calvert County, Maryland, DCP shall provide written notification of the date that the first export of LNG authorized in Ordering Paragraph A above occurred.

M. DCP shall file with the Office of Oil and Gas Global Security and Supply, on a semi-annual basis, written reports describing the progress of the proposed Liquefaction Project. The reports shall be filed on or by April 1 and October 1 of each year, and shall include information on the progress of the Liquefaction Project, the date the liquefaction facility is expected to be operational, and the status of the long-term contracts associated with the long-term export of LNG and any long-term supply contracts.

N. Prior to any change in control of the authorization holder, DCP 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 DCP, 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, DCP 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 Shell LNG, Sierra Club, Riverkeeper, APGA, and the Trades Council are granted.

R. The motion to reply filed by Sierra Club on February 29, 2012, and the request to rebut filed by Riverkeeper on March 6, 2012, are granted.

Issued in Washington, D.C., September 11, 2013.

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