PPHB
ENERGY INVESTMENT BANKING

MUSINGS FROM THE OIL PATCH

April 16, 2013

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Note*: Musings from the Oil Patch reflects an eclectic collection of stories and analyses dealing with issues and developments within the energy industry that I feel have potentially significant implications for executives operating and planning for the future. The newsletter is published every two weeks, but periodically events and travel may alter that schedule. As always, I welcome your comments and observations.* Allen Brooks

Obama Not Lacking Advice About Keystone XL Decision

The draft report stated that the pipeline's denial would have little impact on the status of global climate change because Canada will develop its oil sands resource

Ever since the State Department released its draft environmental review of the Keystone XL pipeline without formulating any opinion or recommendation, which infuriated environmentalists opposed to the line's construction, lobbying on both sides of the approval issue has been intense. The draft report stated that the pipeline's denial would have little impact on the status of global climate change because Canada will develop its oil sands resource. The report stated, "Approval or denial of the proposed project is unlikely to have a substantial impact on the rate of development in the oil sands, or on the amount of heavy crude oil refined in the Gulf Coast area." The draft review further projected that the pipeline would deliver a temporary economic boost in terms of jobs and taxes, but it identifies 13 vulnerable species that could be hurt, such as the whooping crane and the greater sage-grouse. It says the project could hurt farmland soil and water supplies, but it says steps could be taken to minimize these potential problems.

According to Inside Climate News, it appears the secrecy of the comments may include withholding them from government agencies

The report, officially released at the end of February, established a 45-day period commencing March 1st for the public to provide comments on the draft. A public hearing will be held in Grand Island, Nebraska on April 18th for comments from citizens about the construction of the pipeline. As part of the public comment process, the State Department has established a web-based electronic docket, however, the comments themselves are not going to be available online for the public to access and read. According to *Inside Climate News*, it appears the secrecy of the comments may include withholding them from government agencies like the Environmental Protection Agency (EPA) and Departments of Energy, Interior, Transportation and Commerce.

One cynic commented about the Obama administration accepting a transparency award behind "closed doors" in 2011

This controversy has erupted on the environmental blogs with sharp attacks on the "most transparent administration ever" Obama government. One cynic commented about the Obama administration accepting a transparency award behind "closed doors" in 2011. *Inside Climate News* has submitted a Freedom of Information Act (FOIA) request for the release of the most significant comments and that their release is expedited so hopefully the public can receive documents before the pipeline is approved and while there are key government decisions still to be made. However, the environmental blogs are reporting that the State Department and the CIA were the top two government agencies most likely to deny FOIA requests outright (44% and 49%, respectively). Since the comments are in response to an impact statement that is not final, the State Department could very well refuse to respond to the FOIA request with copies of comments before a final decision is made.

During the Senate budget negotiations a non-binding budget amendment (sense of the Senate) was passed with a veto-proof 62 favorable vote margin, including 17 Democrats

After the State Department draft environmental review was released news agencies, magazines and newspaper editorial staffs have weighed in urging the approval of the permit based on economic benefits from the pipeline's construction and the lack of environmental concerns. During the Senate budget negotiations a non-binding budget amendment (sense of the Senate) was passed with a veto-proof 62 favorable vote margin, including 17 Democrats. Within days of the vote, at least three Democratic Senators who voted in favor indicated they voted that way because they want the government to consider using all avenues available to gain revenues from the project. In essence they were announcing that had the measure been a binding vote, they would not have supported the pipeline, dropping the vote margin below the veto-proof threshold.

The State Department draft report shows only 3,900 construction jobs created during the 1-2 year construction phase (multiplier effect yields an estimate of 42,000 total temporary jobs created) and 35 permanent jobs

Recently a Pew Institute poll of Americans found that 66% favor building the pipeline suggesting significant support because of its perceived economic benefits. Those benefits have been targeted by environmental opposition that point out the State Department draft report shows only 3,900 construction jobs created during the 1-2 year construction phase (multiplier effect yields an estimate of 42,000 total temporary jobs created) and 35 permanent jobs. They also point out that the State Department acknowledges that the pipeline will not help Americans as its purpose in moving Canadian oil sands output to the Gulf Coast for either refining or export is designed to eliminate the bottleneck of crude in the Midcontinent area that will raise oil prices, and therefore gasoline and diesel pump prices. Thus, the environmentalists see Keystone as merely helping big oil companies who are despised by this group. The Pew poll was taken shortly before the ExxonMobil (XOM-NYSE) oil pipeline rupture and resulting spill that contaminated a stream and the backyards of homes in an adjoining neighborhood. The poll also showed that 69% of those surveyed believe the earth is warming, which is up 12 percentage points from a survey in 2009, although unchanged from the results of a poll last fall.

Exhibit 1. Exxon Oil Spill In Arkansas Neighborhood

Source: Greenpeace

The *Financial Times* editorialized that the Keystone pipeline should be approved by the President but it should be linked to a carbon tax

A former key environmental advisor to President Barack Obama said he will not be swayed by public opinion polls. He advised that the President will allow the review process to function and will rely on the recommendation of Secretary of State John Kerry. A week ago, the *Financial Times* editorialized that the Keystone pipeline should be approved by the President but it should be linked to a carbon tax, although the paper acknowledged that there was little chance that would be passed by Congress. Other media outlets generally opposed to the pipeline are grudgingly yielding to the public polling support, while arguing for compensating environmental actions. A recent letter to the editors of *The Wall Street Journal* from John Engler, president of the Business Roundtable, urged immediate approval of Keystone but also argued that it should be a part of an energy strategy for America's future that the Roundtable CEO-members concluded is sorely lacking after a year's examination of the issue. We wonder why it took the CEOs a year to figure out that the U.S. doesn't have an energy policy.

It is becoming apparent that a decision on the Keystone permit may not come before October

At the time of the *Financial Times* endorsement of Keystone, President Obama was fundraising in San Francisco. Two of the four fund raisers were sponsored by people officially opposed to the pipeline (investment manager Tom Steyer) or unofficially opposed (environmental philanthropist Gordon Getty, son of the oil magnet). Media reports suggest the President did not offer any opinion about Keystone at his meetings, but rather he discussed the need for as strong an economic push to help the Middle Class as for environmental protection. As it is becoming apparent that a decision on the Keystone permit may not come before October, we continue to believe the President will reject it with a renewed push for increasing the use of natural gas, which the energy industry has clearly acknowledged is a "job creator." At the same time, we

suspect he will push for greater oversight of hydraulic fracturing to ensure that the development of our natural gas resources is done in the safest and most environmentally-friendly manner. This is the proverbial "good news, bad news" or Hobson's Choice dilemma facing the petroleum industry and its supporters.

China And The Importance Of The South China Sea

China realizes it has emerged as a super power, and with that status it must demonstrate its power meaning it must establish dominance in the Pacific region

The world has been riveted with the drama unfolding in the northern Pacific region as North Korea rattles its rockets and threatens war. One of the key players in this drama is China, a long-time supporter of North Korea. China has many conflicting geopolitical objectives, some of which are driven by the nation's need for increased energy supplies and raw minerals to power its economy in order to support its 1.2 billion in population. China realizes it has emerged as a super power, and with that status it must demonstrate its power meaning it must establish dominance in the Pacific region. Economically, militarily and politically, China has power throughout Asia from Vietnam to North Korea. What it hasn't had until recently is a significant naval presence. That situation is changing as China has built it first aircraft carrier and other sophisticated naval vessels including submarines. At the same time, China has reiterated its long-standing claim over the South China Sea, and with it the country's claim over whatever mineral and energy resources might be present.

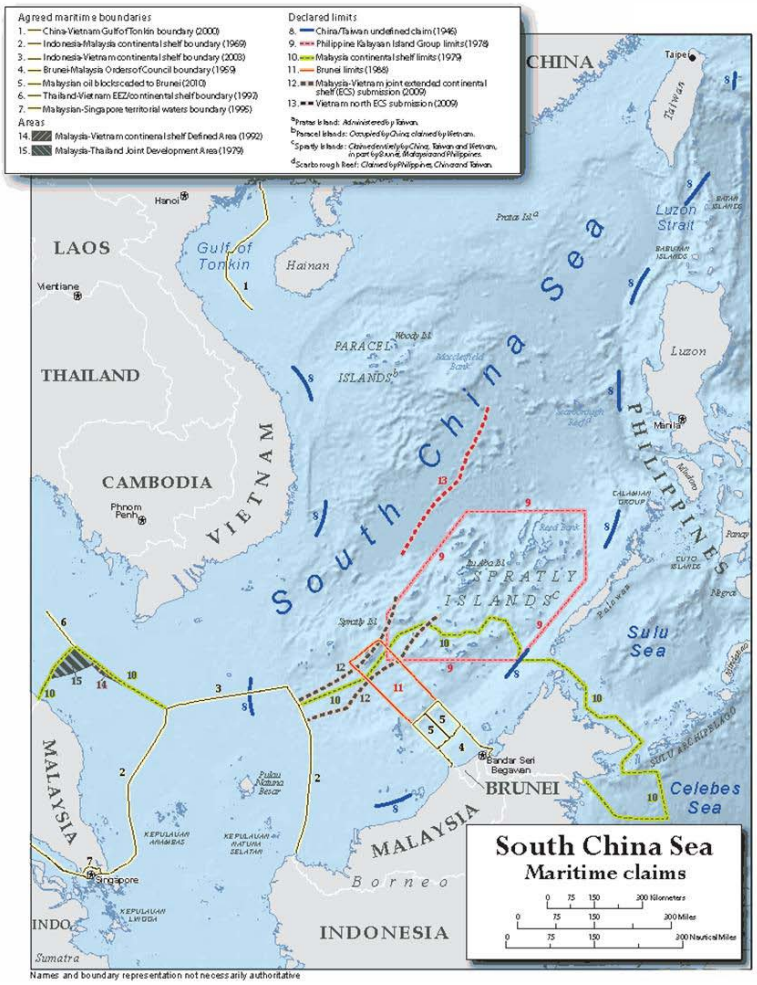
Exhibit 2. The South China Sea Defined

Source: EIA

China's claim over most of the South China Sea is based on its 1946 undefined claim – the nine dashes on a map

The South China Sea is a large and strategic body of water. China's claim over most of the South China Sea is based on its 1946 undefined claim – the nine dashes on a map. Exhibit 3 shows the numerous agreed boundaries negotiated between South China Sea neighboring countries since the late 1950s. It also shows the declared limits claimed by countries beginning with the 1946 Chinese claim. While there are many geopolitical implications due to these conflicting declarations, our purpose is to examine the significance of the South China Sea to China from an energy perspective.

Exhibit 3. Ownership Claims To South China Sea Area

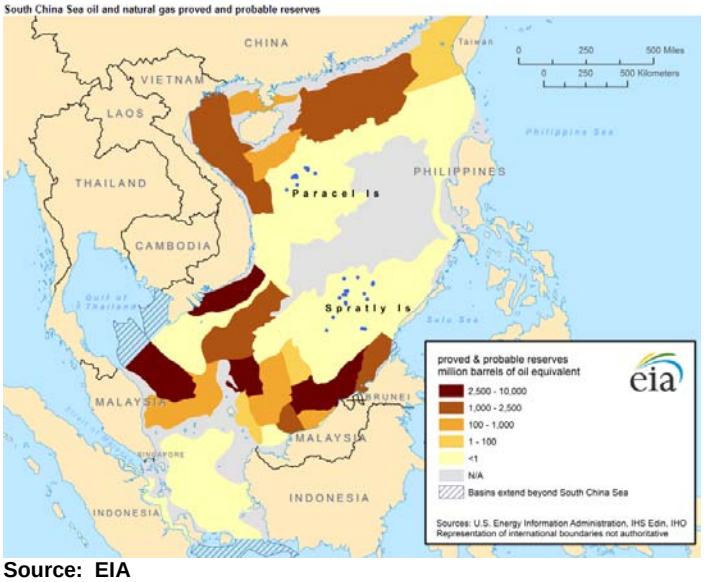


Source: State Department

The initial consideration is the location of possible oil and gas deposits. The Energy Information Administration (EIA), coupled with the resources of other research firms, has put together a map of the possible oil and gas deposits in the South China Sea. A number of these areas have been explored and continue to be explored and

developed. Those include deposits offshore Vietnam, China, Brunei and Malaysia. If one re-examines the nine dashes encompassing the area of the South China Sea claimed by China (Exhibit 3, page 5), some resources claimed by Vietnam, Brunei and Malaysia could be claimed by China setting up tension amongst the countries. (See Exhibit 4.)

Exhibit 4. Petroleum Resource Locations In South China Sea

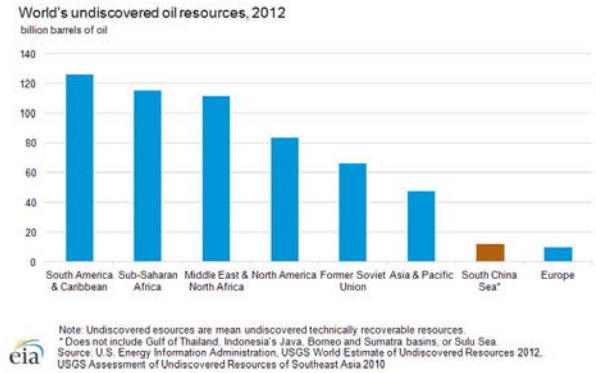


Source: EIA

The South China Sea ranks seventh in all geographic regions and along with Europe represents a minor increment of the world's undiscovered oil resources

However, as the EIA shows, these resources are not truly significant in the global scheme of resource deposits. According to the EIA, the undiscovered oil resources of the South China Sea, excluding the Gulf of Thailand, Indonesia's Java, Borneo and Sumatra basins, and the Solu Sea, are slightly greater than those of Europe at roughly 10 billion barrels of oil. The South China Sea ranks seventh in all geographic regions and along with Europe represents a minor increment of the world's undiscovered oil resources.

Exhibit 5. Little Undiscovered Oil In South China Sea

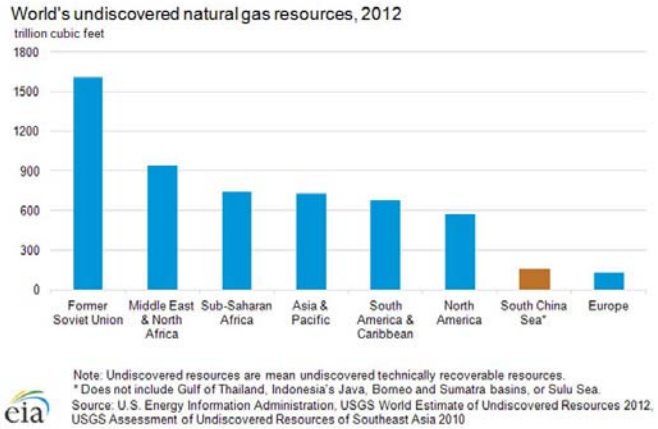


Source: EIA

The South China Sea has about a quarter of the estimated undiscovered natural gas of North America

The South China Sea ranks in the same position relative to Europe and the other regions of the world with respect to undiscovered natural gas resources. The South China Sea has about a quarter of the estimated undiscovered natural gas of North America, a mature conventional gas resource region, but with a rapidly growing unconventional shale gas potential. At the end of the day, all the proved oil and gas reserves plus all the possible undiscovered ones still leaves the region as a bit player in the world's energy business.

Exhibit 6. South China Sea Is Minor Nat Gas Player



Source: EIA

China is also a significant importer of energy and raw materials, all of which are extremely important for the health of the country, its people and its government

If the oil and gas resource potential of the South China Sea is so limited, why does China find it must demonstrate power in the region? The need to show that as an emerging super-power and with the second largest economy on the planet, China must show strength. At the same time, China is also a significant importer of energy and raw materials, all of which are extremely important for the health of the country, its people and its government. China is targeted to surpass six million barrels per day (mmb/d) of crude oil imports during the second half of 2013. At the same time, the United States, the globe's largest oil importer, will be bringing in less than 6 mmb/d of crude sometime early in 2014, dropping the country into second place behind China on the list of the world's largest oil importers.

Nearly 13 mmb/d of oil, almost 15% of total world oil consumption, flows into the Strait of Malacca near Singapore, one of the world's well-established shipping chokepoints

For China that is rapidly becoming the world's largest oil importer, protecting that flow of oil becomes a prime consideration of the government. Note in Exhibit 7 (page 8) that nearly 13 mmb/d of oil, almost 15% of total world oil consumption, flows into the Strait of Malacca near Singapore, one of the world's well-established shipping chokepoints. About 11 mmb/d of that oil flow goes beyond Singapore and Thailand and toward Hong Kong, China, South Korea and Japan, making protecting these shipping lanes imperative for the health of those economies.

Exhibit 7. China Wants To Insure Security Of Oil Imports

Source: EIA

China was projected to import 16 million mts in 2012, or roughly 2.0 Bcf/d, and to reach Japan's 56.6 million mts of LNG consumed in 2012 by 2020

An equally important energy trade is the flow of liquefied natural gas (LNG), much of which comes from Australia and Southeast Asia, but with a growing volume coming from the Middle East. LNG is likely to become an important fuel for China who has relied upon coal-fired electricity to power its economy with the attendant problem of serious pollution problems in its major cities. In 2011, China imported 12 million metric tons (mts) of LNG, equivalent to 1.5 billion cubic feet per day (Bcf/d). China was projected to import 16 million mts in 2012, or roughly 2.0 Bcf/d, and to reach Japan's 56.6 million mts of LNG consumed in 2012 by 2020. To handle that increased volume, China is planning to construct 15 new LNG receiving terminals to go along with the five already in operation. Given the North American shale revolution, the potential for LNG exports from Canada and the United States has become a real possibility. The opening of a widened Panama Canal by 2015 means LNG carriers coming out of the Gulf of Mexico will have a shorter shipping route to Asia then if they were forced to circle South America in order to reach the Pacific market. Two other developing natural gas industry trends will also impact the global flow of LNG. One is the development of the recent huge gas discoveries in East Africa. The Asian region is the target market for the natural gas recently found offshore Mozambique and Tanzania, but the energy industry is also excited about exploration opportunities in Madagascar, Kenya and Uganda, any and all of which would likely flow to Asia.

China could rapidly shift from being an LNG importer to becoming an LNG exporter

Longer term there is also the wildcard of China's gas shale potential. Estimates are that China has the world's largest shale gas resources. If it successfully develops these resources, China could rapidly shift from being an LNG importer to becoming an LNG exporter. Both situations put a premium on China being able to insure the safe passage of LNG tankers, either to terminals in China to offload cargos or to load cargos destined for world markets.

Exhibit 8. Substantial LNG Volumes Move Through Area

Source: EIA

Defense Department budget cuts coupled with a shrinking and aging fleet of naval vessels is hurting our ability to fulfill the many and varied missions assigned to the Navy

As President Barack Obama has indicated his foreign policy initiatives have pivoted toward Asia, the geopolitical tensions in the region will be elevated, not just because of what North Korea is doing. The United States has entered into upgraded trading relationships with our Asian friends, so we must demonstrate our willingness to stand by them when and if they have to confront China over its South China Sea territorial claims. At the same time, the U.S. Navy must demonstrate our strength in the region to prevent the appearance of the U.S. being perceived as a "paper tiger" by other nations in the world. Defense Department budget cuts coupled with a shrinking and aging fleet of naval vessels is hurting our ability to fulfill the many and varied missions assigned to the Navy. Any change in that course will take considerable time.

The real story of this region is its strategic placement within the flow of energy globally and its importance in the geopolitical struggle between the two leading super-powers – the U.S. and China

While oil and gas developments in the South China Sea will be of interest to the petroleum industry and investment community, the real story of this region is its strategic placement within the flow of energy globally and its importance in the geopolitical struggle between the two leading super-powers – the U.S. and China. With a better understanding of the true importance of the South China Sea to China's economic and political stature, one should be better able to understand the significance of actions and events likely to unfold over the next few years.

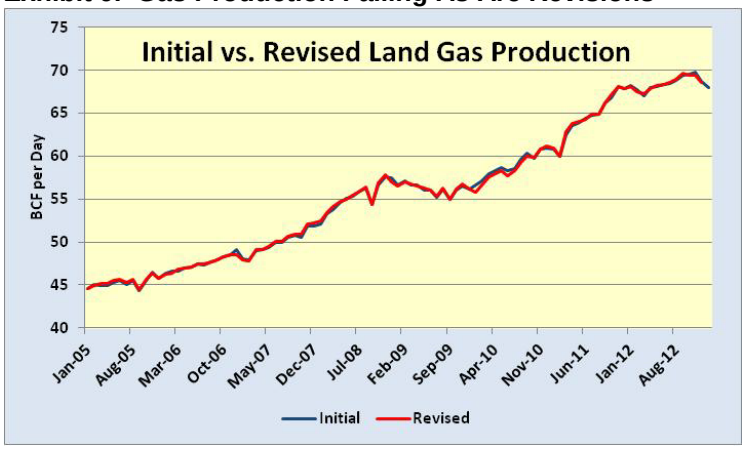
Do Two Months Make A Trend? Are Our Metrics Wrong?

At the end of March, the Energy Information Administration (EIA) released the latest data and analysis from their Form 914 survey of natural gas production. Due to the lag in surveying and compiling the data, we now have January 2013 data, which shows overall another sequential monthly decline. The EIA, in its brief comments about the results, pointed to cold weather that impacted production

The Louisiana production decline, -0.28 billion cubic feet per day (Bcf/d) accounted for nearly half the -0.67 Bcf/d decline of the Lower 48 states

in New Mexico and Wyoming and the closure of a gas plant for maintenance in Louisiana, which hurt that state's output. The Louisiana production decline, -0.28 billion cubic feet per day (Bcf/d) accounted for nearly half the -0.67 Bcf/d decline of the Lower 48 states. New Mexico and Wyoming production fell by -0.18 Bcf/d and -0.19 Bcf/d, respectively. The declines were offset by increased production among Other States that boosted their output by 0.13 Bcf/d, largely due to increased wells being hooked up in the Marcellus, which are primarily natural gas wells in Pennsylvania.

Exhibit 9. Gas Production Falling As Are Revisions



Source: EIA, PPHB

Normal winter weather might have produced meaningfully higher gas production

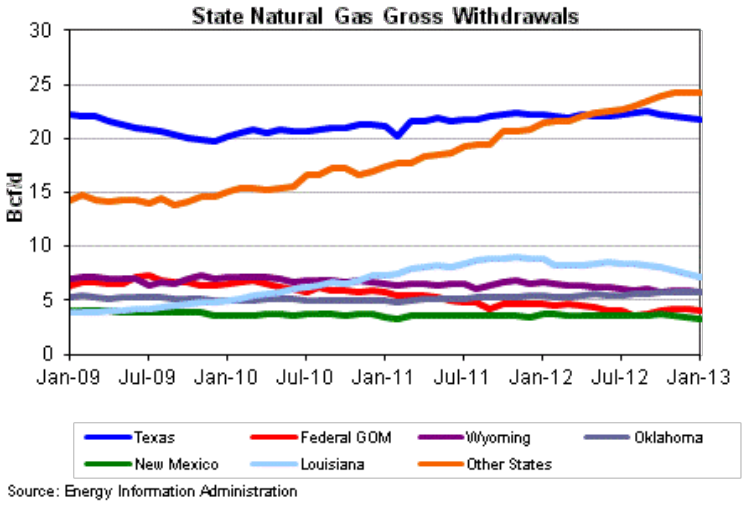
The recent decline in Lower 48 states (land) gas production, as depicted in Exhibit 9, is mirrored by negative revisions to the preliminary survey results for the previous three months. We find some comfort in the negative revisions supporting the view that the fundamentals of the gas shale business have deteriorated in the past such that operators are not drilling as much as before and that older well output declines are not being overwhelmed as much with new production from newly drilled or completed and hooked up wells as before. We do know that the EIA has mentioned cold weather as a negative force on output in recent months, so there must be some tempering of our view by the fact that normal winter weather might have produced meaningfully higher gas production.

For the U.S. as a whole, gas production is up 9.36 Bcf/d since January 2009, or 12.9%

Despite that caveat, we find the data for longer term production trends to be insightful. In examining the State Natural Gas Gross Withdrawals chart (Exhibit 10, page 11) from the EIA web site, we find the changes in production for the four-year period since January 2009 for certain states and areas interesting. Not shown on the chart are national totals. For the U.S. as a whole, gas production is up 9.36 Bcf/d since January 2009, or 12.9%. The national increase has only been helped slightly in the period by the 0.37 Bcf/d expansion of Alaskan output. That makes the increase in production for the Lower 48 states to be 8.99 Bcf/d over the last four years, which, after considering the decline in Federal Gulf of Mexico output

from 6.35 Bcf/d to 4.08 Bcf/d, shows just how significant the growth in shale gas production has been. Lower 48 land gas output has grown by almost 20% since January 2009, or by 11.26 Bcf/d.

Exhibit 10. Gas Shale Production Impacting State Performance

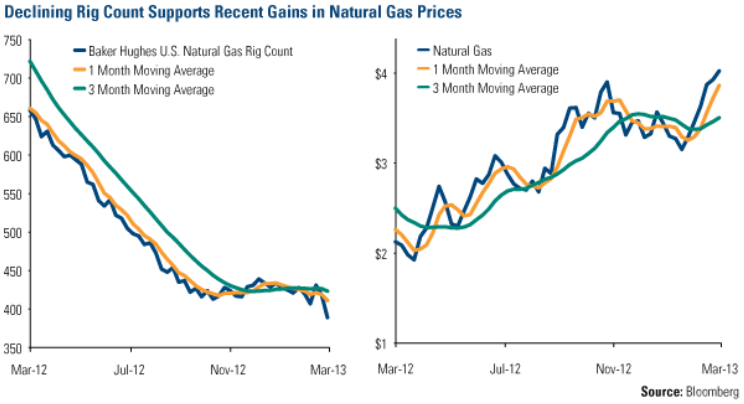


Source: EIA

The largest production declines were felt in Wyoming and the Gulf of Mexico

While Texas and New Mexico experienced minor production declines over the past four years, the largest production declines were felt in Wyoming and the Gulf of Mexico. Large production increases were experienced in Louisiana and the Other States, which encompasses Pennsylvania's Marcellus production and the associated gas output from the Bakken formation in North Dakota.

Exhibit 11. Some Draw Linear Relationship



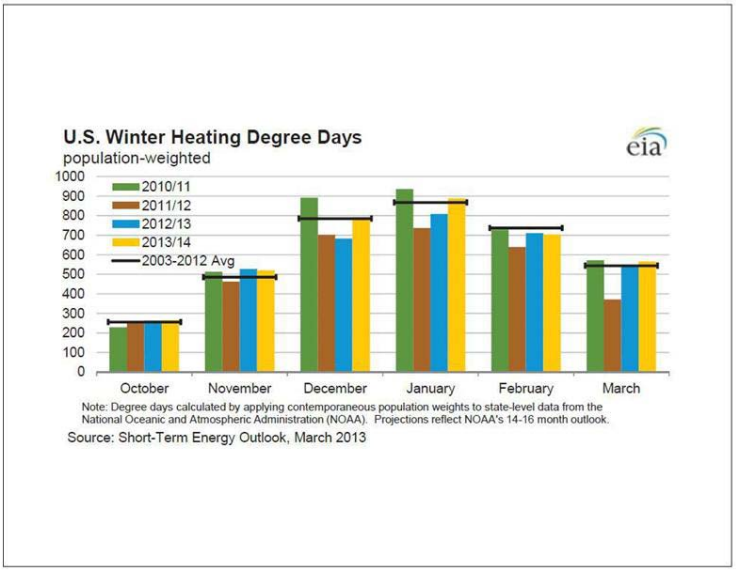
Source: U.S. Global Investors

Much has been made of the possibility that the significant decline in the number of drilling rigs targeting dry gas prospects and now even some liquids-rich areas, would eventually slow the rise in gas shale output and eventually lead to its decline unless natural gas prices

Many analysts are questioning whether we have actually experienced a seismic shift in gas output trends as a result of the decline in the gas-oriented drilling rig count, or if this is merely a transitory event

rebounded meaningfully. For most of the last half of 2012, producers and Wall Street analysts were wishing for the rig count drop to translate into lower natural gas output. In fact, some energy investors are building their investment case for the fuel on the almost direct relationship between the decline in drilling rigs and the rise in gas prices. For an example of this relationship, look at the charts in Exhibit 11 (page 11). Since it is difficult to accurately assess the volumes of natural gas output associated with crude oil production in the Bakken and Texas' Eagle Ford formations, and with the explanations for the recent monthly gas production drops, - weather and gas plant operational issues - many analysts are questioning whether we have actually experienced a seismic shift in gas output trends as a result of the decline in the gas-oriented drilling rig count, or if this is merely a transitory event.

Exhibit 12. Heating Degree Days Up This Winter



Source: EIA

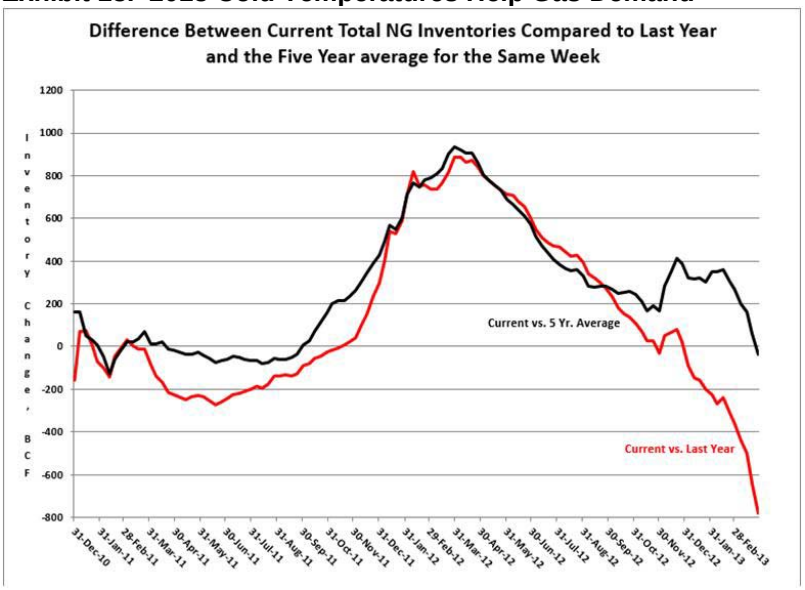
Through the end of March, on a population-weighted basis, the nation has had 168 fewer heating degree days (4% less) than normal, but 525 heating degree days (+16%) more than last winter

This uncertainty has operators holding their breath with respect to the sustainability of current natural gas prices, which have recently exceeded the $4 per thousand cubic feet per day threshold. This recent rise in price is directly attributable to the flat gas production of the past several months coupled with the colder than anticipated winter temperatures. Through the end of March, on a population-weighted basis, the nation has had 168 fewer heating degree days (4% less) than normal, but 525 heating degree days (+16%) more than last winter. Normal is the average number of degree days per year for 1971-2000. The history of heating degree days for the past two winters compared to this winter and the National Oceanic and Atmospheric Administration (NOAA) forecast for next winter is shown in Exhibit 12. Clearly NOAA anticipates much colder December and January temperatures next winter than experienced last winter.

This withdrawal season will likely see the industry starting below the five-year average for gas storage volumes that should help gas prices

The impact of the variation of heating degree days can be observed in the relationship of natural gas storage volumes compared to last year and the last five-year average. The storage volume difference became evident early in the winter heating season, but then temperatures warmed up and storage volume comparisons became less favorable last year. While it wasn't until late January that storage volumes improved, compared to the average of the last five years, but compared to last year's winter, almost every month presented a positive comparison, i.e., substantially less gas in storage. Last year, the industry exited the withdrawal season (winter) with over 800 Bcf of gas volumes in storage. This withdrawal season will likely see the industry starting below the five-year average for gas storage volumes that should help gas prices.

Exhibit 13. 2013 Cold Temperatures Help Gas Demand

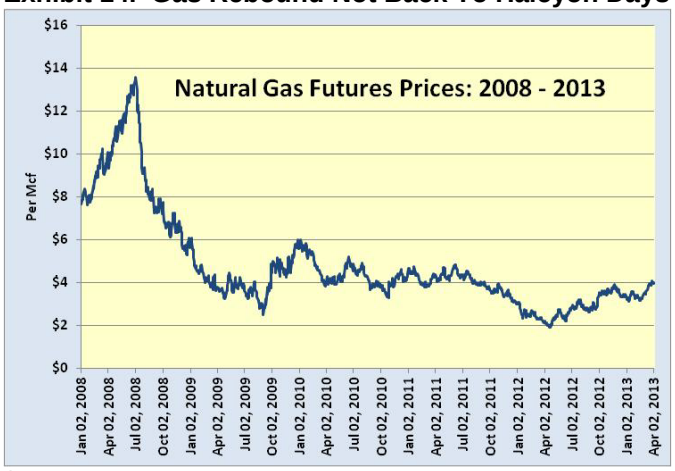


Source: Vanguard Energy

The doubling in gas prices certainly helps the cash flows of the producers, but the more important question for them is whether this trend in rising gas prices will continue

The improved gas storage situation coupled with flat production has boosted gas prices. While gas prices are a long way from the halcyon days before the 2008 global financial crisis that smashed global energy demand, created financial and liquidity concerns that limited producing company spending, and hammered commodity prices into the ground, today they are much better than they were a year ago. The improvement in gas prices can be seen by noting that the April 2012 price was about $2 per thousand cubic feet (Mcf) of gas and 12 months later it is at $4/Mcf. The doubling in gas prices certainly helps the cash flows of the producers, but the more important question for them is whether this trend in rising gas prices will continue. If they believe prices will continue to rise, we will likely see more drilling rigs employed, and more corporate debt repaid.

Exhibit 14. Gas Rebound Not Back To Halcyon Days

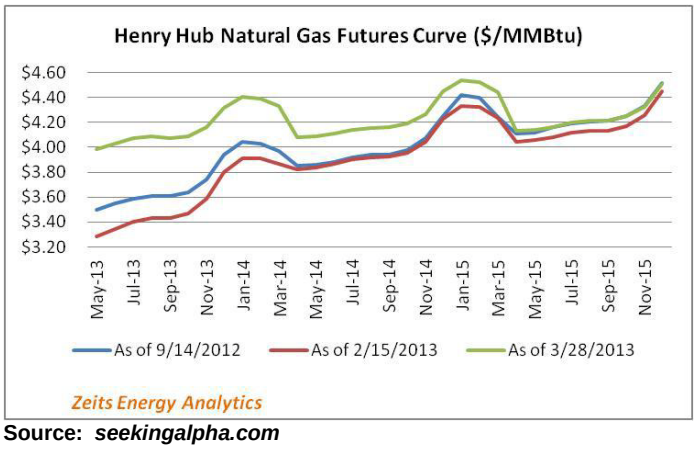


Source: EIA, PPHB

The issue is whether natural gas prices will be trading with a $4-handle for much of 2013, possibly reaching the $4.50 level for part of the year

As in all commodity markets, there are optimists and pessimists. The former believe that with the decline in gas drilling along with the greater drawdown in gas storage inventory than anyone anticipated at the start of the winter heating season, means a recovery is not only underway but that it will be sustained. For them, the issue is whether natural gas prices will be trading with a $4-handle for much of 2013, possibly reaching the $4.50 level for part of the year. The optimists see further economic gains that will boost gas demand plus greater use of natural gas in the domestic transportation sector. They also look to the possibility that as the mercury rises this summer, tighter gas supplies due to pipeline maintenance, low hydropower supplies due to the drought, and stronger power generation and industrial gas demand will combine to lift natural gas prices. For support, they point to how the natural gas futures price curve has increased between September of last year and now. As those curves show (Exhibit 15), the 2015 prices haven't changed much, but certainly the near-term price expectations have increased.

Exhibit 15. Cold Winter Boosts Gas Price Outlook

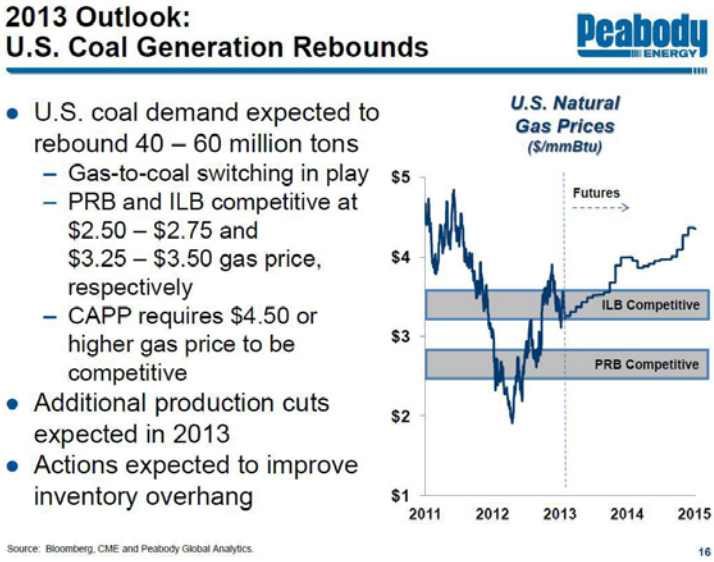


Source: *seekingalpha.com*

Low gas prices last year contributed to gas consumption rising in the power generation market as the cleaner-burning fuel took market share from coal

The pessimists argue that the recent gas price improvement is more a reflection of colder than expected winter weather and a flattening in gas production, much of which has been due to temporary trends that will reverse once winter is behind us. They also point to the impact that higher natural gas prices is having on its competitive position in the power generation market, a demand booster for the industry over the last year. A chart from an investor presentation by Peabody Energy (BTU-NYSE), the nation's largest coal producer, shows that certain coal supplies are price competitive below $3 per million British thermal units (Btus), which is roughly equivalent to the same price for natural gas. They also believe that other coal supplies are in play at natural gas prices in the $3.25-$3.50/Mcf range, and certainly if gas prices stay at or above $4/Mcf. Low gas prices last year contributed to gas consumption rising in the power generation market as the cleaner-burning fuel took market share from coal. The continued tightening of emission restrictions for coal-powered generation plants has increased the fuel cost at these facilities making it easier for gas to seize this market. Higher gas prices will reverse some, although not all, of this demand.

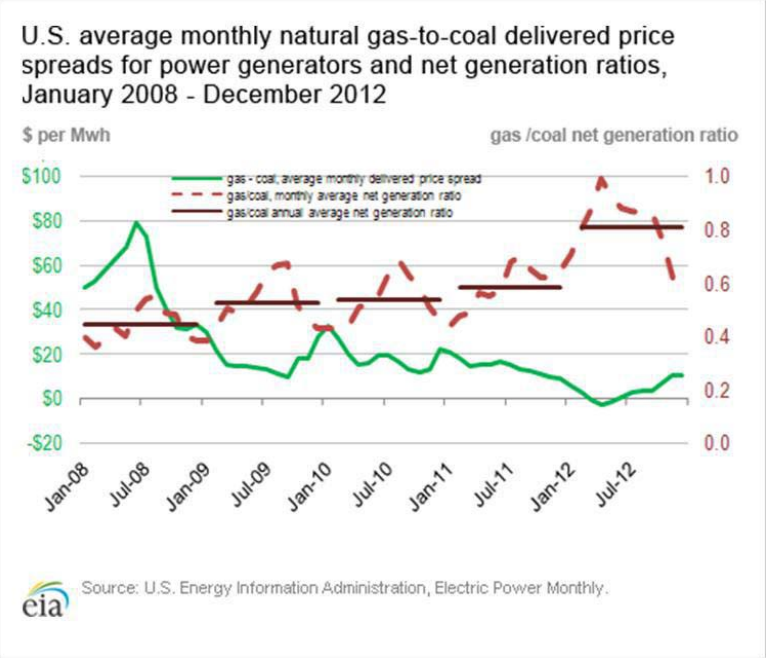
Exhibit 16: Higher Gas Prices Helping Coal Recover



Source: *seekingalpha.com*

The impact of rising natural gas prices and falling coal prices late last year is evident in the chart prepared by the EIA. The green line in Exhibit 17 (page 16) shows that when the gas-to-coal average monthly delivered price spread turned negative in the spring of 2012, it marked the recent peak in the gas/coal monthly average net generation ratio. Since that time, the two ratios have moved in opposite directions.

Exhibit 17. After Taking Market Gas Now Yielding To Coal



Source: EIA

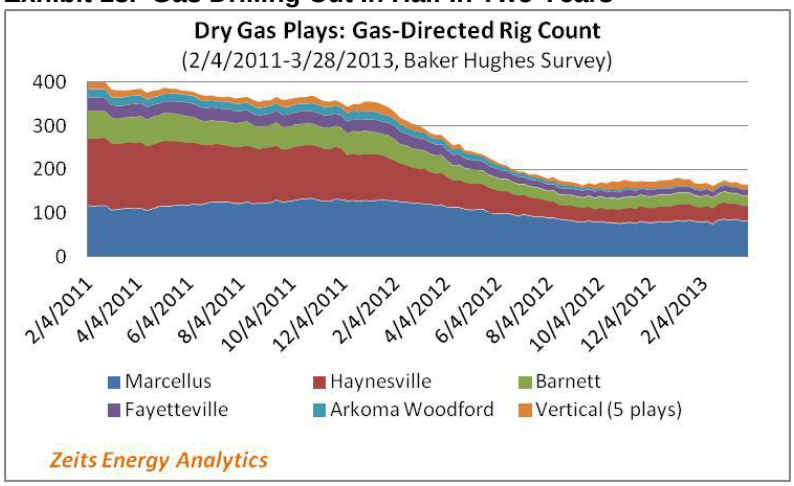
The reaction of producers to the rise in natural gas prices has been interesting and diverse

The reaction of producers to the rise in natural gas prices has been interesting and diverse. EOG Resources Inc. (EOG-NYSE) CEO Mark Papa was quoted at an industry conference saying, "We have zero percent interest in North American natural gas growth." On the other hand, Steve Dixon, the acting CEO of Chesapeake Energy (CHK-NYSE) told analysts on a recent call that the company was hedging substantial gas volumes at well above $4/Mcf. He further reiterated that the company's cash flow would be directed almost exclusively toward drilling crude oil and liquids-rich plays where the economics were more attractive. These attitudes toward natural gas have shown up in drilling activity.

As a producer, if you don't have a large shale acreage exposure today, the only way to acquire it now is to buy the assets of another company or the entire company

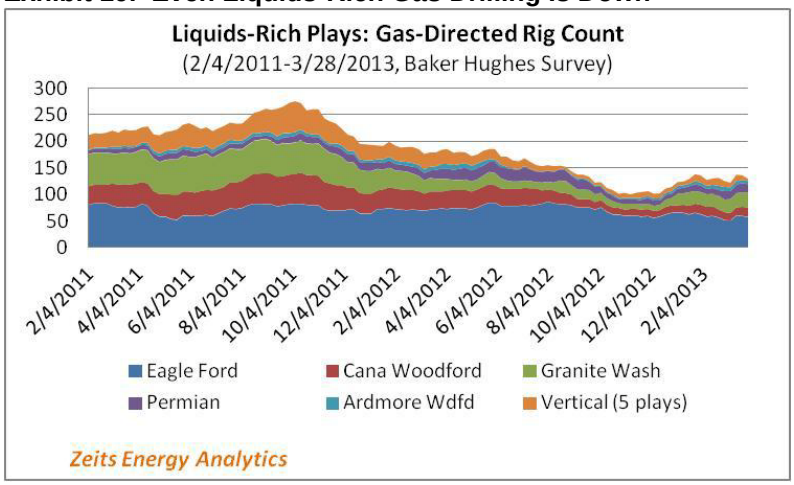
In the dry gas basins, the drilling rig count has been cut in half over the past 24 months. In the liquids-rich basins, the gas rig count is down appreciably, but not as much as in the dry-gas basins. Suffice it to say that the duration of low gas prices, notwithstanding the recent doubling of prices from a year ago, combined with the final stages of the great land grab and lease-demanded drilling has strained the cash resources of most producers. Those without solid balance sheets and/or deep-pocket joint venture partners are being forced to sell out or liquidate assets to sustain their operations. This environment has created the next phase of industry consolidation, which will be further driven by the lack of new large shale basins to absorb investor capital. As a producer, if you don't have a large shale acreage exposure today, the only way to acquire it now is to buy the assets of another company or the entire company.

Exhibit 18. Gas Drilling Cut In Half In Two Years



Source: ***seekingalpha.com***

Exhibit 19. Even Liquids-Rich Gas Drilling Is Down

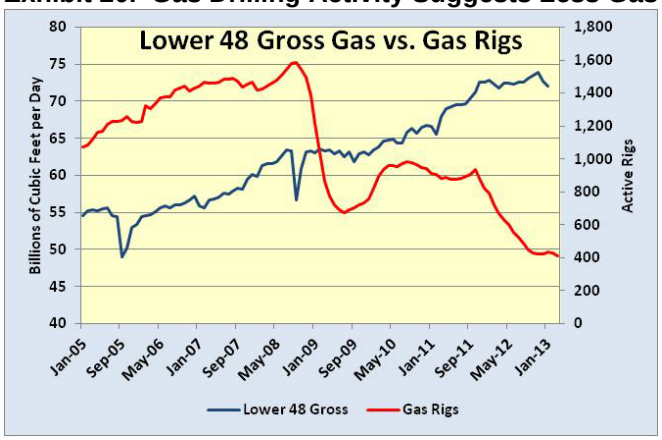


Source: ***seekingalpha.com***

The natural gas drilling rig count has continued to fall, suggesting that gas production will be flat to down in the next month or two

What might gas industry fundamentals tell us about where the business is heading? If we believe the extended and dramatic decline in gas-directed drilling is the primary contributor to the lack of natural gas production growth during the past couple of months, then by looking at where the rig count has gone over the past two months and where it may be heading in the immediate future we may divine the industry's future. Exhibit 20 (page 18) shows us that the natural gas drilling rig count has continued to fall, suggesting that gas production will be flat to down in the next month or two. That should support current gas prices, assuming the cold weather impact on gas production in recent months isn't reversed.

Exhibit 20. Gas Drilling Activity Suggests Less Gas



Source: EIA, Baker Hughes, PPHB

The analyst concludes that gas supply will grow and prices will retreat to the low end of a $3.50-$4.50/Mcf price range.

What if the rig count isn't such a driving force in production any longer? In the last *Musings* issue, we highlighted the drilling and gas output data from Pennsylvania showing that its dramatic rise in production over the past year was largely the result of the opening of two new pipelines giving producers the opportunity to ship more gas. We concluded from that analysis that paying attention to the growth of gas pipeline capacity might be a more meaningful measure of where gas supply will come from and when it might arrive. We found it interesting that one respected Wall Street exploration and production company analyst recently issued a report arguing this same point – it is no longer a rig-driven business but more a pipeline takeaway proposition. Using that metric, the analyst concludes that gas supply will grow and prices will retreat to the low end of a $3.50-$4.50/Mcf price range. That is not good news for future gas drilling.

James Hansen Retires From NASA To Become An Activist

Dr. Hansen's "birthing" of global warming began on a blistering hot day in June 1988 when he testified before a congressional committee that human-induced global warming had begun

James Hansen, recognized as the 'father of global warming' with a little help from Congressional Democrats, announced he was retiring from the National Aeronautical and Space Administration (NASA) on April 3rd after 46 years with the space agency's Goddard Institute for Space Studies in Manhattan, New York. The 72-year old scientist began his career studying Venus, but shifted his research focus in the early 1970s to the effects of human emissions of greenhouse gases. While his initial estimates of the impact on the climate proved way too high, he did begin to illuminate how the planet is likely to respond to rising temperatures. Dr. Hansen's "birthing" of global warming began on a blistering hot day in June 1988 when he testified before a congressional committee that human-induced global warming had begun. The date of the hearing was picked based on a study of the likely hottest June day for Washington, D.C., and to ensure that this happened, the hearing room was closed off and had its heat turned up for the entire night before his testimony in order to create furnace-like conditions.

Dr. Hansen has also been a stern critic of the idea of using energy taxes to expand government

From that point forward, Dr. Hansen was regarded as the leading scientist and forecaster of the doom we, and the planet, were due from rising temperatures. While leading the fight for putting a price on carbon and implementing other climate policies to mitigate the effects of hotter temperatures, Dr. Hansen has also been a stern critic of the idea of using energy taxes to expand government. He believes a carbon tax should be offset by a direct rebate of the tax to citizens to minimize the economic cost of higher energy prices. He believes, however, that higher energy costs will drive environmental benefits from lifestyle shifts by Americans in response.

Exhibit 21. Dr. Hansen Being Arrested August 2011

Source: ***AP***

He has taken vacation time from NASA to protest projects and has been arrested or cited a half-dozen times

In recent years, after failing to win the battle for broad-based energy taxes and consumption restrictions, he has shifted to fighting individual energy projects. He has taken vacation time from NASA to protest projects and has been arrested or cited a half-dozen times. One of his most recent attacks has been against Canadian oil sands, and the Keystone pipeline. He authored an op-ed last May in *The New York Times* where he agonized over an interview of President Barack Obama conducted with *Rolling Stone* magazine in

which he talked about Canada mining its oil sands and that the United States had little control over their development. Of course, President Obama could reject building the northern segment of the Keystone pipeline, which would eliminate an export avenue for the oil sands bitumen and might slowdown their development.

Dr. Hansen wrote, "If Canada proceeds, and we do nothing, it will be game over for the climate"

Dr. Hansen wrote, "If Canada proceeds, and we do nothing, it will be game over for the climate." He went on to explain what was bad about oil sands and the possible impact on our climate. "Canada's tar sands, deposits of sand saturated with bitumen, contain twice the amount of carbon dioxide emitted by global oil use in our entire history. If we were to fully exploit this new oil source, and continue to burn our conventional oil, gas and coal supplies, concentrations of carbon dioxide in the atmosphere eventually would reach levels higher than in the Pliocene era, more than 2.5 million years ago, when sea level was at least 50 feet higher than it is now. That level of heat-trapping gases would assure that the disintegration of the ice sheets would accelerate out of control. Sea levels would rise and destroy coastal cities. Global temperatures would become intolerable. Twenty to 50 percent of the planet's species would be driven to extinction. Civilization would be at risk."

They wondered about Dr. Hansen's explanation as to how the earth got to that 400 ppmv level naturally, i.e., without the burning of fossil fuels, and how we went back down to pre-industrial levels

Some fact-checkers questioned Dr. Hansen's statistics and wondered how he would respond to their challenges to his points. For instance, they pointed out that according to *Wikipedia*, "Carbon dioxide concentration during the mid Pliocene has been estimated at around 400 ppmv from 13C/12C ratio in organic marine matter and stomatal density of fossilized leaves..." We are already at 396.18 ppmv so they wondered about Dr. Hansen's explanation as to how the earth got to that 400 ppmv level naturally, i.e., without the burning of fossil fuels, and how we went back down to pre-industrial levels. Additionally, they wondered how he would explain that at similar CO2 concentration levels our sea levels today are nearly 50 feet lower than in the earlier period.

Mr. Nocera acknowledged Dr. Hansen's right to First Amendment freedom of speech protection, but the release was not from Dr. Hansen private citizen, but rather from NASA

One of the reasons why Dr. Hansen has retired from his government post, albeit with the support of the administrators who were growing uncomfortable with his growing activism, is that he wants to become more active fighting against government policies. This concern was raised by columnist Joe Nocera of *The New York Times* who wrote a column about the "misguided crusade" of Dr. Hansen, partially triggered by his press release sharply criticizing the use of oil sands output two hours and 20 minutes after the State Department released its draft environmental statement about the Keystone pipeline. Mr. Nocera acknowledged Dr. Hansen's right to First Amendment freedom of speech protection, but the release was not from Dr. Hansen private citizen, but rather from NASA, and it identified Dr. Hansen as the head of the Goddard Institute. As Dr. Hansen has become more militant, his use of the government podium to campaign against companies and energy policies he doesn't approve of begins to stretch the boundary of propriety.

He says he senses the beginning of a mass movement on climate change, led by young people

But as Dr. Hansen put it in an interview with *The New York Times*, "As a government employee, you can't testify against the government." He will now be free to do just that, but as a private citizen. He says he senses the beginning of a mass movement on climate change, led by young people. He wants to lend his support. As he told the interviewer, "At my age, I am not worried about having an arrest record." Dr. Hansen's sense about the climate change movement becoming more like the anti-war movement in the 1960's and 1970's, may explain why the leaders of the Sierra Club recently have endorsed the use of civil disobedience, altering a 121-year policy of non-violence, because they believe the risks of climate change are too dire to remain passive any longer.

The energy industry, which has done a terrible job selling its environmental sensitivity story to the public, needs to prepare for greater opposition to its activities and policies

The battle over fossil fuel use is ratcheting up. More high-profile anti-fossil fuel advocates are embracing civil disobedience and activism, which suggests we could be entering a period of increased debate and social pain. The energy industry, which has done a terrible job selling its environmental sensitivity story to the public, needs to prepare for greater opposition to its activities and policies. Greater government regulation may be one outcome. Higher taxes could be another. This may make recruiting new employees to staff the energy industry of the future that much more difficult and costly, impacting the industry's future profitability. The energy industry is entering a new era with many challenges undefined and unknown. Will managements be up for the challenge? We remain optimistic, but continue to keep our fingers crossed.

Economics And Variability Of Renewables Hurting Mandates

While there is no federal mandate, something proponents of "green energy" would like to see implemented, federal tax subsidies have stimulated the construction of a substantial amount of alternative energy power projects

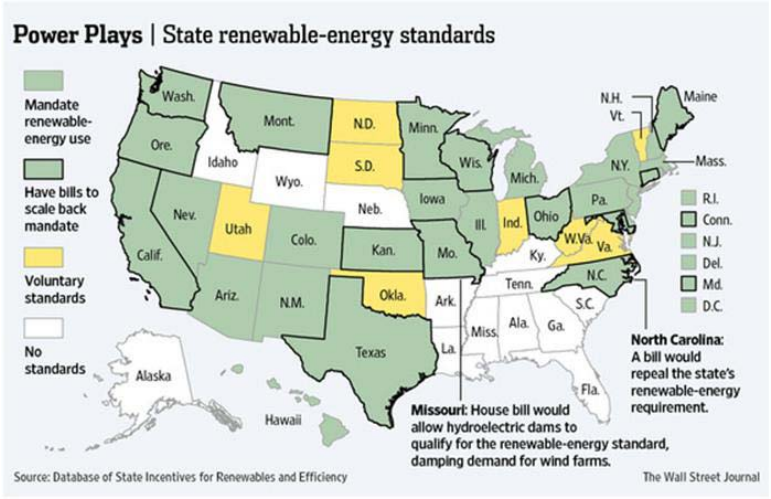
In 29 of the 50 U.S. states legislatures have put in place mandates requiring their local utilities to generate a certain percentage of their power from renewable fuels – primarily solar and wind. Some states are allowing hydroelectric power to be included in the mandates. The purpose of the mandates was to foster the switch from traditional fossil fuel-powered generation in favor of fuels that do not create carbon emissions and thus do not contribute to global warming. While there is no federal mandate, something proponents of "green energy" would like to see implemented, federal tax subsidies have stimulated the construction of a substantial amount of alternative energy power projects.

A negative impact from the mandates however, is that these alternative energy sources tend to be the most expensive power generated in a state

A negative impact from the mandates however, is that these alternative energy sources tend to be the most expensive power generated in a state, thus boosting power costs for all rate payers. We have seen this personally in Rhode Island where the most high-profile alternative energy projects – the offshore Block Island wind turbine farm has yet to even obtain funding while requesting a waiver of state imposed fees associated with its application. When the project begins to generate power, all rate payers, regardless of whether they receive any of the power (some industrial users purchase their own power and have the utility deliver it) must pay a

price nearly three-times the cost of conventionally-generated power. In fact, Rhode Island mandates that the alternative power must be purchased in the state, when similar wind power is available from neighboring states at a fraction of the cost of the offshore project.

Exhibit 22. War To Reduce Power Mandates Underway



Source: ***The Wall Street Journal***

14 states have introduced bills that would dilute or outright repeal renewable energy mandates

As consumers are starting to feel the pain of inflated utility bills and questions about the climatic benefits from these alternative power sources are being raised, states are beginning to question the reason for the mandates. According to the Database of State Incentives for Renewables and Efficiency at North Carolina State University, 14 states have introduced bills that would dilute or outright repeal renewable energy mandates. None of the bills have been signed into law so far, but pressure is growing to modify the mandates. One has to wonder whether it is this apparent shift in sentiment toward renewables that motivated BP plc (BP-NYSE) to sell its U.S. wind power assets. The entire issue of oil company investments in alternative fuels is in a state of flux.

Mr. Tillerson told an energy industry conference, "There is no significant alternative to oil in coming decades…"

BP, which at one time was associated with the identity tagline of "Beyond Petroleum," has also given up on its solar energy efforts. This spring, BP CEO Robert Dudley told the IHS CERAWEEK audience, "We've thrown in the towel on solar. We worked on it for 35 years and never made money." Companies such as ExxonMobil (XOM-NYSE) and Chevron (CVX-NYSE) have continued to invest in alternative energy projects – the latter having developed a solid geothermal business and the former investing in growing algae as a biofuel. ExxonMobil CEO Rex Tillerson has admitted that his company's $600 million commitment to Synthetic Genomics to develop advanced algae is an idea that is proving to be a major undertaking and requiring longer to develop. Mr. Tillerson told an energy industry conference, "There is no significant alternative to oil in coming decades and ExxonMobil will continue to make oil and

natural gas its primary products. The scale advantages of oil and natural gas across a broad array of applications provide economic value unmatched by any alternative." That conclusion fits with the estimate of a University of Houston energy economist who suggests that $50 million spent developing a shale play will create $250 million of value whereas the same amount of money spent on a wind farm will yield only about a $10 million increment in value. If you are running a public company where creating shareholder value is the key priority, those economics will drive future corporate strategy. That doesn't mean that all oil and gas companies are or will abandon alternative energy investments. The French subsidiary of Total (TOT-NYSE), Total Gas & Power, purchased a 60% ownership in SunPower (SPWR-Nasdaq) for $1.38 billion two years ago. Total said at the time it wanted to advance SunPower's research and development efforts. We wonder how that is progressing, given the dismal state of the solar power industry.

A University of Houston energy economist suggests that $50 million spent developing a shale play will create $250 million of value whereas the same amount of money spent on a wind farm will yield only about a $10 million increment in value

As opposed to the increased mandate for power from alternative energy sources enacted by California last year, we believe the battle to reduce mandates will intensify. In an age of low wage and family income growth, rapidly rising power costs are inflicting real pain on citizens. When liberal institutions such as the International Monetary Fund (IMF) are challenging energy subsidies by countries around the world, U.S. energy subsidies will also come under attack, not just those suggested by the current White House occupant as benefiting the profitable oil and gas companies but also subsidies for wind and solar, too. We suspect the battle over energy mandates and subsidies will continue for the foreseeable future.

The IMF is challenging energy subsidies by countries around the world, and U.S. energy subsidies will also come under attack

Random Energy Thoughts: Déjà Vu All Over Again?

West Texas Building Boom

The Wall Street Journal featured an article recently about plans to build a 53-story multi-use tower in Midland, Texas to meet the growing needs of energy businesses rapidly expanding in response to the revival of the Permian Basin and other nearby shale-oriented plays. When we first saw the article, with its accompanying photo (Exhibit 23, page 24), we were taken aback. The tower, sponsored by a private equity and hedge fund, as envisioned, will include office space, apartments, a five-star hotel, restaurants, stores and a public plaza. Virtually all of these resources are needed in Midland.

We've experienced Midland in booms and busts, and we can attest that the former is always better than the latter. We remember the 1970s boom days when the wives of oil and gas company officials would jump on one of the corporate jets, or one owned by an independent oil man, to fly to Dallas, about 300 miles east, for lunch and an afternoon of shopping. Those were BOOM days!

We've experienced Midland in booms and busts, and we can attest that the former is always better than the latter

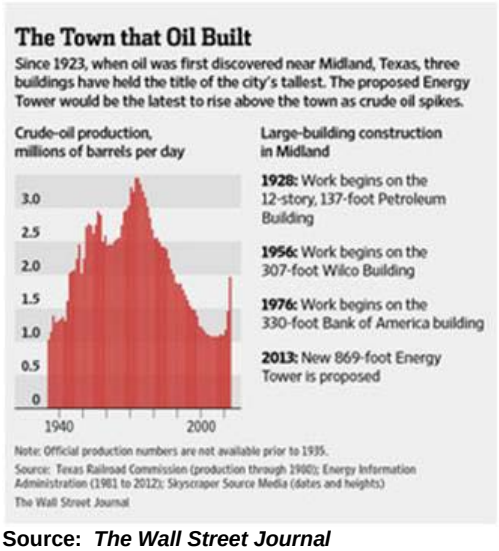
Exhibit 23. Proposed 53-story Midland Tower

Source: ***The Wall Street Journal***

The dates suggest an eerie pattern, and as a student of history, we pay attention to historical patterns

What also caught our eye in The Wall Street Journal story was a chart depicting annual crude oil production in the State of Texas, which has rebounded dramatically in the past several years due to the shale revolution. Also accompanying the oil production chart was a table listing the dates when work first began on the various office "towers" built in Midland since the 1920s (Exhibit 24). The dates suggest an eerie pattern, and as a student of history, we pay attention to historical patterns. The pattern: 1928, one year before the stock market crash and the start of the Great Depression; 1956, two years before a serious recession; 1976, five years before the peak in oil prices and the start of the great oil industry depression of the 1980s; and 2013, ?

Exhibit 24. Busts Always Follow Booms



Source: ***The Wall Street Journal***

Fracking Opponents Win Legal Challenge

Organizations opposed to hydraulic fracturing in California won a legal victory last week in their court challenge of the awarding by the Bureau of Land Management (BLM) of oil and gas leases located in Monterey and Fresno Counties in 2011. A magistrate for the U.S. District Court in San Jose agreed with the opponents who argued that the leases should not have been awarded without a study of the potential environmental damage that could be caused to water resources by the use of hydraulic fracturing.

U.S. Magistrate Paul Grewal ruled the BLM did not properly assess the threat that fracking could pose to water and wildlife before selling the leases

U.S. Magistrate Paul Grewal ruled the BLM did not properly assess the threat that fracking could pose to water and wildlife before selling the leases, some of which lie within the Salinas River watershed. He made clear that he was not ruling on the merits of fracking itself. Magistrate Grewal wrote, "Ultimately, BLM argues that the effects of fracking on the parcels at issue are largely unknown. The court agrees. But this is precisely why proper investigation was so crucial in this case."

The BLM had argued that the environmental assessment of fracking was outside of its jurisdiction, prompting the magistrate to write, "Put another way, if (it's) not within BLM's jurisdiction, then whose?"

The ruling comes as the oil and gas industry begins looking at the Monterey Shale that lies beneath much of the southern San Joaquin Valley and parts of California's central coast. Estimates are that the Monterey Shale could hold 15 billion barrels of oil, making it potentially the country's largest oil shale play. Magistrate Grewal did not rule on the status of the leases, saying that he didn't know what the "correct" ruling should be. Instead, he ordered the environmental groups and the BLM to return to court on April 15th with proposed solutions. The BLM had argued that the environmental assessment of fracking was outside of its jurisdiction, prompting the magistrate to write, "Put another way, if (it's) not within BLM's jurisdiction, then whose?"

Legal warfare may become the next big push to derail oil and gas development in the United States

Previous environmental challenges to the award of leases offshore in the Gulf of Mexico following the Macondo oil spill because the industry now knew that its assessments of the worst spill possible in its bidding documents was grossly understated were thrown out by the federal courts. This is one of the more potent environmental victories, which will encourage the groups to continue to mount legal challenges to the oil and gas industry and its exploration and development activities. Legal warfare may become the next big push to derail oil and gas development in the United States. Conceivably, this ruling could put many leases in limbo awaiting the Department of Energy's hydraulic fracturing study underway, but which will not be completed until sometime in 2014. Would that be a setback to the petroleum industry? What about our economy?

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