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European Energy Security, American LNG, and the Global Natural Gas Marketplace

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EUROPEAN ENERGY SECURITY, AMERICAN LNG, AND THE GLOBAL NATURAL GAS MARKETPLACE

DR. CHRISTOPHER S. KULANDER *

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Introduction

The energy security of Europe, especially Eastern Europe, must be enhanced to provide political and economic security to the region. Natural

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gas supplies approximately a fifth of the world's energy needs.¹ Use of North American-sourced Liquefied Natural Gas ("LNG") and, possibly, locally-derived sources of unconventional natural gas as alternatives to coal and Russian natural gas provides a means of curtailing CO₂ emissions while restraining Putin's Russia.

Historically, national-level energy policies have primarily been reactionary—with each new regime sallying into office new plans which then get warped by unforeseen geopolitical, technological, and economic forces. Establishing and maintaining energy security for Europe, however, is a crucial component of national security for each country proximal to an increasingly aggressive and often unpredictable Russia, particularly during a time of upheaval within both the European Union (the "EU") and the North Atlantic Treaty Organization ("NATO"). The energy portfolios of many of the EU members are experiencing upheaval, with some sources of energy being tamped down and others promoted. For example, the EU has required members with Soviet-era types of nuclear reactors to close such plants while Germany, spurred by the Fukushima disaster, has vowed to close its nuclear plants as they age out of commission. Similarly, the EU and individual members have aggressively sought to increase the renewable component of their energy portfolios.²

Bordering both the heart of the EU on one side and Russia on the other, and with access provided by the Baltic and Black Seas, the countries of Eastern Europe are the crossroads of natural gas in Eurasia. Given the increase in NATO's military presence, the keen interest of the Baltic States in a strong American presence, Russia's invasion of portions of Ukraine, and the hope of lessening the influence of Russian electrical and natural gas imports, American politicians and oil and gas companies should pay close attention to the evolving energy situation in Europe and worldwide and formulate a fluid response to that evolution.

Europe provides a very intriguing region to consider the viability of long-term American exports given the intense distaste of Europeans towards Russian hegemony in natural gas exports and, conversely, a generally favorable impression of American friendship. The countries closest to Russia have made some of the biggest moves. For example, Poland, desperate to wean itself off Russian natural gas, is now paying

1. Christine Buurma, *Liquefied Natural Gas*, BLOOMBERG (Aug. 1, 2016, 9:06 AM), <http://www.bloomberg.com/quicktake/liquefied-natural-gas>.

2. See *Eleven EU Countries Hit 2020 Renewable Energy Targets*, EUROPEAN COMMISSION, <http://ec.europa.eu/energy/en/news/eleven-eu-countries-hit-2020-renewable-energy-targets> (last visited Nov. 17, 2017).

significantly more for natural gas from Qatar than it might from Gazprom after constructing an LNG regasification terminal in 2015. Finland and Estonia are considering constructing the Baltconnector, a 50-mile long bi-directional pipeline between their countries that will also connect the pipeline grid of Latvia. Completion of this pipeline will enable a planned LNG lifting terminal to serve all three countries with natural gas derived from imported LNG.

Concerned about the high cost of Russian natural gas, Lithuania has made its own plans for LNG imports. Lithuania has had constructed a floating LNG importation terminal, the Lithuanian Natural Gas Terminal flagged as the *Independence*, which opened in early 2016. The Lithuanian project was funded through a loan of €87 million (approximately \$118 million) through the European Investment Bank. And in August of 2017, Lithuania accepted its first cargo of LNG from Louisiana, with some of the natural gas eventually destined for Latvia and Estonia.³

All the pieces are coming together in the countries bordering Russia. The question is *if*—or under what conditions—*when* will a steady stream of American LNG and European shale gas step up to help provide energy security to Europe. Other questions follow—how will Southwest Asia—home to (by far) the largest LNG purchasers—respond to and influence European trade? What can America and the EU do to enhance LNG imports into Europe? What other markets exist for LNG? This paper will consider these questions and more. One thing is certain—while the international energy market is dependent on prices and politics, and although it is almost impossible to predict the individual events that affect energy prices, North American LNG will flow to Europe in increasing quantities for the foreseeable future.

Technical Background

Technological advances in hydrocarbon extraction, such as modern directional drilling and hydraulic fracturing (“fracturing”), have sparked a boom in domestic energy development. In addition to enhancing national security by reducing America’s dependence on foreign imports, America’s natural gas boom has expanded opportunities for energy *exports* and, through those, are helping to expand the global geopolitical reach of the U.S. Development of hydrocarbon-bearing “tight” formations, such as shale

3. Andrius Sytas, *Lithuania Receives First LNG from the United States*, REUTERS, <http://www.reuters.com/article/us-lithuania-lng/lithuania-receives-first-lng-from-the-united-states-idUSKCN1B11BW> (last visited Nov. 17, 2017).

and well-cemented sandstone, and the exportation of LNG promise to transform both the onshore U.S. natural gas industry and world energy trade, particularly in Europe, where countries currently dependent on Russian gas are considering alternative sources of energy. Prior to the rise of unconventional shale, production of domestic onshore natural gas languished for many years, giving rise to suggestions that natural gas production had peaked and would thereafter only decline.

LNG is methane gas that has been chilled by LNG liquefaction plants (or “trains”) to -260°F at atmospheric pressure in order to convert it into a liquid state. This liquid is then lifted into an LNG tanker for international transport, often to another continent at constant temperature and pressure. These tanker ships are typically double-hulled for both safety and insulating purposes. At the receiving terminal, the LNG is typically off-loaded into insulated storage tanks for distribution. LNG has a higher reduction in volume than simple compressed natural gas, so the “energy density” (the amount of energy contained in the same volume) of LNG is 2.4 times higher than that of compressed natural gas, or 60% of that of diesel fuel. This makes LNG cost efficient to transport over long distances where pipelines do not exist. Upon arrival, the regasification terminals warm the LNG so that it reverts to a gaseous state for entry into the natural gas transmission system of the importing country and is then transported to local distribution networks for residential use or to large industrial users. Because LNG is 1/600 the volume of natural gas in gaseous form, one large tanker of LNG can deliver the same amount of natural gas as 5% of U.S. gas usage in a single day. Technological improvements in design and fabrication of LNG terminals and transport ships have lowered the cost of LNG shipments by approximately 30% since 1990.

Natural gas is more difficult to bring from remote fields than liquids, because natural requires pipelines as opposed to marine tankers. Sometimes, however, pipelines cannot be built, or are too long and expensive to construct.⁴ Because the locations of reserves are often remote, significant portions of natural gas are considered “stranded” as they are not economical to connect to a market via pipelines. LNG tankers may be the only economic way to bring such natural gas to markets. The first commercial LNG cargos began in 1964 with shipments floating from Algeria to France and the UK, and the fleet has since grown to over 400 vessels. The largest ships, Qatar’s Q-Max Tankers, now exceed 1,100 feet in length and cost around \$250 million to construct.

4. Buurma, *supra* note 1.

Some in industry believe that producers need to facilitate LNG use into new regions and industries.⁵ In America and beyond, multi-sector industry consortiums are forming to speed adoption of LNG as ship fuel. The members—including LNG shippers, ports, LNG suppliers, and others—seek to construct storage and liquefaction assets in major ports to insure an efficient and cleaner global network of facilities to support the switch to LNG from other marine fuels such as diesel.⁶ LNG ships will be more expensive than traditional ships. For example, LNG-powered vessels classified as “afamax” (ships that are the largest size allowed in the Suez Canal) are predicted to cost approximately \$10.5 million more than standard ships of similar size.⁷

Another example of a “pop-up” outlet for LNG that might bolster spot markets is the recent installation of LNG tanks at JaxPort in Jacksonville, Florida.⁸ This LNG asset will be to fuel new LNG-powered ships that will deliver freight to and from Puerto Rico. Bunkering of LNG for ship use is already speeding ahead in Southeast Asia, with giants like Total looking to acquire ship grade LNG from regional suppliers.⁹ Providing another example, the Finnish entity Containerships has received a grant from the EU to broaden its fleet of LNG-powered trucks and to build LNG-powered ships.¹⁰

5. Miwa Naruse, *LNG Producers Seek New Demand in Slack Market*, NIKKEI ASIAN REV. (Apr. 7, 2017 6:40 AM), <http://asia.nikkei.com/Markets/Commodities/LNG-producers-look-for-new-demand-in-slack-market>.

6. See *SEA/LNG Coalition Adds JAX LNG, Petronet LNG, and Toyota Tsusho Corporation*, PORTNEWS (Mar. 29, 2017, 4:03 PM), <http://en.portnews.ru/news/236571/>.

7. Karen Thomas, *LNG Rising for Sovcomflot as Russian Owner Passes Gas-Shipping Milestone*, LNG WORLD SHIPPING, http://www.lngworldshipping.com/news/view,lng-rising-for-sovcomflot-as-russian-owner-passes-gasshipping-milestone_46958.htm (last visited Nov. 17, 2017). International maritime emission restrictions will likely force many shipping companies switch to LNG in the years ahead. The fines associated for violating the restrictions are similar to the costs of switching to LNG for their vessels, allowing a financial incentive structure that shifts the global fleet to LNG.

8. See Drew Dixon, *New 260-Ton LNG Tanks at JaxPort Put ‘Jacksonville at the Top,’* FLORIDA TIMES – UNION JACKSONVILLE (Mar. 27, 2017 12:10 PM), <http://jacksonville.com/metro/business/2017-03-27/new-260-ton-lng-tanks-jaxport-put-jacksonville-top>.

9. See Jacqueline Woo, *Pavilion Energy Teams Up With Total for LNG Bunkering*, STRAITS TIMES (Apr. 5, 2017, 5:00 AM), <http://www.straitstimes.com/business/companies-markets/pavilion-energy-teams-up-with-total-for-lng-bunkering>.

10. PR Newswire, *Finnish Containerships Receives Almost EUR 17 Million Grant from the EU and NEFCO*, OIL & GAS 360° (Apr. 3, 2017, 2:18 PM), <http://www.prnewswire.co.uk/news-releases/finnish-containerships-receives-almost-eur-17-million-grant-from-the-eu-and-nefco-617955793.html>.

2017 brought another breakthrough—a Mobile Natural Gas Production platform (“FLNG”) that can also serve as a liquefaction asset.¹¹ Malaysia’s Petronas reached the finish line first as its *Satu* FLNG filled a tanker ultimately destined for, it was rumored, South Korea. The \$10 billion platform began lifting first when similar projects hatched by Royal Dutch Shell and Japan’s Inpex encountered repeated delays.

Permitting and Financing LNG Projects

Since significant U.S. domestic supply curtails any near-future price hikes, LNG exports offer an option over domestic use as a way to increase demand. Regulatory perils in America, however, await. One complication for LNG exports is the permitting required by the Department of Energy (“DOE”). Obtaining general state and federal government approvals for construction of LNG exporting projects can be both expensive and time-consuming. Potentially most daunting are the permits required by the DOE, through its branches, the Federal Energy Regulatory Commission (“FERC”) for facility construction, and the Office of Fossil Energy for the import or export of LNG to most countries. As provided for in Section 3 of the Natural Gas Act, anybody wishing to export LNG from the America is required to achieve authorization from the Secretary of Energy. Once asked, the Secretary must then determine if the proposed export is consistent “with the public interest.” If determined to be so, and if the exports would be to non-free trade agreement countries—such as all of Europe¹²—the U.S. Department of Energy then issues a conditional authorization based on a review of the effect of the exports on domestic supply. Even if given, the conditional authorization may later be impacted by subsequent applications, because the Department will continually monitor the cumulative effect of these exports on the domestic natural gas market. Such a potential impact *after* construction worries financiers.¹³

Another complication is ownership of American strategic assets by foreigners. Acquisition by an alien entity of control over strategically

11. See Henning Gloystein, *Petronas to Export World’s First LNG from Floating Production Unit: Data, Sources*, REUTERS (Mar. 30, 2017, 3:31 AM), <http://www.reuters.com/article/us-malaysia-lng/petronas-to-export-worlds-first-lng-from-floating-production-unit-data-sources-idUSKBN1710V9>.

12. The Department of Commerce generally maintains a list of countries with which the U.S. maintains free trade agreements, see, e.g., <http://www.trade.gov/fta/>, for more information about these international trade agreements.

13. See Brad Richards, *New Transport Options for Liquefied Gas*, ENERGY WORLD, Dec. 6, 2016, at 20-21.

important domestic assets such as oil and gas real property may also trigger the Foreign Investment and National Security Act of 2007 (“FINSA”).¹⁴ FINSA requires an alien entity to address several concerns when seeking approval of an covered acquisition or merger. Most importantly, the foreign entity must address the extent to which the transaction will affect the America’s “critical infrastructure” in national security. If approval of a covered interest is not approved, the deal may be unraveled later.¹⁵

Because LNG projects are so costly and time-consuming, the LNG transportation business, like the pipeline business before it, relied on—and still largely relies on—long-term contracts designed to guarantee an income stream.¹⁶ The assured income stream remains necessary in order to bring in investors seeking a relatively predictable return. These long-term agreements links all the parties involved in the transportation chain: the consuming importers, the terminal facilities and shippers, and the financiers that stand behind all of them.¹⁷

The high up-front costs of exporting trains are daunting. Price arbitrage can assist in securing attractive financing, provided the underlying sales agreement provides secure and appealing long-term prices. Because natural gas prices are unpredictable, companies entering such long-term contracts typically develop a hedging scheme to reduce price risk for buyers, seller, and the lenders that rely on the sales agreements to provide income for debt service.

LNG liquefaction projects also rely on immensely expensive assets on either side of the plants—pipelines landward and LNG ships seaward. Such large projects typically require multiple lenders that must be satisfied that the plant will have landward assets like pipelines and a steady market of

14. See 50 U.S.C. § 4565 (2012); 31 U.S.C. § 301 (2012); see also Edward Rubinoff & Tatman Savio, *CFIUS Implements FINSA Amendments to Exon-Florio Foreign Investment Law*, METROPOLITAN CORP. COUNS. (May 1, 2008, 12:00 AM), <http://www.metrocorp.counsel.com/current.php?artType=view&artMonth=May&artYear=2008&EntryNo=8232>.

15. For an discussion of FINSA and the other regulatory hurdles to owning and operating energy assets in the U.S. as a foreigner, see Christopher Kulander, *Intruder Alert! Running The Regulatory Gauntlet To Purchase, Own, And Operate American Energy/Mineral Assets By Foreign Entities*, 46 TEX. TECH L. REV. 995 (2014).

16. Mark Tay & Aaron Sheldrick, *UPDATE 2-LNG Supply Gap May Form as Investment Drop Stymies Projects*, REUTERS (Apr. 4, 2017, 2:32 AM), <http://in.reuters.com/article/japan-gastech-lng/update-2-lng-supply-gap-may-form-as-investment-drop-stymies-projects-idINL3N1HC1B4>.

17. For a discussion of the past and present of financing oil and gas transactions from exploration to transportation to distribution, see Bernard F. Clark, Jr., *OIL CAPITAL: THE HISTORY OF AMERICAN OIL, WILDCATTERS, INDEPENDENTS, AND THEIR BANKERS* (2016).

natural gas as well as purchasers overseas and a secure route to get there. Therefore, projects must be structured so that they include pipelines to the export train, long-term lifting contracts with buyers worthy of credit, and a robust hedging strategy.¹⁸

Obviously, large pipeline projects like Keystone can raise hackles. Even small domestic LNG projects can meet with stiff local resistance and opposition from FERC. For example, a proposed LNG pipeline in Oregon has raised local hackles and had its permit denied twice by FERC.¹⁹ The existence of American LNG depends on fracturing, a crucial component of the production process, but also the target of environmental activists.

But the fracturing genie and its attendant pipelines will not easily be put back in the bottle, and domestic production is robust and seeking a market. While exporting license applications, in the aggregate, should provide some indicator of the volume of future LNG exports, the total amount of liquefaction capacity that would be made possible if the most recent applications (less than 2500 billion cubic feet) led to actual construction is dwarfed when compared to the total natural gas produced in America.²⁰

American LNG is now going into all major markets and as a result, volumes of LNG being traded leaped more in 2016 than in any of the prior five years.²¹ Growing U.S. exports will not only result in downward pressure on world prices but will create demand for shorter purchase contracts and greater flexibility for buyers to resell, along with more parties involved in buying and trading volumes.

This wave of LNG has meant that the primacy of long-term, bilateral, dedicated deals between utilities and LNG exporters are being challenged.²² In the past, oil and gas companies borrowed capital to fund drilling and the building of liquefaction capacity. In order to pay back the lenders, the companies would execute sales contracts lasting decades with electric utilities. The contracts were typically pegged at a fraction of oil prices. This is changing, with U.S. exporters instead calculating LNG prices based on natural gas trades at markets like the Henry Hub in Louisiana. In addition,

18. Richards, *supra* note 13.

19. Nick Morgan, *Jordan Cove Draws Protest in Renewed LNG Pipeline Push*, OREGONIAN, http://www.oregonlive.com/business/index.ssf/2017/03/renewed_pipeline_push_by_jorda.html (last updated Mar. 24, 2017).

20. Richards, *supra* note 13.

21. *See LNG Giants in Biggest Shake-Up as U.S. Supply Flows to Asia*, STRAITS TIMES (Apr. 5, 2017, 5:00 AM), <http://www.straitstimes.com/business/lng-giants-in-biggest-shake-up-as-us-supply-flows-to-asia>.

22. *Id.*

destination restrictions are being dropped, allowing tankers to go to different ports and thus allowing traders to buy cargos and “flip” them to another destination en route.

In the past, LNG producers in Qatar, Australia, and Russia, armed with long-term contracts for high prices, invested vast sums into more production, leading them to harvest a period of LNG saturation when the Indian and Chinese economies slowed a bit in 2015-2016.²³ This saturation allowed American “spot cargos”—one-time/one-ship deals—to begin slipping into ports long accustomed to only visits from contracted cargos. All these spot cargos floating around have inevitably conjured up trading specialists.²⁴ These middlemen, long common in commodities like coal or oil, buy LNG from producers and sell to importers elsewhere. “People need to sit in the middle of the chain [to] provide the flexibility and meet the different customer needs,” said Mike Utsler, the chief operations officers at Woodside Petroleum.²⁵ In a sure sign that a market is coming for spot cargos, Trafigura—a Singaporean multinational commodity trading—released a form master sales and purchase agreement for LNG trading in April, 2017.²⁶

The Worldwide LNG Market

Global liquefaction capacity has ballooned since 2000, going from 15.9 Bcf/day to 35.5 Bcf/day in 2010 to (it is predicted) 52.6 Bcf/day in 2017.²⁷ This increase has been accelerating—in 2016, global liquefaction capacity reached 339.7 million tons per year, up from 301.5 in 2015.²⁸ The global LNG markets remain saturated in 2016 and 2017.²⁹ In 2016, global

23. See Osamu Tsukimori & Aaron Sheldrick, *LNG Producers Turn to Trading, Risk Taking to Maintain Market Share*, REUTERS (Apr. 4, 2017, 12:51 AM), <http://www.reuters.com/article/us-japan-gastech-lng/lng-producers-turn-to-trading-risk-taking-to-maintain-market-share-idUSKBN1770GZ>.

24. *Id.*

25. *Id.*

26. *Id.*

27. *US Approaching Net Exporting of Gas, Driven by Shale & LNG*, OIL & GAS 360°, <http://www.oilandgas360.com/u-s-approaching-net-exporting-gas-driven-shale-lng/> (last visited Nov. 17, 2017) [hereinafter OIL & GAS 360°].

28. Joe Fisher, *2016 Was Banner Year for Global LNG Trade, IGU Says*, NAT. GAS INTELLIGENCE, <http://www.naturalgasintel.com/articles/110014-was-banner-year-for-global-lng-trade-igu-says> (last visited Nov. 17, 2017).

29. See Helen Robertson, *The Great LNG Market Showdown*, PETROLEUM ECONOMIST, <http://www.petroleum-economist.com/articles/midstream-downstream/lng/2017/the-great-lng-market-showdown> (last visited Apr. 9, 2017).

liquefaction capacity was believed to have reached 408 million tons, but LNG imports were thought to be close to 261.2 million tons, an increase of only 15 million tons over 2015.³⁰ Meanwhile, spot LNG prices in Southeast Asia hovered around \$6.00-\$6.50/mmBtu in the fall of 2017, down from \$16.00/mmBtu in early 2015.³¹ Current conditions are not conducive for the development of large greenfield LNG projects.³²

258 million tons of LNG were shipped worldwide in 2016, up 5% from 2015 and much higher than the 0.5% average growth rate seen the prior four years.³³ American and Australian LNG entering the market was the primary driver in the increase. Such a depressed market for new liquefaction capacity could see an eventual dearth of capacity in the face of future rising demand.³⁴ Some believe that the present time of LNG abundance will not last and that new importers and those contemplating imports should seek to lock down supplies now in anticipation of coming scarcity.³⁵

Demand for LNG outside North America is growing.³⁶ Global natural gas consumption is expected to rise 60% from 2014 levels by 2040—a faster growth rate than any other type of energy.³⁷ The America LNG market is expected to provide a quarter to a third of all the available LNG available for sale by 2020.³⁸ Qatar and Australia are predicted to provide a third of all LNG each by that time, with smaller suppliers making up the balance.³⁹ Buyers will generally purchase LNG from the closest market but “spot” cargos will be available, providing a spot market for LNG. Approximately 200 LNG tankers will be on the water at any given time by

30. *Id.*

31. *Id.*

32. A “greenfield” LNG project is one built where no prior natural gas-related infrastructure is located. These can be much more expensive as they require not only train construction but also interconnection with producing fields via new pipelines, importation of skilled workers, and perhaps even basic port facilities.

33. Fisher, *supra* note 28.

34. Robertson, *supra* note 29.

35. *Id.*

36. Bradley J. Richards, *The Future of LNG*, OIL & GAS FIN. J., <http://www.ogfj.com/articles/print/volume-9/issue-05/features/the-future-of-lng.html> (last visited Nov. 18, 2017).

37. Richards, *supra* note 13.

38. Joe Fisher, *U.S. LNG: A Growing Slice of a Growing Pie*, NAT. GAS INTELLIGENCE, <http://www.ogfj.com/articles/print/volume-9/issue-05/features/the-future-of-lng.html> (last visited Nov. 17, 2017).

39. *See id.*

2020, allowing for cargos of spot-priced LNG to be attracted to any particular epicenter of temporary high prices.⁴⁰

New LNG buyers like Pakistan—an importer only since 2015—represent a new market that will not be receptive to “Qatari” long-term LNG contract.⁴¹ Australian and Qatari LNG sales contracts have such destination clauses while recent U.S. deals have not come freighted with such restrictions, a feature that Japanese purchasers like.⁴² Fixed prices and multi-year contracts will not simply disappear, however, but rather will likely just shift to shorter terms, contain less restrictions, and provide for lower prices.⁴³ In 2016, Cheniere offered multiple Japanese LNG purchasers five-year contracts for \$8.00/mmBtu with delivery from Louisiana starting in 2023.⁴⁴

Generally speaking, due to lower LNG prices, purchasers in 2017-18 are seeking better prices and are less concerned about supply security and long-term contracts. Prices, however, are locally very different from the world average and high price “hotspots”—areas experiencing spiking spot prices—commonly pop up periodically around the world due to wars, weather issues, and speculation. The largest growth for natural gas markets will be provided by LNG exports for at least the next five years, perhaps ten.

The Pacific/Indian Market

No realistic discussion about the future of LNG anywhere in the globe can take place without accounting for the Asian market. The Pacific/Indian Basin comprises one of two regional markets served by LNG tankers. It is much bigger than the Atlantic Basin, however—Japan alone accounts for more LNG imports than all Atlantic basin customers combined.⁴⁵ Currently, the five largest LNG importers are found in Asia: Japan, South Korea, China, India, and Taiwan. Together, these countries use approximately 70%

40. *Id.*

41. Tsukimori, *supra* note 23.

42. Yuta Koga, *U.S. LNG a Boon for Japan*, NIKKEI ASIAN REV. (Mar. 17, 2017, 12:00 PM), <http://asia.nikkei.com/Markets/Commodities/US-LNG-a-boon-for-Japan>.

43. Nick Cunningham, *How U.S. LNG Transformed the Market*, OILPRICE.COM (Apr. 9, 2017, 12:00 PM), <http://oilprice.com/Energy/Natural-Gas/How-US-LNG-Transformed-The-Market.html>.

44. *See id.*

45. Robertson, *supra* note 29.

of the world's traded LNG.⁴⁶ The latest international energy outlook from the U.S. Energy Information Agency projects that India and China will inhale 31% of global energy in 2035, up from 21% in 2008. Outside of China and Australia, regional-sourced natural gas reserves are limited. And while China has significant technically-recoverable domestic shale gas deposits, its economic reserves are still small. In both oceanic basins, the price of natural gas has, until recently, remained well above gas prices in North America for some time, making a compelling argument for establishing exporting terminals in America to service both basins. For example, after the Fukushima Daiichi nuclear disaster in 2011, natural gas prices in Japan rocketed from \$10.00 MMBtu to \$17.00 MMBtu and remained above \$15.00 MMBtu until January, 2015 when natural gas prices lowered in both basins.⁴⁷

All the new LNG capacity—over 300 million tons a year worldwide in 2016, while only 266 million tons was actually traded—illustrates a surplus that has caused the Asian spot LNG price to drop by more than 70% from its 2014 high.⁴⁸ Beijing has invited privately-owned outfits to import spot LNG cargos.⁴⁹ China also began a carbon-trading desk, a move that should encourage further LNG importation as natural gas is much cleaner than coal and easier to develop than nuclear assets.⁵⁰ In addition, with Japan's restructured gas markets, large commercial and industrial users that can buy and LNG directly will likely appear, helping to move the global LNG market more towards spot trading and greater liquidity.⁵¹ These buyers will likely look to new capacity in North America.

LNG imports into Japan and South Korea have recently been level or declining, with Moody's expecting Japanese imports to fall by 9% by 2020

46. Henning Gloystein, *U.S. Exports Fill Asia's LNG Demand Gap as Market Tightens*, REUTERS (Jan. 19, 2017, 11:19 PM), <http://www.reuters.com/article/us-asia-lng/u-s-exports-fill-asias-lng-demand-gap-as-market-tightens-idUSKBN1540EK>.

47. Victoria Zaretskaya & Scott Bradley, *Natural Gas Prices in Asia Mainly Linked to Crude Oil, But Use of Spot Indexes Increases*, EIA, <http://www.eia.gov/todayinenergy/detail.php?id=23132> (last visited Nov. 17, 2017).

48. Tom Finn, *Qatar Restarts Development of World's Biggest Gas Field After 12-Year Freeze*, REUTERS (Apr. 3, 2017, 6:53 AM), <http://www.reuters.com/article/us-qatar-gas/qatar-restarts-development-of-worlds-biggest-gas-field-after-12-year-freeze-idUSKBN175181>.

49. Karen Thomas, *Asia: A Tale of 2 LNG Importers*, ING WORLD SHIPPING, http://www.lngworldshipping.com/news/view,asia-a-tale-of-two-lng-importers_46802.htm (last visited Nov. 18, 2017).

50. *See id.*

51. Robertson, *supra* note 29.

from their peak of 2014 and flat demand from South Korea to 2020.⁵² Despite the perceived saturation, by early 2017, about a dozen U.S. LNG tankers were delivering spot cargos to Asia, spurned by surging demand in Pakistan and China, as well as hiccups in Australian production.⁵³ Spot prices at the time hovered at \$3.21 per mmBtu in the U.S., while comparable Asian LNG prices had spiked to almost \$10.00 per mmBtu—an 80% increase over June, 2016 prices.⁵⁴ At the beginning of 2017, China's LNG import level had reached 25 million tons a year, a 30% percent increase over 2015.⁵⁵

In contrast, as of 2017, the growth rate of lifting into China and India were among the highest of the 35 countries importing LNG.⁵⁶ Australia, despite setbacks in its export volume, showed the highest growth in exports, followed closely by the U.S. LNG demand reached 265 million tons in 2016, an amount sufficient to provide electricity to approximately half a billion residences.⁵⁷ In fact, Shell believes that the growth of LNG demand will be double that of natural gas demand between 2016 and 2030.⁵⁸ This demand is caused by national politics, the proliferation of Floating LNG Storage and Regasification Unit (“FSRU”), the need to replace declining natural gas production, and “small scale LNG” projects like that found in seaports.

In response to the sudden drop in long-term, oil-pegged prices for Asian cargos (when compared to U.S. LNG spot prices), some smaller Asian markets that hitherto had enjoyed lower relative spot prices are scrambling to limit their exposure to the (now) relatively higher-priced American LNG. For example, India—looking for a cleaner feedstock for its electricity generating and fertilizer industries—has turned to LNG over coal and other sources. First eschewing long-term, oil-indexed contracts for cargos from the U.S., India then found itself obligated to purchase U.S. LNG priced *higher* than Asian spot prices. In a sign that a market is emerging, the

52. James Catlin, *LNG Shipping Demand Side Macro Update: March 2017*, SEEKING ALPHA, (Mar. 24, 2017, 9:01 AM), <http://seekingalpha.com/article/4057506-lng-shipping-demand-side-macro-update-march-2017>.

53. Gloystein, *supra* note 46.

54. *Id.*

55. *See id.*

56. *See Shell Launches First LNG Outlook*, SHELL GLOBAL, <http://www.shell.com/energy-and-innovation/natural-gas/liquefied-natural-gas-lng/lng-outlook.html> (last visited Nov. 18, 2017).

57. *See id.*

58. *Id.*

Indian state-run gas entity GAIL executed a time-swap deal with Swiss global commodity Gunvor, getting fifteen cargos at oil-linked prices on a delivered basis in late 2017 in return for selling ten cargos of U.S. LNG in 2018.⁵⁹ This swap arose from GAIL's purchase binge between 2011 and 2013 of American LNG when prices were high and cargos scarce.

Ultimately, lower prices mean a better bargaining position for buyers—including those in Europe. Low LNG prices are motivating large natural gas purchasers to seek renegotiated terms to the long-term purchase contracts they executed with producers and shippers.⁶⁰ For example, Korea Gas Corp., Japan's JERA, and China National Offshore Oil Corp.—a combination representing a third of global LNG purchasing—announced in early 2017 that they had entered into a “memorandum of understanding” to “cooperate in the joint procurement of LNG.”⁶¹ Such a grouping of purchasers has hitherto been rare, with groups of producers (such as OPEC) being more common. The buyers seek to garner concessions from producers, including the right to re-sell imports to other parties.⁶² Producers, from countries such as Australia, Qatar, and Malaysia, like to have purchasers sign fixed supply contracts that may last decades and which contain “take-or-pay” clauses requiring purchasers to take certain amounts of LNG regardless of the current prices and with no right to re-sell the product to third parties.⁶³

India—projected to soon be the most populous country—is making a push at LNG imports, with Shell set to complete a capacity-doubling expansion of its Hazira LNG terminal in 2017-18.⁶⁴ India is also considering eliminating its import tax on LNG, an example of a government

59. Nidhi Verma, *UPDATE 1-India's GAIL Signs 1st Time-Swap Deal for U.S. LNG with Gunvor*, REUTERS (Mar. 3, 2017, 2:48 AM), <http://www.reuters.com/article/india-gail-gunvor/update-1-indias-gail-signs-1st-time-swap-deal-for-u-s-lng-with-gunvor-idUSL3N1GG2RA>.

60. See Jane Chung et al., *World's Top LNG Buyers form Alliance to Push for Flexible Contracts*, REUTERS (Mar. 23, 2017, 11:08 AM), <http://www.reuters.com/article/us-asia-lng-markets/worlds-top-lng-buyers-form-alliance-to-push-for-flexible-contracts-idUSKBN16U27X>.

61. *Id.*

62. *Id.*

63. *Id.*

64. Arathy S. Nair & Tanvi Mehta, *Shell Plans to Double Hazira LNG Plant Capacity – India Head*, REUTERS (Mar. 31, 2017, 7:12 AM), <http://www.reuters.com/article/shell-hazira-capacity/shell-plans-to-double-hazira-lng-plant-capacity-india-head-idUSL3N1H84HZ>.

altering its tax structure to promote desired energy portfolio results.⁶⁵ India has indicated its willingness to import increasing volumes of American LNG—but only at the right price.⁶⁶ Next door, Burma, where electricity consumption is set to triple between 2012 and 2020, also plans to begin allowing LNG to take its place in the country's energy portfolio.⁶⁷

The North American Market

America began building and then operating import terminals for LNG in the 1970s.⁶⁸ By 2012, twelve import terminals were operational around the country and Cheniere was importing LNG in Sabine Pass, Louisiana.⁶⁹ By 2012, however, the United States was awash in natural gas. Gas prices at Henry Hub—America's largest point for pricing gas—in March, 2012, hovered at \$2.29 per MMBtu.⁷⁰ The question then turned—could America retool its LNG import terminals to *export* LNG instead? Conversion costs to refit a terminal have been estimated at 2-8 billion dollars per terminal, so long term prospects for sustained exportation of gas must be good to justify financing such a transformation.⁷¹

Excluding Alaska, the U.S. was last a net exporter of LNG in 1957.⁷² By the end of 2018, U.S. LNG exporting capacity will surpass six billion cubic feet, up from no capacity at the end of 2015 and enough natural gas to power all the homes in California, Texas, and Florida.⁷³ This export capacity looks to help deplete an overabundance of domestic natural gas

65. Neha Dasgupta & Nidhi Verma, *Government Officials Seek Zero Import Tax on LNG in Budget 2017 – Document*, REUTERS (Jan. 6, 2017, 12:16 AM), <http://in.reuters.com/article/lng-india-energy-tax-budget2017/govt-officials-seek-zero-import-tax-on-lng-in-budget-2017-document-idINKBN14Q0HD>.

66. Marianna Parraga, *India Looks for 'Right Prices' to Boost LNG, Crude Imports from U.S.*, REUTERS (Mar. 6, 2017, 1:42 PM), <http://www.reuters.com/article/us-ceraweek-india-imports/india-looks-for-right-prices-to-boost-lng-crude-imports-from-u-s-idUSKBN16D2DU>.

67. Motokazu Matsui, *Myanmar to Solicit Bids for its 1st LNG Terminal*, NIKKEI ASIAN REV. (Mar. 14, 2017, 2:25 PM), <http://asia.nikkei.com/Politics-Economy/Economy/Myanmar-to-solicit-bids-for-its-1st-LNG-terminal>.

68. Richards, *supra* note 36.

69. *Id.*

70. *Id.*

71. *Id.*

72. Scott DiSavino, *After Six Decades, U.S. Set to Turn Natgas Exporter Amid LNG Boom*, REUTERS (Mar. 29, 2017, 12:08 AM), <http://www.reuters.com/article/us-usa-natgas-lng-analysis/after-six-decades-u-s-set-to-turn-natgas-exporter-amid-lng-boom-idUSKBN1700F1>.

73. *Id.*

and lift the fortunes of domestic shale producers like Chesapeake Energy Corp., Cabot Oil and Gas Corp., and Range Resources.⁷⁴

That is good news for producers, because on the supply side of the ledger, a consensus has developed that the U.S. has more than a century of natural gas. Of course, domestic use of natural gas for heating as well as in petrochemical and other industrial plants will draw down exportable natural gas. The former use threatens to be particularly voracious as more stringent air quality controls encourage more power producers to utilize natural gas over coal for electrical generation. On the other hand, coal-fired power plants use cheap fuel and are prized for base-load plants.

Some corporate captains in energy believe that the U.S. will be the largest exporter of LNG by 2035.⁷⁵ American natural gas exports effectively matched imports for the first time in December, 2016.⁷⁶ LNG exports began providing an outlet for the American gas market in 2016, with two exporting trains taking up to 650 million feet of natural gas per day off the domestic market.⁷⁷ A third terminal began operations in 2017, along with the commissioning of a fourth.⁷⁸ With the completion of the first two Cheniere trains, the company began collecting fixed take-or-pay payments for 20-year terms from purchasers Royal Dutch Shell and Spain's Gas Natural Fenosa in 2016-2017.⁷⁹

Cheniere is not the only company in the U.S. looking to expand its exporting capability. Venture Global Plaquemines LNG, LLC and Venture Global Gator Express LLC made application to FERC in early 2017, seeking approval of a proposed LNG export train and associated pipelines to be located along the Mississippi River in Louisiana.⁸⁰ The project, if approved, is expected to cost \$8.5 billion and would supplement the

74. *See id.*

75. Michael Foster, *Will U.S. Become Largest Natural Gas Exporter?*, INVESTOPEDIA (Mar. 9, 2017, 12:46 PM), <http://www.investopedia.com/news/will-us-become-largest-natural-gas-exporter-ung-ugaz/>.

76. OIL & GAS 360°, *supra* note 27.

77. Naureen S. Malik, *U.S. Will Soon Double Shale LNG Exports*, WORKBOAT, <http://www.workboat.com/news/bluewater/u-s-will-soon-double-lng-sends-overseas/> (last visited Nov. 18, 2017).

78. *Id.*

79. *Id.*

80. Joe Fisher, *Venture Global Files at FERC for Second Louisiana LNG Export Project*, NAT. GAS INTELLIGENCE, <http://www.naturalgasintel.com/articles/109615-venture-global-files-at-ferc-for-second-louisiana-lng-export-project> (last visited Nov. 26, 2017).

companies' \$4.5 billion LNG exporting terminal currently under construction in Calcasieu Parish, Louisiana.⁸¹

Samsung and KBR Inc. have been selected to build a 625-acre LNG liquefaction train for Texas LNG LLC in the Port of Brownsville, Texas.⁸² Exxon announced plans in March, 2017 to construct eleven facilities in Texas and Louisiana that will include LNG liquefaction and exporting projects with a projected completion date of 2022.⁸³

All told, in 2017, LNG exports are predicted to comprise 9% of total domestic production of natural gas.⁸⁴ Optimism in the future of the U.S. export market has even led to *planned* U.S. LNG projects being expanded. For example, an enlargement to a planned LNG plant in Cameron Parish was announced in March of 2017.⁸⁵ G2 LNG, a Baton Rouge-based company, had announced plans in 2015 to build an \$11 billion plant, but potential purchasers expressed such interest that the company added 500 acres to the 766 acre plant site in March, 2017.⁸⁶

Further heightening the excitement, the Panama Canal expansion was completed in 2014. Upon completion, 80% of LNG carriers are able use the canal. Use of the canal shortens the trip from the Gulf Coast to Asia by around 20 days, shaving around \$0.80 MMbtu to \$1 MMbtu off cargo prices.⁸⁷ Of course, the U.S. already has an outlet of LNG to Asia, one not dependent on canals and closer than Texas and Louisiana—Alaska. Home of America's only LNG export terminal for years—the Kenai LNG Plant, located in Nikiski—Alaska is home to enormous gas reserves. A gas

81. *Id.*

82. Texas LNG, *Samsung Engineering and KBR to Design and Build Texas LNG's Export Facility*, GLOBALNEWswire (Mar. 2, 2017, 2:00 AM), <http://globenewswire.com/news-release/2017/03/02/929901/0/en/Samsung-Engineering-and-KBR-to-Design-and-Build-Texas-LNG-s-Export-Facility.html>.

83. Gillian Rich, *Russia Calls Natgas 'The Future' as Exxon Backs LNG, Refining Projects*, INVS. BUS. DAILY, <http://www.investors.com/news/russia-wants-to-expand-lng-exports-exxon-announces-gulf-investment/> (last visited Nov. 18, 2017).

84. *Id.*

85. Associated Press, *Plan for \$11 Billion Natural Gas Facility in Cameron Parish Expanding*, NOLA, http://www.nola.com/business/index.ssf/2017/03/lng_plant_cameron.html (last updated Mar. 12, 2017).

86. *Id.*

87. Panama transit prices generally match the LNG transport costs most of the time. Several reasons exist why American LNG shipper prefers to go around Cape Horn instead of through the Panama Canal. See Anna Shiryaevskaya, *The Gas Tankers Lurking at Sea Looking for a Better Deal*, BLOOMBERG (Aug. 17, 2017, 3:26 AM), <http://www.bloomberg.com/news/articles/2017-08-17/smarter-gas-tankers-earning-more-taking-scenic-routes-amid-glut>.

pipeline would be needed, however, to bring these stranded reserves from the northern half of the state to proposed liquefaction plants in the Anchorage region, and this need has state officials clamoring for federal assistance.⁸⁸

Once the first American LNG train on the Gulf Coast was ready for action in 2016, however, the market had changed enormously from the time that project received its final investment determination.⁸⁹ Japan has ratcheted back demand, renewables and coal had eaten up a portion of demand, and a relentless quest for grid and use efficiency had cut LNG prices.⁹⁰ In addition, Chinese demand for LNG had grown at a slower rate than expected after 2012.⁹¹

On the supply side, LNG availability has risen 20% since 2011, with exporting capacity rising to 340 million tons per year from 278.7 at the end of 2016.⁹² If all proposed projects were completed, the 880 million tons per year plateau might be reached, although it is unlikely that many proposed projects will go forward soon. This is because, while American LNG has hitherto enjoyed a price advantage over other sources, that lead may be diminishing.⁹³ With long-term contracts of LNG tied to oil prices, and with oil prices having more than halved since late 2014, prices for contracted LNG has sunk much closer to the prices realized for spot U.S. cargos.

One example of this price inversion roiling markets is provided by a 2013 contract Pertamina, an Indonesian firm, executed with Cheniere to buy LNG at Henry Hub prices (plus 15%) along with a fixed \$3.50/MMBtu fee.⁹⁴ When the deal was closed, those terms provided for a price of approximately \$8.00/MMBtu, a superior deal over the \$18/MMBtu that non-U.S. LNG was trading for in 2013.⁹⁵ In late 2016, however, with Asian spot prices reaching down to \$6/MMBtu, Pertamina found itself motivated to try to get out of the contract.⁹⁶ Many contract renewals are coming up in

88. Alex DeMarban, *Alaska Governor Asks Trump to Throw His Weight Behind Alaska LNG Project*, ALASKA DISPATCH NEWS, <http://www.adn.com/business-economy/energy/2017/03/04/alaska-governor-asks-trump-to-throw-his-weight-behind-alaska-lng-project/> (last updated Mar. 6, 2017).

89. Cunningham, *supra* note 43.

90. *Id.*

91. *Id.*

92. *Id.*

93. *Id.*

94. *Id.*

95. *Id.*

96. *Id.*

2018 and 2019, giving room for parties to negotiate for alternative sources of imports and exports.⁹⁷

To nobody's surprise, the beginning of American exports soon ushered in a fledging commodities trading desk.⁹⁸ In early 2017, Intercontinental Exchange, Inc. ("ICE") opened an LNG future contracts trading branch, hoping to provide a marketplace for Gulf Coast LNG trading and hedging. More such desks are likely.⁹⁹

Canadian LNG projects and related pipelines have not shown the same progress similar projects have seen in America. Canada may eventually join the Atlantic Basin exporter club if a contemplated LNG plant in Cape Breton, Nova Scotia is completed. The sticking point, as always, is securing financial support and purchase contracts.¹⁰⁰ Meanwhile, on Canada's West Coast, Shell announced in March, 2017 it would not complete a proposed \$11 billion Prince Rupert LNG pipeline and liquefaction project.¹⁰¹ Later, in July, Malaysia-based Petronas and its partners also walked away from a similar project.¹⁰² The Canadian government waited three years to approve construction of the North Montney pipeline, which would supply northern British Columbia with natural gas. Industry analysts wonder if it will be constructed given the current low prices.¹⁰³ In response to the development of LNG assets along the Gulf Coast and the foot-dragging in Canada, Cheniere has sought out natural gas supplies from Alberta and British

97. See, e.g., International Group of Liquefied Natural Gas Importers, *The LNG Industry: GILGNL Annual Report 2017*, http://www.giignl.org/sites/default/files/PUBLIC_AREA/Publications/giignl_2017_annual_report_0.pdf.

98. S&P Global Platts, *U.S. LNG Positioned for Anchor Role in Global Markets: S&P Global Platts*, PR NEWswire (Mar. 22, 2017, 9:12 AM), <http://www.prnewswire.com/news-releases/us-lng-positioned-for-anchor-role-in-global-markets-sp-global-platts-300427701.html>.

99. *Id.*

100. James Risdon, *Cape Breton Eyes 1,500 New Jobs*, CHRON. HERALD, <http://thechronicleherald.ca/business/1454578-cape-breton-eyes-1500-new-jobs> (last updated Mar. 30, 2017, 4:09 PM).

101. MarEx, *Shell Halts Prince Rupert LNG Plans*, MARITIME EXECUTIVE (Mar. 14, 2017, 6:28 PM), <http://www.maritime-executive.com/article/shell-halts-prince-rupert-lng-plans>.

102. Robin Rowland, *Petronas "Will Not Proceed" with Prince Rupert LNG Project*, NW. COAST ENERGY NEWS, <http://nwcoastenergynews.com/2017/07/25/8075/petronas-will-not-proceed-with-prince-rupert-lng-project/> (last visited Nov. 18, 2017).

103. Ethan Lou, *UPDATE 3-TransCanada Seeks Pipe Approval Linked to Petronas LNG Terminal*, REUTERS, <http://www.reuters.com/article/canada-lng-transcanada/update-3-trans-canada-seeks-pipe-approval-linked-to-petronas-lng-terminal-idUSL2N1GX0OI> (last visited Nov. 18, 2017).

Columbia, raising the spectre of pipelines across the Great Plains to bring such gas to the trains in the south.¹⁰⁴

The Middle East

Booming U.S. shale production helped trigger the 2014 decision of OPEC to maintain high output. The subsequent crash in prices put pressure on countries that depended on oil exports. One such country was Qatar, the largest LNG exporter with reserves of 866 trillion cubic feet, where hydrocarbon exports account for 55% of the nation's GDP.¹⁰⁵ Dropping prices and this dependency has steered the country towards foreign investments and international partnerships outside of the Persian Gulf.

LNG exporters in the Middle East compose the largest exporting group in the world today, with six facilities housing 25 exporting trains.¹⁰⁶ Assuming that the Trump administration does not act to change the lifting on the Iranian sanctions related to nuclear activities, Iran looks to also return to the LNG exporter field. Overall, however, by 2021, the Middle Eastern LNG market share is anticipated to have dropped to 23% from 28% in 2016 due U.S. and other new supplier exports.

Qatar is planning to heighten its domestic production from the North Field, the world's largest gas field which extends into the Persian Gulf, in order to maintain its position ahead of Australia as the largest generator of LNG.¹⁰⁷ It is believed that, by the time the new production from this large field shared with Iran is achieved around 2022, the world LNG market will have tightened. With its large reservoirs close to existing infrastructure, it is also believed that if Qatar goes forward with re-starting significant development of its North Field reserve after a twelve-year hiatus, it will once more eventually have the cheapest production prices in the world.¹⁰⁸ Just the threat of such a competitor may retard construction of new

104. Naureen Malik & Stephen Cunningham, *Canadian LNG Exports May Route Through Louisiana*, WORKBOAT, <http://www.workboat.com/news/government/canadian-lng-exports-may-route-louisiana/> (last visited Nov. 18, 2017).

105. Andrea Alie, *The Hydrocarbon Pivot of Qatar and the United Arab Emirates*, FUSE, <http://energyfuse.org/hydrocarbon-pivot-qatar-united-arab-emirates/> (last visited Nov. 18, 2017).

106. Mark Adeosun, *Global LNG Market Outlook*, OIL & GAS FIN. J., <http://www.ogfj.com/articles/print/volume-13/issue-11/departments/capital-perspectives/global-lng-market-outlook.html> (last visited Nov. 18, 2017).

107. Finn, *supra* note 48.

108. Robin Mills, *Qatar's Bold Move to Reassert Its Grip on Natural Gas Market*, BLOOMBERG (Apr. 4, 2017, 10:00 PM), <http://www.bloomberg.com/view/articles/2017-04-05/qatar-s-bold-move-to-reassert-its-grip-on-natural-gas-market>.

exporting capacity in the U.S., Russia, Australia, and other market contenders, furthering strengthening the Qatari position.

LNG imports *into* Middle Eastern countries are expanding, bucking the global trend.¹⁰⁹ In 2016, 20.9 million metric tons was imported into the arc of countries between North Africa and Pakistan, an amount accounting for 7.9% of the global total—up from about 2.0% in 2014.¹¹⁰ This growth is expected to continue, with Egypt leading region while other countries like UAE and Bahrain ramp up LNG imports for electricity generation via an FSRU and the Dolphin pipeline, respectively.

The Eurasian Market

The Atlantic Basin primarily concerns Europe, where natural gas transported in pipelines from Russia and Norway and LNG from Norway and Qatar currently dominate. While Qatar and Australia are perhaps best positioned to serve the Pacific basin due to lower shipping costs due to proximity, Europe is potentially the closest significant market for American LNG and could become a “sink” for spot cargoes that fetch a good one-time price from a European importer.¹¹¹ Platts data showed that LNG imported into Europe remained level during the 2014-2016 interval during the period of oversupply and suggested that since Europe is the “destination of last resort” for LNG cargoes, this suggested demand was higher than predicted.¹¹² Oversupply, Platts alluded, would have seen Europe take more spot cargoes off an oversupplied world market, heightening imports.¹¹³

Russia is *not* a reliable supplier of natural gas to Europe, having used the threat of supply cessations as a foreign policy weapon against states reliant on imports. Russian President Putin, however, has trumpeted that Russia will someday become the largest producer of LNG.¹¹⁴ Russia currently has one LNG terminal off its eastern coast on Sakhalin Island, but is completing

109. Fareed Rahman, *LNG Demand in the Middle East is Expected to Grow*, S&P Global Platts Says, GULF NEWS (Mar. 21, 2017, 8:02 PM), <http://gulfnnews.com/business/sectors/energy/lng-demand-in-the-middle-east-is-expected-to-grow-s-p-global-platts-says-1.1998039>.

110. *Id.*

111. DiSavino, *supra* note 72.

112. Stuart Elliott, *Analysis: Global LNG Outlooks Test Conventional Wisdom of Supply Glut*, S&P GLOBAL PLATTS (Mar. 10, 2017, 8:35 AM), <http://www.platts.com/latest-news/natural-gas/london/analysis-global-lng-outlooks-test-conventional-26683006>.

113. *Id.*

114. Tsvetana Paraskova, *Putin Says Russia Will Become World's Top LNG Producer*, OILPRICE.COM (Apr. 2, 2017, 3:00 PM), <http://oilprice.com/Energy/Natural-Gas/Putin-Says-Russia-Will-Become-Worlds-Top-LNG-Producer.html>.

construction of a second train in the northwestern Russian Arctic—the Yamal LNG project, the result of a consortium of Russia’s Novatek, Total SA, and two Chinese entities—that will serve Southwest Asia. But Russia’s historical problem—limited access to oceanic trade routes—shows in the proposed seasonal routes from Yamal to the Asian markets.¹¹⁵ The tankers need to have icebreaking capabilities for year-round use of the train.¹¹⁶ In the summer, these special LNG ships will traverse the Arctic Ocean and head south through the Bering Strait.¹¹⁷ In the winter, the LNG ships will go to Europe, transfer their loads to standard LNG tankers that will then travel through the Suez canal, a trip of over 7,000 miles.¹¹⁸ Despite the current low prices, Novatek is planning a third LNG train, also in northern Russia, to be completed in 2023.¹¹⁹

China has turned away from Russian gas, concentrating instead on sources from overseas.¹²⁰ Given its dearth of warm-water ports, this has Russia focused on Europe as a prime target for its gas.¹²¹ Given Europe’s overall hope of diversifying its import scheme, the EU remains uneasy about continuing to primarily rely on Russian gas.¹²²

The state gas firm of Poland—PGNiG—is pondering constructing a second LNG terminal on the Baltic Sea as an alternative to a proposed pipeline from Norway.¹²³ The project would likely involve an FSRU with an onshore connection near Gdansk and a have an importing capacity of 4.1 to 8.1 billion cubic meters per year.¹²⁴ Poland’s first LNG import train was opened in 2016 in a bid to lower its dependency on Russian gas, which accounts for roughly two-thirds of Poland annual gas consumption.¹²⁵ The

115. *Id.*

116. *See id.*

117. *Id.*

118. *See id.*

119. *Id.*

120. Dániel Stemler, *What’s Next for Europe and Natural Gas; The Importance of LNG*, CORNER, <http://thecorner.eu/news-europe/whats-next-for-europe-and-natural-gas-the-importance-of-lng/63152/> (last visited Nov. 18, 2017).

121. *Id.*

122. *Id.*

123. Agnieszka Barteczko, *Poland Considers Building Floating LNG Terminal by 2021*, REUTERS (Mar. 27, 2017, 6:34 AM), <http://af.reuters.com/article/commoditiesNews/idAFL5N1H42QY>.

124. *See id.*

125. *Id.*

current Gazprom purchase contract expires in 2022 and PGNiG has no plans to extend it.¹²⁶

The long-term market for LNG in Europe seems assured. Natural gas is cleaner than coal and is found in abundance in and around Norway, in Russia, and over the Atlantic in a (mostly) friendly North America. After the Fukushima nuclear disaster in Japan, Germany decided to close its nuclear reactors after 2020, shifting much of the demand for fuel to coal and natural gas. Italy also decided to not build new nuclear plants.

In Lithuania, Höegh LNG, a Norwegian company, constructed the FSRU *Independence* in South Korea to be used as an LNG import terminal in Klaipeda Harbor. It has an annual capacity of between 2–3 billion cubic meters of natural gas. In addition, the Klaipėdos Nafta AB (Lithuania’s state-controlled energy company) hired PPS Pipeline Systems to connect this new LNG terminal to Lithuania’s natural gas grid. The link to shore is a 20-kilometer (approximately 12-mile) pipeline, completed in 2014. The completion of the FSRU gave Lithuania leverage in negotiating long term natural gas contracts with Russia. Completion of other FSRUs could establish similar leverage for other small states.

The Future

In markets, perception can alter reality. LNG suppliers release “outlooks,” white papers that predict the future of supply and demand for the commodity. Not surprisingly, these can contradict one another and may reflect the agenda of the drafter. For example, Shell’s 2016 LNG Outlook essentially claimed the market was balanced, with all available production on the water being consumed.¹²⁷ This view contrasted outlooks from traders such as Vitol that believed that oversupply will continue for the next five years. Shell relies on selling LNG, so higher and stable prices suit it better—perhaps a motive for finding a balance between buyers and sellers. Vitol and its ilk trade LNG, so it is thought that a market with more volatility and more suppliers would benefit the traders’ continual scrutiny for angles to profit. Similarly, Hoegh LNG, manufacturer of FSRUs, forecasted a strong need in the future for FSRUs.¹²⁸

Groups like the afore-mentioned Korean/Japanese/Chinese consortium and their “memorandum of understanding” representing purchasers result in pressure on producers but their formation is hardly a surprise—Asian spot

126. *Id.*

127. *See* Elliott, *supra* note 112.

128. *Id.*

prices for LNG fell approximately 70 percent from the 2014 peak to 2017.¹²⁹ It is unclear if such groups violate World Trade Organization rules, and not all producers are members of the World Trade Organization. So long as prices remain low, however, such groups and the pressure they exert on behalf of buyers will continue to develop. The Japanese government is also considering deregulating its electricity market, a move that is thought to raise the possibility of more coal entering the generation realm to the detriment of LNG import volume.¹³⁰

Long-term outlook for LNG prices appears robust as Asian markets will continue to expand in the long term despite occasional retreats. Malaysian's chief LNG transporter, MISC Group, expects "financial pressure" in the near term but remains optimistic of LNG's continued ascendance over the next five years.¹³¹ In addition, environmental concerns are steering both China and the EU to strive for cleaner alternatives to coal for electricity generation. From 2017-2021, industry analysts expect capital expenditures for LNG projects to expand by 50% over the period of 2012-2016 to \$284 billion.¹³² Much of this increase is centered in the U.S. as Australasia projects with completion dates after 2017 that required a second tranche of investment are expected to be either delayed or cancelled.¹³³

Worldwide, among all the projected LNG-related projects, liquefaction trains will represent most of the total investment, an amount thought to be \$192 billion over the next five-year interval, which would be a 42% increase over the 2012-2016 period.¹³⁴ Importing facilities will represent 14% of the total expenditures at \$38 billion, an increase of 25% over the 2012-2016 interval.¹³⁵ LNG ships represent another component of the chain, and although there currently is an overabundance of the thermos vessels, a recent Douglas-Westwood forecast predicts that \$54 billion will

129. Jane Chung et al., *World's Top LNG Buyers form Alliance to Push for Flexible Contracts*, REUTERS (Mar. 23, 2017, 11:08 AM), <http://www.reuters.com/article/us-asia-lng-markets/worlds-top-lng-buyers-form-alliance-to-push-for-flexible-contracts-idUSKBN16U27X>.

130. Thomas, *supra* note 49.

131. *LNG, Petroleum Shipping to Underpin MISC's Growth Over Next 5 Years, Says MARC*, STAR ONLINE (Mar. 29, 2017, 5:20 PM), <http://www.thestar.com.my/business/business-news/2017/03/29/lng-petroleum-shipping-to-underpin-misc-growth-over-next-5-years-says-marc/>.

132. Adeosun, *supra* note 106.

133. *Id.*

134. *Id.*

135. *Id.*

be spent on LNG ships from 2017 to 2021, representing approximately 150 ships.¹³⁶

The locus of this coming wave of investment appears to be Louisiana and Texas, resulting in a region providing 17% of worldwide exporting capacity.¹³⁷ Southeast Asia, where many of the LNG ships are constructed, will account for roughly a third of global LNG infrastructure investment.¹³⁸ Western Europe, with a couple of shipbuilding projects excepted, is projected to not see much investment, accounting for only 2% of global LNG expenditure.¹³⁹ Eastern Europe and Russia, on the other hand, are forecast to account for *six times* that amount.¹⁴⁰

Encouraged by lower commodity prices, LNG tankers flagged by Asian countries will increase by 60% in the next few years, with 39 ships joining a fleet that is already 67 ships strong.¹⁴¹ Providing tankers themselves will allow Asian importers to purchase cheaper LNG and better match cargos with individual importing train. Combined with more importer-friendly purchase and sale agreements, more importer-owned ships could spur development of a spot market hub in Asia. The fleet of LNG tankers flagged to *exporters* to Asia—currently about 50 ships—awaits only three on order as of early 2017.¹⁴²

The number of decades-long purchase and sale agreements will continue to retreat.¹⁴³ While Japan will not likely see significant increases in the volume of imported LNG in the near term, significant volumes are currently being traded under long-term contracts that will soon be expiring.¹⁴⁴ To replace this volume, Japanese utilities are securing LNG from new sources from Australia and the U.S. South Korea is also a static market, with China likely to eclipse it by the end of 2017.¹⁴⁵

In response to the purchasers' agitation, large producers of LNG like Shell and Woodside are lessening their opposition to more flexible terms in

136. *Id.*

137. *Id.*

138. *See id.*

139. *Id.*

140. *Id.*

141. *Asian LNG Importers Set for 60 Per Cent Charter Fleet Boost*, HELLENIC SHIPPING NEWS WORLDWIDE, <http://www.hellenicshippingnews.com/asian-lng-importers-set-for-60-per-cent-charter-fleet-boost/> (last visited Nov. 18, 2017).

142. *Id.*

143. *Id.*

144. *Id.*

145. *Id.*

the long term purchase contracts.¹⁴⁶ If the purchasers are allowed to resell the regasified natural gas, it is believed a more-actively traded commodity market may result, particular in countries like Japan where power and gas markets are being restructured. More cargoes of LNG are being sold on the Asian spot market, further pressuring sellers to soften their contractual demands on purchasers.

Some see signs of recovery on LNG prices sprouting in Southeast Asia.¹⁴⁷ Low LNG prices are predicted to create a shortfall of LNG within the next five years.¹⁴⁸ Low prices may also limit infrastructure financing, preventing later construction of assets. Shortfalls can cause prices to double, triple, or go even higher very quickly, and later to retreat just as quickly. Such a shortfall would likely last at least a couple of years as LNG projects are expensive (multiple billions) and require years of permitting, planning, and construction. Steady prices in the neighborhood of \$7.00-\$8.00 per mmBtu are predicted to be enough to get sellers and their bankers to pursue liquefaction assets.¹⁴⁹ One example is Tellurian Inc., which announced it would guarantee deliver of LNG to Japan under five year contracts starting in 2023 if it received \$8.00 per mmBtu.¹⁵⁰

Without domestic production and LNG imports, European countries must rely on pipelines from the east for natural gas. Perhaps the most well-known natural gas project in Europe today is the expansion of the Nord Stream pipeline, a conduit running from Vyborg, Russia to Greifswald, Germany.¹⁵¹ Nord Stream 2 would pipe natural gas into the center of the EU, but would not diversify the ultimate source of that gas—an unpredictable Russia.

The EU is keenly interested in gas from the Caspian region, primarily from Azerbaijan, as this source would seem to not include Russian gas.¹⁵² The Southern Gas Corridor provides a route for Caucasian natural gas by connecting three smaller links—the South Caucasus Pipeline, the Trans-

146. Mark Tay & Yuka Obayashi, *LNG Sellers Ready for More Flexible Contracts after Years of Pressure*, REUTERS (Apr. 4, 2017, 4:30 AM), <http://www.reuters.com/article/us-japan-gastech-lng-sellers/lng-sellers-ready-for-more-flexible-contracts-after-years-of-pressure-idUSKBN1760UC>.

147. *LNG Markets Shows Signs of Recovery*, KOREA ECONOMIC DAILY (Mar. 29, 2017, 1:40 AM), <http://english.hankyung.com/business/2017/03/29/1340041/lng-market-shows-signs-of-recovery>.

148. Tay & Sheldrick, *supra* note 16.

149. *Id.*

150. *Id.*

151. Stemler, *supra* note 120.

152. *Id.*

Anatolian Pipeline across Turkey, and the Trans-Adriatic Pipeline (the “TAP”).¹⁵³ A planned expansion of the TAP portion of the Southern Gas Corridor for 2020 would allow an additional ten billion cubic meters of gas to enter the heart of Europe through Italy, but the source of that gas is a mystery.¹⁵⁴ It *may* include Gazprom gas—a result that would defeat the purpose of seeking a non-Russian gas inlet in the first place.¹⁵⁵

Another possible source for natural gas for Europe is fields in the East Mediterranean Sea off Cyprus, Egypt, and Israel.¹⁵⁶ Significant recovery of these reserves will take years, however, and much of the gas in this politically unstable region will be sold for domestic use.

Japan, China, and Singapore are all considering establishing an LNG pricing hub for Southeast Asia.¹⁵⁷ In response to this need for an LNG hub, the Japanese government has introduced reforms designed to animate private-sector (i.e. non-utility) customers to start a hub and associated pricing index.¹⁵⁸ Japan, China, and Singapore have begun LNG price indexes, which will probably be the most reliable price benchmarks for the next couple of years.¹⁵⁹

Suggestions for America and Europe

Given the history, observations, and predictions above, what are some suggestions for America and Europe to promote energy security through the LNG trade? On both sides, governments, concerned about the alleged climate change effects of CO₂, are more interested in natural gas. On the North American side of the Atlantic, continued *steady* development of LNG exporting assets will insure U.S. and (maybe) Canadian gas will eventually be a mainstay in Europe. Other nations are ahead of America regarding natural gas exports and have secured steady customers to finance their exploration projects. For example, Norway is already developing natural gas reserves in the Arctic.¹⁶⁰ Geopolitically, however, Eastern Europe is a

153. *Id.*

154. *Id.*

155. *Id.*

156. *Id.*

157. MarEx, *Asia Ready for LNG Pricing Hub*, MARITIME EXECUTIVE (Mar. 27, 2017, 7:43 PM), <http://maritime-executive.com/article/asia-ready-for-lng-pricing-hub>.

158. *Id.*

159. *Id.*

160. *See, e.g.*, Christopher S. Kulander, *Out Through the In Door—Shale Gas Set to Reverse the Direction of LNG Sales in America*, 2 LSU J. OF ENERGY L. & RESOURCES (2014), at 232 & n.177, available at <http://digitalcommons.law.lsu.edu/jelr/vol2/iss2/4>.

great place to enable the kind of stable and long-term exports that financiers like given the intense dislike of the way Russia has used its position as Europe's natural gas provider and a generally favorable impression of American friendship. Given this, a European market for American LNG appears assured provided American companies continue on their course of developing LNG exporting apparatus and the government does not stand in the way.¹⁶¹ Finally, saturation remains an issue. As of mid-2017, sixteen LNG liquefaction projects were being constructed globally, making some believe the markets will remain oversupplied.¹⁶² An oversupply allows for countries with restricted budgets to use LNG projects as a source of cheaper energy while also diversifying their energy portfolios. Meanwhile, other outlets close. For example, LNG demand in Brazil recently dropped 80% due to a surge in hydroelectric power.¹⁶³

Any possible new outlet for domestic LNG would help provide the revenue for continued steady advancement of American liquefaction and transportation capacity. Of course, opponents to the LNG trade abound in America, each with different motivations. Environmentalists opposed to the fracturing that ultimately yields the natural gas oppose exports as a stimulus of fracturing. Consumer advocates worry about cost increases to those who use natural gas for heat and electricity while manufacturers that rely on natural gas do not want the commodity price to increase. For example, the American Public Gas Association, a consortium of natural gas utilities owned by municipalities, are against significant LNG exportation as it might raise prices for their members and, ultimately, their customers.¹⁶⁴

While U.S. LNG producers are primarily motivated by price and reliability and not geopolitics, U.S. politicians do have such concerns. Some complained during the Obama Administration that the Department of Energy had been slow to issue exporting permits and that, once issued, they may be revoked. Currently, the political winds blow in favor of federal support of LNG exports. When compared to the last administration, energy programs that do not show promise of standing on their own financial feet will likely receive less subsidies and other support. That would bode ill for a significant portion of renewables in that many portions of that market are dependent on taxpayer support, unlike with fossil fuels. This author

161. For discussion of Russian chicanery and European resentment and response to same, see *id.*

162. Naruse, *supra* note 5.

163. Fisher, *supra* note 28.

164. Buurma, *supra* note 1.

believes that Trump will continue move to remove barriers to exportation of LNG and crude.

The “National Balancing Point” of England is the pricing hub for Northern Europe for LNG.¹⁶⁵ In Southern and Central Europe, the establishment of a gas pricing hub similar to the Henry Hub in Louisiana is crucial. Beyond mere gas pricing, however, this hub should allow for real-time, internet-based trading in transportation capacity in a network of private carrier gas pipelines throughout the EU. Establishing such a hub would hopefully lead to trading desks that would allow future contracts trading. No contender has yet stepped forward with the necessary infrastructure, regulatory structure, or—perhaps most importantly—price transparency necessary to establish a regional hub similar to that of the Henry Hub or the National Balancing Point in England. The U.S. Energy Information Administration has studied natural gas hubs in North America and noticed they are centered on pipeline location and rely on constant flow of natural gas, standardized product specifications, delivery and contracting rules, and a corresponding daily record of deliveries and receipts—all under the watchful eye of regulators. In contrast, Asia necessarily involves more countries with less experience and with limited pipeline interconnectivity. Also, until recently, the LNG market in Europe—like Asia—was served almost entirely by long-term bilateral contracts—a setup that limits price transparency and trading.

Combined with short-term purchase and sale agreements, more importer-owned ships could spur development of a spot market hub in Europe. Here, smaller purchasers like those found in Eastern Europe could more easily pick up spot cargos from the U.S. or from storage waystations. Then, while still at sea, the cargo would be then be traded at a European hub and its final distribution determined.

In addition, not all LNG re-gasification terminals have to be big.¹⁶⁶ Re-gasification terminal platforms are being devised that will allow smaller ports to take LNG cargos. From these points, transportation of gas to new interior markets will necessitate pipelines or even rail projects. Such tanking projects are relatively new—in late 2016, the Alaska Railroad Corp. transported LNG by rail from the Cook Inlet north to Fairbanks, a first for American natural gas. If such schemes could stop vaporization of the LNG

165. For example, Lithuania’s contracts are NBP linked. Some Russian contracts with Lithuania and Latvia are also supposedly linked to the NBP.

166. Richards, *supra* note 13.

during transit in Europe, more markets could be found for imported natural gas.

Because more LNG is used in the winter than summer while production and transportation continues all year, opportunity awaits European ports and other facilities that can store summer-arriving LNG as natural gas for winter use.¹⁶⁷ These facilities are still another expensive necessary asset in the chain from production to local distribution in the lifespan of natural gas. Entities such as OLT Offshore in Italy that can purchase and store LNG could see a significant profit opportunity in “very distress LNG available in the summer” that can be held over for winter distribution, provided pipelines are available to transport the stored natural gas to sales points throughout Europe.¹⁶⁸ Opportunity and enhanced energy security awaits any European country with access to such LNG storage facilities.¹⁶⁹

Predicting future price swings of LNG is fraught with peril. Buyers in emerging markets are thought to be less willing to enter into natural gas purchase contracts with decades-long terms pegged to oil prices than more “traditional buyers” like utility companies in countries that have long imported LNG, such as Japan.¹⁷⁰ Part of this emerging market includes FSRUs and ports that will sell LNG directly to ships for use as fuel. Emerging markets like Eastern Europe and the Baltic, which accounted for 5% of total global LNG demand in early 2017, are expected to account for 27% of demand in 2025. On the other hand, while relying on spot cargos is attractive so long as prices are low, the public that is served by natural gas is quick to forget the good times when suddenly receiving gas bills that reflect a spike in the commodity portion that can more than quintuple the rate.

No pricing scheme is foolproof and consumers will always be exposed to price increases to some extent. In addition, while fixed-rate contracts can provide some attenuation of these spikes, if a transparent price hub could be established, a robust and transparent market for swaps and hedges could be trusted to better yield a happy medium between the poles of an unpredictable spot market and unresponsive long-term contracts between

167. Robert Perkins & Stuart Elliott, *LNG to be Part of Seasonal Natural Gas Storage Play in Europe: Snam CEO*, S&P GLOBAL PLATTS (Mar. 29, 2017, 9:25 AM), <http://www.platts.com/latest-news/natural-gas/lausanne-switzerland/lng-to-be-part-of-seasonal-natural-gas-storage-26698054>.

168. *Id.*

169. LNG Storage is much more expensive than crude oil storage, however, and this will be a barrier to growth in LNG storage capacity.

170. Robertson, *supra* note 29.

one buyer and one seller. Until a regional pricing hub is established in Europe, a varied portfolio of contracts, spot cargos, and multiple sellers could provide the best balance of price flexibility and stability. Still, though, demand for LNG is predicted to exceed supply by 2022, with buyers preferring LNG from exporters with actual natural gas production instead of middlemen or “portfolio players.”¹⁷¹ New LNG markets are exhibiting stout energy demand growth and slackening proximal onshore production, making LNG imports appealing to many. Getting ahead of this wave should be a priority for smaller EU members.

LNG brings conventional gas reserves to a worldwide market. Since local production is declining in a number of countries that depend on natural gas, LNG-sourced transportation will continue to wax as a foundational energy source. New future demands for LNG are predicted to come more and more from the transportation sector. For example, with international regulations requiring ships with less emission, vessels powered by LNG-sourced natural gas are appearing.¹⁷² In order to heighten stable domestic markets for natural gas and to limit CO₂ emissions, development of LNG-powered ships and fleet vehicles should be encouraged.

Shale gas deposits in Europe exist, largely along the north of the Carpathian Mountains, and could be further surveyed if public opposition to fracturing can be overcome and financiers convinced to lend on such projects. The immediate future for European natural gas from onshore projects related to shale is dim. France, for example, has effectively banned fracturing and European Greens seek to expand this prohibition across the continent. Doubt exists whether Europe will ever be able to mimic the shale gas success America has enjoyed.¹⁷³ Doubt also exists about whether the European gas pipeline regulatory scheme is adequate to facilitate financing and construction of gas pipelines in a way seen in the robust market for

171. Texas LNG, *Texas LNG Executes Term Sheets Exceeding 3 MTA with Asian LNG Buyers; Phase 2 Marketing Underway*, GLOBENEWSWIRE (Jan. 10, 2017, 2:30 PM), <http://globenewswire.com/news-release/2017/01/10/904915/0/en/Texas-LNG-Executes-Term-Sheets-Exceeding-3-MTA-With-Asian-LNG-Buyers-Phase-2-Marketing-Underway.html>.

172. Daniel Graeber, *Woodside: LNG Demand Coming from Transportation Sector*, UPI (Apr. 4, 2017, 7:51 AM), <http://www.upi.com/Woodside-LNG-demand-coming-from-transportation-sector/2771491301781/>.

173. See, e.g., Richard Anderson, *No Shale Gas Revolution in Europe*, BBC NEWS, <http://www.bbc.com/news/business-32993104> (last visited Nov. 18, 2017).

transportation space in America.¹⁷⁴ Finally, the reservoirs may simply prove uneconomic. For example, the first small wave of shale exploration in Eastern Europe was a disappointment in Poland and Lithuania.¹⁷⁵ But without further study, foreclosure of these potential reserves for consideration should be postponed.

I believe great strides can be made to enhance the strategic geopolitical position of American and Canada through the exportation of LNG. If the price of natural gas increases, the use of North American LNG in Europe as an alternative to coal and Russian natural gas will provide not only a customer base for North American producers and shippers but also a means to curtail future coal use and contribute to lowering CO₂ emissions while curtailing the reach of Putin's Russia. A 2012 Department of Energy-commissioned study concluded that LNG exports would provide an overall net economic boost across the U.S. economy.¹⁷⁶ The fate of pending and future applications to export LNG, as well as the larger debate over government's role in such exports, hangs in the balance.

174. See, e.g., Jeff D. Makhholm, *THE POLITICAL ECONOMY OF PIPELINES: A CENTURY OF COMPARATIVE INSTITUTIONAL DEVELOPMENT* 118-74 (2012).

175. Neil Buckley, *Eastern European Shale Exploration On Ice As Boom Turns to Bust*, FIN. TIMES, <http://www.ft.com/content/72a0fbd4-7cae-11e5-a1fe-567b37f80b64> (last visited Nov. 26, 2017).

176. See Nera Economic Consulting, *Macroeconomic Impacts of LNG Exports from the U.S.*, U.S. DEP'T OF ENERGY (2012), http://energy.gov/sites/prod/files/2013/04/f0/nera_lng_report.pdf.