NARUC
National Association of Regulatory Utility Commissioners

LNG: A Local Market – A Global Market

An Introductory Handbook for State Public Utility Commissioners

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NARUC Committee on Gas

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Foreword by New York Commissioner Diane X. Burman, Chair, NARUC Committee on Gas

The National Association of Regulatory Utility Commissioners, or NARUC, is a non-profit organization founded in 1889 whose members include the governmental agencies that are engaged in the regulation of utilities and carriers in the 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands. NARUC's member agencies regulate telecommunications, energy, and water utilities. NARUC represents the interests of state public utility commissions before the three branches of the federal government. This handbook is the product of several ongoing NARUC collaborations that span several decades.

In 2009, NARUC, published *Global Liquefied Natural Gas Supply: An Introduction for Public Utility Commissioners*, which explored the supply dimensions of liquefied natural gas (LNG): where it comes from, what it costs, and the factors that make it an important resource for state commissions to consider. During that period, LNG discussions focused on imports. However, by February 2016, the United States became an exporter of LNG. In addition, new gas production and liquefaction technologies have provided new opportunities for LNG use.

NARUC has consistently been engaged in examining the evolving liquefied natural gas market and seeking to convey information to state regulators for their critical evaluation on the LNG issues. In fact, NARUC facilitated recent discussions on LNG. For example, at its February 2018 Policy Summit in Washington, D.C., the Staff Subcommittee on Gas hosted a discussion between the Center for LNG and the Industrial Energy Consumers of America, and the Committee on Gas covered issues surrounding the LNG export permitting process. Moreover, NARUC actively participated at the recent 2018 World Gas Conference[1] in Washington, D.C., where LNG was seen as an important element for examining shifts to drive regulatory change in the natural gas markets.[2] And most recently, NARUC became engaged joining the USEA, as participatory members of the U.S.–India Gas Task Force (GTF), convened under the U.S.–India Strategic Energy Partnership led by U.S. Secretary of Energy Rick Perry and Indian Minister of Petroleum and Natural Gas Dharmendra Pradhan. The goal of the Task Force is to facilitate the continued energy collaboration between our countries to promote the development of India's natural gas sector.[3]

The time was deemed right to build on NARUC's previous research and educational activities and publish a comprehensive handbook on the state of the LNG market in the United States. Thus, in response to the United States' changing role regarding liquefied natural gas, NARUC undertook the task of producing a new updated handbook focused specifically on LNG. NARUC President John Betkoski III tapped me, as the Gas Committee Chair, along with the Chair of the Staff Subcommittee on Gas Andreas Thanos (Massachusetts Department of Public Utilities), to author this new publication in the hopes of delivering an educational product that helps to advance the regulators' understanding of LNG. Thus, this handbook is designed to assist regulators in understanding the regulatory and market frameworks for liquefied natural gas.

LNG continues to play a significant and important role not only in the United States market, but also globally. LNG is viewed by many market participants as a viable asset to help expand the use of natural gas and support environmental policies striving to reduce the volume of CO_2 and other pollutants that are emitted in the atmosphere by human activity.

In its over 50-year-history of being traded, LNG has fostered alliances and become a vital source of revenue to producing regions. LNG has helped consumers in many regions reduce their carbon footprint and enjoy an energy source not bound by agreements entered into by a handful of producers.

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1 With NARUC Executive Director Greg R. White, we were members of and contributors to the WGC's Steering Committee. At the WGC, I was joined by NARUC President Betkoski, Commissioner Balasbas (Washington), Commissioner Kimbrel (Illinois), and Andreas Thanos (whose two abstracts were accepted by the conference organizers and who participated in three panel discussions at the conference).

2 In regard to LNG, NARUC was represented in two sessions at the WGC. "The Forces Driving Regulatory Change in Natural Gas Markets," https://wgc2018.com/program/#session_3031 and "Best Practices in Governance and Regulation," https://wgc2018.com/program/#session_3048.

3 In addition to NARUC staff, Andreas Thanos and I are also members of the GTF.

Technological advances have propelled LNG from a fuel used under extreme conditions, such as a cold spell, to a fuel that can be produced, transported, stored, and delivered safely to consumers for a broad range of applications, ranging from vehicular fuel to power generation.

With this handbook, we do not claim that we have exhausted the topic. In fact, between new discoveries, new market participants, and new applications, such a claim would be unrealistic. The private sector generates new reports on LNG practically on a daily basis. Rather, the objective of this undertaking from the outset was to provide an introductory sound and balanced handbook to be used as a tool for regulators and other interested readers to understand the basics behind the LNG market today and facilitate a thoughtful discourse between producers, regulators, and consumers for further appropriate and responsible engagement and communication on the path forward. I would like to note that we intend to periodically update this handbook, to reflect any changes in the LNG market and the regulatory world.

To serve this purpose, links to all information are offered on each page to allow the reader of the electronic version to access the material for as long as it is available.

I wish to thank NARUC President John Betkoski III, for assigning us the task of compiling what we hope will be an informative handbook. Moreover, I want to thank Andreas Thanos, without whom we would not have been able to complete, on time, this substantive and educational handbook. Andreas Thanos took on the arduous task of being the principal lead researcher and author. A special thanks to the Honorable Robert Pickett, of Alaska, for his review and critical assessments that helped to shape the handbook. Lastly, we want to thank the countless individuals who shared their knowledge and understanding of the issues during this process.

This handbook is not the final word. LNG markets, regulations, and the implementation of new technology will continue to evolve, and with that evolution comes new opportunities, challenges, more food for thought, and, likely more questions of what this future will look like. It is my hope that state commissioners and other interested readers will find this handbook both educational and useful.

Sincerely yours in dedicated public service,

Diane X. Burman, Esq.

Chair, NARUC Committee on Gas

Commissioner, New York State Public Service Commission

DIANE X. BURMAN is a Commissioner of the New York State Public Service Commission.

Ms. Burman serves on the National Association of Regulatory Utility Commissioners' (NARUC) Board of Directors; is Chair of the NARUC Gas Committee; a member of NARUC's Committee on Critical Infrastructure and Special Subcommittee on Pipeline Safety. She is the Chair of the NARUC-Department of Energy Natural Gas Infrastructure Modernization Planning Initiative. Ms. Burman serves as Chair of the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) Voluntary Information-Sharing Working Group as well as the Vice Chair of PHMSA Gas Pipeline Advisory Committee. She is also a member of the National Petroleum Council. Ms. Burman was a Founding Board member of the Greater Albany Chapter of the Women's Energy Network. She previously served as the NARUC President appointee to the Gas Technology Institute Public Interest Advisory Committee.

Immediately prior to the Commission, she served as Chief Counsel to the New York State Senate Republican Conference. In her capacity as the chief legislative legal officer for the New York State Senate, Ms. Burman was responsible for advising the Temporary President of the Senate and each member of the Republican Conference on every major legislative policy initiative confronting the State. Prior to her position with the Senate, she served as Special Counsel to the New York State Public Service Commission.

Ms. Burman previously held other positions including Assistant Attorney General, Senior Court Attorney, judicial clerk for New York's highest State Court (the Court of Appeals), Assistant Counsel with the Department of Economic Development, Executive Director of the State PTA, and Director of Pro Bono Affairs for the State Bar Association. She was also an adjunct legal professor at Hofstra University and Adelphi University.

ANDREAS D. THANOS,
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Andreas Thanos has been, in various capacities, with the Gas Division of the Massachusetts Department of Public Utilities since 1993. In addition to his regular gas division-related duties, he is working on local and regional cybersecurity matters, cooperating with utilities, counterparts and commissioners at the state and regional level. At the national level, he is the Chair of the National Association of Regulatory Utility Commissioners' ("NARUC') Staff Subcommittee on Gas. He was the key staff person on NARUC's LNG Working Group -- a NARUC-US DOE partnership established to educate commissions about LNG. He is a member of the Advisory Council to the North American Energy Standards Board.

Andreas Thanos has participated in several international, USAID-funded NARUC projects on topics varying from communications and cybersecurity to natural gas interstate and local transportation and planning. Finally, in his spare time, he produces a monthly summary of LNG news.

Andreas Thanos has previously served on the Board of the Boston Fuel Consortium (currently Green Energy Consumers Alliance) and was an adjunct professor at the University of MA/Boston.

Andreas holds an MBA from the University of Massachusetts in Boston, and a Master's in Energy Economics from Boston University.

Introduction/Background

Natural gas is easily transported from production to end users, via an elaborate network of pipelines. However, there are instances where pipeline infrastructure is not available, primarily due to geology/geography or geopolitical conditions. In instances where pipelines are not a feasible option, liquefying the product allows for an easier transport to the end user. Liquefied natural gas, better known by its acronym LNG, is simply natural gas that has been cooled to -256° Fahrenheit (-161° Celsius). The liquefaction process reduces the volume of natural gas to 1/600th of its original, gaseous state.

In its liquid state, natural gas can be transported over long distances from the liquefaction facility to the consumption area, where it is either stored in specially built insulated storage tanks or vaporized for immediate consumption.

October 12, 1964, is credited as the first commercial delivery of LNG. However, the discussion and efforts to develop a commercially feasible process for the delivery of LNG dates back to the early 1950s. William Wood Prince, president of Chicago's Union Stock Yard and Transit Company, is credited as the father of LNG. Because he expected high natural gas prices in 1951, Prince developed a plan to liquefy natural gas in Louisiana and barge it up the Mississippi River. Although the project did not proceed as planned, the design and research efforts continued until the U.K. Parliament passed the 1956 Act that encouraged the use of natural gas for domestic heating and cooking. Entities in the United States and U.K. cooperated to develop the necessary infrastructure. As a result, the vessel *Methane Pioneer* carried the first trial shipment of LNG from Louisiana's Calcasieu River on January 28, 1959 for a 27-day voyage to the U.K. By the end of 1961, the U.K. government had approved a 15-year, 700,000 tons per annum contract for the supply of Algerian LNG.[4] The vessels, *Methane Princess and Methane Progress*, were the first LNG carriers to enter commercial service. On October 12, 1964, the vessel Methane Princess delivered the first commercial LNG cargo at Canvey Island in the River Thames.

LNG in the United States

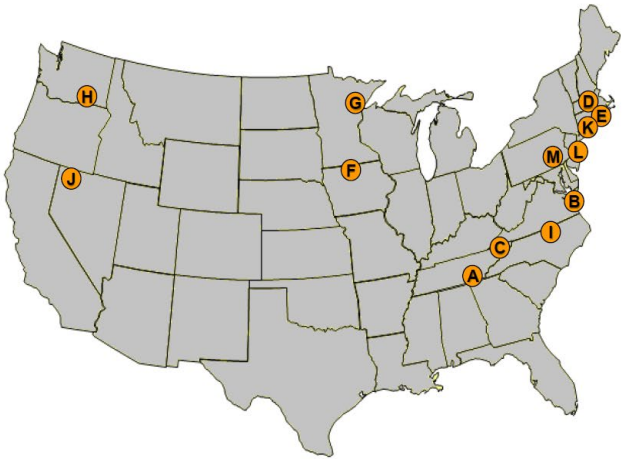
Until recently, when Cheniere exported its first LNG cargo, the United States was an LNG importer. This holds true for the contiguous states – the lower 48. What is not widely known is that the United States began exporting LNG in 1969. The LNG plant on the Kenai Peninsula, in Nikiski, Alaska operated between 1969 and 2011. The plant's customers were electric generators in Japan.[5]

The longest operating LNG import facility in the United States is Distrigas of Massachusetts, located in Everett, Massachusetts. The facility has been operating continuously since November 1971 when it received its first LNG shipment. The Elba Island LNG import facility, now owned by Kinder Morgan, on Elba Island, Georgia received authorization in 1972. LNG arrived at Dominion's Cove Point LNG terminal (Cove Point) in 1978, but the facility was soon converted to a storage facility. Due to the energy needs of the regions in which they are located, and the availability of pipeline infrastructure, only the DOMAC facility will continue importing for the foreseeable future.

4 LNG SHIPPING AT 50, Society of International Gas Tanker and Terminal Operators Ltd (SIGTTO) (2014)

5 Revenue Sources Book, FALL 2013 (State of Alaska Department of Revenue), http://tax.alaska.gov/programs/documentviewer/viewer.aspx?1022r.

FERC Jurisdictional Peakshavers



A. **Chattanooga Gas Co.**, Chattanooga, TN
B. **Columbia Gas Transmission, Inc.**, Chesapeake, VA
C. **East Tennessee Natural Gas, L.L.C.**, Kingsport, TN
D. **Hopkinton LNG Corp.**, Hopkinton, MA
E. **National Grid LNG, L.P.**, Providence, RI
F. **Northern Natural Gas Co.**, Garner, IA
G. **Northern Natural Gas Co.**, Wrenshall, MN
H. **Northwest Pipeline Corp.**, Plymouth, WA
I. **Pine Needle LNG Co.**, Stokesdale, NC
J. **Paiute Pipeline Co.**, Lovelock, NV
K. **Total Peaking Services, L.L.C.**, Milford, CT
L. **Transcontinental Gas Pipe Line Co., L.L.C.**, Carlstadt, NJ
M. **UGI LNG, Inc.**, Reading, PA

Peak Shaving

LNG historically had one primary function—to meet consumer needs during periods of high demand when pipeline capacity is not available.

As the United States enjoys the benefits of abundant domestically produced natural gas, the US market is not expected to require new import terminals in the near future. The only terminal to continue operations for the foreseeable future is the facility in Everett, Massachusetts. The Northeast Gateway facility–a floating facility, although still operational, may continue playing a trivial role.

The availability of natural gas combined with the expansion of the interstate pipeline system guarantees that natural gas will be delivered to consumers. However, local LNG facilities are still required to meet peak demand resulting from extended periods of cold weather. Depending on their function, the facilities are referred to either as Peak Shaving or as Satellite Plants. Peak shaving provides the necessary fuel security in areas where pipeline capacity is not adequate to meet peak demand. Most natural gas distribution companies own or lease peak shaving facilities. In the continental United States, the New England region relies heavily on these facilities, because of the limited pipeline capacity flowing into the region. The New England gas distribution companies rely on LNG to meet approximately 30 percent of the region's peak day requirements. New England LNG storage capacity combined with that of New Jersey and New York totals 29.9 Bcf.[6] Depending on the company, LNG is either transported to the storage facility, or liquefied at the facility by the distribution company's own equipment. Most, if not all, of the over 100 local LNG storage facilities nationwide,[7, 8] are regulated by the state's regulatory agency where the facility is located. However, there are 13 facilities that fall under FERC's jurisdiction.[9,10] Depending on their location and function, LNG facilities may be subject to federal oversight by a number of agencies (refer to appendix for a schematic and web link).

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6 https://www.northeastgas.org/pdf/stat_guide_2017.pdf

7 https://www.ferc.gov/industries/gas/indus-act/lng.asp

8 The Pipeline Hazardous Materials Administration (PHMSA) collects data from all LNG operators. Data for 2017were submitted to PHMSA by August 1, 2018. The data reveal that for calendar year 2017, these facilities comprised 230 LNG tanks, with 417 vaporizers and total capacity of 27,784.44 MMcf (54,299,831 BBL), https://www.phmsa.dot.gov/data-and-statistics/pipeline/gas-distribution-gas-gathering-gas-transmission-hazardous-liquids.

9 https://www.ferc.gov/industries/gas/indus-act/lng/peakshavers.pdf

10 The FERC is responsible for authorizing the siting and construction of onshore and near-shore LNG import or export facilities under Section 3 of the Natural Gas Act. The FERC, under Section 7 of the Natural Gas Act, also issues certificates of public convenience and necessity for LNG facilities engaged in interstate natural gas transportation by pipeline.

Other Uses

LNG is a key fuel input for energy systems that offer opportunities to reduce air emissions, at higher system efficiency, with greater reliability and at lower cost compared to other fuels. As such, LNG is used in a variety of applications. The benefit of using LNG, compared to propane, for commercial or industrial purposes is, if or when, the gas distribution company expands its system, the customers will not need to modify their equipment for the change in Btu content. In addition, according to U.S. DOE data, even when taking into consideration the different Btu content,[11] LNG retains its cost advantage over propane.[12]

Automotive

Although not as widely used as electricity or Compressed Natural Gas (CNG), LNG has acquired a small share of the automotive market. As automotive fuel, LNG is used primarily for trucks. There are currently 74 LNG public and 63 private LNG fueling stations in the United States.[13] Demand for LNG for automotive use is not high; therefore, the availability of public fueling stations, at large, remains a challenge.

Manufacturing

Most manufacturing processes require a significant volume of energy. According to the Energy Information Administration, the industrial sector in the United States accounts for approximately 22 percent of total primary energy consumption. As the economic recovery, following the early 21st century downturn, took hold, natural gas consumption increased significantly compared with all other forms of energy. In areas where there is inadequate pipeline capacity, industrial users turn to LNG.

LNG storage facilities vary in size, depending on the anticipated customer needs. A significant number of developers can build LNG storage tanks in a variety of sizes to accommodate customer needs in areas where connecting to the gas distribution system may not be economical. The approach is similar to on-site storage of propane.

High Horse Power Processes (potential for trains, trucks, etc.)

"High Horse Power" refers to use by heavy trucks and trains that currently use diesel fuel. LNG has proven its effectiveness in replacing diesel. However, as mentioned in the "Automotive" section, lack of appropriate infrastructure limits the extent of the deployment of LNG for such processes. Despite these difficulties the Florida East Coast Railway (FEC) is one successful example by operating its entire mainline fleet on LNG of approximately 24 dual-fuel (LNG-Diesel) locomotives.[14,15]

LNG as a Marine Fuel

In 2016, the International Maritime Organization (IMO) announced standards for the reduction of marine fuel sulphur by 2020. Under the new standards, sulphur in marine fuel to be reduced from the current limit of 3.5 percent to 0.5 percent. As a result of the IMO 2020 regulations, ship owners will either have to continue using high sulphur fuel oil and add scrubbers/exhaust gas cleaning systems or switch to low sulphur fuel options such as LNG.

LNG is already available in several European, Asian, and U.S. harbors as marine fuel. LNG bunkering is an active industry that has proven its ability to successfully fuel LNG powered ships. Although the process of retrofitting existing vessels may be costly, the benefits of a lower cost fuel combined with avoidance of penalties as regions endeavor to reduce air pollution make LNG a viable option. Realizing the potential economic and environmental benefits, cruise company Carnival Corporation is updating its fleet with

11 https://www.afdc.energy.gov/fuels/fuel_comparison_chart.pdf

12 https://www.afdc.energy.gov/fuels/prices.html

13 U.S. Department of Energy, Alternative Fuels Data Center, https://www.afdc.energy.gov/stations#/analyze?fuel=LNG&country=US&access=private.

14 The 24 locomotives run primarily on LNG with diesel as a backup fuel, https://www.argusmedia.com/news/1570353-florida-railway-first-in-us-to-embrace-lng?amp=1

15 As of October 2017, FEC completed over 2,300 trips traveling more than 850K miles while consuming more than 2.7M gallons of LNG, https://fecrwy.com/uncategorized/blog-lng-operations/

cruise ships that can use both diesel and LNG as fuel.[16] Whereas Carnival's ships are currently on order, Jacksonville, Florida-based Tote Maritime has already deployed LNG-powered containerships operating out of Jacksonville, Florida.[17] There are several methods of providing LNG as a marine fuel: truck-to-ship, shore-to-ship and ship-to-ship. Ship-to-ship is the most commonly used method—especially in ports where larger vessels require fueling. Further, because of the flexibility it provides, ship-to-ship bunkering is expected to become the main bunkering method, as it can accommodate ships of all sizes. According to the trade association SEA\LNG, there are currently 119 LNG fueled ships in operation. SEA\LNG has also developed an interactive map that allows the user to track LNG bunkering facilities around the globe.[18] In the United States, there are several LNG bunkering locations—in Seattle, Washington;, Los Angeles, California; Port Fourchon, Louisiana; and Jacksonville, Florida.

Small Cogeneration Facilities

Cogeneration, also known by the more formal "Combined Heat and Power" (CHP), refers to the process by which electricity and heat are produced simultaneously, using a single fuel source. Natural gas fuels 70 percent of existing CHP capacity in the United States.[19] In areas where access to natural gas is limited, LNG has proven to be the fuel of choice for implementation of the CHP process. The University of Massachusetts at Amherst operates such a facility, fueled by LNG provided by a Pennsylvania supplier. The application of CHP is broad in the United States and varies from textiles to machinery.[20]

Virtual Pipeline/Virtual LDC[21]

A gas LDC may contract with a single or multiple customers and receive regulatory approval to expand its distribution system. However, a number of factors, including geology, economics, population/customer density, could make pipeline expansion an unnecessarily expensive undertaking. In such a case, portable LNG storage and vaporization facilities can provide the necessary fuel to proceed with expansion to satisfy customer needs, thus creating the virtual pipeline. Similar to the virtual pipeline, in areas where gas distribution company expansion is not scheduled for the near future, a virtual distribution company can be established with portable LNG storage and regasification facilities.

This application is gaining momentum in areas where pipeline infrastructure has yet to be developed such as New England, New York and Eastern Canada. The virtual pipeline/LDC can be set up in a matter of months, once approval for a site has been granted. Natural gas can be sourced from the local or a nearby gas distribution company or a domestic LNG producer. LNG is transported via LNG trailer trucks that can either fill storage or use portable vaporizers to inject natural gas into the newly established distribution system.

In fact, the development of new liquefaction facilities can provide the opportunity to promote smallerscale utilities without the need to overcome the regulatory and political hurdles.

16 http://phx.corporate-ir.net/phoenix.zhtml?c=200767&p=irol-newsArticle&ID=2359468

17 http://www.toteinc.com/about/lng/.

18 http://sea-lng.org/bunker-navigator/ (Note: This interactive map, does not list the Port Fourchon, La.A facility.)

19 https://www.energy.gov/sites/prod/files/2016/04/f30/CHP%20Technical%20Potential%20Study%203-31-2016%20Final.pdf

20 Ibid.

21 LDC is the acronym for Local Distribution Company

LNG Safety

Following the September 11, 2001, attacks on the United States, regions with a significant number of LNG storage facilities were concerned with the possible effect of an attack on LNG tankers and storage facilities. The U.S. Department of Energy (U.S. DOE) funded a series of studies on the topic. The findings of the most recent DOE-sponsored study on the topic, were submitted to the U.S. Congress in a May 2012 report titled *Liquefied Natural Gas Safety Research*.[22] The report, a product of a three-year project spanning May 2008 through May 2011, focused on large-scale LNG fire and cryogenic damage tests, and relying on high performance computer models and developed simulations of LNG vessel damage resulting from large LNG spills and fires on water. Based on the report, the Department of Energy concluded the following:

1. The major findings for smaller breach events include:

- For the very small breach events, which could occur from a number of credible accidental or intentional events, the spill rates are more than 1,000 times less than that of potential larger breach events.
- This puts smaller spills into a regime that would typically fall within current spill detection and safety systems on LNG vessels such that it is extremely likely there would be sufficient time to move the vessel to a safe anchorage to monitor, inspect, and assess damage and long-term response options.

2. The major findings for medium and larger breach events:

- Large-scale fracture testing, cryogenic flow analyses, and fire modeling indicated that LNG vessels would be disabled, severely damaged, and at risk of sinking.
- For these events, LNG vessels would not be capable of movement to a safe anchorage, and would require longer periods to monitor, inspect, assess, and establish long-term response and remediation measures.

3. The major findings for Cascading Damage Hazards:

- Current LNG vessel and cargo tank design, materials, and construction practices are such that simultaneous multi-cargo tank cascading damage spill scenarios are extremely unlikely, though sequential multi-cargo tank cascading damage spill scenarios are possible.
- Should sequential cargo tank spills occur, they are not expected to increase hazard distances resulting from an initial spill and pool fire, but could increase the duration of the fire hazards.
- Based on the data collected from the large-scale LNG pool fire tests conducted, thermal (fire) hazard distances to the public from a large LNG pool fire will decrease by at least two to seven percent compared to results obtained from previous studies.
- Risk management strategies to reduce potential LNG vessel vulnerability and damage from breach events that can result in large spills and fires should be considered for implementation as a means to eliminate or reduce both short-term and long-term impacts on public safety, energy security and reliability, and harbor and waterways commerce.

22 https://www.energy.gov/sites/prod/files/2013/03/f0/DOE_LNG_Safety_Research_Report_To_Congre.pdf

Jones Act

The Merchant Marine Act of 1920, known as the Jones Act, is a federal statute establishing support for the development and maintenance of a merchant marine in order to support commercial activity and serve as a naval auxiliary in times of war or national emergency (See 46 USC § 50101). The statute, among other things, requires shipping between US ports to be conducted by US-flag ships (46 USC § 50102). Although any foreign flagged vessel can enter a United States port, the Jones Act prohibits transportation of goods between two U.S. ports, unless the vessel was built in the United States and operated, primarily, by Americans. The law applies to all U.S. ports, with the exception of the U.S. Virgin Islands.

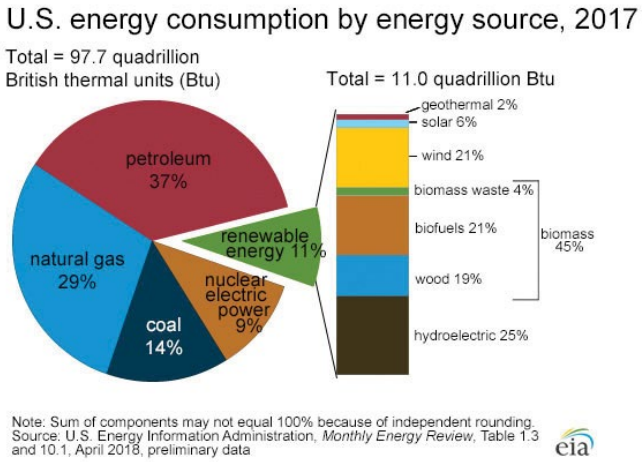
As noted, the financially prohibitive requirements of the Jones Act were the primary reason LNG exports from Alaska to mainland United States would have been more expensive than what the same exports were to Japan.

The most recent effort to repeal the Jones Act was made in July 2017 by then Senator McCain (R-AZ) who introduced legislation to repeal the Jones Act and promote free trade. The effort did not succeed.

Although, in regards to LNG, the Act affects only a fraction of the U.S. natural gas market, it affects many areas that could benefits from domestically produced LNG, such as the United States' northeast, Puerto Rico, Hawaii, and any region where LNG can complement inadequate pipeline capacity.

Takeaways

As national and local governments continue with their efforts to reduce Greenhouse Gases (GHGs) it is important to understand how LNG fits in their respective state's energy mix. Regardless of the leaps renewable energy sources have been making, these sources are still but a small percentage of the total energy mix. According to the Energy Information Administration[23] (**see table, below**) renewable sources like solar, wind, and geothermal comprise a small percentage of the country's energy mix. In fact, these three renewable sources accounted for 3.19 percent of the total U.S. energy consumption in 2017.



It is therefore, imperative that regulators appreciate the role LNG can and will continue to play in the domestic market as we move to a lower carbon and GHG emissions energy mix.

For the most part, pricing of contracts for the sale of LNG in the domestic market is protected under confidentiality agreements. However, a common formula for the determination of the delivered cost is based on: (1) a market index that reflects the price of the initial commodity, (2) a fixed adder that reflects the cost of liquefaction and storage, and (3) an economic index such as a Producer or Consumer Price Index-based formula that captures the shifts in economic activity.

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23 https://www.eia.gov/energyexplained/?page=us_energy_home

As mentioned, LNG plays an important role in instances and areas where pipeline capacity is not available, or a 365-day pipeline capacity contract would lead to a significant increase in costs. Absent an immediate and rapid conversion to renewable energy sources, LNG is essential exceptionally versatile and requires a lower financial investment.

In smaller applications as cogeneration, LNG has proven a valuable resource. Large energy users, like the University of Massachusetts at Amherst, have been able to reduce both costs and emissions by relying on LNG to feed their combined heat and power plants.

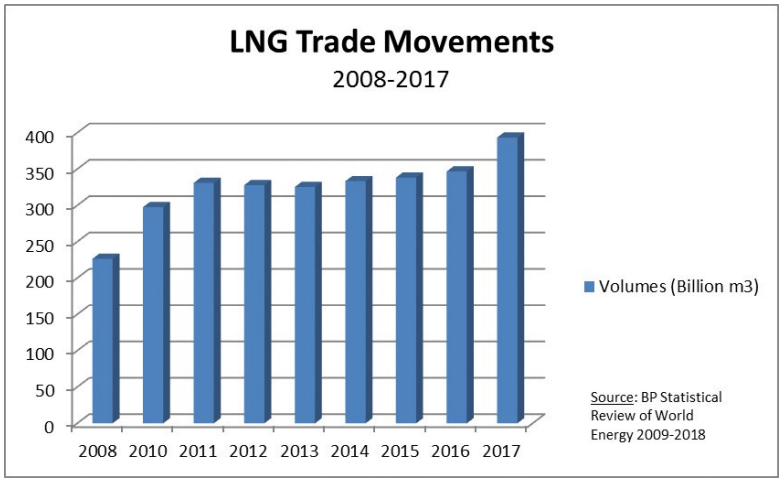
Companies with commercial fleets, like the United Parcel Service[24] in the United States have introduced LNG as vehicular fuel, reducing both fuel costs and their carbon footprint. State regulatory review may be required depending on whether the fuel is delivered by regulated utilities or independent contractors. For instance, where the fuel is delivered by a gas LDC, the role of the regulator will be to ensure proper cost allocation and the LDC offers its services in a safe, reliable, and least cost manner. For the exact same reason as with automotive fuel, state regulators may be required to review pricing and adequacy of any LNG products offered to marine customers.

Finally, where pipeline capacity is inadequate and prospects of new capacity coming online are unlikely, regulators and regional governments, when interested, may choose, to actively participate in any efforts to repeal or amend the Jones Act.

LNG: An International Market

During the past 54 years, LNG has transformed from a fuel that is produced by a few and consumed by a few, to a product that is widely consumed and traded across the globe. Globally, LNG trade has increased from 226.51 m3 in 2008 to 393.4 m3 in 2017.[25] This represents an increase of approximately 74 percent.

In 2017 there were 19 exporting and 40 importing countries. Currently there are 21 LNG-exporting countries and 41 importing countries.[26] Thirty-nine percent of the supplied volumes originated from the Pacific Basin, whereas Asian countries accounted for approximately 72 percent of global LNG demand.[27] Asia accounts for 72.9 percent of global LNG demand.. Almost half of this demand, 45.3 percent, was met with volumes produced in the Pacific Basin. At the same time, LNG supplies from Qatar met 26.7 percent of global LNG demand.[28]



24 https://www.pressroom.ups.com/pressroom/ContentDetailsViewer.page?ConceptType=FactSheets&id=1467289512779-870

25 To convert m^3 to Bcf, you multiply m^3 by 35.315

26 BP Statistical Review of World Energy 2018.

27 Ibid.

28 https://giignl.org/sites/default/files/PUBLIC_AREA/Publications/rapportannuel-2018pdf.pdf

Technology

Technological advances in liquefaction, transportation storage, and regasification have contributed significantly in the expansion of LNG trade. Companies like Texas-based Excelerate Energy, Royal Dutch Shell, or Helsinkibased Wärtsilä, to name a few, develop technologies that allow for broader use of LNG.

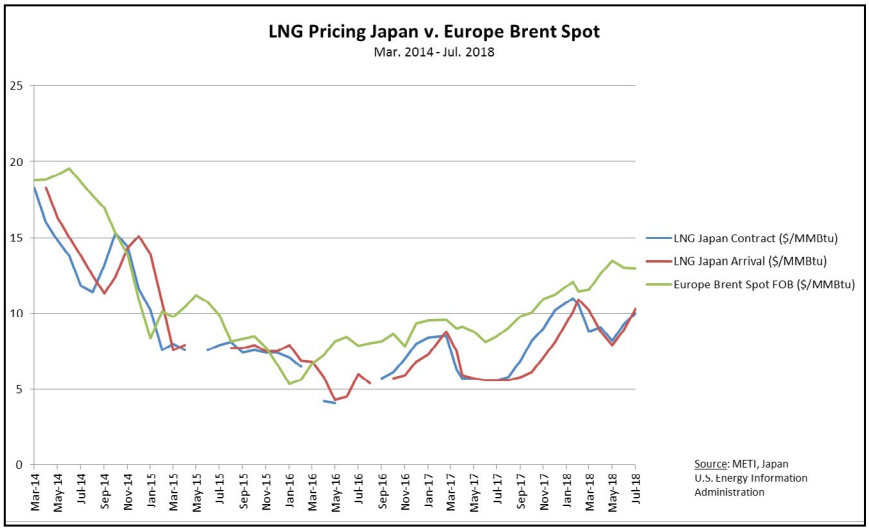
Excelarate Energy asserts that is "the pioneer of floating storage and regasification units (FSRUs)."[29] An FSRU is a ship converted to store and regasify LNG. It is mostly used in locations and instances where the construction of a land-based storage facility may be problematic both in terms of regulations and overall cost. Deployment of such facilities does not require long-term commitments similar to a land-based LNG storage facility.

Royal Dutch Shell was the first to develop a floating liquefied natural gas facility (FLNG) the Prelude. A FLNG receives natural gas produced offshore, liquefies it, and loads it on LNG tankers that deliver the product directly to the market. Construction of the Prelude, that has the capacity to produce 3.6 million tons of LNG per annum, began on October 18, 2012. The FLNG was put in position at the Browse Basin in Australia on December 2017, after a journey that began on June 29, 2917.[30]

Finland's Wärtsilä[31] is extensively involved with LNG, from propulsion to storage and power generation. Wärtsilä has developed the capability to develop LNG terminals of varying sizes to accommodate the needs of customers. Some of Wärtsilä's products include mini to large liquefaction plants, FSRUs, regasification units, and LNG-fueled power plant configurations.

Pricing

LNG pricing had, for the longest time, been based on oil prices. Since 2015, India managed to persuade Australia, Qatar, and Russia to reduce the formula that was used to price delivered LNG. As of May 2016, the pricing of spot cargoes delivered to Asian markets severed their connection to oil pricing.[32] During the past couple of years international consumers demanded and succeeded in decoupling the price of delivered LNG from oil. The chart, that follows shows the comparison between prices for LNG since March 2014, when Japan's Ministry of Economy, Trade and Industry (METI[33]) began providing records. Although drawing a solid



29 http://excelerateenergy.com/fsru/

30 https://www.shell.com/about-us/major-projects/prelude-flng.html

31 https://www.wartsila.com/

32 See May 2016 in the chart. LNG prices to Japan in May 2016 were at the lowest over the past four-year period.

33 http://www.meti.go.jp/english/

conclusion from such a limited set of data is not always appropriate,[34] it nevertheless provides an adequate depiction of the divergence between the price of oil and LNG beginning January 2018.

LNG customers have also succeeded in breaking the controls imposed by producers on the ability of the customer to resell the LNG.[35]

LNG IMPORTS/EXPORTS

LNG Imports into the United States

As mentioned previously, the United States joined Algeria in becoming an LNG exporter in 1969. However, the lack of importing facilities in the western United States, combined with the restrictions imposed by the Jones Act meant that Alaskan LNG was less expensive to buyers in Japan than buyers in the United States.[36] As a result, U.S. LNG customers have relied on imports from other countries such as Algeria, Trinidad and Tobago, and Yemen. For the period 1973 through and including 2017, the United States imported LNG from the following countries:[37]

Country	MMcf[38]
Algeria	1,885,990
Australia	56,553
Brunei	2,401
Canada	3,617
Egypt	632,843
Guinea	17,795
Indonesia	4,429
Malaysia	36,421
Nigeria	359,129
Norway	118,300
Oman	45,574
Peru	32,665
Qatar	363,901
Trinidad & Tobago	3,787,519
United Arab Emirates	18,056
Yemen	145,034
Other Countries	4,203
TOTAL	**7,514,430**

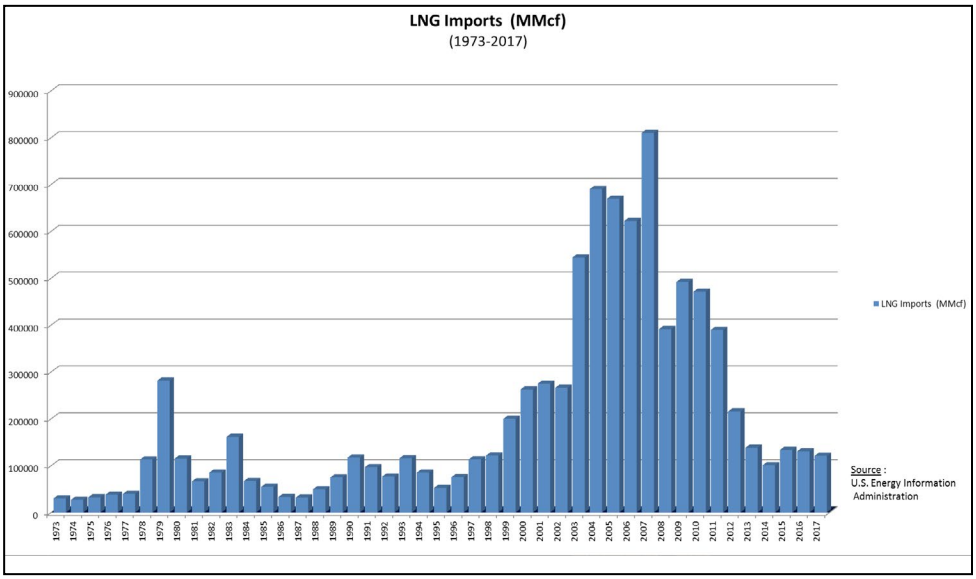
34 One could argue that the fact prices for LNG and Brent are not coincident could be due to a variety of reasons such as supply, demand, weather or geopolitical discord. However, in such a case, the price of oil would have followed a similar trajectory.

35 On June 27, 2018, in its effort to liberalize the LNG market, Japan's Fair Trade Commission ruled that all new LNG contracts should not contain restrictions on reselling cargoes of the fuel.

36 Because of the Jones Act-based restrictions, a vessel transporting Alaska LNG to the lower 48 would require higher cost vessels, in terms of construction, ownership, and operations than a vessel transporting Alaska LNG to Japan.

37 The figure on the right-hand column is the total cumulative imports from the specified producing country. Source: https://www.eia.gov/dnav/ng/ng_move_impc_s1_a.htm

38 Volume posted represents the total volumes of LNG imported during the 44-year period.



LNG imports to the United States peaked in 2007 totaling 770,812 MMcf. In 2007, the United States imported LNG from six countries: Algeria (77,299 MMcf), Egypt (114,580 MMcf), Equatorial Guinea (17,795 MMcf), Nigeria (95,028 MMcf), Qatar (18,352 MMcf), and Trinidad & Tobago (447,758 MMcf).[39] During the period 2000-2010, there were 12 LNG import terminals in the United States.[40] By 2017, only three of the LNG import terminals: Cover Point, Md.; Elba Island, Ga.; and Everett, Mass. received LNG.[41] The three terminals imported a combined total of 76.6 Bcf of natural gas, with the Massachusetts facility receiving approximately 84 percent of the volumes.[42]

Over the past 32 years, U.S. LNG trade has experienced a significant transformation. In the late 1990s, a shift in the use of energy, combined with the understanding of its role in reducing atmospheric pollution, led to a significantly higher demand for natural gas. As domestic production was not capable of meeting domestic demand, the United States witnessed an increase in imports. By 2008, however, as the process of hydraulic fracturing was expanded, more domestic natural gas found its way into the market, causing a decrease in LNG imports. This transformation was "finalized" on February 2016, when the first LNG cargo left Cheniere's Sabine Pass Liquefaction facility.

As a result of the increased availability of domestically produced natural gas, the need for LNG imports has been limited to the areas where pipeline infrastructure is not adequate to meet consumer needs, especially during peak periods. The only area in the United States that continues to rely on LNG imports is New England—the Northeastern part of the country. The LNG delivered to New England serves two purposes. First it provides fuel for a nearby power generation facility, but more importantly it continues to serve in its traditional role—to provide natural gas in a capacity constrained region during peak periods. The facility provides most of the fuel required to fill the region's peak shaving facilities. During calendar year 2017, the United States imported 76,442 Mmcf of LNG. A total of 63,935,707 Mcf, representing 83.6 percent of the imported volumes were delivered to the Everett, Mass., import facility. The other two facilities were the Elba Island, Ga., and Cove Point, Md., terminals.[43]

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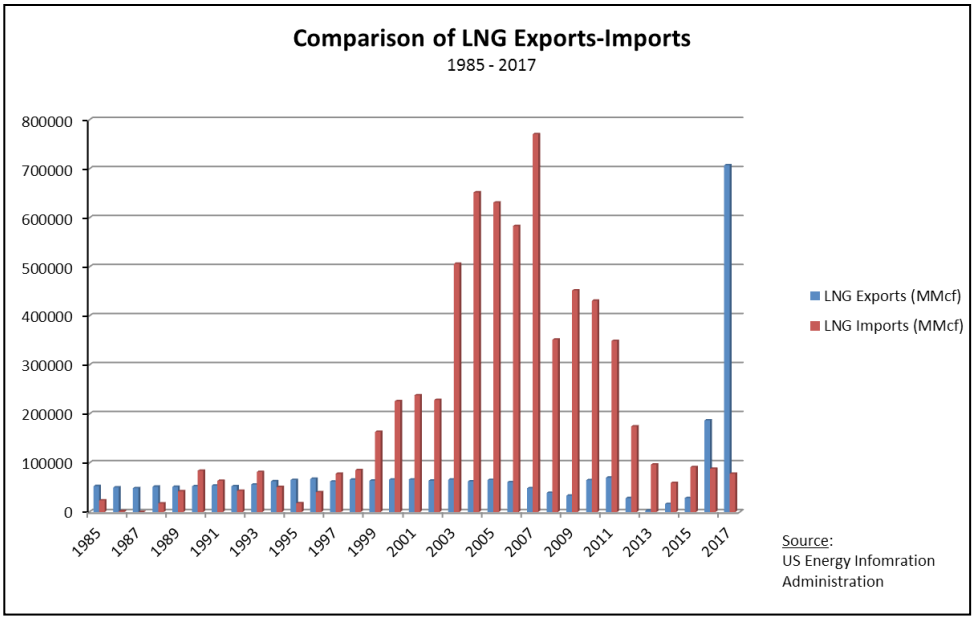
39 Source: https://www.eia.gov/dnav/ng/ng_move_impc_s1_a.htm

40 Cameron, La.; Cove Point, Md.; Elba Island, Ga.; Everett, Mass.; Freeport, Tex.; Golden Pass, Tex.; Gulf Gateway Energy Bridge, Gulf LNG, Miss.; Lake Charles, La.; Neptune Deepwater, Mass.; N/E Gateway Energy Bridge, Mass.; and Sabine Pass, La.

41 https://www.energy.gov/sites/prod/files/2018/04/f50/LNG%20Annual%20Report%20-%202017.pdf

42 Ibid.

43 Source: https://www.energy.gov/fe/listings/lng-reports.



The significant decline in imports depicted above was followed by a significant increase in exports, shown in the chart below.[44]

For the period January 2018 through and including June 2018, government data indicate a dramatic decrease in imports and slow average increase in exports. (**See chart**).

Exports of U.S. LNG

Issues with U.S. LNG Exports

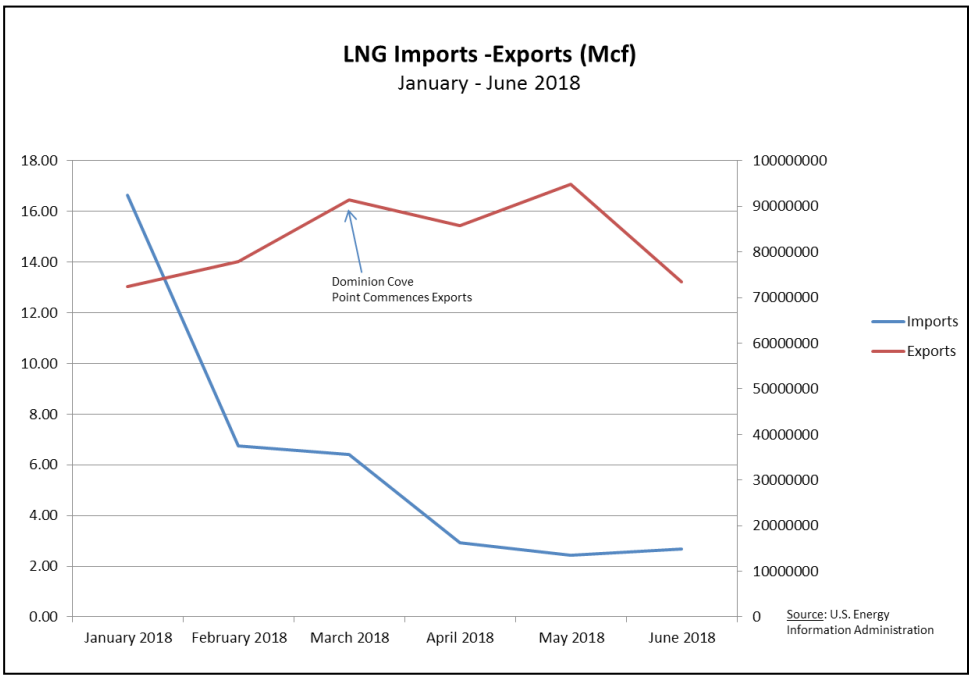
The international market of LNG importers comprises countries that are moving to natural gas in their effort to reduce air pollution while enjoying the benefit of less expensive natural gas. Although the list of countries is long enough, two—India and China—stand out, as they are two of the potentially growing markets for LNG. In 2017, India and China imported 20 percent of the LNG that was traded internationally. This was before both countries undertook sincere efforts to reduce urban pollution.

Although the increasing size of the market looks promising to the US LNG producers, domestic consumer groups have expressed their concerns about the impact of such exports on the domestic US market.

The U.S. DOE has undertaken several studies to determine the extent to which LNG exports to non-FTA nations will lead to higher prices for consumers in the United States. In particular, the DOE released studies to assess the macroeconomic impacts of LNG exports, to inform the decisions on applications seeking authorization to export LNG from the lower-48 states to non-free trade agreement countries.[45]

44 Source: https://www.eia.gov/dnav/ng/hist/n9103us2a.htm; https://www.eia.gov/dnav/ng/hist/n9133us2a.htm

45 https://www.energy.gov/fe/downloads/lng-export-studies



The studies concluded that as a result of LNG exports, domestic natural gas prices will increase. However, the conclusions drawn from the studies include a net economic impact to the US economy:

- **2012 LNG Export Study:** Across all these scenarios, the United States was projected to gain net economic benefits from allowing LNG exports. Moreover, for every one of the market scenarios examined, net economic benefits increased as the level of LNG exports increased. In particular, scenarios with unlimited exports always had higher net economic benefits than corresponding cases with limited exports.
- **2014 LNG Export Study:** In most cases, US consumers increase their consumption expenditures as the positive impacts of increased energy production outweigh energy price changes.
- **2015 LNG Export Study:** Negative impacts in energy-intensive sectors are offset by positive impacts elsewhere. Other industries benefit from increasing U.S. LNG exports, especially those that supply the natural gas sector or benefit from the capex needed to increase production. This includes some energy-intensive sectors and helps offset some of the impact of higher energy prices.
- **2018 LNG Export Study:** About 80 percent of the increase in LNG exports is satisfied by increased U.S. production of natural gas, with positive effects on labor income, output, and profits in the natural gas production sector.
- The higher world prices that bring forth those supplies improve U.S. terms of trade, so that there is a wealth transfer to the United States from the rest of the world equal to the increase in prices received for LNG exports times the quantity exported. The transfers from natural gas related activity to the U.S. economy improve the average consumer's ability to demand more goods and services leading to higher economic activity

The U.S. DOE solicited comments on the 2018 LNG Export Study. The consensus among those who oppose unrestricted exports is that they will eventually increase domestic prices based on what producer can secure abroad.[46] However, the commenters do not appear to agree on what the tipping point is—that is at what volume exports will affect domestic prices.

46 https://fossil.energy.gov/app/docketindex/docket/index/10

There are groups that have opposed U.S. LNG exports arguing on the economic impact domestic natural gas market in the United States and the effect increase natural gas production will have on the environment.[47] As early as 2014, the American Public Gas Association representing America's publicly owned natural gas local distribution companies opposed LNG exports on economic fuel diversity grounds.[48] However, on July 25, 2018, during its Annual Meeting, the association removed its policy resolution opposing the export of LNG.[49]

More recently, the Industrial Energy Consumers of America (IECA), an industry group that represents a broad range of industrial consumers,[50] has been one of the most vocal opponents of unlimited LNG exports to non-FTA nations. In regards to the latest U.S. DOE study (2018 LNG Export Study), IECA concludes that:[51]

- The U.S. DOE's "Macroeconomic Outcomes of Market Determined Levels of U.S. LNG Exports" (study) confirms that excessive volumes of LNG exports to non-free trade agreement (NFTA) countries is not in the public interest under the Natural Gas Act (NGA) and does not comply with the Data Quality Act (DQA). Both are legal issues for the DOE and for LNG export applicants that seek final approval.
- The study lacks credibility due to conflicting studies from the National Economic Research Associates (NERA) and the inability of the economic models to determine whether the oil and gas industry is consuming U.S. or imported goods to produce, transport, and build LNG terminals, thereby overinflating economic growth and job projections due to LNG exports.

Current data are insufficient to determine whether domestic prices have been or will be affected by the level of exports to non-FTA nations. U.S. LNG exports commenced on February 2016 and the Cove Point facility came online in 2018. As more U.S. facilities are expected to begin LNG production over the next two years, the relationship between exports and domestic prices depicted in the graph that follows, may change. It should be noted that the market has experienced significant changes over the past two years. On the trade side, this change is continuous with new entrants both on the producer and buyer side. Globally, new commercially viable sources of natural gas are discovered and are under consideration for commercial development, in the Mediterranean, Africa, and Asia. On the trading side, long-term contracts are being replaced by short-term and spot purchases; hub pricing is replacing contracts tied to oil; and the ability to resell is now an option for buyers—to name a few of the developments. It is, therefore, difficult to forecast the future price or availability of natural gas in the domestic U.S. market.

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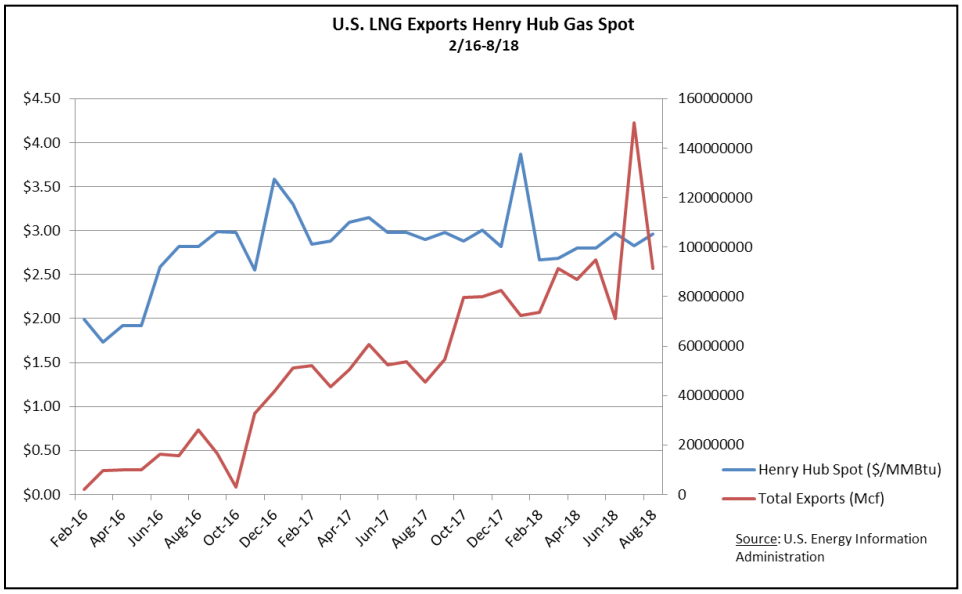
47 See, for instance, https://fossil.energy.gov/ng_regulation/sites/default/files/programs/gasregulation/authorizations/export_study/kennedy_em01_24_13.pdf

48 https://www.apga.org/issues/lng-export; http://community.apga.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=bbd98a17-b8a7-4199-901e-042e22456e33&forceDialog=0

49 http://community.apga.org/blogs/dave-schryver/2018/07/26/apga-members-approve-revisions-to-policy-resolutio

50 https://www.nrdc.org/sites/default/files/media-uploads/1.pdf

51 https://www.ieca-us.com/wp-content/uploads/07.27.18_2018-DOE-LNG-Export-Study-Comments.pdf



Existing, New, and Proposed LNG Import Terminals

The Approval Process for LNG Exports

Developers of LNG export facilities must go through a two-step review process to obtain federal approvals. The developer has to receive approvals from the U.S. DOE for the export (the actual transaction) and the Federal Energy Regulatory Commission (FERC), which has jurisdiction over the construction of the proposed LNG export terminals. Although the federal process has, in the past, proven cumbersome, steps are being taken to streamline it and reduce the obstacles the developers face.

It is during this review period that interested parties, including state regulators, get the opportunity to support or oppose a proposal. The experience of the newest LNG exporter—Dominion's Cove Point —shows how support from state regulators and local representatives can be invaluable.[52]

State Regulatory Input

In cases of FERC jurisdictional facilities, state regulators retain some level of authority over the siting and construction of LNG and associated facilities within the specific state's jurisdiction. During the FERC process, summarized below, the regulatory agencies can submit their contribution in support or opposition of the proposed facility.

Federal Review Process—U.S. DOE[53]

The U.S. DOE has regulatory responsibilities related to LNG. Companies that want to export natural gas must get authorization to do so from the U.S. DOE's Office of Fossil Energy (FE). The Natural Gas Act (NGA) requires FE to make public interest determinations on applications to export LNG to countries where the U.S. does not have existing free trade agreements. FE's natural gas import-export regulatory program is implemented by the Division of Natural Gas Regulation.

52 Dominion enjoyed support from both the state administration and local government, such as the Calvert County Board of Commissioners, despite opposition from national groups and some smaller local groups.

53 https://www.energy.gov/fe/science-innovation/oil-gas/liquefied-natural-gas

There are two standards of review under the NGA for LNG export applications, based on destination countries. Applications to export LNG to countries with which the United States has a free trade agreement (FTA countries) are deemed automatically in the public interest. The NGA directs the U.S. DOE to evaluate applications to export LNG to non-FTA countries. DOE is required to grant export authority to non-FTA countries, unless the DOE finds that the proposed exports will not be consistent with the public interest, or where trade is explicitly prohibited by law or policy. DOE acts on long-term LNG export applications to non-FTA countries after it has received feedback on several factors including economic and environmental review of the proposed export.[54]

During the FERC portion of the export application review, the DOE is typically a cooperating agency. Receiving a DOE authorization to export LNG to non-FTA countries is an important step for most projects in their path toward financing and construction. To-date (August 2018) and after comprehensive reviews, the U.S. DOE has issued over two dozen long-term LNG or compressed natural gas (CNG) export authorizations for any country in the world not prohibited by U.S. law or policy. However, some of the companies that have LNG export authorizations from the DOE have not reached final investment decisions on their projects. To-date, DOE has authorized just over 21 Bcf/day of exports.

Currently the U.S. DOE has received 69 applications to export domestically produced LNG to both FTA and non-FTA nations. With the exception of a few applications that have either been withdrawn or vacated, the majority have been approved. The total combined export volumes proposed in the applications were 111.6 Bcf of LNG pre day, with 57.14 Bcf/day proposed to be exported to FTA nations.[55]

To streamline the review process, on July 25, 2018, the U.S. DOE issued a new final rule dubbed the "Small-Scale Rule" that would expedite the permitting process for certain small-scale LNG exports. In summary, the U.S. DOE will grant any application to export LNG to non-FTA nations provided that the volumes will not exceed 51.75 Bcf per year and the proposal qualifies for a categorical exclusion under the National Environmental Policy Act.[56] However, to provide some perspective, it should be noted that Cheniere's Sabine Pass facility is authorized to export 1,022 Bcf per year—almost 20 times the volumes under the "Small-Scale Rule." Dominion's Cove Point facility is authorized to export 299 Bcf annually – approximately 5.8 times the "Small-Scale Rule" volumes.

Federal Review Process—FERC[57]

Typically, the FERC has jurisdiction over the siting, construction, and operation of LNG export facilities in the United States. The FERC leads the environmental impact assessments of proposed projects consistent with the National Environmental Policy Act.

There are more than 110 LNG facilities operating in the U.S. performing a variety of services. Some facilities export natural gas from the U.S., others provide natural gas supply to the interstate pipeline system or local distribution companies. Other facilities are used to store natural gas for periods of peak demand ("Peak Shaving"). There are also facilities which produce LNG for vehicle fuel or for industrial use. Depending on the location and use, an LNG facility may be regulated by several federal agencies and by state utility regulatory agencies.

In regards to LNG exports (and imports), the FERC is responsible for authorizing the siting and construction of onshore and near-shore LNG import or export facilities under Section 3 of the Natural Gas Act. The Commission, under Section 7 of the Natural Gas Act, also issues certificates of public convenience and necessity for LNG facilities engaged in interstate natural gas transportation by pipeline. As required by the National Environmental Policy Act, the FERC prepares environmental assessments or impact statements for proposed LNG facilities under its jurisdiction.

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54 From an ordering perspective, FERC is the first agency to review. Once the FERC has issued a final EIS, the DOE begins the review of Non-FTA applications. The DOE will not issue an authorization until FERC has completed its review.

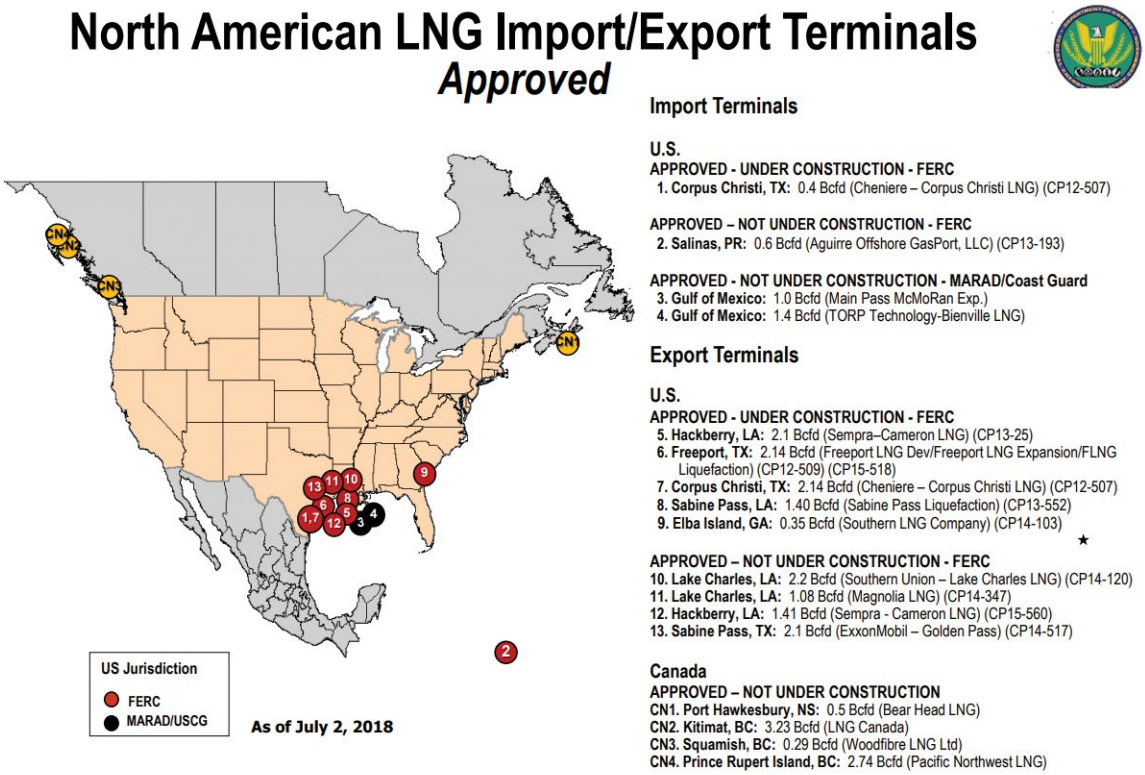
55 https://www.energy.gov/sites/prod/files/2018/06/f53/Summary%20of%20LNG%20Export%20Applications_0.pdf

56 https://www.federalregister.gov/documents/2018/07/25/2018-15903/small-scale-natural-gas-exports

57 https://www.ferc.gov/industries/gas/indus-act/lng.asp

Projects that have been approved and built are subject to FERC oversight for as long as the facility is in operation. FERC currently regulates twenty-four operational LNG facilities.

The FERC lists five approved LNG terminals that are under construction—in Louisiana, Texas, and Georgia. Those five, combined with the three currently exporting, account for a daily capacity of 11.95 Bcf per day.



Federal Review Process—PHMSA

The Pipeline and Hazardous Materials Safety Administration (PHMSA) has exclusive authority to establish and enforce safety regulations for onshore LNG facilities under 49 CFR Part 193. PHMSA inspects LNG facilities and operators to enforce compliance with the requirements of Part 193. Under 49 CFR §193 et seq., requirements are addressed for siting, design, construction, equipment, operations, personnel qualification and training, fire protection, and security of LNG facilities.

PHMSA periodically inspects each LNG facility under its jurisdiction for compliance with Part 193. Specifically, PHMSA's review is intended to confirm proper maintenance of the facility and that the operator has developed and follows operation, maintenance, security, and emergency procedures to ensure the continued safe operation of the facility.[58]

On July 19, 2018, FERC Chairman Kevin McIntyre announced that PHMSA and the FERC have agreed to develop a Memorandum of Understanding (MOU) to refine and reduce the permit application review process for proposed LNG facilities.[59] The FERC-PHMSA MOU was entered into on August 31, 2018.[60] Under the terms of the MOU, the two agencies will coordinate the siting and safety review of LNG facilities that fall under FERC's jurisdiction. In doing so, PHMSA will assure compliance with the standards governing the location and design of the proposed facilities, whereas FERC will review whether the proposed facilities are in the public interest. For the full MOU, follow the link in footnote 54.

58 https://www.phmsa.dot.gov/pipeline/liquified-natural-gas/lng-regulatory-documents

59 https://www.phmsa.dot.gov/news/phmsa-ferc-sign-memorandum-understanding-strengthen-safety-review-and-permitting-process-lng

60 https://www.ferc.gov/legal/mou/2018/FERC-PHMSA-MOU.pdf?csrt=1296065874264480587

Streamlining the Process

On July 26, 2018, U.S. Representatives Pete Olson and Gene Green introduced H.R. 6552,[61] to give FERC the flexibility to consult with the Office of Personnel Management (OPM) and determine appropriate salaries to hire the staff they clearly need.[62] The proposed bill was developed to address the realization that "… [the] review [of] the applications for construction of energy export terminals has been stymied by a shortage of highly specialized engineers. Salary is a critical component in deciding where to work, and it has become clear that at this time engineers can work in the private sector for significantly higher pay than FERC can offer."

FERC Chairman McIntyre was very clear in his response to the proposed legislation by tweeting: "*Strongly supportive of and appreciate Rep. Olson and Rep. Green for their bipartisan leadership to assist in our ongoing efforts to find creative solutions for timely processing of all remaining #LNG applications. #EnergyInfrastructure #GridResilience.*"[63] Similarly, in response to the proposed legislation, FERC Commissioner Chatterjee[64] noted that "[t]he task of reviewing applications for vital infrastructure such as liquefied natural gas export terminals is among the Commission's top responsibilities. While the talented staff at the Commission has been working diligently to evaluate these applications, more needs to be done to ensure our process moves forward in an efficient manner. All stakeholders, from project developers to local communities, appreciate a process that is timely and predictable."[65] Commissioner Chatterjee followed his comments with a series of social media posts highlighting that, in addition to reviewing applications for export facilities, FERC staff also has to oversee existing LNG facilities, while reminding the energy industry that LNG exports to U.S. allies are critical for the nation's geopolitical interests.[66] By August 10, 2018, the proposed bill had seven co-sponsors: four Republicans and three Democrats.[67]

Closing

Although we will not argue that LNG is some sort of a "miracle cure" during this global transition period to a cleaner energy mix, we will argue that there are significant benefits that accrue to producers and consumers of LNG, regardless of longitude or latitude.

It is understood that, generally speaking, natural gas whether in gaseous or liquid form, provides significantly greater environmental benefits than the other fossil fuels. LNG is and will continue to be the fuel of choice for regions and nations that cannot easily access piped natural gas.

In producing regions, such as the United States, LNG takes many roles. For instance, because it can be stored easily it is the fuel of choice to meet winter peak demand; stored LNG is regasified and used for power generation; and, finally, LNG is used as marine fuel. To a lesser extent, certain industrial customers rely on LNG as their primary energy input.

Internationally, LNG plays an equally important role as countries move from more polluting fossil fuels to a cleaner, more environmentally friendly energy mix. It is this market that U.S. and international regulators need to appreciate the most. Certain nations rely on fuels that can produce, as a byproduct, particulates in multiples of what regasified LNG does. In other regions, , in addition to its potential to feed generating facilities, LNG can be used to replace wood burning and as a consequence, reduce the deforestation process while providing the health and environmental benefits associated with using a cleaner fuel.

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61 https://www.congress.gov/bill/115th-congress/house-bill/6552

62 https://olson.house.gov/media-center/press-releases/reps-olson-green-act-to-address-ferc-backlog-to-improve-federal-review

63 https://twitter.com/McIntyreFERC/status/1024374780764540929

64 Following the resignation of Chair McIntyre, President Trump appointed Commissioner Neil Chatterjee FERC Chair on October 24, 2018, https://www.ferc.gov/media/statements-speeches/chatterjee/2018/10-24-18-chatterjee.asp?csrt=7521522978477429759#.W9Hgh2hKjIU, https://www.whitehouse.gov/presidential-actions/president-donald-j-trump-announces-designation-intent-nominate-individuals-key-administration-posts/?utm_source=link

65 https://olson.house.gov/media-center/press-releases/reps-olson-green-act-to-address-ferc-backlog-to-improve-federal-review

66 https://twitter.com/FERChatterjee?lang=en

67 https://www.congress.gov/bill/115th-congress/house-bill/6552/cosponsors

In regards to geopolitics, LNG can be used to strengthen alliances and provide countries and consumers with significant economic and political benefits.

We do recognize that there is a serious concern regarding the impact of LNG exports on the domestic market of the producing nation. In the United States, large industrial customers are opposed to the magnitude of the proposed exports of LNG, arguing that the exports will increase the cost to domestic consumers as producers can find a more lucrative market abroad. Similarly, the government and consumers in Australia are concerned with how exports will affect the quantities available for the domestic market as well as the potential price impact. As noted the U.S. DOE has sponsored studies that recognize a certain price impact on the domestic market. In Australia, the government has considered intervening and limiting exports. The discussion continues in both countries, as producers and consumers are working toward developing a common understanding regarding the others' needs.

The LNG market, despite its mature age, is still evolving and growing and it continues to provide a safe, clean, and reliable fuel to consumers globally.

We published this update of the 2009 NARUC report to serve as a comprehensive handbook on the state of the LNG market in the United States and abroad. The intent is to keep our members apprised of the shifts in the evolving LNG

This handbook contains general information on LNG. We hope that as state utility/public service commissions refer to the handbook, they gain a better understanding of the LNG market and the current regulatory frameworks. The report lays out some key takeaways for regulators to keep in mind. However, this information and takeaways are in no way intended to be prescriptive. State regulators must evaluate and determine their state's own best interests and best course of action for its stakeholders.