An Analysis of the Oil and Natural Gas Markets

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By

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About the Author

Kevin Lindemer has 30 years of experience in the oil and downstream petroleum industries and is an expert on the global oil industry. He has led numerous strategic consulting and research projects around the world in the energy, biofuels, oil and downstream oil business and has authored numerous articles and papers covering many aspects of the oil and energy industry, testified before the *U.S. Senate Energy and Natural Resources Committee,* guest lecturer in business schools in the Boston area, and spoken at numerous industry conferences.

His extensive background in the oil industry includes serving as Executive Managing Director of Global Insight's Energy Group, Director of Strategy and Business Development at Irving Oil Corporation; Senior Director in the Oil Practice at Cambridge Energy Research Associates (CERA) of Cambridge, MA for 14 years; and as a planning and strategy analyst for CENEX Petroleum (CHS).

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An Analysis of the Oil and Natural Gas Markets

The U.S. oil and natural gas markets are undergoing significant and rapid changes that have both domestic and global implications. As new policies and regulations are considered, it is important to carefully consider the changes that are now underway and what they may mean for future government actions.

Summary Points

U.S. energy policy changes over time as perceptions of future supply and demand change:

- Long-term oil and gas price forecasts are revised substantially from one year to the next as markets change.
- The world oil and North American natural gas markets are transitioning from what was recently considered a future of tight supplies and high prices to one of abundance and low prices.
- Global oil reserves are rising rapidly, which could signal lower oil prices.
- As the global economy grows, it requires less and less oil to generate each new dollar of GDP.
- The U.S. refining industry has become a major supplier of diesel fuel and heating oil to the global market.
- North American natural gas markets can be characterized as being 'short' of both demand and customers.
- U.S. natural gas demand is growing rapidly in the power generation and industrial sectors but is declining in the residential and commercial sectors.
- North America could become a major LNG exporter over the next few years due to the abundant supply of gas and low prices.
- Signposts are emerging that indicate the possibility for higher natural gas prices and lower oil prices.

Responding to the changing developments in energy markets has been an ongoing effort for policymakers at every level of government. Governments are constantly regulating or de-regulating energy based on the real and perceived societal needs and goals. Often policies adopted to address a particular energy issue need to be revised as the result of market responses which are different than anticipated, technological advancements or unintended consequences from previous policy actions. In some cases, the policy adopted as the solution causes different problems and thus impedes the efficiency of the market.

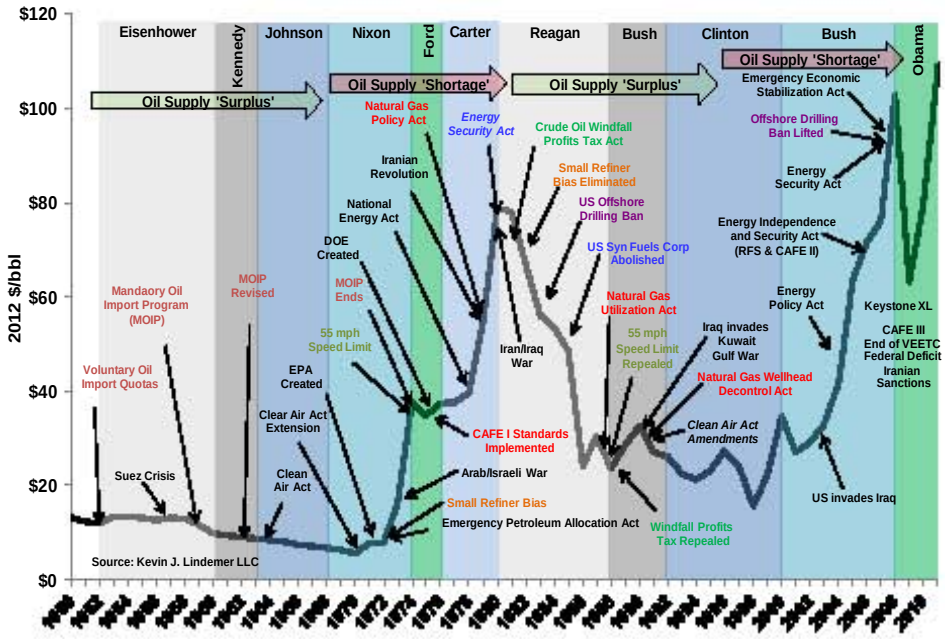
Energy Policy: Variable not Constant

U.S. energy policy has often been driven by the existing perceptions of future supply and demand (Figure 1). As a result, U.S. energy policy has changed in emphasis several times over the last 70 plus years. As energy supply and security concerns wax and wane, polices are enacted, repealed, modified, expire, etc. Today the world energy markets are

transitioning from a mindset of shortage, as exemplified by the "Peak Oil" view, to a mindset of surplus which is driven by the growing abundance of shale-based oil and gas.

Figure 1

US Energy/Environmental Policy: Driven by Perceptions of Future Oil Supply and Subject to Repeal or Change



Energy prices, supplies, reserves, and expected changes in demand have often driven energy policy. Unfortunately, predicting any one of these factors is difficult -- much less all of them. Despite earlier predictions that America's days as an energy leader had long passed, America is returning to being a dominant producer of oil and the world's leading producer of natural gas. These developments have resulted from technological improvements in energy exploration and development that were not anticipated a scant ten years ago. In fact, the U.S. has just surpassed Saudi Arabia as the world's largest liquids fuels producer.

Long-term Price Forecasts: Change with Prevailing Market Fundamentals

It has been suggested that EIA's most recent long-term oil and gas price forecasts are, in part, justification for consideration of expansion of the residential natural gas customer base in New York. That forecast is for oil and gas price differentials to remain wide for years and decades to come. However, long-term oil and gas prices forecasts have changed dramatically over the years and are revised every year as new information becomes available (Figures 2 and 3).

Figure 2

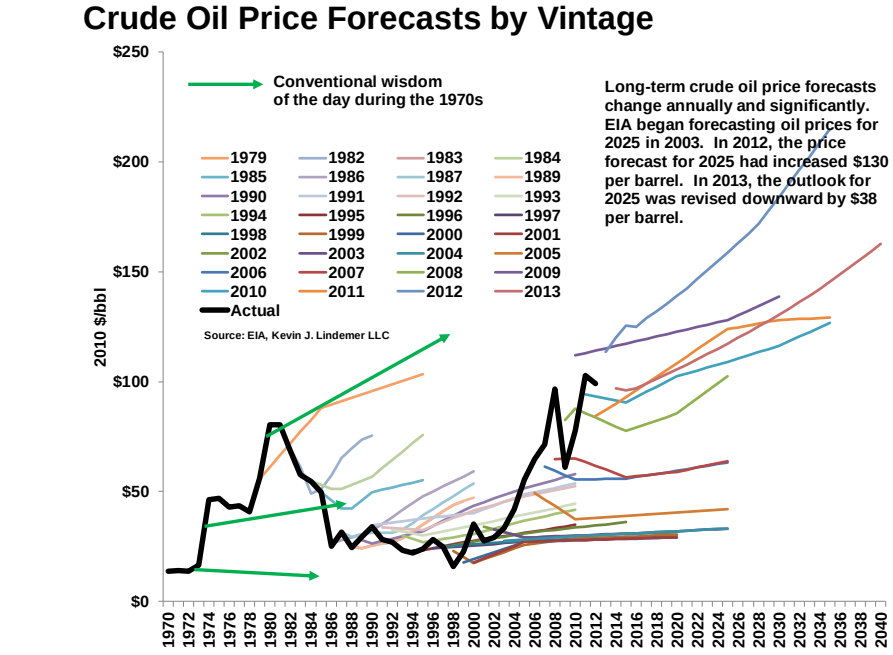
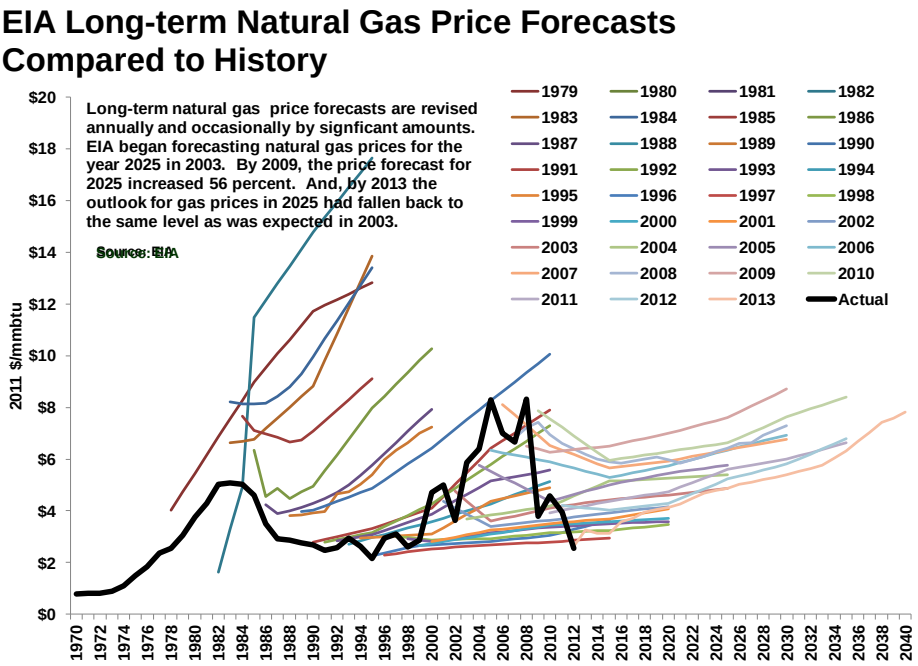


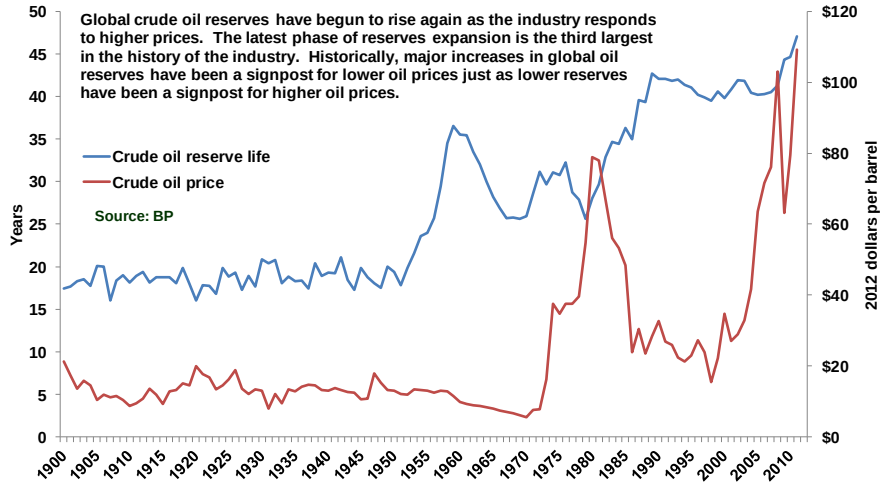
Figure 3



Over the course of the past five years, global and North American oil reserves have been rising at historically rapid rates as the upstream industry responds to high oil prices (Figure 4), and upstream technology is deployed that allows shale oil resources to be developed -- even at relatively low prices. Worldwide reserves are rising at a rate that is consistent with weaker future oil prices. At the same time, demand growth worldwide has not been sufficient to absorb rising production. As a result, OPEC spare capacity as a percent of global demand is rising to a level that is also an indicator that downward pressure on oil prices is building.

Figure 4

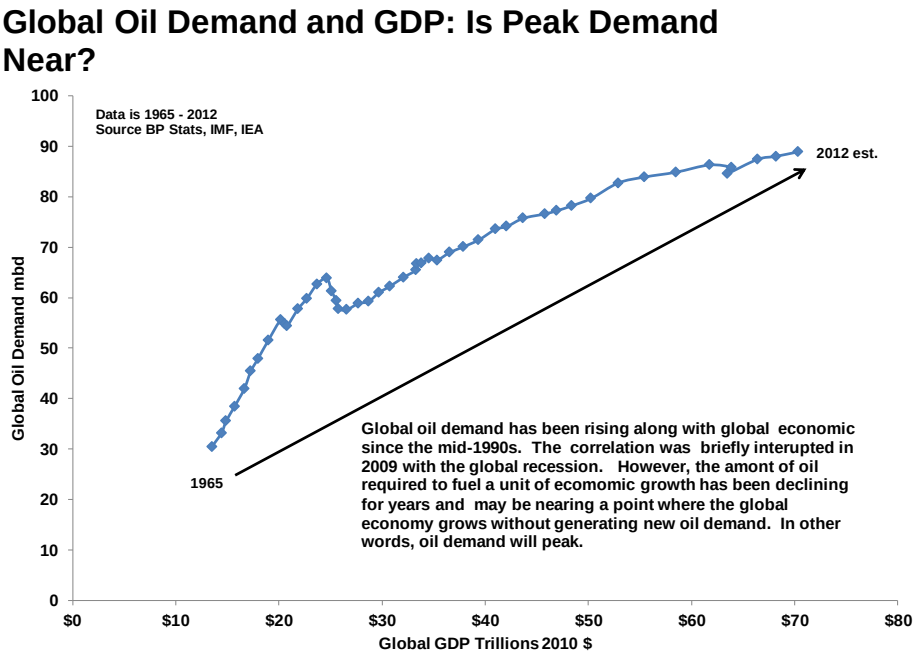
Crude Oil Prices and Reserves Have Been Linked: Recent Increases in Global Oil Reserves Indicate a Growing Possibility of Lower Prices



Oil Demand: Slowing Global Growth, Is Peak Demand Far Off?

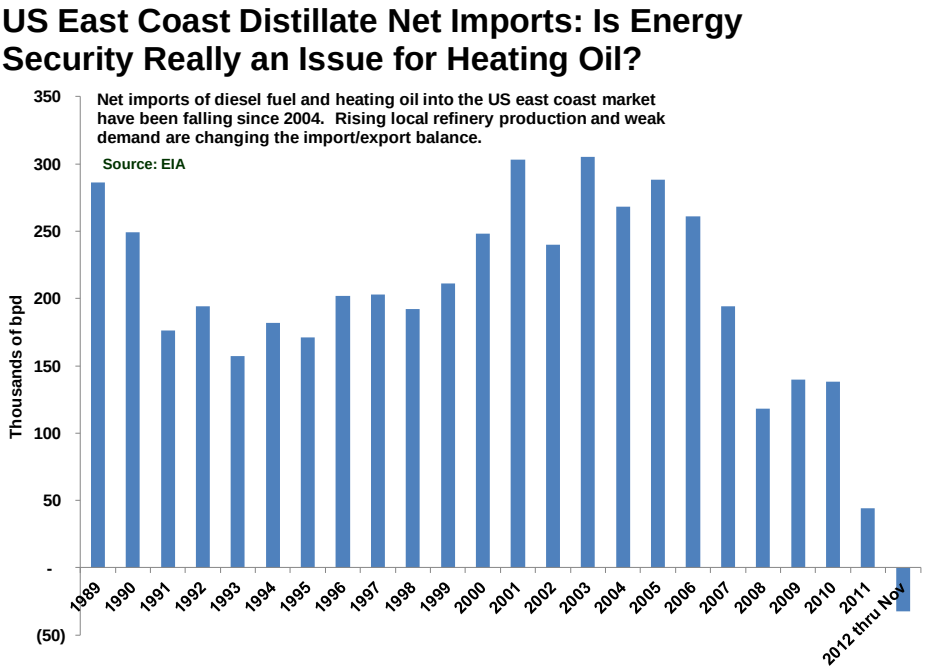
The oil intensity of the global economy -- the amount of oil needed to generate a unit of economic growth -- has been declining for many years. Figure 5 shows that the correlation between world oil demand and economic growth is weakening and that the amount of oil consumed worldwide could be approaching its peak. In the last few years, global economic growth has been generating oil demand growth at a decreasing rate. It is possible that within the next several years economic growth will not require additional oil demand. At that point, oil demand ceases to grow and could decline. Major oil-consuming countries, including China, have in place and are adopting policies designed to significantly slow the rate of growth in oil demand or reduce the level of oil demand.

Figure 5



U.S import dependency is falling as production rises. This is the case for both crude oil and refined products. As Figure 6 shows, the U.S. east coast market is becoming a net exporter of heating oil and diesel fuel. In addition, the imports that are required are almost entirely from eastern Canadian refineries whose primary market is the U.S. east coast.

Figure 6



North American Natural Gas: Abundant Supplies, Scarce Customers

Natural gas demand in the U.S. has been rising rapidly due to low prices. As shown in Figure 7, natural gas has been displacing coal in power generation due to both the low commodity price of natural gas and the low capital cost of building a gas-fired power plant compared to a new coal plant. This trend is expected to continue well into the future.

Nationally, natural gas demand has been rising in the power generation and industrial sectors. Pipeline exports of natural gas have also been increasing. Since 2002, gas demand has risen 10 percent in these areas while falling 12 percent in the residential/commercial sectors (Figure 8).

Prices may be part of the reason for the difference in demand trends between these two groups of sectors. The natural gas price for industrial and power generation users tends to trend very closely with the commodity price of natural gas. However, the price of natural gas charged to residential/commercial customers is less responsive to commodity price changes. The U.S. average price difference between the commodity price and the prices for industrial and electric power consumers has not changed over the years.

Figure 7

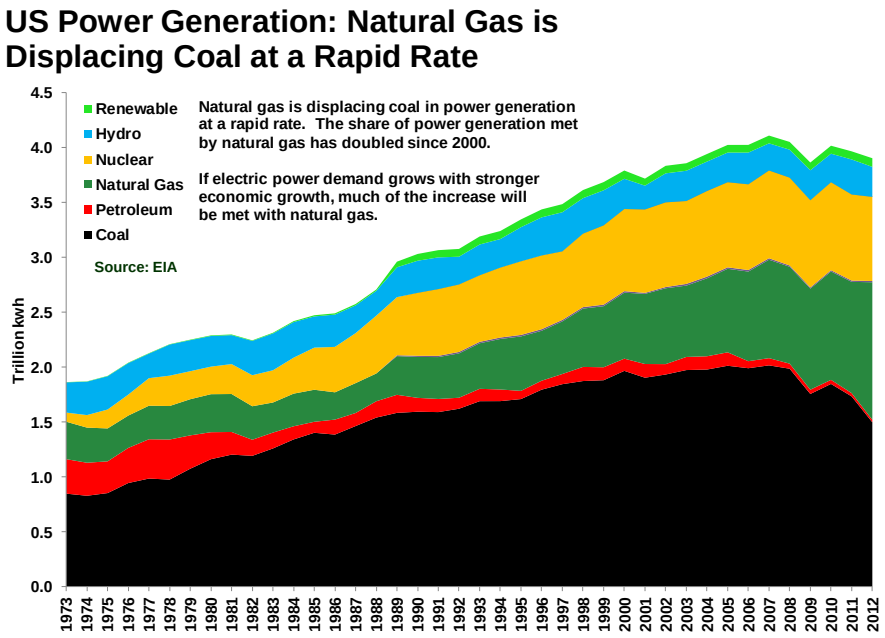
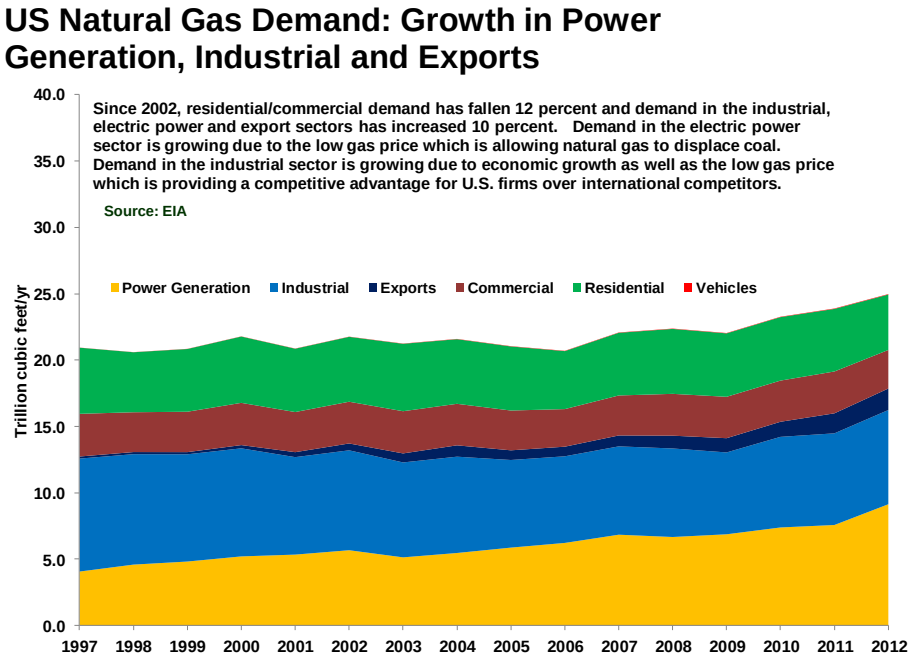
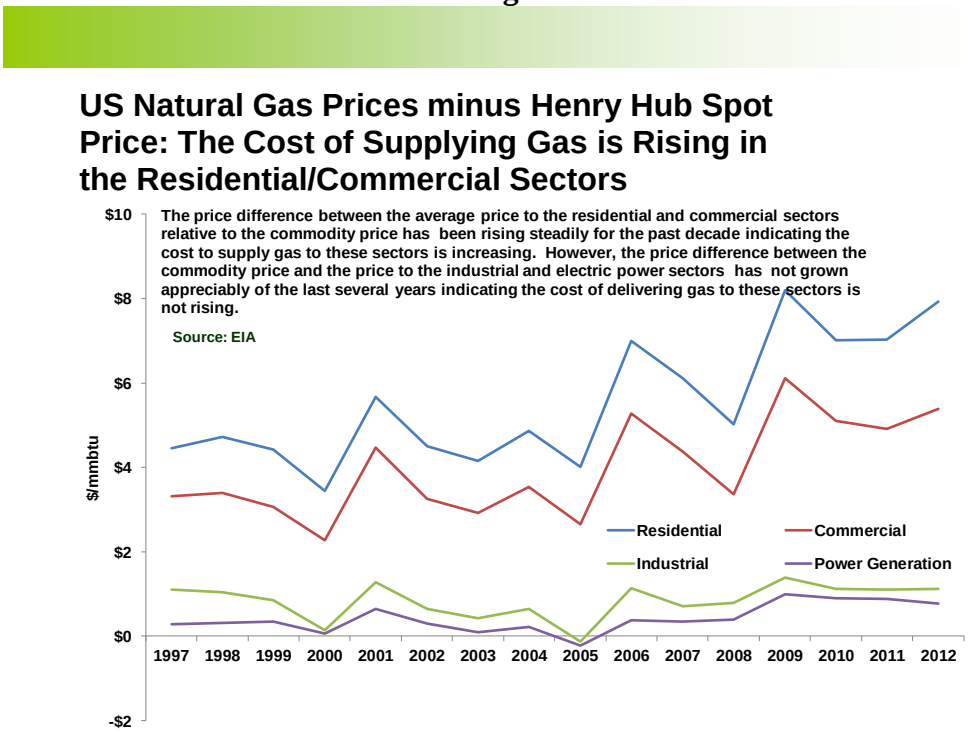


Figure 8



However, the U.S. average price difference between the commodity price and the residential/commercial prices has nearly doubled since 2003. In New York, the price differential between the commodity price and the residential and commercial prices has increased 195 percent and 32 percent, respectively, since 2003. This suggests the cost to supply these sectors is rising while the cost to supply industrial and power generation is not (Figure 9).

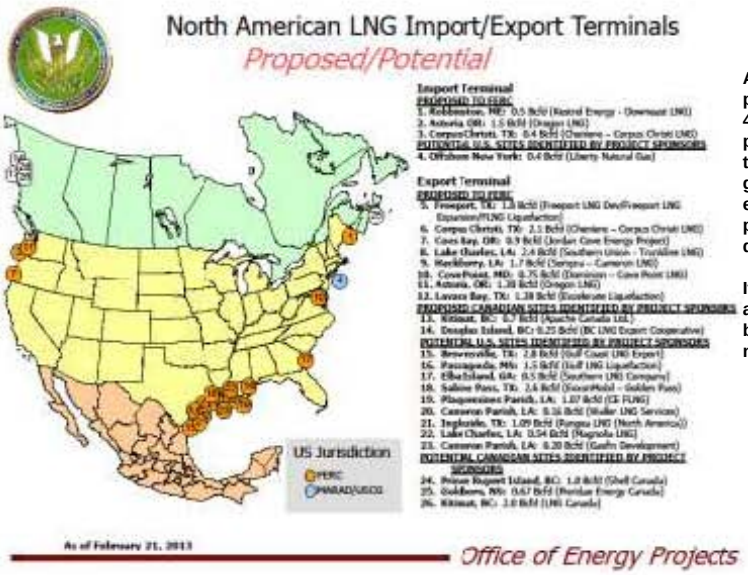
Figure 9



The current natural gas supply surplus may only be temporary as the market responds to low prices. For example, in the United States, several LNG export terminals are being considered. Currently, at least 21 LNG export projects have been proposed with combined capacity of 27 bcf/d or about 40 percent of current U.S. natural gas demand (Figure 10). In addition, natural gas is playing a major role in fueling economic recovery. As natural gas use rises in the power generation and industrial sectors or is exported, it is possible that natural gas prices will rise from their recent low levels. As a result, the price differential between oil and gas will narrow.

A further uncertainty is the future policy governing shale gas and oil production. If future government policies slow production or restrict access to resources, the price of natural gas could rise.

Figure 10



At least 21 LNG export projects in the US lower 48 and Canada have been proposed by 2020. These total over 27 bcf/d of natural gas demand which is equivalent to about 40 percent of 2011 US gas demand.

If a substantial amount of this capacity is built, it could cause US natural gas prices to rise.

Source: FERC

The Signals Point to Continued Changes in Relative Oil and Gas Prices

Which way prices will move for oil and gas in the future is uncertain, and will be affected by many factors that cannot be adequately modeled. However, in weighing possibilities, it seems there is a growing probability that oil prices will move down in the future while natural gas prices may move up (Figure 11).

There are a growing number of signposts from both the oil and natural gas markets indicating that oil and gas prices may begin to converge over the next several years. Should the price premium for oil fall relative to natural gas, the fuel cost savings from switching to natural gas will erode. If this were to occur, investments made by homeowners, investors or utilities to accomplish such a switch may become uneconomic.

Figure 11

On Balance: Policy and Market Fundamentals May be Pointing to Greater Risk for Higher Natural Gas and Lower Oil Prices – Policy is the Greatest Risk

	Lower Prices	Higher Prices

Oil and Refined Products	• Mature developing country demand fundamentals
	• On-going global demand responses to record high oil prices
	• Global demographics
	• Rising domestic and international reserves and production
	• Policy measures:
	  ○ CAFÉ standards worldwide
	  ○ Biofuels
	  ○ Alternative fueled vehicles
		• Rising demand in emerging markets
		• Policy uncertainties:
		  ○ Hydraulic fracturing-related regulations

Natural Gas	• Rising domestic supplies
	• Technology and innovation
		• Demand fundamentals
		• Policy measures and potential developments:
		  ○ Hydraulic fracturing-related regulations
		  ○ Coal-fired power plant emissions
		  ○ LNG exports
		  ○ Rising costs to upgrade, maintain and expand distribution
		  ○ Sustainability of government subsidies for renewable energy