PPHB

ENERGY INVESTMENT BANKING

MUSINGS FROM THE OIL PATCH

March 24, 2015

Allen Brooks
Managing Director

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

More Thoughts On The Restructuring Of The Oil Industry

We were amused at some of the early 1970's studies projecting the oil industry's future that offered up outlooks that proved to be absolutely wrong

Our article in the last *Musings* about the beginning of the next restructuring of the oil industry generated a number of comments from readers that continue to keep us thinking about what will be different about this cycle. One comment came in an email from a distinguished oilfield service company senior executive and a friend who offered a couple of points that prompted us to reflect on how the oil business has changed over our working career. It is from that perspective that our retrospective analysis begins. First, we went back to our bookshelf and were amused at some of the early 1970's studies projecting the oil industry's future that offered up outlooks that proved to be absolutely wrong. That perspective dovetailed with our friend's view. He entered the industry later than we did so his starting reference point was slightly different from ours. Ours was an optimistic outlook that morphed into a darker outlook that coincided with our friend's long-term future. His view is substantiated by an anecdote from a lunch we had with a very senior major oil company executive that I describe below.

The Massachusetts Institute of Technology project team developed a global model "to examine the complex problems troubling men of all nations."

Quoting from our friend's email, he wrote: "I remember when I joined the industry in 1976, by this time, 2015; I was supposed to be out of a job because the world would be out of oil and each living creature was allotted 9 square feet to live on because of rampant population growth." That outlook was part of the thesis of The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind, written by Donella Meadows, Dennis Meadows, Jørgen Randers and William Behrens, members of the Massachusetts Institute of Technology project team that developed a global model "to examine the complex problems troubling men of all nations." The problems they identified included: "poverty in the midst of plenty; degradation of the environment; loss of faith in institutions; uncontrolled urban spread; insecurity of employment; alienation of

youth; rejection of traditional values; and inflation and other monetary and economic disruptions." This sounds much like the current dogma of the climate change movement.

In fact, the teaser about the book's thesis was contained on the inside cover page of our volume and reads as follows:

"Will this be the world that your grandchildren will thank you for?

"A world where industrial production has sunk to zero. Where population has suffered a catastrophic decline. Where the air, sea, and land are polluted beyond redemption. Where civilization is a distant memory.

"This is the world that the computer forecasts. What is even more alarming, the collapse will not come gradually, but with awesome suddenness, with no way of stopping it."

Could this mean that the next 40 years for the global petroleum industry will match the dramatic shifts that have impacted it over the past 40 years?

This was published in 1972, coincident with the peaking in U.S. crude oil production, but not apparent at that time. It was at this point that oil market power shifted from the Seven Sisters to the members of the Organization of Petroleum Exporting Countries (OPEC), which marked the most dramatic change for the oil business in its then 100-year history. If we take a step back and examine the rhetoric of the climate change (née global warming) debate today, it appears we are experiencing dejá vu. Could this mean that the next 40 years for the global petroleum industry will match the dramatic shifts that have impacted it over the past 40 years?

It remains the primary source for powering the global economy that now supports several billion more people than were alive in 1972 with higher standards of living

As our friend wrote, he didn't expect to have a job, or a position in the oilfield service industry in 2015. In fact, one could question whether the oilfield service industry would even exist. For all the changes the energy industry has undergone, it remains the primary source for powering the global economy that now supports several billion more people than were alive in 1972, all with higher standards of living. However, there still remain an estimated 1.6 billion people who lack access to electricity – the most basic form of energy that transforms economies and civilizations from subsistence to reasonable living standards marked by easier access to food, education, health care and, importantly, employment.

The petroleum industry has gone through a seismic shift over the past 40 years. Our friend highlighted those changes when he wrote: "We had north of 20 'IOC's' [Integrated Oil Companies] that were fully integrated with drilling rigs and crews and everything else was bought from hundreds of service/supply companies. Today all the oil is owned by sovereign national oil companies ['NOC's'], there are half dozen IOC's that are really real estate owners and 4 service companies that provide 75% of all service and supply, oh, and they have larger market caps that the IOC's of the 80's."

Before Daniel Yergin wrote his epic history of the oil business in The Prize in 1991, the classic book about the industry was Anthony Sampson's The Seven Sisters: The Great Oil Companies and The World They Shaped that was published in 1975. I met the author on one of his visits to Houston as my boss at that time was one of his sources. As a result, it made reading the book more interesting.

Mr. Sampson seized on the term, Seven Sisters, coined in the 1950's by businessman Enrico Mattei, who at that time was the head of the Italian state oil company Eni (E-NYSE), for the title of his book. Mr. Mattei used the term to describe the seven oil companies, which formed the "Consortium for Iran" cartel and dominated the global petroleum industry from the mid-1940's to the early 1970's. The group of seven companies comprised Anglo-Persian Oil Company, now BP Ltd. (BP-NYSE); Gulf Oil, Standard Oil of California (SoCal), and Texaco, all now part of Chevron (CVX-NYSE); Royal Dutch Shell (RDS.A-NYSE); and Standard Oil of New Jersey (Esso) and Standard Oil Company of New York (Socony), both now part of ExxonMobil (XOM-NYSE). No European oil companies were part of this sisterhood. Compagnie française des pétroles (CFP), literally the "French Petroleum Company" was formed in 1924 after the French government rejected a proposal from Royal Dutch Shell to form a joint venture company. CFP, now TOTAL (TOT-NYSE), received the French government's 25% share in the Turkish Petroleum Company (TPC) it had received as compensation for damages caused by Germany in World War I. That share in TPC morphed into a 23.75% share in the renamed Iraq Petroleum Company in 1929, which enabled CFP to become involved in carving up of the Middle East oil world along with the Seven Sisters.

Mr. Mattei used the term to describe the seven oil companies, which formed the "Consortium for Iran" cartel and dominated the global petroleum industry from the mid-1940's to the early 1970's

Chapter two of Mr. Sampson's book opens with the words of John D. Rockefeller, the creator of the Standard Oil empire saying, "The American beauty rose can be produced in its entire splendor only by sacrificing the early buds that grow up around it." That statement encapsulates what has been perceived as the predatory nature of these oil companies. As the book highlights, the Seven Sisters plus one were active participants with their host governments in the evolving geopolitics of the Middle East with its significant oil reserves as the Petroleum Age was emerging.

The Seven Sisters plus one were active participants with their host governments in the evolving geopolitics of the Middle East with its significant oil reserves as the Petroleum Age was emerging

Today, there are only four surviving companies from the Seven Sisters - BP, Chevron, ExxonMobil and Royal Dutch Shell. They are now referred to as the "supermajors" along with TOTAL and sometimes the Italian company Eni. The "New Seven Sisters" was proclaimed some years ago by the *Financial Times* when it wanted to describe the group of the most influential national oil companies based in countries outside of the Organization for Economic Cooperation and Development (OECD). The New Seven Sisters group consists of: Saudi Aramco (Saudi Arabia); China National Petroleum Corporation; Gazprom (Russia, GAZP.ME); National

Today, there are only four surviving companies from the Seven Sisters

Iranian Oil Company; Petrobras (Brazil, PBR-NYSE); PDVSA (Venezuela); and Petronas (Malaysia)

Today, supermajors hold only about 3-4% of the world's reserves and about 10% of global oil output

Prior to the 1973 Arab oil embargo, the Seven Sisters controlled around 85% of the world's petroleum reserves and most of the world's oil output. Today, supermajors hold only about 3-4% of the world's reserves and about 10% of global oil output. The shift in these percentages speaks to the power of the OPEC cartel and the rise of national oil companies. They also speak to the difference in the business models of the supermajors and the independent oil and gas companies.

These trends were at the heart of our friend's email. He wrote: "Now that mix of companies competes in an economic model that consists of the lion's share of ownership of resources operating as a cartel and they try and do that with free market principles a la Adam Smith. We then try and predict and measure part of the industry on supply and demand, part with sovereign politics and the remainder with cartel geopolitics. I challenge any of us to come up with a predictive economic formulation based on any measurable KPI that allows us to predict the future in this industry. I haven't in the 38 years I've been in it seen even one that ever panned out. I think it never will."

Mr. Jamieson was still a director of Exxon, and he emphatically told me that the future for Exxon was in "hard rock minerals"

In 1976, I had lunch with Ken Jamieson, the recently retired Chairman of Exxon. This was during the industry's interregnum between the shocks of the Arab oil embargo in 1973 and the Iranian revolution in 1979. Mr. Jamieson was still a director of Exxon, and he emphatically told me that the future for Exxon was in "hard rock minerals." Many people fail to remember that Exxon was a major coal miner, a leading uranium producer and also mined copper in South America. Exxon also diversified into office products systems (anyone remember that?) and bought Reliant Electric, a maker of electric motors, because Exxon claimed it possessed energy saving technology that turned out not to work. Most of those businesses were entered into or expanded during the late 1970's as Exxon management, as reflected in Mr. Jamieson's comment, had a negative outlook for the company's oil and gas future. In the mid-1980's many of the businesses were sold, with the coal company being disposed of in the early 2000's. We don't remember whether Exxon published an energy outlook as they do now, but it sure would have looked different than their most recent version.

Is it possible to predict the future structure of the oil business?

Is it possible to predict the future structure of the oil business? We think it is possible to define the forces that will shape the industry's future, but we are fully cognizant of the pitfalls in making any prediction. Who is clairvoyant about the role of demographics, government economic policies and geopolitics? We don't claim that mantle. What we do believe is that these forces have been present throughout the history of the petroleum industry but are changing and in some cases becoming more volatile. That means they can easily tip the industry off course. Take for example the issue of

Government action can dramatically change the relative value of fossil fuels in favor of less efficient, intermittent and more costly power sources

climate change and the movement to tax carbon emissions, in which petroleum plays a significant role. Government action can dramatically change the relative value of fossil fuels in favor of less efficient, intermittent and more costly power sources. Although petroleum's role in global energy supply is projected to shrink in the future, it will not disappear within the next generation. It means oil companies must continue developing new supply sources.

The most dramatic change for the oil industry was the expansion of oil and gas exploration activities around the world, especially offshore

Just as the energy crisis of the late 1970's sent world economies on a different economic development path than anticipated prior to the crisis, it also altered the oil industry's future. The most dramatic change for the oil industry was the expansion of oil and gas exploration activities around the world, especially offshore. In fact, over the past 60 years, offshore oil and gas operations expanded from one country to over 80 today. In the 1970's, there were probably two dozen oil producing countries and based on 2013 data, the Energy Information Administration (EIA) now lists 125 oil producing countries, and there may be few more if we count those countries that only produce natural gas.

The global petroleum industry today is being shaped by the shale revolution that has been driven by independent oil and gas companies

The global petroleum industry today is being shaped by the shale revolution that has been driven by independent oil and gas companies. These plays highlight what has been a traditional theme throughout the history of the oil business – progressively more expensive to find and develop oil and gas is needed for new supplies. From seeps to massively deepwater fields, the oil industry has progressively pushed its technology capabilities in drilling for and producing oil and gas. That trend has been behind the rise in oil prices at times throughout the industry's history. The past decade with its shale revolution marks only the latest episode in this history. The ability of the petroleum industry to push the frontiers of drilling and producing technology and make what begins as a science experiment evolve into commercially viable enterprises remains today, regardless of the health of the industry. That talent is a key part of the industry's DNA.

The biggest changes for the petroleum industry going forward will be felt among the national oil companies and the independents

The biggest changes for the petroleum industry going forward will be felt among the national oil companies and the independents. The financial scandal at Brazil's Petrobras and the Venezuelan government's destruction of PDVSA by turning into a social spending credit card highlight some of the challenges the New Seven Sisters face. Other countries farther behind in the development of their national oil companies should take heed of the requirement to develop technically-proficient and profitable state oil companies that can become major economic contributors to their nation's economies and not personal bank accounts for politicians. Certainly that is a tall order, but there are many, very highly respected national oil companies that can be role models.

The supermajors will continue to play their role in opening up the new, more expensive petroleum provinces of the world. They are

Independent oil and gas companies will continue to play an important role in developing more output by pushing down the cost curves on new plays

the companies that can continue to engage in science projects since they have the financial strength to carry the load and the technical staffs to help guide the projects. Independent oil and gas companies will continue to play an important role in developing more output by pushing down the cost curves on new plays. The biggest changes they confront are mastering the economics of their plays and striving for profitability records rather than production growth records. This means attracting and rewarding builders of E&P companies, such as occurred with companies in the late 1970's and early 1980's. Many of those startup or then-tiny oil and gas companies have evolved into large independent status, or have been acquired by the supermajors. What was true about them then was that they were true to their business model technologically, while remaining financially conservative.

Larger and stronger independents are likely to be acquirers of debt-laden independents either in their entirety or by buying the bulk of their assets

Will the supermajors become acquirers of independent companies in this industry downturn? Most of them have indicated they will not as they are more focused on managing their cash flows and how they are spent – capital spending versus dividends. That leaves an opening for private equity and national oil company investors. More than likely, larger and stronger independents are likely to be acquirers of debt-laden independents either in their entirety or by buying the bulk of their assets. The boom in start-up E&P companies sponsored by private equity funds is probably at an end. It may still take a while for the end to become evident, but it will likely be marked by more blood being spilled by E&P equity investors. Will it take lower oil and gas prices, or merely an extended period of low prices – the proverbial "L-shaped" industry recovery?

These trends will likely dictate there be a smaller universe of service companies, however, they will be larger with broader, more integrated product and service lines

The biggest industry change will probably come within the oilfield service sector. As the E&P technological challenges grow, the need for high-tech solutions will force more R&D to be conducted by service companies. This trend started in the 1990s in response to the restructuring of the supermajors, who traditionally conducted most of the oil and gas industry R&D. This capability will probably become a defining line separating top service companies from low-tech, commodity-oriented service companies. Those service companies possessing the higher margin technologies should be able to secure more business and at higher profit margins. The E&P companies are pushing for the ultimate in exploration, which is that every well they drill will be the best well ever drilled in their fields. Technology will assist in that effort, as will increased automation of the drilling rig. Those trends will also help on the labor front as the service industry strives to reduce its field work forces while increasing the consistency of results in what continues to be an uncertain business. These trends will likely dictate there be a smaller universe of service companies, however, they will be larger with broader, more integrated product and service lines.

We state with great trepidation that the last half dozen years may reflect the last great oil boom for the industry. The industry is

The slashing and burning necessary for companies to survive the current industry bust has arrived at a particularly bad time

heading into a less significant, albeit continuingly challenged role. Reduced energy intensity in global economies, aging populations in mature economies, rapid population growth in less developed economies, the rise of renewables and increased regulation and taxation worldwide on fossil fuels will characterize the future environment for the petroleum industry. The slashing and burning necessary for companies to survive the current industry bust has arrived at a particularly bad time. As the industry faces the "great crew change" among its labor force, it needs to attract young, talented workers. While today's youth seem to be more open to frequent job changes, that trend will probably fade as they age and desire the same stability older generations coveted. Personnel management may become one of the greatest challenges for the petroleum industry of the future, especially as labor continues to represent the lion's share of operating costs. Balancing stability against growth will be a constant challenge. All of these challenges may dictate that there should be more 'turtles' than 'hares' in the management of the petroleum industry of the future.

Northeast Remains Environmental Battleground Over Energy

The battle over expanding the pipelines bringing natural gas into the region continues unabated

As cold weather and snow continues to hound the New England region of the country sending its electricity and heating demand skywards, the battle over expanding the pipelines bringing natural gas into the region continues unabated. While there are two significant pipeline expansion proposals on the drawing board seeking approvals so they can haul additional gas supplies into the region, environmentalists are becoming more militant in fighting them over the health and ecological risks of hydraulic fracturing and natural gas pipelines in general.

Exhibit 1. Anti-Pipeline Activists Brave Cold Weather

Source: ***Eco-RI***

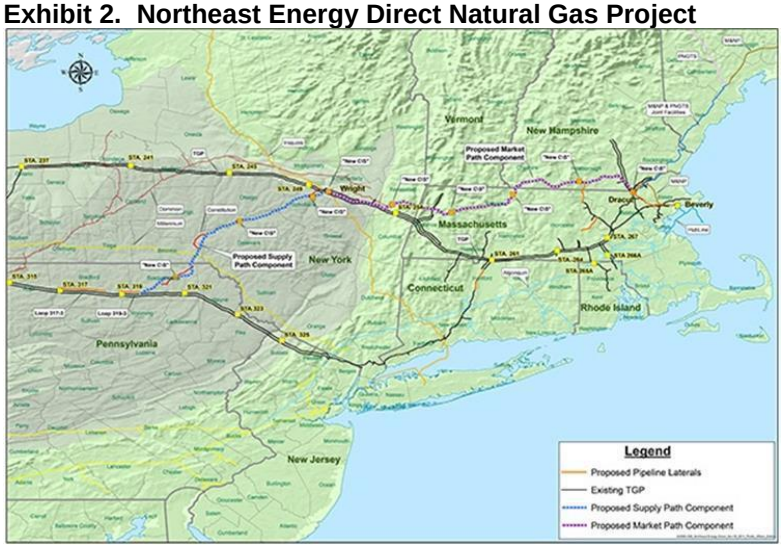
The New England states have some of the most expensive electricity costs in the nation

The New England governors are backing these pipeline expansion projects with the hope that by having more natural gas flowing into the region utilities will be able to restrain increases in electric power costs that have become a significant burden on local residents and businesses. The New England states have some of the most expensive electricity costs in the nation, which is cited as a partial explanation for the weak economic performance of these states in recent years, and especially in their effort to fully recover from the 2008-2009 financial crisis-induced recession.

This project would bring additional gas from the Marcellus producing region in Western Pennsylvania into the markets of New Hampshire, Massachusetts and Connecticut

One of the pipeline expansion projects is the Northeast Energy Direct Project sponsored by Tennessee Gas Pipeline, a company owned by mid-stream energy powerhouse, Kinder Morgan (KMI-NYSE). This project would bring additional gas from the Marcellus producing region in Western Pennsylvania into the markets of New Hampshire, Massachusetts and Connecticut. This project is conducting its open season solicitation to determine the volume of gas demanded and whether producers will commit to ship their gas on the line.

Exhibit 2. Northeast Energy Direct Natural Gas Project

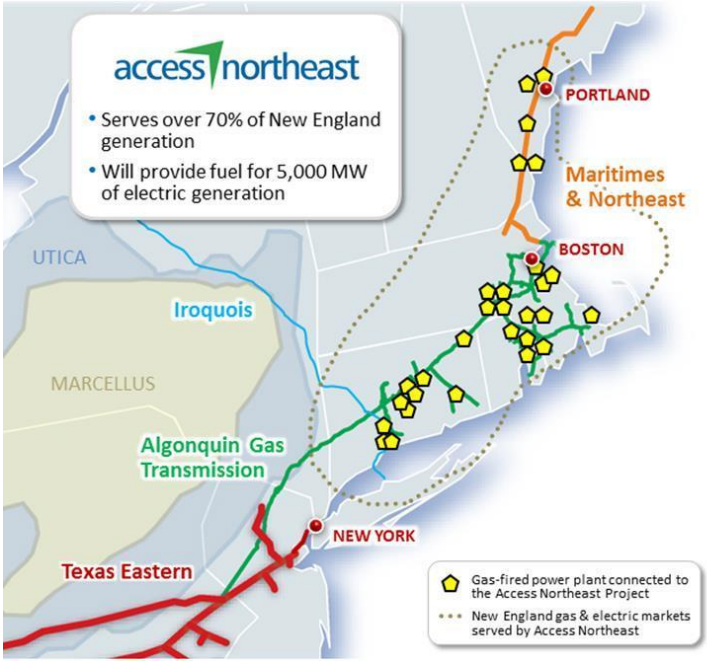


Source: Kinder Morgan

In the past year it has become the symbolic target of emotional protests against the gas pipeline expansion project following 60 years of operation without any incidents or complaints from local residents

The more advanced pipeline expansion project is that of Spectra Energy's (SE-NYSE) Algonquin Gas Transmission subsidiary, which has proposed expanding its pipeline's capacity into the Boston metropolitan area primarily by increasing the pumping capacity at several of its existing compressor stations. One of those stations is located in Burrillville, Rhode Island. In the past year it has become the symbolic target of emotional protests against the gas pipeline expansion project following 60 years of operation without any incidents or complaints from local residents. Now, however, based on the protests, one would think it is the noisiest and dirtiest compressor station in the nation.

Exhibit 3. Algonquin's Pipeline Expansion Project



Source: Spectra Energy

Ironically, the same day that the Federal Energy Regulatory Commission gave its approval to the project, was the start of the most recent protest

The Burrillville compressor station expansion proposal has sparked numerous protests, beginning last fall when an environmental organizer arrived in the community, that increasingly have turned ugly. Ironically, the same day that the Federal Energy Regulatory Commission (FERC) gave its approval to the project, was the start of the most recent protest, which involved a three-day march from the Boston area to Providence and was organized by the activist group Stop the West Roxbury [Massachusetts] Lateral Pipeline and joined by members of Fight Against Natural Gas (FANG) and Burrillville Against Spectra Energy (BASE).

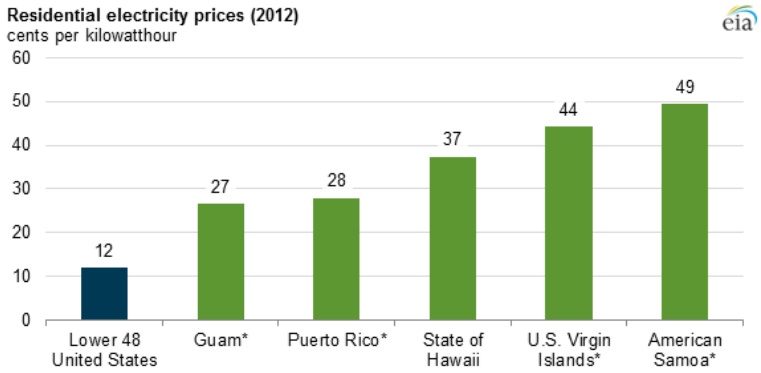
The goal of the protest movement is to hopefully derail the Algonquin project, but it is truly hoped that the movement will stop four other pipeline projects proposed for New England

According to the protest leaders, FERC's approval was predetermined, but the project still needs additional permits, including at least two from Rhode Island agencies, thus explaining why the protesters came to the state. The goal of the protest movement is to hopefully derail the Algonquin project, but it is truly hoped that the movement will stop four other pipeline projects proposed for New England. As part of its protest efforts, on February 28th, FANG interrupted a speech by Senator Sheldon Whitehouse (D-RI) at the Yale Law School in New Haven, Connecticut. The group also staged protests in Sen. Whitehouse's office in Providence and Senator Jack Reed's (D-RI) office in Cranston. The interesting thing is that Sen. Whitehouse is the Senate's leading climate change promoter and he has been making almost weekly speeches on the subject on the floor of the Senate. Senator Reed, a Northeast liberal, is also a leading environmental promoter. Arrests were made in ending each of these protests.

DEM director Janet Coit sat down with the group, and according to the activists, expressed sympathy for their cause

The most recent protest march finished in the Rhode Island capitol and the office of Governor Gina Raimondo (D). The activists also rallied in the offices of the Rhode Island Department of Health, the Department of Environmental Management (DEM) and Senator Whitehouse. While neither Gov. Raimondo nor any of her staff would meet with the activists after they entered the outer chamber of her office, the group did hold a brief protest there. DEM director Janet Coit sat down with the group, and according to the activists, expressed sympathy for their cause. Remember, this is the state that will be hosting the first offshore wind energy project that will have the highest cost electricity in the continental United States at 24.4 cents per kilowatt-hour with an annual increase guaranteed, or nearly twice the average cost for the nation and nearly as expensive as power in Guam.

Exhibit 4. Expensive RI Wind Power Matches Highest Prices



Source: EIA

Surprisingly, for all the push by environmental groups and politicians, the market share of renewables has barely increased over this time period

It is important to understand the dramatic shift in power supplies in New England to understand both the opportunity for pipeline companies to expand their delivery capacity and the need for these additional supplies of low-cost natural gas to help hold down electricity cost increases in the region. A table (Exhibit 5 on the next page) published by *EnerKnol* shows how New England's power supply has changed over the past 15 years, with natural gas' share now nearly three times what it was in 2000. Importantly, with the closure of the Vermont Yankee nuclear power plant at year-end 2014, nuclear's share of the power market will decline. Surprisingly, for all the push by environmental groups and politicians, the market share of renewables has barely increased over this time period. The clear message from the table is that natural gas has displaced coal and oil, meaning that pollution has been reduced in the region. The big problem for the region is that without additional gas transportation capacity, when seasonal demand surges, power companies need to restart oil- and coal-fired plants, which tend to be more expensive and dirtier.

Exhibit 5. Natural Gas Nears Half Of N.E. Power Supply

Table 1 –New England Energy Mix (2000 and 2014)

Fuel	% Share in 2000	% Share in 2014
Natural Gas	15	44
Nuclear	31	34
Renewables	8	9
Hydro	7	8
Coal	18	5
Oil	22	1

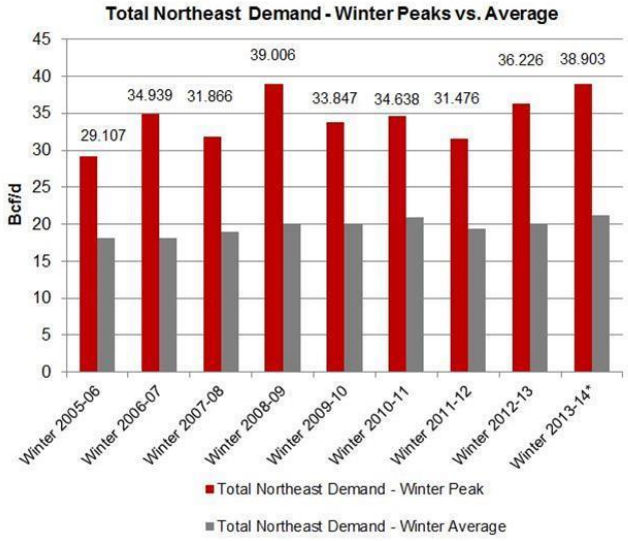
Source: ISO-NE, EnerKnol Data

Source: *EnerKnol*

So far this winter, gas demand has surged to a new high of 43.1 billion cubic feet on February 16th, a 3% increase compared to the highest level of demand experienced during last winter's polar vortex

One thing we have observed about the region is that its consumption of natural gas has continued to grow as homeowners switch from fuel oil to gas for home heating and new power plants favor using gas over other fossil fuels. So far this winter, gas demand has surged to a new high of 43.1 billion cubic feet on February 16th, a 3% increase compared to the highest level of demand experienced during last winter's polar vortex. It will be interesting to see not only what peak demand ends up being (it may have exceeded that February peak in the most recent cold snap) but also what the average winter demand is this year. The chart in Exhibit 6 shows the trend in gas consumption for the prior nine years.

Exhibit 6. New England Peak And Winter Gas Demand



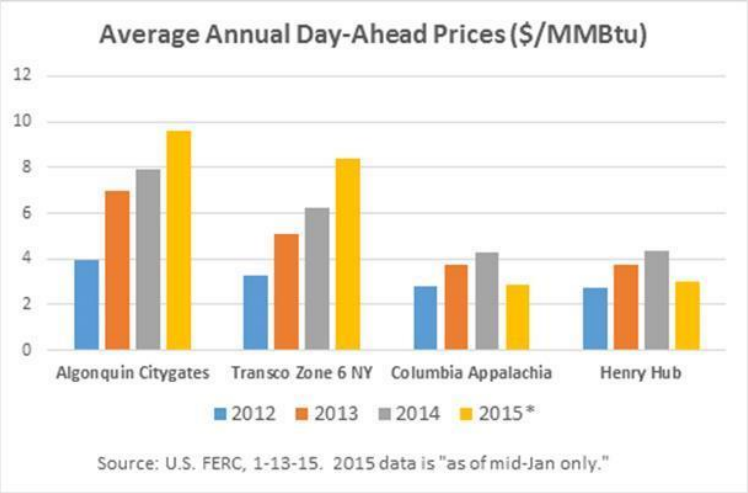
Source: EnerKnol

The impact of the pipeline capacity shortage in the face of growing demand in the region is demonstrated by the cost of day-ahead prices for natural gas. While the data in the chart in Exhibit 7 below reflected mid-January pricing, the key point is that the Algonquin city

The ability to bring more gas into the region should allow utilities to enter into more long-term gas supply contracts and reduce city gate prices

gate and Transco Zone 6 pricing, which are reflective of natural gas prices in the New England consuming market, is considerably higher than the prices reflected in the Marcellus (Columbia Appalachia) and national (Henry Hub) markets. The ability to bring more gas into the region should allow utilities to enter into more long-term gas supply contracts and reduce city gate prices. It is unlikely that these price disparities will completely close, but they will certainly narrow.

Exhibit 7. Pipeline Bottlenecks Boost Region Gas Prices



Source: FERC

These pipeline expansions will only come over the opposition of anti-gas protestors and green-energy proponents

More natural gas pipeline capacity in the New England region should lower home heating and electricity bills for residents. That should be a positive for economic growth in the region. These pipeline expansions will only come over the opposition of anti-gas protestors and green-energy proponents. The governors of the states seem to have awakened to the economic benefits of utilizing more clean-burning, low-cost natural gas. Let's hope they don't cave into the politically expedience of bowing to more high-cost renewable energy.

Winter's Latest Surprise And The Natural Gas Outlook

These collisions resulted in significant snowfalls

After starting off in what looked like it might be a warmer than normal winter, the Arctic cold air swirling around the North Pole suddenly began finding its way into North America, and in particular the Northeast region of the nation. The past three months seem to have been a groundhog day of repeating blasts of Arctic cold slamming into moisture-rich air traveling across the middle of America or coming up from the Gulf Coast region. These collisions resulted in significant snowfalls.

The New England region of the country has been particularly hard hit. Boston officially broke its historical record for snowfall as a bevy of recent storms pushed seasonal accumulation to 108.6 inches as

Bostonians were hoping that their winter was over – hey, it's time to play baseball!

of March 15th at 7 pm, as reported by the National Weather Service in Boston. Bostonians were hoping that their winter was over – hey, it's time to play baseball! However, National Weather Service statistics point out that the last measurable snowfall of last year occurred on April 6th when 0.3 inches of the stuff was measured. The prior record winter of snow in 1995-1996 saw its final snowfall on April 10th when 5.4 inches accumulated at the end of a three-day winter storm spanning April 7th to April 10th that produced a total accumulation of 7.3 inches. Friday, Boston got 0.5 inches of snow.

On Tuesday of last week, natural gas prices spiked by 4.4%, or 11.8 cents per million British thermal units

On Tuesday of last week, natural gas prices spiked by 4.4%, or 11.8 cents per million British thermal units (MMBtu), which is roughly equivalent to the heat content in a thousand cubic feet of gas, as gas traders focused on expectations for another blast of cold air hitting the U.S. Northeast later in the week bringing with it the possibility of more snow despite spring arriving Friday. Snow flurries were seen in New York City and Washington, D.C. Friday morning. Despite the jump in natural gas prices, they merely traded up to $2.834/MMBtu that morning. Natural gas futures did close the trading day higher at $2.86/MMBtu, suggesting that the momentum from expectations for at least one more large gas storage withdrawal carried on throughout the day.

They then fell by 12 cents by late morning in New York trading following the federal government's mid-morning release of its weekly storage withdrawal estimate for the prior week

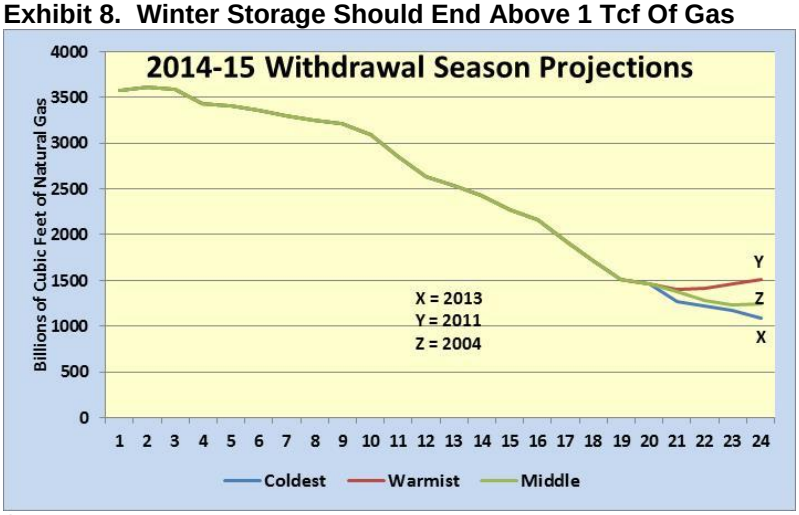
After the April futures contract had climbed to $2.92/MMBtu at the close of trading on Wednesday, prices began drifting lower on the opening of trading on Thursday morning. They then fell by 12 cents by late morning in New York trading following the federal government's mid-morning release of its weekly storage withdrawal estimate for the prior week. According to that report, only 45 billion cubic feet (Bcf) of gas was withdrawn, slightly below the industry's expectation for a withdrawal of 48 Bcf. It appeared, as the market approached noon on Thursday in New York that the April 2015 gas contract price was heading back to where it had closed on Monday - $2.72/MMBtu.

Last week's small withdrawal volume has boosted the likelihood that we will exit this winter season with at least one trillion cubic feet of gas in storage

To see where we are in the current winter withdrawal season and what that implies for upcoming gas prices, we updated our projections. Last week's small withdrawal volume has boosted the likelihood that we will exit this winter season with at least one trillion cubic feet of gas in storage, thereby reducing the need for higher gas prices to suppress demand and induce more supply in order to rebuild storage volumes for next winter. As has been the case for the past several years, and especially true this past year, the growth in natural gas production, which continues nearly unabated despite the low number of rigs drilling for gas, has been more than adequate to meet demand while also keeping storage from being drawn down precipitously. That observation must be treated with some degree of caution given that there remain a few weeks in the withdrawal season, but there is little doubt that the harsh winter weather period is over and any cold spell will likely have less impact on gas demand than if it was experienced during January or February.

Our gas withdrawal model is based on applying the weekly withdrawal patterns experienced during the coldest, the warmest and a middle of the pack winter during the past 20 years. The three winters that met those conditions were the winters of 2013-2014 (coldest), 2011-2012 (warmest) and 2004-2005 (middle of the pack). In Exhibit 8, we show what the final storage numbers will be assuming the remaining weeks this winter follow these weekly withdrawal patterns. In order to see how this latest forecast compares to earlier ones, we have also posted in Exhibit 9 a chart we published in an early February *Musings* showing how forecasts had changed between early January and early February.

Exhibit 8. Winter Storage Should End Above 1 Tcf Of Gas



Source: EIA, PPHB

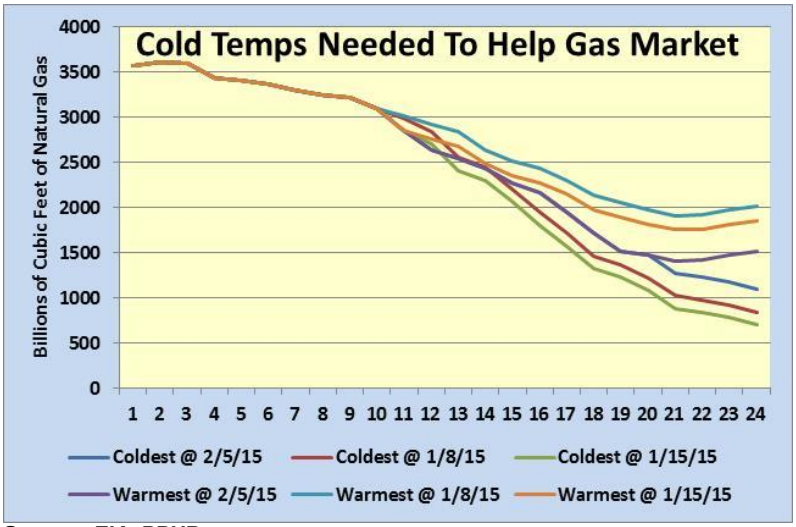
If we hit either the middle or the coldest forecasts, the winter of 2014-2015 would be either the third or the second largest winter season withdrawals in the past 20 years

The latest forecasts for this year suggest that storage volumes will wind up somewhere between 1,093 Bcf on the low end to 1,506 Bcf on the high end. Interestingly, the forecasts call for total winter withdrawals of 2,518 Bcf for the coldest winter, 2,105 Bcf for the warmest and 2,369 Bcf for the middle winter. If we hit either the middle or the coldest forecasts, the winter of 2014-2015 would be either the third or the second largest winter season withdrawals in the past 20 years. If we only mirror the warmest winter withdrawal, the winter of 2014-2015 would not make the top five winter withdrawals.

The gas industry should have little trouble in refilling storage caverns this summer

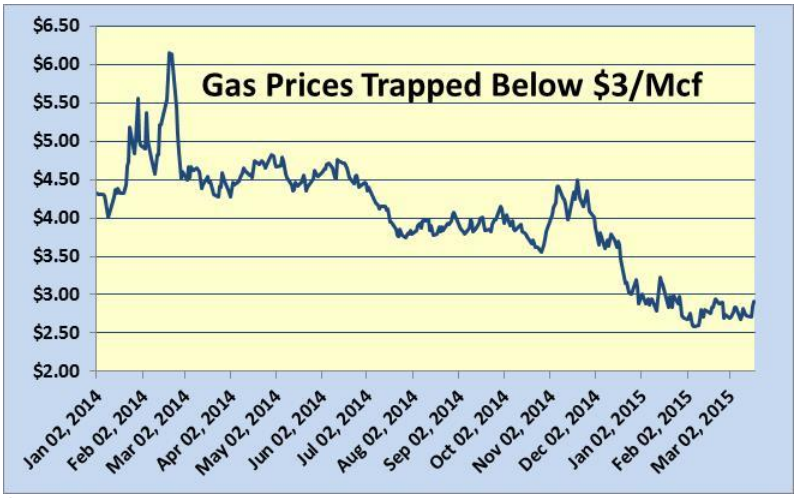
The most interesting aspect in looking at this winter's forecast against the earlier forecasts is to see how the past six weeks have essentially put this winter within the range of the coldest and warmest winter projections made in early February. The conclusion is that despite the attention paid to the long string of bad winter storms experienced during the past six weeks, we really haven't experienced a worse time than was experienced in recent winters. This means the gas industry should have little trouble in refilling storage caverns this summer unless something dramatic happens to the nation's natural gas output.

Exhibit 9. Forecasts Move To Mid-Point Of Prior Estimates



Source: EIA, PPHB

Exhibit 10. Natural Gas Prices Suffer From Production Growth



Source: EIA, PPHB

The projected winter-ending storage volumes coupled with continued natural gas production growth signals that sub-$3/Mcf pricing is likely for the balance of this year, barring an extraordinarily hot summer

The greatest challenge for the petroleum industry is figuring out how to get natural gas prices back to levels that would support more profitable E&P operations. As shown in Exhibit 10 above, natural gas futures prices jumped up to nearly $4.50/Mcf last fall as an early cold snap scared gas buyers that this could be a colder winter with gas supplies becoming tighter as winter developed. The fact that no more cold weather appeared until after the new year sent gas prices skidding below $3/Mcf where they have resided for almost all of 2015. The projected winter-ending storage volumes coupled with continued natural gas production growth signals that sub-$3/Mcf pricing is likely for the balance of this year, barring an extraordinarily hot summer. The longer crude oil and natural gas liquids prices remain depressed, the greater the likelihood that drilling for both oil

and gas will suffer. Maybe the industry will be looking at an improved pricing outlook as it moves toward 2016. Hope always springs eternal.

A Global Force Influencing Oil Prices That Is Often Ignored

When the discussion shifts to the forces influencing global oil prices, the debate is usually about what is more important – overproduction or weak demand

When the discussion shifts to the forces influencing global oil prices, the debate is usually about what is more important – overproduction or weak demand. Much like the chicken or egg question, there is no uniform answer. From that esoteric debate, the focus then usually shifts to debating how much the oil price is influenced by the level of political conflict or uncertainty that exists in the world. The greater the level of conflict, the higher the oil price is likely to be. Even absent actual conflict, the mere hint of it occurring and possibly impacting the stability of major oil producing countries can send oil prices up. Likewise, a cooling of political tensions can send commodity prices, especially oil prices, down.

Unless oil is priced in a different currency, at the margin, oil demand will be influenced by whether the oil price in dollar terms is rising or falling

Geopolitical discussions are usually more fun than debating the fine points of oversupply versus lack of demand issues. But a more arcane, yet equally significant point about oil prices is to understand the relationship between the value of the U.S. dollar and other leading currencies such as the euro or the Japanese yen. Since crude oil is priced in U.S. dollars, whenever the dollar's value rises or falls in relation to the value of other currencies, what it costs non-Americans to buy crude oil fluctuates, thereby influencing the amount of oil they are likely to consume. Unless oil is priced in a different currency (some believe China is hopeful of getting oil priced in yuan to boost its stature), at the margin, oil demand will be influenced by whether the oil price in dollar terms is rising or falling.

Part of the reason for the sharp increase in the DJIA was a jump in the value of the energy shares in the index in response to the move in the crude oil price

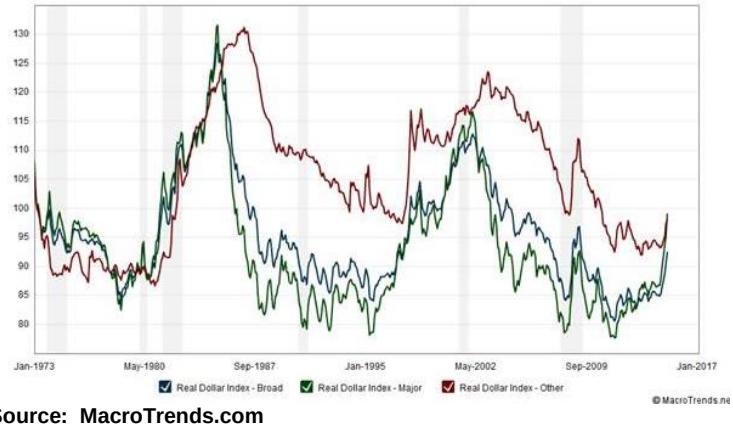
The significance of this relationship was illustrated last Wednesday afternoon following the announcement by the Federal Reserve that it was preparing a gradual path to normalizing interest rates (whatever normal means), suggesting that it could begin raising domestic interest rates sometime later this year. Once it became clear that the Fed was not planning on raising rates in April, but possibly June or September, the dovishness of the release gained traction. The news was received well by financial markets as the Dow Jones Industrial Average (DJIA), which had fallen by about 150 points for the day at that point, soared by roughly 400 points before giving back about 20 points to close up about 230 points for the day. The Federal Reserve's message drove the value of the U.S. dollar lower, which in turn sent the value of crude oil higher. West Texas Intermediate (WTI) oil futures had traded as low as $42.03 a barrel, a six-year low, before the news broke, but then climbed to close at $44.88, reflecting the monetary news and its impact on the value of the dollar. Part of the reason for the sharp increase in the DJIA was a jump in the value of the energy shares in the index in response to the move in the crude oil price.

"It's a dollar play all over again today. The fact that the oil market is oversupplied is a given, so the only real variable now are currency moves and how they impact commodities demand."

What we learned on Thursday, however, was that Wednesday afternoon's oil price jump, which was related to the move in the value of the dollar, was not sustainable. As commodity analyst Phil Flynn at the Price Futures Group stated, "It's a dollar play all over again today. The fact that the oil market is oversupplied is a given, so the only real variable now are currency moves and how they impact commodities demand." The fact that industry fundamentals have not changed despite the positive interest rate news was demonstrated Wednesday with the news that U.S. crude oil inventories had increased by 9.6 million barrels in the prior week, more than twice the estimate of analysts. Part of that storage increase was due to a jump in oil imports - a 703,000 barrel-a-day increase. The import hike was helped by the re-opening of the Houston Ship Channel following a ship collision and the absence of dense fog that had limited ship movement in the Gulf Coast region.

We believe it is important for people to understand the relationship between the value of the U.S. dollar relative to other foreign currencies and crude oil prices. Exhibit 11 shows how several measures of the value of the dollar have moved over time. One must concede that changes in the dollar's value is certainly not the only, and maybe not even the principle cause for the movement in the price of crude oil.

Exhibit 11. Value Of U.S. Dollar Has Up And Down Record



Source: MacroTrends.com

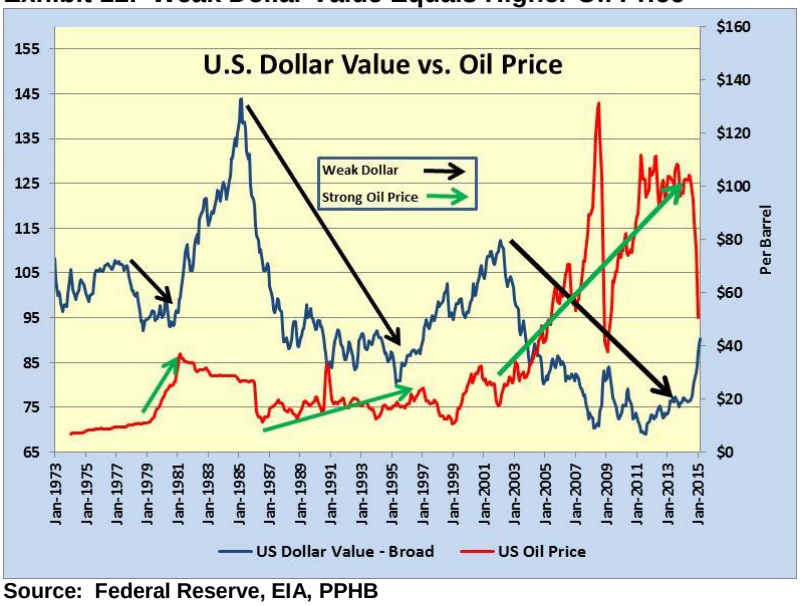
The more recent period of dollar weakness occurred between 2001 and late 2014, and we know oil prices rose, even though they suffered during 2008-2009

To demonstrate how these fluctuations in the value of the dollar have impacted oil prices, we prepared the chart in Exhibit 12 on the next page. We can clearly point to those periods when the dollar's value was declining and oil prices were rising. For example, during the ten-year span 1985-1995, the dollar's value was falling and oil prices rose, albeit not appreciably. In the earlier years of 1977-1981, oil prices rose as the value of the dollar fell, but there was also the Iranian revolution, which most people consider the primary reason for the rise in oil prices. The more recent period of dollar weakness occurred between 2001 and late 2014, and we know oil prices rose, even though they suffered during the 2008-2009

If the dollar strengthens any more does that mean oil prices are heading into the $30's?

financial crisis. What is interesting is that during that two-year period, there was a time when the value of the U.S. dollar rose sharply and then subsequently fell sharply, which appears to coincide with the "V-shaped" oil price movement that sent prices from roughly $143 a barrel down into the $30's and then quickly back to the $80 a barrel level. Lastly, between late 2014 and now, the value of the dollar has steadily climbed while oil prices have essentially been cut more than in half from about $100 a barrel to the low $40's. If the dollar strengthens any more does that mean oil prices are heading into the $30's?

Exhibit 12. Weak Dollar Value Equals Higher Oil Price



Source: Federal Reserve, EIA, PPHB

These currency wars may stimulate weak economies, which would be a good thing for global energy demand

The Federal Reserve has been engaged in an extended period of crisis financing for the U.S. economy, which was deemed necessary to prevent the 2009 Great Recession from slipping into another "Great Depression." However, the engineered historically low interest rates as a result of this U.S. monetary policy has created huge flows of U.S. dollars that have found their way into commodities and other assets offering investors returns in excess of what was/is available in financial markets. One of the possible unintended consequences of this easy money policy is that many of these newly created dollars found their way to companies abroad who used them to finance their businesses. Those cheap U.S. dollar-based loans must now be repaid in an environment of a stronger dollar that is inflicting significant financial pain on the borrowers, and in some cases actual financial failure. Now, with almost every central bank around the world embracing easy monetary policies, one has to wonder what will happen to foreign economies and their businesses. These currency wars may stimulate weak economies, which would be a good thing for global energy demand. But that stimulus may come at the expense of

growth in dollar-based or dollar-tied economies such as Australia, Canada and China. We are not sure that will happen, but it could certainly become an unintended consequence of this wave of global monetary easing. What we are comfortable stating is that the global economic outlook is changing – whether it is for the better or worse remains uncertain. That uncertainty partly explains the volatility in oil prices.

Will Cheap Capital Bail Out Energy Or Prolong The Agony?

One force that has made the current energy industry business cycle different from past ones has been the influx of cheap capital, an outgrowth of the easy monetary policy of the Federal Reserve and the lack of returns available on low risk investments. Last Friday brought news of the latest private equity fund focused on the energy business. Private equity firm, Carlyle Group (CG-NYSE), announced closing a $2.5 billion fund targeting international energy deals. The money raised exceeded Carlyle's target of $1.5 billion and represents the largest first-time fund raising done by Carlyle in its 28-year existence. With this new money, coming from 160 investors, Carlyle now has in excess of $10 billion of investment funds to put to work in the energy business. Carlyle joins Blackstone Group LP (BX-NYSE), KKR & Co. (KKR-NYSE), and Apollo Global Management LLC (APO-NYSE) as other large private equity firms that have raised funds to capitalize on the turmoil in the energy sector. The firm's enthusiasm for the energy space has not been tempered by the recent performance of its North American fund. The fund has concentrated on exploration and production companies and lost 65% of its value during the fourth quarter in concert with the 55% decline in oil prices.

With this new money, coming from 160 investors, Carlyle now has in excess of $10 billion of investment funds to put to work in the energy business

Carlyle International Energy Partners is managed by Marcel van Poecke, who joined Carlyle in 2013 but had previously run Petroplus, a European refining company the private equity firm owned in 2005-2007. In an interview with *Bloomberg Business*, Mr. van Poecke said, "This is one of the best periods, if not the best, to invest in global energy." He further revealed that the fund has already made its first investments: a refiner, an African-focused E&P company and a European-based oil storage company. He indicated that the fund would now target E&P companies, especially those operating in the North Sea.

Mr. van Poecke said, "This is one of the best periods, if not the best, to invest in global energy."

The flood of money going into private equity and distressed bond funds hoping to capitalize on the problems now emerging among oil and gas producers and oilfield service companies is not surprising. This merely reflects the flip-side of the rush to pour funds into the shale revolution during the past half dozen years, a period marked by historically high global crude oil prices. According to former banker Satyajit Das, energy companies now account for about 15% of the Barclays U.S. Corporate High-Yield Bond Index, up from a 5% weighting in 2005. Since 2010, energy producers have raised $550

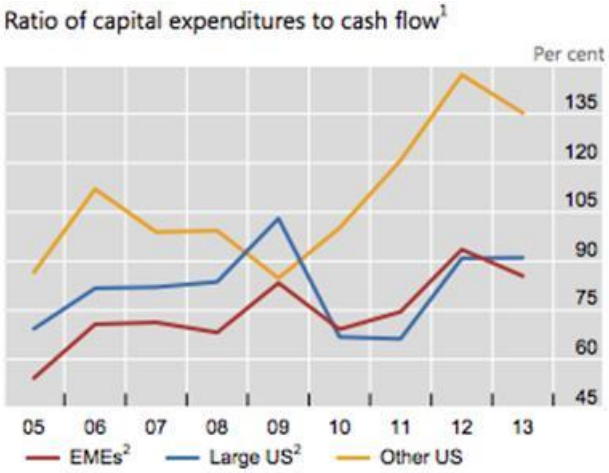
Energy companies now account for about 15% of the Barclays U.S. Corporate High-Yield Bond Index, up from a 5% weighting in 2005

billion of funds through new bond issues and loans. In 2014, over 40% of new non-investment grade syndicated loans were to the oil and gas sector, providing attractive business opportunities for commercial and investment banks.

American oil companies account for about 40% of total outstanding debt, with much of it issued to small shale producers who have grossly outspent their cash flow

Much of the money that has been raised for E&P companies reflects their need for funds to drill and develop shale plays that require capital expenditures well in excess of company cash flows. The Bank of International Settlements has a new analysis highlighting the growing risks of the amount of oil debt outstanding. According to the report, the sector increased its debt burden to $2.5 trillion in 2014 from $1 trillion in 2006. American oil companies account for about 40% of total outstanding debt, with much of it issued to small shale producers who have grossly outspent their cash flow. The report showed the chart in Exhibit 13. The small producers are represented by the yellow line, while large U.S. oil companies (assets in excess of $25 billion) are in blue and E&P companies in emerging markets are in red.

Exhibit 13. Small E&P's Cash Flow Problems



Source: Bank of International Settlements

Petrobras alone has $170 billion in debt, making it one of the most indebted companies in the world and one of the least profitable of the world's 15 largest oil companies by market value

In the international arena there are also growing risks from the amount of oil debt outstanding. As Mr. Das points out, since 2009, Petrobras (PBR-NYSE), Mexico's Pemex and Russia's Gazprom have borrowed about $140 billion in bond markets. Petrobras alone has $170 billion in debt, making it one of the most indebted companies in the world and one of the least profitable of the world's 15 largest oil companies by market value. With production of only 500,000 barrels a day from Petrobras' pre-salt deposits, which is well below expectations, and a daily production cost estimated at $70-$80 a barrel, among the most expensive production in the world, the company is struggling financially. Its problems are amplified by the ongoing corruption scandal that has shut Petrobras' access to foreign capital markets and forced it to rely on financial support from the Brazilian government.

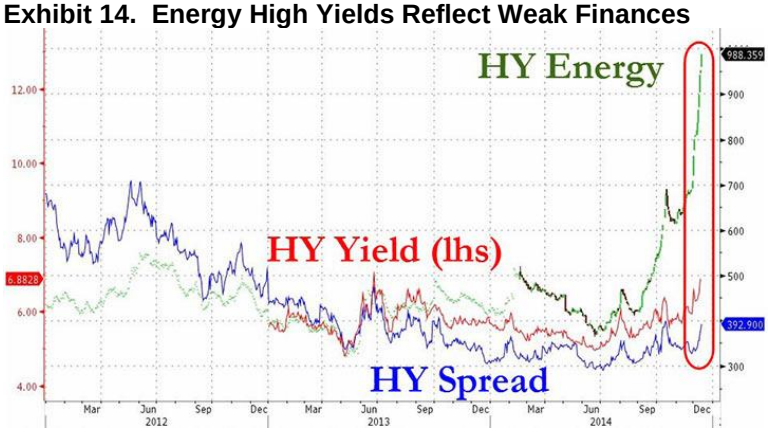
Continued low natural gas prices and now low oil and natural gas liquids prices are straining the finances of E&P companies

As small U.S. oil producers struggle to remake their business models, the bankruptcies are already beginning to be announced with Quicksilver (KWKA-OTC), a Barnett gas shale producer being the most recent company to file for court protection. Continued low natural gas prices and now low oil and natural gas liquids prices are straining the finances of E&P companies, and in some cases oilfield service firms. We are seeing frequent announcements of E&P company asset sales, capital spending cuts and employee layoffs. We also see numerous announcements of companies hiring advisors signaling that more restructuring activity is on the horizon.

As oil prices fell at the end of 2014, the energy HY rate soared as the financial weakness of highly leveraged energy companies was highlighted

Indicative of the challenges facing energy companies with substantial debt loads is shown in Exhibit 14, which plots the rates for the high-yield (HY) debt market overall and for the energy sector within that market. As shown, immediately before global oil prices began to slide last year, the spread between energy HY and overall HY yields was almost non-existent. As oil prices fell at the end of 2014, the energy HY rate soared as the financial weakness of highly leveraged energy companies was highlighted.

Exhibit 14. Energy High Yields Reflect Weak Finances



Source: ***Capital & Crisis***

As Dealogic has reported, so far this year, energy equity offerings have accounted for 12% of total U.S. equity issuances, or roughly $8 billion

The most surprising phenomenon (for us) this year has been the receptivity of public equity and debt markets to offerings from energy companies. As *Dealogic* has reported, so far this year, energy equity offerings have accounted for 12% of total U.S. equity issuances, or roughly $8 billion. The firm also reports that the pace of energy debt issuance has remained consistent with the pace the sector experienced over the past five years, as companies have sold $5.6 billion in new bonds. It appears investors are happy to back energy companies with the expectation crude oil and natural gas prices will rise from current levels in response to global energy demand growth and prospects that supply additions will be limited or even decline, as producers cut back their drilling. How much this view is shaped by a hoped-for-cut in output this spring by OPEC, Russia and Mexico that would shoot oil prices sharply higher is unknown, but we suspect that possible scenario does play a role.

With producers being able to issue equity and long-term debt, as well as selling assets, they are easing their current cash flow squeezes

The unanswered question for investors, however, is how long it will take for oil and gas production to slow or decline and demand to increase. Reports are that when crude oil futures prices rose during February, many producers were able to hedge additional future production at those higher prices boosting their expected cash flows and providing them additional time to deal with the low-price environment and their leveraged balance sheets. With producers being able to issue equity and long-term debt, as well as selling assets, they are easing their current cash flow squeezes. That may contribute to them continuing to drill and produce in order to generate revenue to pay their bills and the interest on their debt. Will the financial bridges the companies are attempting to build by these actions be sufficiently long enough to span the low commodity price era? If not, there will be substantially more pain inflicted on the industry and its make-up when this cycle begins recovering will be quite different than today. Therein lay the challenges and opportunities for energy industry participants and its investors.

Contact PPHB:
1900 St. James Place, Suite 125
Houston, Texas 77056
Main Tel: (713) 621-8100
Main Fax: (713) 621-8166
www.pphb.com

PPHB is an independent investment banking firm providing financial advisory services, including merger and acquisition and capital raising assistance, exclusively to clients in the energy service industry.