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ENERGY INVESTMENT BANKING

MUSINGS FROM THE OIL PATCH

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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

How The Future Is Changing For The Energy Business

We learned how they were changing their companies to deal with the commodity price downturn

Two weeks ago, CERAWeek dominated the energy news in Houston as the best, brightest and the leaders of the energy business descended on Houston to mingle, exchange ideas and maybe even make a deal or two. While we didn't attend the energy bash, we were treated to all the media reports. More importantly, however, was that we did attend two meetings during the week involving leaders in the natural gas exploration and development business at which we learned how they were changing their companies to deal with the commodity price downturn. Their comments aided our thinking about how the energy industry is changing and how it may evolve in the future.

Robert D. (Doug) Lawler is the CEO of Chesapeake Energy Corp. (CHK-NYSE), having assumed the position in June 2013 following the ousting of the company's founder, Aubrey McClendon. Mr. Lawler spoke to the Houston Producers Forum and discussed his early experiences at the company and the progress it has made in improving its performance. Most of the audience, our self-included, had watched Mr. McClendon build and then nearly destroy Chesapeake Energy. He was ultimately forced out by activist investors over decisions during his tenure as CEO that reflected questionable business judgment and reckless financial management.

During those three years, the company invested $42 billion but generated total revenues of only $15 billion, or a ratio of nearly three to one

In describing Chesapeake Energy's position when he arrived, Mr. Lawler displayed a chart of capital spending showing its projected decline. He then pointed out that the chart didn't show the years 2010 through 2012 when Chesapeake Energy invested $14 billion a year. During those three years, the company invested $42 billion but generated total revenues of only $15 billion, or a ratio of nearly three to one. Mr. Lawler also highlighted that the average well

drilled by Chesapeake Energy cost $2-$3 million more than those drilled by his former employer, Anadarko Petroleum Corporation (APC-NYSE).

If you aren't making money, the rest of the company's core values are not important because you won't have a business

These two data points fed into Mr. Lawler's commentary about the culture of Chesapeake Energy that he needed to change while restructuring and downsizing the business to restore profitability and pull the company back from the brink of bankruptcy. He described a dinner upon his arrival at the company with the senior managers during which the Chesapeake Energy culture was extolled. Core values are important at every company and are what drives success. What shocked Mr. Lawler was that as the various managers talked about the company's core values and why Chesapeake Energy was a great place to work, one important value appeared to be missing – profitability. The company essentially did not have a budget and on a number of performance metrics, it ranked in the bottom quarter of industry peers. According to Mr. Lawler, from 2010 to 2012, the company employed every form of debt and financial strategy invented, which was a reflection of the embrace of the shale revolution by Wall Street and investors. The lack of performance and profitability seemed not to have impacted employees as they were continuing to be paid bonuses twice a year. As Mr. Lawler put it, and told the employees, if you aren't making money, the rest of the company's core values are not important because you won't have a business.

It also had its lowest cash cost per unit produced in a decade

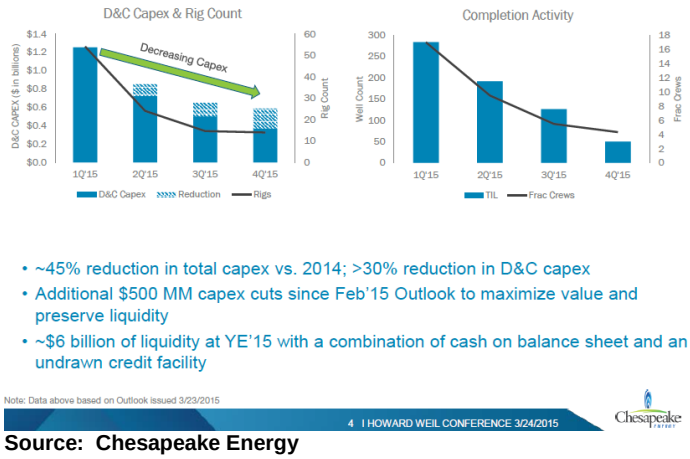
The idea of "making money" was something new at Chesapeake Energy, but not now. Mr. Lawler has instituted 16 metrics for one, three and five year performance measures against its peers. These metrics are designed to emphasize risk and return measures along with growth and operating efficiency parameters. Last year, Chesapeake Energy had its best safety performance ever. It also had its lowest cash cost per unit produced in a decade. Maybe more important, Chesapeake Energy was able to grow its reserves and production while using half the number of drilling rigs employed in previous years. They hope to continue that trend in 2015. In fact, the company has twice reduced its capital spending plans this year.

Capital spending, drilling and well completion activity will fall by quarter during 2015

Chesapeake Energy's strategy is to reduce its capital spending and its drilling activity while concentrating on maximizing the returns from the dollars invested. A series of charts from the company's presentation at the recent Howard Weil investment conference highlight some of the specifics of this strategy. Exhibit 1 shows how capital spending, drilling and well completion activity will fall by quarter during 2015. At the same time, the company wants to build up its financial flexibility.

To be more specific, Chesapeake Energy laid out its plans for drilling activity by formation, demonstrating how those plans have been reduced so far this year and what the targets are for year-end activity. According to the year-end target, drilling activity will be

Exhibit 1. Cutting Capex Not Positive For Service Industry



Source: Chesapeake Energy

The decline certainly doesn't bode well for the oilfield service industry

25%-50% below the company's original plan for 2015. If we assume that the March 23rd column reflected then-current activity levels, the decline to the year-end numbers is stark. The decline certainly doesn't bode well for the oilfield service industry, although for those seeking hope, they can focus on the optimistic number of potential rigs working at year-end.

Exhibit 2. Schedule For Reduced Drilling Activity

REDUCED ACTIVITY LEVELS

	2015E Avg.Op Rigs (2/25 Outlook)	2015E Avg.Op Rigs (3/23 Outlook)	YE 2015 Op. Rigs (3/23 Outlook)
Eagle Ford	12 – 14	8 –10	2 – 4
Utica	3 – 5	3 – 5	2 – 3
Haynesville	7 – 8	5 – 6	2 – 4
PRB: Niobrara & Upper Cretaceous	3 – 4	2 – 3	1 – 2
Mississippian Lime	7 – 8	5 – 6	2 – 4
Mid-Continent South	1 – 2	1 – 2	0 – 1
Marcellus	1 – 2	1 – 2	0 – 1
Other(1)	1 – 2	0 – 1	–
Total	**35 – 45**	**25 – 35**	**9 – 19**

(1) Other includes Cleveland Tonkawa, Barnett

5 I HOWARD WEIL CONFERENCE 3/24/2015

Chesapeake

Source: Chesapeake Energy

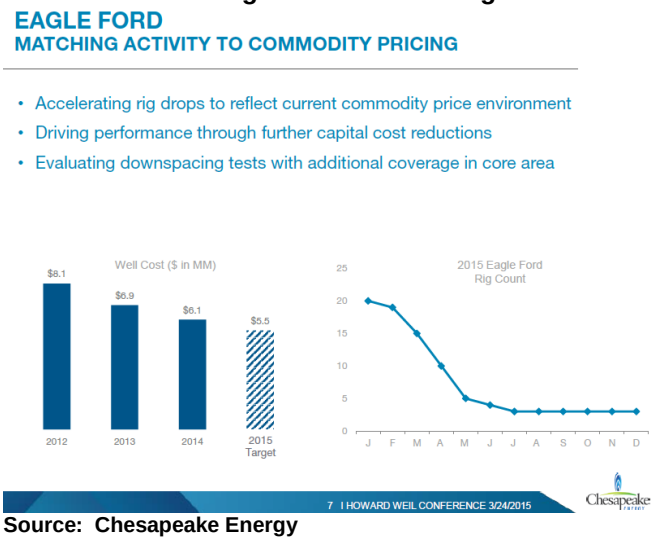
A dollar of spending in 2016 should yield 45% more petroleum than in 2014

Reducing well cost is an important force at work in today's energy business. Its impact, however, may be perverse for the oilfield service companies. As analysts at energy consultant IHS point out, a dollar of spending in 2016 should yield 45% more petroleum than in 2014. How is that possible? It is a function of reduced equipment

if they meet their target, Chesapeake Energy will have reduced the typical well cost by over 30% versus the average well cost in 2012

and service costs and improved well selection by producers. The charts in Exhibits 3 (below) and 4 (page 5) show Chesapeake Energy's plans for its drilling and well completion work in specific shale formations. In the Eagle Ford formation, the company is seeking to reduce its well cost by 10% compared to 2014, but more impressive is that if they meet their target, Chesapeake Energy will have reduced the typical well cost by over 30% versus the average well cost in 2012.

Exhibit 3. Reducing Well Cost And Rig Needs



Source: Chesapeake Energy

Their modern well design should result in only a modest cost reduction, about 3%, but should produce a doubling of the well's EUR and a 70% increase in its initial production rate

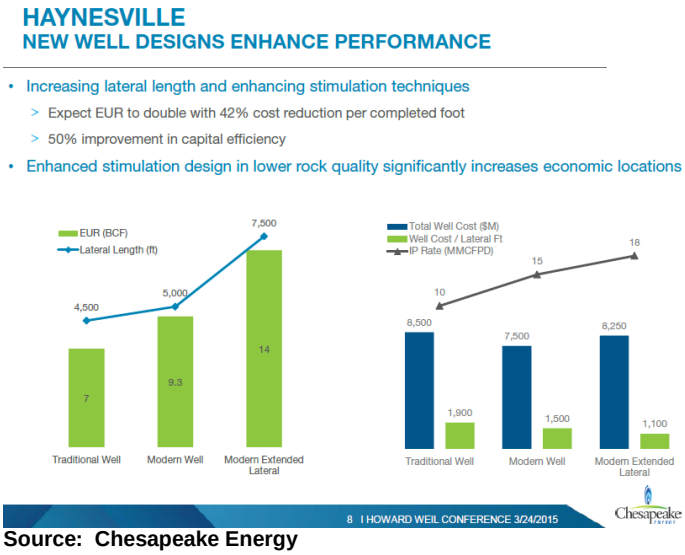
When we examine Chesapeake Energy's plans for new wells in its Haynesville field, their modern well design should result in only a modest cost reduction, about 3%, but should produce a doubling of the well's estimated ultimate recovery (EUR) and a 70% increase in its initial production rate. This should improve the financial results for Chesapeake Energy, but it will come at the expense of the oilfield service industry.

With Mr. Lawler's presentation in mind, we attended the Houston Strategy Forum meeting later in the week that hosted Steven Mueller, chairman and CEO of Southwestern Energy Company (SWN-NYSE). He has been with the company since 2008, but he has a long oil and gas exploration and production career with which we are familiar. This meeting is structured quite differently than most industry meetings in that it involves a small audience and no presentation, leading to an interactive discussion.

80% to 90% of natural gas demand growth over the next five years would occur in the eastern half of the United States

Mr. Mueller began his discussion by pointing out that 80% to 90% of natural gas demand growth over the next five years would occur in the eastern half of the United States, ignoring the impact of potential LNG shipments from the Gulf Coast. The challenge for the natural gas industry is to improve its infrastructure in the East, but as that happens and gas production from the Marcellus and Utica

Exhibit 4. New Wells Are Much More Productive



Source: Chesapeake Energy

In his view, the current number of gas drilling rigs at 222 is too low and needs to increase to roughly 350 in order for the industry to meet the gas demand forecast

formations grows, Canadian and Rocky Mountain gas will be at a significant disadvantage. According to industry and government forecasts, natural gas demand should grow from 70 billion cubic feet per day (Bcf/d) to between 90-100 Bcf/d over the next five years. In his view, the current number of gas drilling rigs at 222 is too low and needs to increase to roughly 350 in order for the industry to meet the gas demand forecast. He was also optimistic that natural gas prices would rise to, and eventually exceed, $4 per thousand cubic feet.

Possibly the most interesting point Mr. Mueller made was that the shale E&P business is more about handling water and logistics than anyone imagined

From his discussion of industry trends, he went on to show how Southwestern Energy was approaching managing its business. The company is currently the fourth largest natural gas company but aims to overtake number three soon. Possibly the most interesting point Mr. Mueller made was that the shale E&P business is more about handling water and logistics than anyone imagined. According to Mr. Mueller, 15-30% of a well's cost today is due to water handling issues ranging from having sufficient water available for hydraulic fracturing operations and the disposal of produced water. The cost is at the high end of his estimated range when companies operate in the Marcellus and Utica regions where roads are narrow and building water ponds is limited. Southwestern Energy's goal is to be fresh water neutral by 2016.

Learnings are an important consideration

In describing the shape of the new E&P business, Mr. Mueller pointed to issues with becoming more productive and efficient, keys to become more profitable. Learnings are an important consideration. By that he meant understanding as much about the shale rock as possible, which then enables the selection or design of drilling bits that improve drilling the well faster. He mentioned that sometimes the best bit for maximizing speed in drilling the vertical section of a well may impede the pace of drilling the horizontal

section. He also cited a challenge that comes when they are able to drill 3,000-5,000 feet of horizontal well section per day but cannot receive and process the drilling data at the surface fast enough to guarantee their drilling success.

Increased automation allows drilling to go faster with managers dealing with issues that are exceptions to the standard well rather than managing every drilling detail

Another aspect involves automating the drilling process. That is partially done by removing men from the rig floor and replacing them with robots and mechanical tools that can be controlled by the driller from the rig's console or possibly from a remote location. Increased automation allows drilling to go faster with managers dealing with issues that are exceptions to the standard well rather than managing every drilling detail. We wonder how much risk that approach introduces into the drilling process, but with increased pad drilling it may be less of a risk than we think.

Southwestern Energy has adopted vertical integration for many aspects of the exploration process

Lastly, Mr. Mueller pointed to the need to assess various business models. In the case of Southwestern Energy, it has adopted vertical integration for many aspects of the exploration process. For instance, the company owns drilling rigs, fracturing crews and even sand plants. The company's philosophy is that they will own things that do not need ongoing capital investment. Therefore, the sand plant has little need for new capital following its original investment. This business model, according to Mr. Mueller, means that the typical $3 million well costs Southwestern Energy $2.6 million. He also pointed out that for the industry, five years ago, that $3 million well cost $3.6 million.

Vertical integration works because of concentration of exploration and development efforts

Vertical integration works because of concentration of exploration and development efforts. That is one reason why Southwestern Energy is focused on only two geographic areas. The concentration in shale lends itself to a greater concentration of wells that matches the integrated ownership of service assets as opposed to conventional fields where there are few wells needed. This geographic concentration means that Southwestern Energy has less downtime with its equipment, which is a factor that oilfield service companies must account for in setting their rates. Southwestern Energy doesn't do all its drilling and completion work, only about 70%, which allows it to benchmark its operations and technology. What has this strategy meant for Southwestern Energy? For its Fayetteville field, it needed 17 days to drill a well in 2007, but by 2014 it only needed six days. The least time to drill a well in the field was three days. The wells are roughly 13,000 feet in total depth – approximately 6,000+ feet down with another roughly 6,000+ feet laterally. What these trends mean for Southwestern Energy is that while today it takes four rigs to drill roughly 400 wells in the Fayetteville basin, before it used to require 15 rigs. Think of the implications that means for land drilling companies.

Part of Mr. Mueller's discussion focused on long-term trends for the natural gas business as it has transitioned from conventional to unconventional resource development. He pointed out that the peak

In his view, we are in the early stages of discovering and developing unconventional fields, and so far the focus has been in North America

in the discovery of conventional oil and gas fields in the United States occurred during the 1920's to 1940's, while internationally the high point was in the 1940's to 1960's. In his view, we are in the early stages of discovering and developing unconventional fields, and so far the focus has been in North America. While we know of shale resources worldwide, the effort to develop them has not been successful to date, largely due to legal and knowledge challenges. In other words, given more time and higher commodity prices, these international shale resources will begin to be developed.

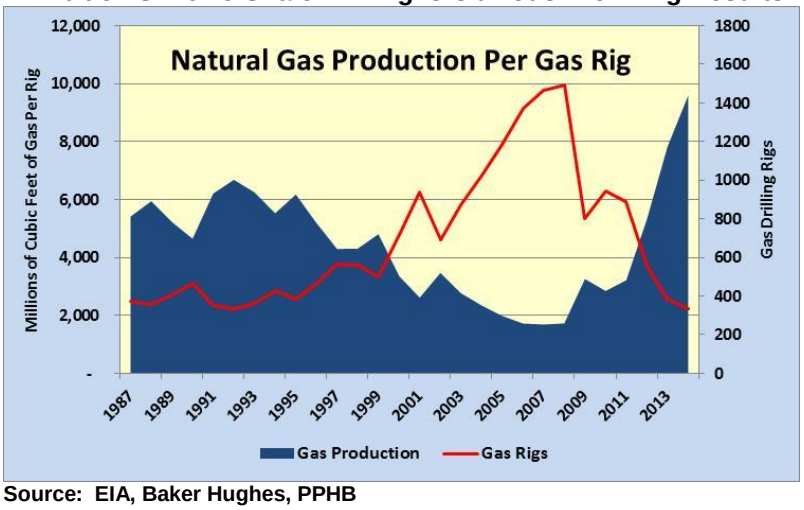
He said that based on total natural gas output to the number of gas drilling rigs, the ratio had remained pretty flat from the 1970's through to 2008

With respect to natural gas, Mr. Mueller made the point that the efficiency of the natural gas E&P business was creating a new industry. He said that based on total natural gas output to the number of gas drilling rigs, the ratio had remained pretty flat from the 1970's through to 2008. After that, he said Moore's Law appeared to be at work (the law that says the rate of increase in the capacity of semiconductors would double every five years) as the industry seemed to be able to double production efficiency every two and a half years. If one included the impact of associated natural gas output, the doubling would occur every five years. He acknowledged that the rate of increase was slowing currently, but largely due to too few gas rigs working.

From that point forward the amount of gas produced per gas drilling rig rises sharply

We were intrigued by Mr. Mueller's statements and attempted to verify them. Our problem was that the Baker Hughes historical rig data doesn't separate the rig count into oil- and gas-focused counts until the late 1980's. What we were able to do was to calculate the average natural gas production per gas drilling rig for 1987-2014 as shown in Exhibit 5. What is evident is a fairly stable relationship between 1987 and 1995, after which the ratio reflects a decline that other than one year increases in 1999 and again in 2002 doesn't stop until 2008. From that point forward the amount of gas produced per gas drilling rig rises sharply.

Exhibit 5. Shift To Shale Drilling Is Obvious From Rig Results

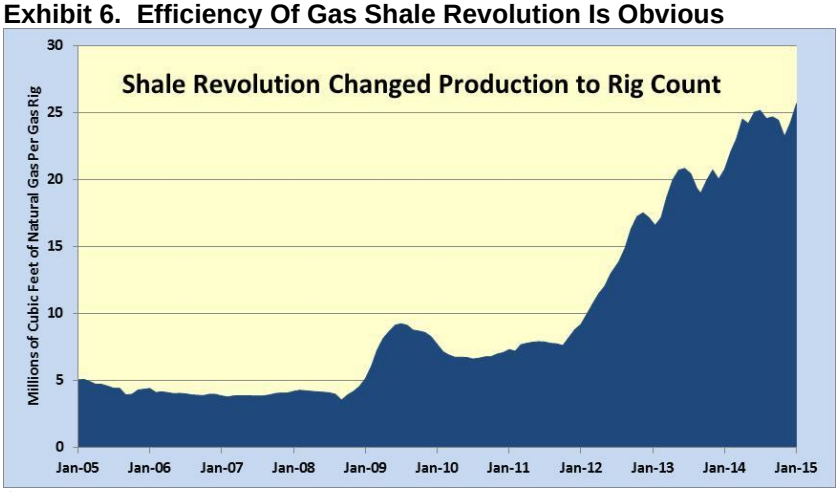


Source: EIA, Baker Hughes, PPHB

Since the fall of 2011, there has been an almost steady rise in the efficiency of the natural gas industry as measured by gas output per gas-rig

In order to gain a better perspective on this trend in efficiency, we looked at the monthly data from the Energy Information Administration's Form 914 natural gas production data. When we compare the monthly data for natural gas output per gas-focused drilling rig from 2005 forward, we see a clear change in trend beginning in the fall of 2008. While the initial increase then leveled off we would suggest reflected the sharp drop in overall drilling activity driven by the 2008-2009 financial crisis and resulting economic recession. Since the fall of 2011, there has been an almost steady rise in the efficiency of the natural gas industry as measured by gas output per gas-rig. It is this latest period's rise in efficiency that reflects many of the business and technical trends Mr. Mueller was referencing in his comments.

Exhibit 6. Efficiency Of Gas Shale Revolution Is Obvious



Source: EIA, PPHB

These trends will also translate into a smaller, more broadly diversified oilfield service industry

The insights offered by Mr. Lawler and Mr. Mueller reinforce our view that the energy business is undergoing seismic changes that are not yet apparent to the future shape of the industry. We continue to examine these issues since we believe they mean a smaller industry composed of larger, more highly focused E&P companies. These trends will also translate into a smaller, more broadly diversified oilfield service industry. The pace of change for the industry will probably shock many, but for those who are pushing them, they will likely not happen as fast as they would like. We will continue exploring this new energy world.

What Is Meaning Of Saudi Arabia Royal Lineup Changes?

Little did we appreciate that we would be writing numerous articles about the internal workings of the Royal Family

Our initial issue of *Musings* this year led with an article carrying the provocative headline: "Saudi Succession To Be 2015's Energy And Mideast Wild Card?" Little did we appreciate that we would be writing numerous articles about the internal workings of the Royal Family and Saudi Arabia along with thoughts about how the moves might impact the global oil market.

al-Naimi commented on Saudi Arabia's view of the oil market to the media and analysts who were grasping to understand how OPEC's long-standing policy for defending oil prices could be abandoned and left to market forces to determine

In that article, we focused on how the big story of 2014 had been the slow decline in global oil prices until the late November meeting of the members of the Organization of Petroleum Exporting Countries (OPEC). At that meeting, the organization, led by Saudi Arabia's Oil Minister Ali al-Naimi, agreed to retain its production quota of 30.4 million barrels a day of crude oil, a volume that was contributing to growing global storage volumes, which in turn was pushing oil prices lower. At the time of OPEC's decision, Oil Minister al-Naimi commented on Saudi Arabia's view of the oil market to the media and analysts who were grasping to understand how OPEC's long-standing policy for defending oil prices could be abandoned and left to market forces to determine. We wrote the following in the article's opening paragraph.

"Moreover, just as Saudi watched in the late 1970's and early 1980's, the high oil prices of the past five years have stimulated the oil industry to develop new supplies, further undercutting OPEC's and Saudi's market share potential"

"When the Saudis added that they were fine with oil prices in the $70-$80 per barrel price range for up to two years, panic swept the oil industry. For the final two months of 2014, analysts and political theorists speculated on the Kingdom's motives behind the policy shift. Was Saudi trying to punish its fellow OPEC members who were continuing to cheat on their production quotas to capitalize on $100 a barrel oil prices? On the other hand, was the new policy designed to inflict pain on Saudi's neighbor and Middle East political rival, Iran? Or maybe it was part of a conspiracy with the United States to drive down oil prices to punish Russia? Then again, many respected energy analysts speculated that Saudi was primarily lowering prices to disrupt the expansion of the shale oil revolution in the United States, which has driven Saudi oil sales here to modern day lows. Our own view has been and remains that Saudi Arabia, having only oil to sell, is worried about the lack of global economic growth, especially in Europe, and its negative impact on global oil consumption growth. Moreover, just as Saudi watched in the late 1970's and early 1980's, the high oil prices of the past five years have stimulated the oil industry to develop new supplies, further undercutting OPEC's and Saudi's market share potential. They expect low oil prices will shut down exploration and development of these new oil supplies, especially those with long production lives such as Canada's oil sands and offshore deepwater oil fields, which will allow Saudi to regain its recently lost market share."

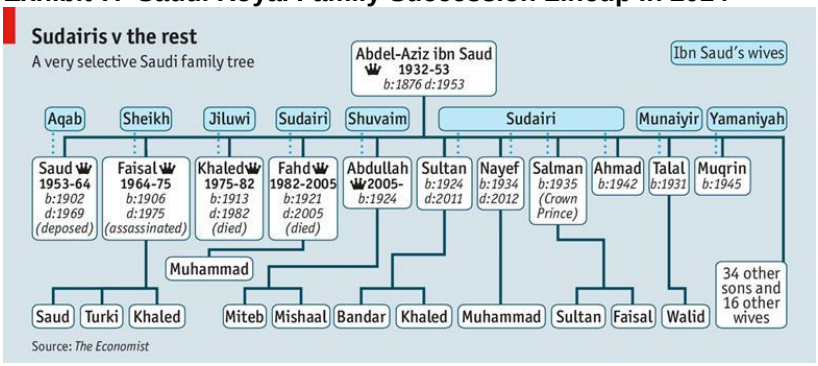
Therefore, besides engaging in a guessing game of how low global oil prices might sink, analysts were wondering how the Royal Family succession would progress and who would be appointed next in line

The purpose in focusing on the possible motives behind Saudi Arabia's dramatic philosophical shift in how oil markets should be managed was related to the anticipated change in the Kingdom's leadership. At the time we were writing our article, it was well-known that the then-Saudi Arabian King, Abdullah bin Abdulaziz, had been admitted to a hospital possibly suffering from pneumonia. At 90 years of age, his chance of rallying from the illness was questioned. Therefore, besides engaging in a guessing game of how low global oil prices might sink, analysts were wondering how the Royal Family succession would progress and who would be appointed next in line.

The big question was who would Prince Salman anoint as his successor?

There was little doubt about who would immediately succeed King Abdullah since Prince Salman had already been identified and positioned as crown prince, ready to immediately step up. The big question was who would Prince Salman anoint as his successor - an important decision because the number of potential successor candidates from the sons of King Abdulaziz bin Saud, the founder of modern Saudi Arabia and the guardian of the two Islamic holy cities, Mecca and Medina, in the Kingdom, was shrinking and many of them were aged and ill. In Exhibit 7 is a chart of the founder, King Abdulaziz, along with his sons and their male offspring as existed in the final days of King Abdullah's reign.

Exhibit 7. Saudi Royal Family Succession Lineup In 2014



Source: ***The Economist***

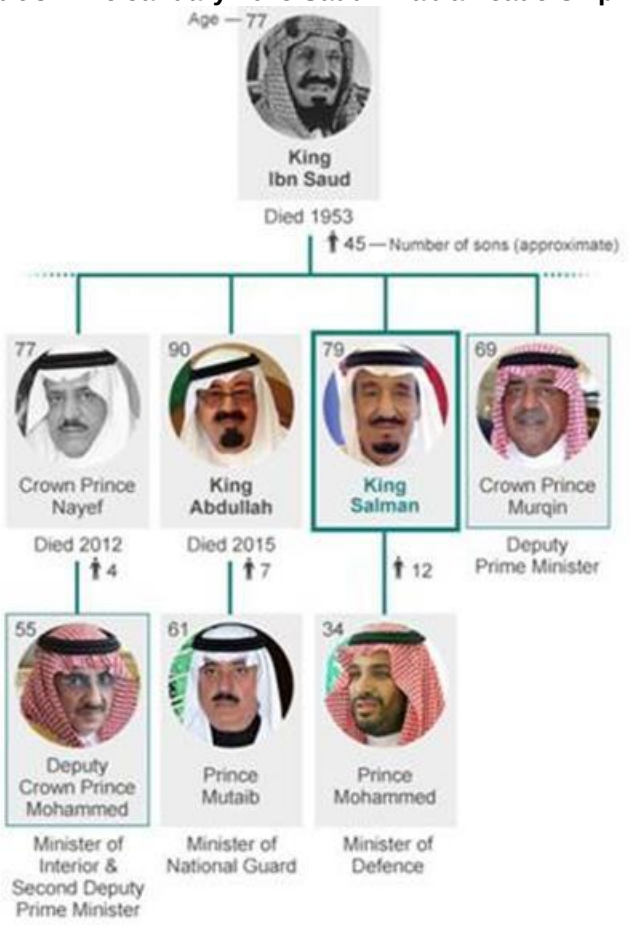
The new Royal Family line-up featured the elevation of one of the next generation of children, Prince Mohammed bin Nayef, aged 55, as an eventual leader with his appointment as deputy crown prince

Upon King Abdullah's death in mid-January, the succession process proceeded quickly and smoothly with the 79-year old prince becoming King Salman and his younger half-brother, Prince Muqrin bin Abdulaziz, aged 69, being designated the crown prince and next in line to rule the Kingdom. The new Royal Family line-up featured the elevation of one of the next generation of children, Prince Mohammed bin Nayef, aged 55, as an eventual leader with his appointment as deputy crown prince. Several other grandsons were placed into positions of leadership with the view that they could become potential future rulers. The leadership lineup following King Salman's elevation is displayed in Exhibit 8 on the next page.

King Salman acted by pushing aside his half-brother Prince Muqrin and elevating Prince Mohammed bin Nayef to be the crown prince and next in line of succession

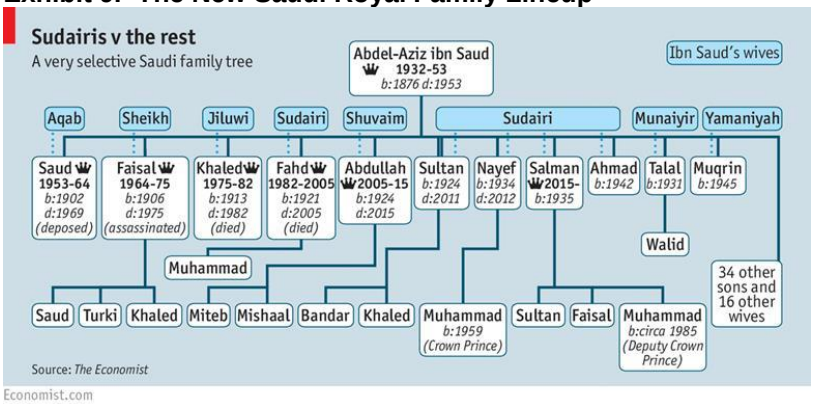
Since that leadership was put in place, geopolitical events have swirled around the Kingdom changing the previous landscape and causing King Salman to rethink his view of who should be ready to assume the leadership of the country upon his death. The decision was surprisingly announced at 4 AM last Wednesday. It was also announced that the decision was blessed by the Allegiance Council, representing all factions of the family. King Salman acted by pushing aside his half-brother Prince Muqrin and elevating Prince Mohammed bin Nayef to be the crown prince and next in line of succession. He also tapped his youngest son, Prince Mohammed bin Salman, in his mid-30s and currently the minister of defense, to be deputy crown prince and presumably the second in line of succession. The new royal lineup is shown in Exhibit 9 (next page).

Exhibit 8. The January 2015 Saudi Arabia Leadership



Source: ***BBC***

Exhibit 9. The New Saudi Royal Family Lineup



Source: ***The Economist***

The surprise announcement has prompted Saudi Arabia-watchers to speculate on the motives behind the shifts and their geopolitical

implications. While the initial view was that King Salman had pushed aside Prince Muqrin, later reports suggest that the prince requested to be replaced due to health concerns. Politically, Prince Muqrin's rule would likely have been relatively short but it would have delayed the ascension of the grandson's generation to leadership roles. Additionally, while Prince Muqrin was a favorite of King Abdullah, the prince had no full brothers and was the son of a Yemeni mother, further straining his relationship with his half-brothers with their long tribal lineage. At the time of his elevation to crown prince, questions were raised about how long he might hold the title. Now we know.

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The elevation of Prince Muhammad bin Nayef to crown price cements the hold of the Sudairi faction of the family over the governance of the country. Prince Muhammad is the interior minister having assumed that role following the death of his father, Prince Nayef in 2012. During the long rule of King Fawd from 1982-2005, his two Sudairi brothers – Prince Sultan and Prince Nayef – were important assistants in governing the Kingdom. The power of that Sudairi triumvirate has been revived with the teaming up of King Salman with his nephew, Crown Prince Muhammad bin Nayef, and his youngest son, Muhammad bin Salman.

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There were other leadership changes announced in the various decrees, the scope of which suggest that other areas of concern within Saudi Arabia and among its political allies were being addressed. Improving the economy, boosting the role of women in the country, upgrading the health industry, preparing for changes in the management of the national oil company and improving relations with the United States are areas of focus based on the shift in leaders. King Salman also announced the payment of a one-month salary bonus for those members of armed and security forces engaged in the military campaign in Yemen since late March. This is similar to the social bonus he awarded citizens upon assuming the title of king last January.

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Central to the personnel changes is the shifting geopolitical landscape of the Middle East. The struggle with Iran is being fought through proxy wars in Yemen, Syria, Libya and Iraq. Over-shadowing that struggle is the strained relationship that exists with the Obama administration. President Barack Obama has chided the Saudis for not taking a more active role in resolving the chaos that characterizes the Middle East. The Saudis, however, have been frustrated with the U.S. response to the problem of Syria, and they became active in defending the government of Yemen without involving the U.S. These moves have created other tensions.

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The two new Saudi Arabian leaders, along with King Salman, represent a security-oriented view of the region. They view terrorism and Iran to be the Kingdom's biggest security threats. They have worried about the retreat by the United States from the Middle East,

which has created a political vacuum allowing Iran to expand its political and military influence. That situation has translated into a deep concern about a possible U.S.-Iran nuclear deal that enables Iran to obtain a nuclear weapon in the future along with its ability to develop missiles able to deliver nuclear bombs to its neighbors.

Saudi Arabian leadership has become increasingly worried about the country's social fabric

Besides the geopolitical concerns, Saudi Arabian leadership has become increasingly worried about the country's social fabric, especially in this era of low oil prices, which it has helped to create. Since the two Mohammads have shown little interest in democratic or social reforms, the significance of some of the other appointments along with some earlier moves take on greater weight.

On June 15th the country's stock exchange will open to direct foreign investment

Besides Prince Mohammad bin Salman's role as minister of defense, which to date has not been a monumental success as the battle with the Iranian-backed Houthi rebels in Yemen has produced little other than destruction of that country and a humanitarian disaster, he also has been handed responsibility for the council dealing with economic reform. King Salman appointed Labor Minister Adel Fakeih, a former chairman of Savola Group, a food company, as minister of economy and planning. In January, King Salman appointed Azzam bin Mohammed Al-Dakhil, a board member on several private companies, as minister of education. He also named Mohammed Al Jadaan, an advisor to Morgan Stanley and Clifford Chase in Saudi Arabia, to head the capital markets authority. This is quite important as on June 15th the country's stock exchange will open to direct foreign investment. Saudi Arabia will become one of the largest emerging market indexes available to investors.

Mr. al-Falih replaces Oil Minister al-Naimi as chairman of Aramco, thus putting him in place to potentially rise to head the oil ministry

King Salman also made a significant move in the oil arena. He moved Khaled al-Falih, chief executive officer of Saudi Arabian Oil Company, to the position as chairman of the company, as well as making him health minister. Mr. al-Falih replaces Oil Minister al-Naimi as chairman of Aramco, thus putting him in place to potentially rise to head the oil ministry since Mr. al-Naimi has indicated that he wishes to retire soon. While some observers question how one moves from health minister to oil minister, there is little doubt that Saudi Arabia has health problems that have grown with its more sedentary lifestyle that have promoted greater issues with diabetes and obesity.

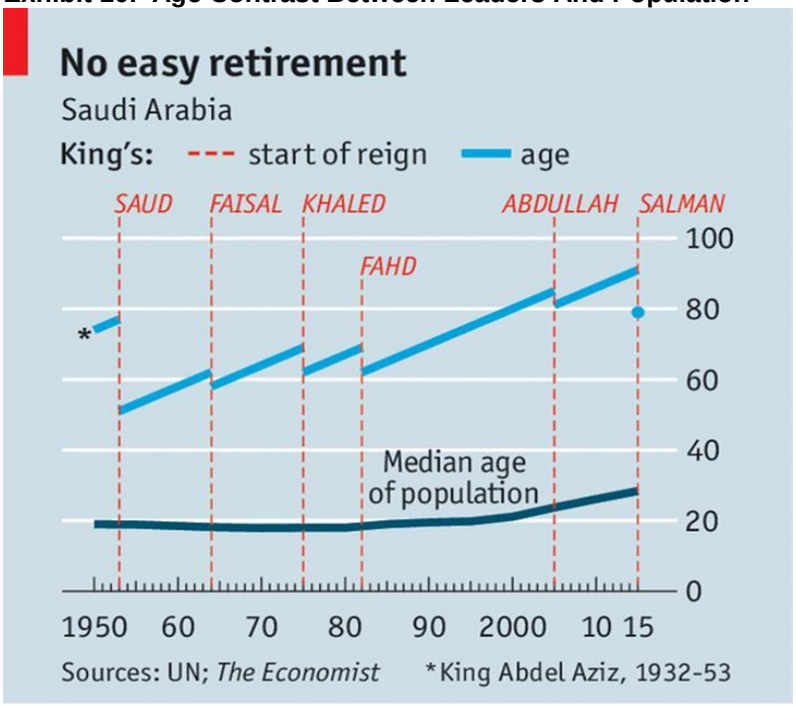
Aramco has been asked to oversee the construction and development of universities and new industrial cities

People forget what Saudi rulers have asked Aramco to do in the past. Not only does it conduct upstream oil and gas activities but it has also developed refineries and petrochemical plants, along with water desalination plants. But more recently, Aramco has been asked to oversee the construction and development of universities and new industrial cities. With that experience, it is not farfetched to think that Mr. al-Falih has the skills to help the country's health industry address its emerging health crises.

This would be the first time in history that the oil ministry is run by a member of the Royal Family

The most recent report that Saudi Aramco might be separated from the oil ministry may signal that Mr. al-Falih will not become oil minister. The report suggests that King Salman will appoint his son, Prince Abdulaziz bin Salman, as oil minister, replacing Mr. al-Naimi who wishes to retire. This would be the first time in history that the oil ministry is run by a member of the Royal Family. Does it mean that oil policy will be more tightly controlled and integrated with foreign and military policy?

Exhibit 10. Age Contrast Between Leaders And Population



Source: ***The Economist***

All of the countries in the region have demographic challenges as a result of having large and growing youth populations with limited economic prospects for the future

All of these leadership changes give us pause to reflect on comments from Dr. Vali Nasr, the dean of the Johns Hopkins School of Advanced International Studies about the state of the Middle East. According to Dr. Nasr, speaking to the National Ocean Industries Association, all of the countries in the region have demographic challenges as a result of having large and growing youth populations with limited economic prospects for the future. In his view, he considers Saudi Arabia to be most at risk as 47% of its population is 34 years old or younger and the unemployment rate for its youth is very high. Part of the Kingdom's problem is that it is dependent on one income source – the sale of hydrocarbons – that generates about 90% of the government's income and more than half its export earnings. Equally challenging is that an estimated 45% of the country's GDP goes to supporting the 9,000 members of the Royal Family.

Exhibit 11. How Sound Is The Saudi Royal Family Foundation?

Source: ***The Economist***

Dr. Nasr believes that the region is composed mostly of failed states since there is no structure for the peaceful transfer of power from the minority (Sunni) to the majority (Shia). The rise of the Islamic State (ISIS) is forcing a redrawing of the map of the Middle East for the first time since the Treaty of Versailles in 1919. He questions whether Jordan and/or Saudi Arabia will survive this redrawing, which should give American politicians pause because the U.S. could lose two of its most staunch allies in the region. In his view, the fact that the United States and Iran are talking after 35 years of ignoring each other represents a game-changer for the region. While many in the region are concerned about these talks, Dr. Nasr believes that most Arabs are less worried about an Iran with a nuclear weapon than they are merely about the existence of Iran. He further believes that it is this concern that has driven Saudi Arabia to become more aggressive both in its oil policy and its military strategy. One can see the impact of this fear and its manifestation in the recent leadership changes.

He questions whether Jordan and/or Saudi Arabia will survive this redrawing, which should give American politicians pause because the U.S. could lose two of its most staunch allies in the region

In digesting Dr. Nasr's thoughts, along with comments we have gathered from others we know that are active in Saudi Arabia, we began to perceive a possible solution for what we call the Saudi Arabia dilemma. Saudi Arabia's problem is its exploding youth population and rising unemployment coupled with a stagnant one-product economy (hydrocarbons) that unfortunately is not labor-intensive. As we contemplated this dilemma, we noted that there is another country in the Middle East with a highly innovative economy that could benefit from a large pool of unskilled or semi-skilled labor and capital. Imagine a technological agreement being struck between Saudi Arabia and Israel to create the world's largest Silicon Valley focused on high tech and biotech industries. Modern plants staffed by young Saudis earning healthy incomes by producing high tech products and software along with new medical devices and medicines developed by Israeli innovators. Imagine also the potential for an alliance between a nuclear Israel with the ability to

Saudi Arabia's problem is its exploding youth population and rising unemployment coupled with a stagnant one-product economy (hydrocarbons) that unfortunately is not labor-intensive

Nuclear power could help solve the Kingdom's apparent insatiable hunger for electricity now supplied by oil

protect and eventually guide the peaceful development of a nuclear industry in Saudi Arabia. Nuclear knowledge might eventually lead to the development of a nuclear weapon by Saudi Arabia, but that is a political question that will depend on what develops from the U.S./Iranian talks. Nuclear power could help solve the Kingdom's apparent insatiable hunger for electricity now supplied by oil. Eventually, the hunger will consume all of the Kingdom's oil export capacity and eliminate its oil export earnings, thus leaving Saudi Arabia destitute. If prices rise sharply as a result of restricted exports from Saudi Arabia, the country runs the risk of losing demand as consumers are forced to seek alternative power sources. Our idea represents an outrageous proposal, we understand, but its implications are fun to contemplate.

Global Growth Remains Major Headache For Energy Demand

Forget whether the latest oil price downturn was driven by too much supply or too little demand. In contrast to the old beer commercial where one group yelled "less filling" while another chanted "tastes great," the global oil industry wants just one thing – more demand!

What the media stories fail to mention is that this revised demand estimate merely brings 2015's growth forecast in line with the average increase experienced during the past 23 years

Much is being made of the comments and revised forecasts by the Energy Information Administration (EIA) and the International Energy Agency (IEA) showing more oil demand in 2015 than previously forecast. In the case of the IEA, media stories have focused on the agency's recent hike in its estimate for global oil demand to a one million barrel a day increase compared to 2014. But more importantly, the media is talking about how much better this demand forecast is relative to the 650,000 barrel per day increase experienced during 2014. What the media stories fail to mention is that this revised demand estimate merely brings 2015's growth forecast in line with the average increase experienced during the past 23 years. The new forecast, however, would be only slightly better than the average annual growth posted for 2000-2014 of 950,000 per barrels a day. From a positive viewpoint, the 2015 forecast is considerably better than the world's average annual increase for the past four years when it endured $80-$110 per barrel oil prices, which clearly crimped demand growth.

One would have thought that a cut in global oil prices of roughly 50% should have had a greater impact on oil consumption than suggested by the one million barrel a day increase

When put into historical perspective, one would have thought that a cut in global oil prices of roughly 50% should have had a greater impact on oil consumption than suggested by the one million barrel a day increase. Does this mean that the relationship between world economic activity and oil use is changing? Or does it reflect disparate consumption patterns of advanced versus emerging economies. A new research paper by a group of economists affiliated with the Birkbeck Center for Applied Macroeconomics at the University of London focused on the impact of ageing demographics on economic growth of countries included in the Organization for Economic Cooperation and Development (OECD). They point out that among the OECD countries, the average

"Demographic structure changes can be expected to influence real interest rates, inflation and real output in the long and short-term"

proportion of the population aged 60+ will increase from 16% in 1970 to 29% in 2030 with most of the offsetting decline being felt in the 0-19 age group. The authors of the paper state that "demographic structure changes can be expected to influence real interest rates, inflation and real output in the long and short-term either directly or via their effects on expectations on the future course of key variables." The challenge for the authors is to measure this impact.

The researchers moved on to attempt to analyze the impact of the entry into the labor market of the baby boomer generation and its retirement in the late 2000's on individual countries

The study concludes that "…the changing age profile across OECD countries has economically and statistically significant impacts on all key macroeconomic variables and that roughly follows a life-cycle pattern; that is, dependent cohorts (both young and old) tend to have a negative impact on all real macroeconomic variables including real returns and add positive inflationary pressures in the long-run." Given this result, the researchers moved on to attempt to analyze the impact of the entry into the labor market of the baby boomer generation and its retirement in the late 2000's on individual countries.

The key point is that these 22 countries accounted for 42.5% of global oil consumption in 2013

The result of the study is captured in Exhibit 12 that shows the impact on gross domestic product (GDP) for each country between 2000-2009 and 2010-2019 due to demographic changes predicted by the UN's population group. Every country is negatively impacted. The key point is that these 22 countries accounted for 42.5% of global oil consumption in 2013 as reported by BP plc (BP-NYSE). This study would corroborate other studies suggesting that the use of oil in the OECD will remain weak for the foreseeable future.

Exhibit 12. OECD Country Oil Price Impact

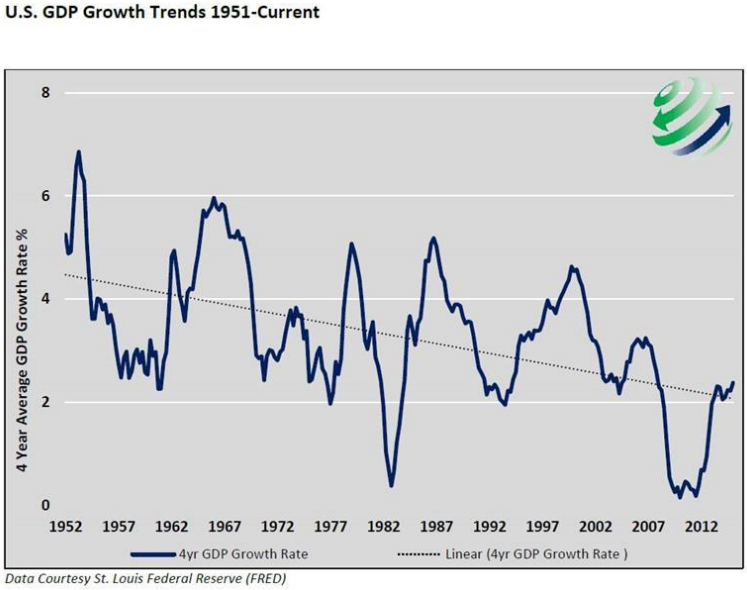
	Δ GDP Growth
Australia	-0.97
Austria	-0.69
Belgium	-1.02
Canada	-1.63
Denmark	-0.56
Finland	-1.39
France	-1.16
Germany	-0.60
Greece	-0.76
Iceland	-1.18
Ireland	-1.12
Italy	-0.57
Japan	-0.62
Netherlands	-1.16
New Zealand	-1.14
Norway	-0.91
Portugal	-0.65
Spain	-0.94
Sweden	-0.78
Switzerland	-0.85
United Kingdom	-0.73
United States	-1.33

Source: Birkbeck Center for Applied Macroeconomics

The U.S. has a very favorable demographic profile compared to most other large, economically-mature countries

Demographics is a powerful force for predicting economic activity as the current array of population age groups show how many people are already present in a country as producers and consumers. The demographics are also important for studying how these producers and consumers may change in the future and the impact those changes might have on a country's economic growth rate, especially when we consider the impact of ageing populations on growth forecasts. The United States will be experiencing a significant growth in its ageing population – those 65 years and older – as the baby boomer generation reaches retirement age. Despite that trend, however, the U.S. has a very favorable demographic profile compared to most other large, economically-mature countries, making it an attractive long-term investment target. But the impact of the ageing U.S. population, coupled with the increased regulation of the country's economy, appears to be slowing economic growth down, a phenomenon demonstrated in Exhibit 13.

Exhibit 13. Slowing Growth In GDP Performance In U.S.



Source: St. Louis Federal Reserve Bank

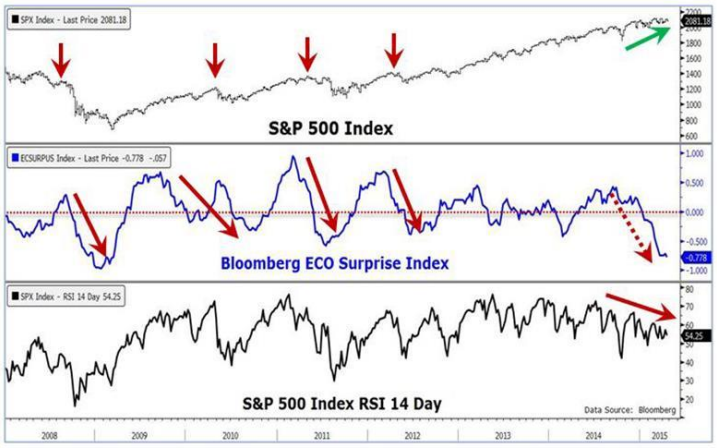
In the case of the latest measure, the economic surprise data is showing more negative surprises than positive ones

While our demographic profile may help our longer term economic outlook, some of the latest economic statistics are showing troublesome trends for near-term growth. A composite chart prepared by *Bloomberg News* shows that the economic surprise index is showing weakness. The index (the blue line in the middle chart in Exhibit 14, next page) reflects those economic data series that are reporting better than expected or worse than expected results. In the case of the latest measure, the economic surprise data is showing more negative surprises than positive ones. As the chart shows, that pattern is not healthy for the performance of the stock market, which often appears out of step with current economic data reports. The explanation is that the stock market is a forward-

Market observers see the poor economic statistics reflecting temporary weather-related problems and not underlying economic weakness

looking measure of economic health, so its continued rise, despite deteriorating economic reports, is taken by market observers as a statement that the poor economic statistics reflect temporary weather-related problems and not underlying economic weakness. On the other hand, that explanation works until it doesn't, meaning that additional negative economic surprises could cause the stock market to fall – an outcome that would certainly be a surprise to many.

Exhibit 14. Current Economic Statistics In A Slump

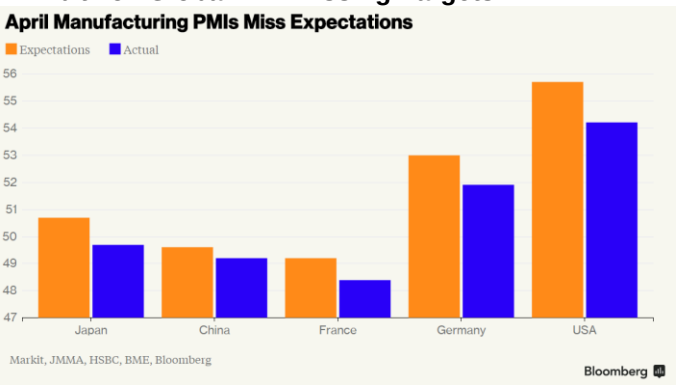


Source: ***Bloomberg News***

The indexes for the USA and Germany remain above 50, meaning that their economies are expanding, even though the results were below expectations

One set of data that has market participants concerned is the latest Purchasing Managers Index (PMI) that reflects the attitude of purchasing managers toward their near-term business prospects and the need for more materials, labor and sales. The April PMI for manufacturing businesses, as opposed to service businesses, reflects underlying demand for products. The indexes for the USA and Germany remain above 50, meaning that their economies are expanding, even though the results were below expectations. Had Japan met expectations for its PMI, then it would have been the third major economy to demonstrate growth.

Exhibit 15. Global PMI Missing Targets



Source: ***Bloomberg News***

While most economists are still expecting 2nd quarter GDP to be in the range of 2.5%-3%, the Federal Reserve Bank of Atlanta, the most accurate predictor of 1st quarter GDP growth, is projecting a 0.9% growth for the 2nd quarter, a shock to forecasters if it proves correct

We are now reaching that point in the year when the impacts of bad winter weather on economic output should be behind us. The economist for the financial firm Markit that prepares the PMI was quoted saying that while the April U.S. PMI decline was the sharpest in seven months the index still remains firmly in expansion territory. This suggests that U.S. GDP for 2015's second quarter should be in the 3% range compared to the expected 1% for the first quarter, which will be reported soon. The first estimate of GDP growth in the first quarter was 0.2%. While most economists are still expecting 2nd quarter GDP to be in the range of 2.5%-3%, the Federal Reserve Bank of Atlanta, the most accurate predictor of 1st quarter GDP growth, is projecting a 0.9% growth for the 2nd quarter, a shock to forecasters if it proves correct.

China's economy continues to underperform its recent history of growth despite the government embarking on easier monetary policy and reduced regulatory restrictions

Until global economic growth accelerates, energy demand will continue to post only moderate growth. Economists and energy forecasters are counting on U.S. economic growth to pick up following the winter weather-challenged first quarter's performance. Signs are that the quantitative easing undertaken by the European Union's central bank has contributed to better economic performance of numerous economies on the continent, but there are certainly concerns about the financial situation with Greece and whether it remains in the EU or not. China's economy continues to underperform its recent history of growth despite the government embarking on easier monetary policy and reduced regulatory restrictions. Global oil demand is being helped at the moment by China's decision to use the lower oil price to step up its purchases of crude oil for its strategic petroleum storage reserve. The Chinese government is working to expand the storage capacity faster than originally planned. How sensitive is this component of Chinese oil use to higher oil prices?

For the energy industry, there are many cross-currents driving oil use higher as well as lower. Which of these currents will prove to be stronger remains uncertain? It is our belief that the forces restraining consumption growth will be stronger than those causing it to accelerate. Time will tell.

What Is Oil Price's Future As Industry Is Just Now Adjusting?

WTI sits just above $59 a barrel as of Friday's close, a level it has not experienced since December 10, 2014, when it dropped to $60.94 a barrel

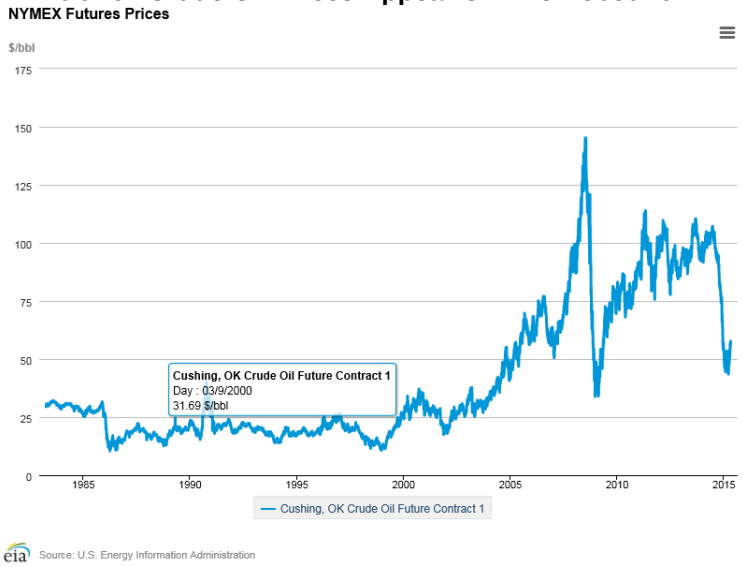
The near month futures contract for West Texas Intermediate (WTI) is sitting just above $59 a barrel as of Friday's close, a level it has not experienced since December 10, 2014, when it dropped to $60.94 a barrel on its way to the $43 a barrel low reached last March. While crude oil traders have been surprised with the speed of the rebound as industry fundamentals continue to deteriorate, although the latest supply, demand and inventory numbers are suggesting a possible change in conditions.

Wednesday, the Energy Information Administration (EIA) announced that oil inventories grew by only 1.5 million barrels, but the closely

Estimates are that the industry has accumulated roughly 4,000 DUCs, which represents about 8% of all the wells drilled in 2014

watched storage volumes in Cushing, Oklahoma actually fell for the first time in five months. Coupled with shrinking weekly storage volume increases and signs that oil demand is growing in the United States, Europe and China, falling domestic drilling rig counts point to less future production growth that should support higher oil prices. The most confusing trend for determining how the oil price trend might progress from here is to understand the possible impact from the growing overhang of drilled but uncompleted (DUC) wells. Estimates are that the industry has accumulated roughly 4,000 DUCs, which represents about 8% of all the wells drilled in 2014. DUCs represent potential new oil supply as they only need to be fractured and completed in order to be brought into service. Given that shale wells begin at high rates of production, the question becomes how meaningful a surge in production will accompany the wave of DUCs being completed. There is one estimate that the DUCs could add as much as 500,000 barrels a day in new production over a few months' time when all of them are completed. Might that surge be enough to derail the oil price recovery? That is the unanswered question.

Exhibit 16. Crude Oil Prices Appear On The Rebound



Source: EIA

Bob Dudley of BP said, "It will be a long time before we see US$100 again."

There is clearly a divergence of opinion among oil industry executives about the pace of an oil price recovery. BP plc's (BP-NYSE) CEO Bob Dudley was quoted a short while ago saying that "The fundamental supply and demand does remind me of 1986 a bit, where we could go into a period in this decade of lower oil prices." He later amplified his view about what type of oil price recovery we could expect when he said, "It will be a long time before we see US$100 again." This is the epitome of the "lower for longer" school of thought about oil prices subscribed to by many U.S. major oil company managers. Representing the other school of thought

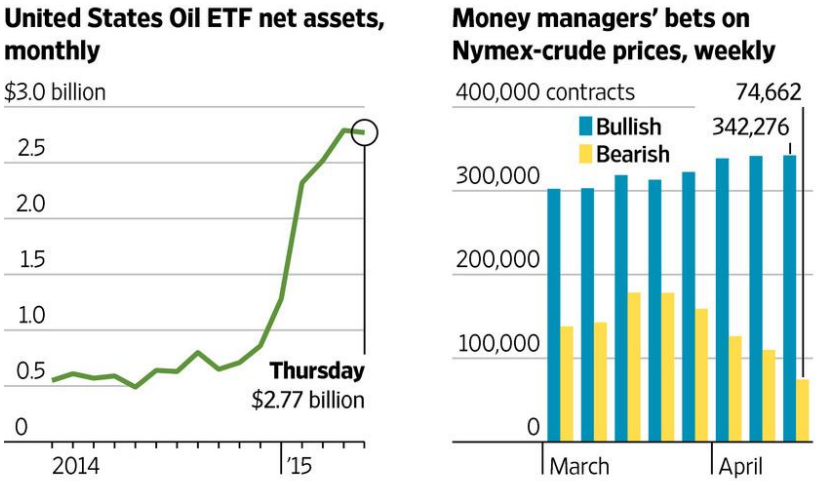
In his view, it had taken OPEC only six months to stop the U.S. shale revolution

about the direction of oil prices is Mr. Dudley's former boss, Tony Hayward, currently running Genel Energy plc (GENL.L), who spoke at the FT Commodities Global Summit two weeks ago. Mr. Hayward described the Organization of Petroleum Exporting Countries (OPEC) as "the most successful cartel in history." In his view, it had taken OPEC only six months to stop the U.S. shale revolution. With U.S. shale output about to drop, Mr. Hayward believes it will not be long before oil prices return to $80 a barrel.

Low oil prices are putting upwards of two-thirds of the 200 major international oil and gas projects scheduled to be developed in 2015-2016 in jeopardy of being delayed or cancelled

Amazingly, a worry has emerged about the potential for a sharp oil price spike due to the significant reduction in oil industry capital spending (estimates are for 30% cuts, or $50 billion less spending) and continued low oil prices, which is putting upwards of two-thirds of the 200 major international oil and gas projects scheduled to be developed in 2015-2016 in jeopardy of being delayed or cancelled since they are unprofitable at $50-$60 a barrel oil prices.

Exhibit 17. Oil Price Direction Bets Are In Flux



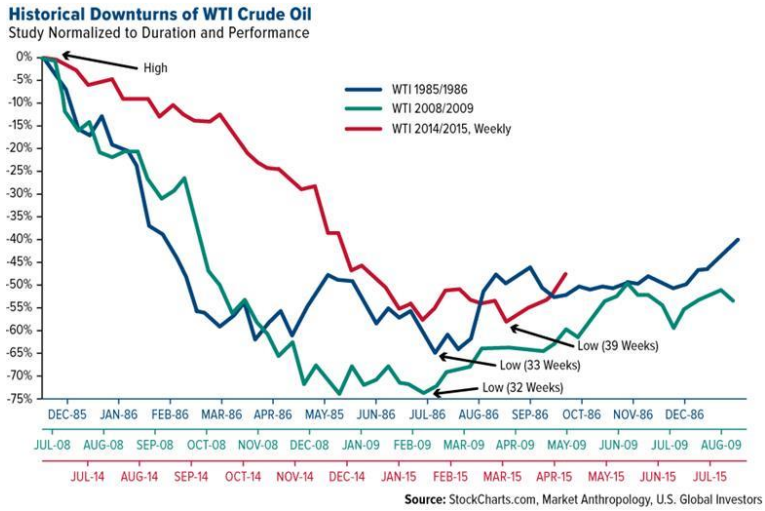
Sources: Morningstar (net assets); Commodity Futures Trading Commission (bets); WSJ Market Data Group (futures)
Source: ***The Wall Street Journal***

The ETFs for oil have suddenly witnessed huge outflows of money that will put downward pressure on crude oil prices as futures contracts, which the funds hold, are sold to meet the redemptions

Two trends in the crude oil trading market will help shape the future of oil prices. One is the action of commodity traders who seem to have thrown in the towel in late March on their bets that oil prices would continue to fall. (See Exhibit 17 above.) The traders have since added to their long trades, meaning they expect prices to continue rising. But the ETFs for oil have suddenly witnessed huge outflows of money that will put downward pressure on crude oil prices as futures contracts, which the funds hold, are sold to meet the redemptions. *The Wall Street Journal* reported that one ETF, the United States Oil Fund LP, experienced a $2.7 billion cash outflow in April. That fund was holding about 11% of the June crude oil futures contracts' total open interest. Will the commodity traders tossing in their towels be the buyers of the contracts the ETFs are

selling? If yes, then oil prices will not retreat. If the answer is no, then look for near-term downward pressure on oil futures prices.

Exhibit 18. Which Historical Price Correction Will 2015 Follow?



Source: U.S. Investors

It has taken longer for oil prices to bottom in this downturn - 39 weeks versus 32 and 33 weeks in the earlier corrections

For a perspective on what might happen to oil prices, Exhibit 18 shows the path of oil price declines for 1985/1986, 2008/2009 and 2014/2015. It has taken longer for oil prices to bottom in this downturn - 39 weeks versus 32 and 33 weeks in the earlier corrections. The interesting question is whether we will see the sort of rebound in prices experienced in 2009 or the bounce and then an extended flat pattern as we observed in 1986. The major oil companies suggest the recovery will look more like 1986. The oilfield service companies seem to be betting on a 2009 recovery path. We will know about mid-summer.

A Texas Power Company's Take On Gas And Temperatures

Driving to work one morning last week, we heard a commercial for an electric power marketing company that convinced us it isn't optimistic about higher natural gas prices or hot summer temperatures. We might say they are pessimistic, but that wouldn't fit with their marketing strategy.

Texas has a deregulated electricity market, meaning that companies compete to sell consumers electricity with regulated utilities providing the wires to deliver the power to your home or business

For those not familiar with the Texas power market, the state has a deregulated electricity market, meaning that companies compete to sell consumers electricity with regulated utilities providing the wires to deliver the power to your home or business. Rather than having the electricity price set by a utility commission that considers the investment the utility company has made in generating, transmission and distribution assets in order to deliver power to customers, the electricity sellers are free to offer their power at whatever price they chose. Contract terms are fairly standard and must meet certain

minimum terms as dictated by the overall regulator to protect individuals from abuse by the sellers.

Contract terms range from three months up to 24 months with rates mostly fixed for the term and varying depending on the amount of power consumed

While consumers negotiate purchase terms with the electricity seller (actually they are selecting proposed contract terms) they pay a fixed rate for the transmission and distribution services provided by the regulated utility. The electricity portion of the bill reflects what the sellers believe consumers will pay for power. Contract terms range from three months up to 24 months with rates mostly fixed for the term and varying depending on the amount of power consumed. There are other terms such as cancellation fees and deposit requirements. The contracts are regulated by the Public Utility Commission of Texas and are marketed primarily on the web site PowertoChoose.org, or by billboards, advertisements and direct mail solicitations.

That means that if you consume more power than you paid for during the course of the contract you were not obligated to pay any more

The advertisement we heard was sponsored by one of the Houston-based electricity sellers, Reliant Electric Retail, a division of NRG Energy, Inc. (NRG-NYSE), which is a national power provider. The commercial began by talking about how difficult it was to offer a differentiated product when you're talking about electricity since you can't add flavoring or artisanal qualities. But it could be differentiated if the plan was designed specifically for the customer. This specific plan was a level monthly rate that wasn't trued up at the end of the plan. That means that if you consume more power than you paid for during the course of the contract you were not obligated to pay any more. However, if you consumed less power than you paid for you were not entitled to a refund.

Current PowertoChoose.org electricity offers range between a low of 5.1-cents per kilowatt-hour (kWh) up to 13.7-cents per kWh of power a month

The economics of the plan for Reliant are tied to the amount of power it anticipates a customer using each month, how much it costs to obtain that power, and the profit margin the seller wishes to obtain on the contract. Historical electricity use data is readily available and is based on the home's location, the size of the home, details about the family living there, etc. Judging how variable that power demand might be requires a model to project power consumption given different weather conditions – primarily the air conditioning load due to summer heat since there are not many homes with electric heat for the winter in the Houston market. Once you have a model of the monthly demand, the seller can lock in future power purchase agreements with electricity generators, leaving only unusual demand variability as a risk factor. With natural gas prices low, electricity prices are quite cheap. Current PowertoChoose.org electricity offers range between a low of 5.1-cents per kilowatt-hour (kWh) up to 13.7-cents per kWh of power a month. For using less than 1,000 kWh of power per month rates are considerably higher, but they were usually slightly lower if you use 2,000 kWh or more power per month.

This is the first time we have heard this commercial, suggesting that Reliant believes it can offer such a unique power contract while

Low power prices tied to low gas prices allows for a fat profit margin as protection against heat-related power spikes that drive up incremental power costs

protecting itself from financial disaster due to an extremely hot summer. Low power prices tied to low gas prices allows for a fat profit margin as protection against heat-related power spikes that drive up incremental power costs and wipe out monthly profit margins. As one would expect – this contract is a statistical bet that power costs remain low (low natural gas prices) and the summer temperatures will be within a modest range around the normal historical pattern (no global warming impact).

The bad news for the petroleum industry and its Houston employees is that the rate plan suggests there is little likelihood of materially higher natural gas prices anytime soon

On one hand, we take the existence of this new electricity rate plan as confidence that our summer will be hot, but not unseasonably hot. That's the good news as a consumer. The bad news for the petroleum industry and its Houston employees is that the rate plan suggests there is little likelihood of materially higher natural gas prices anytime soon, at least in the view of this utility. We will be interested to see how well the plan sells because we have to believe that by purchasing a fixed-rate plan rather than a fixed-dollar plan, the consumer would come out ahead. But for people on tight budgets (higher unemployment in Houston due to the petroleum industry downturn), they may find this an attractive financial insurance plan.

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.