**SUMMARY FOR PAPER #1**
**Friday, October 2nd, 2009 (1:10 P.M.)**

# THE FUTURE OF OIL AND GAS LAW*

**by**

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In the first phase of this symposium fifteen years ago, I addressed a pure legal problem. I spoke about "Defining the Royalty Obligation." In this session, I will have a broader focus – the future of oil and gas jurisprudence.

My thesis is simple: Oil and gas jurisprudence has a bright future. We live in a hydrocarbons world, and that is not going to change dramatically over the next 20 years or so. In fact, world demand for oil and gas is likely to increase substantially. So there will be a place for oil and gas law and oil and gas lawyers -- who are among the people that make it possible for us to produce hydrocarbons -- for at least that time.

Let me illustrate with some data and some projections. Until mid-2008, managers, investors, government officials, and even lawyers around the world watched as oil prices at first inched upwards, and then surged. The high energy costs that energized us until a year and a half ago [and that appear poised to return when the world economy rebounds] were a result of the convergence of several factors. Some were short to mid-term, such as limited worldwide excess oil production capacity. In 2007 there was just approximately 2 million barrels excess production capacity, most of it in Saudi Arabia, in a production system that supplied a daily world oil demand of about 84 million barrels. Lack of excess capacity meant that interruptions in supply, whether caused by natural disasters such as hurricanes or man-made such as the war in Iraq, would cause prices to soar.[1] Political uncertainty was also a factor. The potential for interruptions in supply from political upheaval in Iran, Nigeria, Venezuela, or Eastern Europe encouraged hoarding and speculation, which further fueled price rises.[2] Finally, constrained

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[1] As of September 2009, a prominent Saudi claimed that Saudi Arabia held 4 ½ million barrels of oil per day spare capacity, 90% of world excess production capacity. Turki al-Faisal, "Don't Be Crude," Foreign Policy, September 2009, p. 102, at 103. Five million barrels excess capacity will greatly diminish the risk of price spikes, but it may "burn off" quickly if the world recession is short.
[2] Political uncertainty may also be a domestic phenomenon. The US presidential campaign, with its debates over what US Energy Policy should be -- emission regulations, drilling in Arctic, the Eastern OCS, Yellowstone – also encouraged speculation.

refinery capacity in the US and Europe, created economic bottlenecks that periodically drove gasoline prices artificially high. This country has built no new refineries for more than thirty years, and most of its capacity is along the hurricane-vulnerable Gulf Coast. Europe has built no new refineries for 20 years.[3]

But there has been a fourth and long-term problem -- surging demand for energy of all sorts, but particularly oil. From 2000 to 2007 world oil demand increased by 9.4 million barrels per day.[4] Consider some statistics and some projections.[5] Here is a depiction of energy consumption history and projections over the next 20 years.

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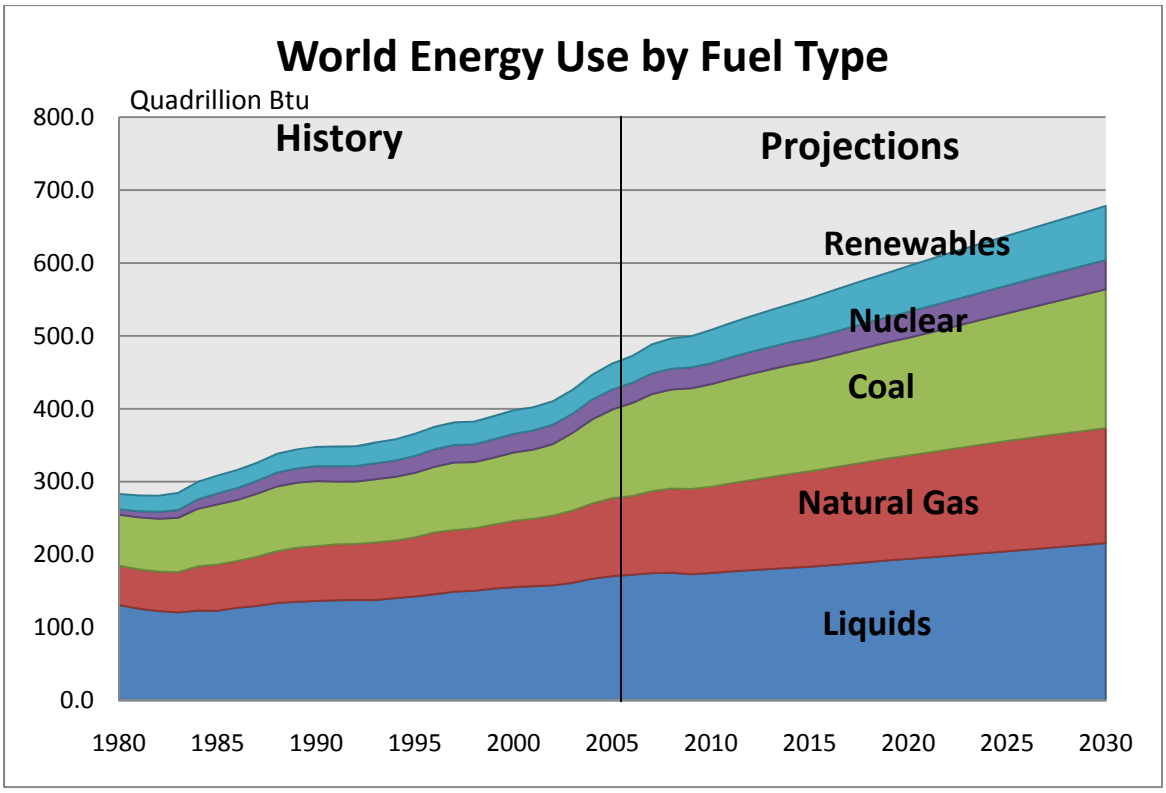
[3] "Oil Refinery Capacity Bottleneck," Peak Oil News, Sept. 13, 2006. http://www.peak-oil-news.info/oil-refinery-capacity-bottleneck/. As of June 2009, U.S. refining capacity was 17,644,000 barrels a day [http://tonto.eia.doe.gov/dnav/pet/hist/mocleus2m.htm], while US consumption was 20,680,000 barrels a day. https://www.cia.gov/library/publications/the-world-factbook/rankorder/2174rank.html?countryName=United States&countryCode=us&regionCode=na&rank=1#us.

[4] Daniel Yergin, "It's Still the One," Foreign Policy, September 2009, p. 89, at 92.

[5] Energy Information Administration, International Energy Outlook 2009. May 27, 2009, http://www.eia.doe.gov/oiaf/ieo/highlights.html. The U.S. Energy Information Administration (the EIA) is the source of most of the data in this paper. Though a part of the U.S. Department of Energy, the EIA has a good reputation for both even-handedness and competence. *See* http://www.eia.doe.gov/. Other excellent sources include the International Energy Administration, the Organization of Petroleum Exporting Countries, and many international oil companies such as British Petroleum's Annual Statistical Review [*see* http://www.bp.com/productlanding.do?categoryId=6929&contentId=7044622], ExxonMobil's Energy Outlook [*see* http://www.exxonmobil.com/Corporate/energy_o.aspx], and Shell's data on the new energy future [*see* http://www.shell.com/home/content/responsible_energy/nef/].




Worldwide energy consumption in 2006 was approximately 472 quadrillion Btus a year, up from 398 quadrillion in 2000.[6] EIA predicts that energy demand will increase worldwide by about 44%, to about 678 quadrillion Btus a year, by 2030.[7]

The increase in demand for energy and EIA's projections are based on population growth and economic growth, especially in Asia -- China and India. While energy demand will inch up in the developed nations of the world, it will bound upwards in the developing nations. Many Chinese feel that "Americans got to grow dirty for 150 years—America got to have its Industrial Revolution based on coal and oil—and now it is our turn."[8] Why should we expect that 1.5 billion Chinese will accept a standard of living less than that attained by 300 million Americans?

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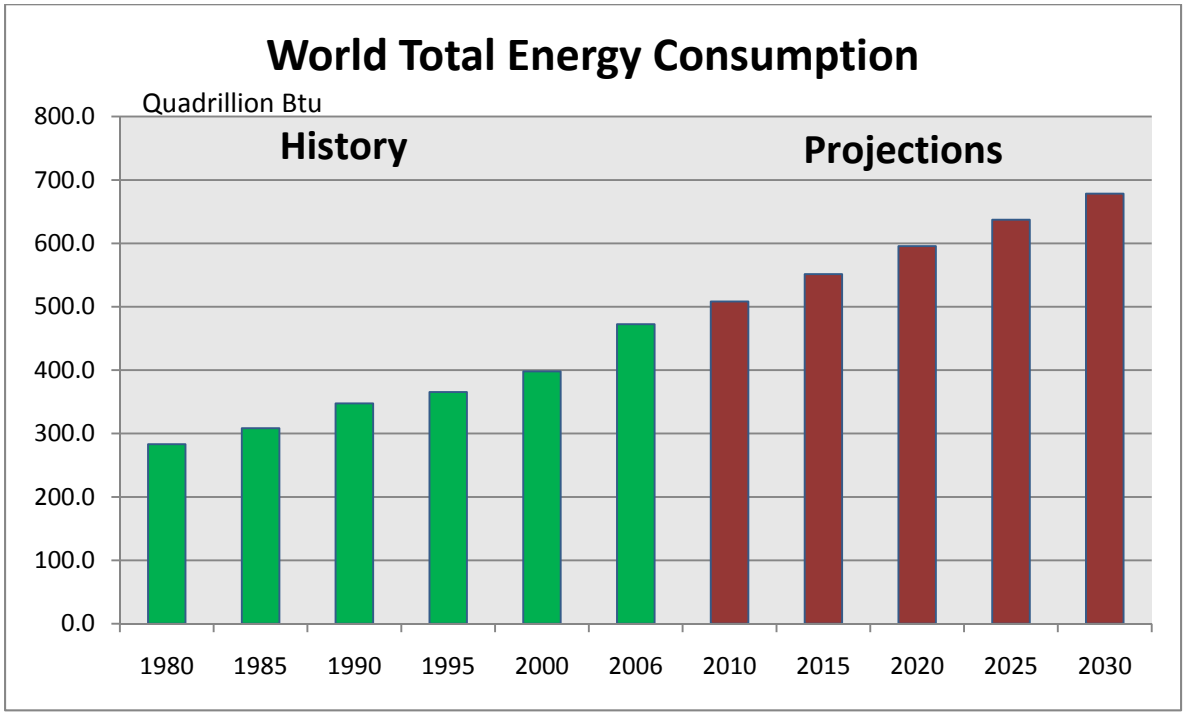
[6] Energy Information Administration, International Energy Outlook 2009, p. 1. http://www.eia.doe.gov/oiaf/ieo/index.html. For those lawyers who have forgotten their high school general science lessons, "Btu" refers to British Thermal Unit, and is a unit of energy equal to the amount of heat required to raise one pound of water one degree Fahrenheit at one atmosphere pressure; equivalent to 251.997 calories. [*see* http://wordnetweb.princeton.edu/perl/webwn?s=btu]. A quadrillion Btus is approximately equal to the amount of energy in 45 million tons of coal, or 1 trillion cubic feet of natural gas, or 170 million barrels of crude oil. [*see* http://wilcoxen.maxwell.insightworks.com/pages/137.html]. Other sources are more optimistic. ExxonMobil's "Outlook for Energy," estimates that world demand will increase just 35%. [*See* http://www.exxonmobil.com/corporate/files/news_pub_2008_energyoutlook.pdf.]

[7] *Id.*

[8] Thomas Friedman, *Hot Flat and Crowded* 241-242 (2008).

The following graph illustrates the history and projection of world energy demand growth.[9]



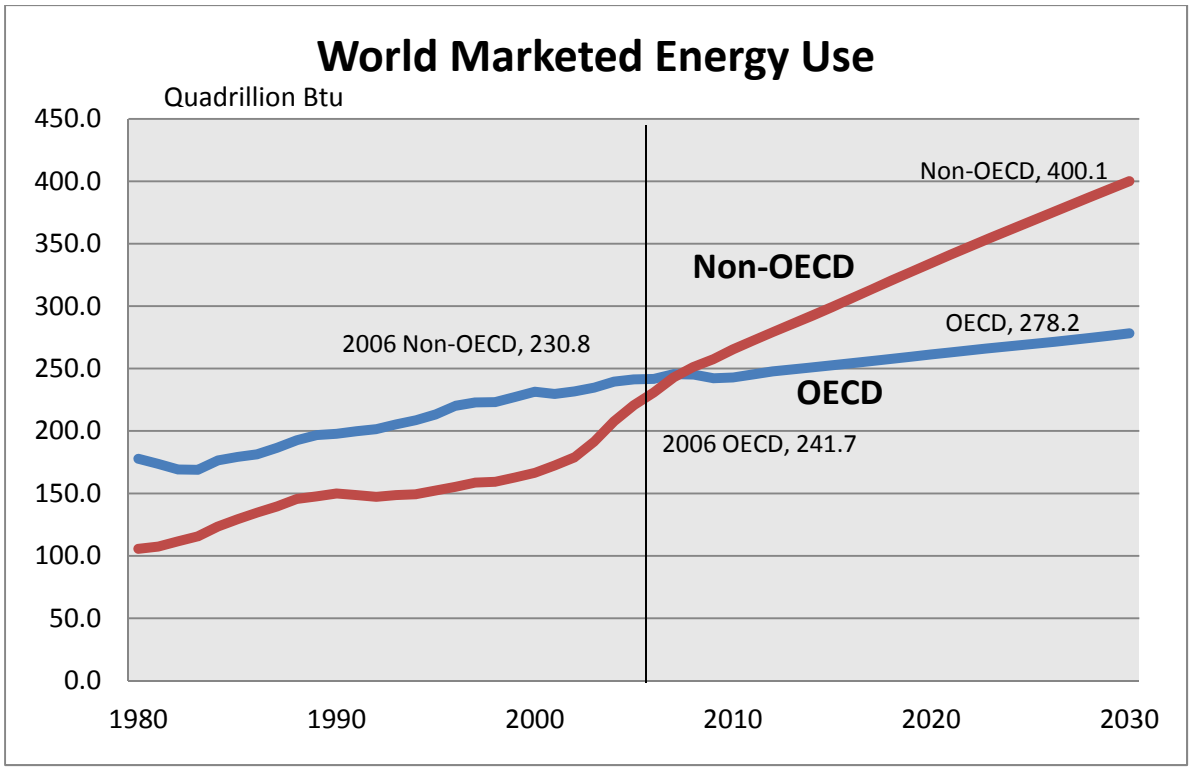

Energy consumption in the OECD nations – the major industrialized nations of the world[10] has increased at a relatively modest rate over the last 25 years and will likely increase less than 20% by 2030, largely as a result of population growth. Energy consumption in non-OECD nations, however, will probably increase by nearly 70% during the same period, both as a result of population growth and expanding economies. For example, China's economy is expected to grow 7.8% this year, notwithstanding a global recession that will likely cause the global economy to shrink by 2 ½ %.[11] India's economy grew 6.8% from April-June, 2009, compared to the same quarter in 2008.[12]

[9] Energy Information Administration, International Energy Outlook 2009. May 27, 2009, http://www.eia.doe.gov/oiaf/ieo/highlights.html.

[10] The Organisation for Economic Cooperation and Development is a group of 30 industrialized nations that seek to develop coherent economic policies. *See http://www.oecd.org*. Its member nations have approximately 18% of the world's population.

[11] UNCTAD 2009 Trade and Development Report, http://www.unctad.org/Templates/webflyer.asp?docid=11867&intItemID=2068&lang=1, reported in the Shanghai Daily, http://www.shanghaidaily.com/sp/article/2009/200909/20090908/article_413138.htm

[12] http://online.wsj.com/article/SB125169693308971767.html



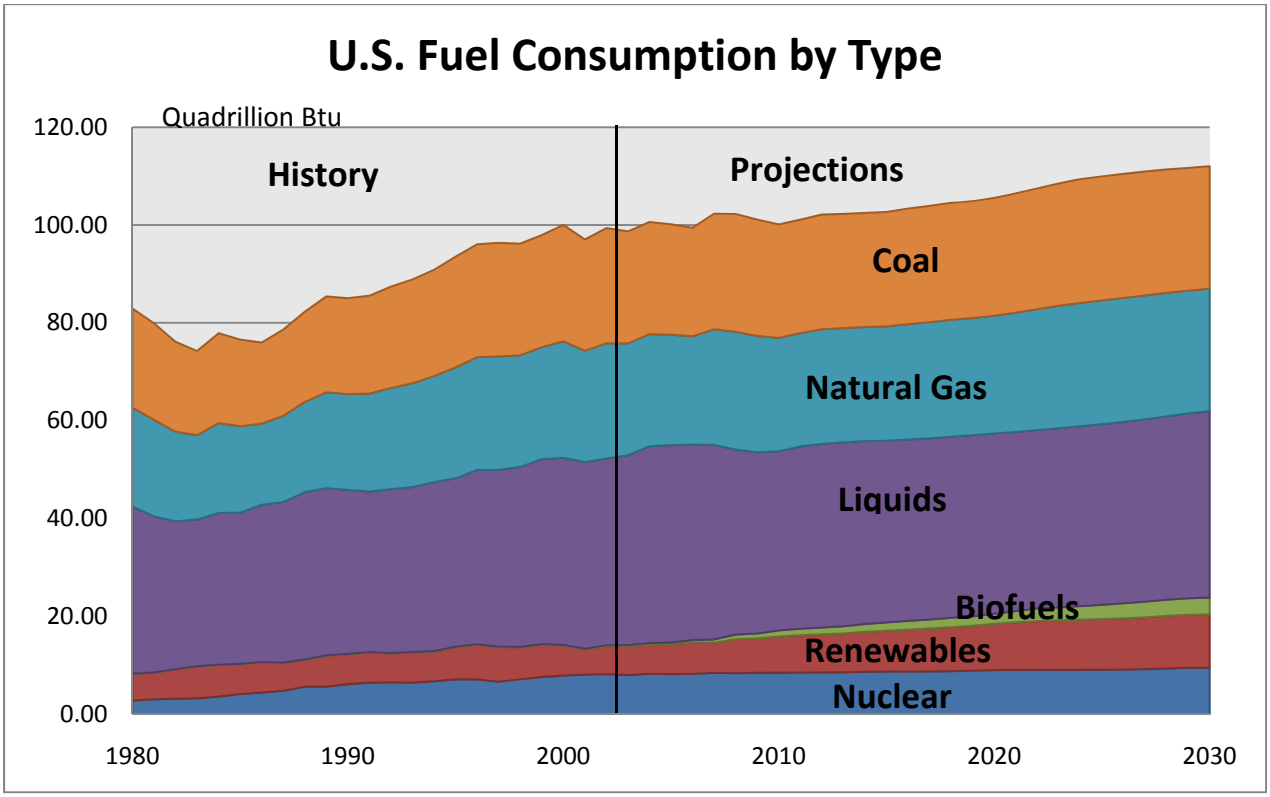

But the second thing to note from the first chart is that even by 2030, approximately two-thirds of world energy will come from hydrocarbons, from oil, gas, and coal. That will represent a significant move away from fossil fuels, which currently account for about 85% of energy consumed. Nuclear power and renewable energy will grow in importance, from a total of about 59.2 Quadrillion Btus in 2003 to about 97.1 quadrillion Btus in 2030.[13] But the bulk of world energy 30-years from now will still come from hydrocarbons, from oil, gas, and coal. The world economy runs on hydrocarbons, and likely will continue to do so for many years. Despite the fact that we are [finally] moving to diminish our reliance on fossil fuels, the transition will not take place overnight. For the foreseeable future we will live in a hydrocarbons world.

Now let's bring this a step closer to the U.S. This is a big country in area, in population, and in energy demand! The U.S., with about 4.5% of the world's population consumes approximately 21.2% of total world energy consumption,[14] and produces about 24% of world GDP[15], as well as about 24% of world carbon dioxide emissions.[16] The United States' per-capita energy consumption is also disproportionately large. In 2006, per-capita consumption in the United States was an estimated 334.6 million Btus, compared to 79.0 million Btus in Argentina,

[13] http://www.eia.doe.gov/oiaf/ieo/pdf/ieoreftab_2.pdf.
[14] http://tonto.eia.doe.gov/country/country_energy_data.cfm?fips=US US- 99.856 Quadrillion Btus. World- 472 Quadrillion Btus.
[15] US GDP: IMF- 24%, World Economic Outlook ; World Bank- 24%, World Development Indicators Database, 1 July 2009 ; CIA World Fact Book- 23%, Field Listing, GDP according to exchange rate.
[16] Energy Information Administration, Energy-Related Carbon Emissions. http://www.eia.doe.gov/environment.html

51.2 million in Brazil, and 56.2 million in China, and just 1.9 million in Malawi. Even many highly-industrialized nations consume far less energy per capita than the U.S.: Japan's per-capita consumption in 2006 was 178.7 million Btus, Switzerland's was 170.7 million Btus, and the United Kingdom's was 161.7 million Btus. [17]

And we get our energy from the same sources in about the same proportions as the rest of the world. The U.S. relies on hydrocarbons, as the graph following shows. In 2008, approximately 37.1% of the energy the U.S. consumed came from oil, 23.8% from natural gas, 22.5% from coal, and smaller percentages from renewable energy resources and nuclear power generation.[18]




But most importantly for the purposes of this essay, the graph shows that hydrocarbons -- coal, oil, and natural gas will continue to meet the largest share of total primary energy consumption in the U.S., although their share likely will decline from 85 percent in 2007 to 79 percent in 2030. The U. S. economy, like the world economy, is hydrocarbons based and will continue to rely on hydrocarbons for the foreseeable future. These facts, alone, guarantee the

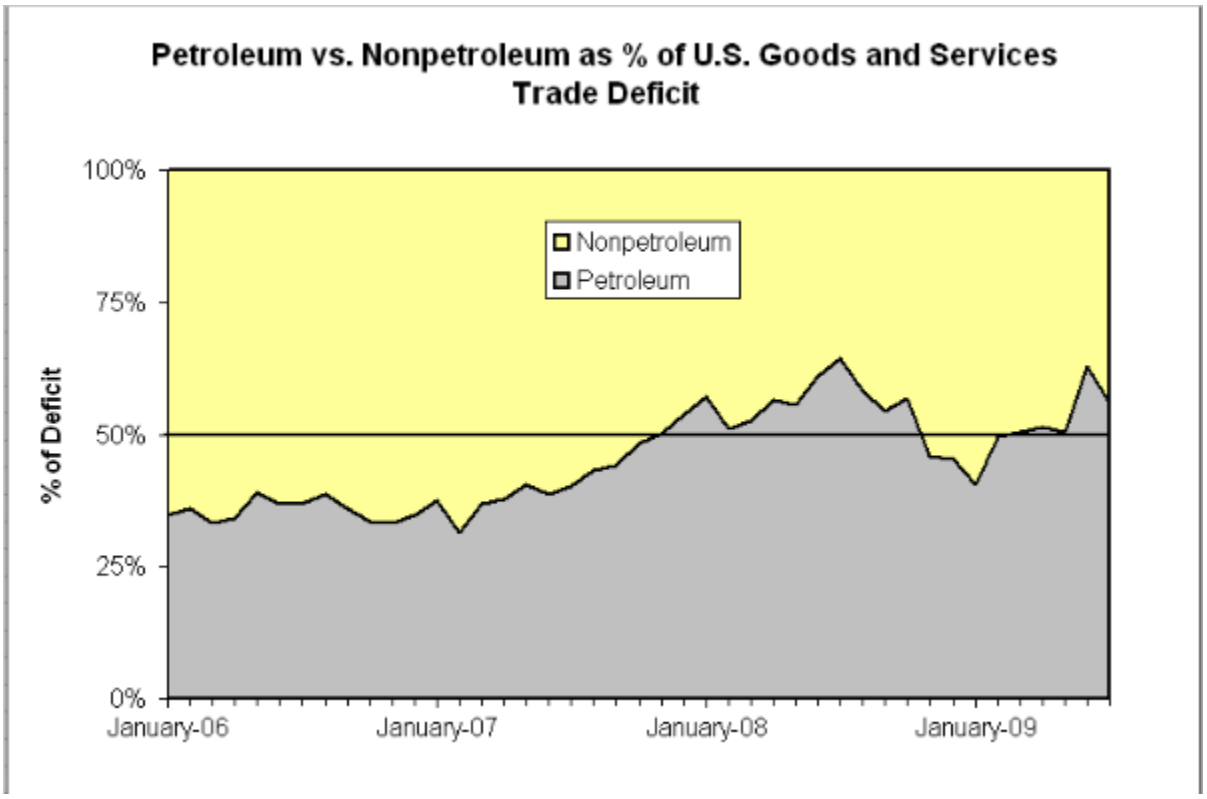
[17] All per-capita consumption data is from www.eia.doe.gov/pub/international/iealf/tablee1c.xls. Per-capita consumption is largely a matter of economic activity and geography. So some nations use much more than the U.S. In 2006, for example, Canada's per capita energy consumption was 427.2 million Btus, the United Arab Emirates was 577.6, and Qatar's was 1,023.3

[18] Energy Information Administration, Annual Energy Outlook 2009. March, 2009. http://www.eia.doe.gov/oiaf/aeo/demand.html

relevance of the jurisprudence that permits exploration for, and development and marketing of our domestic resources.

Moreover, the role of oil and gas lawyers will likely increase in importance because the U.S. cannot meet its own energy needs, and so will continue to have to trade to get a substantial part of the energy that it needs. Everybody in this audience knows that the US is a huge energy importer. At the present time, we use approximately 20 million barrels of crude oil per day, but we produce only about eight million barrels.[19] The remainder, more than 12 million barrels per day, we import. We also import about 16% of our natural gas, most of it from Canada, but two or three percent in the form of LNG . Only in coal are we self sufficient.

The cost to this country is huge. If oil prices are $70 per barrel, 12 million barrels of oil adds nearly $850 million *per day* to our trade deficit. When oil prices peaked in 2008, the cost to the US of its oil imports was more than $1.5 billion per day, a total of $50 billion for the month of July 2008,[20] well more than 60% of the U.S. trade deficit. In June of 2009, petroleum imports reached 63.7% of the total U.S. trade deficit, even with substantially lower oil prices.[21]




[19] The CIA Factbook estimates that the U.S. produced 8.457 million barrels of oil per day in 2007, while consuming 20.68 million barrels. [*See* https://www.cia.gov/library/publications/the-world-factbook/geos/us.html].
[20] U.S. Census Bureau, Foreign Trade Statistics. http://www.census.gov/foreign-trade/statistics/graphs/PetroleumImports.html. [*See also* http://www.census.gov/indicator/www/ustrade.html].
[21] *Id.*

Further, we pay a price in terms of energy security. U.S. reliance on oil imports exposes us to the threat of disruptive price shocks. The problem is not just the high cost of oil imports, but that *we depend upon oil imports that we cannot control.* Nearly half of the U.S. oil imports in 2008 (46%) came from Organization of Petroleum Exporting Countries ("OPEC") nations, and nearly a fifth (18%) from Persian Gulf sources.[22] A significant interruption in supply caused by war, natural disaster, or political disagreement could easily cause a sharp oil price spike, triggering a recession or spiraling inflation, as happened twice in the 1970s.[23]

Because of technology advances, the import picture will likely become marginally better over the next twenty years. Technology permits us to produce goods and live well with less energy use; this country is twice as efficient in energy use today than in the 1970s.[24] U.S. energy consumption in terms of Btus consumed per dollar of economic output has shrunk from 18,000 Btus to 8,900 Btus.[25] Technology also enables us to produce a higher percentages of our reserves than most of us had ever expected would be true. Finally, technology makes it possible to develop unconventional oil and gas resources that we had only dreamed about using. Shale gas is an example. The U.S. had expected to become a large importer of natural gas by the end of the first decade of the 21st Century, but shale gas development now accounts for nearly 50% of U.S. gas supply and caused U.S. estimated gas reserves to increase by 35% from 2006 to 2008. The two slides following tell the story of the impact of advances in the technology of oil and gas exploration and production.

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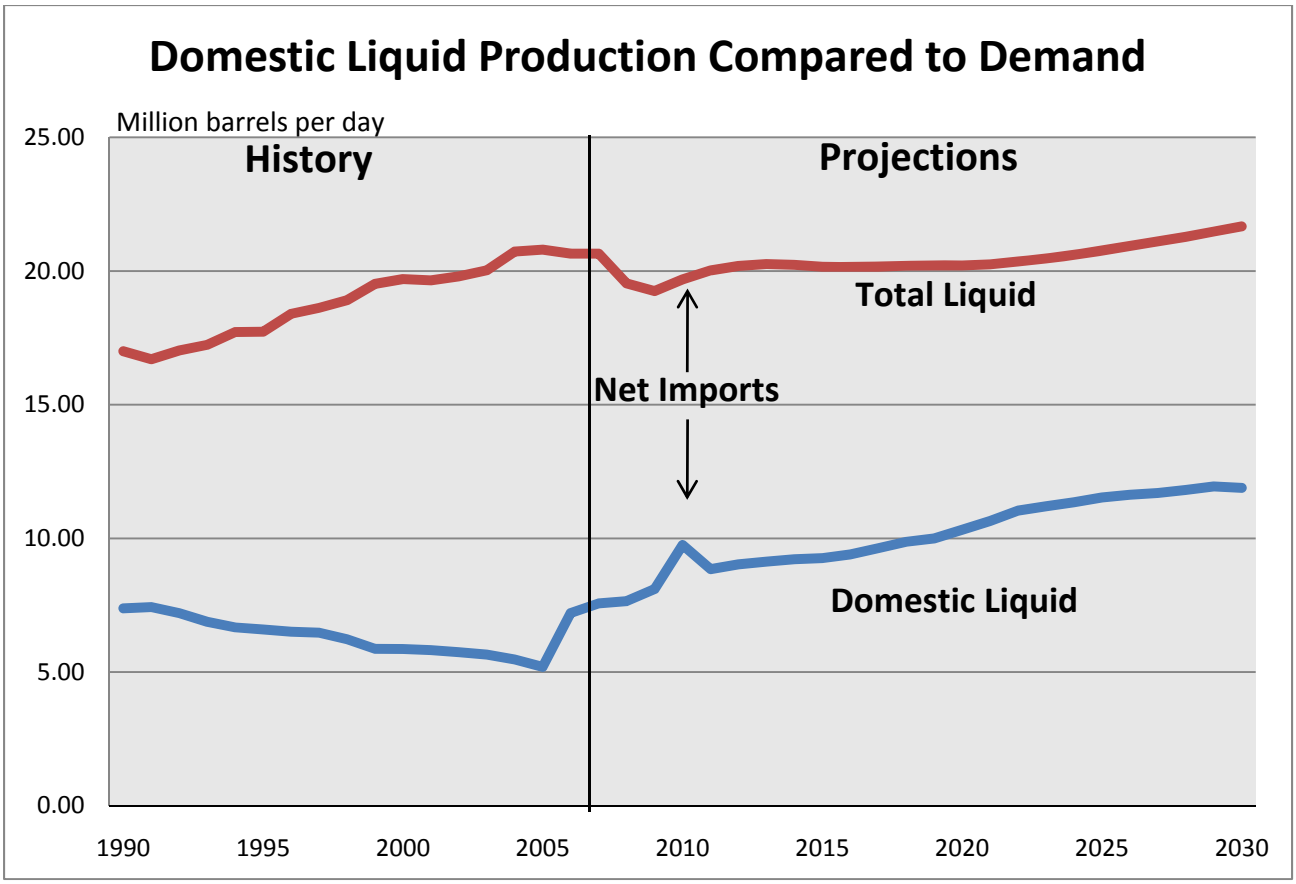
[22] Petroleum Imports by Country of Origin, available at http://www.eia.doe.gov/emeu/aer/txt/ptb0504.html.

[23] Estimates of the reduction in U.S. Gross National Product levels caused by the Arab Oil Embargo ranged from 3% to 5% per year. Estimates of the reduction in U.S. Gross National Product levels caused by the Iranian Crisis of 1979 ranged from 3% to 8% per year. Wilfrid L. Kohl, *Oil and U.S. National Security*, *in* AFTER THE OIL PRICE COLLAPSE 156-57 (1991).

[24] Daniel Yergin, "It's Still the One," Foreign Policy, September 2009, p. 89, at 95.

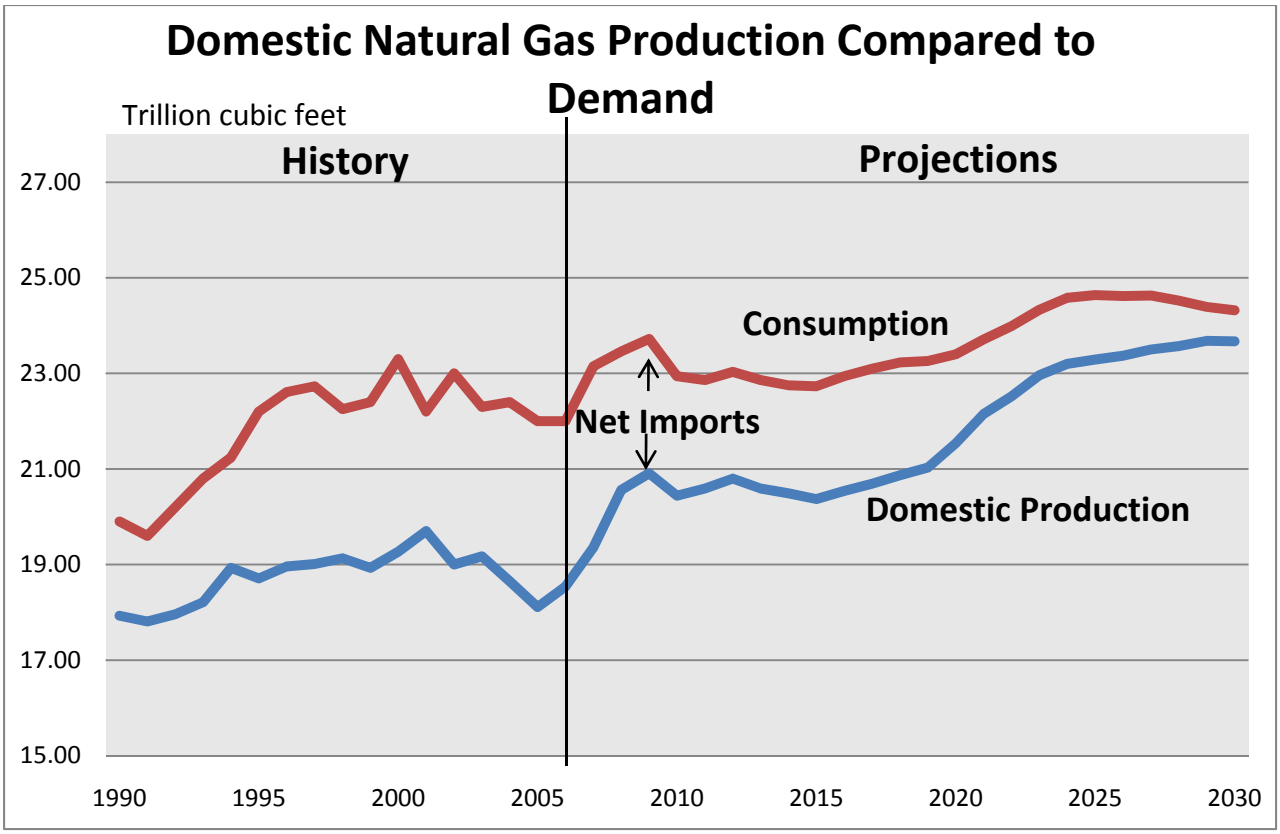
[25] http://www.aceee.org/press/e083pr.htm.




EIA projects that technology will permit the US to turn round the steady decline in oil and gas production that we have suffered for more than thirty years. The agency projects that US production of crude oil will increase a whopping 44% over 2007 levels by 2030.[26] In conjunction with conservation, which will curb somewhat the growth in U.S. consumption, increased domestic production of crude oil will narrow the gap between domestic oil production and consumption from 60% to about 40%.

The picture for natural gas is even more dramatic, as the slide following illustrates.

[26] Energy Information Administration, An Updated Annual Energy Outlook 2009 Reference Case Reflecting Provisions of the American Recovery and Reinvestment Act and Recent Changes in the Economic Outlook, Table A1, p. 16 (April 2009). Available at http://www.eia.doe.gov/oiaf/servicerpt/stimulus/index.html.




The technology that permits exploitation of unconventional gas resources like shale gas should permit us to narrow the import gap for natural gas from 16% of our usage to just 3%, according to EIA. In part that reflects increased natural gas production, which EIA projects will increase nearly 24% by 2030[27] and in part smaller increases in demand for natural gas, which EIA projects will stay basically flat from 2007 to 2030.[28]

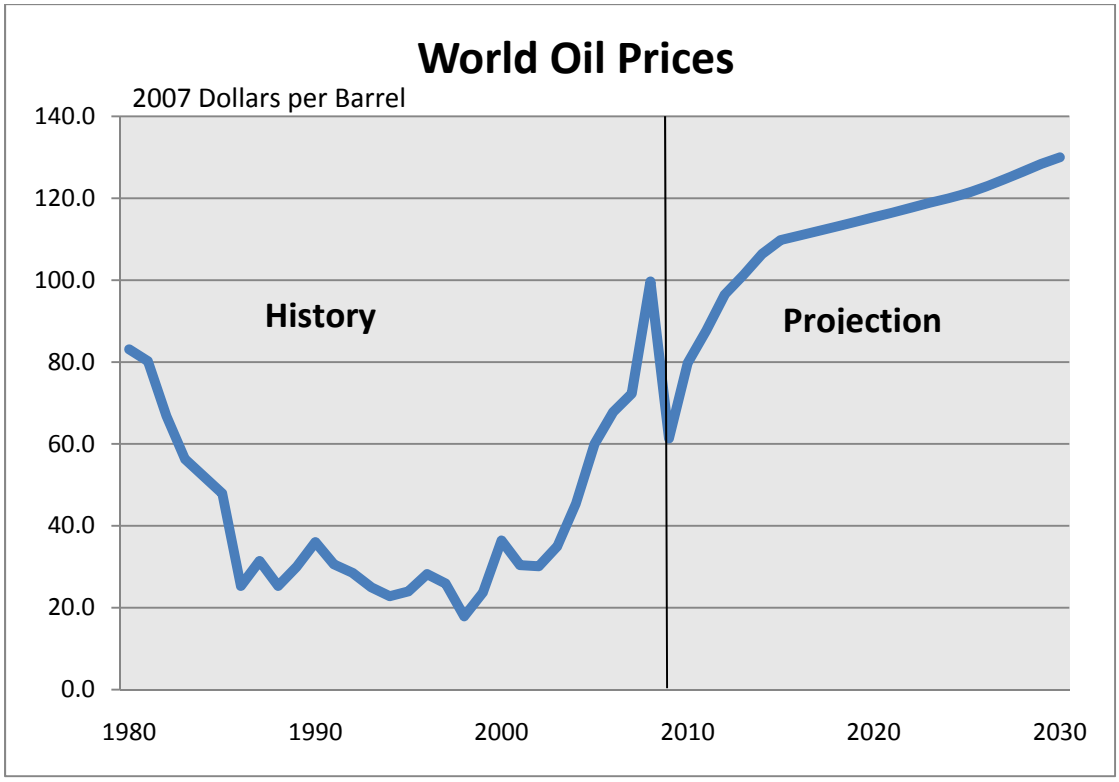
Still the cost of our energy imports, particularly for oil, will be huge, because increased world demand will likely drive up the price. EIA estimates that the price of imported oil will nearly double from 2007 to 2030, from $63.83 in 2007 to $124.36 in 2030 in 2007 dollars.[29] And high

[27] From 19.84 quadrillion Btus in 2007 to 23.67 quadrillion Btus in 2030. Energy Information Administration, An Updated Annual Energy Outlook 2009 Reference Case Reflecting Provisions of the American Recovery and Reinvestment Act and Recent Changes in the Economic Outlook**,** Table A1, p. 16 (April 2009). Available at http://www.eia.doe.gov/oiaf/servicerpt/stimulus/index.html.

[28] The projected increase is from 21.86 quadrillion Btu in 2007 to just 22.02 in 2030. Energy Information Administration, An Updated Annual Energy Outlook 2009 Reference Case Reflecting Provisions of the American Recovery and Reinvestment Act and Recent Changes in the Economic Outlook**,** Table A2, p. 20 (April 2009). Available at http://www.eia.doe.gov/oiaf/servicerpt/stimulus/index.html.

[29] Energy Information Administration, An Updated Annual Energy Outlook 2009 Reference Case Reflecting Provisions of the American Recovery and Reinvestment Act and Recent Changes in the Economic Outlook**,** Table A1, p. 16 (April 2009). Available at http://www.eia.doe.gov/oiaf/servicerpt/stimulus/index.html. This is EIA's "reference case," its most likely scenario. In "nominal" 2030 dollars, the "low price" estimate for 2030 was $165.45/barrel**.** The high price estimate was $196.81/barrel. The reference case was $180.66. Energy Information Administration, Annual Energy Outlook 2009**,** Table B1, p. 152 (March 2009). The graph shown is based on data from: http://www.eia.doe.gov/oiaf/ieo/highlights.html.

energy prices invariably mean that energy lawyers are in high demand and that energy issues are frequently presented to the courts.




What this data signifies is that oil and gas law is not yet a dying subject. There will continue to be a need for oil and gas and coal, and for lawyers who understand the principles of property, contract, regulatory, and tax law that apply to private mineral rights and transactions that involve them.