

# ARTICLE

## THE POWER STRUCTURE: ENERGY, POLITICS, AND THE PUBLIC INTEREST IN THE LNG DEBATE

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## I. INTRODUCTION

Energy must surely be a top contender for the defining attribute of today's world.<sup>1</sup> Energy, or power, has transformed our world from the early-to-bed, early-to-rise ethic of an agrarian society to the always-on life and economy of urban-style overdrive. Consider how our energy is spent: from all-night grocery stores to video games, from racecar tracks to jet runways—our world vibrates with light, energy, and purpose. Street lights, neon signs, and downtown skyscrapers present a spectacular show, blurred by the haze from power plants that make the show possible. Viewing the planet in photos from space, one sees first and primarily the light of energy consumption. The earth glows; a globe of shimmering light and color spinning in the dark. One zoom lens closer and we see that our planet looks like the inside of a pinball machine: life in miniature, organized and electric.

If energy consumption animates our way of life, the quest for energy defines the world's political agenda. Energy provides the backbone of the global economy and animates the foreign policy of all major players on the world stage. In short, the power to control energy is the power to control the destiny of modern civilization. The production and use of fossil fuel brings dangers as well as power, however. In February of 2007, the Intergovernmental Panel on Climate Change made clear that the need to limit carbon emissions into the atmosphere is urgent.<sup>2</sup> “In a grim and powerful assessment of the future of the planet, the leading international network of climate scientists has concluded

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1. The search for a defining aspect of a civilization is irresistible, perhaps because it appears to impose order on an otherwise chaotic mental landscape. For example, we associate the Romans with conquest, the Greeks with government, and the Renaissance with exploration, both geographical and intellectual. The spiritual connectedness of Native Americans with nature may be the central attribute most associated with North American society prior to European settlement.

2. Elisabeth Rosenthal & Andrew C. Revkin, *Science Panel Calls Global Warming 'Unequivocal'*, N.Y. TIMES, Feb. 3, 2007, at 1.

for the first time that global warming is “unequivocal” and that human activity is the main driver, “very likely” causing most of the rise in temperatures since 1950.”<sup>3</sup> This article considers one discrete but important aspect of today’s energy debate: the move of the United States toward investment in liquefied natural gas (“LNG”) as a continuation of its program to develop fossil fuels as a primary energy source for the twenty-first century. Part II of this Article discusses factors motivating the development of LNG as a major energy source world-wide and the growing interest in LNG importation to the United States. Part III summarizes the energy consumption choices that frame the LNG debate. Part IV examines environmental risks and other costs associated with LNG development. Part V assesses the public interest at stake, noting the need for vetting individual LNG facilities on a case-by-case basis and the general desirability of sitings remote from population centers. Part VI concludes with observations about the inescapable mix of policy and science in national energy choices and the need for full assessment of the costs of such energy choices, whether those costs are borne primarily by current or future generations.

## II. LNG: ENERGY FOR THE NEAR TERM

The Federal Energy Regulatory Commission (“FERC”) defines LNG as “liquefied natural gas (methane) that has been cooled to an extremely cold temperature (-260 °F/ -162.2 °C).”<sup>4</sup> LNG is a form of natural gas that has been converted into liquid form by cooling the gas to compress its volume by approximately six hundred times for the process of transport.<sup>5</sup> Because LNG is volatile, shipment requires double-walled cryogenic containers.<sup>6</sup> When LNG reaches its destination, it is converted back to gaseous form and transported by pipeline or tankers to its ultimate destination.<sup>7</sup> LNG is poised to become a major energy

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3. *Id.*

4. FERC, For Citizens—LNG Overview, <http://www.ferc.gov/for-citizens/citizen-guides/lng.asp> (last visited Apr. 14, 2007) [hereinafter FERC For Citizens] (“At standard atmospheric conditions, methane is a vapor, not to be confused with gasoline, which is a liquid.”).

5. ENERGY INFO. ADMIN., U.S. DEP’T OF ENERGY, U.S. LNG MARKETS AND USES: JUNE 2004 UPDATE 4, n.5 (2004) [hereinafter U.S. LNG MARKETS AND USES], [http://www.eia.doe.gov/pub/oil\\_gas/natural\\_gas/feature\\_articles/2004/lng/lng2004.pdf](http://www.eia.doe.gov/pub/oil_gas/natural_gas/feature_articles/2004/lng/lng2004.pdf) (noting the volume of natural gas in liquid form is 610 times lower than in gaseous form, which makes it more convenient for transportation).

6. Ann Powers & Odin Smith, *Emerging Ocean Issues: Liquefied Natural Gas*, in OCEAN AND COASTAL LAW AND POLICY ch. XVII (forthcoming 2007) (citing Judy Benson, *Afloat in the Sound*, THE DAY, Nov. 6, 2005, <http://www.theday.com/eng/web>).

7. FERC For Citizens, *supra* note 4. This site explains that:

source.<sup>8</sup> Moreover, the United States appears likely to emerge as the largest importer of liquefied natural gas.<sup>9</sup> The world supply of natural gas far exceeds the supply of crude oil, and the comparatively low costs associated with transportation of LNG enhance its viability as a primary source of energy.<sup>10</sup>

Part of the increase in demand for natural gas comes from its emergence as the prime fuel for new power generation stations because gas is cheaper, cleaner, and emits less carbon dioxide (“CO<sub>2</sub>”) than coal.<sup>11</sup> The U.S. leads the world in natural gas consumption, sometimes using up to a quarter of the world’s production.<sup>12</sup> FERC estimates the portion of energy supplied by natural gas to be “almost one-fourth of all energy consumed in the United States . . . .”<sup>13</sup> A significant portion of U.S. homes use natural gas. During 2005, “about 57% of 110 million U.S. households heat[ed] with natural gas, which ha[d] risen above \$13 per million Btu from around \$7.”<sup>14</sup> The current cost of LNG is

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Ships unload LNG at specially designed terminals where the LNG is pumped from the ship to insulated storage tanks at the terminal. LNG is also converted back to gas at the terminal, which is connected to natural gas pipelines that transport the gas to where it is needed. Specially designed trucks may also be used to deliver LNG to other storage facilities in different locations.

*Id.*

8. ENERGY INFO. ADMIN., THE GLOBAL LIQUEFIED NATURAL GAS MARKET: STATUS & OUTLOOK (2006), [http://www.eia.doe.gov/oiaf/analysispaper/global/pdf/eia\\_0637.pdf](http://www.eia.doe.gov/oiaf/analysispaper/global/pdf/eia_0637.pdf).

Liquefied natural gas (LNG) is expected to play an increasingly important role in the natural gas industry and global energy markets in the next several years. The combination of higher natural gas prices, lower LNG costs, rising gas import demand, and the desire of gas producers to monetize their gas reserves is setting the stage for increased global LNG trade.

*Id.*

9. Simon Romero, *Qatar Finds a Currency of Its Own: Natural Gas*, N.Y. TIMES, Dec. 22, 2005, at C1.

10. Wesley Loy, *Supplying Demand for Natural Gas*, ANCHORAGE DAILY NEWS, July 30, 2006, <http://www.adn.com/money/story/8021976p-7915010c.html>.

11. Jacqueline Lang Weaver, *The Traditional Petroleum-Based Economy's Eventful Future: Of Peak Oil, Big Oil, Chinese Oil, Flags and Open Doors*, 36 CUMB. L. REV. 505 (2006).

12. See Powers & Smith, *supra* note 6 (citing ENERGY INFO. ADMIN., INTERNATIONAL ENERGY ANNUAL (2003), <http://www.eia.doe.gov/iea/contents.html>).

13. FED. ENERGY REGULATORY COMM’N, A GUIDE TO LNG: WHAT ALL CITIZENS SHOULD KNOW 1, available at <http://www.ferc.gov/for-citizens/citizen-guides/citz-guide-lng.pdf>.

14. Rebecca Smith & Russell Gold, *Cold Spell: Years of Short-Term Strategy Create a Crunch in Natural Gas*, WALL ST. J., Oct. 17, 2005, at A1; see also Bill Trotter, *Terminal Velocity: LNG Industry Sets a Course for Washington County*, BANGOR DAILY NEWS, Dec. 10, 2005, at 1 (explaining that “[o]ne Btu is the energy needed to raise the temperature of 1 pound of water 1 degree Fahrenheit,” and noting that “[a]pproximately 820,000 Btu is the equivalent of 1,000 cubic feet of natural gas”).

high, partially in response to rising consumption.<sup>15</sup> Estimates of the market share of energy sales represented by LNG vary. In 2004, worldwide LNG sales made up 27.4% of global natural gas sales, which totaled 180 billion cubic meters.<sup>16</sup>

Moreover, worldwide interest in natural gas is growing as supplies of oil diminish, and as a result several countries are developing active export programs in LNG.<sup>17</sup> Despite concerns about dependence on foreign resources, the United States seems likely to emerge as the largest importer of LNG.<sup>18</sup> Until recently, the liquefaction and transportation expenses discouraged the development of LNG import terminals.<sup>19</sup> In fact, four LNG facilities served the U.S. import market, and with only one recent exception, it has been roughly twenty-five years since a new has been built.<sup>20</sup> Currently, however, Shell Oil and TransCanada Pipeline are proposing a major LNG import terminal in Long Island Sound,<sup>21</sup> and many additional sites are currently in the

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15. FED. ENERGY REGULATORY COMM'N, HIGH NATURAL GAS PRICES: THE BASICS 2 (2006) [hereinafter HIGH NATURAL GAS PRICES: THE BASICS], available at <http://www.ferc.gov/legal/staff-reports/high-gas-prices.pdf> (noting that "[n]atural gas prices have reached historically high levels"); Joseph T. Kelliher, Chairman, Fed. Energy Regulatory Comm'n, Statement of Introduction of Natural Gas Panel (Oct. 20, 2005), available at <http://www.ferc.gov/press-room/statements-speeches/kelliher/2005/10-20-05-kelliher.pdf> (noting that "natural gas prices will be significantly higher this winter," and reporting that the Energy Information Administration "estimated the average consumer's natural gas bill may be as much as 48 percent higher this winter than last, if there is an average winter and if the Gulf Coast infrastructure is largely repaired by then"); see Cohen *infra*, note 28 (estimating natural gas prices to rise by fifty percent).

16. *Russia's Gazprom Welcomes LNG Export Duty Decision*, PRIME-TASS ENGLISH-LANGUAGE BUSINESS NEWSWIRE, Dec. 14, 2005 [hereinafter *Russia's Gazprom*].

17. FERC For Citizens, *supra* note 4 ("Algeria, Malaysia, Qatar and Trinidad are the leading exporters of LNG").

18. Romero, *supra* note 9, at C1.

19. Trotter, *supra* note 14, at 1.

20. *Id.*; FERC, Existing and Proposed North American LNG Terminals, <http://www.ferc.gov/industries/lng/indus-act/terminals/exist-prop-lng.pdf> (last visited Apr. 10, 2007) [hereinafter Existing and Proposed North American LNG Terminals] (showing the four locations are Everett, Massachusetts; Cove Point, Maryland; Elba Island, Georgia; and Lake Charles, Louisiana); Excelerate Energy, Gulf Gateway Deepwater Port, [http://www.excelerateenergy.com/gulf\\_gateway.php](http://www.excelerateenergy.com/gulf_gateway.php) (last visited Apr. 10, 2007) (describing a LNG terminal that was built 116 miles off the Louisiana shore and completed in February 2005).

21. Citizen's Campaign, Broadwater: Liquefied Natural Gas Facility Endangers Long Island Sound, Project Overview, <http://www.citizenscampaign.org/campaigns/broadwater.htm> (last visited Apr. 10, 2007). The facility would be located nine miles off the shore of Rocky Point, Long Island and eleven miles from the shore of Connecticut. This facility would be as big as the Queen Mary II and would be on a mooring system, the base of the system would cover an area of 7,000 square feet on the bottom of the Sound. The facility would move depending on the tides and the currents in the Sound. The LNG barge would require a twenty-two mile pipeline dug into the bottom of the Sound to connect the facility to the existing Iroquois pipeline. Two to three large

offing. The increase in the cost of domestic natural gas has made importation of LNG more financially viable.<sup>22</sup> The price of other fuels and the lower transportation costs of LNG combine to make LNG the favorite for those committed to fossil fuel as the energy source of choice.<sup>23</sup>

FERC Chairman Kelliher reported that the EIA predicted “overall natural gas deliveries to consumers [to] be 3 percent less” in the 2005–2006 winter than the 2004–2005 winter.<sup>24</sup> Industry experts present differing views of increases in both the price and demand of natural gas in the future.<sup>25</sup> Increased costs seem likely over the long term. Strategies and policies that drove natural-gas utilities to focus on the short term made sense in the 1990s, when prices were falling and a long era of cheap natural-gas was expected, but price hits are more quickly passed along to consumers when supplies tighten.<sup>26</sup> Currently, most natural gas used in the United States is produced domestically.<sup>27</sup> About eighty-four percent of natural gas pumped into homes and businesses is domestically produced, with an additional thirteen percent imported from Canada.<sup>28</sup> Increased use of LNG will depend on importation of LNG from other countries. “Rising fuel prices and demand make importing more natural gas an economic necessity.”<sup>29</sup> Moreover, increased demand seems inevitable: “[t]he demand for natural gas in the U.S. has been exceeding supply for most of the decade. In fact, natural gas usage is increasing while U.S. production is falling.”<sup>30</sup>

Interest in developing sites for natural gas production is

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tankers per week would deliver LNG to the facility, taking up to fifteen hours to offload. Since LNG is an explosive gas, there would be an approximately one-mile radius around the facility that would become the first “public no access zone” on the Sound. *Id.*

22. Trotter, *supra* note 14, at 1.

23. *Russia's Gazprom*, *supra* note 16 (noting that LNG contains “mostly methane and low concentrations of other hydrocarbons”); Editorial, *A Terminal Case*, L.A. TIMES, Nov. 28, 2005, at B10 (noting that liquid form of LNG facilitates shipping the product from overseas); U.S. LNG MARKETS AND USES, *supra* note 5.

24. Kelliher, *supra* note 15.

25. *Cambridge Energy Research: Forecast Doesn't Call for Peak in Oil Supply Before 2020*, WALL ST. J., Dec. 8, 2005, at A13 (noting that it “sees no evidence to suggest peak in world oil supply before 2020,” and predicting an “increase in unconventional oils, including condensates and natural gas liquids, will help boost capacity by up to 25% in next 10 years”).

26. See Smith & Gold, *supra* note 14, at A1.

27. NaturalGas.org, Natural Gas Supply, <http://www.naturalgas.org/business/analysis.asp> (last visited Apr. 10, 2007).

28. See Stephanie I. Cohen, *Natural-Gas Bills Forecast to Rise By 50% in Winter*, WALL ST. J., Oct. 12, 2005, at D3.

29. *A Terminal Case*, *supra* note 23, at B10.

30. FERC, LNG—Issues, <http://ferc.gov/industries/lng/indus-act/issues.asp> (last visited Apr. 10, 2007).

high, as is cultivation of business links to the countries rich in natural gas. One example of industry enthusiasm for development of LNG is found in Exxon Mobil's development of a relationship with the small nation of Qatar.<sup>31</sup> Qatar is "working with Western energy companies and Asian shipping concerns in the construction of an immense industrial complex in Ras Laffan near the maritime border with Iran, about an hour's drive through the scorching desert north of Doha."<sup>32</sup>

The intensity of interest has spiked as a result of gas supply and oil production disruptions of 2005 and the increased use of natural gas for new electric power generation stations as a cheaper and cleaner energy resource.<sup>33</sup> The Energy Department significantly increased its projection for oil prices in twenty years.<sup>34</sup> The price of LNG has also risen as a result of these disruptions, and natural gas prices are likely to continue to rise.<sup>35</sup> Fluctuations in price are expected, particularly when there is uncertainty in the infrastructure necessary to import LNG.<sup>36</sup> Analysts predict that natural gas prices in countries like the United States and Britain could fall sharply by 2007, as large

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31. Romero, *supra* note 9 (quoting Wayne A. Harms, ExxonMobil's President of Operations in Qatar, as saying, "We're building what might be the largest plant facility anywhere in the world," and noting that ExxonMobil is the largest foreign investor in the country).

32. *Id.* (noting that Shell and ExxonMobil offices in Qatar are protected by physical barriers and corporate camouflage).

33. See Spencer Jakab, *Natural Gas Rises Following Months Of Wild Swings*, WALL ST. J., Dec. 3, 2005 at B4; Elwin Green, *Gas Bill Relief Unlikely*, PITTSBURGH POST-GAZETTE, Dec. 3, 2005, at E1 (noting soaring oil costs "as surging global demand for natural gas, supply disruptions caused by hurricanes Katrina and Rita, and in much of the Northeast, an unusually cold early winter, conspired to push prices to record levels").

34. See Justin Blum, *Oil Prices Predicted to Stay High*, WASH. POST, Dec. 13, 2005, at D02 (noting that in twenty years, oil prices would be as high as \$54 per barrel). These estimates were dramatically lower than prices have recently been. In mid-July, 2006, the price of oil was above \$78 per barrel. See Associated Press, *Oil Prices Over \$58 After Saudi Announcement: Kingdom Signals Support for OPEC Move to Cut Daily Production*, MSNBC.COM, Oct. 19, 2006, <http://www.msnbc.msn.com/id/12400801/>.

35. Blum, *supra* note 34. Blum reported:

The forecast also calls for declines in natural gas prices, which have risen to unusually high levels during the past year. The average wellhead price—slightly lower than prices on the New York Mercantile Exchange—is forecast to fall to \$4.46 per thousand cubic feet in 2016 and rise to about \$5.90 per thousand cubic feet in 2030. Prices are now above \$10 per thousand cubic feet.

*Id.*; see also Green, *supra* note 33 (noting that "[t]he Energy Department's information arm forecast natural gas prices in the Northeast [during the 2005–2006 winter] to run 31 percent above [the 2004–2005 winter level]"); Cohen, *supra* note 28.

36. Cf. ENERGY INFO. ADMIN., THE NORTHEAST HEATING FUEL MARKET: ASSESSMENT AND OPTIONS 37–50 (2000), available at [http://www.eia.doe.gov/oiaf/servicerpt/nehfuel/pdf/sroiaf\(2000\)03.pdf](http://www.eia.doe.gov/oiaf/servicerpt/nehfuel/pdf/sroiaf(2000)03.pdf).

amounts of LNG reach the market.<sup>37</sup> FERC Chairman Kelliher has noted that the states have primary authority over retail sales of natural gas.<sup>38</sup> Nevertheless, he pledged that FERC will issue rules under the Energy Policy Act of 2005 to “prevent prices from going higher still because of market manipulation.”<sup>39</sup>

Development of importation will require significant outlays in funding by both government and industry. FERC reports that fifty-five ships are “under construction, of which 46 are designed to carry at least 138,000 cubic meters of LNG (equivalent to 2.9 bcf of natural gas).”<sup>40</sup> The number of proposals for LNG facilities, which receive and convert the product to gaseous form for dispersal, has grown dramatically in the last year.<sup>41</sup> Five LNG facilities are currently operating in the United States, FERC and the U.S. Coast Guard have approved eighteen new sites,<sup>42</sup> and approximately forty new LNG facilities are currently in the process of approval and licensing.<sup>43</sup> Kelliher has asserted that FERC should “provide greater incentives to expand natural gas storage through gas storage pricing reform.”<sup>44</sup> FERC has responded to rising natural gas prices by approving applications for a substantial expansion of the nation’s LNG import terminals and by approving applications for new pipelines both “quickly and in an environmentally responsible way.”<sup>45</sup> Location is a major factor—both in terms of the location of natural gas supplies and of building a supply and distribution chain for LNG.<sup>46</sup> Likewise, industry interest in preparing the U.S. to receive imported LNG is more intense than ever.

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37. Romero, *supra* note 9.

38. Kelliher, *supra* note 15.

39. *Id.*

40. Energy Information Administration, World LNG Shipping Capacity Expanding, <http://www.eia.doe.gov/oiaf/analysispaper/global/worldlng.html> (last visited Apr. 10, 2007) [hereinafter World LNG Shipping Capacity Expanding].

41. See Existing and Proposed North American LNG Terminals, *supra* note 20, <http://www.ferc.gov/industries/lng/indus-act/terminals/exist-prop-lng.pdf> (last visited Apr. 14, 2007).

42. *Id.*

43. FERC, Industries, Liquefied Natural Gas, <http://www.ferc.gov/industries/lng.asp> (last visited Apr. 10, 2007).

44. Kelliher, *supra* note 15.

45. HIGH NATURAL GAS PRICES: THE BASICS, *supra* note 15, at 3.

46. See Romero, *supra* note 9 (noting that Qatar is becoming a “leader in the emerging international market for natural gas”).



## III. ENERGY CHOICES

## A. U.S. Energy Policy

President George W. Bush has stated emphatic support for advancing LNG importation: “Federal agencies must expedite the review of 32 proposed new projects that will either expand or build new liquefied natural gas terminals.”<sup>47</sup> More recently, President Bush declared the American public is addicted to oil and in need of weaning itself from the fuel source in last year’s State of the Union Address.<sup>48</sup> While many people support renewable resources, many were skeptical about the achievability of the President’s newly stated goals.<sup>49</sup> Others assert that the administration is not committed to developing alternatives to oil such as renewable energy sources.<sup>50</sup> And, while

47. President George W. Bush, Remarks to the Small Business Administration’s National Small Business Week Conference (Apr. 27, 2005) (urging international collaboration on clean energy), in WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS Vol. 41 No. 17, at 675–81 (2005), available at [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2005\\_presidential\\_documents&docid=pd02my05\\_txt-9.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2005_presidential_documents&docid=pd02my05_txt-9.pdf); see also *Stuck in the Past Conservation, Fuel Efficiency Can Be a Bridge to Energy Future*, SARASOTA HERALD TRIBUNE, May 1, 2005, at F2, available at 2005 WLNR 6830226 (noting that President Bush “touted a proposal that looks too much to the past,” calling for “increasing domestic oil production and building more refineries and liquified natural gas terminals in the United States”).

48. See, e.g., Elisabeth Bumiller, *Bush’s Goals on Energy Quickly Find Obstacles*, N.Y. TIMES, Feb. 2, 2006, at A1. The association of the current administration with oil interests makes this declaration sound like the bartender scolding the alcoholic. Moreover, Vice President Cheney has revealed disdain for conservation in the past. MICHAEL T. KLARE, BLOOD AND OIL: THE DANGERS AND CONSEQUENCES OF AMERICA’S GROWING DEPENDENCY ON IMPORTED PETROLEUM 58–59 (Henry Holt and Company 2001) [hereinafter KLARE 1] (citing Joseph Kahn, *Cheney Promotes Increasing Supply as Energy Policy*, N.Y. TIMES, May 1, 2001, at A1). Klare discusses the Bush administration’s assessment of the NEPDG report:

Given the extent of the administration’s links to the energy industry, not many observers expected that the NEPDG report would buck the status quo. And Vice President Cheney did nothing to change their minds when, on April 30, 2001, he belittled conservation and suggested that upping oil, coal, and natural gas production was our only viable option. Speaking to reporters at an Associated Press meeting in Toronto he scoffed at the notion that ‘we could simply conserve or ration our way out’ of an impending energy crisis. ‘Conservation may be a sign of personal virtue,’ he sniffed, ‘but it is not a sufficient basis for a sound, comprehensive energy policy.’ The reality, he said, was that oil and other fossil fuels would remain America’s primary source of energy for ‘years down the road,’ and therefore the administration would seek to *increase* their availability, not restrict it.

*Id.*

49. See, e.g., Bumiller, *supra* note 48.

50. Mark Clayton, *A New Fuel Fix: Boon or Bane?*, THE CHRISTIAN SCIENCE MONITOR, June 23, 2005, at 13 (quoting Gal Luft, executive director of the Institute for the Analysis of Global Security, a think tank in Washington, D.C. focused on energy security issues, as saying, “All we’re talking about doing is replacing one dependency with

Bush's assertion does focus attention on the problem of oil dependency, it overlooks the fact that individual consumers often lack the power to choose non-fossil-fuel energy sources.<sup>51</sup>

Influencing the market to produce renewable fuels is more a matter of government policy than consumer choice. Government leaders influence the choice of energy sources far more than consumer demand, which operates within the sphere of available choices.<sup>52</sup> The development of an energy policy by the Bush administration has been closely studied and intensely litigated.<sup>53</sup> The administration had the choice to: "continue consuming more and more petroleum and sink deeper and deeper into its dependence on imports" or "choose an alternative route, enforcing strict energy conservation, encouraging the use of fuel-efficient vehicles, and promoting the development of renewable energy sources, such as wind and solar power."<sup>54</sup> The incompatibility of these two policy paths has long been apparent to energy experts and, to one degree or another, the general public.<sup>55</sup> With Vice-President Cheney's view that "upping oil, coal, and natural gas production was our only viable option," the Bush Administration has chosen the former path.<sup>56</sup>

The United States is the leading emitter of greenhouse gases, due primarily to the U.S.'s high energy use. Americans average six times higher energy use per person than the rest of the world.<sup>57</sup> These facts, however, do not necessarily reveal a public addicted to oil or bent on environmental destruction. Individual choice in this area is limited dramatically by the

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another. The main sources of natural gas are located in the Middle East and Russia. So we're talking about the same sort of problem").

51. President George W. Bush, *supra* note 47, at 677–79 (stating "[o]ur dependence on foreign energy is like a foreign tax on the American people . . ." and, moments later, encouraging us to "expand our use of liquefied natural gas" by building more coastal LNG terminals).

52. Brian C. Howard, *Compassionate Conservation: A Real Answer to High Oil Prices*, E/THE ENVIRONMENTAL MAGAZINE, Jan./Feb. 2006, available at <http://www.emagazine.com/view/?3008>. Howard noted:

In September, George W. Bush surprised many observers by calling on Americans to curtail nonessential travel as a solution to the fossil-fuel crunch. 'We can encourage employees to car pool or use mass transit, and we can shift peak electricity use to off-peak hours. There's ways for the federal government to lead when it comes to conservation,' Bush added.

*Id.*

53. See KLARE 1, *supra* note 48, at 57.

54. *Id.*

55. *Id.*

56. *Id.* at 58–59.

57. Energy Information Administration, Energy Kids Page, Energy Efficiency, Energy Consumption, <http://www.eia.doe.gov/kids/energyfacts/saving/efficiency/savingenergy.html> (last visited Apr. 10, 2007).

market. For example, the current cost of an electric car is beyond the financial capability of the vast majority of consumers.<sup>58</sup>

Depletion of the world's supply of fossil fuels creates concern regarding the need to continue to supply energy for economic development.<sup>59</sup> The claim that renewable sources of energy are not economically feasible under current conditions usually comes from government agencies and industry leaders committed to fossil fuel initiatives.<sup>60</sup> On the contrary, wind energy is now economically competitive for the grid, and solar energy is competitive in many applications, particularly in rural areas of developing countries not served by a grid. Additionally, the price of ethanol is competitive with gasoline.<sup>61</sup> Perhaps most important in the debate on energy resources is the fact that development of natural gas as a major fuel source will tend to extend global dependence on fossil fuel and thus delay development of renewable sources of energy.

### *B. Factors Relating to LNG Policy*

Taking as a starting point the assumption that the United States will remain committed to an energy program of exploration and use of fossil fuels as its primary energy policy, LNG may present the best of the possible choices under serious consideration. "LNG is odorless, colorless, non-corrosive, and

58. *Id.*

59. David M. Driesen, *Free Lunch or Cheap Fix?: The Emissions Trading Idea and the Climate Change Convention*, 26 B.C. ENVTL. AFF. L. REV. 1, 47 (1998). In discussing the necessity of developing renewable energy, Driesen stated:

If population and energy consumption both increase worldwide, then continued reliance on inefficient burning of fossil fuels will increase, not decrease, worldwide emissions of carbon dioxide. Hence, in the long run, reducing emissions while accommodating population growth and economic development requires reduced reliance upon inefficient fossil fuel consumption. This necessarily implies deploying alternative renewable energy and improving energy efficiency.

*Id.*

60. NPS Considers Trading Land to Allow Dam in Glacier Bay, HYDROPOWER, October 21, 2004 (noting that the final Environmental Impact Statement on the project indicated it was not economically feasible because it would "lose \$90,000 annually and cost \$43 more per megawatt hour than current generation with diesel"). By contrast, FERC notes that "LNG is economically viable at today's market price, based on supply contracts and on netback pricing." FERC, LNG—Issues, *supra* note 30.

61. Steven Cole Smith, *Sign of the Times: With Gasoline Prices Going Up, Ethanol Fuel—Usually Corn-Based—Isn't Such an Out-Of-This-World Option Anymore*, ORLANDO SENTINEL, Mar. 23, 2006, at F1 (noting the price of ethanol or ethanol combined fuel at filling stations is equivalent to gasoline and should decline as production increases); see also OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY, U.S. DEP'T OF ENERGY, ALTERNATIVE FUEL FACT SHEET 2 (2003), available at <http://www.nrel.gov/docs/fy03osti/33058.pdf> (noting the price of ethanol fuel is cheaper than gasoline in 2003).

nontoxic.”<sup>62</sup> Compared with other fossil fuels, it is relatively benign. “When extracted from underground reserves, natural gas is composed of approximately 90 percent methane. During the liquefaction process, oxygen, carbon dioxide, sulfur compounds, and water are removed, purifying the fuel and increasing its methane content to almost 100 percent.”<sup>63</sup> Not all carbon dioxide is removed during the liquification process, however. “Potential reductions in carbon dioxide emissions of 25% are possible depending on the source of the natural gas.”<sup>64</sup>

Considering its lower CO<sub>2</sub> emissions, LNG presents less concern for global climate change than conventional power sources such as coal or oil.<sup>65</sup> It also appears to present less of a threat to public health and safety than nuclear reactors, considering the long-range effect of any nuclear releases or explosions. Moreover, increasing the U.S. supply of LNG seems to present the best choice as a matter of economics. Because of high U.S. demand for LNG, former Federal Reserve Chairman Alan Greenspan encouraged expansion of LNG imports as the best way to lower prices.<sup>66</sup> Of course, the frame of reference for the comparison of energy choices is of critical importance. Comparing LNG with renewable resources presents a different picture. Renewable resources such as solar and wind power are a viable energy source for the long term. It is unlikely that energy production will cease when fossil fuel sources are completely harvested. One issue rarely addressed in the assessment of renewable energy sources is the factual basis for the decision that renewable energy sources lack economic feasibility.<sup>67</sup> Such comparisons generally use oil prices based on current markets and fail to take into account the costs of military deployment associated with protecting fossil fuel sources in hostile regions.<sup>68</sup>

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62. U.S. Env'tl. Prot. Agency, Clean Alternative Fuels: Liquefied Natural Gas, <http://eerc.ra.utk.edu/etcfc/docs/EPAFactSheet-lng.pdf> (last visited Apr. 10, 2007).

63. *Id.*

64. *Id.*

65. Weaver, *supra* note 11.

66. *Natural Gas Supply and Demand Issues: Hearing Before the H. Comm. on Energy and Commerce*, 108th Cong. 91, 98–99, 105 (2003) (statement of Alan Greenspan, Chairman, U.S. Fed. Reserve Bd.), available at <http://republicans.energycommerce.house.gov/108/action/108-26.pdf>; *The Economic Outlook: Hearing Before the J. Economic Comm.*, 109th Cong. (2005) (statement of Alan Greenspan, Chairman, U.S. Fed. Reserve Bd.) (pushing for increased capacity, without waiver), available at <http://www.house.gov/jec/hearings/testimony/109/11-03-05ag.pdf>.

67. RENEWABLE ENERGY GENERATORS OF AUSTRALIA, *THE FUTURE OF RENEWABLE ENERGY AND THE ROLE OF HYDROELECTRICITY* 4 (2000) (noting that renewable “[r]esources . . . are not economically feasible at present time”).

68. MICHAEL T. KLARE, *RESOURCE WARS: THE NEW LANDSCAPE OF GLOBAL*

An assessment of trade-offs is inherent in all choices. National energy policy relating to the production and use of LNG is no exception to this general truth. LNG presents the potential of lower fuel costs because of the world's falling oil supplies and unstable markets. The lower cost of transportation and storage of LNG also enhances its desirability.<sup>69</sup> There are, however, risks associated with this form of energy that must be considered. Whether the benefits of cost savings outweigh other costs is a matter of judgment, policy, and the science of risk assessment.

The larger issue is the effect of fossil-fuel use on the global climate. From this perspective, the best thing for the health of the planet would be to reduce use of fossil fuels as rapidly as possible. Development of LNG as a resource will inevitably prolong the dominance of fossil fuel as a major energy source for the nation, and perhaps for the world.<sup>70</sup> Predictions regarding the sources now under exploration and development will extend the use of fossil fuel for generations.<sup>71</sup> Increased energy consumption seems not simply predictable but inevitable. All available information suggests that the worldwide demand for petroleum will rise at a steady rate of approximately two percent per year until 2020.<sup>72</sup> Some estimate that in 2020, transportation will

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CONFLICT 9 (Henry Holt and Company 2001) [hereinafter KLARE 2].

[T]he military . . . *can* play a key role in protecting resource supplies. Resources are tangible assets that can be exposed to risk by political turmoil and conflict abroad—and so, it is argued, they require physical protection...only military power can ensure the flow of oil and other critical materials from (or through) distant areas in times of war or crisis. As their unique contribution to the nation's economic security...the armed forces have systematically bolstered their capacity to protect the international flow of essential materials.

*Id.*

69. Capital cost is high because, for example, “[s]pecially designed ships are used to transport LNG to U.S. terminals. They have double hulls and are constructed of specialized materials that are capable of safely storing LNG at temperatures of -260° F/-162.2° C.” FERC For Citizens, *supra* note 4. Transportation cost, however, is relatively low because, for example, “LNG tanker trucks typically carry between 10,000 and 12,000 gallons of LNG; enough to supply the daily needs of approximately 1,000 homes.” *Id.*

70. In the related area of gasoline prices, consumers pay high prices while ExxonMobil and other oil producers are “raking in the largest corporate profits in history, we’re at least finally paying attention.” Jim Motavalli, *The Outlook on Oil: Some Experts Worry that the Production Will Soon Peak, Others Warn it Already Has*, E/THE ENVIRONMENTAL MAGAZINE, Jan./Feb. 2006, available at <http://www.emagazine.com/view/?3004>.

71. Romero, *supra* note 9 (quoting the chief economist at Qatar's largest bank as estimating that a natural gas field in Qatar will provide a supply of natural gas “for about a century”).

72. KLARE 2, *supra* note 68, at 35. Klare notes that:

Using Department of Energy projections, this means that oil use will rise from about 77 million barrels per day (mbd) in 2000 to 85 mbd in 2005, 94 mbd in 2010, 102 mbd in 2015, and 110 mbd in 2020. At that point, oil consumption will be half again as great as it was in 1996 . . . .

account for about fifty-two percent of global petroleum consumption, up from forty-three percent in 1996.<sup>73</sup> However, consumption patterns may be in the midst of change now that renewable fuels such as ethanol are available on the market.<sup>74</sup>

Elementary economic analysis suggests the truism that dominant players seek to retain their position of market dominance and influence.<sup>75</sup> Applying this truism to the context of the energy market suggests that companies that deal in fossil fuels will seek to retain their market power in the energy sector.<sup>76</sup> Rather than retooling for new renewable sources of energy such as wind, sun, and water power, some major energy providers seem committed to continuing to use fossil fuel resources as long as possible rather than aggressively developing renewable energy resources.<sup>77</sup> Other major players in the energy market have made significant commitments to renewable fuels.<sup>78</sup> Indeed, renewable resources are the “fastest growing energy source in the U.S. and the world, albeit from a small base.”<sup>79</sup> Nevertheless, both government and private commitments to the costly infrastructure necessary to provide natural gas as a world fuel are escalating.<sup>80</sup> The infrastructure of the world’s fossil fuel

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*Id.* (citing the ENERGY INFO. ADMIN., INTERNATIONAL ENERGY OUTLOOK 145, Table A4 (1999)).

73. KLARE 2, *supra* note 68, at 37.

74. See *Biofuels: Stirrings in the Cornfields*, THE ECONOMIST, May 12, 2005, at 52.

75. See *e.g.*, Marianne Lavelle, *Billions at Stake: Oil and Gas Companies Stand to Get Royalty Relief on Top of Record Profits*, U.S. NEWS AND WORLD REP., Feb. 27, 2006, at 36 (reporting that despite historic profits for the oil industry of “nearly \$23 billion for the top four players in the past quarter,” the federal government may subsidize the industry with \$7 billion in royalty relief).

76. See Motavalli, *supra* note 70. Motavalli described the approaches used by big-oil to maintain the status quo, and thus their big profits:

As consumers suffer at the pumps, the oil companies themselves are floating on an ocean of record profits. The third quarter of 2005 showed \$9.92 billion in earnings for ExxonMobil, \$9.03 billion for Royal Dutch Shell and \$6.53 billion for British Petroleum. In an attempt to deflect the blame, the oil giants are spending heavily on ad campaigns, such as an American Petroleum Institute (API) spot that urges consumers to turn down their thermostats, clean their furnace and weatherstrip their windows.

*Id.*

77. See, *e.g.*, Jad Mouawad, *The New Face of an Oil Giant*, N.Y. TIMES, Mar. 30, 2006, at C1 (noting that new ExxonMobil chairman Rex W. Tillerson presents a “less adversarial tone” but continues the ExxonMobil philosophy of focusing on fossil fuel rather than expanding its focus to include renewable fuels).

78. *Id.*

79. E-mail from Richard Ottinger, Dean Emeritus, Pace University Law School, to Author (Mar. 1, 2006) (on file with Author); see U.S. Department of Energy, Energy Efficiency and Renewable Energy, Wind and Hydropower Technologies Program, <http://www1.eere.energy.gov/windandhydro> (last visited Oct. 30, 2006).

80. ENERGY INFORMATION ADMINISTRATION, INTERNATIONAL ENERGY OUTLOOK 2006 37 (2006), [http://www.eia.doe.gov/oiaf/ieo/pdf/nat\\_gas.pdf](http://www.eia.doe.gov/oiaf/ieo/pdf/nat_gas.pdf) (last visited Oct. 30, 2006)

industry is clearly a significant investment. For example, a small number of facilities currently serve as import stations for LNG into the U.S.<sup>81</sup> Cost estimates for a LNG importation facility vary dramatically but are likely to be in the range of \$166.4–\$900 million.<sup>82</sup> Likewise, estimates of the cost of the double-hulled tankers designed to transport LNG are substantial, though they vary significantly.<sup>83</sup> Manufacturing LNG tankers is relatively expensive; it costs about \$150 to \$160 million for a 138,000-cubic-meter ship, more than double the price of a very large crude oil tanker which carries four to five times as much energy.<sup>84</sup> The high cost is due in part to the fact that LNG ships require expensive, insulated cryogenic containment for the cargo.<sup>85</sup> Although LNG transportation costs are lower than they would be

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(noting that “natural gas trails coal as the fastest growing primary energy source”); see Smith & Gold, *supra* note 14.

81. *A Terminal Case*, *supra* note 23 (stating that “[t]here are only a handful of LNG terminals in the U.S., none of them on the west coast”).

82. Beth Daley, *LNG Firm Eyes Site Off Gloucester*, BOSTON GLOBE, Feb. 15, 2005, [http://www.boston.com/news/local/massachusetts/articles/2005/02/15/lng\\_firm\\_eyes\\_site\\_off\\_gloucester/](http://www.boston.com/news/local/massachusetts/articles/2005/02/15/lng_firm_eyes_site_off_gloucester/) (noting that “[t]he operator of a liquefied natural gas depot in Everett on Monday proposed building New England’s first offshore LNG terminal, a \$900 million project that comes as proposed onshore LNG facilities face opposition because of safety concerns”); Reuters, *FERC OKs delay for CMS Energy expanded LNG Terminal*, FORBES, Oct. 22, 2003, [http://www.forbes.com/home\\_europe/newswire/2003/10/22/rtr1118505.html](http://www.forbes.com/home_europe/newswire/2003/10/22/rtr1118505.html) (discussing \$166.4 million LNG gas terminal in Lake Charles, Louisiana); *BP Proposes New Jersey LNG Terminal*, THE OIL DAILY, Dec. 2003, [http://www.findarticles.com/p/articles/mi\\_go1505/is\\_200312/ai\\_n6522896](http://www.findarticles.com/p/articles/mi_go1505/is_200312/ai_n6522896) (estimating cost of terminal at \$500 million).

83. Diane Lindquist, *LNG Tanker Fleet Expanding; So Are Security Concerns*, SIGN ON SAN DIEGO, June 30, 2004, <http://www.signonsandiego.com/news/business/20040630-9999-1b30tanker.html> (noting that two types of ships provide LNG transport—membrane and spherical, and that both range up to 1,000 feet long and have a capacity of 125,000 to 138,000 cubic meters of fuel); Dan Denning, *Liquid Natural Gas Opportunities: Energy’s Liquid Future*, THE DAILY RECKONING, July 13, 2005, <http://www.dailyreckoning.com/Issues/2005/DR071305.html>. The author noted:

According to LNG Shipping Solutions, there were only 151 LNG tankers in operation in October 2003. And no wonder. Because of the rigorous specifications, the average cost of a 138,000-cubic-meter LNG tanker is about \$160 million. According to the Energy Information Agency, that’s more than double the price of a crude oil tanker that could carry four or five times as much energy. Yet despite the cost and the seemingly bad comparison to oil tanker economics, there were 55 LNG tankers under construction as of last year. Forty-six of them are designed to carry 138,000 cubic meters of LNG, which translates into about 2.9 billion cubic feet of natural gas. LNG Shipping Solutions also notes that the ships currently under construction would raise the total fleet capacity by 44 percent, or from 17.4 million cubic feet of LNG (366 Bcf of natural gas) to 25.1 million cubic meters of liquid (527 bcf of natural gas).

*Id.*; JACK W. PLUNKETT, PLUNKETT’S ENERGY INDUSTRY ALMANAC, 2004: THE ONLY COMPREHENSIVE GUIDE TO THE ENERGY & UTILITIES INDUSTRY 11 (2004).

84. World LNG Shipping Capacity Expanding, *supra* note 40.

85. *Id.*

without the condensed form of the fuel, costs relating to the capital outlay for facilities and tankers are nevertheless substantial, and the price of LNG is likely to rise along with the price of crude oil, despite lower transportation costs.

Focusing on the small nation of Qatar provides an example of the development of LNG and the commitment of the United States to LNG as an emerging fuel source. Investments in Qatar alone are expected to exceed \$100 billion by the end of the decade.<sup>86</sup> Qatar has surpassed Russia and Iran, the only nations with larger reserves of natural gas, seizing new opportunities to export the fuel to markets in North America, southern Europe, and the Far East.<sup>87</sup> Also, LNG traffic is increasing significantly in Asia and other areas.<sup>88</sup>

The national interests of countries rich in natural gas have led to collective action among these countries in concert with their exploration for natural gas.<sup>89</sup> Just as OPEC attempts to gain more control over world oil markets, "Qatar has moved to exert greater influence over the trade in natural gas through the creation of the Gas Exporting Countries Forum ("GECF")."<sup>90</sup> GECF has twelve members, and the group's liaison office is located in Doha.<sup>91</sup> Similarities are already being drawn between OPEC and GECF, including both groups' efforts to control oil and gas prices, respectively.<sup>92</sup> However, officials in Qatar contend GECF was not formed to control world gas markets.<sup>93</sup>

### C. Conservation and Renewable Energy Sources

Public interest in renewable energy sources has increased in recent years along with concerns about energy security, national oil supply, the use of military action to secure foreign energy sources, and environmental and human health impacts from fossil fuels.<sup>94</sup> The issue of global climate change has focused

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86. Romero, *supra* note 9.

87. *Id.*

88. *See id.* This article discusses the rise of LNG traffic worldwide, and Qatar's prominent position in the LNG industry. The author noted: "[t]ankers laden with gas supercooled to liquid already depart each day for Japan and South Korea from the northern port of Ras Laffan, not far from Al Udeid Air Base in the Qatari desert, the American military's main air operations center in the Arabian Peninsula." *Id.*

89. *See id.*

90. *Id.*

91. Romero, *supra* note 9. GECF members, including Algeria, Indonesia, and Venezuela, control more than seventy percent of the world's gas reserves and more than forty percent of production. *Id.*

92. *Id.*

93. *Id.*

94. *See* Earthjustice, Coalbed Methane in the Powder River Basin,



attention on greenhouse gases.<sup>95</sup> Because fossil fuels are nonrenewable, it is inevitable that renewable sources will be used in the future.<sup>96</sup> Despite undesirable consequences from fossil fuel use, the United States' energy policy continues to depend on them,<sup>97</sup> raising significant risks to health.

Natural gas results in lower emissions of greenhouse gases than other fossil fuels, so more imports are environmentally desirable as well.<sup>98</sup>

A comparison of LNG with renewable resources is different, however. Renewable energy provides public benefits including a cleaner atmosphere and less dependence on fossil fuels. Renewable energy sources offer clean energy and also reduce the dependence of the U.S. on foreign sources of energy, thus reducing the costs of military involvement on foreign soil. The continued use of incentives by the federal government to promote the use of renewable energy will have many ancillary benefits, including reducing acid rain, urban smog, ozone depletion, respiratory problems, extreme weather occurrences, and climate change. As the world's largest producer of greenhouse gases, the U.S. has an opportunity to make dramatic reductions in global CO<sub>2</sub> levels, setting the stage for developing new markets for renewable power.<sup>99</sup>

Environmental groups have emphasized the risks associated with LNG facilities, including risks to marine resources and to global climate change. They have also emphasized the need for commitment to conservation and renewable sources of energy such as wind, solar, water, ethanol, and other renewable fuels.<sup>100</sup> These sources would be preferable to both oil and LNG as a

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[http://www.earthjustice.org/library/background/coalbed\\_methane\\_in\\_the\\_powder\\_river\\_basin.html](http://www.earthjustice.org/library/background/coalbed_methane_in_the_powder_river_basin.html) (discussing just one example, Wyoming's Powder River Basin, where an increase in natural gas fields in the United States creates significant environmental impacts on the landscape and wilderness areas).

95. Press Release, United Nations Framework Convention on Climate Change, Groundbreaking Kyoto Protocol Compliance System Launched (Mar. 3, 2006), available at [http://unfccc.int/files/press/news\\_room/press\\_releases\\_and\\_advisories/application/pdf/20060303\\_compliance\\_committee\\_1st\\_meeting.pdf](http://unfccc.int/files/press/news_room/press_releases_and_advisories/application/pdf/20060303_compliance_committee_1st_meeting.pdf) (noting that the main goal of the compliance program started under the Kyoto Protocol was to reduce greenhouse gas emissions by 2012).

96. Motavalli, *supra* note 70.

97. See EPA, Climate Change—U.S. Climate Policy, <http://epa.gov/climatechange/policy/index.html> (last visited Apr. 10, 2007). A perusal through the website shows that U.S. climate change policy mostly addresses the continued use of fossil fuels as a primary energy source. *Id.*

98. *A Terminal Case*, *supra* note 23.

99. See generally U.S. OFFICE OF TECHNOLOGY ASSESSMENT, CHANGING BY DEGREES: STEPS TO REDUCE GREENHOUSE GASES (1991).

100. Campaigns—New York State Renewable Energy Purchasing Requirements, [http://www.citizenscampaign.org/campaigns/renewable/ny\\_renewables.htm](http://www.citizenscampaign.org/campaigns/renewable/ny_renewables.htm).

matter of public health and the health of the planet. Nevertheless, current U.S. energy policy suggests that until fossil fuel resources are depleted or the rate of extraction passes its peak, the country will not make renewable resources a significant part of its energy program. In the last presidential campaign, both Senator Kerry and President Bush supported imports of LNG and increased facilities for importing LNG.<sup>101</sup>

The claim that renewable energy is not economically feasible is no longer viable, even when simply comparing prices for renewable energy sources such as wind, solar, and ethanol with the current price of conventional fossil fuels.<sup>102</sup> Moreover, the cost of fossil fuel is staggering if one takes into account the costs of military involvement on foreign soil. Chairman Kelliher recently identified conservation as the most important way of controlling the price of natural gas. But, rather than identifying conservation as an on-going strategy, he recommended consumer conservation in the short-term until LNG terminals are available.<sup>103</sup> He asserted that “the most important action that can be taken now is to reduce consumer demand through conservation.”<sup>104</sup> FERC estimated that demand for natural gas in the next twenty years will increase thirty-eight percent<sup>105</sup> and advocates conservation.<sup>106</sup>

President Bush’s charge that the American people are addicted to oil fails to take into account the limited energy choices available to consumers and the fact that demand for energy during the winter for heating is inelastic. Electric power plants contribute to much of the energy consumed. While some states offer a green power option, which gives consumers who are willing to pay a slightly higher rate the ability to choose power generated from renewable resources, many consumers are unable

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101. David Garman & David Hayes, *Bush and Kerry: Competing Visions for U.S. Energy Policy*, 17 GEO. INT’L ENVTL. L. REV. 201, 208 (2004). The article notes that President Jimmy Carter, in contrast, was straight-forward about the need to conserve energy resources. Indeed, some commentators suggest that President Carter’s focus on conservation contributed to his defeat in 1980. *Id.*

102. E-mail from Ottinger, *supra* note 79.

103. Kelliher, *supra* note 15.

104. *Id.*

105. FERC, A GUIDE TO LNG: WHAT ALL CITIZENS SHOULD KNOW, *supra* note 13.

106. HIGH NATURAL GAS PRICES: THE BASICS, *supra* note 15. FERC notes:

You can cut your own natural gas bill through conservation—see (for example) the Department of Energy’s website <http://energysavers.gov> for practical suggestions on conservation. When you conserve, you also help everyone else, since reduced consumption lowers stress on the whole gas industry and tends to lower prices.

*Id.* See also, e.g., The Power is in Your Hands, <http://www.powerisinyourhands.org> (last visited Apr. 14, 2007) (suggesting that consumers can control their heating costs).

to pay the additional costs.<sup>107</sup> Real change can occur in this area but is necessarily dependent on government and industry to make fuel choices available. Experts link the steady increase in fuel consumption to transportation, which accounts for about two-thirds of our current petroleum usage.<sup>108</sup> Zoning and management of urban sprawl can have impressive influence on fuel consumption. It seems logical then, that consumption patterns could change significantly as use of renewable fuels such as ethanol increases. “The numbers are staggering as Americans buy more and bigger vehicles and drive them longer distances every year, the 13.5 million barrels per day devoted to transportation use in 2001 will jump to an estimated 20.7 million in 2025 at which point such usage will commandeer approximately three-quarters of America’s petroleum supply.”<sup>109</sup>

On the other hand, commentators suggest that changes in transportation policies and patterns could make a significant difference in fuel use. Many economists contend that a significant increase in the gasoline tax could lead to sharp changes in American behavior, because it would give consumers strong reasons to drive more efficient vehicles and give manufacturers incentives for innovative cars, such as hybrids that run on gasoline and electricity.<sup>110</sup> Commercial transportation also plays into this analysis. The Brundtland Report to the United Nations recommended moving more commercial transport to trains as a strategy for protecting the environment and combating global warming.<sup>111</sup> The dependency of modern life on oil extends beyond transportation and home heating.<sup>112</sup> Nevertheless, significant cuts in fuel consumption are a realistic possibility because of expanding transportation choices. One solution for reducing oil dependence is to change the way cars are designed. Automobiles,

107. See, e.g., Helen Martin et al., Editorial, *Would You Pay?*, NEWSDAY, Mar. 14, 2005, at A55.

108. KLARE 2, *supra* note 68.

109. KLARE 1, *supra* note 48, at 16–17 (citing ENERGY INFO. ADMIN., ANNUAL ENERGY OUTLOOK 144 tbl. A7, 150 tbl. A11 (2004); ENERGY INFO. ADMIN, INT’L ENERGY OUTLOOK 185 tbl. A4 (2003)).

110. See Elisabeth Bumiller, *Bush’s Goals on Energy Quickly Find Obstacles*, N.Y. TIMES, Feb. 2, 2006, at A20.

111. FEDERAL OFFICE FOR SPATIAL DEVELOPMENT, ARE—1987 BRUNDTLAND REPORT 142 (1987), <http://www.are.admin.ch/themen/nachhaltig/00266/00540/00542/index.html?lang=en>.

112. Motavalli, *supra* note 70. Motavalli notes that:

... the average piece of food travels 1,500 miles before it reaches your plate. Geologist Dale Allen Pfeiffer has pointed out that it takes 10 calories of fossil fuel to produce one calorie of food eaten in the U.S. . . . Farming machinery, increasingly complex in recent years, runs on oil and was built using it.

*Id.*

for instance, use about 9 million barrels of the 20 million barrels of oil that the United States consumes each day.<sup>113</sup> Improving the efficiency of hybrid engines, like those used in the Toyota Prius, and using advanced metal alloys and carbon composites instead of heavier steel to make cars could double or triple the miles per gallon in these automobiles.<sup>114</sup>

While such changes are not within the immediate control of the individual consumer, they have some influence on car design. Over the long-term, manufacturers should respond to consumer demand for vehicles that allow drivers a fuel choice, assuming that consumer demand is clear. Indeed, from one perspective, consumer desire drives the market. For example, the recent move of auto manufacturers toward hybrid design suggests that manufacturers will become more responsive to consumer demand. Detroit automakers' recent losses may be a result of the failure to recognize consumer demand for hybrid models. The relationship between producers and consumers is complicated, suggesting that government regulation has a role to play in this area. Hybrid automobiles are gaining in popularity and clean technology continues to improve.<sup>115</sup>

Other countries have made strides in developing renewable energy resources and encouraging use of renewable energy.<sup>116</sup> Brazil, for example, has incorporated renewable energy in transportation and other energy consumption—a move spurred by government initiatives.<sup>117</sup> Government policy choices are crucial to the development of alternative energy resources, a reality that Brazil has seized upon:

The government [of Brazil] subsidized ethanol heavily until 1998, when it deregulated ethanol and substituted gasoline taxes for its costs. To start the program, the state-owned oil company guaranteed ethanol purchases on a cost plus basis and provided tax incentives for the purchase of neat

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113. See Simon Romero, *Much Talk, Mostly Low Key, About Energy Independence*, N.Y. TIMES, Feb. 2, 2006, at C1.

114. See *id.*

115. For example, technology now exists for plug-in hybrids that average 140 miles per gallon. See Felix Kramer, Editorial, *A Real Life 100+ MPG Car*, AMERICANS FOR ENERGY INDEPENDENCE, May 12, 2006, [http://www.ei2025.org/previous\\_editorial.asp?e=163](http://www.ei2025.org/previous_editorial.asp?e=163).

116. See Richard L. Ottinger & Rebecca Williams, *Renewable Energy Sources for Development*, 32 ENVTL. L. 331, 361 (2002).

117. *Id.* (noting that “Brazil supplies 60% of its primary energy requirements from renewable energy sources, 37% from hydro and 23% from biomass under programs sponsored by the government,” and citing HOWARD GELLAR ET AL., AM. COUNCIL FOR ENERGY-EFFIC. ECON., UPDATE ON BRAZIL’S NATIONAL ELECTRICITY CONSERVATION PROGRAM 9–10 (1999)).

ethanol-using vehicles.<sup>118</sup>

The importance of policy decisions and the need for a unified policy objective in this area can hardly be overstated. For example, a federal commission is now studying the feasibility of a per-mile fee that would charge drivers more for gas used in cars that achieve high mileage per gallon.<sup>119</sup> This concept is based on the idea that hybrid and other gas-saving cars are using the infrastructure as much as other cars that pollute more, and therefore the federal government is losing revenue.<sup>120</sup> Similarly, the U.S. Chamber of Commerce has proposed increasing highway financing by taxing alternative-fuel vehicles to offset the loss in fuel taxes from having more vehicles that use less fossil fuel.<sup>121</sup> Such perverse tax incentives could defeat the benefits of increased mileage and pollution prevention. Tax policy that fails to take into account the big picture can significantly undercut energy policy, and the administration needs a unified approach on issues of such importance.

#### IV. RISKS OF LNG DEVELOPMENT: COMPARED TO WHAT?

Risks accompany all choices. Compared with oil, coal, and nuclear energy, LNG presents a more benign alternative.<sup>122</sup> For example, the risks of LNG seem minimal compared with those of a nuclear reactor meltdown. However, LNG is not without risk of harm. Compared with renewable fuel sources, the risks of LNG are dramatic. Scholars and commentators have noted concerns about the safety of LNG, both from unintended fires and explosions.<sup>123</sup> These risks are even more substantial when terrorism is considered. The geographic location of the fuel

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118. Ottinger & Williams, *supra* note 116 (noting reduction of carbon emissions and the support of rural jobs based on Brazil's energy policy).

119. Edward Epstein, *Hybrids Could Pay More Gas Tax; U.S. to Study Tariffs on Miles Driven, Not Gallons Purchased*, S.F. CHRON., Apr. 20, 2005, at A3.

120. *Id.*

121. NAT'L CHAMBER FOUND., U.S. CHAMBER OF COMMERCE, EXECUTIVE SUMMARY: FUTURE HIGHWAY AND PUBLIC TRANSPORTATION FINANCING—STUDY RELEASE EVENT viii (2005), available at <http://tinyurl.com/2nmup6> (suggesting that “[t]o ensure adequate federal transportation revenues beyond 2015, the federal government can supplement current federal motor fuel taxes with an annual federal vehicle tax on hybrid and nonpetroleum-powered vehicles so that all passenger vehicles pay their fair share of highway use costs”); Associated Press, *Report Suggests Taxing Hybrid Cars*, BOSTON GLOBE, Nov. 26, 2005, [http://www.boston.com/news/nation/articles/2005/11/26/report\\_suggests\\_taxing\\_hybrid\\_cars](http://www.boston.com/news/nation/articles/2005/11/26/report_suggests_taxing_hybrid_cars) (reporting suggestion).

122. Accepting the likelihood that the energy industry and the government will continue to maintain a preference for fossil fuels, natural gas and LNG are better than oil, coal, and nuclear energy.

123. See Powers & Smith, *supra* note 6 and accompanying text.

enhances the potential for terrorist strikes on tankers or facilities, and the involvement of the United States military in foreign states to secure the fuel source also carries with it considerable costs. The risks associated with terrorism and military action also add to the economic risks of a LNG-based energy policy. Lastly, climate change is a risk that is real and must be taken seriously.<sup>124</sup>

This section discusses the risks of an energy policy devoted to LNG. Public health and safety risks; risks of terrorism, natural disasters, and military action; economic risks; and risks related to climate change are all important factors in the debate over LNG. The discussion focuses on risks inherent in the LNG choice without comparisons to the range of policy choices available.

#### A. Public Health and the Environment

Assuming that LNG prevails as the next primary energy source for the United States, it is imperative that the risk to the environment and public be taken into account. FERC gives a favorable assessment of the safety of LNG. It notes the reduced volume of the product for transportation and storage as a primary reason for focusing on LNG.<sup>125</sup> FERC states that LNG is not explosive in liquid state.<sup>126</sup> Likewise, FERC states that the product is not explosive after LNG becomes a gas by heating if it is unconfined.<sup>127</sup> It emphasizes that LNG is “only flammable within a narrow range of concentrations in the air (5% to 15%). Less air does not contain enough oxygen to sustain a flame, while more air dilutes the gas too much for it to ignite.”<sup>128</sup> The explanation provided by FERC suggests an apparently low level of risk from a LNG spill:

In the event of a spill, LNG vapors will disperse with the prevailing wind. Cold LNG vapor will appear as a white cloud. To keep the public safe, flammable vapor (gas) dispersion exclusion zones are established for LNG facilities. If LNG is spilled in the presence of a flame, a very localized fire will result. Since this fire would burn with

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124. The phrase “climate change” is growing in preferred use to “global warming” because it helps convey that there are other changes in addition to rising temperatures. EPA, Climate Change, Basic Information, <http://epa.gov/climatechange/basicinfo.html> (last visited Apr. 14, 2007). That is, global warming is one of a number of possible climate changes. *See id.*

125. FERC For Citizens, *supra* note 4.

126. *Id.*

127. *Id.*

128. *Id.*

intense heat, thermal exclusion zones are also established. Flammable vapor and thermal exclusion zones are determined to keep the public at a safe distance from LNG facilities.<sup>129</sup>

Risk assessments from other individuals and environmental groups provide a marked contrast to FERC's point of view. For example, the Citizen's Campaign for the Environment describes two types of LNG fires:

Pool Fires: One of the most serious hazards associated with LNG pool fires occur when LNG spills into water and ignites in the air. The fires are more intense and burn hotter than gasoline or oil fires and cannot be extinguished until all of the LNG fuel has been consumed. The fire burns so hot the thermal radiation emitted may damage property or injure people that are a considerable distance away.

....

Flammable Vapor Clouds: If LNG spills but does not immediately ignite the evaporating natural gas forms a vapor cloud that may drift some distance from the spill. If the cloud subsequently encounters an ignition source, those portions of the cloud with a combustible gas-air concentration will burn in a similar fashion to the pool fires.<sup>130</sup>

Dr. Stanislav Patin describes the environmental effects of two large LNG spills in the Sea of Asov in Russia as follows:

These accidents caused long-term releases of large amounts of natural gas into the water accompanied by self-inflaming of the gas.... These accidents drastically disturbed the composition and biomass of the water fauna and caused mass mortality of many organisms, including fish and benthic mollusks.

....

Fish in the zones of the accidents developed significant pathological changes. In particular, they displayed impaired movement coordination, weakened muscle tone, pathologies of organs and tissues... and some other anomalies typical for acute poisoning of fish. These pathological changes were found even in the fish collected at a considerable distance from the place of accident.<sup>131</sup>

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129. *Id.*

130. Citizen's Campaign, *supra* note 21.

131. STANISLAV PATIN, ENVIRONMENTAL IMPACT OF THE OFFSHORE OIL AND GAS INDUSTRY 223, 235-36 (Elena Cascio trans. 1999).

Much of the controversy regarding siting of LNG terminals relates to public health and safety. Concerns include not only spill-created fires but also noncombustion explosions called Rapid Phase Transitions (“RPT”), an often overlooked LNG safety problem. RPT involves a physical shock from rapid expansion of the substance, which can cause significant damage to structures over a mile away.<sup>132</sup>

There are also concerns about fishing and other issues.<sup>133</sup> For example, Weaver’s Cove Energy received FERC approval to build a LNG receiving terminal on the Taunton River in Washington County, Massachusetts. Opposition groups and elected officials from the area continue to fight the project, raising concerns such as the potential environmental impacts of dredging projects to accommodate tankers on the river and the proximity of the project to residents.<sup>134</sup> Similarly, California energy officials have noted concerns about the safety of LNG facilities.<sup>135</sup> FERC prepared a report dealing with the likely impact of a fire at the LNG terminal proposed at the Port of Long Beach,<sup>136</sup> a facility with a slated capacity to handle three LNG tankers per week—enough fuel to serve 5 million homes.<sup>137</sup> Delaware rejected plans for a LNG facility on the ground that the terminal would violate the state’s Coastal Zone Act.<sup>138</sup>

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132. See California Energy Commission, Frequently Asked Questions About LNG, <http://www.energy.ca.gov/lng/faq.html#1100> (last visited Apr. 14, 2007); see Jerry Havens, *Terrorism: Ready to Blow?*, BULLETIN OF ATOMIC SCIENTISTS, July/Aug. 2005, at 16, available at <http://www.wildcalifornia.org/pages/page-109> (last visited Apr. 14, 2007).

133. Trotter, *supra* note 14 (noting that “[f]ishermen on Deer Island, New Brunswick, such as these at Leonardville wharf are concerned that a LNG facility would affect the health of ocean stocks and that the timing of tankers carrying natural gas would interfere with pulling their lobster traps”).

134. *Id.*; see also Proposed and Recently Approved Liquefied Natural Gas Facilities (by location), [http://www.citizen.org/cmep/energy\\_enviro\\_nuclear/electricity/Oil\\_and\\_Gas/lng/articles.cfm?ID=13756#ne](http://www.citizen.org/cmep/energy_enviro_nuclear/electricity/Oil_and_Gas/lng/articles.cfm?ID=13756#ne) (visited Apr. 14, 2007).

135. California Energy Commission, Liquefied Natural Gas Safety, <http://www.energy.ca.gov/lng/safety.html> (last visited Oct. 19, 2006).

136. See *LNG: Feds Withhold Report on Calif. Terminal’s Safety Risks*, GREENWIRE, Dec. 7, 2005, at 9 [hereinafter *Feds Withhold Report*].

137. *Id.*

138. *Id.* New Jersey filed a suit in the U.S. Supreme Court against Delaware, which disputed Delaware’s right to permit a LNG plant on the New Jersey side of the Delaware River. Petitioner’s Motion to Reopen and for a Supplemental Decree, *New Jersey v. Delaware*, 2005 WL 3707901 (U.S. Aug. 1, 2005) [hereinafter *N.J. Motion*]; see also Press Release, N.J. Office of the Governor, Codey Directs Attorney General to Sue the State of Delaware: State to File Suit Tomorrow in U.S. Supreme Court on Right to Regulate Development Along Delaware River (July 27, 2005), available at [http://www.state.nj.us/cgi-bin/governor/njnewsline/view\\_article.pl?id=2652](http://www.state.nj.us/cgi-bin/governor/njnewsline/view_article.pl?id=2652). New Jersey charged that Delaware’s imposition of siting requirements violated a 1905 agreement between the states. *N.J. Motion*. Delaware argued that its environmental laws prohibit some industry and manufacturing procedures within the state’s coastal zone, and that it



Large scale disasters also have repercussions beyond the immediate vicinity of the harm, including possible impact on the economy of the country and beyond. The dislocation and the resulting human, cultural, and economic costs from Hurricane Katrina demonstrate the broad effects of such catastrophes. Additionally, the environmental damage from the 1989 *Exxon Valdez* spill was estimated to have cost billions of dollars.<sup>139</sup>

### *B. Terrorism and Military Resources*

FERC also presents a favorable assessment of the security of LNG during transportation. Security measures for land-based LNG facilities and onshore portions of marine terminals are required by U.S. Department of Transportation ("DOT") regulations.<sup>140</sup> Examples of these requirements include security patrols, protective enclosures, lighting, monitoring equipment, and alternative power sources.

While the DOT has taken measures to secure LNG transport in the U.S., scholars as well as environmentalists note significant dangers with LNG importation. For example, several scholars and commentators have articulated concerns about the potential for LNG explosions and the potential for terrorist use of LNG tankers as weapons.<sup>141</sup> A recent report in the *Los Angeles Times* noted the far-ranging effects of a LNG explosion: "[a] terrorist

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controls the river up to the mean low-tide mark on the New Jersey shore. Associated Press, *Delaware Can Stop Planned LNG Pier Off N.J., Special Master Rules*, PHILLYBURBS.COM, Apr. 13, 2007, <http://www.phillyburbs.com/pb-dyn/news/147-04132007-1330096.html>. A special master agreed with Delaware, reportedly finding that "Delaware, 'as the sovereign owner of the land,' can regulate and police developments extending from New Jersey's shoreline into the waterway." *Id.*

139. James M. Stuhltrager, *Oil Pollution And Environmental Terrorism—An Overview Of The Potential Legal Response In The United States*, 9 WIDENER L. SYMP. J. 401 (2003) (noting the release of 11 million gallons of oil into Prince William Sound tainted 1,300 miles of coastline, killed 250,000 sea birds, 2,800 sea otters, 300 harbor seals, 150 bald eagles, fourteen to twenty-two killer whales, and resulted in economic loss of billions of dollars).

140. *Id.*

141. See, e.g., Suedeen G. Kelly, *Address to the Environmental Regulation, Energy, and Market Entry Symposium*, 15 DUKE ENVTL. L. & POL'Y F. 251, 256–57 (2005). Kelly noted:

[T]he biggest issue that has come to light in the last year and a half since this LNG activity has been progressing at FERC has been concern about terrorism on the tankers. FERC does not have jurisdiction over the tankers. The Coast Guard has jurisdiction over the tankers and the Coast Guard has jurisdiction over the movement of the tankers into the port or onto the offshore facility.

*Id.*; Terry Macalister, *Safety Fears for Fleet of New LNG Tankers after Leaks Are Found: Soaring Demand for Gas Raises Pressure on BG: Scare Adds to Alarm over 'Floating Bombs' Since 9/11*, THE GUARDIAN, Dec. 22, 2005, <http://business.guardian.co.uk/story/0,,1671607,00.html>.

attack on a tanker delivering LNG . . . could produce an explosion that would burn skin . . . nearly a mile away.”<sup>142</sup> Professor Antonio J. Rodriguez narrates the hypothetical nightmare scenario of a terrorist attack using a LNG tanker.<sup>143</sup>

While attacks on maritime targets to date have been carried out abroad, there is serious concern that such attacks could occur in the United States. There are significant fears of a terrorist attack either against shipping interests, or in the worst case scenario, by using a vessel as a weapon in much the same manner as airliners were used on September 11.<sup>144</sup>

Likewise, an article by Professor James M. Stuhltrager provides a graphic illustration of the dangers of terrorism in this context.<sup>145</sup> Hijacked oil tankers or LNG carriers could be used to carry out suicide missions. Due to the size of oil tankers and the proximity of sea lanes, confined areas such as straits, harbors, and rivers, are the most vulnerable.<sup>146</sup> Explosions not only present potentially significant human and environmental costs, they also force consideration of economic costs.<sup>147</sup>

The use of the military to protect energy resources presents another risk. The link between the nation’s energy policy and national security strategy is undeniable. A study by Amory Lovins of twenty years ago concluded that the actual price of U.S. oil exceeded \$100 per barrel when the calculation included the military costs of protection of oil, not including the cost of war.<sup>148</sup> Armed conflict for the purpose of securing energy sources can hardly be categorized as an unforeseeable event in today’s world. Energy Secretary Abraham made the point that “[e]nergy security is . . . national security.”<sup>149</sup> In his book *Resource Wars: The New Landscape of Global Conflict*, Michael Klare notes that “while diplomacy and economic sanctions can be effective in promoting other economic goals, only military power can ensure the continued flow of oil and other critical materials from (or

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142. *A Terminal Case*, *supra* note 23 at B10.

143. Antonio Rodriguez, *When Your Ship Is In The Bull's Eye: The Maritime Transportation Security Act and Potential Vessel Owner Liability to Third Parties Resulting from Terrorist Attack*, 17 U.S.F. MAR. L.J. 241 (2004–2005).

144. *Id.* at 243–44.

145. Stuhltrager, *supra* note 139.

146. *Id.* at 404.

147. *Id.* at 401.

148. Amory B. Lovins, *Energy Strategy: The Road Not Taken?*, FOREIGN AFFAIRS, Oct. 1976, at 65.

149. KLARE 1, *supra* note 48, at 73.

through) distant areas in times of war or crisis.”<sup>150</sup> Klare further elaborates:

American forces will speed overseas to protect oil fields, pipelines, refineries, and tanker routes more and more frequently, and they will often encounter enraged local populations. The American military can help deter attacks on vital oil facilities and ensure the continuing flow of petroleum, but it can never guarantee that our rising demand for imported oil will be satisfied. All that is certain is that we will pay for it with an increasing sacrifice of blood.”<sup>151</sup>

Because of the important role of energy in today’s world, the use of military force to secure energy sources in situations of scarcity is a real risk in using fossil fuels. Notwithstanding a paradigm shift in energy policy, the industrialized societies of the world cannot survive without substantial supplies of oil. Any significant threat to the continued availability of this resource will threaten to cause a crisis and, in extreme cases, provoke the use of military force.<sup>152</sup>

All major players in the world economy are dependent on energy, primarily petroleum.<sup>153</sup> The stakes of the global chess game of oil markets and oil nations are obviously high, and the incentives and motivations grow more complicated over time. In a *New York Times* article, Robert F. Worth and James Glanz reported on the corruption in the flow of oil money, much of which funds attacks against the United States in the Middle East.<sup>154</sup> Stephen Glain explored OPEC’s current interests and strategies in his book, *Mullahs, Merchants, and Militants: The Economic Collapse of The Arab World*, suggesting that OPEC now has more to lose from destabilized oil prices than in the past.<sup>155</sup> The need to commit U.S. military to police fossil-fuel resources in other countries is as much a predictable cost of an energy program dependent on fossil fuel as the predicted capital

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150. *Id.*

151. KLARE 2, *supra* note 68, at 27.

152. *Id.*

153. *See id.* at 10–11 (discussing that China and Russia, like the United States, have turned to “economization of international security affairs” as a strategy for securing and protecting oil and mineral resources, and have provided arms to friendly governments in major energy-producing areas and in some cases have deployed their own military forces).

154. Robert F. Worth & James Glanz, *Oil Graft Fuels the Insurgency, Iraq and U.S. Say*, N.Y. TIMES, Feb. 5 2006, at 1.

155. STEPHEN GLAIN, MULLAHS, MERCHANTS, AND MILITANTS: THE ECONOMIC COLLAPSE OF THE ARAB WORLD 15 (Thomas Dunne Books) (2004) (noting that “[t]he Organization of Petroleum Exporting Countries . . . , once the spoiler of the global economy, now has as much interest in stable fuel prices as net oil-importers”).

outlay for research and development of wind mills or solar panels is a part of an energy program based on renewable resources.

The increasing involvement of American troops in these conflicts is an unavoidable consequence of the dependency dilemma; the reality is that we need more imported petroleum every day to sustain a way of life that was born and established when the United States was largely self-sufficient in energy. Because most of the countries with sources of petroleum are unstable, unfriendly, or both, we will continue to have to fight—literally—to ensure our access to oil. And unlike earlier wars in which we could withdraw our forces once the hostilities had come to an end, these encounters will require the permanent presence of American soldiers for as long as we remain dependent on these sources for a significant share of our energy.<sup>156</sup>

### C. Climate Change

There are also significant climate change-related risks with the continued use of fossil fuels such as LNG. According to the growing scientific consensus, temperatures rise in correlation with emissions of green house gases.<sup>157</sup> The best scientific estimate is that approximately fifty-five percent of global warming is attributable to carbon dioxide emissions from coal and petroleum use.<sup>158</sup> Coal produces the highest levels of CO<sub>2</sub> per unit of energy compared with other fuel sources. But because of higher consumption levels, petroleum use accounts for the most CO<sub>2</sub> emissions in absolute terms.<sup>159</sup> Researchers presented strong evidence of global climate change at the 2005 annual meeting of the American Association for the Advancement of Science (“AAAS”), singling out CO<sub>2</sub> emissions as the most prominent source of the greenhouse gas.<sup>160</sup> Researchers at the meeting presented evidence that increasing concentrations of atmospheric CO<sub>2</sub> are causing biosystems to approach damaging thresholds around the world.<sup>161</sup> The AAAS estimated that in a “business-as-usual” condition global temperatures will increase about 2.5

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156. KLARE 1, *supra* note 48, at 180–81.

157. JOAN ARON & JONATHAN PATZ, ECOSYSTEM CHANGE AND PUBLIC HEALTH (Johns Hopkins University Press 2001).

158. POWER SCORECARD, METHODOLOGY REPORT 6–9 (rev. 2005) (showing representative CO<sub>2</sub> emission rates for common thermal electricity generating technologies), [http://www.powerscorecard.org/documents/ps\\_method.pdf](http://www.powerscorecard.org/documents/ps_method.pdf).

159. Bette Hileman, *Stark Effects from Global Warming*, CHEMICAL & ENGINEERING NEWS ONLINE, Mar. 16, 2005, <http://pubs.acs.org/cen/news/83/i12/8312globalwarming.html>.

160. *Id.*

161. *Id.*

degrees Celsius by 2050.<sup>162</sup> Similarly, the 2001 Report of the Intergovernmental Panel on Climate Change ("IPCC") predicted that rising levels of CO<sub>2</sub> will increase temperatures between 3.5 and 4.2 degrees Fahrenheit by the end of the century.<sup>163</sup> While such estimates and predictions lack certainty, it seems clear that human energy consumption presents the risk of significant climate change.

*D. The Importance of Considering Risks of LNG Development*

Society faces persistent disagreement regarding the appropriate balance between protections from physical harm and the need for government discretion, both in protecting the safety of people and in meeting society's energy needs. Concerns about environmental terrorism are by no means fanciful. Moreover, LNG terminals as well as tankers are vulnerable to the threat of terrorism. Assuming that LNG emerges as a major energy source for the United States, it is imperative that the infrastructure for transportation and importation be designed to withstand, as far as possible, both natural disasters and terrorist attacks. Professor Stuhltrager draws our attention to the enhanced dangers inherent in intentional environmental terrorism: "Terrorists would plan the incident to occur in environmentally sensitive or economically important areas."<sup>164</sup>

On the other hand, the potential targets for terrorist activity include many other vulnerable sites from water supplies to chemical plants, and the balance of risks and benefits favor LNG as compared with nuclear power, other fossil fuels, and coal. Nevertheless, LNG risks are by no means insubstantial. The loss of human life from a LNG explosion is the starkest risk of a program based on LNG imports. Other likely environmental impacts of offshore facilities include the effects the regasification process and ballast water have on the temperature of seawater and marine life, the disruption of bird or fish life by noise and lighting of the facility at night, interference with marine mammal populations, and destruction of habitat due to pipeline construction from the offshore unloading facility to the onshore storage and distribution point.<sup>165</sup>

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162. *Id.*

163. *World Faces Massive Increase In CO<sub>2</sub> Emissions As Population Grows*, CHINESE CLIMATE CHANGE NETWORK, July 19, 2005, <http://www.ipcc.cma.gov.cn/Website/index.php?ChannelID=35&NewsID=134>.

164. Stuhltrager, *supra* note 139.

165. Powers & Smith, *supra* note 6 .

## V. ASSESSING THE PUBLIC INTEREST IN THE LNG DEBATE: ACHIEVABLE GOALS

The public has a significant stake in acquiring affordable, secure, and safe energy sources. Likewise, public interest in the protection of those production and storage facilities is also of great importance. Finally, the public has a legitimate interest in protecting the health of citizens, families, and the planet.

Protection of the public has been a major part of risk assessment in U.S. LNG facilities. Several major studies note the risk of terrorist activities involving LNG shipment or processing.<sup>166</sup> Additionally, the DOT regulations require specific training, equipment, and safety zones around LNG facilities and tankers:<sup>167</sup>

Federal safety regulations require LNG terminals to be surrounded by 'exclusion zones' to protect neighboring communities in the event of a pool fire or flammable vapor cloud. For FERC site approval, a prospective LNG terminal owner or a government agency must exercise 'legal control' of activities within such zones.<sup>168</sup>

U.S. energy policy needs to continue to improve the practice of considering the public interest when siting LNG infrastructure. In order to do so, it is essential to make offshore siting the rule for new LNG infrastructure and to make public input necessary.

### A. Achievable Goals: A Default of Offshore Siting

In assessing an offshore default rule for LNG terminal siting, the analysis must encompass all potential threats in order to objectively assess the environmental and safety considerations. Assessing both environmental effects and safety goals in the siting of LNG terminals is by no means easy. Fully vetting the risks presented by LNG as an energy source includes considering every facet of the system of terminals and transportation infrastructure. Likewise, efficient processes for

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166. PAUL W. PARFOMAK & AARON M. FLYNN, CONG. RESEARCH SERV., LIQUEFIED NATURAL GAS (LNG) IMPORT TERMINALS: SITING, SAFETY AND REGULATION 13, available at <http://www.ncseonline.org/NLE/CRSReports/05apr/RL32205.pdf> [hereinafter CRS LNG SITING, SAFETY AND REGULATION]; MIKE HIGHTOWER ET AL., NAT'L NUCLEAR SEC. ADMIN., GUIDANCE ON RISK ANALYSIS AND SAFETY IMPLICATIONS OF A LARGE LIQUEFIED NATURAL GAS (LNG) SPILL OVER WATER 21, 60–62 (2004), available at [http://www.fossil.energy.gov/programs/oilgas/storage/lng/sandia\\_lng\\_1204.pdf](http://www.fossil.energy.gov/programs/oilgas/storage/lng/sandia_lng_1204.pdf).

167. CRS LNG SITING, SAFETY AND REGULATION, *supra* note 166 (requiring exclusion zones to protect against thermal radiation and flammable vapor-gas).

168. *Id.* (internal citations omitted).

assessing and comparing possible locations for facilities are crucial to minimize the costs of the system. A case-by-case assessment of each facility seems unavoidable, though consideration of establishing a default of offshore siting may be justifiable based on the current level of knowledge about the risks of LNG as an energy source.

The level of security achievable for offshore facilities is likely to be significantly greater than onshore facilities as a general matter.<sup>169</sup> Moreover, with the exception of onshore facilities in locations remote from population centers, the effects of an explosion on human life would be less catastrophic for offshore facilities. The risks of terrorism in particular make offshore siting a more protective choice compared with onshore siting. A full assessment of risks requires considerations of proportionality of risk and magnitude of harm. As noted by the Congressional Research Service, the argument against siting LNG facilities offshore also concerns terrorism:

Some policy makers have proposed that new LNG import terminals should be built only offshore to keep associated terrorism hazards away from populated areas. Such a strategy may indeed reduce terrorism risks to ports and coastal communities, but it may also increase the risks to the terminals themselves. Because offshore oil and gas facilities are remote, isolated, and often lightly manned, some experts believe they are more vulnerable to terror attacks than land-based facilities.<sup>170</sup>

This assertion, although legitimate, fails to weigh two distinct threats: the threat of environmental harm and the threat to public safety. Assuming offshore facilities are more vulnerable because of their remoteness does not seem to neutralize the considerations that weigh against onshore siting, namely the potential for loss of human life. Thus, the analysis of offshore siting in the CRS Report mentioned above is incomplete, at best. As a whole, LNG analysts must strive to include as many aspects of siting as possible so as to accurately and objectively choose a LNG siting policy.

#### *B. Achievable Goals: Vetting All Issues on Each Site*

Open debate and public process are essential to vetting the safety and efficacy of the importation and use of LNG. Moreover,

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169. Cf. PAUL W. PARFOMAK, CONG. RESEARCH SERV., LIQUEFIED NATURAL GAS (LNG) INFRASTRUCTURE SECURITY: ISSUES FOR CONGRESS 6 (2005), available at <http://www.ncseonline.org/NLE/CRS/abstract.cfm?NLEid=248>.

170. *Id.*

maintaining the public trust in the government's ability to regulate risks effectively depends on full disclosure and open debate on important issues. Since the 1970s, the history of environmental policy in the United States has enunciated a standard of open debate based on disclosure of relevant information and public participation in government decision making regarding issues with significant environmental and safety consequences. In the case of LNG facility siting, the public has a clear interest in knowing and understanding the effects of such sitings.

The debate on specific sites for LNG import facilities is driven by the specifics of each potential site considered.<sup>171</sup> FERC should seek to serve the purpose of open debate by providing meaningful information to the public, employing full notice and comment procedures, and seriously considering the comments of the public. Access to pipelines and markets are vital factors in the equation. On the East Coast, for example, deepwater access for large ships and proximity to the East Coast market drive the analysis.<sup>172</sup> The best chance for responsible development of this resource is through careful study of risks and benefits.

Despite the potential for governmental opposition to LNG sites at the state and local level,<sup>173</sup> factors such as topography, weather risks, and proximity to population centers and facilities that present additional risk factors require site-specific consideration. These points suggest that development of remote sites can serve the goal of minimizing both danger to the public

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171. Trotter, *supra* note 14 (stating the coastline of Washington County, Maine's easternmost county, is "within forty miles of an underused pipeline that runs from Nova Scotia to southern New England through Baileyville" and is "closer than any other U.S. ports to international shipping lanes by which LNG would be imported").

172. *Id.* (noting that there are at least "three proposals for building LNG terminals in Washington County, none of which has yet been submitted formally to federal regulators" each of which could "handle more than \$1 billion worth of natural gas each year").

173. Editorial, *Keep LNG Terminals Out of Local Hands*, BOSTON HERALD, June 20, 2005, at 28 (supporting President Bush's move to give federal authorities "power to usurp parochial opposition" to LNG facilities and predicting that if the states have control over LNG facility siting "there will never be another liquified natural gas terminal built on the east or west coast of this country. Period."); *see also* CA SCR 40, 2005 Leg., Reg. Sess. (Cal. 2005), available at 2005 WLNR 10712802. The California state senate resolved that:

To grant FERC exclusive control over the siting of LNG import terminals would be inconsistent with numerous federal regulatory systems in which Congress has respected the rights of states to protect their coastlines, to protect their environment, and to protect the safety of their citizens, including the Coastal Zone Management Act, the Natural Gas Pipeline Safety Act, the Clean Water Act, and the Clean Air Act . . . .

*Id.*



as well as dissent about the projects.

The Natural Gas Act gave FERC lead agency status over LNG facilities for the purpose of complying with the National Environmental Policy Act.<sup>174</sup> In this capacity, FERC coordinates federal authorizations and takes the lead on preparing the Environmental Impact Statement for a LNG terminal and related pipeline facility.<sup>175</sup> The Energy Policy Act of 2005 amended the Natural Gas Act to give FERC exclusive authority over siting and construction of onshore LNG facilities.<sup>176</sup> It also invested FERC with authority over pipelines leading from deepwater LNG terminals that are above the high water mark.<sup>177</sup>

FERC is not the only authority over LNG offshore terminals, however. The Deepwater Port Act ("DWPA") gives the Coast Guard jurisdiction over LNG terminals and pipelines outside of state waters.<sup>178</sup> In exercising this jurisdiction, the Coast Guard should also ensure public involvement in its decision making.<sup>179</sup> Moreover, the DWPA gives state governors a veto power by providing that the Secretary of Transportation "shall not issue a license without the approval of the Governor of each adjacent coastal state."<sup>180</sup> Such control is particularly noteworthy when one considers the minimal role of states in siting facilities within state waters or onshore.<sup>181</sup> States traditionally play a role in regulating dangers within their jurisdictions,<sup>182</sup> including local

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174. Natural Gas Act of 1938 § 3, 15 U.S.C. § 717(b) (2000) (referring to the Federal Power Commission, which is now FERC); Press Release, FERC, Commission Asserts Exclusive Jurisdiction for Natural Gas Facilities (Mar. 24, 2004), <http://ferc.gov/press-room/press-releases/2004/2004-1/03-24-04-lng.asp> (last visited Apr. 14, 2007) (noting that "[r]egulatory authority for the siting and construction of liquefied natural gas (LNG) import terminals rests exclusively with the federal government, the Federal Energy Regulatory Commission concluded in an order issued today").

175. See FERC, Industries, LNG—Environment, <http://www.ferc.gov/industries/lng/enviro.asp> (last visited Apr. 14, 2007).

176. Energy Policy Act of 2005 § 311(e)(1) (2005) (amending section 717(b) of the Natural Gas Act).

177. FERC, Industries, LNG—Laws and Regulations, <http://www.ferc.gov/industries/lng/gen-info/laws-regs.asp> (last visited Apr. 14, 2007).

178. *Id.*

179. *Id.*

180. 33 U.S.C. § 1508(b)(1) (2006).

181. Maritime Administration Deepwater Port Licensing, Frequently Asked Questions, [http://www.marad.dot.gov/dwp/faqs/index.asp#faq\\_7](http://www.marad.dot.gov/dwp/faqs/index.asp#faq_7) (last visited Apr. 14, 2007).

182. Donald L. Mason, Comm'r Pub. Util. Comm'n of Ohio, Cong. Testimony (Nov. 5, 2005) (asserting that successful Federal policy must respect and preserve the States' traditional roles in regulating distribution systems, planning, siting approval, reliability assurance, and consumer protection, and asserting the necessity of coordination and cooperation of both State and Federal governments in LNG siting decisions).

effects of LNG siting and operations.<sup>183</sup> While states have a legitimate interest in the safety of their residents and, thus, the local effects of LNG facilities,<sup>184</sup> and the Energy Policy Act of 2005 specifically requires consultation with states regarding LNG facilities, this requirement of consultation appears more limited than in the past.<sup>185</sup> The focus of the Energy Policy Act emphasizes federal decision-making on LNG sitings,<sup>186</sup> however the traditional canon of environmental law requiring state approval continues to apply to LNG sitings except where exempted. For example, the Clean Water Act, the Clean Air Act and the Coastal Zone Management Act apply to both onshore and offshore LNG facilities.

The Clean Water Act's state certification requirement provides a potent tool to the state in the siting and construction of a facility onshore or within the state's territorial waters . . . . The state may refuse certification, or may place conditions on the license sufficient to protect the waterbody at issue. The state's decision is generally controlling, and may not be rejected by the federal agency.<sup>187</sup>

An agency decision to isolate important factors from public debate heightens the risk of a truncated process and implementation of foregone conclusions. The approach to licensing of nuclear power plants taken by the Atomic Energy Commission and the Nuclear Regulatory Commission, and

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183. *Japan Line v. County of Los Angeles*, 441 U.S. 434, 438 (1979) (recognizing the power of the state to regulate local effects of commerce).

184. Bryan Lee, *FERC Files a Response*, BANGOR DAILY NEWS, Dec. 30, 2005, at A12. (disputing an earlier op-ed on FERC's role on LNG facility siting and asserting that the Energy Policy Act of 2005, "strengthened the ability of states to conduct safety reviews" based on the fact that "FERC does not authorize use of eminent domain to acquire land rights, which remain governed by state law").

185. Powers & Smith, *supra* note 6 (citing the Clean Water Act § 401, 33 U.S.C. § 1341 (2000), the Coastal Zone Management Act, 16 U.S.C. § 1456 (2000) (now § 307 (c)(3)(A)), and stating Section 7 of the Coastal Zone Management Act requires federal activity to be consistent with each state's coastal zone management plan). "However, it is the permit applicant which certifies consistency, and even if the state objects, the Secretary of Commerce may overrule the objection." *Id.*; see also Darren Goode, *Senate Panel To Decide How Much To Mandate Ethanol Use*, CONGRESS DAILY, May 25, 2005, available at 2005 WLNR 8296637 (explaining that FERC would be given pre-emptive authority over LNG facility siting, while states would retain some control over permitting).

186. Meeting Notice, 70 Fed. Reg. 221 (Nov. 17, 2005) (explaining inclusion of a public meeting and comment and accepting public comments on a proposed LNG facility because of the "scope and complexity of this project").

187. Powers & Smith, *supra* note 6 (citing the Clean Water Act § 401, 33 U.S.C. § 1341 (2000), and the Coastal Zone Management Act, 16 U.S.C. § 1456 (2000) (now § 307 (c)(3)(A))).

validated by the Supreme Court in *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.*, trimmed the regulatory process by separating considerations of the spent fuel from the licensing process.<sup>188</sup> The majority opinion approved the Nuclear Regulatory Agency's decision to consider transportation and disposal of nuclear fuel and waste in a separate rulemaking decision, rather than as part of the licensing adjudications for nuclear power plants.<sup>189</sup> In some cases the approach of proceeding with rulemaking on some factors of general applicability, endorsed in *Vermont Yankee*, is defensible.<sup>190</sup> Use of such an approach in siting LNG facilities may pose a significant risk that the environmental cost accounting of some sites will fall short of a full vetting. Giving short shrift to public comment and state involvement in the siting process is likely to increase public concern about the development of LNG plants—particularly if the plants are located in the vicinity of other facilities that present particular dangers or are susceptible to attack. For example, locations that are near nuclear power plants or chemical plants clearly should be subject to conditions commensurate with the risks involved. In other words, an issue of the magnitude of a LNG facility deserves assessment of risks and benefits on a site-by-site basis, and should include a balance of all benefits and all risks associated with the facility under consideration.<sup>191</sup>

## VI. CONCLUSION

To the extent that we can epitomize today's complex and polycentric world, energy consumption may present the most compelling picture of both the developed and rapidly developing world. The demand for energy and the location of energy resources dictate both domestic and international policy in

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188. *Vt. Yankee Nuclear Power Corp. v. Natural Res. Def. Council, Inc.*, 435 U.S. 519 (1978).

189. *Id.* at 554 (noting that agencies may grant procedural rights, but that reviewing courts generally are not free to impose them if the agency had chosen to grant them, and finding the agency's decision well within its discretion and reversed the court of appeal's judgment).

190. *Id.* at 519 (changing the procedure presented in this case to mean that those who challenged a particular nuclear power plant lack access to information about the transportation or disposal issues as they related to a particular power plant under consideration for licensing; thus, the adjudication did not include some issues of concern to neighbors and others who might be involved in the licensing proceeding).

191. *Regulators Are Cooperating Well Across North American Borders, but Consumers' Knowledge of Power and Natural Gas Issues is "Abysmal"*, FOSTER NATURAL GAS REPORT, Nov. 24, 2005, at 8 (providing a title that penetrates the issues), available at 2005 WLNR 19437158.

significant ways. Important questions remain regarding how to meet energy demand responsibly. The nation's dependence on fossil fuel as a primary energy source gives rise to a host of issues, ranging from price fluctuations and supply problems to the use of military action to protect energy sources in areas of the world that are subject to intense political instability. Many of the important issues in the area relate to policy as much as to science. One pivotal issue is the cost of conventional fuels compared with imported LNG and with renewable fuels.

A careful cost-benefit analysis would require public input on important governmental decisions, such as the specific sites chosen for LNG facilities, may be of greater value than efforts advocating policies that are unlikely to survive the political process. It is possible that the best strategic move for nongovernmental organizations and others concerned about public health and safety may be to focus efforts on influencing development of the safest, least destructive program of natural gas importation and use, including individualized site selection. Whether citizens will play an active role in assessing LNG as a resource option is unknowable at present and clearly dependent on the mettle of citizen groups and individuals, as well as on the responsiveness of the federal and state governments. Effective efforts in LNG site selection require commitment to the intensive and expensive process of individualized site selection. While such a site selection process is costly, it is less costly than the risks incurred in a process that sites LNG facilities without full vetting of the risks and benefits of the particular sites.