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ENERGY INVESTMENT BANKING

MUSINGS FROM THE OIL PATCH

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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

Seeing Disconnect Between Fundamentals And Share Prices

A share's value is a reflection of the market's perception of the company's future earnings potential

One of the more interesting phenomena of the investment world, and often puzzling to the general public, is how company share prices often do not reflect the current fundamental business trends. This reflects that a share's value is a reflection of the market's perception of the company's future earnings potential. Obviously, a company's future earnings will be related to expected business activity and profitability. The investment research firm Bespoke Investment Group called attention to this phenomenon with its recent declaration that energy shares had entered a new bull market phase. How can it be possible given recent earnings releases by energy producers and oilfield service companies that presented dismal results and bearish industry outlooks and regarding their own future earnings?

Low oil prices have undercut the fundamentals of these development plans

For the third quarter of 2015, energy companies uniformly announced sharp declines in their earnings, both sequentially and in a year-to-year comparison, assuming they had any earnings to report. One reason why many companies were reporting massive losses for the quarter was because they were forced to address the carrying value of assets on their balance sheets. Bringing these asset values into line with their current worth, in light of the lower commodity prices, dictated write-downs. At the same time, many companies were re-sizing their businesses for lower levels of future cash flow generation and subsequently less reinvestment in their businesses. This often means reducing staffing along with other cost reduction steps. Companies were also being forced to face the mountains of debt they have accumulated in recent years after over-spending their cash flows in order to develop their shale assets that were anticipated to produce a bonanza of cash once completed. Unfortunately, low oil prices have undercut the fundamentals of these development plans.

Oilfield service companies have been forced to downsize their workforces and address their debt loads

For the oilfield service industry, forced reductions in exploration and production company capital spending meant lower drilling, well completion and workover activities. That translated into fewer drilling and service rigs working meaning fewer field workers were needed. Lower oilfield activity also backed up into the industry's capital equipment sectors as fewer new drilling rigs and other units were needed, less equipment had to be repaired, and demand for consumable products fell in concert with the reduced activity. Much like their customers, oilfield service companies have been forced to downsize their workforces and address their debt loads in an attempt to generate positive cash flows in order to sustain their downsized operations until the next business upturn arrives.

A recent drilling rig forecast calls for a lower average number of rigs operating in 2016 versus 2015

Many industry forecasters recently have revised their earlier projections for oilfield activity and spending for the balance of 2015 and all of 2016. Next year, the forecasters see that in the two main global oilfield markets of Canada and the United States, energy industry capital spending will fall by 10%-15% after dropping 25%-30% in 2015 from 2014's levels. A recent drilling rig forecast calls for a lower average number of rigs operating in 2016 versus 2015, but because this organization expects sharply higher oil and natural gas prices during the second half of 2016, it expects the Canadian and American drilling rig counts to be meaningfully higher in 4Q2016 versus 4Q2015. While this would be a welcomed scenario, the strength of the rig count recovery projected during the second half of 2016 is highly dependent on the higher commodity price outlook. Without a further reduction in North American oil and gas output and a continued strengthening in global energy demand, there might not be any rig count recovery, let alone a healthy one.

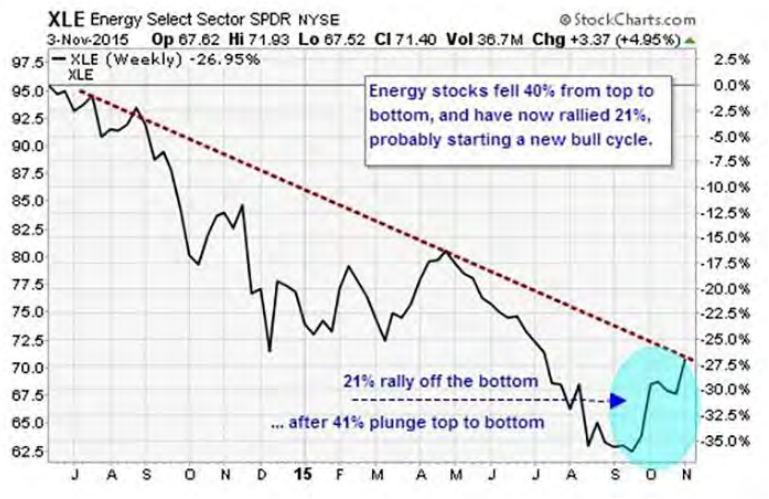
Bull markets are defined by investment professionals as a 20%+ rise in a stock or industry price that was preceded by a 20%+ decline

The Bespoke Investment Group's call for a new bull market for energy is based on the performance of the Energy Select Sector SPDR (XLE-NYSE), a chart of which is displayed in Exhibit 1 (next page). The chart shows the XLE index's performance over the past 60 weeks. The period stretching from June 2014 to August 2015 produced a decline in the XLE index of 41%. From that August low until November 3rd, the XLE index has climbed 21.3% exceeding the traditional measure of a bull market. Bull markets are defined by investment professionals as a 20%+ rise in a stock or industry price that was preceded by a 20%+ decline.

The rally in energy stocks, which has just broken through the downtrend line, has been under way for 70 calendar days

We thought it would be interesting to see what was happening to the industry fundamentals as reflected by the trend in oil prices during the bear market for energy stocks and what happened when the stocks bottomed and began their rally. In Exhibit 2 (next page), we plotted the trend in the futures price for crude oil as reported by the NYMEX exchange from the start of August 2015 through November 3rd. According to the Bespoke Investment Group, the rally in energy stocks, which has just broken through the downtrend line, has been under way for 70 calendar days. That means that the rally started on August 25th. On that day, the futures price for oil closed at

Exhibit 1. Energy Bull Market Starts After Deep Bear Market

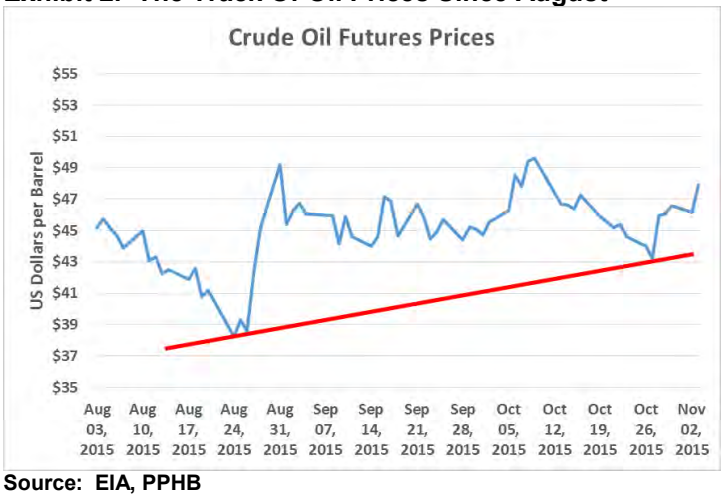


Source: Bespoke Investment Group

The trading suggested a bottom had been reached

$39.31 a barrel. The day before, August 24th, the oil price closed at $38.24 a barrel, which turns out to have been close to the absolute low oil price for this down-cycle. The day after the official start of the energy stock bull market, the oil price closed at $38.60 a barrel, but more important, it did not fall below the low of $38.24 a barrel established on August 24th. The trading suggested a bottom had been reached.

Exhibit 2. The Track Of Oil Prices Since August



Source: EIA, PPHB

That support line was recently touched in late October and the oil price bounced off it

In the chart, we have drawn a support line for oil prices that connects the two low prices in August. That support line was recently touched in late October and the oil price bounced off it. It is interesting to note that after the oil price retested the low price of August 24th, the price went up sharply until the end of August when it reached $49.20 a barrel. The price then corrected and bounced

around $45 a barrel until it reached a new low at mid-September, a low that was not retested until the oil price decline at the end of October. That mid-September date proved significant as it marked the point at which the rally in the energy stocks began to climb as shown in the chart of XLE prices. (The current oil price drop still has it above the support line.)

The median bull market for energy stocks has lasted 888 calendar days, or one and a half months shy of three years in duration

So what is the significance of Bespoke Investment Group's determination of a bull market for energy stocks? They prepared a chart, shown in Exhibit 3, listing all the bull and bear markets for energy stocks during the past 35 years. What their research shows is that the median bull market for energy stocks has lasted 888 calendar days, or one and a half months shy of three years in duration. The median gain for bull markets was 65.3%. Based on the performance of the current bull market – 70 calendar days and a 20.3% gain – there remains substantial upside for energy stocks over approximately the next 27 months assuming this bull market reaches the median bull market duration.

On the downside, the median energy bear market lasted for 127 days and produced a 27.5% loss. The most recent bear market for energy stocks lasted 428 days and generated a shockingly large 41.3% loss. Unfortunately, the Bespoke Investment Group does not show us how energy stocks performed during the longest and most devastating decline for the energy business – the 1981-1987 period.

Exhibit 3. History Of Energy Bull And Bear Markets

S&P 500 Energy Sector Cycles				
Cycle	Start	End	Change	Days
Rally	9/11/89	5/1/98	154.1%	3154
Decline	5/1/98	8/31/98	-23.8%	122
Rally	8/31/98	5/18/01	58.4%	991
Decline	5/18/01	9/26/01	-26.6%	131
Rally	9/26/01	4/2/02	24.5%	188
Decline	4/2/02	7/23/02	-29.6%	112
Rally	7/23/02	5/20/08	308.2%	2128
Decline	5/20/08	10/27/08	-49.9%	160
Rally	10/27/08	11/4/08	24.9%	8
Decline	11/4/08	11/20/08	-22.4%	16
Rally	11/20/08	1/6/09	26.5%	47
Decline	1/6/09	3/5/09	-25.8%	58
Rally	3/5/09	4/29/11	96.2%	785
Decline	4/29/11	10/3/11	-28.4%	157
Rally	10/3/11	6/23/14	72.1%	994
Decline	6/23/14	8/25/15	-41.3%	428
Rally	8/25/15	11/3/15	21.3%	70
		Median Rally	65.3%	888
		Median Decline	-27.5%	127

Source: Bespoke Investment Group

The current energy industry downturn, on the basis of fundamentals, has often been compared to that 1980s downturn, but our memory is that the energy stocks began to perform better well before the industry's fundamentals showed improvement.

The unanswered question is does a bull market in energy stocks signal that we are about to reverse the industry's fundamental performance, which will lead to substantially higher activity?

Importantly, a bull market for energy stocks does not mean that the fundamentals are going to turn around, although we have to believe that in this case the stock price move reflects an improvement. It suggests that the domestic oil output, which has begun falling, will decline further. It also probably means that global energy demand will continue to climb as reflected by the statistics of the International Energy Agency and the Energy Information Administration. The unanswered question is does a bull market in energy stocks signal that we are about to reverse the industry's fundamental performance, which will lead to substantially higher activity? In our view, energy stocks can continue to outperform while industry capital spending and oilfield activity remain depressed. However, once we restore a better balance between oil and gas supply and demand, this does not necessarily mean a jump in new well drilling as there are substantial volumes of new output that could come from completing the large inventory of drilled-but-uncompleted oil and gas wells. In other words, the better energy industry outlook suggested by improving energy stock prices may only mean that the industry's fundamentals may only moderately improve over the next few years.

Keystone Saga Ends: Is This Really The End?

The rejection killed the 7+ year saga of the pipeline, which had morphed into the poster child for the anti-fossil fuel movement

Just over a week ago, President Barack Obama announced that he had rejected the application by TransCanada Inc. (TRP-NYSE) to build the final segment of the Keystone XL pipeline that would bring Canadian and U.S. oil to the Gulf Coast refining complex. The rejection covered that section of the proposed pipeline that would cross the U.S.-Canada border. The rejection killed the 7+ year saga of the pipeline, which had morphed into the poster child for the anti-fossil fuel movement. President Obama, in his statement, attempted to strike a presidential pose of seriously weighing the positives against the negatives of the pipeline's role in the U.S. economy and the global climate change debate.

President Obama said that "this pipeline would neither be a silver bullet for the economy, as was promised by some, nor the express lane to climate disaster proclaimed by others."

In attempting to strike his pose, Mr. Obama stated that the public debate "has occupied what I, frankly, consider an overinflated role in our political discourse." He characterized the cases on both sides of the issue as overstated. President Obama said that "this pipeline would neither be a silver bullet for the economy, as was promised by some, nor the express lane to climate disaster proclaimed by others." After establishing his credentials as a "fair" judge of the merits of the project, Mr. Obama then went on to make a strong case against the benefits of the pipeline for the U.S. economy and its citizens, and conveniently misstated numerous facts.

Exhibit 4. Keystone XL's Proposed Route

Source: TransCanada

Keystone was a "shovel-ready" project, which would certainly would help in today's energy sector, but more importantly, this was an infrastructure project financed by private money rather than government spending

First and foremost, President Obama dismissed the employment impact of building the pipeline. He said that a better strategy would be for Congress to pass a bipartisan infrastructure bill "that, in the short term, could create more than 30 times as many jobs per year as the pipeline would." Hummm! Is that like his $800 billion stimulus bill with its "shovel-ready" projects that several years later President Obama acknowledged had never existed? Keystone was a "shovel-ready" project, which would certainly help in today's energy sector. But more importantly, this was an infrastructure project financed by private money rather than government spending. The timing of Mr. Obama's announcement coincided with a very positive report on the state of the U.S. labor market. That report was much better than anticipated, which makes one wonder whether the President would have made his announcement had the October jobs report mirrored the shockingly weak reports of the prior two months.

President Obama went on to highlight two other considerations that building the pipeline wouldn't help - lowering gasoline pump prices for American consumers and increasing America's energy security.

Bringing 830,000 barrels per day of Canadian oil sands and Bakken oil (a conveniently ignored fact by the President) to the Midwest and Gulf Coast refining centers, along with the Houston port, offered the potential for a substantial reduction in the roughly four million barrels per day of oil imported into the U.S. from non-Canadian locations

Yes, gasoline prices are low today, primarily due to the fall in global oil prices that has been helped by the dramatic increase in U.S. oil output driven by the shale revolution and hydraulic fracturing, all achieved without the support of the Obama administration and while over-coming hurdles put in place by the government. Bringing 830,000 barrels per day of Canadian oil sands and Bakken oil (a conveniently ignored fact by the President) to the Midwest and Gulf Coast refining centers, along with the Houston port, offered the potential for a substantial reduction in the roughly four million barrels per day of oil imported into the U.S. from non-Canadian locations. The Keystone XL volumes would represent nearly 20% of that volume, but maybe more important, the oil sands volumes could displace Venezuelan heavy crude oil currently being processed in Gulf Coast refineries and helping to support a repressive political regime – a human rights situation that the Obama administration seems to ignore.

We are sure that President Obama wishes there was a Nobel Prize for Climate, as he isn't likely to win the Nobel Peace Prize a second time

After outlining what he felt Keystone wouldn't do for America, Mr. Obama went on to highlight the progress the country is making in boosting its energy efficiency and reducing its carbon emissions, largely through the development of new clean energy technology and regulation. The defining rationale for the President's decision was summed up in the following comment: "America is now a global leader when it comes to taking serious action to fight climate change. And frankly, approving this project would have undercut that global leadership. And that's the biggest risk we face -- not acting." We are sure that President Obama wishes there was a Nobel Prize for Climate, as he isn't likely to win the Nobel Peace Prize a second time.

Given President Obama's claim that climate change is the leading threat to the world, we wonder how that view stands following Friday's terrorism in Paris. We also wonder how many environmentalists will decide not to show up at the UN conference on climate change in Paris.

By October 2010, then-Secretary of State Hillary Clinton said the Obama administration was "inclined" to approve the pipeline

For environmentalists, the Keystone XL saga is over. But is that truly the case? People forget that TransCanada and its crude oil shippers (people forget that TransCanada doesn't own the oil it will ship) have fought for the right to build this pipeline for over seven years. The first application was filed by TransCanada in September 2008. By October 2010, then-Secretary of State Hillary Clinton said the Obama administration was "inclined" to approve the pipeline, which motivated the environmental movement to protest and elevate its attacks on Keystone. About 10 months later, the State Department released its first final environmental review of the project, which concluded that Keystone would not add significant amounts of greenhouse-gas emissions to the atmosphere as claimed by the environmentalists.

Exhibit 5. How Canadians View Obama's Decision

Source: ***Globe and Mail***

The delay was designed to help the President and his party mobilize the environmental movement's political donations and get-out-the-vote efforts for his re-election

As the Keystone project approval appeared to be making progress, legal challenges developed in Nebraska that resulted in changes to the pipeline route. As these issues were being resolved, in November 2011, President Obama said he wouldn't make a final decision on the pipeline construction permit application until after the 2012 election since the new pipeline route needed to be selected and approved by the states it would transverse. The delay was designed to help the President and his party mobilize the environmental movement's political donations and get-out-the-vote efforts for his re-election. However, Congressional Republicans moved to pass legislation forcing the President to make a decision on the application within 60 days after he signed the legislation. Mr. Obama rejected the permit in January 2012 and suggested that TransCanada could reapply, which it did four months later.

About six months later, the State Department issued its second environmental review confirming that Keystone would not negatively impact the environment

In a high-profile climate speech in June 2013, President Obama laid down the standard against which he would judge the Keystone application. It would only be approved if the pipeline would not "significantly exacerbate" climate change. About six months later, the State Department issued its second environmental review confirming that Keystone would not negatively impact the environment. Hopes were raised that Mr. Obama would now approve Keystone, but politics in Nebraska intruded when a country judge ruled that the law under which Keystone's route had been approved by the state's governor was unconstitutional. This forced an appeal in which the Nebraska State Supreme Court overturned the lower court verdict in January 2015. In early February 2015, the State Department set a deadline for the eight government agencies that had to weigh in on the pipeline's approval to raise any

objectives. The very next day, the Environmental Protection Agency said that the pipeline's approval decision should be evaluated against a scenario of its need in light of the current low oil prices. In Nebraska, TransCanada was battling landowners over eminent domain to secure access to the property for building the pipeline. After failing to secure access, the company in September 2015 shifted its strategy and elected to adopt the recommended state review process. At this point, with the pipeline winding its way through the new approval process in Nebraska, hopes were raised that a final approval decision would soon be forthcoming.

According to Senator John Hoeven (R-ND), TransCanada was contacted on Friday, October 30th by the State Department asking if the company would withdraw the application

Setting the stage for the final act was the growing pressure on the administration from the environmental movement to reject Keystone prior the start of the UN climate change conference in Paris due at the end of November. Even with the Nebraska approval process underway, Keystone supporters and TransCanada officials began to sense that a rejection decision would soon be announced. According to Senator John Hoeven (R-ND), TransCanada was contacted on Friday, October 30th by the State Department asking if the company would withdraw the application. When the company said no, the State Department then asked if it would consider requesting a pause in the permit approval process, although there is no known procedure for this step under the law. Our sources tell us that the request actually came directly from the White House. After consideration, TransCanada requested a pause in the approval process in a letter sent to the State Department on Monday, November 2nd. The amusing aspect of this saga was that the next day, White House Press Officer Josh Ernest expressed shock that TransCanada had asked for the pause, which was denied, as expected, on Wednesday. On Friday, President Obama received Secretary of State John Kerry's recommendation that Keystone XL was "not in the best interests of the nation" and then announced his decision to deny the pipeline permit application. The timing of the announcement was keyed to the start of the ministerial discussions over the language for the draft policy statement to be issued at the close of the UN climate change conference. By rejecting the pipeline, President Obama was attempting to establish his leadership (legacy) position prior to the start of the conference. Of course, the recent revelation by China that its coal consumption was much higher than it had ever admitted, also raising doubts about the accuracy of its carbon emissions data, undercut its emissions agreement with the U.S. This revelation reconfigures the agenda for Paris, which may be China's way of assuring that no serious restrictions will emerge from Paris, much as has happened with all the climate conferences since Kyoto in 1997. The outcome of the Paris conference is also overshadowed by Sec. of State Kerry's acknowledgement that the U.S. would only be able to agree to a policy and not a treaty, since Congress will not approve a climate treaty. The French have challenged the validity of that position heading into the conference, but we now have a new dynamic of terrorism intruding on the negotiations.

The net result is that the oil can still get to the Gulf Coast, although releasing substantially greater carbon emissions and thus greater environmental damage

We have yet to hear from TransCanada, which issued a statement following President Obama's decision that it was considering all its options. Clearly, there are options under the North American Free Trade Act (NAFTA), but we don't know whether that would require the support of the new Liberal Canadian government headed by environmental-leaning Prime Minister Justin Trudeau. We wonder whether the American oil company shippers committed to Keystone for moving their oil sands output to the U.S. have a case under the U.S. Constitution's "takings" clause. Another option might be to build the pipeline sections close to the border and then either truck or rail the oil across, an act that does not require any U.S. government approvals. The net result is that the oil can still get to the Gulf Coast, although releasing substantially greater carbon emissions and thus greater environmental damage.

What this means is that the Keystone saga is not over yet, and the likely outcome will be worse for the public than if the pipeline had been approved. The politicization of the approval process, something President Obama created, should be a signal that in the future, all energy legislation will be decided in favor of popular environmental claims, even if their facts are wrong. The energy industry likely can kiss goodbye any hopes of securing oil export authority, approval of East Coast offshore drilling, or support for Arctic drilling.

Texas Wind Power, Chapter Two – The Future Draws Near

The challenge for the grid is that wind power is generally at its strongest during the night when power demand is lowest.

In our last *Musings*, we wrote of the unique characteristics of the Texas electric power market and how they enabled electricity produced from wind to have a negative price. Briefly, the condition that facilitates this scenario is that the state is largely a power-market island with virtually no interconnections with neighboring multi-state power markets. As a result, all the power generated within the state and delivered to the state's grid operator – Electric Reliability Council of Texas (ERCOT) – must be consumed within the state or lost as there is no way to store it or ship it outside of the state. The second most unique aspect of the state's power industry is that Texas has aggressively promoted the development of wind power, primarily in West Texas where the wind resource is particularly strong. The challenge for the grid is that wind power is generally at its strongest during the night when power demand is lowest. As we highlighted, there was a point during the early fall when wind power exceeded 30% of power consumption and the sellers of that power actually bid at negative prices to ERCOT who buys and distributes all the power. The fact that wind power generators were willing to pay ERCOT to take their power is explained by the operation of the federal renewable tax credit that pays wind power generators 2.3 cents for every kilowatt-hour of power a wind turbine generates for the first ten years of its operation. That $23 per megawatt-hour income overcame the negative $18.75 per megawatt-hour price for power sold to ERCOT.

The Texas electricity industry has an additional advantage over most other electric utilities around the country, which is their heavy investment in smart utility meters

The Texas electricity industry has an additional advantage over most other electric utilities around the country, which is their heavy investment in smart utility meters. This effort started some years ago as a way for the utilities to control their future operating costs while offering customers better controls over their power use. This investment is now contributing to one of the largest experiments in the domestic power industry for shifting power loads, altering people's lifestyles, but saving them money.

Recently, TXU Energy, the retail electricity arm of Energy Future Holdings Corp., a company owned by private equity investors KKR (KKR-NYSE), TPG and Goldman Sachs (GS-NYSE). The same company that traces its roots back to the 1880s when companies founded to provide power to the citizens of Dallas, Texas, and later those living in Fort Worth, Texas, began offering free electricity at night. The TXU retail power plan offers free power between 9 pm and 6 am. To offset the free power, TXU charges customers slightly higher prices for daytime electricity.

The plan is facilitated by smart utility meters enabling TXU to know exactly when and how much power is consumed by its customers

A recent article in the *New York Times* explored the social and business implications of this free power plan. The plan is facilitated by smart utility meters enabling TXU to know exactly when and how much power is consumed by its customers. This information can be used by consumers to manage their electricity consumption by having high power-consuming appliances disconnected during expensive power periods. This was indirectly the thrust of the *NYT* article as it discussed how consumers were treating the nighttime free power – telling visitors they could party all they wanted after 9 pm, or planning to do their laundry and/or run the dishwasher.

The *NYT* article pointed out that the electricity companies are seeking to ease the burdens and costs that the oversupply of wind energy puts on the power grid, e.g., not selling wind power at negative prices during the night because there isn't enough demand. If the shift in power load becomes meaningful, it may reduce the need for new power generation capacity.

The switch enabled the utility to shut off air conditioning units when power demand soared

These power demand experiments have been tried for decades with limited success. For example, in the 1970s and 1980s, Houston Lighting and Power offered a program where they provided a monthly credit to a customer's power bill for allowing the utility to install a switch on the home's air conditioning unit that could be operated remotely by the utility. The switch enabled the utility to shut off air conditioning units when power demand soared. This control was similar to utilities' ability to interrupt power it was supplying to manufacturing plants at a discounted rate in return for this flexibility.

According to Jim Burke, TXU's chief executive officer, "The American consumer wants choice. Consumer choice, with its impacts and benefits, will drive the future of the power industry." He

added that "I think the pace at which it evolves is the unknown." Based on figures from ERCOT, "time of use" plans are growing in popularity in Texas. In June 2013, 135,320 households had enrolled in these plans, but participation had more than doubled in 15 months to 290,328 in September 2014. This gain came even though an estimated 63,000 residences had dropped out of the program.

Customers suggest that these plans are saving them as much as $40 or $50 a month during the peak summer months

The members of "time in use" plans in 2014 represented slightly under 5% of the estimated six million residences in Texas. The issue holding back increased penetration may be the higher daytime costs for power. However, customers suggest that these plans are saving them as much as $40 or $50 a month during the peak summer months. That is not an insignificant savings when monthly electric bills can soar to $400 or more.

Demand management represents another trend reshaping the operation of electric utilities

A senior ERCOT analysts was interviewed in the *NYT* article about the pace of penetration of these "time of use" power plans. As Paul Wattles was quoted saying, "We are still in the formative stages of this. If we can reach critical mass – and 290,000 is already a pretty good number – but if that number started to double or triple, you could start seeing a significant shifting of load, and that is the whole point." The Texas experiment is important for two reasons. One, it could open the door for increased use of renewable power sources such as wind and solar as demand could be managed to better match the supply. On the other hand, demand management represents another trend reshaping the operation of electric utilities. Many of today's utility executives probably look back on the "good old days" for the business when power demand grew 3% a year like clockwork and a CEO's primary responsibility was making sure there was sufficient capacity available and that regulators granted appropriate rate increases. In other words, the "care and feeding" of utility regulators was the CEO's primary responsibility.

Are Investors Missing A Potential Tailwind For 2016 Oil Prices?

Those fears reflect many assumptions about the volume of crude oil imports, refinery demand and the value of the U.S. dollar

As we write this article on Veteran's Day, crude oil prices have fallen below $43, primarily due to fears that the American Petroleum Institute's Tuesday evening estimate for a weekly crude oil inventory build of 6-7 million barrels against the view of experts that there may be a withdraw suggests that domestic oil output is not falling. Those fears reflect many assumptions about the volume of crude oil imports, refinery demand and the value of the U.S. dollar. As Veteran's Day is a federal government holiday, the U.S. Energy Information Administration's report on weekly inventories will not be released until mid-morning on Thursday, either confirming the oil market's fears or refuting the API estimate. (The EIA essentially supported the API with a build estimate of more than four million barrels.)

As we watched the movement of oil prices and listened to the talking heads on CNBC, we reflected on an earlier discussion we had heard

involving Tom Lee, an investment strategist with *Fundstat*. In that discussion, he said that the expected Federal Reserve's hike in interest rates, now anticipated in December, could actually cause the value of the U.S. dollar to fall in 2016, which would certainly be a surprise. A weaker U.S. dollar should be supportive of higher commodity prices, especially crude oil.

When a nation raises its interest rates, money from outside the country wants to come in to capitalize on the higher rate

One might ask how a rise in U.S. interest rates could cause the dollar's value to fall. The traditional economic expectation is that when a nation raises its interest rates, money from outside the country wants to come in to capitalize on the higher rate than available elsewhere. To do that foreign investors have to exchange their currency into the currency of the target country causing its value to rise relative to the currencies being sold.

He identified reasons why the U.S. dollar rally could be approaching an end

We were surprised by Mr. Lee's argument, but intrigued when he said it was based on an examination of interest rate movements and the value of the U.S. dollar over the past 35 years. As we began to investigate this history, we found another report issued by Andrew Garthwaite of Credit Suisse (CS-NYSE). According to Mr. Garthwaite, "Optimism on the dollar is widespread, and our house view is for further dollar strength." He noted that his firm had conducted a survey of its investor clients and found that 70% expected the dollar to continue appreciating over the next 12 months. His report was titled "Where could the consensus be wrong?" He identified reasons why the U.S. dollar rally could be approaching an end. One reason was that he found history was not on the side of the consensus view. He wrote, "The dollar has historically fallen after the first Fed rate hike; indeed, the first rate hike on the last five tightening cycles was associated with the dollar weakening by around 10% over the following three months."

Exhibit 6. Value Of U.S. Dollar And Interest Rate Hikes

Source: ***Business Insider***

For the five interest rate hikes tracked, the value of the dollar fell for roughly the first 80-120 days following the interest rate increase

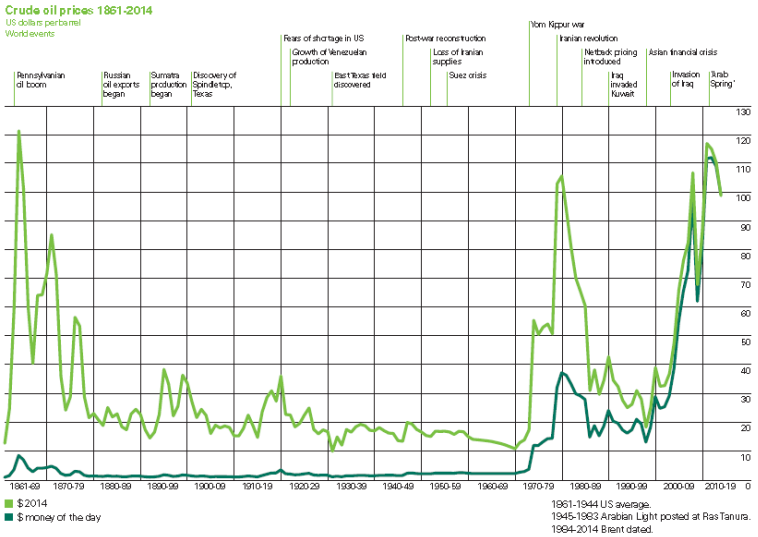
Mr. Garthwaite's report produced the chart in Exhibit 6 on the previous page. The chart shows the movement of the trade-weighted dollar for the 90 days prior to the date of the first interest rate hike and then for the next 260 days. What can be seen is that for the five interest rate hikes tracked, the value of the dollar fell for roughly the first 80-120 days following the interest rate increase. After that period, the value of the dollar rose following the 1999 rate hike, but it took about 180 days for the 1994 and 2004 rate hikes to mirror the 1999's dollar's value pattern. The patterns displayed in this chart would seem to support the claim about what might happen to the value of the U.S. dollar after the Federal Reserve raises interest rates in December. Clearly that argues that what has been a headwind for crude oil prices since the second half of 2014 and all of 2015 so far could become a tailwind during the first quarter of 2016 and possibly for much longer.

Our curiosity in interest rates, the value of the U.S. dollar and oil prices prompted us to look further for patterns, recognizing that they might be coincidental and not reflect causation. We located a chart of 200 years of U.S. interest rates, unfortunately, we couldn't get the data behind the chart in order to plot the interest rates against domestic oil prices. However, by putting the two charts in close proximity we could at least observe if there were any similarities.

Exhibit 7. The History Of Interest Rates In U.S.

Source: ***CNBC***

Exhibit 8. History Of Oil Prices In Current And Inflated Dollars

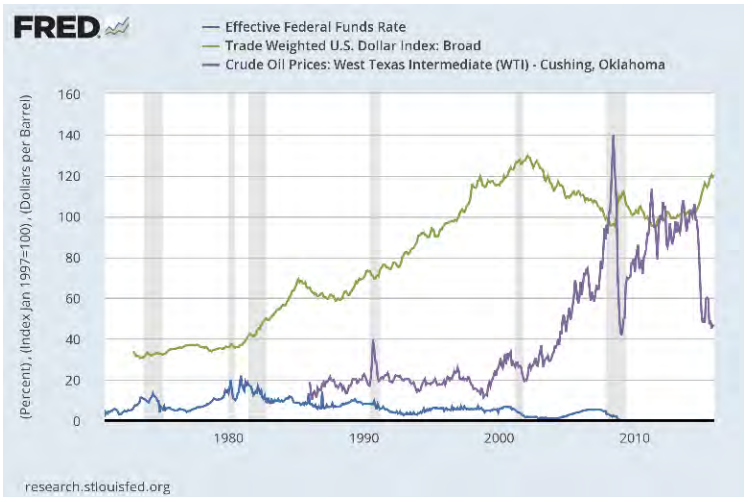


Source: BP

If falling interest rates was supportive of a long-term weakening of the value of the U.S. dollar, the general rise in oil prices is a manifestation of that support

The purpose of the chart in Exhibit 7 on the previous page was to demonstrate that we were ending a very long period of falling interest rates, but if falling interest rates was supportive of a long-term weakening of the value of the U.S. dollar, the general rise in oil prices is a manifestation of that support. To test this relationship, we tapped the St. Louis Federal Reserve's statistical data base and constructed a chart from 1970 to November 11th showing the federal funds rate (short term interest rates), the value of the U.S. dollar and domestic oil prices.

Exhibit 9. Interest Rates. Dollar Value And Oil Prices



Source: St Louis Fed, PPHB

When we examine the chart in Exhibit 9, we would point out the long-term decline in short-term interest rates from 1981 to 2003.

As interest rates remained near zero, the value of the dollar remained fairly stable and oil prices traded in a relatively narrow range until the dollar began strengthening and oil prices collapsed in late 2014

During the same time period, the value of the U.S. dollar was strengthening, but when interest rates reached near zero, the value of the dollar began falling. The price of oil started rising after the 1998 Asian currency crisis and then continued rising until the start of the financial crisis in 2008 at which point the value of the dollar rose while oil prices collapsed along with oil demand. After a brief rally in the value of the dollar during 2008-2009, interest rates fell to zero and oil prices began climbing. As interest rates remained near zero, the value of the dollar remained fairly stable and oil prices traded in a relatively narrow range until the dollar began strengthening and oil prices collapsed in late 2014.

A surprise in 2016 could be that a falling U.S. dollar value becomes a tailwind for higher oil prices

After examining all these charts, we are left with the impression that interest rates and the value of the U.S. dollar are factors in the determination of crude oil prices. Exactly how much influence they have, and whether they are a determinant or merely a coincident indicator is very difficult to fathom. What we do believe is that Mr. Garthwaite's report asks the correct question about interest rates and the value of the dollar. A surprise in 2016 could be that a falling U.S. dollar value becomes a tailwind for higher oil prices aiding the impact of lower U.S. shale oil output.

How Important Is Technology For Renewables Energy Use?

The breakthrough could enable rechargeable super-batteries that contain five times more energy in a given space compared to today's best rechargeable batteries

A research paper published in the journal *Science* by the Grey Group, a team of 35 scientists based at Cambridge University and headed by chemistry professor Clare Grey, announced a breakthrough in battery technology. The breakthrough could enable rechargeable super-batteries that contain five times more energy in a given space compared to today's best rechargeable batteries, greatly extending the range of electric vehicles and potentially transforming the economics of electricity storage. The battery technology is based on the development of lithium-air batteries.

The two major hurdles for buyers of electric vehicles is the range the vehicle can travel before needing to be recharged along with the time required to recharge it

While Professor Grey acknowledges that her research has not overcome all of the practical problems of the technology, particularly the chemical instability that led to a rapid fall-off in performance of the lithium-air cells demonstrated previously, it has demonstrated the capability of generating more power per unit and up to 2,000 recharges. One of the drawbacks compared to lithium-ion rechargeable batteries is the time necessary to charge the battery, a concern to buyers of electric vehicles. The two major hurdles for buyers of electric vehicles is the range the vehicle can travel before needing to be recharged along with the time required to recharge it. Finding a recharging facility is also a headache, unless the vehicle owner is returning home where their recharging facility is located.

Professor Grey is hopeful that the lithium-air cells in the battery will be able to power an electric vehicle that could travel between London and Edinburgh, some 414 miles, or twice the maximum distance electric vehicles with lithium-ion rechargeable batteries can

travel. Additional advantages of lithium-air cells is that the batteries will be lighter besides providing five times the power of traditional rechargeable batteries.

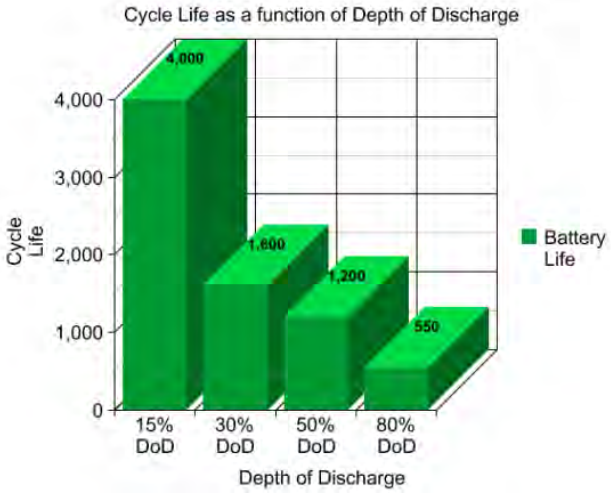
By changing the chemistry somewhat, the Grey Group hopes to make the recharging process more controllable

The basic chemistry underlying lithium-air batteries is relatively simple. The cell generates electricity by combining lithium with oxygen to form lithium peroxide. It is recharged by applying an electric current to reverse the chemical reaction. A critical challenge is getting these reactions to take place reliably over many recharging cycles. By changing the chemistry somewhat, the Grey Group hopes to make the recharging process more controllable. By converting lithium peroxide to lithium hydroxide, they had a compound that was much easier to work with. They then added lithium iodide to the mix and made a very porous electrode from graphene, a form of carbon discovered 12 years ago at Manchester University in England. This porous electrode becomes "fluffy," which is how the weight of the battery is reduced while also increasing the surface area that facilitates the increased charging capacity.

The number of cycles is a function of several variables, in particular, the temperatures in which the vehicle (battery) is operated and the amount of the battery capacity used before it is recharged

According to the Grey Group's article, the rechargeable battery they have developed is 90% efficient. They also believe it can be recharged 2,000 times. So how does that compare with existing lithium-ion batteries? According to some research we found, the number of cycles is a function of several variables, in particular, the temperatures in which the vehicle (battery) is operated and the amount of the battery capacity used before it is recharged. A document from a leading electric vehicle battery supplier suggested that its batteries could get close to 9,000 cycles at 1°C (33.8°F) based on an extrapolation of other data. At 2°C (35.6°F) the battery would get 4,000 cycles, but only 3,000 cycles at 3°C (37.4°F). These estimated recycles are based on 100% depth of discharge and returning to 80% of remaining battery capacity.

Exhibit 10. Shorter Trips Better For Batteries



Source: ***greencarreport.com***

The chart in Exhibit 10 on the previous page shows the sensitivity of the depth of battery discharge and the recharge cycles. In other words, if you have an electric vehicle and drive it short distances, such as the typical driver's commute of under 25 miles a day, and then charge it up every time, the number of cycles will be large. The inverse is also true, suggesting that an electric vehicle is not the best choice for long-distance trips.

Professor Grey said it will likely require another decade of research work in order to turn the battery into a commercial product for a vehicle and for grid power storage for renewable power sources

Despite all the positive commentary about this battery technology breakthrough, Professor Grey said it will likely require another decade of research work in order to turn the battery into a commercial product for a vehicle and for grid power storage for renewable power sources. Other scientists may be working on other breakthrough battery technologies. We know that certain auto manufacturers are working on other power sources for vehicles that will not emit greenhouse gases. The workings of the Corporate Average Fuel Economy (CAFE) standards negotiated by the Obama administration and the auto manufacturers several years ago allowed electric vehicles (non-carbon emitting) to be counted twice in determining each auto company's compliance with the standard. The more non-polluting vehicles the manufacturers can sell, the more traditional internal combustion engine (ICE) vehicles they can also sell. And right now, those ICE vehicles are where the profits are. In the future, we expect the line-up of auto manufacturer vehicles to be largely populated with small, non-polluting vehicles and large ICE-powered vehicles.

Global Oil Inventories And Production Hurt By Weak Economies

Global uncertainty caused by the turmoil in the Middle East and the surge of refugees is overwhelming European countries and could cause future economic weakness

One of the major issues bedeviling the energy business is the problem of growing production outside of the United States and weakening demand. Early in November, the European Commission (EC) published a new forecast pointing to slowing growth in emerging economies. Global uncertainty caused by the turmoil in the Middle East and the surge of refugees is overwhelming European countries and could cause future economic weakness. Shortly after the EC issued its outlook, the Bank of England decided to hold its benchmark interest rate steady signaling that the need to raise borrowing costs in the United Kingdom has receded giving a gloomier outlook for the country's economy. In a speech in Milan last week, European Central Bank President Mario Draghi said his bank would step up its stimulus program while inflation is low.

Germany's top economic advisors have downgraded their outlook for the country's growth in 2016

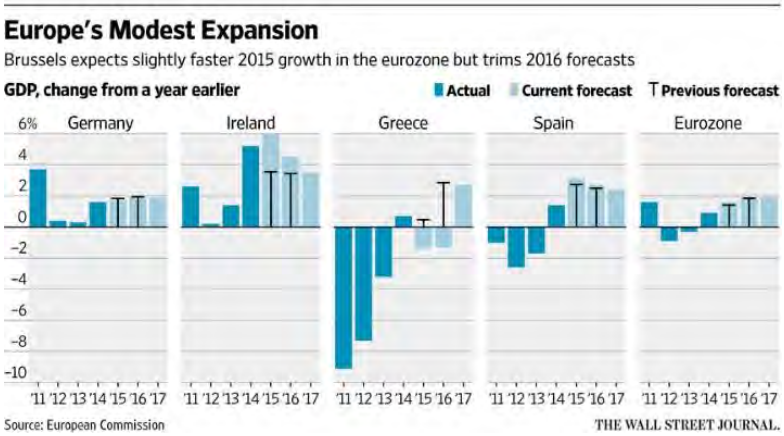
Germany's latest economic report for September showed growing gloom among its manufacturers in what is Europe's largest economy. It was also announced last week that Germany's top economic advisors have downgraded their outlook for the country's growth in 2016. They now see Germany's economy growing only by 1.6%, which is below the government's official projection for 1.8% growth. The reduced growth estimate is due to expectations that exports will be weaker due to global economic softness, especially

for China. The most recent raft of economic data emanating from China supports the view of a weakening global economy, which will reverberate throughout those countries that are export-driven.

Possibly the more troubling forecast is the first look at growth for the Eurozone in 2017, which shows no improvement from 2016's projected growth

The EC forecast puts growth in the 19-nation Eurozone at 1.6% this year, up slightly from the organization's prior forecast in May calling for 1.5% growth. It now predicts 1.9% growth for the region in 2016, up from the 1.8% growth predicted last May. Possibly the more troubling forecast is the first look at growth for the Eurozone in 2017, which shows no improvement from 2016's projected growth. Equally troubling was the data reported last Friday when, according to Eurostat, the Eurozone's gross domestic product (GDP) showed only a 0.3% increase for 3Q2015, which was lower than the growth rate in 2Q2015 and below the forecast of economists. The two largest economies – Germany and France – showed growth similar to the region's average, while Italy posted only a 0.2% growth.

Exhibit 11. Global Growth Appears To Be Slowing



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

Low global economic growth and growing despair among oil producing countries due to low oil prices is setting the world up for a Black Swan event

The lack of healthy economic growth in 2016 and 2017 means that Europe will not be a driver in global economic activity and energy consumption in particular. The actions of the European central bankers who are resigned to having to continue to promote easy money mean that key economies of the world are not growing sufficiently to be able to support higher interest rates without running the risk of them being thrown back into recession. Low global economic growth and growing despair among oil producing countries due to low oil prices is setting the world up for a Black Swan event. By definition, Black Swans are events people cannot predict, so what that event may be is impossible to define, but it will cause a shock pushing the world economy and/or the energy industry into a scenario we cannot anticipate.

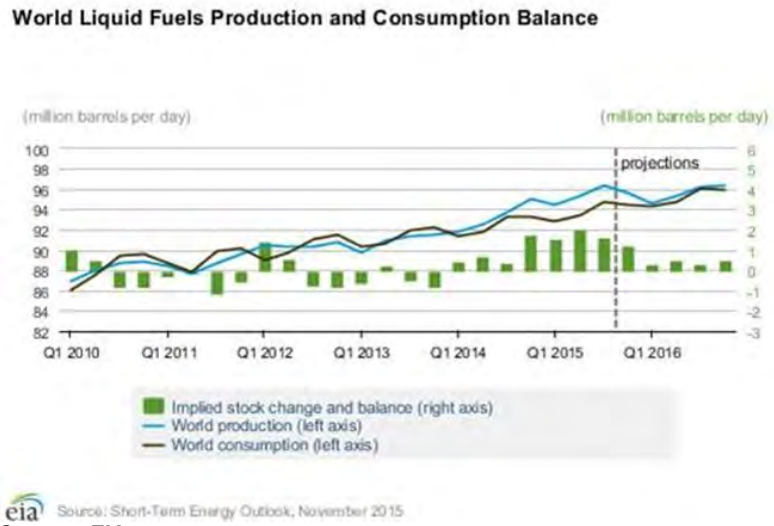
Comments On Recent Readings And Energy News

Crude Oil Demand Up But Growth Slowing

That means that these forecasters continue to anticipate healthy (well above historical trendline) demand increases for 2015 but less robust growth for 2016, which is the troubling outcome

A topic of high interest last week was the release of the November reports issued by the three primary energy forecasting agencies in the world – OPEC, the International Energy Agency (IEA) and the Energy Information Administration (EIA) – showing oil demand projections that are consistent with the agencies' previous forecasts. That means that these forecasters continue to anticipate healthy (well above historical trendline) demand increases for 2015 but less robust growth for 2016, which is the troubling outcome. The least conservative forecaster is the EIA that sees worldwide oil demand growing by 1.4 million barrels a day (mmb/d) in both 2015 and 2016. OPEC and the IEA expect demand growth to be higher in 2015 (+1.5mmb/d and +1.8mmb/d, respectively) than in 2016 (+1.25mmb/d and +1.2mmb/d, respectively). The implications of these demand forecasts is that with U.S. oil output declining along with possibly several other countries, the imbalance between oil supply and demand is on the road to rebalancing. The speed of this rebalancing will dictate the pace of the increase in global oil prices.

Exhibit 12. EIA Sees Oil Market Returning To Balance



Source: EIA

How supply and demand growth impacts the volume of oil inventories is best seen by examining the chart in Exhibit 12. This chart comes from the Short-Term Energy Outlook (STEO) prepared by the EIA every month. The chart shows how the jump in inventories that occurred in 2014's fourth quarter and peaked in the second quarter of 2015 before declining in the third quarter and which is projected to further decline during the next several quarters, will lead to a balancing of supply and demand. This is all seen by

The scenario painted by this chart suggests that as the lines come together and oil inventories shrink, crude oil prices should rise

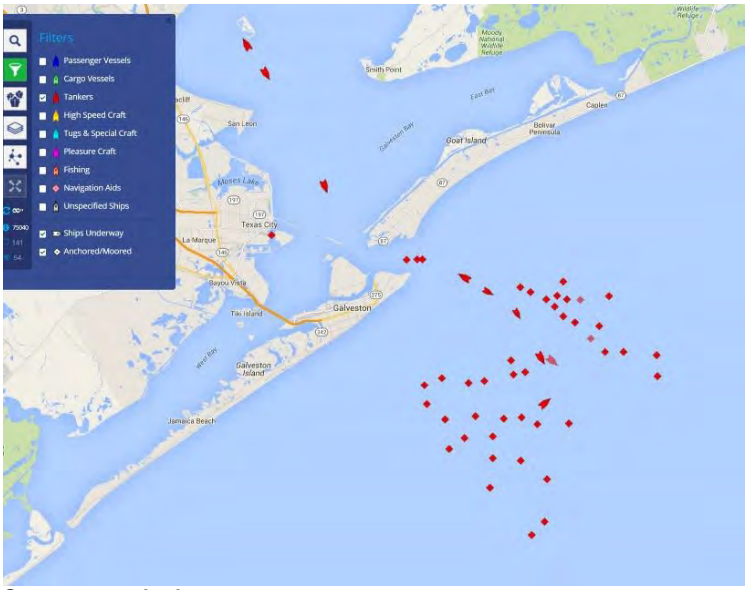
the coming together of the blue (production) and black (consumption) lines that are mirrored by the shrinking of the green bars (changes in inventories that come from changes in supply and demand). The scenario painted by this chart suggests that as the lines come together and oil inventories shrink, crude oil prices should rise. Just how high is impossible to know, but the optimists will say they could soar to $80 a barrel by the fourth quarter of 2016. Other forecasters may assume these lines will not come together as quickly so they see oil prices improving but possibly into the mid- to upper-$50s a barrel.

The Latest Twist In The Oil Tanker Story

People are concerned that these tankers will bring sufficient oil to swamp any growth in oil use and will send oil prices sharply lower

At the end of last week, crude oil prices dropped sharply as questions about the pace of global oil inventory growth coupled with recent cuts in global economic growth forecasts are raising concerns about a lack of storage capacity that will force prices down significantly. On Thursday, the Energy Information Administration (EIA) reported that domestic oil inventories rose by over 4 million barrels, approximately five times the estimates by experts. One aspect of the oil inventory build that went viral on the Internet and throughout the investment community was an article about the increase in the number of oil tankers arriving of the coast of the United States with volumes of Iraqi oil, which has recently stepped up the country's production. There is also concern about the amount of oil that may eventually come from Iran once the sanctions are dropped following the Iranian nuclear agreement. People are concerned that these tankers will bring sufficient oil to swamp any growth in oil use and will send oil prices sharply lower.

Exhibit 13. Oil Tanker Traffic Offshore Texas Coast



Source: ***Zerohedge.com***

The articles circulating on the Internet suggest that the rising number of oil tankers parked off the coast of Texas is a sign of the growing surplus of crude oil

The articles circulating on the Internet suggest that the rising number of oil tankers parked off the coast of Texas is a sign of the growing surplus of crude oil. One article quoted the Houston Pilots, the people who help navigate these ships through the channel from Galveston up to the Port of Houston, saying that there were 50 commercial vessels anchored of which 41 were tankers. As was pointed out, however, there are normally 30 to 40 vessels, of which two-thirds are tankers, or 20 to 27 vessels parked off Galveston. The article was published a day after an Internet story highlighted a two-mile long line of oil tankers hauling Iraqi oil to the west.

According to the data, the wait-time now for a tanker is five days compared to three days last May

The larger number of tanker anchored off Galveston, Texas, may reflect issues with the weather that often limits ship movement into and out of the area's ports. In an attempt to better quantify the impact, the *Associated Press* reported that there were 39 crude oil tankers with a combined capacity of 28.4 million barrels sitting off Galveston, based on shipping data compiled by *Bloomberg*. Last May, similar data showed that there were 30 vessels with 21 million barrels of capacity anchored there. According to the data, the wait-time now for a tanker is five days compared to three days last May. The presentation of the data was used to set up a quote from Matt Smith, director of commodity research at *ClipperData* who said: "It appears that the glut of supply in the global market is only getting worse." That increased the downward pressure on oil prices.

We would note that in the past, a story like this would be used as ammunition to show that the oil companies were holding supplies off the market until oil prices went up

The oil tanker story needs substantially more research than we have time currently. We remind readers that this is a much more complicated story than just a few more tankers idling offshore Galveston. But we were amused about the chart showing the tankers parked offshore Texas. We would note that in the past, a story like this would be used as ammunition to show that the oil companies were holding supplies off the market until oil prices went up. Now these idle tankers are being used to drive down the oil price. My how times have changed!

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