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Out Through the In Door—Shale Gas Set to Reverse the Direction of LNG Sales in America

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I. INTRODUCTION

Technological advances in natural gas extraction techniques, such as hydraulic fracturing, have triggered what some call a "revolution" in domestic energy development. In addition to the promise of reducing dependence on foreign imports, America's natural gas boom has expanded opportunities for energy *exports*. America may soon go from liquefied natural gas (LNG) importer to exporter due to advancements in the use of modern hydraulic fracturing and directional drilling. Development of hydrocarbon-bearing "tight" formations, such as shale, 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 natural gas imports are looking for alternative sources of energy. Provided that the United States can prevent delay and overregulation of unconventional development and can quickly permit and build LNG export terminals, a brighter future may await onshore natural gas producers currently mired in soft commodity prices. Those opportunities have not, however, come without growing debate and controversy, as some recent developments reflect.

Even though most oil from the Middle East currently goes to India and China,[1] most hydrocarbon imports into the United States are from Mexico, Canada, Nigeria, and Venezuela, among others.[2] While imports of oil have recently dipped to roughly match the amount of domestic production, imports of natural gas have—with the exception of Canadian imports via pipeline—tapered off to insignificance. If the regulatory hurdles are navigated, the United States appears to be on the cusp of a bright future of LNG export.

Meanwhile, Europe's energy picture is in turmoil. The European Union is requiring Eastern European countries with Soviet-era

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1. *See China, India spar over Persian Gulf oil*, UNITED PRESS INT'L (Apr. 26, 2013, 1:30 PM) http://www.upi.com/Business_News/Energy-Resources/201304/26/China-India-spar-over-Persian-Gulf-oil/UPI-34601366997454/ [http://perma.cc/N29Y-5UQ2] (archived Feb. 4, 2014).

2. *U.S. Natural Gas Imports by Country*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/dnav/ng/ng_move_impc_s1_a.htm [http://perma.cc/T2HB-C5SU] (archived Feb. 4, 2014) [hereinafter *NG Imports by Country*].

model nuclear reactors to close such plants while Germany, spooked by the Fukushima disaster, has vowed to voluntarily close its nuclear plants by 2020. Much of Europe still relies on natural gas shipped via pipeline from an erratic and often belligerent Russia, and in response are looking both to develop their own shale assets and to heighten natural gas imports via pipeline and through the use of LNG imports. All the while, increased demand for LNG in Southeast Asia, primarily driven by China, gradually raises the tide of demand and prices worldwide.

This Article begins with a look at the shale gas revolution in the United States, highlighting its causes and implications, before turning, in Part II, to the history of dwindling imports and the current rising demand for action on exports. Next, Part III, addressing a different aspect of the current debate over LNG exports, focuses on different viewpoints in Congress and concerns over siting and safety of approved and proposed LNG export sites before turning to LNG export permitting and delays in Part IV. Finally, the international situation related to LNG is analyzed in Part V, beginning with Europe and then the rest of the world, before the article ends with some final commentary.

II. THE SHALE GAS REVOLUTION

A. Twilight of Onshore Domestic Hydrocarbons?

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, with perhaps Outer Continental Shelf production eventually making up the majority.[3] Onshore domestic oil production had fallen far more precipitously from its 1971 peak of approximately 3.1 billion barrels a year, declining by 2005 to about 1.5 billion.[4]

3. *See U.S. Natural Gas Marketed Production*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/dnav/ng/hist/n9050us2a.htm [http://perma.cc/KME2-ZPYP] (archived Mar. 10, 2014); *see also Exxon says N. American gas production has peaked*, REUTERS (Jun. 21, 2005, 4:52 PM), http://www.reuters.com/article/2005/06/21/specialeventii-energy-summit-exxonnatgas-idUSN2163310420050621 [http://perma.cc/347H-MSQF] (archived Feb. 10, 2014); *Natural Gas Production*, BUREAU OF SAFETY & ENVTL. ENFORCEMENT, http://www.bsee.gov/uploadedFiles/BSEE/Newsroom/Offshore_Stats_and_Facts/OCS%20GAS%20VS%20OTHER%20GRAPH.pdf [http://perma.cc/4NMR-NX4N] (archived Mar. 10, 2014).

4. *Natural Gas Production*, *supra* note 3.

This decline led many commentators to believe that domestic production—particularly onshore—would continue to dwindle when compared to foreign production.[5] In particular, nobody expected production in the Central Appalachians, which were previously considered to be a hardscrabble and hard-luck basin, to blossom into the center of production it is today.[6] Even recently, in the face of mounting evidence that shale development has considerably pushed back the final act of the fossil fuel age, experts continue to see an imminent twilight to domestic production.[7] The continued expansion of production in, and reserve estimates for, the Marcellus and Utica shale in the northeast United States has long provided job security for their doomsayers.[8]

B. Dawning of Shale Hydrocarbons

Two technologies, refined into modern form, have made development of unconventional reservoirs—primarily shale—possible: hydraulic fracturing and horizontal drilling. Hydraulic fracturing—known colloquially as "fraccing," "fracking," and, in this Article, as "fracing"—is a process in which fluid is injected into a well at very high pressures in order to either widen and deepen existing cracks or create new fractures in the tight formation.[9] In addition, fracing often will allow more oil or gas to be produced from wells previously thought to be dry or in decline.[10] Currently, about 35,000 wells per year undergo some measure of hydraulic fracturing, and a majority of oil and gas wells have undergone some form and level of fracturing during their productive lifetime.[11]

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5. *See, e.g.*, Thomas Hayes, *Doubts on Supply Spur Predictions of High Oil Prices*, N.Y. TIMES, Feb. 24, 1990, at A1.

6. *See* Seamus McGraw, *The Story of the Marcellus Shale*, PITTSBURGH Q., Winter 2010, at 108, 110.

7. *See generally* Peter Maass, CRUDE WORLD: THE VIOLENT TWILIGHT OF OIL (2009).

8. *See* Ken Ward, Jr., *Shale-gas supplies over-hyped, report says*, CHARLESTON GAZETTE, Mar. 10, 2013, at P1B.

9. For a short video of current fracing techniques, see *Hydraulic Fracturing: Safe Oil and Natural Gas Extraction*, AM. PETROLEUM INST., http://www.api.org/oil-and-natural-gas-overview/exploration-and-production/hydraulic-fracturing/hydraulic-fracturing-safe-oil-natural-gas-extraction [http://perma.cc/GZ8N-ZU9Z] (archived Mar. 10, 2014).

10. *Hydraulic Fracturing: The Process*, FRACFOCUS, http://fracfocus.org/hydraulic-fracturing-how-it-works/hydraulic-fracturing-process [http://perma.cc/ZYY4-TDZT] (archived Mar. 10, 2014).

11. *About Us*, INTERSTATE OIL & GAS COMPACT COMM'N, http://www.iogcc.state.ok.us/2009-resolutions [http://perma.cc/3AEF-2ED9] (archived Mar. 10, 2014) (follow Resolution 09.011 hyperlink).

The second advancement that has made widespread development of shale gas more economical is modern horizontal drilling techniques. Boreholes may now traverse a much longer portion of a targeted horizon (up to a mile and a half or more) instead of the much shorter interval covered by vertical or slant drilling, making the return to the operator in increased production worth the cost of mobilization of a fleet of directional drilling and fracing equipment.[12] Because fracing may be conducted in stages all along the interval in which the borehole is in the productive zone, more hydrocarbons may be drained from each well, meaning one horizontal well can replace multiple vertical wells, cutting back on the surface footprint necessary to exploit the hydrocarbons in a given area.

After the process of hydraulic fracturing became commercially feasible on an industry-wide scale, it was noticed that man-made processes using a horizontal borehole could fracture "tight" formations that are oriented more or less laterally. Specifically, wells were drilled into the Barnett Shale in Texas, where the horizontal component remained within the Barnett over the entire lateral displacement of the well.[13] Fracing allowed the gas in the shale to flow to the well all along the lateral extent of the borehole, and a new source of natural gas appeared.

Fracing operations are found wherever the combination of the following may be found: (1) tight shale located reasonably close to the surface, (2) trapped gas or oil within the shale, and if necessary, (3) a market for the produced gas.[14] In the east, the Marcellus Shale dominates production. The Barnett Shale is perhaps the best-known gas shale in Texas, but it is not the only one. Interest and activity are also found around the Haynesville Shale in East Texas, the Eagle Ford Shale in South Texas, and analogous Barnett Shale prospects in the Western Panhandle of Texas.[15] The Williston Basin in western North Dakota and eastern Montana is the site of the Bakken

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12. *See* U.S. ENVTL. PROT. AGENCY, DIRECTIONAL DRILLING TECHNOLOGY 2 tbl.1, http://www.epa.gov/cmop/docs/dir-drilling.pdf [http://perma.cc/ASV3-M2Z2] (archived Mar. 10, 2014).

13. *See generally* Zhongmin Wang & Alan Krupnick, *A Retrospective Review of Shale Gas Development in the United States—What Led to the Boom?* ch. 3 (Res. for the Future, Discussion Paper RFF DP 13-12, 2013), *available at* http://www.rff.org/RFF/documents/RFF-DP-13-12.pdf [http://perma.cc/DBK7-NZDC] (archived Mar. 10, 2014).

14. For a map of shale gas plays, see *Lower 48 states shale gas plays*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/oil_gas/rpd/shale_gas.pdf [http://perma.cc/W593-49TE] (archived Mar. 10, 2014).

15. *See generally* Thomas E. Kurth et al., *American Law and Jurisprudence on Fracing—2012*, 58 ROCKY MTN. MIN. L. INST. § 4.06 (2012) (detailing the most prolific shale plays across the United States as of 2012).

formation, a layer of rock that is reputed to hold the largest accumulation of oil identified in North America since 1968, a veritable "sea of oil," estimated by the head of the North Dakota Department of Mineral Resources as potentially containing 11 billion barrels of oil that may be obtained using current technology.[16]

Modern directional drilling and fracing operations have helped make development of vast natural gas reserves possible in the United States. Estimates suggest that the United States has almost 750 trillion cubic feet (Tcf) of technically recoverable natural gas.[17] Technically recoverable unconventional gas—a category that includes gas derived from shale, tight sandstone, and coalbed methane—accounts for approximately 60% of the onshore recoverable reserves.[18] Given U.S. production rates for 2007, 19 Tcf—approximately the current recoverable shale gas estimate—provides enough natural gas to supply the U.S. for about 90 years.[19] Some estimates of the shale gas reserves extend the onshore domestic supply up to 116 years.[20]

The use of fracing and directional drilling has been estimated to contribute to 30% of recoverable hydrocarbon reserves in the United States.[21] These technologies are believed to provide an additional 600 Tcf of gas and seven billion barrels of oil that would not be recoverable without it.[22] Two recent estimates of gas reserves located in the sprawling Marcellus Shale suggest more than 500 Tcf of recoverable reserves.[23]

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16. Eric Konigsberg, *Kuwait on the Prairie*, THE NEW YORKER, Apr. 25, 2011, at 42 (citing estimates by the North Dakota oil and gas commission).

17. *Review of Emerging Resources: U.S. Shale Gas and Shale Oil Plays*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/analysis/studies/usshalegas/ [http://perma.cc/B799-MZEF] (archived Mar. 10, 2014).

18. MODERN SHALE GAS DEVELOPMENT IN THE UNITED STATES: A PRIMER, U.S. DEP'T OF ENERGY 3 (2009), *available at* http://dnr.louisiana.gov/assets/docs/mineral/haynesvilleshale/ShaleGasPrimer2009.pdf [http://perma.cc/W28C-65KC] (archived Mar. 10, 2014) [hereinafter PRIMER].

19. *Id*. at ES-1.

20. *Id*. at 9.

21. INDEP. PETROLEUM ASS'N OF AMERICA, HYDRAULIC FRACTURING: EFFECT ON ENERGY SUPPLY, THE ECONOMY, AND THE ENVIRONMENT (2008), http://energyindepth.org/docs/pdf/Hydraulic-Fracturing-3-E's.pdf [http://perma.cc/EH4K-BWSY] (archived Mar. 10, 2014) (see page 1 of PDF).

22. *Id.*

23. Del Torkelson, *Marcellus and Haynesville Grab Industry's Attention as Gas Shale Giants*, AM. OIL & GAS REPORTER, March 2010, at 73. *See also* Jon Hurdle, *Natural gas boom brings riches to a rural US town*, REUTERS (Apr. 5, 2010, 8:59 AM), http://www.reuters.com/article/2010/04/05/energy-fracking-wellsboro-idUSN0214504720100405 [http://perma.cc/8YVY-Y58Q] (archived Feb. 10, 2014).

Although the more controversial of the two enabling technologies, fracing is essential to the viability of oil and gas production in the United States according to industry groups.[24] Hydraulic fracing provides an additional seven billion barrels of oil and 600 Tcf of natural gas to domestic reserves, according to one industry association's estimate.[25] Industry groups also warn that, without fracing, America would be producing much less oil and natural gas, which would in turn increase dependence on foreign imports.[26] Further, hydraulic fracing and the concomitant production of natural gas has brought economic benefits to many communities, such as overall job creation, royalties paid to property owners, and taxes paid to counties.[27]

Given the size of the potential reserves made available by directional drilling and fracing, the influence and capital of the producers of natural gas, the money made by the mineral owners in bonus and royalty, and the jobs and tax revenue that fracing makes possible,[28] widespread hydraulic fracturing will continue, and the hunt for prospective shale oil and gas will proliferate. Additionally, as techniques for unconventional development have matured, growth in overall production of natural gas has actually increased from 5 billion cubic feet (Bcf) per day in January 2007 to approximately 28 Bcf per day in April 2013, while the number of active rigs has dropped by 70% from the beginning of 2007.[29] All this production has kept domestic natural gas prices from 2011 to 2013 below $4.50 per million cubic feet (Mcf), an unprofitably low price for some producers, at the largest American market, the Henry Hub in Houston.[30] Producers are seeking another use for natural gas

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24. AM. EXPLORATION & PROD. COUNCIL, THE REAL FACTS ABOUT FRACTURE STIMULATION (2010), *available at* http://energyindepth.org/wp-content/uploads/2011/10/Real-facts-behind-fracture-stimulation-technology.pdf [http://perma.cc/6D8A-L2MV] (archived Mar. 12, 2014) (citing that 46% of all domestic natural gas comes from unconventional formations like shale, tight sandstone, and coal formations, and 90% of all domestic natural gas wells (about 35,000 a year) require fracing).

25. INDEP. PETROLEUM ASS'N OF AMERICA, *supra* note 21, at 1.

26. *Id.*

27. *Id.*

28. *See* Mark Niquette & Romy Varghese, *Youngstown Opens Mills Again as States Jockey for Fracking Jobs*, BLOOMBERG (Jan. 9, 2012, 11:00 PM), http://www.bloomberg.com/news/2012-01-10/youngstown-opens-mills-again-as-states-jockey-for-fracking-jobs.html [http://perma.cc/M3Y7-ZX5H] (archived Feb. 4, 2014).

29. *See* Andrew D. Weissman, *U.S. Natural Gas Industry Positioned for Dominant Role in Global LNG Markets*, AM. OIL & GAS REPORTER, Oct. 2013, at 44 fig.1 (citing U.S. shale gas performance versus rig count information compiled and reported from EBW Analytics and Bloomberg).

30. *Id.* at 1.

to increase consumption in order to balance the supply and demand imbalance that is keeping natural prices low.

Onshore domestic oil production, too, has begun to blossom. U.S. oil production reached its highest level in almost 24 years in September 2013—7.621 million barrels per day—representing another milestone in an astounding rebound from an extended trough of approximately 5 million barrels per day from 2005 to 2008, an increase significantly fueled by production from unconventional sources.[31] American oil exports, made illegal in the 1970s when conducted without a license, are again contemplated, and commentators have begun to clamor for the removal of the licensing requirement.[32]

III. LIQUEFIED NATURAL GAS IN AMERICA

A. The Resource

LNG is methane gas that has been chilled by LNG terminals (or "trains") to –260°F at atmospheric pressure in order to convert it into a liquid state.[33] This liquid is then lifted into an LNG tanker for transport to another continent at constant temperature and pressure.[34] These tanker ships are typically double-hulled for both safety and insulating purposes.[35] At the receiving terminal, the LNG is typically off-loaded into insulated storage tanks for distribution.[36] 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.[37] This makes LNG cost efficient to transport over long distances where pipelines

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31. Zain Shauk, *US oil production reaches highest level in 24 years*, FUELFIX (Sept. 6, 2013, 7:30 AM), http://fuelfix.com/blog/2013/09/06/u-s-oil-production-at-highest-level-in-24-years/ [http://perma.cc/7T9M-9ERD] (archived Feb. 10, 2014) (citing data from the U.S. Energy Information Administration).

32. Blake Clayton, *The Case for Allowing U.S. Crude Oil Exports* (Policy Innovation Memorandum No. 34), COUNCIL ON FOREIGN RELATIONS (July 2013), http://www.cfr.org/oil/case-allowing-us-crude-oil-exports/p31005 [http://perma.cc/WA8C-DPJE] (archived Feb. 4, 2014).

33. *Frequently Asked Questions About LNG*, CAL. ENERGY COMM'N, http://www.energy.ca.gov/lng/faq.html [http://perma.cc/JE32-8EXG] (archived Mar. 12, 2014) [hereinafter *FAQs*].

34. *Id.*

35. *Id.*

36. *Id.*

37. *Liquefied Petroleum Gas (LPG), Liquefied Natural Gas (LNG) and Compressed Natural Gas (CNG)*, ENVOCARE LTD., http://www.envocare.co.uk/lpg_lng_cng.htm [http://perma.cc/Y6WW-DPJ6] (archived Feb. 4, 2014).

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.[38] 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.[39] Technological improvements in design and fabrication of LNG terminals and transport ships have lowered the cost of LNG shipments by approximately 30% since 1990.[40]

Enormous exploitable natural gas reserves have been found in some of the most remote and harsh environments. For example, some estimates of the hydrocarbon potential of the Arctic place 20% of the world's undiscovered reserves within the confines of the Arctic Ocean.[41] The U.S. Geological Survey estimates that up to 90 billion barrels of oil and 30% of the world's undeveloped natural gas lie above the Arctic Circle.[42] Russian energy giant Gazprom will have to rely on remote Arctic and offshore locations to provide half of its natural gas production by 2020 as output declines sharply at mature Siberian fields, but the production infrastructure necessary to exploit these reserves is not in place and may not exist anywhere.[43] Because of the remote locations of such natural gas assets, significant portions of the world's natural gas resources are considered "stranded" because they are not connected to a market via a pipeline network.[44] Transportation of ship-borne LNG is the only way to bring stranded gas to markets.

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38. *See generally FAQs*, *supra* note 33.

39. Daniel Yergin & Michael Stoppard, *The Next Prize*, FOREIGN AFFAIRS, Nov./Dec. 2003, at 103, 108.

40. FRED BOSSELMAN ET AL., ENERGY, ECONOMICS AND THE ENVIRONMENT 542 (3d ed. 2010).

41. KENNETH J. BIRD ET AL., U.S. GEOLOGICAL SURVEY, FACT SHEET 2008-3049, CIRCUM-ARCTIC RESOURCE APPRAISAL: ESTIMATES OF UNDISCOVERED OIL AND GAS NORTH OF THE ARCTIC CIRCLE (Peter H. Stauffer ed., 2008), http://pubs.usgs.gov/fs/2008/3049/fs2008-3049.pdf [http://perma.cc/C7EX-QJQZ] (archived Feb. 4, 2014).

42. Thomas Grove, *Russia to submit Arctic claim to U.N. next year*, REUTERS (July 6, 2011, 1:30 PM), http://www.reuters.com/article/2011/07/06/us-russia-arctic-claim-idUSTRE76528320110706 [http://perma.cc/32MV-BU2H] (archived Feb. 4, 2014).

43. *Id.*

44. *Liquefied Natural Gas*, U.S. DEP'T OF ENERGY, http://energy.gov/fe/science-innovation/oil-gas/liquefied-natural-gas [http://perma.cc/N3N5-H9US] (archived Feb. 4, 2014).

B. Domestic Oversupply

As with most mass-produced commodities, natural gas prices are usually determined by supply and demand.[45] For almost a decade, domestic natural gas prices have stayed low as supplies increased, and demand lagged despite new industrial and gas-sourced electricity generation.[46] During the 1980s and 1990s, natural gas prices generally stayed between $1.6 and $2.3 million British thermal units (mmBtu), with demand and supply about evenly balanced.[47] In the early 2000s, however, prices spiked at $10 mmBtu, even briefly reaching $14 mmBtu.[48] The U.S. Department of Energy has predicted that, over the next twenty years, domestic natural gas consumption will increase from 24.3 to 26.6 Tcf.[49]

Domestic demand for natural gas is now met with domestic production and Canadian imports arriving via pipeline, with only a small percentage being imported as LNG.[50] In fact, LNG imports are withering in the United States. In 2011, the United States imported 349 Bcf of LNG through twelve import terminals, down from 431 Bcf in 2010—a decrease of 19%.[51] The vast majority of U.S. demand for natural gas is met with domestic production and imports via pipeline from Canada.[52] In the 1990s and 2000s, a small group of countries, including Qatar, Nigeria, Egypt, Trinidad, and Algeria exported LNG to the United States.[53] One by one, as domestic production increased in the late 2000s, this list dwindled, and Trinidad currently remains the only importer of significant volumes of LNG into the United States.[54]

At the same time, development of unconventional shale deposits swept the United States, erupting first in Texas within the Barnet

45. *See* Richard J. Pierce, Jr., *The Evolution of Natural Gas Regulatory Policy*, NAT. RESOURCES & ENV'T, Summer 1995, at 53, 53–55, 84–85 (noting that this has been true at least since natural gas production was largely freed from the long shadow of badly mishandled federal price controls).

46. *See generally LNG Exports An Opportunity the Country Must Not Fumble*, AM. OIL & GAS REP., Apr. 2013, at 214.

47. Keith Schaefer, *Natural Gas Price Chart 1980-2007; Some Bullish Signs*, OIL & GAS INVESTMENTS BULL. (Jan. 30, 2009), http://oilandgas-investments.com/2009/investing/natural-gas-price-chart-1980-2007-some-bullish-signs/ [http://perma.cc/VDQ2-PYUS] (archived Mar. 12, 2014).

48. *Id.*

49. *Liquefied Natural Gas*, *supra* note 44.

50. *Id.*

51. *Id.*

52. *NG Imports by Country*, *supra* note 2.

53. *Id.*

54. *Id.*; *see also U.S. Natural Gas Imports & Exports 2012*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/naturalgas/importsexports/annual/ [http://perma.cc/H8VM-HXYQ] (archived Feb. 4, 2014).

Shale. By 2009, natural gas prices in the United States had dramatically declined.[55] For the first seven months of 2012, American natural gas prices were 70.3% below the annual average wellhead price of 2008.[56] By 2012, the United States produced a record high 30 Tcf, meaning it had passed Russia in production of natural gas.[57] All this natural gas production has left the domestic markets awash in natural gas and has pressed relentlessly down on prices—the run-up in American natural gas supplies has prevented significant and sustainable price increases and will likely continue to do so for the foreseeable future despite some proliferation in gas-using outlets, primarily in the Gulf of Mexico.[58]

Low gas prices are good for some,[59] but as seen in the Texas oil fields in the 1930s,[60] sustained periods of low prices inhibit drilling—especially in immature fields—and the financing of more expensive infrastructure,[61] such as LNG liquefying terminals. Sustained low gas prices may also drive production from fields that produce dry gas to those that produce natural gas liquids that fetch a higher price.[62] Prior to the rise of domestic onshore shale gas, the United States was an importer of natural gas.[63]

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55. Matthew Philips, *Is Natural Price Too Cheap to Drill?*, BLOOMBERG BUSINESSWEEK (Apr. 17, 2012), http://www.businessweek.com/articles/2012-04-17/is-natural-gas-too-cheap-to-drill [http://perma.cc/4PJS-ZT5N] (archived Mar. 12, 2014).

56. *See* U.S. ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, DOE/EIA-0035(2012/11), MONTHLY ENERGY REVIEW: NOVEMBER 2012, at 131 (2012), http://www.eia.gov/totalenergy/data/monthly/archive/00351211.pdf [http://perma.cc/JE8K-JJ4T] (archived Feb. 10, 2014).

57. Julia Bell, *IPAA Ranks Top 10 U.S. Oil & Natural Gas Records*, INDEP. PETROLEUM ASS'N OF AMERICA (July 30, 2013), http://www.ipaa.org/2013/07/30/ipaa-ranks-top-10-u-s-oil-natural-gas-records/ [http://perma.cc/6U2K-CKS7] (archived Feb. 10, 2014).

58. *Id.*

59. *See* Molly Ryan, *Houston Sees Resurgence in Manufacturing Due to Petrochemical Rebirth*, HOUSTON BUS. J. (July 27, 2012, 5:00 AM), http://www.bizjournals.com/houston/print-edition/2012/07/27/petrochemical-rebirth.html?page=all [http://perma.cc/NF7W-XLYG] (archived Mar. 12, 2014) (noting that the petrochemical industry has enjoyed higher profits due to lower natural gas prices and that the industry uses natural gas as a chemical feedstock).

60. *See The Oil Wars*, TEX. STATE LIBRARY & ARCHIVES COMM'N ch. 7, *available at* https://www.tsl.state.tx.us/exhibits/railroad/oil/page7.html [http://perma.cc/4L5C-7JEZ] (archived Mar. 12, 2014).

61. *See* Yergin & Stoppard, *supra* note 39, at 107.

62. Valerie Wood, *Natural Gas Price Picture May Change by Late 2012*, PIPELINE & GAS J., Sept. 2011, at 16.

63. Daniel Gilbert & Tom Fowler, *Natural Gas Glut Pushes Exports*, WALL ST. J., Oct. 4, 2012, at A1.

C. LNG Exports

Now, with imports stalling and domestic natural gas piling up, exports are seen as a price-firming panacea. LNG is the key to American natural gas becoming a global commodity. The United States has one active LNG natural gas-liquefying "train" able to provide LNG to tankers, known as the Kenai LNG Plant, located in Nikiski, Alaska.[64] It provides LNG to Asia, primarily Japan.[65]

As of the end of 2012, the U.S. Department of Energy (DOE) reported thirteen new or expanded LNG export terminal projects have been proposed that would deliver gas to countries with which the United States does not share a free trade agreement.[66] Additionally, twelve LNG re-gasification terminals have been proposed, three of which have been approved, one of which is under construction, and some of which are being designed to include both import and export capabilities.[67] On August 7, 2013, the DOE approved construction of the third LNG exporting train in the Lower 48, located in Lake Charles, Louisiana.[68] The three trains comprising that project, when combined, will be capable of processing approximately 8% of the United States' daily natural gas production, or 5.6 Bcf of gas.[69]

Can these exports reduce the natural gas glut? The American Petroleum Institute and several commentators have noted that, volumetrically, new domestic natural gas outlets use a minuscule amount of natural gas compared to LNG exports.[70] For example, one major LNG train could take in six to seven times the natural gas used by all the industrial and electricity-generating outlets recently

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64. Yereth Rosen, *ConocoPhillips restarts LNG exports from Alaska*, REUTERS (Jun. 14, 2012, 12:38 AM), http://www.reuters.com/article/2012/06/14/us-conoco-lng-idUSBRE85D06C20120614 [http://perma.cc/5WZD-ZSZG] (archived Feb. 10, 2014).

65. *Id.*

66. *Id.*

67. *Id.*

68. *See Energy Department Authorizes Second Proposed Facility to Export Liquefied Natural Gas*, U.S. DEP'T OF ENERGY (May 17, 2013, 12:00 PM), http://energy.gov/articles/energy-department-authorizes-second-proposed-facility-export-liquefied-natural-gas [http://perma.cc/44DQ-83BM] (archived Feb. 10, 2014) (noting that the second LNG exporting train for exports to countries with no free trade agreement was approved on May 17, 2013).

69. Ayesha Rascoe, *U.S. approves natural gas exports from third terminal*, REUTERS (Aug. 7, 2013, 6:13 PM), http://www.reuters.com/article/2013/08/07/usa-lng-exports-idUSL1N0G811120130807 [http://perma.cc/LV6Y-2W58] (archived Feb. 10, 2014).

70. *See LNG Exports An Opportunity the Country Must Not Fumble*, *supra* note 46, at 214–15.

announced in the Gulf of Mexico, about 330 Mcf a day.[71] Just one LNG project can provide demand for two Bcf of natural gas daily—equal to all the natural gas used in New England and New York City daily.[72] Since supply curtails any near-future price hikes, LNG exports are a far better option over domestic use as a way to increase demand. Three or four large LNG export terminals can take in as much natural gas as the total increase in domestic natural gas use attributable to heightened electrical generation in the last decade.[73]

Popular general arguments in favor of increased natural gas use include its clean burning characteristics compared to coal, particularly lignite. Jitters about the "worst case scenarios" offered by other energy sources, such as the BP Gulf Spill or the Fukushima nuclear power plant disaster, have ignited renewed international interest in LNG imports.[74] Natural gas burns much cleaner than coal, generating significantly less CO_2, which is popularly thought to contribute to global warming.[75]

Because the equipment used to transport LNG is highly expensive, and because the time and money involved in constructing new natural gas power plants are immense, the LNG trade requires a business model comprised of long-term gas purchase agreements that links all parties involved: the consuming importers, the terminal facilities and shippers, and the financiers that stand behind all of them.[76] If the availability of natural gas happens to change drastically, these agreements would fall apart. To mitigate that risk, specific natural gas reserves have been pledged in specific gas purchase agreements with terms over 20 years to send gas through specific terminals and shipping lines.[77] Daniel Yergin and Michael Stoppard have referred to this elaborate system of parallel development and infrastructure construction as the "LNG paradigm" that is made necessary by the enormous capital expenses ($3 to $10 billion per project) tied up in an LNG project.[78] This paradigm is

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71. *Id.* (citing comments by the American Petroleum Institute filed with the DOE).
72. *See id.*
73. *Id.*
74. *See, e.g.*, Rebecca Smith & Mari Iwata, *Japanese Buyers Line Up for U.S. Shale Gas*, WALL ST. J., May 25, 2012, at B8 ("[In May 2012,] Japan shut down the last of its 50 nuclear reactors, switching off a power source that once produced 30% of the nation's electricity. Even if some reactors eventually restart, demand for natural gas is likely to remain strong for years in Japan . . . .").
75. *See Natural Gas*, U.S. ENVTL. PROT. AGENCY, http://www.epa.gov/cleanenergy/energy-and-you/affect/natural-gas.html [http://perma.cc/D6PR-QR6Y] (archived Feb. 10, 2014).
76. Yergin & Stoppard, *supra* note 39, at 108.
77. *Id.*
78. *Id.*

similar to the old onshore, domestic natural gas markets, and like the gas purchase agreements of yore before gas market restructuring, take-or-pay clauses still lurk in LNG gas purchase agreements.[79]

One complication for LNG exports is a bottleneck—a lack of pipelines to transport natural gas to some potential LNG export trains. In the 1970s, the United States began preparing to import LNG, and indeed planned four such terminals, completing one that then experienced a couple of years of imports before petering out in the early 1980s when the natural gas bubble burst. The densely-populated northeastern United States utilizes a great deal of natural gas for space heating and electricity generation, relying heavily on interstate exports from the Gulf Coast region.[80] The usual reasons for quicker and broader approvals of LNG exporting projects have been forwarded, generally that more jobs will be created, more tax revenue will result from LNG trains, and a reduction in the trade deficit will occur.[81]

IV. THE DEBATE OVER LNG EXPORTS

A. The Federal Question

On May 21, 2013, Senator Ron Wyden (Democrat, Oregon), chairman of the Energy and Natural Resources Committee, said the following at the National Gas Roundtable on Supply and Exports:

> Some will assert that this is unquestionably a good thing: That the energy trade could reduce our trade deficits, improve relationships with our allies, and provide a further boost our recovering economy. Others are going to assert that unfettered exports with little to no consideration of broader economic and regional concerns could lead to the United States exporting its advantage. . . . [O]ur country should not be wedded to this either-or choice between no exports and no limits on exports. Done right, there ought to be a way to get the trade benefits to exporters and trade

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79. *Id.*

80. Matthew Phillips, *Frozen Northeast Getting Gouged by Natural Gas Prices*, BLOOMBERG, Jan. 27, 2014, *available at* http://www.businessweek.com/articles/2014-01-27/frozen-u-dot-s-dot-northeast-gouged-by-natural-gas-prices-amid-shale-boom.

81. Application for Long-Term Authorization to Export Liquefied Natural Gas, 77 Fed. Reg. 55,197, 55,198 (Sept. 7, 2012) (exposing reduction of trade deficit and job creation to be expected from approved project).

> partners while maintaining the domestic economic and energy security benefits in our country.[82]

About two and a half months later, Senator Wyden and Energy and Natural Resources ranking minority member Senator Lisa Murkowski, in a letter to Secretary of Energy Ernest Moniz, highlighted the Department of Energy's power to modify or revoke export licenses.[83] In the letter, the senators directed eleven questions to the secretary regarding the speed and transparency of the DOE's permitting decisions with regards to LNG decisions.[84] Four days later, Senator Murkowski issued an *Energy 20/20 White Paper* articulating her strong support for expanding exports.[85] Later, in November 2013, when the Freeport LNG train was authorized by the DOE to expand its exporting volume, Senator Murkowski provided faint praise for the approval, saying, "We know that exports of natural gas are already boosting the U.S. economy, creating jobs, and lowering our deficits across the board. While I welcome the decision, this approval refers to a relatively simple expansion of capacity at a facility that has already received authorization to export."[86]

While Senator Murkowski urges an expeditious approach, other elected officials have called for more reflection and study. In August 2013, the congressional "Bicameral Task Force on Climate Change" urged the DOE to "conduct a thorough analysis of the climate change impacts of proposed LNG exports."[87] The Task Force

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82. Ron Wyden, Chairman, U.S. Senate, Comm. on Energy & Natural Res., Opening Statement at the Natural Gas Roundtable on Supply and Exports (May 21, 2013), *available at* http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=bc81cedc-58ad-4138-8e19-c6f0e6a8cb31 [http://perma.cc/3LAB-DQDE] (archived Mar. 12, 2014).

83. Letter from Ron Wyden & Lisa Murkowski, U.S. Senate, Comm. on Energy & Natural Res., to Ernest Moniz, Sec'y, U.S. Dep't of Energy (Aug. 2, 2013), http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=fcd19e75-9ff9-4d75-aa4e-7330b5f8b03f [http://perma.cc/R6UV-QJA9] (archived Mar. 12, 2014).

84. *See id.*

85. *See generally* LISA MURKOWSKI, THE NARROWING WINDOW: AMERICA'S OPPORTUNITY TO JOIN THE GLOBAL GAS TRADE (2013), http://www.energy.senate.gov/public/index.cfm/files/serve?File_id=d647e1a3-f2fb-42e6-9d0d-d65e23fb058f [http://perma.cc/7DD9-WYWE] (archived Mar. 12, 2014).

86. Press Release, U.S. Senate, Comm. on Energy & Natural Res., Sen. Murkowski Welcomes DOE Approval of Freeport LNG Export Expansion (Nov. 15, 2013), http://www.energy.senate.gov/public/index.cfm/republican-news?ID=9d03e773-abe4-48b2-b1b7-f65ed5100214 [http://perma.cc/B4NS-L6S4] (archived Mar. 12, 2014).

87. U.S. CONGRESS, BICAMERAL TASK FORCE ON CLIMATE CHANGE ACTIONS THE DEPARTMENT OF ENERGY SHOULD TAKE TO ADDRESS CLIMATE CHANGE: IMPLEMENTING THE PRESIDENT'S CLIMATE ACTION PLAN: U.S. DEPARTMENT OF

acknowledged that the use of natural gas worldwide would reduce coal use, but "significant uncertainties" exist about how much, and whether alleged leaks of gases, such as methane, would counteract any benefits.[88] Interestingly, however, in April 2013, the Environmental Protection Agency reduced its estimate of methane leakage in the agency's greenhouse gas inventory,[89] and several respected climate scientists have strongly questioned the impact natural gas-related leaks have on climate change.[90]

Contemplation of LNG exports has given rise to complaints from three sources: environmentalists (who argue that fracing poses an environmental threat),[91] manufacturers (entities like Dow Chemical and the Industrial Energy Consumers of America, who believe that exports of LNG will raise their natural gas prices domestically),[92] and Americans heating with natural gas (who, like manufacturers, also see exporting raising their own usage costs).[93]

B. Safety & Security

One source of continuing concern for both advocates and detractors of LNG is the safety and security of LNG terminals and ships, particularly in this day of expanded threats of terrorism. When one considers all the main sources of energy worldwide, after

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ENERGY 15 (2013), http://democrats.energycommerce.house.gov/sites/default/files/documents/Bicameral-Task-Force-DOE-Climate-Report-2013-8-6.pdf [http://perma.cc/5YTA-H9TD] (archived Mar. 18, 2014).

88. *Id.*

89. Bill Sweet, *How Big a Problem is Methane Leakage from Natural Gas Fracking?*, IEEE SPECTRUM (Aug. 6, 2013, 5:18 PM), http://spectrum.ieee.org/energywise/energy/fossil-fuels/how-big-a-problem-is-methane-leakage-from-natural-gas-fracking [http://perma.cc/R66S-8HVC] (archived Mar. 12, 2014).

90. Andrew C. Revkin, *Two Climate Analysts Fault Gas Leaks, but Not as a Big Warming Threat*, N.Y. TIMES: DOT EARTH (Aug. 1, 2013, 5:12 PM), http://dotearth.blogs.nytimes.com/2013/08/01/two-climate-analysts-fault-gas-leaks-but-not-as-a-big-warming-threat/?r=1 [http://perma.cc/A6GB-AUY8] (archived Feb. 12, 2014).

91. *See Sierra Club Takes Stand Against LNG Exports for Rise in Fracking*, NAT. GAS WEEK (Feb. 13, 2012) (on file with *LSU Journal of Energy Law and Resources*).

92. Jeff McMahon, *Dow, ConocoPhillips Spar Over LNG Exports*, FORBES (June 16, 2013, 9:00 AM), http://www.forbes.com/sites/jeffmcmahon/2013/06/16/dow-conocophillips-spar-over-lng-exports/ [http://perma.cc/YZ87-24AS] (archived Mar. 12, 2014).

93. Erin McBride, *The Argument for and Against LNG Exports*, THE MOTLEY FOOL (Jan. 15, 2013), http://beta.fool.com/erinannie/2013/01/15/argument-and-against-lng-exports/21631/ [http://perma.cc/SDR2-PEG9] (archived Mar. 12, 2014).

nuclear energy (Chernobyl, Three-Mile Island, Fukushima), LNG can, at least in the public's imagination, claim title to the most horrific "worst case scenario" popularly associated with it—mainly, an LNG tanker or terminal exploding in proximity to a major population center. LNG itself does not burn, but upon turning to gas and then mixing with oxygen, a spark can ignite a gas explosion.[94] LNG tankers, however, have crashed, run aground, lost containment (with associated damage from brittle metal failure due to extreme cold), and suffered serious weather damage and engine room fires, all with no cargo explosions reported.[95] While spills of LNG have occurred, no significant destructive or lethal explosions have resulted as vaporization and dispersal of the re-gasified natural gas follows rapidly.[96]

After Islamic terrorists attacked the United States in 2001, safety worries regarding LNG projects became louder and more widely heard. Dr. James A. Fay, a professor at MIT, claimed than an accident or attack against an LNG tanker in Boston Harbor would result in explosions and fire far beyond the capacity of local authorities to stymie.[97] Mike Hightower, a researcher with Sandia National Laboratories, testified before a subcommittee of the Energy and Natural Resources[98] and cited an early-2000s vintage Sandia Laboratories report stipulating that, when simplified and translated from specialist terms, an exploding LNG tanker, train, or terminal could result in near-total destruction out to a mile-blast radius and compressive- and thermally-triggered damage far beyond that.[99] Another group of consultants to the State of Rhode Island estimated that LNG facilities could very well be terrorist targets, warning:

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94. Doug Quillen, ChevronTexaco Corp., LNG Safety Myths and Legends, Presentation at Natural Gas Technology: Investment in a Healthy U.S. Energy Future (May 14–15, 2002), *available at* http://www.netl.DOE.gov/publications/proceedings/02/ngt/Quillen.pdf [http://perma.cc/F2G9-GN3C] (archived Feb. 13, 2014).

95. *Id.*

96. *Id.*

97. JAMES A. FAY, SAVE PASSAMAQUODDY BAY, SPILLS AND FIRES FROM LNG AND OIL TANKERS IN BOSTON HARBOR 3 (Mar. 26, 2003), *available at* http://www.savepassamaquoddybay.org/documents/safety_reports/Fay_LNG_Fire_Impact.pdf [http://perma.cc/RTV6-4U68] (archived Feb. 13, 2014).

98. *Liquefied Natural Gas: Hearing Before the Subcomm. on Energy & Natural Res.*, 109th Cong. 59 (2005) [hereinafter *Hearing*] (testimony of Mike Hightower, Technical Staff Member, Sandia National Laboratories).

99. For the most recent Department of Energy publication on LNG safety and security, see U.S. DEP'T OF ENERGY, LIQUEFIED NATURAL GAS SAFETY RESEARCH (2012), *available at* http://energy.gov/sites/prod/files/2013/03/f0/DOE_LNG_Safety_Research_Report_To_Congre.pdf [http://perma .cc/4MK2-DMTZ] (archived Feb. 13, 2014).

> We judge that terrorist groups now have the intent to attack facilities in the U.S. such as the urban [near Providence] LNG off-loading facility proposed. We judge that they could relatively easily both obtain the needed capability and conduct an attack on the urban LNG facility and/or the LNG tanker . . . . We judge that such attacks run a high risk of generating catastrophic damage, with which the region could not adequately cope during the consequence management or recovery phases.[100]

When siting for LNG projects was considered, such dire predictions of disaster played like bellows on the fires of NIMBYism—that is, "Not in my backyard!" For example, the Dominion Cove Point LNG export terminal, which was to be located on the Chesapeake Bay, faced strong resistance from groups that included the Sierra Club, Earthjustice, and local groups alarmed by safety concerns and ecological impacts on the bay prior to the DOE's approval of LNG exports from the site on September 11, 2013.[101]

The safety record of LNG en route is actually very good. As of 2005, after approximately 33,000 shipments of LNG worldwide, no cargo explosions were reported.[102] The other main LNG process—liquefying and regasification at the beginning and endpoint of transportation—has also historically been mostly safe but not without several small incidents that serve to help imagine what the results of a terrorist attack on an LNG facility may look like.[103] Perhaps the worst disaster was in Skikda, Algeria, in January 2004, when a boiler exploded in a liquefying train with such violence that

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100. RICHARD A. CLARK, GOOD HARBOR CONSULTING, LLC, NO. GHC-RI-0505A LIQUEFIED NATURAL GAS FACILITIES IN URBAN AREAS 8 (2005), *available at* http://cfpub.epa.gov/ols/catalog/catalog_display.cfm?&FIELD1=AUTHOR&INPUT1=Lynch%20AND%20Patrick&TYPE1=ALL&item_count=1 [http://perma.cc/R67S-VW6B] (archived Feb. 13, 2014).

101. Brain Wingfield & Jim Polson, *Dominion Wins U.S. Approval for Cove Point Gas-Export Hub*, BLOOMBERG (Sep. 11, 2013, 2:46 PM), *available at* http://www.bloomberg.com/news/2013-09-11/dominion-wins-u-s-approval-for-cove-point-gas-export-terminal.html [http://perma.cc/DF5V-R7CH] (archived Feb. 13, 2014); *see also* Al Maiorino, *Building public support for LNG projects*, ENERGY GLOBAL (June 13, 2013), http://www.energyglobal.com/news/liquid-natural-gas/articles/Building_public_support_for_LNG_projects_014.aspx#.Upe3FF9MGUl [http://perma.cc/X3YE-GFXA] (archived Feb. 13. 2014).

102. FRED BOSSELMAN ET AL., ENERGY, ECONOMICS AND THE ENVIRONMENT 548 (3d ed. 2010).

103. *See Hearing*, supra note 98, at 61 (testimony of J. Mark Robison, Director of Energy Projects, FERC).

it was impossible to definitively determine how the leak occurred and why the leak could not be immediately detected.[104]

C. Federal Permitting

Another complication for LNG exports is the permitting required by the Department of Energy. Obtaining general state and federal government approvals for construction of LNG exporting projects can be both expensive and time-consuming.[105] 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.[106]

The Natural Gas Act of 1938, as amended, requires natural gas (including LNG) importers or exporters to first obtain approval from the DOE regardless of whether the country has a free trade agreement with the United States.[107] No LNG export application to the DOE may be modified or denied if the importing country has a free trade agreement with the United States.[108] The DOE has more latitude when considering LNG exporting projects where the importing country does not share a free trade agreement with the United States.[109] While countries that share free trade agreements with the United States are entitled to DOE application approval "without delay," the process may take longer for countries without

104. *Id.* at 61–62.

105. Mark R. Haskell & Levi McAllister, *Shale Gas Development: The Implications of the Shale Gas Revolution for the Natural Gas Industry*, 3 HARV. BUS. L. REV. ONLINE 33, 38 (2012), http://www.hblr.org/wp-content/uploads/2012/12/Shale-Gas-Development-The-Implications-of-the-Shale-Gas-Revolution-for-the-Natural-Gas-Industry.pdf [http://perma.cc/YG2C-Z3XS] (archived Mar. 13, 2014).

106. 15 U.S.C. § 717b (2012).

107. CHARLES EBINGER & GOVINDA AVASARALA, BROOKINGS ENERGY SEC. INITIATIVE, NATURAL GAS BRIEFING DOCUMENT #2: REVISING THE LNG EXPORT PROCESS 4 (2013), http://www.brookings.edu/~/media/research/files/reports/2013/08/19%20revising%20lng%20export%20process%20ebinger%20avasarala/revising%20the%20lng%20export%20process.pdf [http://perma.cc/86K3-KEZ7] (archived Feb. 13, 2014).

108. As of October 31, 2012, the United States has FTAs that require national treatment for trade in natural gas with Australia, Bahrain, Canada, Chile, Colombia, Dominican Republic, El Salvador, Guatemala, Honduras, Jordan, Mexico, Morocco, Nicaragua, Oman, Panama, Peru, South Korea, and Singapore. For regulatory explanation, see *How to Obtain Authorization to Import and/or Export Natural Gas and LNG*, U.S. DEP'T OF ENERGY, http://www.fossil.energy.gov/programs/gasregulation/How_to_Obtain_Authorization_to_Import_an.html [http://perma.cc/G82A-5436] (archived Feb. 13, 2014).

109. *Id.*

free trade agreements with the United States—and, with the exception of South Korea, the United States does not share a free trade agreement with any major LNG importer—because then the DOE must approve the permit only if it determines the proposed exports are in the "public interest."[110] The DOE interprets the Natural Gas Act as containing a rebuttable presumption that LNG exports are in the public interest.[111] Over 20 permits for LNG export to countries with which the United States does *not* possess a free trade agreement have been tendered to the DOE, but approvals have backed up.[112] The DOE has announced that it will evaluate the export applications in the order it received them while considering the cumulative impact of its prior approvals when considering future applications.[113] While Energy Secretary Ernest Moniz insists the DOE is committed to reviewing all the non-free trade applications "expeditiously," the DOE has missed the Secretary's stated goal to review all existing backlogged applications by the end of 2013.[114]

Specifically, the Office of Fossil Energy issues permits for the import or export of natural gas, via either pipeline or LNG tanker, and collects and disseminates information detailing annual and monthly levels of domestic natural gas imports and exports. The permits may be either blanket or long-term export or import authorizations.[115] The blanket authorization allows LNG imports or exports on either short-term or spot market basis for up to two years.[116] The long-term authorization is used in situations involving gas purchase agreements and sales contracts, tolling agreements, or other contracts resulting in imports or exports of natural gas that last for a period longer than two years.[117]

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110. *Id.*

111. *Id.*

112. *Applications Received by DOE/FE to Export Domestically Produced from the Lower-48 States (as of August 7, 2013)*, U.S. DEP'T OF ENERGY, http://energy.gov/sites/prod/files/2013/08/f2/Summary_of_Export_Applications.pdf [http://perma.cc/78PE-GAUM] (archived Feb. 13, 2014).

113. *See* EBINGER & AVASARALA, *supra* note 107, at 4.

114. *See The Fiscal Year 2014 U.S. Department of Energy Budget: Hearing Before the Subcomm. on Energy & Power of the H.R. Comm. on Energy & Commerce*, 113th Cong. (2013) (testimony of Ernest J. Moniz, Sec'y, U.S. Dep't of Energy), *available at* http://www.gpo.gov/fdsys/pkg/CHRG-113hhrg85443/pdf/CHRG-113hhrg85443.pdf [http://perma.cc/36CZ-2BUA] (archived Mar. 13, 2014) (see page 13 of PDF).

115. *Natural Gas Regulation*, U.S. DEP'T OF ENERGY, http://energy.gov/fe/services/natural-gas-regulation [http://perma.cc/4ATH-9SRV] (archived May 12, 2014).

116. *Id.*

117. *Id.*

Some complain that the DOE has been slow to issue the second category of permits and that, once issued, they may be revoked. This worries financiers. The DOE has been slow during the Obama administration to approve LNG exporting trains, with only seven applications conditionally approved.[118] The DOE temporarily stopped granting new LNG export licenses to proposed LNG exporting projects in 2011 after granting one U.S. company in Louisiana both free-trade and non-free trade licenses for its proposed LNG exporting plan, citing the need to examine the potential impact of further LNG export licenses on the domestic U.S. natural gas market.[119] Then, although the DOE-funded study, which was released in 2012, concluded that exporting LNG would benefit the U.S. economy overall despite raising natural gas prices domestically, newly-ensconced Energy Secretary Ernest Moniz said he will delay licensing decisions on approximately twenty applications to export LNG until he himself "reviews studies by the Energy Department and others on what impact the exports would have on domestic natural-gas supplies and prices."[120]

V. THE EUROPEAN SITUATION

Three possible targets currently exist for U.S exports of LNG: the Pacific Rim (e.g., Korea, Japan, and Taiwan), India, and Europe. Europe is an especially intriguing destination for LNG exports as the gas sold would be derived from sources in the eastern and southern United States and liquefied at LNG "trains" along the Eastern Seaboard and the Gulf of Mexico.

Imports from the United States, however, may have to wait a couple of years. Europe will not experience near-term LNG import growth as heightened demand in Asia is predicted to absorb new worldwide supply in 2014.[121] This increased appetite will primarily

118. Ted Sickinger, *Feds approve LNG exports from proposed Jordan Cove Energy Project in Coos Bay*, THE OREGONIAN (Mar. 24, 2014, 4:18 PM), http://www.oregonlive.com/business/index.ssf/2014/03/feds_approve_lng_exports_from.html [http://perma.cc/V3QS-CHJT] (archived May 12, 2014).

119. *See US government further delays LNG export decision*, ICIS (Mar. 30, 2012), http://www.icis.com/heren/articles/2012/03/30/9546199/us-government-further-delays-lng-export-desicion.html [http://perma.cc/X38B-Q3NL] (archived Feb. 10, 2014).

120. Matthew Daly, *Energy chief puts LNG exports on hold until studies reviewed*, THE SEATTLE TIMES (May 21, 2013, 5:54 PM), http://seattletimes.com/html/businesstechnology/2021029388_lngdelayxml.html [http://perma.cc/KYU5-KKAQ] (archived Feb. 15, 2014).

121. Chou Hui Hong, *Europe LNG Imports to Stagnate as Supply Goes to Asia: Barclays*, BLOOMBERG (Sept. 4, 2013, 2:38 AM), http://www.bloomberg

arise from China, where five new regasification plants are ready to begin operations by the end of 2014.[122] India, Malaysia, Indonesia, and Singapore may also expand LNG imports.[123] Such a leveling of imports will likely not be permanent, however, because the supply pinch is predicted to ease as the global LNG amounts are estimated to continue growing by 900 Mcf a day in 2014, driven by four new liquefaction projects coming online during the year.[124] In addition, global regasification capacity is predicted to grow by 2.8 Bcf daily next year, with all but one new regasification plant to be located in Asia.[125]

This dearth of LNG caused by sellers and shippers seeking higher profits in South America and Southeast Asia has led to the idling of LNG regasification terminals in Europe.[126] These terminals, facing a 24% decrease in deliveries in 2013, have turned to other activities, such as use as ship-fuelling stations, for other sources of income.[127] This scarcity has also led to the resurrection of a problem long familiar to seasoned oil and gas transactional lawyers: take-or-pay woes.[128] Take-or-pay clauses in the long-term purchase contracts are forcing LNG importers to accept LNG deliveries—even if demand within the continent is not there—or pay liquidated damages.[129] As a result, these take-or-pay clauses and

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.com/news/2013-09-04/europe-lng-imports-to-stagnate-as-supply-goes-to-asia-barclays.html [http://perma.cc/675H-KY9F] (archived Feb. 16, 2014).

122. *Id.*
123. *Id.*
124. *Id.*
125. *Id.*
126. Oleg Vukmanovic & Muriel Boselli, *Many European LNG terminals face idling, seek new activities*, REUTERS (Sept. 30, 2013, 6:30 PM), http://in.reuters.com/article/2013/09/20/energy-lng-europe-idINL5N0HF3KD20130920 [http://perma.cc/6V3R-XRFX] (archived Mar. 14, 2014).
127. *Id.*
128. *Id.*; Take-or-pay clauses were used by natural gas producers in long-term gas purchase contracts executed in the 1960s to 1980s as a hedge against future slackening demand by pipeline purchasers. If the purchaser took less than the minimum quantity of gas required by contract, the purchaser had to pay for gas not taken, which is known as a take-or-pay payment. If, within a set period of time from the making of the take-or-pay payment, the pipeline could take extra gas over the contractually required minimum, that extra gas would be credited against the money paid earlier on the take-or-pay agreement. As the 1980s progressed, sudden and long-lasting price declines forced pipeline companies into deepening financial strains concerning take-or-pay payments because they could not resell the great volumes of high-priced gas they were contractually obliged to take when prices were high. As a result, large volumes of take-or-pay liabilities accrued, and the inability to pay resulted in the producers bringing suit. *See* LOWE ET AL., CASES AND MATERIALS ON OIL AND GAS LAW 313–14 (6th ed. 2012).
129. *Id.*

temporary sagging demand more than 10% of ship-borne LNG arriving at European terminals continues onward to markets in Central and South America or Southwest Asia.[130]

At first blush, slack desire for LNG in Europe that leads to LNG traveling on to recipients willing to pay more simply sounds like an unproblematic classic free market reaction to global price changes. The costs to operate and maintain the idled LNG terminals, particularly in Spain, Italy, and France, however, fall on the national governments and, inevitably, the citizens of both the country with the terminal and, indirectly, the EU at large.[131] This idleness has led to approaches to Russia and Qatar to see that European terminals are used for ship-to-ship transfers and as an import hedge against a possible drop in Asian demand, and for use of LNG as a ship fuel.[132]

This lacuna of demand and prices, along with contractual woes currently putting the European regasification terminals back on their financial heels, might seem to remove the luster from the idea of American LNG exports to EU members. In Europe, several potential importers include countries attempting to wean themselves off Russian natural gas. Russia's influence in Eastern Europe is partially tied to what comes out of its pipelines.[133] Should LNG exports from the United States materialize in Europe, Gazprom may have to renegotiate contracts with its customers in Europe at more competitive rates. Various central and eastern European countries are planning on girding themselves with natural gas pipelines, such as the Baltic Gas Interconnector between Germany, Denmark, and Sweden;[134] the Baltic Pipe, a natural gas pipeline for carrying Norwegian gas from Denmark to Poland;[135] and most recently, the "Balticconnector" between Finland and Estonia.[136] While these

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130. *Id.*
131. *Id.*
132. *Id.*
133. Russia is suspected of funding environmental groups concerned with LNG imports and associated fracing. *See* Kevin Begos, *Natural gas boom in US. Is Russia the big loser?*, CHRISTIAN SCI. MONITOR (Oct. 1, 2012), http://www.csmonitor.com/Environment/Latest-News-Wires/2012/1001/Natural-gas-boom-in-US.-Is-Russia-the-big-loser [http://perma.cc/96L9-82LY] (archived Feb. 16, 2014).
134. *See Improving gas supply*, BALTIC GAS INTERCONNECTOR, http://web.archive.org/web/20080127194645/http://balticgas.com/ [http://perma.cc/6V6V-GBRB] (archived Mar. 14, 2014).
135. *Denmark and Poland considering gas pipeline*, ENERGY BUS. REV. (May 3, 2007), *available at* http://www.energy-business-review.com/news/Denmark_and_poland_considering_gas_pipeline [http://perma.cc/Y3QY-Z3S5] (archived May 12, 2014).
136. *See Estonia's Gas System Development Plan*, NATURAL GAS EUROPE (Jan. 14, 2013, 12:05 AM), http://www.naturalgaseurope.com/estonia-gas-system-development-plan [http://perma.cc/B7PD-NCZE] (archived Feb. 16, 2014).

pipelines could push Russian natural gas westward, both the individual governments and the European Union also see the possibility that these projects could help to attenuate the need for Russian gas in the Baltics and further west by bringing south natural gas from Norway and by creating a network to distribute re-gasified LNG from America.[137]

Meanwhile, Finland and the three Baltic states continued to jockey among themselves for a location for a LNG terminal that would supply natural gas for the Balticconnector undersea pipeline, which originates in North America.[138] Finland's proposal seeking $680 million in EU funding for the Finngulf LNG import terminal and a connection to the Balticconnector (proposed by the Finnish energy company Gasum) remained unsettled after the European Commission included both that bid and competing Estonian and Latvian proposals on a list for possible funding released in October 2013.[139] Senior politicians from the competing nations have spoken in favor of their own country's bids. For example, the Estonian Prime Minister said, "The [European Commission's] analysis produced an outcome favorable for Estonia."[140] The Finns, however, would like the LNG terminal to be located in the southern Finnish coastal town of Inkoo—30 miles west of Helsinki.[141] The EU, in turn, would like Finland and Estonia to decide where the LNG regasification plant goes between them and are perhaps reluctant to anger one country by picking the other.[142] Wherever the plant goes, the two countries will then be connected by the Balticconnector

137. *See* Walter Russell Mead et al., *U.S. Shale Gas Boom Undermining Putin's Gazprom*, THE AM. INTEREST (May 1, 2013, 12:30 PM), http://blogs.the-american-interest.com/wrm/2013/05/01/us-shale-gas-boom-undermining-putins-gazprom/ [http://perma.cc/SWF6-CSRH] (archived Feb. 15, 2014).

138. *Gasum: Environmental Impact Assessment for Balticconnector Starts*, LNG WORLD NEWS (Feb. 10, 2014), *available at* http://www.lngworldnews.com/gasum-environmental-impact-assessment-for-balticconnector-starts/ [http://perma.cc/6JJN-4J5Y] (archived May 12, 2014). *See also* Andres Mäe, *Liquefied Natural Gas (LNG) Terminal for Eastern Baltic*, GEOPOLITIKA (May 6, 2013), *available at* http://www.geopolitika.lt/?artc=6077 [http://perma.cc/377G-H4E3] (archived May 12, 2014).

139. *Finland OKs $168 million in funding for LNG capacity expansion*, UNITED PRESS INT'L (Oct. 19, 2013, 12:12 AM), http://www.upi.com/Business_News/Energy-Resources/2013/10/19/Finland-OKs-168-million-in-funding-for-LNG-capacity-expansion/UPI-90451382155920/ [http://perma.cc/KU6Y-LBUB] (archived Feb. 15, 2014).

140. *Location of Baltic Sea LNG terminal has to be decided by end of June*, POSTIMEES (May 16, 2013, 6:32 PM), http://news.postimees.ee/1238198/location-of-baltic-sea-lng-terminal-has-to-be-decided-by-end-of-june [http://perma.cc/EYF6-G9RP] (archived Feb. 15, 2014).

141. *Id.*

142. *Id.*

pipeline over which natural gas will be transmitted between the two countries.

Concerned about the high cost of Russian natural gas, Lithuania has its own plans for LNG imports. Lithuania is planning to either own or rent a smaller LNG importation terminal, the Lithuanian Natural Gas Terminal, in Klaipedos Harbor, to be opened in late 2014.[143] The Lithuanian project is being partially funded through a loan of €87 million (approximately $118 million) through the European Investment Bank.[144] Höegh LNG, a Norwegian company, is constructing a floating LNG storage and regasification unit (FSRU) in South Korea to be used as an LNG import terminal in Klaipeda Harbor with an annual capacity of between 2–3 billion cubic meters of natural gas.[145] In addition, the Klaipedos Nafta AB (Lithuania's state-controlled energy company) hired PPS Pipeline Systems to connect this new LNG terminal to Lithuania's natural gas grid after a court lifted a temporary ban on the agreement.[146] The link is to be a 20-kilometer (approximately 12-mile) pipeline to be completed by August 2014.[147]

VI. WORLDWIDE DEMAND

A. Qatar—the Top LNG Exporter—Slows Efforts

Qatar began exporting natural gas in 1997 when 5.7 Bcf of LNG was sent to Spain.[148] Since that time, Qatar has blossomed into the most prolific LNG exporter worldwide, producing almost 5,200 Bcf of natural gas in 2011—a tripling of its production from 2000—and resulting in LNG exports of approximately 3,600 Bcf, mostly to the

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143. Bryan Bradley, *Lithuanian LNG Terminal Gets EU Approval, Klaipedos Nafta Says*, BLOOMBERG (Nov. 19, 2013, 8:38 AM), http://www.bloomberg.com/news/2013-11-19/lithuanian-lng-terminal-gets-eu-approval-klaipedos-nafta-says.html [http://perma.cc/H2V9-RBU7] (archived Mar. 14, 2014).

144. *Id.*

145. *Hoegh to Borrow $250MM to Build FLNG Unit*, DOWNSTREAMTODAY, (Aug. 20, 2012), https://www.downstreamtoday.com/News/ArticlePrint.aspx?aid=37011&AspxAutoDetectCookieSupport=1 [http://perma.cc/M6ZU-XN5G] (archived Mar. 14, 2014).

146. Bryan Bradley, *Lithuania Hires Germany's PPS for LNG Terminal Pipeline Link*, BLOOMBERG (May 6, 2013, 9:58 AM), http://www.bloomberg.com/news/2013-05-06/lithuania-hires-germany-s-pps-for-lng-terminal-pipeline-link.html [http://perma.cc/5KZ5-UQ7G] (archived Mar. 14, 2014).

147. *Id.*

148. *Qatar Accounts for a Growing Share of LNG Exports*, U.S. ENERGY INFO. ADMIN.: TODAY IN ENERGY (Feb. 25, 2011), http://www.eia.gov/todayinenergy/detail.cfm?id=50 [http://perma.cc/VHS3-5NM2] (archived Mar. 14, 2014).

United Kingdom, China, Japan, India, and South Korea.[149] So much Qatari natural gas is produced that Qatar's 2011 condensate and NGL production surpassed one million barrels per day—more than its crude oil production.[150]

Despite this impressive history, Qatar has not constructed a new LNG train since the beginning of 2011, relying instead on additional capacity derived from improvements in existing exporting facilities.[151] This move suggests that Qatar exports may level off in the near term, a slowdown in dry gas production that became apparent in the second half of 2011 and continues today. Interestingly, although the most recent train expansions were originally constructed with U.S. markets in mind, the 2008 financial crisis and subsequent global recession, combined with persistently low U.S. natural gas prices due to shale gas, have pushed Qatar to consider contractual possibilities with a host of other countries.[152]

B. Asia: Rising Chinese Demand & Indonesian/Malaysian Retraction

In Asia, Japan—importer of the largest volume of LNG—is currently buying massive amounts of LNG for electrical generation as a result of closing its nuclear power plants in response to the Fukushima nuclear accident.[153] This wave of LNG importation, however, is expected to wane as Japanese nuclear plants are restarted.[154] India, importer of the fourth largest amount of LNG, is planning on joining Japan as an LNG importing partner in hopes of getting a bulk-rate discount due to their planned combined purchases.[155]

China represents the largest sink for future natural gas exports worldwide. Estimates for Chinese demand have recently soared as the communists' five-year plan requires adding a natural gas-

149. *Qatar*, U.S. ENERGY INFO. ADMIN. (Jan. 30, 2014), http://www.eia.gov/COUNTRIES/cab.cfm?fips=QA [http://perma.cc/6NF3-52YW] (archived Feb. 16, 2014).
150. *Id.*
151. *Id.*
152. *Id.*
153. *See* Nick Cunningham, *Market disruptor: nuclear restarts spells trouble for LNG*, MERCOPRESS (Jan. 28, 2014, 5:17), http://en.mercopress.com/2014/01/28/market-disruptor-nuclear-restarts-spells-trouble-for-lng [http://perma.cc/WBW8-F2KU] (archived Mar. 14, 2014).
154. *Id.*
155. Walter Russell Mead et al., *Poland Will Pay Anything to Rid Itself of Gazprom*, THE AM. INTEREST (Sept. 11, 2013, 8:45 AM), http://blogs.the-american-interest.com/wrm/2013/09/11/poland-will-pay-anything-to-rid-itself-of-gazprom/ [http://perma.cc/5LAM-MBH8] (archived Feb. 15, 2014).

powered electrical plant every six weeks and changing over 3.5 million residential users each year from coal and heating oil to natural gas.[156] This means that demand from China is estimated to increase by 25 Bcf per day through 2020.[157] One driver of this increase in Chinese demand is the ghastly state of air quality in some Chinese cities caused by the proliferation of primitive, coal-fired electricity plants.[158] Unrest, sometimes violent, among the Chinese populace has arisen in the affected areas stemming from this deadly pollution, causing the Chinese State Council to halt future construction of coal-fueled electricity plants in industrial areas near Beijing, Guangzhou, and Shanghai.[159]

While the Chinese plan to meet most of this increase in natural gas usage by tapping their own natural gas reserves—including unconventional plays—the latest Chinese five-year plan calls for 20% of this demand to be made up by imported LNG, requiring an estimated increase in Chinese consumption of natural gas over 2012 levels by 5 Bcf per day.[160] This increase in demand is estimated to represent approximately 10–15% of the estimated worldwide increase in natural gas consumption over the same period.[161] In any event, at least one commentator is nearly certain that predicted models of Chinese demand for natural gas over the next ten years or longer are going to be much higher than previously predicted.[162]

Demand in China will not be easily slaked by growth in regional exports. The third largest LNG exporter, Indonesia, possessor of the largest economy in Southeast Asia and until recently believed to remain a significant exporter of LNG to China, has begun to see both significant declines in reserves and an increase in domestic demand, with 285 projected cargoes in 2013, down from 318 cargoes in 2012.[163] One senior Indonesian government official has

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156. *See* Weissman, *supra* note 29, at 46.
157. *Id.*
158. *Id.*
159. *See id.*; *see also China sentences 16 for violent protest against pollution*, REUTERS (Feb. 7, 2013, 5:08 AM), http://www.reuters.com/article/2013/02/07/us-china-protest-sentences-idUSBRE9160BM20130207 [http://perma.cc/VX7E-AHAH] (archived Feb. 15, 2014).
160. *Id.*
161. *Id.*
162. *Id.*
163. Fergus Jensen, *Indonesia Raises 2013 LNG export target by 4 pct—regulator*, REUTERS (Nov. 12, 2013, 6:18 AM), http://www.reuters.com/article/2013/11/12/lng-indonesia-exports-idUSL4N0IX2UC20131112 [http://perma.cc/UE4J-BGPW] (archived Mar. 14, 2014); *see also Indonesia's 2013 LNG exports set to drop 13.8 pct—regulator*, REUTERS (Dec. 6, 2012, 5:00 AM), http://www.reuters.com/article/2012/12/06/lng-indonesia-exports-idUSL4N09G1

stated that Indonesia will become an LNG importer by 2018, predicting that rising domestic demand, combined with long-term natural gas purchase contracts that will require continued exports to countries that invested in Indonesian projects, such as Japan, will require importation of LNG for domestic use.[164]

Malaysia, currently the world's second largest exporter of LNG, has begun to import LNG as well, completing its first LNG re-gasification terminal in May of 2012.[165] Imports to Malaysia then began in late 2012 despite Malaysia's large domestic gas reserves.[166] While the necessity of imports was explained as a response to a short-term contraction of domestic supply, this scarcity actually stemmed from long-term low prices dampening internal exploration and development.[167] Regardless, Malaysia has been active in increasing its exporting capabilities.[168]

C. Africa & Other Suppliers

A number of analysts note that, since at least 50 new LNG trains are currently planned worldwide,[169] the world may face soft prices for LNG for the near-term future, but prices steadily rise again as usage and Russian-stirred turmoil continues.[170] While this may be

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RU20121206 [http://perma.cc/FW92-66CU] (archived Feb. 15, 2014) (citing decline in reserves).

164. Fitri Wulandari & William Mellor, *Indonesia to Import LNG by 2018 as Demand Rises, Migas Says*, BLOOMBERG (Mar. 6, 2013, 6:06 AM), http://www.bloomberg.com/news/2013-03-06/indonesia-to-import-lng-by-2018-as-demand-rises-regulator-says.html [http://perma.cc/9A9T-EPPP] (archived Feb. 15, 2014).

165. *Malaysia Completes First LNG Import Terminal*, LNG WORLD NEWS (Jun. 5, 2013), http://www.lngworldnews.com/malaysia-completes-first-lng-import-terminal/ [http://perma.cc/82UP-LCXG] (archived Feb. 15, 2014).

166. *World gas: EIU's monthly LNG outlook*, THE ECONOMIST INTELLIGENCE UNIT 5 (Feb. 21, 2013), http://www.cmegroup.com/education/files/eiu-japan-china-driving-global-demand-2013-02-28.pdf [http://perma.cc/8NTQ-78UC] (archived Mar. 18, 2014).

167. *Id.*

168. *Id.* at 5–6.

169. Pat Roberts, *About Commercial Negotiations for Gas and LNG Projects*, *available at* http://www.cwcschool.com/commercial-negotiations-gas-lng-projects/.

170. *See* Keith Schaefer, *Behind the Numbers in the Surging Global LNG Market*, OILPRICE.COM (June 20, 2013, 9:59 PM), http://oilprice.com/Energy/Natural-Gas/Behind-the-Numbers-in-the-Surging-Global-LNG-Market.html [http://perma.cc/LV7M-CW87] (archived May 12, 2014) (describing the enormous growth in projected worldwide LNG exporting capacity); *See also* Chris Nelder, *Oil and Gas Price Forecast for 2014*, SMARTPLANET (Jan. 6, 2014), http://www.smartplanet.com/blog/the-take/oil-and-gas-price-forecast-for-2014/ [http://perma.cc/94G8-7FDY] (archived May 12, 2014) (describing rise in worldwide demand for natural gas); William Watts, *After Crimea secession vote, what's next for markets*,

true, recent developments suggest that a combination of higher-than-anticipated costs for "greenfield" LNG exporting projects,[171] increases in natural gas production costs, and declines in reserves could steer investment toward "brownfield" projects in the United States.[172] The proposed LNG exporting projects in the United States—found mostly in Louisiana and Texas—are now considered to be potentially among the lowest-cost suppliers in the world, making such projects attractive for importers worldwide in striking contrast to contemplated similar greenfield exporting facilities in Angola, Australia, Malaysia, and Nigeria.[173]

African exports are led by Nigeria, second only to Qatar in LNG exports.[174] LNG exporting operations are conducted by Nigeria LNG Limited, a company jointly owned by the national oil company, and the Nigerian National Petroleum Corporation, alongside minority stakeholders Shell Gas BV, Total LNG Nigeria Limited, and Eni International. Nigeria LNG Limited supplies approximately 10% of global LNG imports.[175] Recent events in Nigeria, however, highlight the chronic political problems encountered with LNG imports and exports, such as the month-long LNG import and export ban placed

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WALL ST. J.: MARKET WATCH (Mar. 16, 2014, 3:57 PM), http://www.marketwatch.com/story/what-sundays-crimea-vote-means-for-markets-2014-03-14 [http://perma.cc/GN5T-H3KS] (archived May 12, 2014).

171. A "greenfield" LNG project is one built where no prior natural gas-related infrastructure is located. Compared to "brownfield" projects, 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. *See* Yadullah Hussain, *How Russia's energy sector is eyeing a bigger game beyond the Olympics*, FINANCIAL POST (Jan. 30, 2014, 3:42 PM), http://business.financialpost.com/2014/01/30/how-russias-energy-sector-is-eyeing-a-bigger-game-beyond-the-olympics/?__lsa=2e3f-6d52 [http://perma.cc/EQ56-UUZV] (archived Mar. 14, 2014); *see also Low Henry Hub Prices Will Not Persist, Say US Firms*, ARGUS (Oct. 14, 2013, 4:45 PM), http://www.argusmedia.com/pages/NewsBody.aspx?id=869510&menu=yes [http://perma.cc/W5A2-H3SZ] (archived Mar. 14, 2014).

172. *See* Weissman, *supra* note 29 (noting that a "brownfield" LNG exporting project is one that is built where natural gas facilities, such as LNG regasification plants, refineries, and associated large pipeline networks, already exist).

173. *Id.*

174. Udenna Orji, *Nigeria Set to Become World's Second-largest LNG Supplier – Official*, DOWNSTREAMTODAY (Sept. 28, 2009), http://downstreamtoday.com/news/article.aspx?a_id=18395 [http://perma.cc/8GF3-MZK9] (archived Feb. 15, 2014).

175. *Nigeria LNG exports landmark 3000th cargo*, THE NIGERIAN VOICE (Jan. 7, 2014, 4:00 PM), http://www.thenigerianvoice.com/nvnews/133608/1/nigeria-lng-exports-landmark-3000th-cargo.html [http://perma.cc/Q3HT-E6Y6] (archived Mar. 14, 2014).

by the Nigeria government on cargos entering or leaving the main LNG train in the Niger Delta.[176]

VII. LOST OPPORTUNITY

For U.S. exporters, however, time may be of the essence, as new shale reserves are being found almost monthly worldwide, potentially opening the door to LNG exporting for rival countries. Since LNG is typically sold via long term contracts and utilizes expensive facilities, once another exporter steps up to sell LNG and infrastructure investment goes elsewhere, the door may be closed for U.S. exports. This author speculates that one effect of the "LNG paradigm" may be that, if multiple countries develop shale gas fields at the same time, and some of them streamline the regulatory process for unconventional gas development and LNG export while others do not, the countries that promote development will enjoy not only the immediate economic benefits but also will do so for some time afterward due to the long-term nature of the gas purchase agreements made necessary by the "LNG paradigm." Of course, other factors, such as geography, gas prices, and politics, could depress the importance of the regulatory process of a particular country.

Other nations are ahead of America regarding natural gas exports and are securing the best customers. For example, Norway is already exploiting gas reserves in the Arctic as the Norwegian firm StatoilHydro ASA pumps natural gas from the Snøhvit field in the Barents Sea, condenses it into liquid, and exports it to the rest of Europe.[177]

Eastern Europe may provide perhaps the most fertile field in which to seed long-term American exports given the intense dislike of (often bellicose) Russian hegemony in natural gas exports and a generally favorable impression of America friendship. Poland, desperate to wean itself off Russian natural gas, is contemplating paying 40–50% more for natural gas from Qatar than it currently pays for gas from Gazprom.[178] Poland is currently constructing an LNG regasification terminal to be completed in 2015 and intends to

176. Olgu Okumuş, *Lessons Europe Can Learn from Nigeria's LNG Export Blockage*, NATURAL GAS EUROPE (Aug. 1, 2013, 12:00 AM), http://www.naturalgaseurope.com/lessons-europe-can-learn-from-nigerias-lng-export-blockage [http://perma.cc/5HQ7-V32S] (archived Feb. 15, 2014).

177. Chris Kulander & Sergei Lomako, *The Arctic is White Hot*, OIL, GAS & ENERGY LAW INTELLIGENCE, Feb. 2012, at 27 (noting that no liquefied natural gas from the Arctic had ever been produced before the project).

178. *See* Mead et al., *supra* note 155.

replace 13.5% of its Russian natural gas imports with LNG from Qatar, currently the largest natural gas exporter.[179]

After being the victim of sudden cessations of Russian natural gas imports on multiple occasions, such as winter stoppages that roiled natural gas markets all over Europe,[180] Ukraine has doubled its imports from its western and northern European neighbors, helping to reduce Russian gas imports by 30% in 2013.[181] Further reductions are projected in 2014.[182] Bulgaria, which currently receives 87% of its natural gas from Russia and is susceptible to curtailment when Russia cuts exports to the Ukraine, is attempting to leverage a link to the coming Trans-Adriatic Pipeline from Turkey to Italy in an effort to lower its Russian imports of natural gas to 50% of its total import volume.[183] Romania, another importer of Russian natural gas, is both considering development of its own reserves[184] and expanding its capacity for electricity generated by nuclear power.[185]

Despite the current dip in European LNG import volumes and temporary soft natural gas prices, the positives of American LNG exports to Europe far outweigh the negatives. The long-term enticements of European political stability, ready infrastructure, a desire by Eastern European countries to lessen their dependence on Russian imports, and the geopolitical dividends that could be incurred by American imports would combine with the need to take

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179. *Id.*

180. *Ukraine gas row hits EU supplies*, BBC NEWS (Jan. 1, 2006, 6:06 PM), http://news.bbc.co.uk/2/hi/europe/4573572.stm [http://perma.cc/TPW4-VP4F] (archived Feb. 15, 2014).

181. Pavel Polityuk & Olzhas Auyezov, *Ukraine snubs Russian gas for European imports*, REUTERS (Aug. 19, 2013, 12:49 PM), http://uk.reuters.com /article/2013/08/19/uk-ukraine-russia-gas-idUKBRE97I0FM20130819 [http://perma .cc/6LVP-G43Q] (archived Feb. 15, 2014).

182. *Id.*

183. Veronica Navarro Espinosa & Elizabeth Konstantinova, *Bulgaria Seeks to Cut Russia Gas Imports to Ensure Supply*, BLOOMBERG (Sept. 26, 2013, 1:24 PM), http://www.bloomberg.com/news/2013-09-26/bulgaria-seeks-to-cut-russia-gas-imports-to-ensure-supply.html [http://perma.cc/D8KZ-EWLS] (archived Feb. 15, 2014).

184. Currently, Chevron has several licenses for shale exploration in Romania, Poland, and Bulgaria. Hungary's MOL and Canada's East West Petroleum also have drilling agreements with Romania's Mineral Resources Agency that await government approval. *See generally* Eoin O'Cinneide, *Chevron resumes Romania shale gas work*, UPSTREAM (Dec. 2, 2013, 3:04 AM), http://www.upstream online.com/live/article1345315.ece [http://perma.cc/D4XA-KX8W] (archived Mar. 14, 2014).

185. Margarita Assenova, *Bulgaria and Romania: Pursuing Energy Security in a Changing Environment*, CENTER FOR EUR. POL'Y ANALYSIS (July 2, 2013), http://www.cepa.org/content/bulgaria-and-romania-pursuing-energy-security-changing -environment [http://perma.cc/793E-4L2V] (archived Feb. 15, 2014).

natural gas off the market in America via exports to raise domestic prices to create excellent long-term trade opportunities with negligible downside.

So how fast can the United States respond to this steadily increasing worldwide thirst for LNG? Much of the answer depends on the speed of federal approval of LNG exporting facilities. As described above, the DOE approval process is time-consuming and generates frustration. As is often typical, proposed responses bracket the problem widely on both sides, with one solution calling for a firm volumetric national limit on LNG exports and another calling for quick approval for all proposed projects, whether or not there exists a free trade agreement in place with the country targeted for exports.[186] The first response smacks of ham-fisted government planning that is not responsive to market forces. The second may lead to the problems contemplated by both industrial users and residential users who are opposed to LNG exports: high prices and a "bubble" of LNG exporting infrastructure. One brace of commentators suggests that the DOE should define "public interest" more concretely when considering proposals and approve only those projects that have undergone the FERC pre-filing process and have secured a certain critical minimum of contractual natural gas supply because this would help ensure that only "serious" projects are proposed.[187] This would be advantageous since the DOE claims it considers LNG project applications in the order in which they are received. Additionally, the DOE may consider all projects, both existing or merely proposed, when determining the total amount of LNG that may be exported. If they approve whatever specific project they are currently considering, projects that are unlikely to go forward will be less likely to be proposed.

Recent events suggest, however, that companies are perhaps more quickly responsive than government permitting to market forces. For example, in December 2013, after years of consideration, Royal Dutch Shell announced it had given up on its plan to construct a plant in southern Louisiana that would have created LNG for export and provided fuels like diesel for domestic and international markets largely because the project's estimated cost had jumped from $12.5 to $20 billion.[188] Stung by cost overruns for a similar plant in Qatar, Shell is believed to have cancelled the plant because

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186. EBINGER & AVASARALA, *supra* note 107, at 5.

187. *Id.*

188. James Burgess, *Shell Abandons Plan to Build Giant Gas-to-Liquids Plant in the US*, OILPRICE.COM (Dec. 8, 2013), http://oilprice.com/Latest-Energy-News/World-News/Shell-Abandons-Plan-to-Build-Giant-Gas-to-Liquids-Plant-in-the-US.html [http://perma.cc/RY8K-C8XR] (archived Feb. 16, 2014).

of soft U.S. gas prices, the high cost of construction, and the cheaper alternative of offshore gas liquefying facilities.[189] Such careful study and the willingness to stop an expensive project suggest industry can curtail excess capacity without lengthy parallel government determinations.

VII. CONCLUSION

Natural gas is much more palatable environmentally than coal because gas releases less harmful emissions when burned. In fact, natural gas has been shown to contribute less than half the CO_2 to the atmosphere of coal when burned.[190] This fact alone could result in widening natural gas production being responsible for a significant reduction in those global greenhouse gases thought to contribute to global warming.[191] In addition, coal plants contribute much more particulate matter into the atmosphere than electric plants powered by natural gas,[192] leading to particulate-laden smog and haze like that which currently shrouds so many Chinese cities in a choking miasma.[193]

Over the next couple of decades, most of the new demand for electricity will come from developing countries.[194] Since those in "undeveloped countries"[195] self-evidently have as much a right to

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189. *Id.*

190. Mark Bittman, *Is Natural Gas 'Clean'?*, N.Y. TIMES: OPINIONATOR (Sept. 24, 2013, 9:05 PM), http://opinionator.blogs.nytimes.com/2013/09/24/is-natural-gas-clean/?_r=0 [http://perma.cc/MPA2-NSFA] (archived Feb. 16, 2014).

191. *Id.* (highlighting another potential problem dogging natural gas proponents: alleged methane leaks in the natural gas production stream that could result in making natural gas as "dirty" as coal with regards to the global warming threat and noting that a multitude of studies have been/are being conducted to measure these emissions).

192. *See generally Natural Gas and the Environment*, NATURALGAS.ORG, http://naturalgas.org/environment/naturalgas/ [http://perma.cc/N6J4-WYTX] (archived Mar. 14, 2014).

193. Bryan Walsh, *In China's Polluted Cities, the Smog May Be Here to Stay*, TIME (Oct. 21, 2013), http://world.time.com/2013/10/21/in-chinas-polluted-cities-the-smog-may-be-here-to-stay/ [http://perma.cc/76TP-5BCY] (archived Mar. 14, 2014).

194. *See* Catherine Wolfram et al., *How Will Energy Demand Develop in the Developing World?* 1 (Energy Inst. at Haas, Working Paper No. 226, 2012), *available at* http://ei.haas.berkeley.edu/pdf/working_papers/WP226.pdf [http://perma.cc/8BTH-D8MQ] (archived Feb. 16, 2014) (citing Energy Information Administration data that suggests nearly all of the growth in energy demand, fossil fuel use, associated local pollution, and greenhouse gas emissions is forecast to come from the developing world through 2035).

195. The terms "developing countries" or "undeveloped countries" are being used synonymously in this article as those countries not currently in the Organization for Economic Co-operation and Development (OECD).

establish and provide themselves electrical services as those in the developed world, and since coal is cheap, plentiful, and relatively easy to use for power generation, it is to be expected that much of the future generating activity in developing countries will arise from coal-fired power plants.[196] Renewables are prohibitively expensive and simply cannot provide, by themselves with current technology, anywhere near the power most countries need.[197] Natural gas use in these countries, as an alternative to coal, delivered from the United States in the form of LNG, provides not only a customer base for American producers and shippers but also a means to curtail future coal use and contribute to lowering CO_2 emissions, *provided only* that it can be provided on a cost-effective basis.[198]

Proponents of LNG exports cite the boost to the economy that establishing the necessary infrastructure—trains, pipelines, and ships—will provide.[199] A 2012 DOE-commissioned study concluded that LNG exports would provide an overall net economic boost across the U.S. economy.[200] Effects of LNG exports and potentially higher natural gas prices on the U.S. economy at large have been examined and downplayed.[201]

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. This author hopes that the decision makers keep in mind the words of former Senate Committee on Energy and

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196. *See* MEDIUM-TERM COAL MARKET REPORT 2012, INT'L ENERGY AGENCY 1 (2012), http://www.iea.org/publications/freepublications/publication/MTCoalMR2012_free.pdf [http://perma.cc/7YQJ-N96J] (archived Feb. 16, 2014).

197. *See* TED TRAINER, RENEWABLE ENERGY CANNOT SUSTAIN A CONSUMER SOCIETY 2–5 (2007).

198. *See* Michael Kopalek & Tejasvi Raghuveer, *Multiple Factors Push Western Europe to Use Less Natural Gas and More Coal*, U.S. ENERGY INFO. ADMIN. (Sept. 27, 2013), http://www.eia.gov/todayinenergy/detail.cfm?id=13151 [http://perma.cc/L975-EWYT] (archived Feb. 16, 2014) (citing higher prices being paid by Asian importers as a driver of rising LNG prices in Europe during 2012 causing, in turn, an increase in European coal use).

199. *See* EBINGER & AVASARALA, *supra* note 107, at 3.

200. MACROECONOMIC IMPACTS OF LNG EXPORTS FROM THE U.S., NERA ECONOMIC CONSULTING 77 (2012), http://energy.gov/sites/prod/files/2013/04/f0/nera_lng_report.pdf [http://perma.cc/X4LB-LJUZ] (archived Feb. 16, 2014).

201. *See* Charles Ebinger & Govinda Avasarala, *The Case for US LNG Exports*, OXFORD ENERGY FORUM, Feb. 2013, at 6, *available at* http://www.oxfordenergy.org/wpcms/wp-content/uploads/2013/05/OEF_-91.pdf [http://perma.cc/KE76-QQXH] (archived Mar. 15, 2014) (noting that high natural gas prices in the early 2000s led to exploration for—and discovery of—large onshore volumes of unconventional natural gas reserves are suggestive that American industry will remain competitive regardless of the LNG export policy of the United States).

Commerce Chairman J. Bennett Johnson, whose March *Wall Street Journal* editorial, "Natural Gas Exports and the Mythical 'Sweet Spot'" recollected the mid-1970s oil crisis: "experience has shown that [the free market] is a better allocator and regulator than bureaucrats and politicians."[202]

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202. J. Bennett Johnston, *Natural Gas Exports and the Mythical 'Sweet Spot'*, WALL ST. J., Mar. 5, 2013, at A19.