PPHB
ENERGY INVESTMENT BANKING

MUSINGS FROM THE OIL PATCH

May 1, 2018

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

Shell's Latest Scenario: Realistic, Pie-in-the-Sky or CYA?

All the anti-fossil fuel movement tactics were in evidence

Leading up to Earth Day, the media was replete with articles and opinion pieces about the need to kill the fossil fuel industry before it kills the planet. All the anti-fossil fuel movement tactics were in evidence – assaulting oil and gas companies for hiding their knowledge and complicity in promoting increased use of oil and gas, attacking investors and bankers financing producers and pipeline owners who are encouraging increased oil and gas consumption, and threatening lawsuits against energy companies for failing to modify their business models in favor of green energy.

The report was praised as well as scorned

Amidst the full-throated attack on fossil fuels, Shell Oil's latest planning scenario – Sky – was prominently discussed. The report was praised as well as scorned. It was praised for highlighting the need for an energy revolution and for laying out how Shell's core business might be eliminated. The scorn came because the plan wasn't aggressive enough by still providing a market for the company's core products.

Shell's latest vision for how the world's energy system might transition extends and enhances earlier ones that outlined pathways to a cleaner world

Shell's latest vision for how the world's energy system might transition extends and enhances earlier ones that outlined pathways to a cleaner world. The May 2016 report, "A Better Life With A Healthy Planet," was a supplement to Shell's 2013 planning process: "The New Lens Scenarios." That effort produced two scenarios – "Mountains" and "Oceans" – that examined the implications for the pace of global economic development, the types of energy used and the growth in greenhouse gas emissions. In one case – Mountains – the world experiences moderate economic development, while government policy shapes the global energy system and environmental pathway. More compact cities and a transformed global transport system are the result, but GHG emissions drive temperatures above the 2^{o}C target. The Oceans scenario envisions

a more prosperous but more volatile world, where the energy system is shaped more by market forces than government policy. Combined, these forces limit the growth of nuclear power and natural gas use, retard the development of carbon capture and storage technology, and contribute to an electricity generation structure that requires 30 more years to become carbon neutral than in the Mountains scenario. The two Lens scenarios were disappointing to environmentalists hoping to see a pathway to a fully decarbonized world.

What environmental leaders began recognizing was that the cataclysmic predictions of their climate models were so dire they generated a fatalism that translated into inaction

In fact, the head of Shell's scenario planning, Jeremy Bentham, wrote in the report's introduction, "it is likely that the global energy system in the future decades will closely resemble the trends predicted in these scenarios." The scenarios evolved following the failure of the Copenhagen Accord in 2009, in which 100 countries would have adopted steps to limit carbon emissions and keep global temperatures from rising by 2°C. Subsequent failures to reach agreement on global carbon emission limitations added to the frustration of the environmental movement. What environmental leaders began recognizing was that the cataclysmic predictions of their climate models were so dire they generated a fatalism that translated into inaction. Mountains and Oceans confirmed this assessment.

Obstructionism, in any way possible, became the new mantra

The environmental industry reassessed its game plan and re-energized its effort. While attacks on oil and gas companies continued, the efforts became more sophisticated. The idea of fraud lawsuits emerged, but more dramatic efforts were launched against companies desiring to build new pipelines. Not only were the owners targeted, but the regulatory bodies, including the legality and completeness of their approval processes, were targeted. Obstructionism, in any way possible, became the new mantra. That effort grew to include investors and financial institutions underwriting energy infrastructure investments. As a good citizen of the European "One World" community, Shell realized it needed to address the climate change failure of its Lens' scenarios, regardless of whether they were correct.

"A net-zero emissions world is not necessarily a world without any emissions anywhere"

By now, Shell had a new leader. In Ben van Beurden's foreword to "A Better Life With A Healthy Planet," he wrote, "We know our long-term success as a company depends on our ability to anticipate the types of energy that people will need in the future in a way that is both commercially competitive and environmentally sound." Mr. Bentham then highlighted the challenge of being successful. After pointing out that energy demand will likely require a doubling of the global energy system over the balance of the century, he also pointed out "that a net-zero emissions world is not necessarily a world without any emissions anywhere." In essence, energy systems in different parts of the world could, and likely would be structured differently.

Shell's conclusion is that "for the foreseeable future, hydrocarbons will still be required where high process-temperatures and dense energy storage are necessary…"

Mr. Bentham concluded that while meeting the necessary energy needs in a net-zero carbon emissions world is technically feasible, "it will be very challenging." The 2016 report was designed to examine the necessary consumption and production transformations, the economic growth pathways of developing countries, and what governmental policies were needed to facilitate this transformation. The report began by outlining the future energy demand challenge, which Shell characterized as both providing sufficient energy but also halting the accumulation of carbon emissions. While renewables are perceived as the solution to the energy challenge, Shell's conclusion is that "for the foreseeable future, hydrocarbons will still be required where high process-temperatures and dense energy storage are necessary…" Shell cited industries such as iron, steel, cement, chemicals, and heavy freight and air transportation as ones where renewables offer no acceptable solution to the energy challenge. Given this problem, Shell concluded that "…the energy system in an emerging net-zero emissions world will be something of a patchwork." This leads to differing degrees of energy decarbonization and efficiency. According to Shell, the final elimination of carbon emissions not addressed by renewables and increased energy efficiency would depend on carbon emissions capture and storage deployed at scale, along with the use of sustainable biomass. Neither of these options are commercially available now.

On April 4th, Friends of the Earth Netherlands announced it will take Shell to court if the company does not act on demands to stop its destruction of the climate

Once again, Shell's planning scenario came up short, especially in the eyes of the European anti-fossil fuel community. The Healthy Planet scenario set the stage for Sky, which further explores exactly how a decarbonized world can be achieved, while also setting forth the challenges, and, importantly, the timing of actions necessary to achieve that goal. On April 4th, Friends of the Earth Netherlands announced it will take Shell to court if the company does not act on demands to stop its destruction of the climate. This potential lawsuit is unique in that it demands Shell act to counter climate change rather than merely pay compensation. The thrust of the resolution would require Shell to significantly limit its investments in oil and gas globally by forcing it to comply with climate targets.

A target of the lawsuit is to dissuade Shell from investing in the Nord Stream II gas pipeline to bring Russian gas to Germany

The dilemma Shell faces was crystalized in a comment by Colin Roche, extractive industries campaigner at Friends of the Earth Europe, who stated, "not only is Shell one of Europe's biggest climate polluters but also one of Europe's biggest carbon pushers, continuing to lobby for a fossil fuel future even as the effects of climate change begin to ruin lives and livelihoods across the planet." A target of the lawsuit is to dissuade Shell from investing in the Nord Stream II gas pipeline to bring Russian gas to Germany, but continuing to invest in traditional oil and gas exploration and development is also something the environmentalists want stopped. While Shell's shift toward a natural gas-centric energy portfolio with fewer carbon emissions and its recent $400 million investments in renewable ventures (about 2% of the company's annual capital

investments) represent smart strategic initiatives, those steps may be insufficient to hold off the lawsuit. A Nord Stream II investment may be the straw that breaks Shell's back.

Shell as the world's most hated company in its 2016 ranking

Sigwatch, an NGO that tracks activist activities against companies, listed Shell as the world's most hated company in its 2016 ranking, the fourth consecutive year Shell earned the title. Much of the Shell hatred was driven by its plan to drill for oil and gas in the Arctic Ocean, an effort it abandoned after a failed attempt and a near disastrous accident. Solar farms, clean retail electricity and more natural gas may not protect Shell from an aggressive attack program by environmentalists.

On the other hand, Sky demonstrates to the world that there is a pathway to environmental nirvana, but not without a significant restructuring of the global energy system with meaningful impacts on people's lifestyles

The recent Groningen gas field earthquakes and output restrictions that followed, are a reminder to the Dutch people of the risks of fossil fuels, which underlies the Friends of the Earth lawsuit threat. The Sky planning scenario outlines why fossil fuels such as natural gas will always remain part of the energy mix even in 2070 and a net-zero carbon emissions world. That is a good reason for Shell to promote Sky. On the other hand, Sky demonstrates to the world that there is a pathway to environmental nirvana, but not without a significant restructuring of the global energy system with meaningful impacts on people's lifestyles. At the same time, Sky shows that achieving its carbon emissions goal requires swift and radical actions with respect to government policies and energy technology and investments, something not happening now. If that should change, Shell has a business plan to capitalize. On the other hand, the failure to put in place the drivers necessary for Sky's success, it may become Shell's lawsuit defense.

Sky may also become Shell's "cover your ass" defense against environmental lawsuits and attacks

Sky may well be "pie in the sky," which is defined by Webster as an unrealistic or ludicrous concept. The phrase was coined in a song parody of the 1861 Salvation Army hymn, "In the Sweet By-and-By." The hymn was mocked for over-emphasizing salvation rather than working to meet people's material needs. Is that today's environmental movement? Sky may also become Shell's "cover your ass" defense against environmental lawsuits and attacks. Sky is likely the best exposition of what is needed from society in the near-term in order to defer the disastrous future climate models predict. Shell is providing its data allowing outsiders to better evaluate Sky. Is society prepared for Sky's cost?

2018 Oil Market Challenge: Can It Be About Noble Goals?

Suhail Al Mazrouei, the United Arab Emirates' minister of energy and industry and OPEC's current president, told a *CNBC* reporter on April 23rd that the reality was that members of OPEC had come together last year with the "noble goal" to rescue the oil market. His statement came a day after President Donald J. Trump had tweeted the following:

Exhibit 1. Trump Ruffles Oil Market's Feathers

Source: ***CNBC***

There is a certain community, especially in the developed economies of the world, which sees more oil and gas as a bad thing

While a noble goal implies an unselfish act to assist people, one has to wonder what is being accomplished by raising global oil prices? Yes, the energy business is now better positioned to generate positive cash flow from its operations. Yes, the world will have more oil and gas output in the future due to higher oil prices now. Remember, however, there is a certain community, especially in the developed economies of the world, which sees more oil and gas as a bad thing. But importantly, higher oil prices are aiding the finances of the countries producing the bulk of the world's oil – OPEC members. One might argue that more oil money for OPEC members will lead to more stable governments and reduce the risk of increased political instability in the Middle East, which could be viewed as a positive for global society. However, one may be more inclined to view Al Mazrouei's comments as a reflection of what, as they say in the investment world, "talking his book."

The key point of Al Mazrouei's statement highlights how, by restricting oil output and exports coupled with vigorous global economic growth creating strong oil demand growth, worldwide oil inventories have been reduced, helping to boost oil prices. While all of that describes where we have been, it doesn't help in knowing where global oil prices are heading. If we look at the various oil price forecasts, many are being raised now, reflecting the market's strength. A few forecasters are suggesting that we are likely to see lower prices, due to economic weakness, after we pass this period of high prices.

We often wonder whether this "lower in the future" oil price outlook reflects forecasters seeking to avoid the horrendous price prediction record of the past

We often wonder whether this "lower in the future" oil price outlook reflects forecasters seeking to avoid the horrendous price prediction record of the past. In hindsight, many of them were merely extensions of then-current trends. Of course, they were accompanied with substantial data analyses and opinions about why the current environment would continue. Most price forecasts extending beyond next week, have a pitiful record of accuracy.

Is it possible to separate some wheat from the chaff being tossed around these days? We begin by noting the record of the performance of commodities versus other asset classes since 2004.

Exhibit 2. Commodities Are Leading The Performance Pack

Source: ***Seeking Alpha***

So far in 2018, commodities are topping the investment performance scoreboard

Jeffrey Gundlach, the founder of hedge fund DoubleLine, has argued that as you move closer to the next economic recession, commodities become more attractive relative to equities. So far in 2018, commodities are topping the investment performance scoreboard, measured on annualized year-to-date results. Note that commodities were among the worst performing investment classes in 2017, after ranking third in 2016. The performance of commodities for 2011-2015 was abysmal. To support Mr. Gundlach's observation about the performance of commodities as you near a recession, examine where the group ranked prior to the 2008 financial crisis and recession. In 2007, commodities ranked third, only to fall into sixth place in 2008 and to eighth place in 2009, before bouncing back to third place in 2010, before falling into its extended disastrous performance period thereafter.

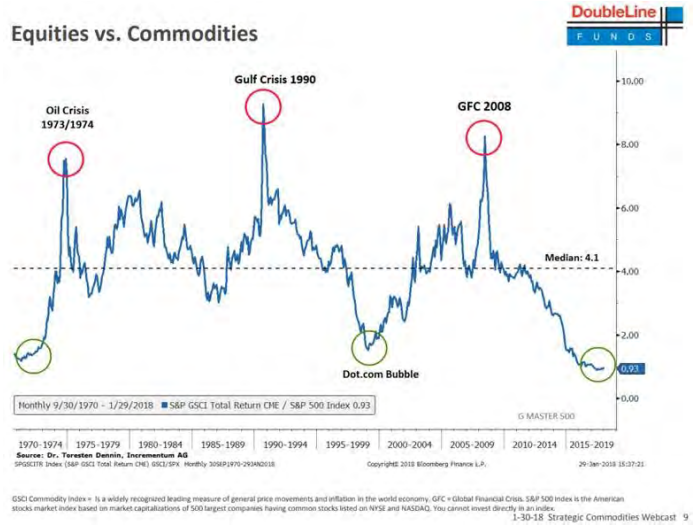
That measure shows that the commodities index today is about where it was at the beginning of the 1970s

Earlier this year, Mr. Gundlach showed a chart supporting his view of commodities being poised to perform better than equities. The chart shows the ratio of the commodities index versus the Standard & Poor's 500 Index, representing equities, since 1970. That measure shows that the commodities index today is about where it was at the beginning of the 1970s, an era marked by rapid inflation, exploding oil prices, sky-high interest rates and sluggish growth. Currently, the ratio is below the low set immediately prior to the bursting of the dot com bubble in 1999. Understand, we are not giving investment advice, but rather are using the argument of a highly regarded trader to make the point that oil's current price rise may be signaling other factors at work within the global economy and financial markets, not merely reflecting the power of OPEC and/or the increased Middle East tensions.

Besides demonstrating the extremely low valuation currently being accorded commodities relative to the stock market, the chart also shows how every low was followed by a recovery. The magnitude of

recoveries has varied, but there has always been a recovery. This time should not prove differently, which is a reason why Mr. Gundlach is promoting this trade.

Exhibit 3. Commodities Are Most Undervalued Since 1970

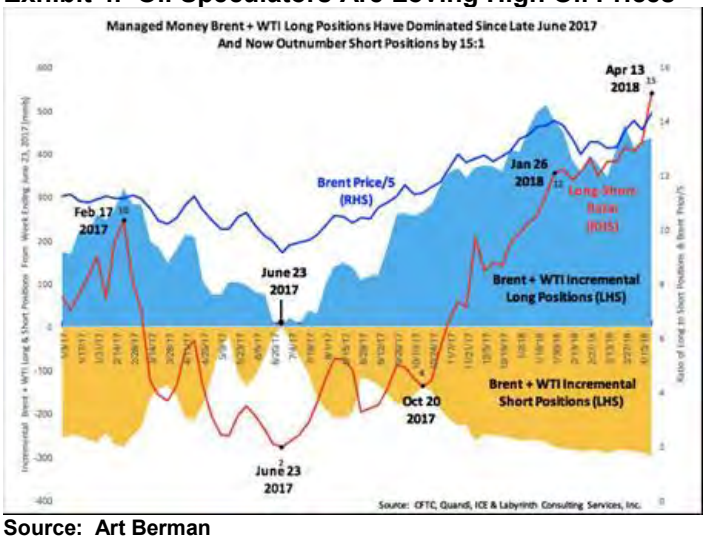


Source: ***CNBC***

Commodity futures speculators are much like a flock of birds – they take-off at the slightest noise and then fly as a group to wherever they think it will be safer

To appreciate the enthusiasm for higher oil prices, and implicitly, the belief that they will go higher, we point to a chart constructed by our friend Art Berman. It shows how speculators' incremental WTI and Brent long positions in the oil futures market have grown recently. Understand, speculators' positions can quickly shift if events unfold differently than expected. Commodity futures speculators are much like a flock of birds – they take-off at the slightest noise and then fly as a group to wherever they think it will be safer.

Exhibit 4. Oil Speculators Are Loving High Oil Prices



Source: Art Berman

Will oil prices continue to rise toward the rumored $80 or $100 a barrel target of Saudi Arabia? The kingdom would like higher prices to boost the success of its planned IPO of national oil company Saudi Aramco. Speculators are assuming that higher prices are the future for oil. With that thought in the back of our head, we recently attended a luncheon sponsored by an energy investment organization composed mostly of retired energy industry executives and headed by a former utility company senior financial executive. He discussed his view of the current state of the oil and natural gas markets and why prices are poised to explode to the upside. Leaving natural gas aside, his argument for sharply higher oil prices was tied to shrinking global, and especially U.S., oil inventories, especially as the refining sector is beginning to ramp up its gasoline output for the summer driving season. He also pointed to the International Energy Agency (IEA) forecast for increased global oil consumption this year. He told the audience that "the IEA always underestimates demand growth, so their 1.5 million barrel a day projected increase this year will be low. We may even get to 2 million barrels a day."

He told the audience that "the IEA always underestimates demand growth, so their 1.5 million barrel a day projected increase this year will be low. We may even get to 2 million barrels a day"

What we know from our prior supply and demand research is that the IEA doesn't always start with a low estimate and raise it as the year progresses. Sometimes, as in the past, it was forced to cut estimates, and sometimes dramatically, as in 2008. Cutting demand projections became the rule during 2005-2009. After the IEA missed the Chinese oil demand explosion in the early 2000s, as the country embarked on a massive building program in anticipation of the 2008 Beijing Olympics, demand forecasts became overly optimistic. China's massive nationwide building program, involving airports, roads, railroads and hotels, to handle millions of Olympic visitors wishing to see more of the country than Beijing, came to an end. An acquaintance who worked for the IEA admitted that the agency's China demand model needed a massive overhaul, but it went from consistently underestimating demand to consistently overestimating it, forcing annual downward revisions to initial demand estimates.

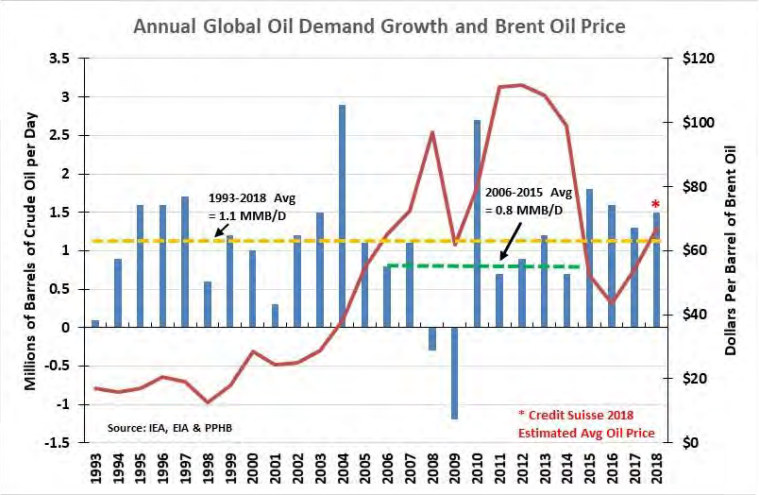
Cutting demand forecasts appeared to be the rule during 2005-2009

When we examined the IEA's recent prediction record in the same fashion as we tracked it in the earlier years, it seems as though most revisions have been upward. The magnitude of the increases, however, have been small.

We decided to focus on annual demand growth versus the level of global oil prices, as we wondered what happened to demand growth when oil prices climbed to lofty levels such as Saudi Arabia supposedly desires. Over 1993-2018, the annual global oil demand increases averaged 1.1 million barrels per day. When measuring the average increase over varying timeframes, we found fairly similar demand growth numbers (1.0-1.2 million barrels a day). It was only when we looked at 2010-2018 that we saw the annual average increase rise to 1.4 million barrels a day.

Over 1993-2018, the annual global oil demand increases averaged 1.1 million barrels per day

Exhibit 5. Global Oil Demand Low Under High Oil Prices



Source: IEA, EIA, PPHB

During 2006-2015, annual demand growth only averaged 800,000 barrels per day

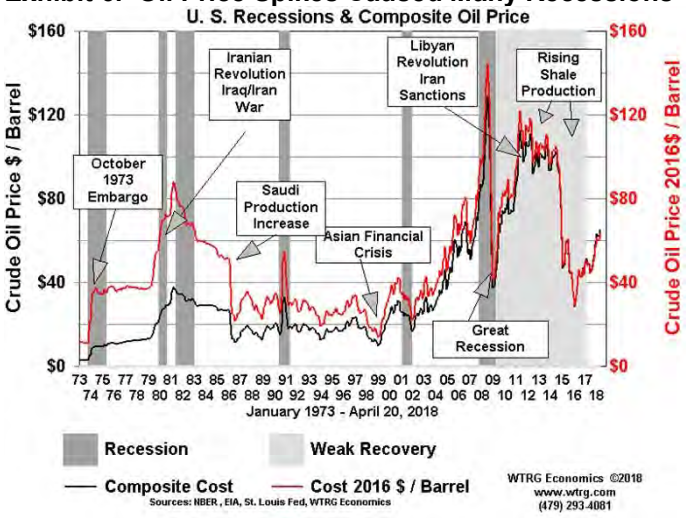
What caught our attention as we were preparing Exhibit 5 was seeing what happened to demand growth around the financial crisis and economic recession years. That period was marked by high oil prices. Notwithstanding the recession of 2008-2009 and the dramatic demand recovery immediately thereafter, during 2006-2015, annual demand growth only averaged 800,000 barrels per day. During that period, Brent oil prices averaged $60 a barrel or greater. If we exclude the demand jump experienced in 2015, the year of the oil price collapse, the average annual demand increase was cut by 100,000 barrels a day.

This chart also helped us understand a possible miscalculation by Saudi Arabia when it engineered the drop in oil prices in late 2014. As we have explained before, in our estimation, the European Union's reversal of its embargo against the burning of Canadian oil sands output convinced Saudi Arabia to believe it had lost market share in the two most developed markets of North America and Europe, leaving only Asia for future growth. To gain market share in Asia, Saudi Arabia had to become more price competitive.

It is reasonable to question the sensitivity of the IEA's demand forecast to higher oil prices

With two-thirds of 2018 yet to go, Brent oil prices are comfortably above $60 a barrel. As forecasts for 2018 prices rise, such as investment bank Credit Suisse's calling for a $71-a-barrel average this year, it is reasonable to question the sensitivity of the IEA's demand forecast to higher oil prices. OPEC, investment bank Goldman Sachs and other forecasters are unequivocally convinced that high oil prices will not curb demand. However, if those views prove wrong, it will be a rude awakening for the bullish oil futures speculators who exercise substantial influence on future oil price expectations. Some analysts point to the history of oil spikes and the timing of global recessions, although the record is not perfect.

Exhibit 6. Oil Price Spikes Caused Many Recessions



Source: WTRG Economics

If higher oil prices do impact demand, it is likely we are closer to the peak in oil prices. That scenario would be consistent with those forecasters calling for a lower 2019 oil price. Most of those lower price projections are based on a recession, or certainly lower economic activity, next year. They also foresee a surge in global supply as troubled OPEC countries heal, and their higher output is coupled with growing U.S. shale oil output.

We also note that over the last 26 years, there has been only one period of low demand growth, which just happens to have coincided with oil prices consistently averaging above $60 a barrel

Although we are not predicting a fall in global oil demand, history has taught us to not underestimate the speed with which corrections may occur. We also note that over the last 26 years, there has been only one period of low demand growth, which just happens to have coincided with oil prices consistently averaging above $60 a barrel. Yes, those were enjoyable years for the oil business, but management practices during that time contributed to the devastating outcome following the drop in oil prices. Living by our mantra of always wanting to be prepared, we believe it is better to have thought about how to manage a business within a range of possible outcomes, rather than to be scrambling to react to an outlier scenario suddenly becoming reality.

Wall Street's Disaffection With Energy Needs A Revolution

"Can Big Oil win back investors?"

Before the major oil companies are scheduled to begin reporting their first quarter 2018 financial and operating results, a *Bloomberg* article asked the question: "Can Big Oil win back investors?" It is a great question because the answer impacts not only the investment performance of funds, but also the ability of the industry to finance its growth, at whatever pace is needed, to meet the energy requirements of the world's economies. If you can't win back investors, think what that may mean for the leaders in Saudi Arabia

If Saudi Aramco isn't worth that much, will the kingdom need to seek money elsewhere?

who are positioning their national oil company, Saudi Aramco, for an initial public offering. Saudi officials have claimed the company is worth at least $2 trillion. If so, the 5% of the company Saudi is planning to offer to investors would yield the kingdom $100 billion - a pile of cash that would help replenish its coffers. If Saudi Aramco isn't worth that much, will the kingdom need to seek money elsewhere?

If Big Oil can't win back investors, what will that mean for its future spending?

If Big Oil can't win back investors, what will that mean for its future spending? The use of debt to fund capital investments only stretches so far without adequate equity support before investors become concerned about too much leverage. That translates into higher financing costs, and limited, or maybe no access to capital markets.

The *Bloomberg* article highlighted the plight of Big Oil. Its weighting in global equity indices is at a 50-year low. Of the MSCI World Index's 100 biggest stocks, only six are oil producers. Within the Standard & Poor's 500 Index, Exxon Mobil Corp. (XOM-NYSE), which a decade ago was the largest company, has fallen to ninth place, and investors are requiring higher dividend yields to sustain the share price. So, what's the problem for Big Oil? Simple. There is a perception that the world is awash in oil at the same time its long-term demand may be falling due to the public's embrace of climate change policies promoting renewable energies and electric vehicles.

Institutional money manager Kevin Holt of Invesco Ltd. was quoted in the *Bloomberg* article saying, "Earnings have started to come through but no one believes it's sustainable. That's why the stocks haven't worked even though the commodity has gone up. Everyone's saying they don't believe it."

Current low valuations are a manifestation of the industry's negative perception

Stock market valuations are the collective view of investors as to the future earnings and dividend prospects for companies. Current low valuations are a manifestation of the industry's negative perception. Mr. Holt is certainly correct about oil prices. Since the start of this year, Brent/WTI prices have climbed 12.2%/13.3% through April 23rd. If we go back to the oil price low of 10 months ago, prices have soared by 66.7%/61.4%. In the past, an increase in oil prices of those magnitudes would have sparked a meaningful recovery in oil company and oil-related company share prices.

A report by the oilfield service research team at Barclays delivered a similar message about their universe of stocks as cited by *Bloomberg* about Big Oil. The most telling chart shows a nearly complete correlation (0.96) between the movement in oil prices and the value of the Philadelphia Oilfield Service Stock Index (OSX) between January 2012 and January 2016. However, from June 2017 to April 2018, the correlation has fallen to only 0.06. And, June 2017 marked the low price for crude oil!

Exhibit 7. The Disconnect For Oilfield Service Stocks

Source: Barclays

Institutional investors are always in need of liquidity

From the perspective of institutional money managers, as well as Wall Street investment banks, the disconnect between share price performance with that of oil creates liquidity issues that further drive investors away. Institutional investors are always in need of liquidity – actively traded shares with substantial market value – that enables them to trade into and out of positions without overtly impacting the share price. While financial fortunes are often made buying "out-of-favor" stocks, institutional investors deplore being lonely investors.

the total market capitalization of the oilfield service group fell from $471 billion to $469 billion to $303 billion

The Barclays report included a snapshot of the universe of oilfield service stocks taken at the peak for the group in 2007 and 2013, and now in April 2018. The number of stocks in the group grew from 48 to 50 to now 56 companies, but, at the same time, the total market capitalization of the oilfield service group fell from $471 billion to $469 billion to $303 billion. Reflective of the 36% shrinking of the oilfield service group's market capitalization was what happened to the values of individual companies. The number of companies with market capitalizations of $5 billion or more has declined from 20 to 19 to 9 companies. Moreover, this large market cap group is dominated by one company – Schlumberger Ltd. (SLB-NYSE) – making it tougher for investors.

As the largest capitalization group has shrunk, the mid-cap (market values between $1 and $5 billion) stock group has expanded, increasing from 21 to 25 to 28 companies. That growth is largely a result of the shrinking of the large-cap group, although new companies and mergers of smaller companies helped swell it, also. The largest increase in companies was in the small-cap universe, or companies with market capitalizations of less than $1 billion, which went from 7 to 6 to 19 companies.

Its entire market capitalization is equal to only 36% of that of Apple

To put the oilfield service sector in perspective, its entire market capitalization is equal to only 36% of that of Apple Inc. (AAPL-Nasdaq), but 63% of Facebook Inc. (FB-Nasdaq). The group does have a total market capitalization that is 2.5 times that of GE (GE-NYSE), a global leader until the dawn of this century, which may be a warning for the industry.

For many investors watching the growing anti-fossil fuel agendas of governments and activists, the risks in owning these stocks is not offset by the potential gains, even if the stocks' valuations return to those of the "good old days"

Many institutional investors view the energy business as a hot stove. They have been burned too many times by false rallies in oil and gas prices, only to see fundamentals reverse due, in many cases, to events beyond their control, often geopolitical developments. With questions about the long-term outlook for oil and gas demand, investors are worried about the ability of executives to grow their companies and provide sustainable returns to investors. For many investors watching the growing anti-fossil fuel agendas of governments and activists, the risks in owning these stocks is not offset by the potential gains, even if the stocks' valuations return to those of the "good old days." Always remember, investors can quickly change their minds if they feel sentiment for the sector is shifting, and in today's financial world there is always a stock market open to execute a trade.

Promises Of Wind Energy May Not Be As Great As Thought

Wind energy has been a prominent ingredient in the renewable energy push

Wind energy has been a prominent ingredient in the renewable energy push, and currently occupies a significant position in America's energy mix. The 2017 annual market report of the U.S. wind industry was recently released by the American Wind Energy Association. The report stated: "The industry is at the center of a transformational change in the country's electricity sector – a change that is bringing consumers cheap, clean, and reliable energy." There are a number of analysts who might challenge the characterization of what wind energy is delivering.

The report showcases that the wind industry employs a record 105,500 men and women across all 50 states

The AWEA report highlights that the American wind energy industry is powering more homes and businesses than ever before. That is good, but also not surprising given the growth in the installed wind generating capacity. The report showcases that the wind industry employs a record 105,500 men and women across all 50 states. While touted as a great accomplishment, the trend in wind energy employment is exactly opposite the trend of America's energy history. It has seen us move progressively toward denser energy fuels requiring less land and fewer people to produce equivalent amounts of earlier, less dense energy fuels. By employing fewer workers, we increase industry efficiency and reduce the cost of energy, which has always been applauded as positive for our economy and society. Today, that doesn't seem to be the case.

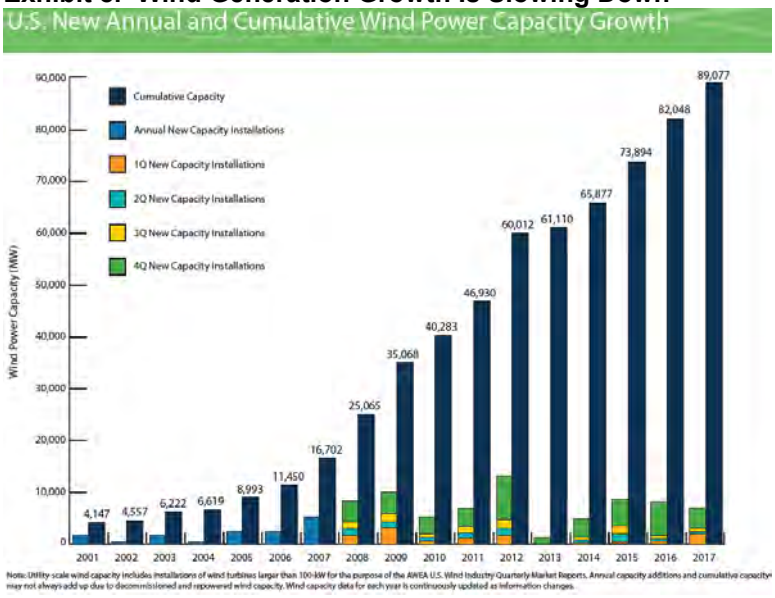
In December 2017, the oil and gas extraction industry only employed 144,500 workers

What is striking about the record wind employment claim is that according to the U.S. Department of Labor's Bureau of Labor Statistics, in December 2017, the oil and gas extraction industry only employed 144,500 workers. What does that mean? In 2017, primary energy production in the United States was 87,458 quadrillion British thermal units (QBtus). Of that total, 52,367 QBtus, or 59.9%, came from natural gas, crude oil and natural gas liquids. Wind energy produced 2,347 QBtus, or 2.7% of our energy supply. Thus, total energy output from oil, gas and NGLs was 22.3 times that of wind. Based on the ratio of QBtus to the number of workers

So, is the wind business about generating power, or employment?

employed in each sector, liquid hydrocarbons had a ratio of 0.3624 while wind was only 0.0222. Clearly, the oil and gas industry is much more efficient than wind in producing energy in the U.S. So, is the wind business about generating power, or employment?

Exhibit 8. Wind Generation Growth Is Slowing Down



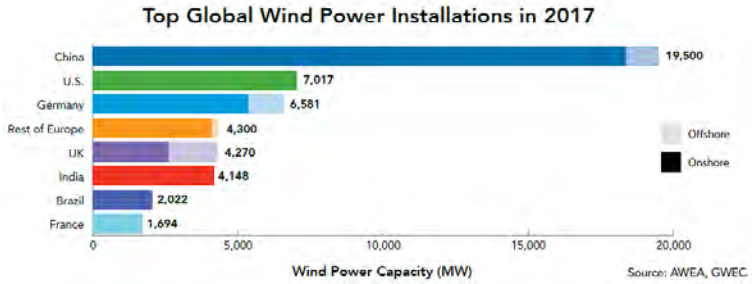
Source: AWEA

The annual additions, shown as multi-colored stacked bars, show wind capacity growth in a downward trend since 2015

The 2017 AWEA report emphasized how the wind industry continues to grow. The report stated that installed wind capacity increased by 9% in 2017 as developers added 7,017 megawatts (MW) of new power. While the number is correct, what we saw by examining the report's chart showing annual, by quarter, and cumulative installed wind capacity each year from 2001, was surprising. The annual additions, shown as multi-colored stacked bars, show wind capacity growth in a downward trend since 2015. Moreover, the peak in annual installed capacity occurred in 2012. According to the cumulative capacity numbers, 2017's increase was more than 1,000 MW below the 2016 increase and nearly 1,000 MW below the 2015 increase.

The AWEA website implies that data totals may be a moving target due to better data collected after the organization's reports are distributed. Also, totals may be impacted by information about previously installed generating capacity being repowered. However, when we reviewed the fourth quarter reports for both 2016 and 2017 and compared them to the implied installations calculated from the changes for the annual cumulative totals, we found preliminary totals average 1.5% per year higher than seen in the cumulative change calculations.

Exhibit 9. U.S. Wind Is Second To China's Growth



Source: AWEA

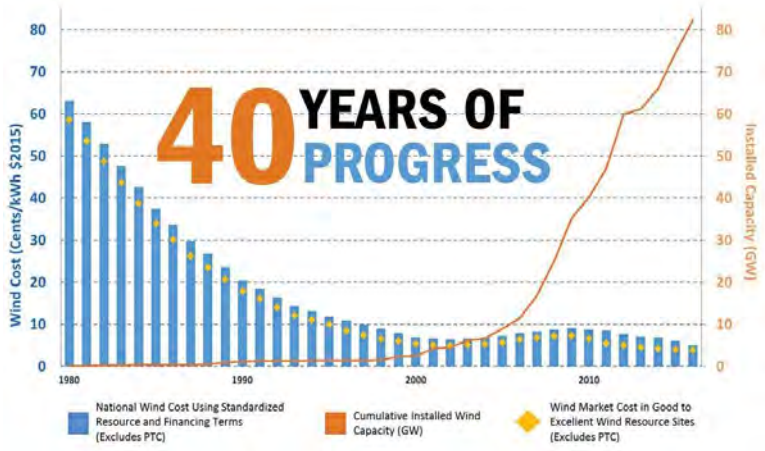
The AWEA reported that the U.S. accounted for 13% of global wind generating capacity installed in 2017

The AWEA report also hailed how well the United States is doing as a global wind power leader. There was a chart showing the installed capacity for a number of leading wind power countries. The U.S. ranked second in installed capacity in 2017 behind China, which installed 2.5 times the amount the U.S. did. The AWEA reported that the U.S. accounted for 13% of global wind generating capacity installed in 2017. But at what cost?

The industry has invested $145 billion in new wind generating capacity over the last decade

According to the AWEA, the industry has invested $145 billion in new wind generating capacity over the last decade. For 2008-2017, the data shows a net increase in installed wind capacity of 64,012 MW. That means the average cost per MW in this period was $2.265 million, which works out to $2,265/kilowatt. AWEA had also produced a report in 2016 showing the 40-year progress the industry has made in reducing wind power costs.

Exhibit 10. Wind Cost Progress May Be Stalling



Source: AWEA

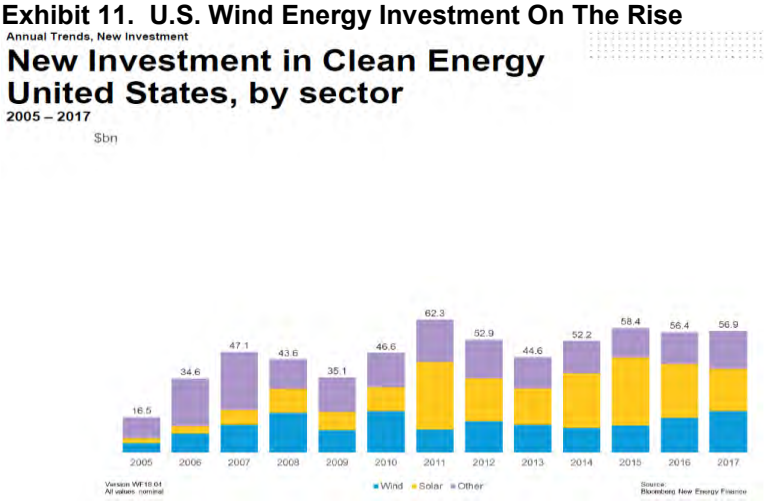
The chart certainly reflects an impressive record. We would note that costs increased during the first decade of this century, but then began to trend lower in the second decade. In fact, as the AWEA wrote in its 2016 report, The Cost of Wind Energy in the U.S.: "The 2016 Wind Technologies Market Report reports that 'The capacity-

weighted average installed project cost within our 2016 sample stood at roughly $1,590/kW. This is down $780/kW from the apparent peak in average reported costs in 2009 and 2010.'" That statement would support significant cost reduction compared to our earlier average cost calculation. However, the data in Exhibit 10 (prior page) would seem to be at odds with other industry data.

This increased annual spending contrasts with falling new wind generating capacity installations and falling unit costs during the same period as reported by AWEA

In a new report from Bloomberg New Energy Finance, the recognized authority on clean energy investing and economics, a chart shows annual clean energy investment in the U.S. covering wind, solar and other energy for 2005-2017. For the last three years, total clean energy spending has been fairly constant, however, wind investment (blue portion of the bars) reflects an upward trend in spending. This increased annual spending contrasts with falling new wind generating capacity installations and falling unit costs during the same period as reported by AWEA. Based on installations, the BNEF data suggests rising wind costs, rather than declining as AWEA states.

Exhibit 11. U.S. Wind Energy Investment On The Rise

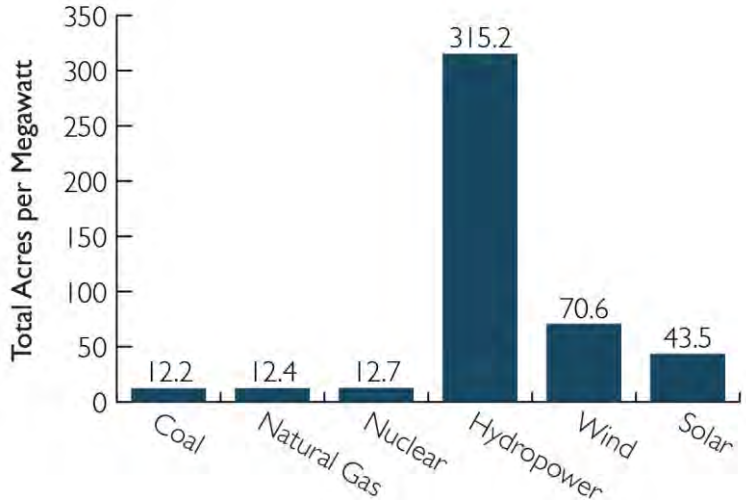


Source: BNEF

Wind requires more than 5.5 times the number of acres to produce a megawatt of power than needed for oil and natural gas

These inconsistencies between spending and capacity additions may reflect trends in the market not being accurately captured. There are issues with the physical realities of wind generation, as well as solar power. For example, wind requires more than 5.5 times the number of acres to produce a megawatt of power than needed for oil and natural gas. Another issue is that the lower power output of wind farms means there must be more of them, which necessitates greater infrastructure investment such as transmission lines to bring the power from the more remote locations of wind farms to population centers. This has also meant longer transmission lines, in addition to more of them. It is possible the BNEF data reflects all-in wind power investment, while the AWEA data only reflects wind farm costs.

Exhibit 12. Wind Uses Substantial Land For Power

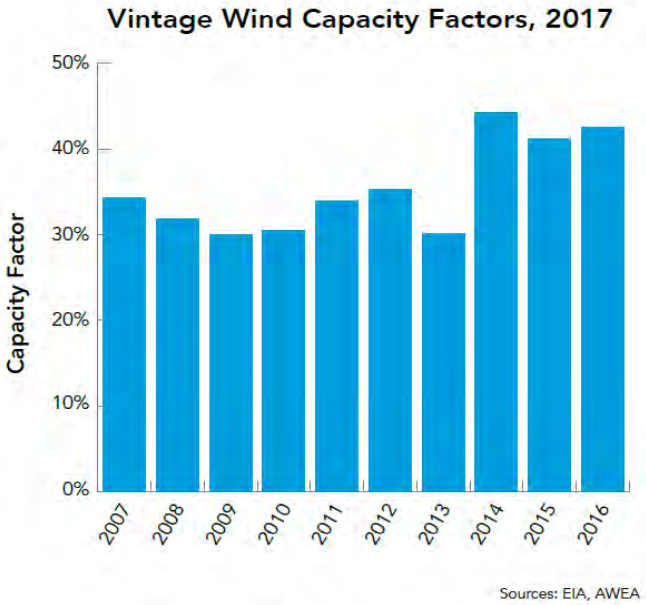


Source: Strata Policy

Due to the intermittency of wind power, to ensure electricity for consumers for every minute of every day, there needs to be backup power available

One thing that is not captured in the various data compilations is the cost of backup power. Due to the intermittency of wind power, to ensure electricity for consumers for every minute of every day, there needs to be backup power available. Utilities must maintain power storage or have immediately available alternative energy sources for those times when the wind doesn't blow. This is a critical weakness in the wind power story that the AWEA and other wind energy proponents fail to acknowledge when discussing wind's virtues and accomplishments. Wind supporters like to focus on the growth in

Exhibit 13. AWEA Cites Wind Utilization Improving



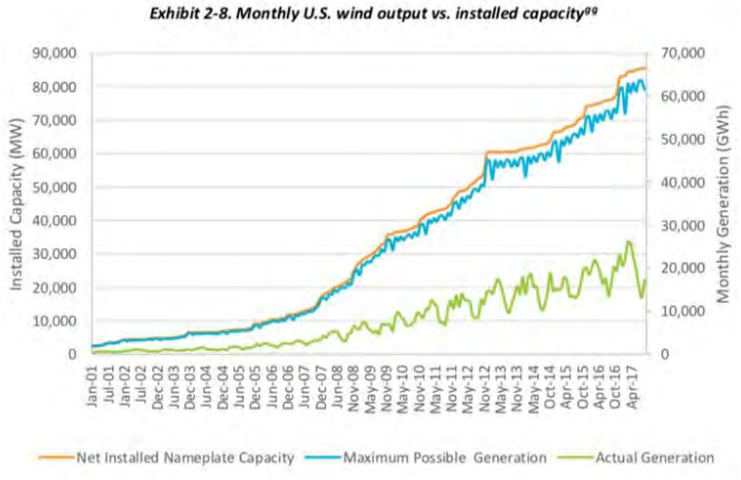
Source: AWEA

generating capacity, but often gloss over the reality that wind power is only available part of the time. Delivery of wind energy happens about 30% to 40% of the time, depending on natural climate variability experienced daily and seasonally. In its 2017 report, AWEA showed a chart with vintage wind capacity factors for 2007-2017 (prior page). They commented that "Projects built in the last three years are achieving annual capacity factors above 40%, on average, compared to 35% or less of older vintages." This increase is a reflection of larger (taller) wind turbines that can reach more consistent wind currents.

So, while both capacity, maximum capacity output and actual output have all been rising, the slope of the capacity lines is much steeper than that of actual output, meaning efficiency is not growing as quickly as installed generating capacity

While the AWEA data shows efficiency improvement in recent years, looked at differently, another picture emerges. In a March 2018 report on reliability of the electricity grid given prospects for retiring baseload units prepared by the National Energy Technology Laboratory, we see this different picture wind power intermittency. Their data plots actual electricity output from wind turbines compared to the reported installed wind generating capacity and the maximum possible output from these turbines. So, while both capacity, maximum capacity output and actual output have all been rising, the slope of the capacity lines is much steeper than that of actual output, meaning efficiency is not growing as quickly as installed generating capacity. Note also how wind power output varies throughout the year, reflecting seasonal climate changes. This is one aspect of reliability, but utilities also must deal with the daily fluctuations in wind power output. Adding to the intermittency challenges is that they often come when power demands from customers are at their highest, complicating power supply management.

Exhibit 14. Improving Wind Power Comes At Huge Cost



Source: NETL

At the end of the day, although consumers may be concerned about the cleanliness of their electricity, they are more concerned with it

being instantly available at the flip of a switch and that its cost is as low as possible. The latter is particularly important as modern lifestyles have increased our power needs pushing up consumer bills. We not only have more electronic devices to be plugged in and charged, we have more appliances that are constantly drawing power in order to instantly respond to our needs – think televisions.

If wind and solar are cheap (they have no fuel cost), why are consumer electricity bills rising so sharply?

Several recent articles have focused on the sharp increase in electricity costs in states and countries that have installed the most renewable power. The question these articles ask is: If wind and solar are cheap (they have no fuel cost), why are consumer electricity bills rising so sharply?

Spain's electricity prices were below the European average in 2009, but today they are among the highest in Europe as the country has switched its power largely to solar

The articles have pointed to various electricity price data: Germany's electricity prices rose by 51% during its expansion of solar and wind energy from 2006 to 2016, and now its carbon emissions are rising as coal is powering backup generating facilities. The country also closed five nuclear power plants and four other reactors at still active nuclear plants. Meanwhile, electricity prices rose by over 100% in Denmark since 1995 when it began deploying renewables, mostly wind, in earnest. Both countries have among the highest consumer electricity prices in Europe. Spain's electricity prices were below the European average in 2009, but today they are among the highest in Europe as the country has switched its power largely to solar.

In the United States, the poster child for expensive electricity is California. Prices increased by 24% during its solar power build-out from 2011 to 2017. At the same time, the state closed its nuclear power plants. Much like Germany, California's energy strategy may be guaranteeing expensive electricity for its citizens.

When too much renewable power is produced, it needs to be shipped somewhere, or people have to be paid to take it

The issue comes down to dealing with the intermittency of renewables. When too much renewable power is produced, it needs to be shipped somewhere, or people have to be paid to take it – either neighboring countries as in Europe, or through negative pricing as seen in large wind generating states in the U.S. On the other hand, when there isn't enough renewable power, fossil fuel or nuclear plants need to be used, and because of the ramp-up issue to offset the intermittency problem, many traditional power plants must be maintained in operating status in anticipation of when their output will be required. All of these issues and actions add to the cost of operating a power grid, which must be passed on to consumers.

When renewable energy penetration in a power sector rises, the economic value of that power falls

These additional expenses are beyond the issue of whether the cost of wind turbines or solar panels is declining. As we know from economics, and have been shown by researchers, when renewable energy penetration in a power sector rises, the economic value of that power falls – basic supply and demand analysis. This situation becomes a problem for the owners of renewable power facilities. It helps explain why the renewable power business

"For example, on wind energy, we get a tax credit if we build a lot of wind farms. That's the only reason to build them. They don't make sense without the tax credit."

continues to push for government subsidies, even after touting how the cost of its power is falling. Wind farm developers are clamoring for investment tax credits, which provide instant economic value for their project. It supports the statement on investing in renewable energy made by preeminent investor Warren Buffett to the shareholders of his company, Berkshire Hathaway (BRK.A-NYSE). Mr. Buffett stated, "For example, on wind energy, we get a tax credit if we build a lot of wind farms. That's the only reason to build them. They don't make sense without the tax credit." Did Mr. Buffett just pull back the curtain on the renewable Oz? Renewable energy may be clean, but it doesn't seem to be as cheap or reliable as its promoters profess.

A Name From Industry's Past Surfaces In FBI Scandal

Little did the assembled executives appreciate how their business would change – and would continue to change, due to the actions of Michael Bromwich

We were surprised recently when we learned that a highly controversial lawyer/bureaucrat involved in one of the offshore industry's most historical events has resurfaced. On April 20, 2010, a well being drilled by Transocean Ltd. (RIG-NYSE) rig Deepwater Horizon on BP plc's (BP-NYSE) Macondo prospect in the Gulf of Mexico blew out destroying the rig, killing 11 and injuring 17 workers, and causing a five-month, estimated 4.9 million-barrel, oil spill. The accident began as the National Ocean Industries Association (NOIA) was holding its annual meeting in Washington, D.C. Little did the assembled executives appreciate how their business would change – and would continue to change, due to the actions of Michael Bromwich. The former assistant U.S. attorney and Department of Justice Inspector General, prior to entering private practice and founding The Bromwich Group, to provide independent monitoring, crisis management, strategic advisory, public affairs, and law enforcement consulting services, was appointed by Secretary of the Interior Ken Salazar to head the revamped Minerals Management Service, renamed the Bureau of Ocean Energy Management, Regulation and Enforcement.

The Obama administration's response to the Deepwater Horizon disaster was to impose a moratorium on offshore drilling, crippling many companies and imperiling the livelihood of thousands of offshore workers. The MMS reorganization, and ultimately the division of BOEMRE into two agencies dealing with all the agency's areas of responsibility – the Bureau of Ocean Energy Management (BOEM) and the Bureau of Safety and Environmental Enforcement (BSEE) – has reshaped the entire offshore regulatory framework.

The treatment of the offshore industry was highly disrespectful other than to inflict pain on an already traumatized industry

The treatment of the offshore industry was highly disrespectful other than to inflict pain on an already traumatized industry. The actions reflected Mr. Bromwich's use of power. The offshore industry's response was spearheaded by the management of Hornbeck Offshore Services Inc. (HOS-NYSE) and resulted in legal victories, only to be slammed repeatedly by Mr. Bromwich, the Obama administration, and the use of moratoria.

His latest role is representing the disgraced #2 FBI leader Andrew McCabe

NOIA members were treated to an abusive lecture at their 2010 fall meeting. We wrote (see below) about the most outrageous presentation we have ever experienced, but it was only our first encounter in following Mr. Bromwich's career. His latest role is representing the disgraced #2 FBI leader Andrew McCabe. Watch for more outrageous showmanship and crude and rude behavior. We wish Mr. McCabe well, but suggest his $500,000 legal fund won't pay for many hours of Mr. Bromwich's help at his routine $1,100 an hour billing rate.

Oil Industry Confronts Ghost Of Future Regulation (Nov. 9, 2010)

At the National Ocean Industries Association (NOIA) fall meeting held at the end of October, the audience of executives from oil and gas companies and oilfield service companies with a strong focus on drilling and producing in U.S. waters were treated to a presentation from Michael Bromwich, the new director of the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE, sometimes shortened to BOEM). The conference program for that day was adjusted to squeeze in an extra 30 minutes of presentation time to accommodate Director Bromwich.

There had been considerable speculation about what he would say and the tone he would use

The meeting room was filled by all the attending members in anticipation of the presentation. There had been considerable speculation about what he would say and the tone he would use. There were thoughts that Director Bromwich would use this conference of offshore industry executives to spell out more about his views on how quickly permits would be issued for drilling in the Gulf of Mexico. There were other, more skeptical views suggesting that the presentation would be treated as more an obligatory necessity with little new and/or revolutionary information in his message.

Director Bromwich appeared from behind the stage and walked up to the podium

With great anticipation, the audience took its seats. The session chairperson strode to the podium and began the introduction. She forewarned the audience that Director Bromwich was on a tight schedule and only had 30 minutes with us, thus the reason why she was starting a bit early and wanted everyone's attention. After the requisite background comments highlighting Director Bromwich's legal career and government service, including the highly-praised investigation of the Houston Medical Examiner's Office, the introduction concluded. Director Bromwich appeared from behind the stage and walked up to the podium. After acknowledging the introductory comments and how he had met and gotten to know a number of industry executives in the audience as a result of the numerous hearings his organization had held with the industry dealing with the investigation of the Deepwater Horizon accident and the BP oil spill and the need for changes in offshore drilling procedures and safety rules, he launched into his prepared remarks.

The nearly 60 year safety and environmental record of the offshore oil and gas industry he attributed to luck!

The opening thrust of the presentation was that there was a fundamental shortcoming in offshore drilling resources and capability to control a deepwater blowout compared to what the regulators had been led to believe. The spill response effort was deemed inadequate and not acceptable. He said neither the offshore industry nor the nation was prepared for the magnitude of the event that occurred. The nearly 60 year safety and environmental record of the offshore oil and gas industry he attributed to luck! If there was any statement that grated every member of the audience that was it. All the advances in drilling, production and safety practices along with the technology developments were all the result of chance according to Director Bromwich.

While the industry welcomed the lifting of the deepwater drilling moratorium, they have found it has only been replaced with a "permitorium"

After swallowing that bitter pill, the audience waited for insights about when the first deepwater exploration drilling permits might be issued. While the industry welcomed the lifting of the deepwater drilling moratorium, they have found it has only been replaced with a "permitorium." As the saying goes, a 'rose by any other name is still a rose.' A suspension of drilling activity, i.e., a moratorium, is still a suspension as long as the government won't, or can't, issue permits to drill. Until permits start flowing, the Gulf of Mexico will truly bear the historical designation as the Dead Sea given it by long-time Tidewater (TDW-NYSE) Chairman John Laborde back in the late 1980s when oil and gas prices were severely depressed.

He said he believed that a permit will be issued before year-end

Director Bromwich generated optimism among some in the audience with his comments about the timing of the granting of deepwater drilling permits. He said he believed that a permit will be issued before year-end, but the reason for the timing was due to the agency having thrown all available resources on the issue. But he acknowledged that the BOEMRE had only received one permit application so far. We found in our discussions with attendees that virtually every major oil company was preparing an application, so it is hard to know who might be the lottery winner.

The optimism about the deepwater drilling permit situation was generated by the fact that Director Bromwich had not rejected the potential of an award before year-end. Since he had previously said that the moratorium would likely be lifted early, which it was, his statement about a permit grant soon was treated as a positive prediction. We understand the logic of this optimistic view, but would caveat that the decision to lift the deepwater drilling moratorium was driven by an entirely different set of circumstances, principally that there was an election and eliminating a voter irritant for some Gulf Coast Democratic Congressmen might help their re-election chances. This action was just as politically motivated as the Environmental Protection Agency's (EPA) decision to approve an increase in the percentage of ethanol that can be blended into motor gasoline from 10% to 15% for modern cars a few weeks ago. One merely needs to note that there are some key Iowa and other corn-

growing state congressional races that would be helped by improving the financial lot of farmers and ethanol plant owners.

Any returning retiree will present a huge conflict of interest management challenge for BOEMRE

After discussing the reorganization of the former Minerals Management Service (MMS) into three separate and focused departments that eliminate the conflicts of interest and the potential for cozy regulatory relations, Director Bromwich went on to talk about his plans for the regulatory organization. He would like to increase the regulatory staff by 200 inspectors and engineers. To do that the agency has been contacting retired oil company offshore drilling and production engineers in hopes of getting some of them to return to the industry as a public service. Of course, any returning retiree will present a huge conflict of interest management challenge for BOEMRE. They certainly couldn't oversee operations of their former employer or employers, but more importantly they would likely be conflicted from regulating any of their former employer's joint venture partners, too. The agency is also recruiting on college campuses where there are established petroleum education programs.

Last week, the listings had doubled to include two IT people, two interns and four engineers and inspectors

While it is admirable seeing the effort of BOEMRE to attempt to recruit additional staff, one has to wonder how easily and quickly the effort will expand the capability of the agency. Recent petroleum study graduates will certainly need extensive time and training before they will be prepared to do offshore inspections. And recruiting retirees presents its own set of management challenges outlined above. We had received an email from an industry participant two weeks ago pointing out that the BOEMRE web site listed only four job openings in the Gulf Coast region – one IT specialist, two interns and one engineer. Last week, the listings had doubled to include two IT people, two interns and four engineers and inspectors. At that recruitment pace it will take a while before 200 new engineers and inspectors are hired and trained.

Director Bromwich said that there would be no blanket extension but rather they would be taken up on a case by case basis

At the end of his prepared remarks, Director Bromwich answered two questions posed by the session chairperson. We assume that these questions had been previously prepared. Then the session was opened up to questions from the audience. The first question was somewhat unfriendly, although not presented that way, but its essence rested on certain premises that Director Bromwich took issue with. The more insightful question involved the extension of leases due to the moratorium. Director Bromwich said that there would be no blanket extension but rather they would be taken up on a case by case basis. The determination would be whether the moratorium actually delayed drilling on the lease. So while all drilling could be stopped by the moratorium, not all leases would be extended. Although we don't expect Todd Hornbeck and his team to be leading the charge to the courthouse on this issue, we certainly expect some producer will take the government to court over the inequity of this action.

After taking the two audience questions, Director Bromwich left the podium and exited by going behind the stage

After taking the two audience questions, Director Bromwich left the podium and exited by going behind the stage. We were taken aback by this arrogant display by an industry regulator, but viewed it as part of the message he was delivering – we are here to regulate you and as such we will be judge and jury, which means we cannot mingle.

If you want to chill oil industry spending, create an environment where no one knows the rules

We may be proven wrong, but it is our belief that Director Bromwich's arrogant appearance at the NOIA meeting signals a more adversarial relationship between BOEMRE and the industry. Clearly we are only just beginning to see the new offshore drilling and safety regulations. But it was clear from Director Bromwich's comments that more regulations are coming and they have yet to be written. If you want to chill oil industry spending, create an environment where no one knows the rules. We haven't even addressed the impact on offshore activity from higher producer liability limits and other rules that will limit the number of oil and gas companies that can operate in the Gulf of Mexico. It is hard to see any quick return to offshore activity levels that approach those that existed before the Deepwater Horizon disaster. We see at best a long, slow recovery in Gulf of Mexico activity.

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