

**DOWNEAST LNG, INC.**  
**DOWNEAST PIPELINE, LLC**  
**DOWNEAST LNG LIQUEFACTION, INC.**  
748 U.S. Route 1  
Robbinston, Maine 04671



August 3, 2015

Ms. Kimberly D. Bose, Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E.  
Washington, D.C. 20426

**Re: Downeast Liquefaction, Inc., Downeast LNG, Inc., and  
Downeast Pipeline, LLC  
Downeast LNG Export Project  
Docket No. PF14-19-000  
Draft Resource Report 1**

Dear Ms. Bose:

On August 11, 2014, the Director of the Office of Energy Projects at the Federal Energy Regulatory Commission ("Commission" or "FERC") issued a letter order in the above-captioned docket commencing the pre-filing process for Downeast Liquefaction, LLC's ("Downeast LNG") proposed Downeast LNG Export Project, to be located in Robbinston, Maine, at the site of the Downeast LNG Import Project that is pending before the Federal Energy Regulatory Commission in Docket Nos. CP07-52-000, CP07-53-000, and CP07-53-001. Pursuant to the Commission's pre-filing requirements,<sup>1</sup> Downeast LNG hereby submits for filing a Draft Resource Report 1 for the Downeast LNG Export Project.

Should you have any questions regarding this matter please feel free to contact the undersigned at (207) 454-3925.

Sincerely,

Dean P. Girdis  
President,  
Downeast LNG

Enclosures

cc: Shannon Crosley, FERC  
John Scott, Tetra Tech

---

<sup>1</sup> 18 C.F.R. §§ 157.21(f)(2014).

**DRAFT**  
**RESOURCE REPORT 1**  
**General Project Description**  
**Downeast LNG Export Project**



**Federal Energy Regulatory Commission**  
**Docket No. PF14-19-000**  
August 2015

**Volume 1**  
**Public Information**

## TABLE OF CONTENTS

## PAGE

<b>1.0 Project Description .....</b>	<b>1</b>
<b>1.1 Project Purpose and Need.....</b>	<b>2</b>
1.1.1 National Perspective – Natural Gas .....	2
1.1.2 New England Perspective – Natural Gas .....	4
1.1.3 The Role of the Downeast LNG Import-Export Project.....	7
<b>1.2 Objective.....</b>	<b>8</b>
<b>1.3 Location and Description of Facilities .....</b>	<b>8</b>
1.3.1 Project Location.....	8
1.3.2 Project Description .....	9
1.3.3 LNG Loading/Unloading.....	10
1.3.4 LNG Liquefaction.....	10
1.3.5 LNG Storage and Natural Gas Sendout .....	11
1.3.6 Utility and Security/Control Systems .....	11
1.3.7 Natural Gas Pipeline .....	11
1.3.8 Acreage.....	11
1.3.9 Aboveground Facilities.....	12
<b>1.4 Project Schedule.....</b>	<b>12</b>
<b>1.5 Land Requirements .....</b>	<b>12</b>
1.5.1 Pipeline Facilities .....	12
1.5.2 Terminal Facilities .....	13
<b>1.6 Construction Procedures.....</b>	<b>13</b>
1.6.1 Pipeline Facilities .....	14
1.6.2 Construction in Special Interest Areas .....	14
1.6.3 Pipeline .....	15
1.6.4 Terminal Facilities .....	15
1.6.5 Operations and Maintenance Team Organization .....	16
1.6.6 Operations and Maintenance Team Training.....	16
<b>1.7 Future Plans and Abandonment .....</b>	<b>17</b>
<b>1.8 Permits and Approvals.....</b>	<b>17</b>
<b>1.9 Affected Landowners.....</b>	<b>17</b>
<b>1.10 Nonjurisdictional Facilities .....</b>	<b>19</b>
<b>1.11 References.....</b>	<b>19</b>

## LIST OF MODIFIED APPENDICES

<b>Appendix No.</b>	<b>Title</b>
Appendix 1A	Preliminary Project Schedule

## **TABLE OF CONTENTS (Continued)**

### **LIST OF MODIFIED TABLES**

<b>Table No.</b>	<b>Title</b>
Table 1-1	Comparative Equipment Listing for Export Project Changes
Table 1-2	Pipeline and Terminal Acreage Impacts (Updated April 2014)
Table 1-3	Environmental Permits and Approvals (Updated July 2015)

### **LIST OF MODIFIED FIGURES**

<b>Figure No.</b>	<b>Title</b>
Figure 1-1	Preliminary Site Plot Plan

## LIST OF ACRONYMS AND ABBREVIATIONS

AEO	Annual Energy Outlook
Bcf	Billion Cubic Feet
Bcfd	Billion Cubic Feet Per Day
CFR	Code of Federal Regulations
EIA	Energy Information Administration
EIS	Environmental Impact Statement
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
HDMS	Hazard Detection and Mitigation System
LNG	Liquefied Natural Gas
LNGC	Liquefied Natural Gas Carrier
M&NP	Maritimes and Northeast Pipeline
MCHE	Main Cryogenic Heat Exchanger
m <sup>3</sup>	Cubic Meter
Mmscfd	Million Standard Cubic Feet Per Day
Mtpa	Million Metric Tonnes Per Annum
NFPA	National Fire Protection Association
NGA	Natural Gas Act
O&M	Operation and Maintenance
Psig	Pounds Per Square Inch Gauge
ROW	Right-of-Way
SCV	Submerged Combustion Vaporizer
Tcf	Trillion Cubic Feet
USCG	United States Coast Guard
USGS	United States Geological Survey

## 1.0 Project Description

This section has been revised because of the conversion of the terminal to include export capability.

This Resource Report 1 provides a general project description of the Downeast LNG Export Project (or “Project”) proposed by Downeast Liquefaction, LLC (“Downeast”), to be located in Robbinston, Maine at the site of the Downeast LNG Import Project that is pending before the Federal Energy Regulatory Commission (“FERC” or “Commission”) in Docket Nos. CP07-52-000 and CP07-53-000.<sup>1</sup> The Downeast LNG Export Project would convert the Downeast LNG Import Project into a bidirectional import-export LNG terminal and pipeline, capable of producing up to 3 million metric tonnes per annum (“mtpa”) of liquefied natural gas (“LNG”) and 100 million standard cubic feet per day (“mmscfd”) of regasified LNG.

The Downeast LNG Export Project will be located within areas that have been evaluated and assessed in conjunction with FERC’s review of the Downeast LNG Import Project, including through the Downeast LNG FEIS, in Docket Nos.:

- CP07-52-000. Downeast LNG, Inc. proposed the siting, construction and operation of LNG import terminal facilities.
- CP07-53-000. Downeast Pipeline, LLC proposed the construction and operation of an approximately 30-mile-long sendout natural gas pipeline to be interconnected with the Maritimes and Northeast interstate transmission pipeline system at the Baileyville Compressor Station.

This Resource Report 1 describes the Project facilities, the purpose and need, land requirements, construction procedures, operation procedures, Project schedule, compliance with regulations and codes, and permits that will be obtained. Resource Reports 2 through 9 will describe the resources at the Project site that may experience impacts from construction and operation of the Export Project, and measures proposed to mitigate those impacts. Resource Report 10 describes the “No Action” alternative as well as possible export liquefaction system and facility siting and configuration alternatives. Resource Report 11 will describe the design, construction, operation, and maintenance measures to maximize the Export Project’s reliability, and to minimize potential hazards to the public from failure of Project components as a result of accidents or natural catastrophes. Resource Report 12, pertaining to polychlorinated biphenyls (“PCB”), is not applicable, as the Project does not involve the removal, replacement, or abandonment of PCB-contaminated facilities. Resource Report 13 will provide a detailed description of the liquefaction and vaporization facilities, as well as detailed engineering and design information.

This Environmental Report supplements the original Environmental Report filed as part of the December 22, 2006 Application and the supplemental Environmental Report amending the preferred pipeline route that was filed on January 16, 2008.

---

<sup>1</sup> The Downeast LNG Import Project is being developed by Downeast LNG, Inc. and Downeast Pipeline, LLC (together, “Downeast LNG”). On December 22, 2006, Downeast LNG submitted an application to the Commission for authorization to site, construct, and operate the Downeast LNG Import Project (“December 22 Application”) in Docket Nos. CP07-52-000, CP07-53-000, and CP07-53-001. On May 15, 2014, the Commission published a Final Environmental Impact Statement, which concluded that the Downeast LNG Import Project “would result in some adverse environmental impacts,” but that “most of these impacts would be reduced to less-than-significant levels with the implementation of Downeast LNG’s proposed mitigation measures and the additional mitigation measures” recommended by FERC. FERC, Downeast LNG Project: Final Environmental Impact Statement, FERC\EIS: 0231F ES-7, *Downeast LNG, Inc. & Downeast Pipeline, LLC*, FERC Docket Nos. CP07-52-000, CP07-53-000 & CP07-53-001 (May 15, 2014) [hereinafter Downeast LNG FEIS].

## 1.1 Project Purpose and Need

This section has been revised because of the conversion of the terminal to include export capability.

The Export Project is being proposed due to the increased domestic natural gas production, specifically drilling productivity gains that have enabled rapid growth in supplies from unconventional, and particularly shale, gas-bearing formations in the United States. Conventional gas production from the western Canadian sedimentary basin is available and under-developed due to decreased exports of Canadian supplies as a result of the growth of U.S. unconventional gas. Improvements in drilling and extraction technologies have coincided with a rapid diffusion of knowledge in the natural gas industry of the unconventional resource base and best practices in drilling and resource development. These changes have largely eliminated concerns for domestic natural gas production declines.

The export of natural gas as LNG would provide a market solution to allow the further development of these emerging sources of domestic natural gas and would result in the following benefits, all of which are consistent with the public interest:

- Stimulate the Maine state, regional and national economies through job creation, increased economic activity and tax revenues<sup>2</sup>;
- Further the President's National Export Initiative,<sup>3</sup> by improving U.S. balance of payments through the exportation of approximately 3 million mtpa of domestically-produced LNG;
- Raise domestic natural gas productive capacity and promote stability in domestic natural gas and associated liquids pricing;
- Promote liberalization of global natural gas trade through fostering of a global LNG market;
- Advance national security and the security of U.S. allies through diversification of global natural gas supplies;
- Increase economic trade and ties with foreign nations including European countries seeking U.S.-sourced LNG; and
- Increase in potential economic trade with Latin American and the Caribbean, displacing environmentally damaging fuels in those countries such as high sulfur fuel oil and diesel used for the production of electricity.

Downeast has initiated the design and equipment selection for the Downeast LNG Export Project with a priority to avoid adverse impacts to the environment and then minimize them to the greatest extent possible where it is not possible to avoid them. This approach is reflected in this Resource Report as well as Resource Reports 2 through 13. Downeast believes that by incorporating this methodology, the Project defined herein is the least environmentally damaging practicable alternative that meets its stated purpose.

### 1.1.1 National Perspective – Natural Gas

This section has been revised because the data was more than five years old.

---

<sup>2</sup> See Todd Gabe, *Economic Impact of Proposed Downeast LNG Terminal* (May 2014).

<sup>3</sup> See Exec. Order No. 13,534, 75 Fed. Reg. 12,433 (Mar. 16, 2010) (“A critical component of stimulating economic growth in the U.S. is ensuring that U.S. businesses can actively participate in international markets by increasing their exports of goods, services, and agricultural products. Improved export performance will, in turn, create good high-paying jobs.”).

Natural gas has become the fuel of choice in the United States, especially in the power generation sector. Its clean burning properties, high efficiency factors and relatively low price have made it the logical choice for residential, industrial, and commercial use. However, the rapid growth in the demand for natural gas has not been matched by the growth of transportation networks to be able to supply the volumes of natural gas that are demanded. Consequently, certain areas of the country experience constrained supplies during peak demand seasons and that results in significantly higher prices.

The rapid development of horizontal drilling and hydraulic fracturing technologies has resulted in the tapping of significant new reserves of natural gas in the United States and North America. Essentially, the entire outlook on the natural gas resources in the U.S. has drastically changed from just a few short years ago. The U.S. Energy Information Administration (“EIA”) has issued its *Annual Energy Outlook 2014* (“AEO 2014”),<sup>4</sup> in which it evaluates the trends in the use of natural gas from 2014 through 2040. The sections below briefly summarize the findings of the report.

The findings of the AEO 2014 related to natural gas supply are:

- Natural gas production grows by an average rate of 1.6% per year from 2012 to 2040.
- The greatest increase in natural gas production is from supplies derived from shale gas reservoirs.
- Shale gas production is expected to increase from 9.7 trillion cubic feet (“tcf”) in 2012 to 19.8 tcf in 2040.
- Natural gas supplies from the Marcellus Shale gas reservoirs in the Mid-Atlantic states greatly exceeds projected demand from the New England region and Mid-Atlantic states from 2016 through 2040.
- By 2016, the United States becomes a net exporter of natural gas, with peak exports of 3.5 tcf in 2030.

The findings of the Annual Gas Outlook related to natural gas consumption are:

- Natural gas consumption grows by an average rate of 0.8% from 2012 to 2040.
- U.S. total natural gas consumption grows from 25.6 tcf in 2012 to 31.6 tcf in 2040.
- Natural gas use increases in all of the end-use sectors except residential use for residential space heating that declines as a result of population shifts to warmer regions of the country and improvements in appliance efficiency.
- Consumption of natural gas for electric power generation grows by about 2 tcf and makes up about 33% of the increase in total natural gas consumption by 2040. Increasingly restrictive air emission regulations make natural gas the preferred fuel source of choice as older coal-fired electrical generations are retired.
- Consumption of natural gas by the industrial sector increases by 2.5 tcf by 2040. Energy-intensive industries take advantage of relatively low natural gas prices for their highest growth rate through 2028. After 2028, industrial sector consumption of natural gas continues to grow but at a somewhat slower rate.
- Although transportation use currently accounts for only a small portion of total U.S. natural gas consumption, natural gas use by heavy-duty vehicles, trains, and ships shows the largest

---

<sup>4</sup> EIA, *Annual Energy Outlook 2014* (Apr. 2014), available at [http://www.eia.gov/forecasts/aeo/pdf/0383\(2014\).pdf](http://www.eia.gov/forecasts/aeo/pdf/0383(2014).pdf).



percentage growth of any fuel in the projection. Consumption in the transportation sector grows from about 40 billion cubic feet (“bcf”) in 2012 to 850 bcf in 2040.

- Net LNG exports increase by 3.5 tcf from 2012 through 2030 and remain flat thereafter. LNG export volumes are uncertain based on unpredictable factors but unrest in regional economies such as currently present in the former Soviet Union Republics and the shutdown of the nuclear generating industry in Japan may significantly increase the global demand for LNG exports.

As noted above, natural gas production grows by an average rate of 1.6% per year from 2012 to 2040, more than double the 0.8% annual growth rate of total U.S. consumption over the period. The doubling of the production growth rate over that of consumption means supply exceeds demand, which in turn means that the United States transitions from a net importer of natural gas to a net exporter of natural gas. The EIA expects this to happen before 2020, most likely in 2018. The growth in production meets increasing demand and exports, while also making up for a drop in natural gas imports. In short, the U.S. transitions from being a net importer of 1.5 tcf of natural gas in 2012 to a net exporter of 5.8 tcf in 2040.

Presently, about 94% of the natural gas that is consumed in the U.S. is from domestic production sources. The remaining amount of natural gas is imported from Canada, with a small share from imported LNG. While supplies from Canada have always been a significant percentage of the natural gas supplies to the Northeast United States, the level of imports from Canada has declined by about 50% from 2009 to 2012.<sup>5</sup>

The reason for the decline in imports is the development of the natural gas supplies from the shale gas deposits, particularly the Marcellus Shale gas reservoirs in the Mid-Atlantic states. Natural gas derived from the Marcellus from these sources has increased from 2 bcf per day (“bcfd”) in 2008 to 13 bcfd in 2013. Current estimates of the natural gas held in the Marcellus Shale gas reservoirs are estimated to be in excess of 500 tcf.<sup>6</sup> As the production from the Marcellus Shale increases, the level of imports will subsequently decrease and likely cease.

Because of the rapid development of natural gas supplies from shale gas deposits across the United States and Canada, the domestic production of natural gas has been rapidly out-stripping domestic demand. The numbers indicate that the United States was producing more natural gas than could be domestically consumed, thus making it inevitable that the United States would become a net exporter of natural gas. Consequently, the Department of Energy’s Office of Fossil Energy has commissioned studies to analyze the impact that the exportation of natural gas would have on the U.S. energy market and economy. The results of these studies indicate that the United States has a net economic benefit due to LNG exports from the United States. The modeled scenarios in the studies also indicate that the benefits to the U.S. economy increased as the volume of LNG exports increased. Additional studies conducted by independent parties have verified these projections.<sup>7</sup>

### **1.1.2 New England Perspective – Natural Gas**

This section has been revised because the data was more than five years old.

---

<sup>5</sup> See Northeast Gas Ass’n, *Statistical Guide to the Northeast U.S. Natural Gas Industry 2013* 3–4, available at [http://www.northeastgas.org/pdf/statguide\\_13.pdf](http://www.northeastgas.org/pdf/statguide_13.pdf).

<sup>6</sup> *Id.* at 6.

<sup>7</sup> See generally NERA Economic Consulting, *Macroeconomic Impacts of LNG Exports from the United States* (Dec. 3, 2012), available at [http://energy.gov/sites/prod/files/2013/04/f0/nera\\_lng\\_report.pdf](http://energy.gov/sites/prod/files/2013/04/f0/nera_lng_report.pdf); EIA, *Effect of Increased Natural Gas Exports on Domestic Energy Markets, as requested by the Office of Fossil Energy* (Jan. 2012), available at [http://energy.gov/sites/prod/files/2013/04/f0/fe\\_eia\\_lng.pdf](http://energy.gov/sites/prod/files/2013/04/f0/fe_eia_lng.pdf).

Natural gas provides approximately 30% of New England's primary energy needs and serves 2.6 million customers. Fuel oil is the leading home heating fuel that is used in approximately 40% percent of the region's homes, while natural gas now heats approximately 37% of all homes in New England. About 49% of the natural gas supplies are utilized for power generation with approximately 21% for residential use, 16% commercial, and 14% industrial use.<sup>8</sup>

Numerous studies have evaluated the natural gas market in New England, and have estimated that the growth rate of consumption will increase at rate of between 0.4% and 1.6%, depending upon projection assumptions. The range of projected growth rates is driven primarily by natural gas use for electrical power generation. The New England region has aggressively switched to natural gas as the preferred fuel source for electrical generation. For example, approximately 52% of the electricity requirements in New England today are generated by natural gas, compared to only 5% in 1990 and 15% in 2000.<sup>9</sup>

The total annual natural gas sendout for consumption in New England is about 880 bcf.<sup>10</sup> Depending upon how the electrical generating industry responds to increased demands, the demand for additional natural gas supplies is projected to increase through the end of the decade from anywhere between 0.25 bcfd to as much as 0.90 bcfd during peak demand days during the winter.<sup>11</sup>

New England has no native supplies of natural gas. The New England natural gas supply infrastructure is comprised of interstate pipelines that transport natural gas from sources of supply to the point of use or storage, storage facilities that augment local natural gas supplies, local distribution networks that provide service to individual customers, and the Everett terminal, which serves as a source of supply for Boston and the surrounding region. Historically, the main three areas that supplied natural gas to New England were the Gulf Coast, Canada, and LNG importation. LNG provides about 20% of New England's annual gas supply and nearly 30% of peak day supply. Distrigas in Everett, MA supplied approximately 87 Bcf to the New England region in 2012 and Canaport in St. John's, NB supplied an additional 60 Bcf. The continued development of natural gas derived from the Marcellus Shale sources in the Mid-Atlantic states is gradually replacing these sources.<sup>12</sup>

Current Nova Scotia gas production is in decline. Although the recently launched Deep Panuke field will add an additional 12 to 15 years of production, it will likely not be sufficient for a long-term secure supply of feedgas for export or to meet regional demand. In a report presented by the Nova Scotia Department of Energy dated March 2013, the authors cite that base case local demand is estimated at roughly 200 million cubic feet per day ("mmcf") for the next 20 years versus local production that is estimated to be between 175 mmcf and 200 mmcf. Offshore oil and gas exploration may yield new finds that would improve the figures for local production. Moreover, the recent elimination of a gas fracking moratorium in New Brunswick for new wells will encourage additional exploration and

---

<sup>8</sup> See Northeast Gas Ass'n, *Statistical Guide to the Northeast U.S. Natural Gas Industry 2013*, available at [http://www.northeastgas.org/pdf/statguide\\_13.pdf](http://www.northeastgas.org/pdf/statguide_13.pdf).

<sup>9</sup> See EIA, *Today in Energy* (Sept. 6, 2013), <http://www.eia.gov/todayinenergy/detail.cfm?id=12851> (last visited Sept. 9, 2014); New England Gas-Electric Focus Group, *Final Report 1* (Mar. 28, 2014), available at [http://www.nescoe.com/uploads/NEGas-ElectricFocusGroup\\_FinalReport\\_31Mar2014.pdf](http://www.nescoe.com/uploads/NEGas-ElectricFocusGroup_FinalReport_31Mar2014.pdf); see generally Competitive Energy Servs., *Assessing Natural Gas Supply Options for New England and Their Impacts on Natural Gas and Electricity Prices* (Feb. 7, 2014), available at [http://competitive-energy.com/docs/2014/02/CES\\_REPORT\\_NaturalGasSupply\\_20140131\\_FINAL.pdf](http://competitive-energy.com/docs/2014/02/CES_REPORT_NaturalGasSupply_20140131_FINAL.pdf).

<sup>10</sup> Northeast Gas Ass'n, *NGA Regional Market Outlook May 2014*, available at [http://www.northeastgas.org/pdf/mkt\\_update0514.pdf](http://www.northeastgas.org/pdf/mkt_update0514.pdf).

<sup>11</sup> See EIA, *Annual Energy Outlook 2012* 62 (June 2012), available at [http://www.eia.gov/forecasts/aeo/pdf/0383\(2012\).pdf](http://www.eia.gov/forecasts/aeo/pdf/0383(2012).pdf).

<sup>12</sup> See generally Northeast Gas Ass'n, *Statistical Guide to the Northeast U.S. Natural Gas Industry 2013*, available at [http://www.northeastgas.org/pdf/statguide\\_13.pdf](http://www.northeastgas.org/pdf/statguide_13.pdf).

development. If these options are unsuccessful, the Maritime Provinces may increasingly look to the shale gas reserves of the Mid-Atlantic states to meet their natural gas demands.<sup>13</sup>

Although there are six gas pipelines that supply natural gas to the New England region, there is limited pipeline capacity to deliver relatively low cost domestic Marcellus Shale and Canadian gas supplies to New England because the region is at the “end of the pipeline.” Further, as gas demand has risen, pipeline capacity has remained static and become constrained, particularly during cold winter months. Whereas 10 years ago pipeline deliverability to the region was only constrained a few days a year, capacity on some pipelines was recently constrained by more than 50% during winter periods.<sup>14</sup> The constraint has restricted gas flows, increased competition for supply and led to higher gas prices for consumers. The only viable solution to increase gas supply, thereby lowering gas prices, is through the construction of new gas pipelines to New England.<sup>15</sup>

Although the gas from the Marcellus Shale domestic sources is the least expensive gas to produce in the United States, less expensive than the gas that is imported from Canada or that derived from LNG imports, the gas is essentially blocked from entering New England. The relatively low price of domestic gas, its environmental benefits and the shutdown of regional coal plants has increased demand further adding to the constraints that the pipeline transmission system can accommodate. Consequently, the natural gas pipeline system in New England has not kept pace with the increase in demand, the declines in the Canadian offshore gas fields, and new regional gas sources.

In response to these changing market conditions and supply/demand imbalance, the New England Governors have jointly proposed additional pipelines to the region that would increase natural gas supplies by about 1 bcfd. Studies have indicated that an additional 1 bcfd of natural gas would be needed to bring the costs of natural gas in New England in line with adjacent areas of the country.<sup>16</sup>

In 2012, the annual natural gas sendout in New England was about 880 bcf, or about 2.4 bcfd. However, the peak demand during the winter may reach 4.2 to 4.5 bcfd. By 2020, the daily average demand for natural gas is expected to increase by about 0.4504 bcfd. Current pipeline capacity can supply approximately 3.5 to 4.0 bcfd of natural gas, with the remainder traditionally being met with LNG imports.

LNG peak-shaving facilities are relatively small facilities that are used to supplement gas supply on peak winter days. LNG derived natural gas makes up about 30% of New England’s utility winter peak day requirements.<sup>17</sup> A few of the LNG peak-shaving facilities have liquefaction capability to make and store LNG from pipeline-sourced gas during the summer months. Most of New England’s peak-shaving facilities receive LNG, delivered by tanker trucks from the Everett LNG terminal, that they store and re-

---

<sup>13</sup> See generally ICF International, *The Future of Natural Gas Supply for Nova Scotia* (Mar. 28, 2013), available at <http://0-fs01.cito.gov.ns.ca.legcat.gov.ns.ca/deposit/b10664245.pdf>.

<sup>14</sup> See generally Concentric Energy Advisors, *Evaluation of the Impact of Downeast LNG on New England Natural Gas Markets* (Aug. 2014).

<sup>15</sup> See generally U.S. Dep’t of Energy, *Infrastructure Constraints in New England* (Apr. 15, 2014), available at [http://energy.gov/sites/prod/files/2014/04/f15/20140415\\_Infrastructure\\_Constraints\\_in\\_New%20England.pdf](http://energy.gov/sites/prod/files/2014/04/f15/20140415_Infrastructure_Constraints_in_New%20England.pdf).

<sup>16</sup> See Competitive Energy Servs., *Assessing Natural Gas Supply Options for New England and Their Impacts on Natural Gas and Electricity Prices 1* (Feb. 7, 2014), available at Competitive Energy Services, *Assessing Natural Gas Supply Options for New England and Their Impacts on Natural Gas and Electricity Prices* (Feb. 7, 2014), available at [http://competitive-energy.com/docs/2014/02/CES\\_REPORT\\_NaturalGasSupply\\_20140131\\_FINAL.pdf](http://competitive-energy.com/docs/2014/02/CES_REPORT_NaturalGasSupply_20140131_FINAL.pdf).

<sup>17</sup> See Northeast Gas Ass’n, *Statistical Guide to the Northeast U.S. Natural Gas Industry 2013 4*, available at [http://www.northeastgas.org/pdf/statguide\\_13.pdf](http://www.northeastgas.org/pdf/statguide_13.pdf).

gasify on peak winter days. Because they have little storage capability, these facilities are used only on the very coldest of winter days and have limited capabilities beyond those peak days.

### **1.1.3 The Role of the Downeast LNG Import-Export Project**

This section has been revised because of the conversion of the terminal to include export capability.

The construction of a new gas pipeline to New England requires customers that are willing to commit to long-term 20-year gas pipeline capacity contracts. This obligates the customer to buy the same quantity of pipeline capacity every day for 20 years, regardless of their gas demand requirements. There are few such customers in the region that can financially commit to such a contract.

Only customers with a firm consistent gas supply requirement, such as industrial customers, or those with the ability to pass through pipeline capacity charges can commit to such contract terms. In New England, only local gas companies, such as Bangor Gas or NSTAR, have been able to fulfill these conditions. Significant industrial load is non-existent in New England, and power producers are unable to pass on pipeline capacity costs to their power customers due to regulatory restrictions. As a result, power producers instead buy gas priced on a spot basis that is often very expensive during cold winter days. Higher spot gas prices are a principal reason why New England power prices are among the highest in the United States.

In comparison, an LNG export project and its offtakers can commit to long-term gas pipeline capacity contracts as LNG export volumes are also sold through 20-year agreements. The commitment by Downeast LNG and its offtakers to buy up to 450 mmcf/d of pipeline capacity, together with the commitment by local gas companies, will support the construction of additional pipeline capacity to the region, thereby increasing gas supply and liquidity, and lowering gas prices. The new pipeline capacity will be additive to current capacity, and will not reduce the availability of gas pipeline capacity for current consumers. Most importantly, the construction of new pipeline capacity is typically oversized, and expandable with the addition of compression. Customers will have another supply option from which to buy short-term or interruptible gas.

Should New England market conditions dictate, the Downeast LNG Import-Export Project will have the capability of importing and revaporizing imported LNG for use by New England consumers. Moreover, the bi-directional nature of the Downeast LNG Import-Export Project will help ensure that should current market conditions of oversupply change in the future, there will be a means for importing and revaporizing LNG for consumption in U.S. markets.

Downeast will be able to draw its feed gas from a number of different sources. The Project will have the ability to access Canadian gas from the western Canadian sedimentary basin or from both onshore and offshore sources in the Maritime Provinces via the existing Maritimes & Northeast Pipeline-U.S. system that interconnects with that of Maritimes & Northeast Pipeline-Canada. It will also have the ability to access Canadian gas via the existing PNGTS pipeline system, which interconnects with TransCanada's Trans Quebec & Maritimes Pipeline, which in turn interconnects with TransCanada's Mainline, sourcing gas from western Canada. Alternatively, the Downeast LNG Export Project could also access U.S. and Canadian gas at Wright, N.Y., via the proposed Kinder Morgan (Tennessee Gas Pipeline Co.) project or the existing TransCanada Mainline and the Iroquois Gas Transmission System, L.P., pipeline, both of which would source gas supply via the Tennessee Gas Pipeline Co. and Dominion Transmission, Inc. pipeline systems.

## 1.2 Objective

This section has been revised because of the conversion of the terminal to include export capability.

Downeast LNG intends to own, construct, and operate an LNG terminal that has bi-directional capability to liquefy natural gas for export and to regasify imported LNG for sendout into the natural gas pipeline system that serves the New England region. The principal components of the Downeast LNG Import-Export Project include a marine pier, on-shore processing, LNG storage, a sendout/supply pipeline, and appurtenant structures within a commercially feasible distance of a major Northeast gas transmission network with sufficient capacity to provide up to 450 mmscfd of natural gas to the Project.

For the majority of the year, the Downeast LNG Import-Export Project will operate in liquefaction mode. The liquefaction component of the Terminal is designed with a nominal capacity of 3 mtpa of LNG that will be exported to global markets. While the annual demand for natural gas has increased, the New England natural gas market continues to be characterized as a winter peaking market where the peak winter month consumption of natural gas can be approximately 2.8 times greater than off-peak monthly consumption.<sup>18</sup> Outside of the peak winter heating months, the supply capacity of natural gas supplies to the New England region exceeds demand because the supply infrastructure has to be capable of providing sufficient supplies to meet peak demand periods. Downeast LNG will utilize the incremental pipeline capacity for feed gas for liquefaction and export.

During the peak consumption periods, the bi-directional design of the Terminal allows the facility to reverse flow and provide natural gas to the pipeline transmission system alleviating shortages and helping to reduce costs to consumers. In effect, the Downeast LNG Import-Export Project will serve as a major peak-shaving facility during the peak winter demand months. The liquefaction and storage capabilities at the Terminal would act as a buffer for the supply and cost issues of natural gas in New England during the peak heating season. Should New England market conditions dictate, the Terminal has the capability of importing and revaporizing imported LNG for use by New England consumers.

The export capability of the Downeast LNG Import-Export Project will help balance natural gas flows to northern New England on a long-term basis, resulting in improved reliability through greater natural gas supply access. The constraints on the natural gas supply pipeline infrastructure in New England are only apparent during the winter heating months when demand peaks. Expanding the pipeline infrastructure in New England to accommodate increased capacity for only a couple of months in the winter may make the commercial viability of the expansion challenging. However, the Downeast LNG Import-Export Project will provide a market for natural gas supplies during non-peak periods of the year that will certainly increase the commercial viability of expansions to the natural gas supply pipeline system in New England. The increased supply options to the region also may help mitigate the volatility in natural gas pricing experienced by natural gas consumers in the Northeast, including northern New England.

## 1.3 Location and Description of Facilities

### 1.3.1 Project Location

This section has been revised because of the conversion of the terminal to include export capability.

---

<sup>18</sup> See Concentric Energy Advisors, *New England Cost Savings Associated with New Natural Gas Supply and Infrastructure* 8 (May 2012), available at [http://www.spectraenergy.com/content/documents/Brochures/New\\_England\\_Cost\\_Savings\\_Infrastructure\\_Report.pdf](http://www.spectraenergy.com/content/documents/Brochures/New_England_Cost_Savings_Infrastructure_Report.pdf).

The Export Project will be located totally within Downeast LNG's current Robbinston, Maine site at Mill Cove. See Figure 1-1, Preliminary Site Plot Plan.

### **1.3.2 Project Description**

This section has been revised because of the conversion of the terminal to include export capability.

The Export Project will have nominal LNG production capacity of 3 mtpa. The natural gas will be delivered via a 29.8-mile-long, 24-inch-diameter natural gas pipeline ("Pipeline") that will connect the Terminal with the Maritimes and Northeast Pipeline ("M&NP") system near the town of Baileyville, Maine. The Project will be capable of processing an average of approximately 450 mmscfd of pipeline-quality natural gas for LNG production.

Table 1-1 summarizes the proposed equipment for the Export Project compared to that required for the previously-proposed Downeast LNG Import Project. The differences in equipment for the bi-directional capability of the Project are listed as follows:

#### Marine Facilities and Transfer Lines

There are no changes in the marine facilities and transfer lines.

#### LNG Storage

The changes to the LNG storage components are as follows:

- One (1) LNG storage tank with a nominal usable storage capacity of 160,000 m<sup>3</sup>. The tank will remain a full containment design consisting of an inner steel tank and an outer concrete tank. The outer concrete tank is sized to contain 110 percent of the volume of the inner tank;
- Fully submerged Low Pressure LNG transfer pumps that will be used to send out LNG to the High Pressure Pumps (in the Regasification Mode) or to LNGCs (in Loading Mode).
- A boil-off gas recovery system;
- High Pressure LNG pumps to increase LNG pressure to the natural gas send-out pressure; and
- A regasification system with two (2) SCVs of which only one SCV will be operational during the sendout mode while the other SCV will be the backup unit.

#### LNG Liquefaction Facilities

The LNG Liquefaction Facilities are new and are as follows:

- Feed gas pretreatment systems
- One (1) LNG liquefaction train with a nominal design capacity of 3 mtpa;
- Refrigerant storage and handling;
- Refrigerant compression systems; and
- Refrigerant cooling system.

#### Pipeline Facilities

The changes in the Pipeline Facilities are as follows:

- The diameter of the pipeline will be reduced from 30 inches to 24 inches.

#### Utilities, Infrastructure and Support Systems

The changes to the ancillary facilities and support systems consist of the following:

- Hazard detection and mitigation systems will be expanded to cover the liquefaction area;
- Fire detection and fire fighting system will be expanded to cover the liquefaction area; and
- Electric power will be provided by onsite power generation facilities;

#### Vent and Flare Systems

The vent and flare system design will be supplemented as necessary to accommodate the liquefaction facilities.

#### Hazard Detection and Response

The Hazard Detection and Mitigation System (HDMS) will be expanded to cover the liquefaction area.

#### Metering

Metering will be revised to account for the bi-directional capability.

#### Pneumatic Testing

There are no changes to the pneumatic testing.

#### Hazard Control System

The Hazard Control System will be expanded to cover the liquefaction area.

### **1.3.3 LNG Loading/Unloading**

This section has been revised because of the conversion of the terminal to include export capability.

There is no proposed change to the LNG loading/unloading system. The marine handling equipment systems are capable of transferring LNG in either the import or export operational mode. The single unloading berth design on the facility's approximately 3,862-foot long pier has been designed for LNGCs that will range in size from 70,000 m<sup>3</sup> up to 165,000 m<sup>3</sup>. The size (from 70,000 m<sup>3</sup> up to 165,000 m<sup>3</sup>) of the LNGCs that will service the Project remains unchanged as does the number of annual LNGC arrivals (60).

### **1.3.4 LNG Liquefaction**

This section has been revised because of the conversion of the terminal to include export capability.

Upon entering the Export Project, the natural gas will be treated at the pretreatment facility, where carbon dioxide, sulfur compounds, water, and mercury will be removed to meet liquefaction feed gas specifications. The treatment process will be accomplished with an amine sweetening system, a molecular sieve dehydration system, and a mercury removal unit. The treated natural gas will then be sent to the liquefaction facility for conversion to LNG.

The liquefaction facility will have a nominal design capacity of 3 mtpa. The liquefaction facility will include refrigerant storage and handling systems, compression, cooling, gas pre-treatment and, if required, heavy hydrocarbon liquids removal and storage facilities. The feed gas requirement to support this production is approximately 450 million standard cubic feet per day of pretreated natural gas. Preliminary engineering indicates that the liquefaction technology will be Air Products & Chemicals, Inc. Propane-Pre-cooled, Mixed Refrigerant, which entails two refrigeration cycles to pre-cool and liquefy the natural gas feed.

In this process, the natural gas feed is first pre-cooled using propane refrigerant at descending pressure levels and corresponding lower vaporization temperatures. After being cooled by the propane refrigeration, the feed gas will enter the main cryogenic heat exchanger (“MCHE”) where sub-cooled LNG is produced by cooling and liquefying of natural gas against the Mixed Refrigerant. Sub-cooled LNG leaving the MCHE is then depressurized and further cooled through LNG Liquid Turbines. LNG at approximately 50 pounds per square inch gauge (“psig”) will flow to the LNG storage tank.

Process cooling will be provided by ambient air. Gas-fired, aeroderivative electric turbine motors will drive the propane and mixed refrigerant compressors.

### **1.3.5 LNG Storage and Natural Gas Sendout**

This section has been revised because of the conversion of the terminal to include export capability.

The only changes to the LNG storage and natural gas sendout are as follows:

- One (1) LNG storage tank with a nominal usable storage capacity of 160,000 m<sup>3</sup>. The tank will remain a full containment design consisting of an inner steel tank and an outer concrete tank. The outer concrete tank is sized to contain 110 percent of the volume of the inner tank;
- An SCV regasification system with two (2) SCVs of which only one SCV will be operational during the sendout mode while the other SCV will be the backup unit; and
- The amount of water generated by the SCVs will be substantially reduced, since only one SCV will ever be operational at a time and the duration of their operation is drastically reduced and may be sporadic.

### **1.3.6 Utility and Security/Control Systems**

This section has been revised because of the conversion of the terminal to include export capability.

The only change in the utility and security/control systems is that during normal operation in the liquefaction mode, the Downeast LNG Import-Export Project will provide its own electrical power.

### **1.3.7 Natural Gas Pipeline**

This section has been revised because of the conversion of the terminal to include export capability.

The diameter of the Pipeline will be reduced from 30 inches to 24 inches. There has been no change to the Pipeline route.

### **1.3.8 Acreage**

There has been no change to the acreage of the Project site property.



### **1.3.9 Aboveground Facilities**

There has been no change to the aboveground facilities associated with the Pipeline.

The aboveground facilities of the Terminal site area have changed with the inclusion of the liquefaction facilities. Table 1-1 lists the major equipment that will be installed at the Terminal. A preliminary siting of the equipment locations is shown on the plot plan presented in Figure 1-1. Additional engineering drawings are included in Resource Report 13.

## **1.4 Project Schedule**

This section has been revised because of the conversion of the Terminal to include export capability.

Downeast LNG anticipates filing its supplemental information to amend the December 22 Application pursuant to Sections 3 and 7 of the NGA, respectively, no later than January 15, 2016, and will respectfully request that the Commission issue an Order authorizing the siting, construction, and operation of the Downeast LNG Import-Export Project no later than January 13, 2017. Downeast LNG anticipates filing its Project implementation plan no later than January 30, 2017, and filing a request for authorization to commence construction by February 28, 2017. Downeast LNG anticipates a construction schedule of approximately 48 months for the completion and startup of the Downeast LNG Import-Export Project.

The Preliminary Project Schedule is included as Appendix 1A.

## **1.5 Land Requirements**

This section has been revised because of the conversion of the terminal to include export capability.

While the Export Project will not result in additional land requirements, certain land use classifications have changed in the affected areas. Since Resource Report 1 was first filed in 2006, there have been some minor changes in land use. For instance there are some new houses that have been built and other areas of open space that have reverted to forest. Land use has been reclassified along the pipeline right-of-way (“ROW”) to understand if any substantive changes have occurred in the ROW that would warrant further analysis. Based on the land use reclassification within the total construction ROW, there are 205.5 acres of forest land, 26.6 acres of developed land, 12.0 acres of grassland, and 3.6 acres of submerged lands. These represent minor changes in land use. It should be noted that in 2006, U.S. Geological Survey (“USGS”) land-use data was used to make this analysis. Because the USGS data has not been updated since 2006, land use for this filing was classified from 2013 aerial photography, and therefore the numbers are not directly comparable between the USGS 2006 database and this 2014 update.

As such, Downeast LNG has updated the following information for this filing. Table 1-2 –Pipeline and Terminal Acreage Impacts lists the temporary (construction) and permanent impacts on current land use categories for the Terminal and the Pipeline. The Terminal category includes the impacts for the LNG storage area as well as the pier.

### **1.5.1 Pipeline Facilities**

There are no changes to the proposed pipeline facilities or routing.

### 1.5.2 Terminal Facilities

The only change to the Terminal Facilities is the Liquefaction Facilities that are now part of the Terminal.

## 1.6 Construction Procedures

### Use of Environmental Inspectors and Company-wide Environmental Training

This section has been revised because the data was more than five years old.

The only change in the Use of Environmental Inspectors and Company-wide Environmental Training is that both the FERC *Upland Erosion Control, Revegetation, and Maintenance Plan* and *Wetland and Waterbody Construction and Mitigation Procedures* have been updated since the original Downeast LNG application. The current 2013 versions of each of these manuals are incorporated by reference herein for use during the Downeast LNG Import-Export Project construction and operational periods.

### Socioeconomic Considerations

This section has been revised because of the conversion of the terminal to include export capability.

The total estimated construction costs of the Downeast LNG Import-Export Project will be approximately \$2.0 billion dollars. While the full construction period will be approximately four years, the majority of the employment and economic impact will occur during the first three years. Statewide, a direct employment of 1,651 full- and part-time jobs is anticipated for each of the first three years of construction. Project operations in Washington County would result in an estimated 185 full- and part-time jobs (including the contract services and maintenance providers). In May, 2014, Professor Todd Gabe of the University of Maine completed an economic impact study examining the state and local (*i.e.*, Washington County) economic impacts of the proposed Downeast LNG Import-Export Project during the first three year construction period.<sup>19</sup> Results of the study show that:

- Constructing the Downeast LNG Import-Export Project, with an annual processing capacity of three million tonnes, will require an estimated \$2.0 billion upfront investment.
- Over the first three years of construction, the Downeast LNG Import-Export Project will generate a total statewide economic impact—including multiplier effects—of an estimated \$1.5 billion in output, an average of 3,525 full- and part-time jobs, and a three-year total of \$562 million in labor income.
- Over the first three years of construction, the impact of Downeast LNG Import-Export Project construction on the Washington County economy—including multiplier effects—will be an estimated \$660 million in output, an average of 2,195 full- and part-time jobs, and a three-year total of \$266 million in labor income.
- After the Downeast LNG Import-Export Project is constructed, the permanent statewide impact of its annual operations—including multiplier effects—will be an estimated \$102 million in output, 505 full- and part-time jobs, and \$32.4 million in labor income.
- The permanent impact of the Downeast LNG Import-Export Project's annual operations on the Washington County economy—including multiplier effects—will be an estimated \$69.6 million in output, 310 full- and part-time jobs, and \$20.9 million in labor income.

---

<sup>19</sup> Todd Gabe, *Economic Impact of Proposed Downeast LNG Terminal* (May 2014)

The type of construction jobs that would constitute the Downeast LNG Import-Export Project construction workforce is not expected to significantly differ from that previously described for the Downeast LNG Import Project.

### **1.6.1 Pipeline Facilities**

There are no changes in the construction procedures for the Pipeline.

### **1.6.2 Construction in Special Interest Areas**

#### **Wetlands and Waterbodies**

This section has been revised because the data was more than five years old.

As an update for this Environmental Report, Downeast LNG has reviewed the potential for any change in the wetlands and waterbodies that might be affected by the Project. Wetlands and waterbodies were delineated in August 2014 by Verdanterra, LLC of Freeport, Maine in order to provide more current information on the wetland boundaries. Completion of a jurisdictional determination is still outstanding with the U.S. Army Corps of Engineers. In order to complete the jurisdictional determination, Downeast LNG is providing the updated information on wetlands and waterbodies. The previously delineated wetlands and waterbodies were last delineated between 2006 and 2008 and therefore required updating to meet regulatory standards.

The wetland delineation on the proposed import-export terminal site identified 9.1 acres of wetland; a 0.1 acre increase, which will be impacted by construction and operation. The 2014 delineation also reported 29.5 acres of wetlands in the pipeline construction ROW and 13.9 acres of wetlands in the pipeline's operational ROW. This acreage may be reduced during final routing design to avoid or minimize the extent of wetland crossings. Resource Report 2 fully describes wetlands and waterbodies potentially impacted by Pipeline construction.

The FERC *Wetland and Waterbody Construction and Mitigation Procedures* and the M&NP *Soil Erosion and Sediment Control Guidelines* will be followed during pipeline planning and construction.

#### **Cropland and Residential Areas**

This section has been revised because the data was more than five years old.

As an update for this Environmental Report, Downeast LNG has reviewed the number of residences within 50 feet of the construction workspaces (also see Resource Report 8). There are approximately two residences that fall within 50 feet of the construction ROW. Special care will be taken in residential areas to minimize neighborhood and traffic disruption and to control noise and dust to the extent practicable.

#### **Road Crossings**

There are no changes to the road crossing procedures for the Pipeline.

#### **Rock Blasting and Rugged Topography**

There are no changes in the Construction Procedures for Rock Blasting and Rugged Topography.

#### **Aboveground Facilities**

There are no changes in the Construction Procedures for Aboveground Facilities.

### **Off-shore Facilities**

There are no changes in the Construction Procedures for Off-Shore Facilities.

### **Berthing Facilities**

There are no changes in the Construction Procedures for Berthing Facilities.

### **Onshore Facilities**

There are no changes in the Construction Procedures for Onshore Facilities.

### **LNG Storage Tank and Foundation Construction**

The only change is that there will now be only one 160,000 m<sup>3</sup> (net) full containment LNG storage tank.

### **Hydrostatic Testing of the LNG Storage Tank**

The only change is that there will now be only one 160,000 m<sup>3</sup> (net) full containment LNG storage tank.

### **Site Stabilization and Restoration**

This section has been revised because the data was more than five years old.

The only change in the Use of Environmental Inspectors and Company-wide Environmental Training is that both the FERC *Upland Erosion Control, Revegetation, and Maintenance Plan* and *Wetland and Waterbody Construction and Mitigation Procedures* have been updated by FERC and the most current versions and are incorporated herein by reference.

## **1.6.3 Pipeline**

### **Pipeline and Right-of-Way Patrols**

There are no changes to the Pipeline and Right-of-Way Patrols.

### **Erosion and Sedimentation Management and Inspection**

There are no changes to Erosion and Sedimentation Management and Inspection.

### **Right-of-Way Clearance Areas – Maintenance**

There are no changes to Right-of-Way Clearance Areas – Maintenance program.

## **1.6.4 Terminal Facilities**

This section has been revised because of the conversion of the Terminal to include export capability.

The Terminal will be operated and maintained in accordance with the Department of Transportation Federal Safety Standards for LNG Facilities, 49 CFR Part 193, and NFPA 59A Standard for the Production, Storage and Handling of LNG, incorporated by reference. In addition, the marine facility will be operated and maintained in accordance with the USCG regulations for LNG Waterfront Facilities, 33 CFR Part 127.

The Terminal will be operated on a permanent 24-hour basis, and will be staffed accordingly. The following sections describe the modes of operation that the terminal will experience.

### **Ship Loading Mode**

LNG will be loaded onto LNGCs using the in-tank LNG transfer pumps. The maximum loading rate will be 10,000 m<sup>3</sup>/hour with LNGCs arriving with a maximum cargo equilibrium pressure of 2.5 psig. LNG loading will be accomplished through the same LNG arms that will be used for LNG ship unloading. The LNG transfer will be accomplished through a single transfer pipeline.

### **Ship Unloading Mode**

There are no changes to the Ship Unloading Mode.

### **Without Ship Unloading Mode**

There are no changes to the Without Ship Unloading Mode.

### **Sendout/Vaporization Mode**

There are no changes to the Sendout/Vaporization Mode.

## **1.6.5 Operations and Maintenance Team Organization**

There are no changes in the Operating and Maintenance Team Organization.

### **Operations and Maintenance (O&M) Procedures**

There are no changes to Operations and Maintenance Procedures.

## **1.6.6 Operations and Maintenance Team Training**

There are no changes to Operations and Maintenance team Training.

### **Basic LNG Training**

There is no change to the Basic LNG Training program.

### **Vendor Supplied Training**

There is no change to Vendor Supplied Training program.

### **Health, Safety and Security Training**

There is no change to Health, Safety and Security Training with the exception of additional program components related to liquefaction equipment.

### **Environmental Training**

There is no change to the Environmental Training program.

### **Hands-On Training**

There is no change to the Hands-On Training program.

### **Ongoing Training**

There is no change to the Ongoing Training program.

## **1.7 Future Plans and Abandonment**

There is no change to any future plans, including facility abandonment.

## **1.8 Permits and Approvals**

This section has been revised because of the conversion of the Terminal to include export capability.

There is no change to the Permits and Approvals section. However, Table 1-3 Environmental Permits and Approvals has been updated to reflect the current Project timetable.

## **1.9 Affected Landowners**

This section has been revised because the data was more than five years old.

An updated (August 2014) List of Affected Landowners has been previously submitted to the Commission. The landowners have been notified of the revised Project purpose as a bi-directional LNG terminal in accordance with FERC procedures.

### **Public Agency/Landowner Consultation**

This section has been revised because the data was more than five years old.

Downeast LNG initiated its development efforts in 2004 with an intensive program of information sharing and Project concept review with community residents, public interest groups, local specialists (e.g., marine pilots of the area), local government officials, and various public agencies. The intent of the information acquisition and sharing program was to seek local input on the proposed Project components, including facility siting, marine transportation, pipeline routing, labor skills availability, etc.

Since announcement of the Downeast LNG Import Project in July 2005, Downeast LNG has attempted to educate the public and receive feedback on the project through formal and informal public meetings, informational open houses, one-on-one discussions, written material, and other means. (See discussion below.)

The end result of Downeast LNG's extensive information gathering and Project concept review with members of the local communities has resulted in the definition of a Project that Downeast LNG believes is appropriate and well balanced for the interests of the public relative to the provision of a new natural gas source and landowner and community concerns and environmental resource issues. The acceptance of the Downeast LNG Import Project by the Town of a Robbinston in a local vote of 227 in favor to 83 opposed demonstrates the value of the community's input to the Project conceptualization and definition process.

In accordance with the guidelines adopted by FERC, Downeast LNG has invited landowners, municipal, town and state government officials, and environmental groups to discuss all potential concerns and has encouraged community input in order to plan the most appropriate Terminal site and Pipeline route for the Project.

### **Downeast LNG Public Involvement Program**

This section has been revised because the data was more than five years old.

Downeast LNG is committed to sharing information and maintaining an open dialogue and open door policy with the Town of Robbinston, surrounding communities, and all stakeholders. The importance of an informed community is critical to the mutual success of the Project and the community in which it is located. Consequently, a broad-based Public Involvement Program has been implemented for maximum outreach to the communities. This program consists of several elements as follows:

- Public meetings to present the Downeast LNG Project;
- Public seminars on issues of importance to the community;
- Public information briefs and bulletins in local papers;
- Newsletters to the community;
- Letters to the Editor/Op-Eds;
- Press releases;
- Radio announcements;
- Rapid response to direct inquiries; and
- Website maintenance.

### **Public Meetings**

This section has been revised because the data was more than five years old.

On September 16, 2014 Downeast LNG sponsored a public Open House for all interested parties regarding its plans to add natural gas liquefaction capacity to the Project. Representatives from Downeast LNG and FERC were available to respond to questions regarding the Project.

### **Public Seminars**

No new public seminars are planned at this time.

### **Public Information Briefs and Bulletins**

No new public information briefs or bulletins are planned at this time.

### **Community Newsletters**

This section has been revised because the data was more than five years old.

Downeast LNG direct-mails a newsletter to all Robbinston property owners periodically to update them on Project status, new developments, and any issues that have been raised. The newsletters are typically three-to-five pages in length, and are an effective tool for keeping the community involved and informed. Recipients of the newsletters also include certain non-property owners such as local media and various government officials.

### **Press Releases**

This section has been revised because the data was more than five years old.

Press releases are developed periodically to share information of general interest to the public and media. Downeast LNG produced a press release announcing the addition of natural gas liquefaction capability for the Project on June 20, 2014.

### **Radio Announcements**

Downeast LNG began using radio announcements in November 2005 as a means of reaching more people than can be achieved with newspaper bulletins, briefs, and newsletters alone. The first radio announcement was an introduction to Downeast LNG and a statement of commitments. Subsequent announcements have included general Project status updates or information about upcoming public meetings and events.

The announcements are broadcast by three radio stations (WQDY, WARZ, and WCRQ) covering the entire region, from Machias to Houlton in Maine, and as far as Nova Scotia in Canada. The selected stations also represent a broad demographic that includes young and old.

Downeast LNG representatives have also been frequently interviewed by radio representatives.

No new radio announcements are planned at this time.

### **Rapid Response to Direct Inquiries**

There is no change to the Rapid Response to Direct Inquiries program.

### **Website Maintenance**

There is no change to Website Maintenance.

## **1.10 Nonjurisdictional Facilities**

There are no new nonjurisdictional facilities associated with the Export Project.

## **1.11 References**

1. Competitive Energy Servs., Assessing Natural Gas Supply Options for New England and Their Impacts on Natural Gas and Electricity Prices (Feb. 7, 2014)
2. Concentric Energy Advisors, *Evaluation of the Impact of Downeast LNG on New England Natural Gas Markets* (Aug. 2014)
3. Concentric Energy Advisors, *New England Cost Savings Associated with New Natural Gas Supply and Infrastructure* (May 2012)
4. Federal Energy Regulatory Commission, *Downeast LNG Project: Final Environmental Impact Statement*, FERC\EIS: 0231F ES-7, (May 15, 2014)
5. Federal Energy Regulatory Commission, *Upland Erosion Control, Revegetation, and Maintenance Plan* (May 2013)
6. Federal Energy Regulatory Commission, *Wetland and Waterbody Construction and Mitigation Procedures* (May 2013)
7. Gabe, Todd, *Economic Impact of Proposed Downeast LNG Terminal* (May 2014)



8. ICF International, *The Future of Natural Gas Supply for Nova Scotia* (Mar. 28, 2013)
9. NERA Economic Consulting, *Macroeconomic Impacts of LNG Exports from the United States* (Dec. 3, 2012)
10. New England. Gas-Electric Focus Group, *Final Report* (Mar. 28, 2014)
11. Northeast Gas Association, *NGA Regional Market Outlook May 2014* (May 2014)
12. Northeast Gas Association, *Statistical Guide to the Northeast U.S. Natural Gas Industry 2013* (2013)
13. U.S. Department of Energy, *Infrastructure Constraints in New England* (Apr. 15, 2014)
14. U.S. Energy Information Administration, *Annual Energy Outlook 2012* (June 2012)
15. U.S. Energy Information Administration, *Annual Energy Outlook 2014* (Apr. 2014)
16. U.S. Energy Information Administration, *Effect of Increased Natural Gas Exports on Domestic Energy Markets, as requested by the Office of Fossil Energy* (Jan. 2012)

# TABLES

**Table 1-1 Comparative Equipment Listing for Export Project Changes**

<b>LNG Facilities Evaluated in Downeast LNG FEIS That Will be Included in Bi-Directional Facility</b>	<b>LNG Facilities Evaluated in Downeast LNG FEIS That Will Not be Included in Bi-Directional Facility</b>	<b>LNG Facilities not Evaluated in Downeast LNG FEIS That Will be Included in the Bi-Directional Facility</b>
<u><b>Marine Facilities</b></u>  L-101 A/B/C LNG Unloading Arm  L-102 Vapor Return Arm  Marine Pier and Trestle  D-103 Jetty Drum  <u><b>LNG Storage Facilities</b></u>  T-201A LNG Storage Tank  P-202AA/AB LNG Sendout Pumps  <u><b>Regasification Facilities</b></u>  P-301 A/B HP LNG Pumps  D-208 HP Pump Drum  B-212 A/B Fuel Gas Heaters  E-302 A/B LNG Vaporizers  P-905 A/B SCV Blowdown Sump Pumps  <u><b>Vapor Handling Facilities</b></u>  E-207 BOG Condenser  C-205 A/B Vapor Return Blower  C-204 A/B BOG Gas Compressor	<u><b>LNG Storage Facilities</b></u>  T-201B LNG Storage Tank  P-202 BA/BB LNG Sendout Pumps  <u><b>Regasification Facilities</b></u>  P-301 C/D HP LNG Pumps  E-302 C/D LNG Vaporizers  E-206 Gas Make-Up Vaporizer  <u><b>Vapor Handling Facilities</b></u>  C-204C BOG Gas Compressor  <u><b>Fire Protection Facilities</b></u>  P-605 A/B/C/D/E/F/G Seawater Backup Firewater Pumps	<u><b>Feed Gas Pretreatment</b></u>  Pipeline Gas Pretreatment Facilities  <u><b>LNG Liquefaction Facilities</b></u>  LNG Liquefaction Train  Refrigerant Storage and Handling  Refrigerant Compression Systems  Refrigerant Cooling System  Natural Gas Liquids Removal and Handling Facilities  <u><b>Vapor Handling Facilities</b></u>  Vent and Flare Systems  <u><b>Fire Protection and Hazard Detection Facilities</b></u>  Expansion of current design fire protection system  Expansion of current design hazard detection and mitigation system

LNG Facilities Evaluated in Downeast LNG FEIS That Will be Included in Bi-Directional Facility	LNG Facilities Evaluated in Downeast LNG FEIS That Will Not be Included in Bi-Directional Facility	LNG Facilities not Evaluated in Downeast LNG FEIS That Will be Included in the Bi-Directional Facility
<p><b><u>Vapor Handling Facilities</u></b> (continued)</p> <p>D-203 BOG Drum</p> <p><b><u>Fire Protection and Hazard Detection Facilities</u></b></p> <p>T-601 Fire Water Tank</p> <p>P-602 Electric Fire Pump</p> <p>P-603 Diesel Fire Pump</p> <p>P-604 Jockey Firewater Pump</p> <p>Hazard Detection Systems</p> <p><b><u>Utilities and Auxiliaries</u></b></p> <p>G-901 Emergency Diesel Generator</p> <p>P-901 A/B/C Well Pumps</p> <p>P-903 A/B Backwash Pumps</p> <p>P-923 A/B Potable Water Pumps</p> <p>P-926 A/B Service Water Pumps</p> <p>P-981 A/B Water Treatment Sump Pumps</p> <p>P-982 A/B Process Area Sump Pumps</p> <p>P-983 A/B LNG Vaporizer Area Sump Pumps</p> <p>P-984 A/B Oily Waste Sump Pumps</p>		

LNG Facilities Evaluated in Downeast LNG FEIS That Will be Included in Bi-Directional Facility	LNG Facilities Evaluated in Downeast LNG FEIS That Will Not be Included in Bi-Directional Facility	LNG Facilities not Evaluated in Downeast LNG FEIS That Will be Included in the Bi-Directional Facility
<p><b><u>Utilities and Auxiliaries</u></b> (continued)</p> <p>P-985 A/B LNG Spill Containment Area Sump pumps</p> <p>P-990 A/B Sanitary Waste Grinder Pumps</p> <p>P-904 A/B Multimedia Filter Air Blowers</p> <p>T-922 Potable Water Tank</p> <p>T-924 Potable Water Hydrostatic Tank</p> <p>T-925 Service Water Tank</p> <p>T-927 Service Water Hydrostatic Tank</p> <p>C-941 A/B Air Compressor</p> <p>D-943 Instrument Air Receiver</p> <p>D-944 Plant Air Receiver</p> <p>D-963 Nitrogen Receiver</p> <p>L-902 A/B Multimedia Filters</p> <p>L-989 Oil Waste System</p> <p>L-991 Sanitary Waste Treatment Package</p> <p>L-942A/B Air Dryer Package</p> <p>L-961 Liquid Nitrogen Storage Vessel</p> <p>L-962 A/B Nitrogen Vaporizer</p>		

LNG Facilities Evaluated in Downeast LNG FEIS That Will be Included in Bi-Directional Facility	LNG Facilities Evaluated in Downeast LNG FEIS That Will Not be Included in Bi-Directional Facility	LNG Facilities not Evaluated in Downeast LNG FEIS That Will be Included in the Bi-Directional Facility
<p><b><u>Buildings and Structures</u></b></p> <p>Administration Building</p> <p>Maintenance / Warehouse Building</p> <p>Main Control Room</p> <p>Utility Building</p> <p>BOG Compressor Building</p> <p>Security Building</p> <p>Firewater Pump House</p> <p>Jetty Control Room</p> <p>A-807 Power Distribution Center</p> <p><b><u>Impoundment Facilities</u></b></p> <p>S-606 LNG Spill Containment</p> <p>S-607 LNG spill containment</p> <p>S-608 LNG Spill Containment</p>		

**Table 1-2 Pipeline and Terminal Acreage Impacts (Updated April 2014)**

<b>Item</b>	<b>Pipeline Operational Right of Way</b>	<b>Pipeline Construction Area</b>	<b>Terminal</b>
<b>Land Cover</b>			
Forested Area (acres)	116.5	205.5	47
Agricultural Area (acres)	0	0	0
Grassland (acres)	2.6	11.9	0
Developed Areas (acres)	8.5	26.5	0.04
Submerged Lands (acres)	0	0	3.6
<b>Wetlands and Waterbodies</b>			
Field Delineated Wetlands (acres)	13.9	29.5	9.1
Remotely Delineated or NWI Wetlands (acres)	0.01	0.07	0
Total Wetlands (acres)	13.9	29.6	9.1
Waterbodies Crossed*	26 crossings	26 crossings	0 crossings
Major Waterbodies (>100 feet)	1 crossing	1 crossing	0 crossings
<b>Significant Species and Habitat</b>			
Threatened and Endangered Species Habitat (acres)	0	0	0
Shorebird Feeding/Roosting Habitat (acres)	0	0	1.9
Inland Wading Bird/Waterfowl Habitat (acres)	3.2	6.4	0
Deer Wintering Area (acres)	0	0	0
Atlantic Salmon Habitat (acres)	0	0	0
Coastal Wetlands (acres)	0	0	3.6

\*includes multiple crossings of same stream

**Table 1-3 Environmental Permits and Approvals (Updated July 2015)**

<b>Agency</b>	<b>Permits/Approvals/Consultations</b>	<b>Anticipated Application Filing/Consultation Date</b>
<b>FEDERAL</b>		
Federal Energy Regulatory Commission (FERC)	Authorization under Sections 3a(Approval of Place of Import for Natural Gas) and 7c (Certificate of Public Convenience and Necessity) of the Natural Gas Act	Downeast filed original applications on December 22, 2006 and January 16, 2008. Anticipates a January 2016 Application for the Import-Export Project
Advisory Council on Historic Preservation (ACHP)	Opportunity to comment on the project under Section 106 of the NHPA	Surveys and evaluations identifying historic properties, and consultations completed with the SHPO and THPO.
U.S. Army Corps of Engineers (COE)	Authorization for activities that will occupy, fill, or grade land in a floodplain, streambed, or channel of a stream or other waters of the United States under Section 10 of the Rivers and Harbors Act of 1899	Preliminary permit application submitted on December 20, 2006. Will submit revised final permit application in conjunction with Maine State permitting and with consideration of new pipeline diameter with updated wetlands database.
	Authorization to discharge dredged or fill material into waters of the United States under Section 404 of the Clean Water Act	Preliminary permit application submitted on December 20, 2006. Will submit revised final permit application in conjunction with Maine State permitting and with new data involving marine environment ( <i>e.g.</i> Eel grass survey results).
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries)	<p>Consultation with NOAA Fisheries Protected Resources Division regarding compliance with Section 7 of the ESA and the MMPA</p> <p>Consultation with NOAA Fisheries Habitat Conservation Division on threatened and endangered aquatic species, EFH conservation recommendations, and compliance with Section 305 of the MSA</p>	<p>Downeast submitted Consultation Request Letter on February 21, 2006; and January 7, 2008 for the amended pipeline route. FERC's BA included as Appendix C of EIS.</p> <p>FERC's EFH Assessment included as Appendix C of EIS.</p> <p>NOAA Approval of FERC BA negotiated successfully as part of FEIS preparation in 2013. BA to be reviewed in consideration of proposed export project.</p>



**Table 1-3 Environmental Permits and Approvals (Updated July 2015)**

Agency	Permits/Approvals/Consultations	Anticipated Application Filing/Consultation Date
<b>FEDERAL (continued)</b>		
U.S. Department of Homeland Security U.S. Coast Guard (Coast Guard)	34 CFR 127 Issue Letter of Recommendation, Waterfront Facilities Handling LNG and Liquefied Hazardous Gas, and Operational Plan	Downeast submitted an initial LOI to the Coast Guard on December 20, 2005 and amendments to the LOI on January 6 and February 8, 2006; and filed a preliminary WSA on December 21, 2005 with a follow-on WSA on December 19, 2006. The Coast Guard issued its LOR and WSR on January 6, 2009, assessing the waterway to be suitable provided risk mitigation measures are implemented. A subsequent 2-Year review was recently completed and found to be Acceptable to USCG. The USCG has issued an affirmative finding regarding the WSA being suitable for LNG Export.
	Permission to Establish Aids to Navigation (33 CFR Part 66, 14; U.S.C. §§ 84-86)	To be submitted following conclusion of primary state and federal permitting (anticipated 2016).
	Spill Prevention and Spill Response Plan under 33 U.S.C. § 1321	Draft Plan submitted on December 22, 2006. No additional work effort required until startup.
U.S. Department of Defense (DOD)	Consultation as required by Section 311 of the Energy Policy Act of 2005 and Section 3 of the Natural Gas Act	FERC consultation on March 24, 2006 with the DOD regarding information on project effects to military installations. No response or comments received. No concurrence required.
U.S. Department of the Interior, Fish and Wildlife Service (FWS)	Section 7 of the ESA Consultation regarding effects on threatened and endangered species  Incidental Take Permit under Migratory Bird Act and Endangered Species Act	Downeast submitted Consultation Request Letter on February 21, 2006; and January 7, 2008 for the amended pipeline route. FERC's BA included as Appendix C of EIS.  Need for permit to be determined following FEIS.
U.S. Department of Transportation (DOT)	49 CFR 192; 49 CFR 193 Evaluate compliance with federal safety standards; encroachment permits for crossing of federal highways	Permit application to be submitted during construction.

**Table 1-3 Environmental Permits and Approvals (Updated July 2015)**

Agency	Permits/Approvals/Consultations	Anticipated Application Filing/Consultation Date
<b>STATE</b>		
Maine Department of Agriculture, Conservation and Forestry – Bureau of Parks and Land;	Submerged lands lease and easement	To be submitted in conjunction with Maine State DEP Permitting.
Maine Natural Areas Program	Consultation and review on other Maine State permits	Consultation Request Letter submitted on February 21, 2006. File is Pending.
Maine Forest Service	Timber Harvest/Management Plan; Consultation on other State permits	To be submitted in conjunction with Maine State DEP Permitting.
Maine Department of Environmental Protection (Maine DEP)	Maine Mandatory Shoreland Zoning Act	Application approved on February 16, 2006.
Bureau of Land & Water Quality	401 Water Quality Certificate	To be submitted in conjunction with Maine State DEP Permitting.
	Natural Resources Protection Act	
	Site Location of Development Act	
	Air Emissions License	
	Maine Construction General Permit (construction stormwater discharges) and Discharge License for Subsurface Waste Water Disposal System (septic tank leach field)	To be submitted prior to construction.
	Multisector Permit and Waste Discharge (Maine Pollutant Discharge Elimination System [MainePDES]) Permit	To be submitted prior to operation.
Department of Marine Services	Consultation/Review on Other Maine State Permits	Consultation Request Letter submitted on February 21, 2006. File is Pending.
Maine Historic Preservation Office (SHPO)	Section 106 of the NHPA Consultation regarding NRHP eligibility and project effects.	Downeast submitted revised cultural resources survey reports to the SHPO in October 2006. SHPO provided reviews of reports on January 25, 2007, March 7, 2007, June 19, 2007, and June 25, 2007. Option 6 pipeline information submitted January 2008. Consultation update will be requested.
Maine Atlantic Salmon Commission	Consultation/Review on other Maine State Permits	Consultation Request Letter submitted on February 21, 2006. Mitigation Plan to be reviewed coincident with re-filing of State permit application.

**Table 1-3 Environmental Permits and Approvals (Updated July 2015)**

<b>Agency</b>	<b>Permits/Approvals/Consultations</b>	<b>Anticipated Application Filing/Consultation Date</b>
<b>STATE (continued)</b>		
Office of State Fire Marshal	Blast Permit Permit for aboveground storage and flammable and combustible liquids	Application to be submitted prior to construction.
Maine Department of Transportation (Maine DOT)	Site access, driveway, traffic movement permit and Route 1 improvements Utility location permit	Application to be submitted prior to construction.
Maine Department of Inland Fisheries and Wildlife (Maine DIFW)	Maine Endangered Species Act	Consultation Request Letter submitted on February 21, 2006. Mitigation Plan to be reviewed coincident with re-filing of State permit applications.
<b>LOCAL</b>		
Town of Robbinston	Conditional Use Permit, Site Plan Approval, and Maine Mandatory Shoreland Zoning Act (delegated to Town via Town Zoning Regulation Adoption) Plumbing Permit Flood Hazard Development Permit Road Improvement	Conditional Use Permit, Site Plan Approval, and Shoreland Zoning Act approved February 16, 2006.  Plumbing Permit, Flood Hazard Development Permit, and Road Improvement Permit to be submitted prior to construction.
Town of Baring Plantation	Town Road access for Sendout Pipeline Right-of-Way	To be submitted prior to construction.
City of Calais	Town Road access for Sendout Pipeline Right-of-Way  Maine Mandatory Shoreland Zoning Act	To be submitted prior to construction.  Consultation initiated March 2007. To be submitted coincident with re-filing of State permit applications.
Town of Princeton	Town Road access for Sendout Pipeline Right-of-Way	To be submitted prior to construction.
Town of Baileyville	Town Road access for Sendout Pipeline Right-of-Way	To be submitted prior to construction.

# **APPENDICES**

# **APPENDIX 1A**

## **Preliminary Project Schedule**

<b>Task Name</b>	<b>Start</b>	<b>Finish</b>
<b><i>Front End Engineering Design</i></b>		
APCI Pre-FEED	Aug 2014	Completed
Process Design	Aug 2014	Completed
BOP Design	Sept 2014	In Progress
FEED Draft Complete	Dec 2014	Oct 1 2015
<b><i>FERC Permitting</i></b>		
Pre-Filing Request	July 2014	Completed
FERC Grants Prefiling	Aug 2014	Completed
First draft RR1	Sept 2014	Completed
Prepare drafts RR 2,3,4,5,6,7,8,9,10,12	Sept 2014	Oct 1 2015
First Draft RR11 Complete	Sept 2014	Oct 1 2015
Draft RR13 Complete	Dec 2014	Oct 1 2015
FERC review of RRs	June 2015	Dec 2015
File Application	Jan 15 2016	Jan 15 2016
FERC Issues Supplemental DEIS	Jan 4 2016	May 16 2016
FERC Issues Supplemental FEIS	May 16 2016	Sept 15 2016
FERC NGA Section 3 Order Issued	Jan 13 2017	Jan 13 2017
Implementation Plan Filed With FERC	Dec 15 2016	Jan 28 2017
<b><i>Final Design</i></b>	Jan 28 2017	Jan 28 2019
<b><i>Construction</i></b>	Jan 28 2017	Jan 28 2021
<b><i>Commissioning</i></b>	Nov 28 2020	Dec 14 2020
<b><i>Startup</i></b>	Dec 14 2020	Jan 1 2021
<b><i>Project Completion</i></b>	Jan 1 2021	Jan 28 2021

# FIGURES

Figure 1-1. Preliminary Site Plot Plan

