



MUSINGS FROM THE OIL PATCH

March 10, 2020

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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

Summary:

Rhyme Of Oil History Should Be Heard And Studied - Part 10

The current oil industry downturn is tracking the 1980 downturn. With the Covid-19 virus disrupting global economic activity and oil use, oil futures prices signal a 1990s pattern of business that led to the petroleum and oilfield service industries' greatest consolidation phase. Are we on track for a repeat of that consolidation?

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What Will OPEC's Inaction Mean For The Oil Market?

OPEC and its partner Russia are squabbling over whether and how much to cut oil output to prevent a further drop in global oil prices. The standoff among the producers will impact oil and gas drilling in the U.S., putting new pressure on the domestic energy industry to consolidate and restructure.

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Does Super Tuesday Mean Fracking Gets A Reprieve?

The amazing comeback of Joseph Biden in the Democratic Party primaries has given hope that Senator Bernie Sanders' anti-fracking ban will not come to pass. What would happen if that view is wrong? A new report suggests the outcome will not be pretty for the industry, the economy, jobs, and various state revenues.

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Rhyme Of Oil History Should Be Heard And Studied - Part 10

It is not surprising that people are less focused on the development of business and industry cycles than on attempting to decipher the virus' impact on near-term industry earnings prospects

Given the tumultuous second half of February and early March in the commodity and financial markets, driven by the explosion of news about the Covid-19 virus, it is not surprising that people are less focused on the development of business and industry cycles than on attempting to decipher the virus' impact on near-term industry earnings prospects. While not trying to downplay the significance or seriousness of the virus, which has infected over 100,000 people around the globe and caused in excess of 3,000 deaths, this virus' major impact has been on global economic activity. Those who favor looking at long-term trends will point out, the U.S. experiences 25,000 to upwards of 60,000 deaths during each flu season, depending upon how virulent each particular year's virus strain turns out to be. The current season is one of the worst in recent years, having claimed roughly 45,000 deaths so far.

The primary goal of China's leaders is to present a powerful image – economically, militarily and geopolitically – of the country to the outside world. Therefore, 'command and control' measures dictate the government's actions across all aspects of its economy and society. Secrecy is a key policy the government employs to prevent anyone from finding weaknesses in China. When Covid-19 emerged in the city of Wuhan, the government's first instinct was to cover up its existence. Because the virus had a relatively long incubation period, during which time contagious people, unaware of their impending illness, could rapidly and easily spread the disease, the number of cases of seriously ill people jumped by huge numbers daily, going well beyond the capability of the medical profession to control the situation. Clamping down on the free movement of people within the city, and into and out of the city, became a critical tool for controlling the situation. The problem for the Chinese government is that Wuhan is a city of 11 million inhabitants, making it virtually impossible to limit individual interactions without resorting to drastic restrictions. Those restrictions were quickly embraced as the number of sick people escalated daily. The mobility restrictions had to expand as the trajectory of the Covid-19 cases was on track to clash with nationwide celebration of the Lunar New Year, a time when Chinese travel mushrooms.

As the Covid-19 virus metastasized around the world, fears of economic fallout exploded

As the Covid-19 virus metastasized around the world, fears of economic fallout exploded. Locking down cities and regions collapsed airline travel, and in China, it even limited intra-country travel. People unable to go to work has disrupted supply chains globally, often limiting production of final goods in many important industries around the world. The fallout from lower economic activity is hammering the commodity markets, as it appears the disruptions are spreading around the world.

Crude oil has been particularly hard hit, extending the volatility the commodity has experienced in recent months. We began 2020 with

When no further retaliations occurred, oil prices gradually fell to \$50 by the start of February, reflecting the impression that an oil inventory glut was building

WTI at \$61 a barrel, only to see it jump to nearly \$65 a couple of days later in response to the January 3rd killing of Iranian general Qasem Soleimani and a retaliatory missile strike by Iran that had everyone convinced World War III was on the verge of beginning. When no further retaliations occurred, oil prices gradually fell to \$50 by the start of February, reflecting the impression that an oil inventory glut was building. After a brief rally, oil prices again assaulted the \$50 support level, trading at \$49.50, but then steadily climbed back to about \$54 a barrel on February 19th. Since then, there has been intense pressure on oil prices with them trading as low as \$43-\$44 a barrel on the final trading day of February and continuing under pressure as OPEC and Russia attempt to negotiate a production cut to minimize the oil glut.

While no one knows the extent or duration of Covid-19's impact on global economic activity and energy demand, the preliminary thinking is that it will certainly cut growth this year. The best summary of the impact was from RBN Energy in a blog last week in which they set out their thoughts. They concluded their article with the following comments:

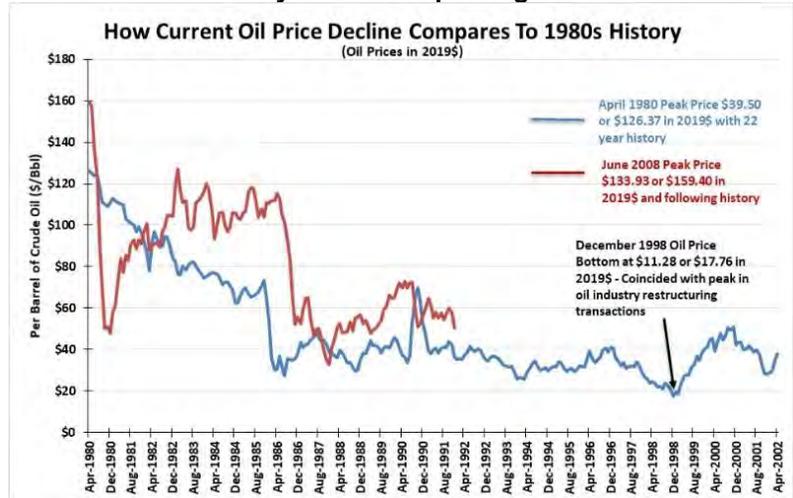
"It's anyone's guess how all this will play out. COVID-19 could blow over in a few months and that we'll look back at March 2020 as a period of paranoia and overreaction. Let's hope so. One thing is for sure, though. The ongoing shocks to energy markets in 2020 will be every bit as powerful as the 2014-15 price crash. We just don't have a clue yet how long it will last or what the long-term consequences will be. Stay tuned."

We are drawn to the RBN Energy comment that the virus impact will be "as powerful as the 2014-15 price crash"

This is probably the best summary of the market's current condition, something that is likely to change not only daily, but quite possibly hourly, depending on the news flow. For the purpose of the historical focus of this downturn versus that of the 1980s and 1990s, the impact from the virus will be a further impediment to a quick recovery for the industry. In fact, we are drawn to the RBN Energy comment that the virus impact will be "as powerful as the 2014-15 price crash." For perspective on what has happened to the oil price since its all-time peak in June 2008 through February 2020, we plotted this recent price history against the previous cycle that saw oil prices, in current dollars, peak in April 1980.

It is eerie how similar the real oil price trajectory has been for the two cycles, even given the difference of the 2008-2009 financial crisis and recession's impact on prices. In the current cycle, the recovery in oil prices from the financial crisis was dramatic, highlighting how much of the oil price decline was due to liquidity issues and fears of the possibility of a global economic depression, which was avoided by the injection of significant financial funds into the economy by nations around the world. What again is eerie is the nearly perfect

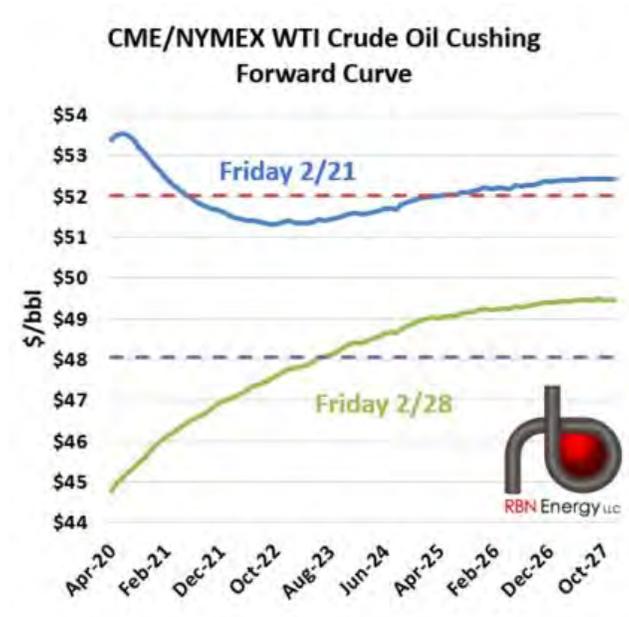
Exhibit 1. Oil Price Cycles Are Repeating



Source: EIA, BEA, PPHB

repeat of the 1985 oil price crash in 2014, and then how similarly oil prices have tracked since they bottomed in those respective collapses.

Exhibit 2. How Oil Price Futures Could Perform



Source: RBN Energy

Crude oil futures prices do not recover to \$48 a barrel until the middle of 2023

In a blog about the impact on oil and gas market from Covid-19, RBN Energy posted a chart showing the futures' forward price curves for crude oil. As the chart shows, crude oil futures prices, as of the end of February (and possibly at the height of investor paranoia), do not recover to \$48 a barrel until the middle of 2023.

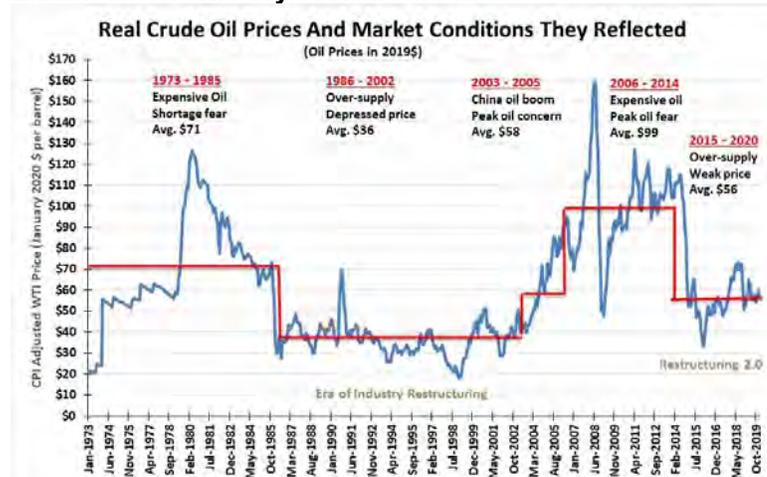
The projected futures price curve suggests a repeat of the 1980s' cycle, at least for oil prices

We must remind readers that seldom do oil price forecasts, especially those for years into the future, ever prove correct

They never return to \$50 a barrel, even by the end of 2027. If that pattern were to come to pass, then the end of 2008 cycle (red line in Exhibit 1 on the previous page) would slide lower (February's average oil price was \$50.56 per barrel) and then remain essentially flat for the next seven years, or the equivalent of going out until 1999 on the chart. In other words, the projected futures price curve suggests a repeat of the 1980s' cycle, at least for oil prices. That scenario would certainly have a significant impact on the oil and gas producing sector, as well as the oilfield service business. None of the impacts would be favorable for companies, although it would likely result in a smaller, but more profitable industry in the future.

After stating how bad things could get for the industry, we must remind readers that seldom do oil price forecasts, especially those for years into the future, ever prove correct. Economic and geopolitical events usually modify the then-current drivers for oil demand and supply, reshaping the future oil price curve. However, one never knows whether the forecasts will be wrong by being too low, or too high. What we are confident about is that the current oil price futures forecast will be wrong; we just don't know in which direction; by how much; or when it will be wrong.

Exhibit 3. The History of Real Oil Prices



Source: EIA, BEA, PPHB

If this price scenario holds through the mid-2020s, then we would be looking at the current low oil price cycle having lasted for 10 years or so

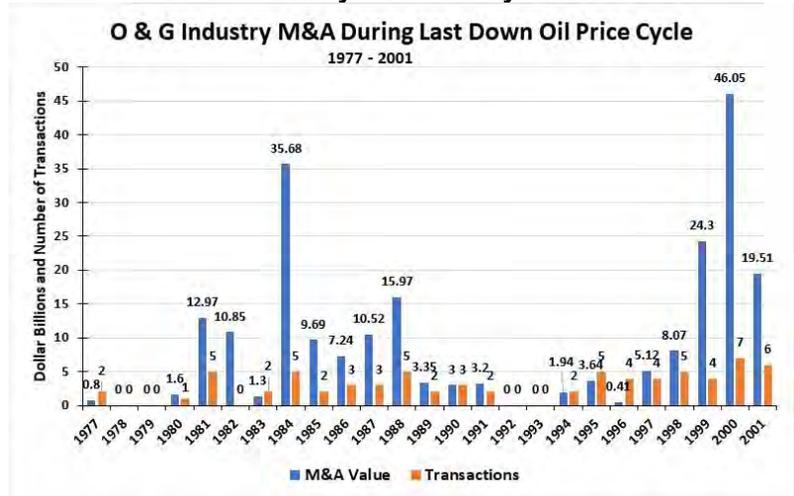
If Covid-19 negatively impacts global oil demand, as it is projected to be doing right now, just how will oil's competitive position among the various fuel alternatives be impacted? If we imagine that crude oil prices remain in the lower end of forecasts, or in the \$50s rather than the \$60s or \$70s, then the 2015-2020 average oil price shown in Exhibit 3 will remain stable for years to come. If this price scenario holds through the mid-2020s, then we would be looking at the current low oil price cycle having lasted for 10 years or so. While that would be a cycle of shorter duration than that of the 1980s-1990s, the financial pressures on oil and gas producers and oilfield

Greater size enables companies to capitalize on operating efficiencies and increased geographic scale, both of which should lead to improved profitability

service companies will be just as intense. The question is whether this cycle will end in the same fashion as the 1990s with a massive industry restructuring that set the stage for the industry’s revival in the 2000s.

Revisiting the 1980s-1990s downturn provides an opportunity to look at the nature of the industry restructuring that occurred. Exhibit 4 shows the number of oil and gas producers involved in mergers and acquisitions, and in a couple of cases the formation of significant joint venture arrangements. What we know about some of the M&A transactions during 1981-1988 is that they were driven by the acquiring company’s desire to increase its critical mass, especially among the universe of integrated oil companies. Greater size enables companies to capitalize on operating efficiencies and increased geographic scale, both of which should lead to improved profitability. Many of these deals marked the conclusion of takeover battles stirred by corporate raiders fueled with capital raised via high-yield debt offerings. These deals often were driven by the chaotic oil market that resulted from the oil price explosion of the 1970s and then the rapid decline that started during the second half of 1980. The OPEC oil price war that culminated in 1985, and which caused oil prices to sink as low as \$9 per barrel, pushed many companies in the industry into bankruptcy and restructuring. What few people realized as they moved into the second half of the 1980s was how long it would take for the oil producing and oilfield service sectors to complete their restructurings.

Exhibit 4. How Oil Industry M&A Has Cycled



Source: various, PPHB

Working from different databases, we have compiled a list of notable M&A transactions during 1980-2001, and then in the more recent cycle extending from 2006 through 2019. In Exhibit 5 (next page), we have listed the producer transactions in black and the oilfield service transactions in red. The four transactions of 1981-1984

Each of these deals enabled the acquirer to become a more substantial company

were the result of failed takeover battles. Each of these deals enabled the acquirer to become a more substantial company, helping them in navigating the subsequent downturn and the industry restructuring phase. They were all accomplished with the acquirer playing the role of a 'white knight' for the targeted company.

Exhibit 5. A History of Energy M&A

| Year | M&A Transaction | Value (\$Bn) |
|------|---|--------------|
| 1981 | DuPont - Conoco | 7.3 |
| 1982 | Occidental - Cities Service | 4.0 |
| 1984 | Chevron - Gulf Oil | 13.2 |
| 1984 | Mobil Oil - Superior Oil | 5.7 |
| 1998 | BP - Amoco | 53.0 |
| 1998 | Exxon - Mobil Oil | 77.2 |
| 1998 | Total - Fina | 12.9 |
| 1998 | Baker Hughes - Western Atlas | 5.5 |
| 1998 | Halliburton - Dresser Industries | 7.7 |
| 1998 | Schlumberger - Camco | 3.1 |
| 1998 | Weatherford Enterra - EVI, Inc. | 2.4 |
| 1999 | BP Amoco - Atlantic Richfield | 26.8 |
| 1999 | TotalFina - Elf Aquitaine | 54.3 |
| 2000 | Anadarko - Union Pacific Resources | 4.4 |
| 2000 | Chevron - Texaco | 35.1 |
| 2001 | Conoco - Phillips Petroleum | 15.2 |
| 2006 | ConocoPhillips - Burlington Resources | 35.6 |
| 2006 | Anadarko - Kerr-McGee & Western Gas Resources | 23.3 |
| 2006 | Statoil - Norsk Hydro | 28.0 |
| 2009 | Suncor Energy - Petro-Canada | 15.9 |
| 2010 | ExxonMobil - XTO Energy | 41.0 |
| 2010 | Schlumberger - Smith International | 11.0 |
| 2011 | BHP Billiton - Petrohawk Energy | 12.1 |
| 2012 | Rosneft - TNK/BP | 55.0 |
| 2014 | Repsol - Talisman Energy | 8.3 |
| 2015 | Suncor Energy - Canadian Oil Sands | 4.6 |
| 2016 | Royal Dutch Shell - BG Group | 52.0 |
| 2019 | Occidental - Anadarko | 57.0 |
| 2019 | Keane Group - C&J Energy Services | 11.0 |

Source: PPHB

Producer M&A activity began to be influenced by the perception that exploration and production (E&P) opportunities in the United States were non-existent and therefore companies needed to increase their size to better compete and operate internationally

From the 1985 oil price collapse until 2000, the oil industry's M&A transactions were driven by bankrupt and financially weak companies being absorbed by stronger companies. However, that restructuring driver disappeared as the industry headed toward the end of the 1990s, and producer M&A activity began to be influenced by the perception that exploration and production (E&P) opportunities in the United States were non-existent and therefore companies needed to increase their size to better compete and operate internationally. An interesting observation was the number of major consolidating transactions in 1998. In fact, within a three-year span, BP, Amoco, Exxon, Mobil, Total, Fina, Arco, Elf, Chevron, Texaco, Conoco and Phillips were all involved in consolidating transactions. All the deals occurred during a

Each transaction, which was often followed by other smaller deals, enabled oilfield service acquirors to broaden its product and service offerings

period when Wall Street oil analysts were calling for the rise of 'supermajor' integrated oil companies as the only way companies would be successful in the changing global petroleum industry.

Another interesting M&A observation, and one that draws little attention in most analyses of the petroleum industry history during this period, is that every one of the major oilfield service companies at that time competed a significant acquisition that significantly reshaped its business. Each transaction, which was often followed by other smaller deals, enabled oilfield service acquirors to broaden its product and service offerings, which was considered critical if they were to successfully support the new supermajors' future international E&P activities.

Much like the Schlumberger/Smith deal, the GE/Baker Hughes deal was designed to create a much larger company with a broader range of services and products offered and markets served

Petroleum M&A in the period immediately prior to the 2014 oil price collapse reflects oil companies beefing up for the expected increase in E&P activity given a world of \$100 a barrel oil. The lone service industry deal in that time period – Schlumberger buying Smith International in 2010 – reflected the difficulty the latter company was having in competing in the global oil industry and the need for the former to gain access to better drilling technology. Another redefining oilfield transaction process began in 2014 but wasn't completed until 2017. Initially, it was a proposed merger between Baker Hughes and Halliburton, which, despite being approved by both companies' shareholders, was challenged by the Department of Justice over anti-trust concerns. The deal was initially valued at \$34 billion, which would have been the largest oilfield service merger in history. As the two companies worked to dispose of competing business units to enable the acquisition to move forward, the downturn impacted the valuations of the units to be disposed and therefore the ability to complete transactions. In 2016, the deal was terminated. Shortly thereafter, General Electric proposed to acquire Baker Hughes in a \$7.4 billion deal involving creating a new company, jointly owned by the respective company shareholders, under the leadership of GE Oil & Gas. Much like the Schlumberger/Smith deal, the GE/Baker Hughes deal was designed to create a much larger company with a broader range of services and products offered and markets served. These qualities were perceived as being very more important given the changes underway in the global oil market, as the industry struggled with the 2014 oil price downturn. The rationale underlying each deal was keyed by the respective strengths of each constituent – Schlumberger and Smith: the shale market and greater international business; and Baker Hughes and GE Oil & Gas: midstream, LNG and offshore markets, besides greater financial strength to compete globally.

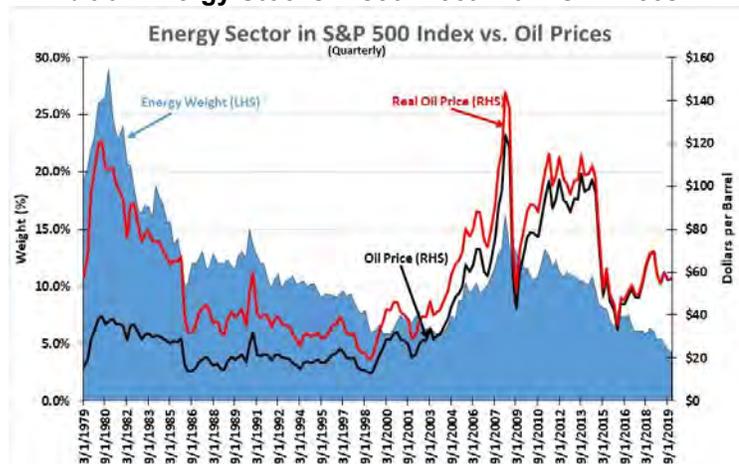
There is little doubt that the petroleum and oilfield service sectors need to consolidate. It is needed for several reasons: 1) to make companies more capital efficient and boost returns; 2) to increase market capitalizations, making companies more relevant in the stock

The history of industry consolidations is that it doesn't happen until there exists greater certainty about the future trajectory for the business

market; 3) to better position companies for the energy transition underway; and 4) to improve balance sheets, capital spending and returns to shareholders. Unfortunately, the drivers behind these needs are not aligned at the present time. The uncertainty about the impact of Covid-19 on the pace of global economic activity and energy demand has clouded the outlook, but the history of industry consolidations is that it doesn't happen until there exists greater certainty about the future trajectory for the business. That isn't present for energy, yet.

We would point out that energy stocks are still among the worst performers in the market, regardless of what oil prices are doing. Exhibit 6 shows the history of energy's weighting within the Standard & Poor's 500 Stock Index versus oil prices. Between 1979 and 2015, the two measures moved pretty much in tandem, although with less linkage evident between 2010 and 2015. Since 2015, the recovery in oil prices has failed to correlate with the performance of energy stocks.

Exhibit 6. Energy Stocks Disconnect From Oil Prices



Source: S&P, EIA, BEA, PPHB

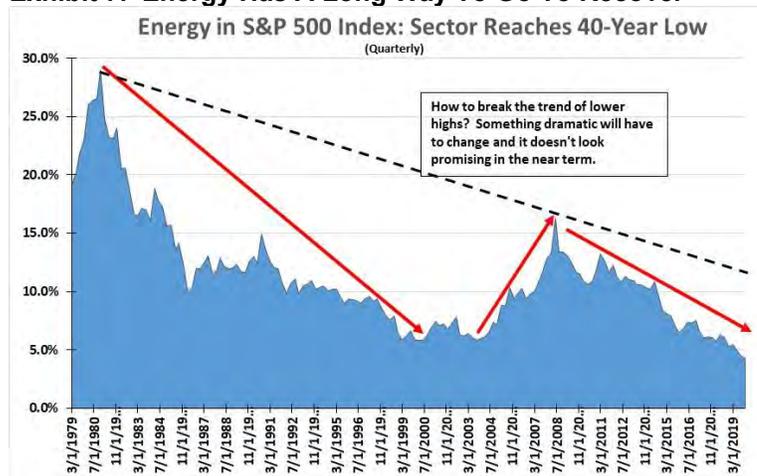
The litany of reasons why investors are shunning energy stocks is long and seemingly endlessly growing

The litany of reasons why investors are shunning energy stocks is long and seemingly endlessly growing. Capital destruction, overspending cash flows on expensive E&P ventures, anemic returns for shareholders, ESG concerns about the fossil fuel business, the encroachment of renewables on fossil fuel's market share, social antagonism toward fossil fuels, and political mandates that will radically alter the future fossil fuel market are some of the reasons why energy shares are being avoided by investors. The list could be expanded, but little would be gained in making our point. Exhibit 7 (next page) shows how far below the long-term trendline for energy sector's weighting the current weighting sits. To attract investors back to energy stocks, major changes for the industry will be needed. Even then, the long-term outlook calls for the industry's future to extend for decades, but it will not be a growth business in

It may require a “tougher skin” to be in the oil business in the future

the traditional sense, or as it has been throughout its history. The industry needs to continue to find and develop new resources in order to sustain current production levels. Energy demand will grow in some geographic areas, while it contracts in others. Managing these industry dynamics will be challenging but rewarding for those who participate, but it may require a “tougher skin” to be in the oil business in the future.

Exhibit 7. Energy Has A Long Way To Go To Recover



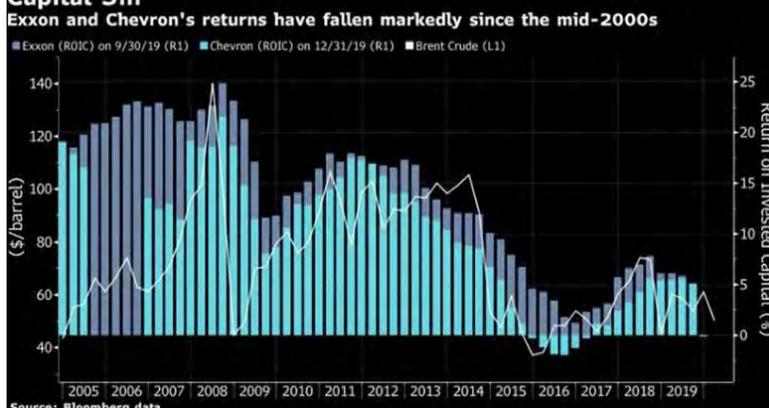
Source: S&P, PPHB

The negative financial performance was attributable to the extensive use of debt to fund dramatic expansion of shale drilling programs as oil prices declined below well costs

What will be critical is for the industry to demonstrate that it can be profitable while continuing to improve its operational measures – finding and developing reserves, increasing or at least stabilizing production, and meeting ESG measures. Exhibit 8 (next page) shows the history of financial returns generated by ExxonMobil and Chevron since 2005. In our last *Musings*, we showed a chart of the financial performance of a representative group of energy companies beginning in the 1970s and extending through 2018. It showed that the industry’s financial performance was negative during part of the recent downturn, something that did not happen in the 1980s downturn. The negative financial performance was attributable to the extensive use of debt to fund dramatic expansion of shale drilling programs as oil prices declined below well costs. That dynamic is changing.

The demand from investors has been for companies to demonstrate greater capital discipline – less debt on the balance sheet, more measured capital spending, sustaining production with tempered capex spending programs, and returning more money to shareholders. The industry has begun to show improved financial results, but that progress will likely be upset by the recent decline in oil prices due to Covid-19’s impact on oil demand. Once oil prices stabilize – and we expect them to rise somewhat from current levels, but not to soar anytime in the future – the hard work of consolidating the industry will begin. The reality is that the industry should wish for

Exhibit 8. How ExxonMobil And Chevron Have Performed Capital Sin



Source: OilPrice.com

moderate oil prices, so it can demonstrate the success of its embrace of greater capital discipline. That would help companies demonstrate to investors that the oil business is not a sunset industry.

Energy company managers will need to spend more time seeking to understand energy's future, and in plotting their companies' futures

It will take a while: for the cloudy outlook to clear, the industry to demonstrate improved financial performance, the future role of fossil fuels in the energy market to be clarified, and investors to embrace the new outlook. Energy is not dead. But its future will be different from its past. Energy will play a key role in future economic growth. However, its role is changing. Energy company managers will need to spend more time seeking to understand energy's future, and in plotting their companies' futures. Opportunities exist, but it will take vision to capitalize on them.

What Will OPEC's Inaction Mean For The Oil The Market?

The organizations' technical committee had originally recommended a 600,000 barrel a day cut, which was then lifted to potentially a 1.0 million barrel a day cut

OPEC oil ministers met last week and failed to reach an agreement to cut output that would support oil prices. The organizations' technical committee had originally recommended a 600,000 barrel a day (b/d) cut, which was then lifted to potentially a 1.0 million barrel a day cut (mmb/d). As the economic fallout from the Covid-19 virus began to become clearer, the technical people, or Saudi Arabia, it's hard to differentiate the two, began to suggest that OPEC plus its new partner, Russia, should cut potentially 1.5 mmb/d. That would be in addition to the current 1.7 mmb/d cut that is destined to run through the end of this month, and the additional 400,000 b/d that Saudi Arabia has cut.

If the maximum suggested production cut were to be implemented, the world would have 3.6 mmb/d less oil supply that it would otherwise have if the cuts were not in place. Would that be enough to prevent a massive build in global oil inventories in the first and

OPEC+ is also being helped in its efforts to support oil prices by the collapse of oil output from Libya

second quarters? It is certainly thought that would be the case, especially as the production woes in Venezuela continue, and the country faces additional U.S. sanctions that would prevent Chevron from continuing to operate and export oil. To offset that potential lost output, the United States is preparing to sell 12 million barrels of sour oil from the U.S. Strategic Petroleum Reserve. OPEC+ (the new alliance of OPEC and Russia) is also being helped in its efforts to support oil prices by the collapse of oil output from Libya.

Moscow would not agree with the new cuts, but rather favored extending the existing ones

When Saudi Arabia went to Vienna for the regular OPEC meeting and a second meeting with the expanded OPEC+ group, it announced it wanted an additional 1.5 mmb/d cut from OPEC+. It also indicated that it might consider agreeing to extend the current 2.1 mmb/d cut through the end of 2020. These terms were unanimously embraced by the OPEC members. OPEC said it would provide 1.0 mmb/d of the cut total, with 500,000 b/d coming from Russia and other outside oil producers. Included in the recommendation was that if Russia, et al, failed to agree, OPEC was prepared to cancel all its existing output cuts.

The latest estimate by IHS Markit is that oil demand will fall by 2.7 mmb/d in the first quarter, the largest first quarter demand drop ever, and largely centered in China

Russian Energy Minister Alexander Novak, when arriving in the Austrian capital, stated that Moscow would not agree with the new cuts, but rather favored extending the existing ones. This escalated the political tension. Following an informal meeting of OPEC leaders with Saudi Arabia oil officials, the group demanded that the full 3.6 mmb/d in cuts now be extended through the end of 2020. This move appeared to be a further rejection of the Russian position, creating a serious stalemate in negotiations.

Russia has never agreed to any continuation of the current 2.1 mmb/d cut beyond the end of March. The OPEC group's new demand would go well beyond any estimates of the impact on oil demand from the Covid-19 virus. The latest estimate by IHS Markit is that oil demand will fall by 2.7 mmb/d in the first quarter, the largest first quarter demand drop ever, and largely centered in China. Estimates of the extent of the oil demand fall due to the virus beyond the first quarter are completely speculative, as it is not known how rapidly the virus might spread and for how long its voracity might last. Therefore, the OPEC/Saudi Arabia proposal is a statement of how seriously it needs to stabilize and increase global oil prices, not only for its budget, but also to support the share price of its recent Saudi Aramco IPO.

The International Energy Agency (IEA) and OPEC have cut their forecasts for oil consumption growth in 2020. The IEA's cut took its forecast of demand growth from 1.2 million b/d to only 850,000 b/d. OPEC had reduced its estimate of global oil demand growth by 230,000 b/d to only 990,000 b/d in February, but as the OPEC meetings opened, it reduced its estimate for 2020 again, cutting it to a 480,000 b/d increase. These cuts reflect guestimates about oil market dynamics in light of the uncertainty about the spread of

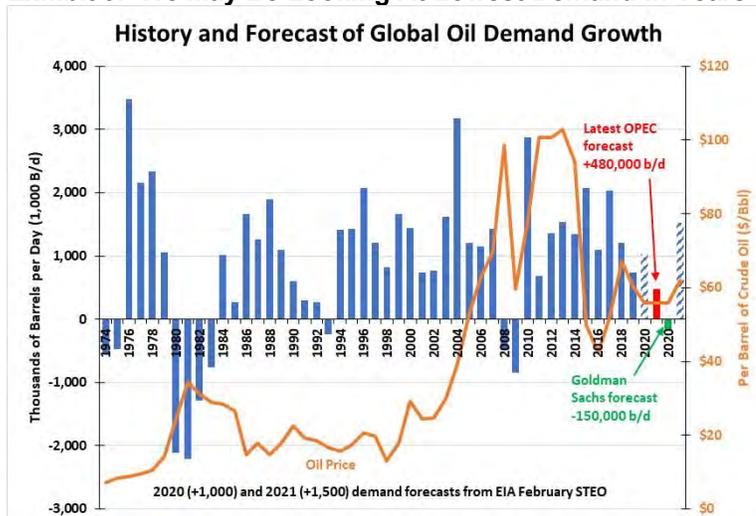
The International Monetary Fund is cutting its forecast for global economic growth below their 2.9% estimate for 2019

Covid-19 and its duration. The International Monetary Fund is cutting its forecast for global economic growth below their 2.9% estimate for 2019. This would be 0.4% below its January forecast for 2020, but the new official estimates won't be available for a couple of weeks. It will be the slowest annual growth experienced since the 2008-2009 financial crisis and recession period.

2021 could be either a sharp rebound in demand, or a more normal oil demand growth year

Oil demand projections are being reassessed daily, both by forecasters and oil companies. In Exhibit 9, we have plotted the history of annual oil consumption growth since 1983 through 2019, along with several estimates for 2020 and the Energy Information Administration's (EIA) projection for 2021. According to the EIA's latest Short-Term Energy Outlook (STEO), published on February 11th, it expects oil demand growth of 1.0 million barrels per day (mmb/d) in 2020, down from its January forecast of 1.3 mmb/d. For 2021, the EIA estimates growth of 1.5 mmb/d, an estimate certainly suspect, given the uncertainty of how 2020's economic activity will unfold and its impact on global oil use. Thus, 2021 could be either a sharp rebound in demand, or a more normal oil demand growth year. (The history of demand growth is shown in blue columns in Exhibit 9, with the latest 2020 and 2021 EIA forecasts shown in blue diagonal stripe columns. The OPEC forecast is shown in the red column.)

Exhibit 9. We May Be Looking At Lowest Demand In Years



Source: BP, EIA, OPEC, Goldman Sachs, PPHB

Goldman sees global oil demand falling 150,000 b/d, which is down from its prior estimate of 550,000 b/d growth

The first negative demand growth forecast (shown in green in Exhibit 9) came from investment banker Goldman Sachs, which is a significant participant in commodity markets. Goldman sees global oil demand falling 150,000 b/d, which is down from its prior estimate of 550,000 b/d growth. That forecast was lower than the firm's previous demand forecast of 1.1 mmb/d growth for 2020. If Goldman's forecast comes to pass, it will mark the first decline in global oil

The average oil price rebounded to \$78.01 per barrel in 2010 in concert with oil demand rising by 2.866 mmb/d, after falling by 0.838 mmb/d in 2009

demand since 2009 during the heart of the global financial crisis and subsequent global economic recession. That was a year when the annual average oil price, based on the U.S. Crude Oil Domestic Acquisition Cost by Refiners price, fell to \$59.49 per barrel from 2008's average price of \$98.47. The average oil price rebounded to \$78.01 per barrel in 2010 in concert with oil demand rising by 2.866 mmb/d, after falling by 0.838 mmb/d in 2009, which followed 2008's decline of 0.483 mmb/d.

WTI settled 10.1% lower at \$41.28 on Friday -- the biggest one-day percentage drop since November 2014, and the lowest close since August 2016

What would be the impact on oil prices if Goldman's demand estimate actually occurred? The firm stated: "Given this higher demand hit, we are once again lowering our oil price forecast, expecting Brent prices to trough in April at \$45/bbl before gradually recovering to \$60/bbl by year-end." That price scenario suggests WTI could hold at \$40 per barrel, or possibly slip slightly below that price. The year-end price could recover to closer to \$55 a barrel. These scenarios are all dependent on an OPEC+ agreement and future economic growth.

The lack of any OPEC+ agreement last week sent oil prices crashing on Friday. Brent settled 9.4% lower at \$45.27 a barrel. That was its worst level in nearly three years, and the worst one-day percentage drop since December 2008. In the U.S., WTI settled 10.1% lower at \$41.28 on Friday -- the biggest one-day percentage drop since November 2014, and the lowest close since August 2016. As expected, the sharp fall in oil prices crushed energy shares as the S&P Energy Sector fell to its lowest level in 11 years.

Will Covid-19 become the equivalent of the Spanish flu in 1918?

Unless Covid-19 becomes the "once-in-a-century pathogen" that Bill Gates has worried about for years, the impact should be more transitory than the negative oil demand forecast for 2020 suggested by Goldman. (We have now seen another negative demand forecast from FGE, a consultancy, which predicts a decline of about 220,000 b/d this year.) Mr. Gates, in an article, pointed out that Covid-19's current predicted fatality rate is higher than that of the 1957 influenza pandemic, which killed an estimated 66,000 patients in the U.S. While that number is significant, that disease's death toll was within the range of annual deaths associated with the normal flu season in the United States. Will Covid-19 become the equivalent of the Spanish flu in 1918, which was the first of the two pandemics involving H1N1 influenza virus, with the second being the swine flu in 2009? We don't know, but the Spanish flu infected 500 million people and was responsible for between 20 and 50 million deaths.

Jet fuel is a surprisingly large amount of global oil demand

This uncertainty, coupled with daily news of Covid-19 cases increasing and popping up in new countries, businesses and consumers are reacting by stopping travel and buying less. Airlines are cutting flights and furloughing pilots. Jet fuel is a surprisingly large amount of global oil demand. According to a report in October 2019 by IHS Markit, global jet fuel demand was 7.45 mmb/d, or approximately 8% of total refined product demand in 2018.

Importantly, the market was growing in excess of 4% per year for the prior two years. What is challenging for oil forecasters is to dissect the importance of specific geographical markets when analyzing the virus' impact on demand for various fuels. In the case of jet fuel, the China market is key. A report dated January 27, 2020, issued by RBC Capital Markets with the title "Oil Strategy: The Artificial Intelligence Approach to Quantifying the Coronavirus," there was a chart showing the top 15 global flight routes, which are dominated by Asian routes.

Exhibit 10. Asia Dominates 15 Top Global Flight Routes

Figure 4: Top 15 Global Flight Routes*



Source: RBC Capital Markets, QAG *Annual Data 2018

Source: RBC Capital Markets

The report stated that jet fuel accounts for about 15% of Chinese oil demand

The report stated that jet fuel accounts for about 15% of Chinese oil demand. This is important because distillate demand in China has struggled to sustain its growth. However, jet fuel growth has averaged 11%, making it the firmest portion of China's refined product demand. The authors of the report suggest that aviation fuel in China may be less "scare-elastic" today than was previously the case. In assessing the demand challenge, the authors wrote:

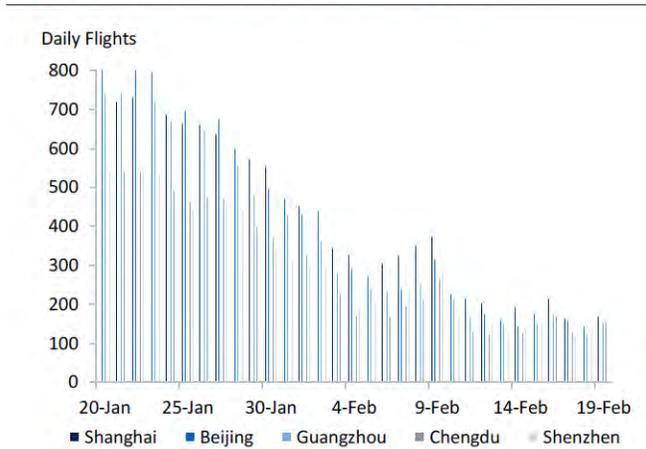
"Since the SARS outbreak in 2002, China is much more of an economic powerhouse than was the case nearly two decades ago. As of 2018, Asia was home to the top seven busiest global flight routes and 12 of the top 15. Further, domestic passenger air traffic is stronger by nearly 8% YoY, while international travel has surged by nearly 17% for the latest 12-month period that we have data relative to the prior period. Market bears would argue that there is more jet demand to lose given elevated consumption levels relative to the SARS timeframe, but we argue that the amount of sticky demand has increased due to a bigger commercial base."

Daily flights fell from 700-800 to 100-200

A chart in a later RBC Capital Markets report (February 20th) on oil markets showed what had happened to the number of daily flight departures from China’s top five airports during the month timespan from January 20th to February 19th. The chart in Exhibit 11 shows that daily flights fell from 700-800 to 100-200. That magnitude of decline had a negative impact on oil demand in China. This decline would certainly put in doubt the idea of greater “sticky” demand for jet fuel due to the larger economy of China. The counter argument might be that had the Chinese government not moved as aggressively to lock down a large portion of its economy, the impact on air traffic might have been less. We will never know the answer, but we would have to assume that if faced with another novel virus, the Chinese government might act faster to lock down population centers, allowing a quicker control over the disease and its ultimate spread. In that case, the overall global economic impact from a future disease might be less than being experienced currently.

Exhibit 11. Declining China Flights Is Hurting Oil Demand

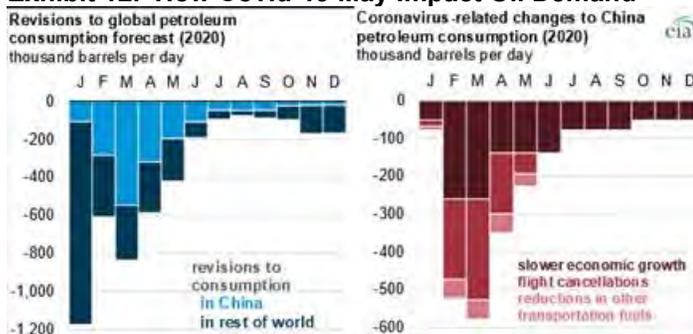
Figure 3: Daily Departures Top 5 Chinese Airports



Source: RBC Capital Markets

The most significant monthly demand impact is in March, and the largest demand impacts are being felt from reduced flight activity and slower economic growth

The EIA just publicized two charts reflecting how it has refined its petroleum consumption estimates for 2020 to reflect the Covid-19 impact on China’s and the world’s oil use. As seen, the most significant monthly demand impact is in March, and the largest demand impacts are being felt from reduced flight activity and slower economic growth. As the charts demonstrate, these impacts peak in 2020’s first quarter, and then moderate as spring transitions into summer. This is everyone’s hope, but there are concerns that the virus might need longer to be brought under control due to the lack of preparedness of countries across the globe and the length of time before vaccines for treatment and prevention arrive.

Exhibit 12. How Covid-19 May Impact Oil Demand

Source: EIA

There are 79 vessels storing crude oil and condensates at sea as of last Tuesday, up from 64 ships a year ago

As OPEC+ comes to grips with the demand falloff, we expect there will be some output cut agreement reached. If all the proposed output cuts were implemented, it would only bring the global oil market into balance, while doing little to reduce the inventory glut that has already developed and will increase without a near-term agreement. Reducing inventory will be a challenge, as demonstrated by the latest data from the oil transportation industry. According to ship-tracking firm Kpler, there are 79 vessels storing crude oil and condensates at sea as of last Tuesday, up from 64 ships a year ago. That translates into roughly 87 million barrels, slightly less than one day's oil consumption.

The number of barrels stored onshore in the Wuhan region has risen 18% to 142 million barrels since the beginning of 2020, according to satellite-data consultancy Ursa Space Systems

Consultant FGE Energy said that refinery shutdowns in China could add about 250,000 barrels a day of oil supply to storage. It also noted that commercial storage in Shandong ports, which are connected by pipeline to Wuhan, site of the Covid-19 virus start, are about 65% full, a record level. The number of barrels stored onshore in the Wuhan region has risen 18% to 142 million barrels since the beginning of 2020, according to satellite-data consultancy Ursa Space Systems. The greatest problem for oil price forecasters is knowing how much oil is in storage in China. The country's oil market is incredibly opaque, meaning that there is little knowledge about the amount of oil stored at any stage of the industry's development from ships to refinery tanks.

This additional cost is coming at the same time oil prices are under pressure, further costing the oil producer, assuming it is selling the oil, or a trader who temporarily owns the oil

One thing many oil traders and shippers have been worried about is the potential for Chinese refiners to declare force majeure on contracts to purchase oil, which will be disastrous for the cargoes at sea. Such an action prevents the ships from unloading, adding to their shipping costs, especially if they are pushed into demurrage and the cargo owners must pay the shipowners for failing to free up the contracted ship on schedule. This additional cost is coming at the same time oil prices are under pressure, further costing the oil producer, assuming it is selling the oil, or a trader who temporarily owns the oil. This scenario could force cargo owners to sell at whatever price they could realize, further pressuring global oil prices.

Force majeure has suddenly emerged in the Chinese natural gas market

Lawyers say attempts to declare force majeure are likely to fail. That is because international commodity contracts are highly specific about situations that allow force majeure, and they rarely mention epidemics. However, force majeure has suddenly emerged in the Chinese natural gas market. Last Thursday, PetroChina, the nation's largest gas importer, declared force majeure on all gas imports.

China imports 40% of the natural gas it consumes, with 70% coming via pipelines from Russia, Kazakhstan, other Central Asian states, and Myanmar. The balance of gas supply comes as LNG from other parts of the world. According to *Reuters* sources, PetroChina asked pipeline gas suppliers for cuts in daily volumes. The company has asked LNG suppliers for deferral of several cargoes to the third quarter. PetroChina's move came after another state-owned energy company, CNOOC, suspended its contracts with at least three LNG suppliers. CNOOC is China's largest importer of LNG.

Owners of LNG are reluctant to store gas in vessels unless they anticipate being able to profit from it

There are 11 LNG ships at sea last Tuesday, according to Kpler. That is an unusually high number at this time of year. Traders typically load up ships in the fall to capitalize on rising demand and higher gas prices when temperatures drop in December. Because LNG is stored at super-low temperatures, some LNG evaporates while the ships are at sea, as well as LNG often being used to power the ship. Therefore, owners of LNG are reluctant to store gas in vessels unless they anticipate being able to profit from it.

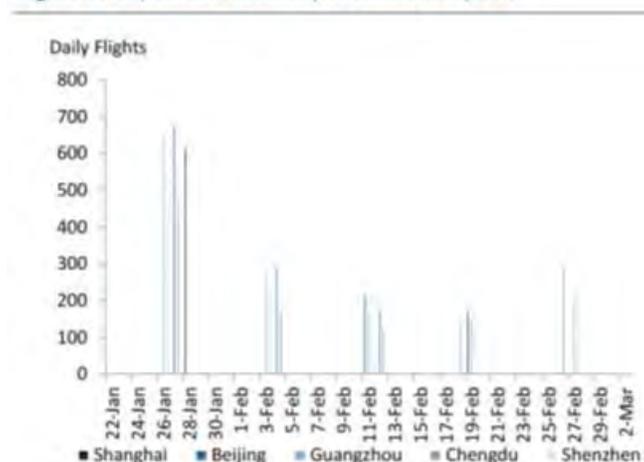
With falling LNG demand in China, Asian and European ports are full after mild winter temperatures. This is leaving LNG owners little choice but to store the gas in vessels. It is also putting tremendous pressure on natural gas prices. It has already led to the deferral of a cargo from the U.S. Gulf Coast. More cargoes are likely to be deferred given the supply/demand and storage imbalances.

It shows that the number of flights increased at February 26-27 compared to February 15-16

Is it possible that Moscow is looking at the new China data that appears to reflect the first signs of economic recovery and oil demand pickup? The most recent oil report from RBC Capital Markets showed an interesting chart of daily flights from the top five Chinese airports. This chart is like the one we showed above, but it picks a few dates from the past along with the most recent data. It shows that the number of flights increased at February 26-27 compared to February 15-16. The latest number of flight departures is equivalent to those of February 3. Yes, the number was a fraction of flight totals from January 26-27, but it is higher than the flight totals for the following two weeks. Does this mean we are seeing early signs of "green shoots" within the Chinese energy wasteland?

Exhibit 13. Are More Flights Signaling A Recovery Start?

Figure 3: Departures from Top 5 Chinese Airports



Source: RBC Capital Markets

The oil price drop is delivering bad news for American shale oil producers, especially those in the Permian Basin, the most important oil and gas shale basin in the United States

Lower oil prices were already leading to more moderate shale oil spending by major oil companies such as ExxonMobil, Chevron, Occidental and others, but their output will continue to grow, just not as quickly as earlier projected

The prospect of an OPEC+ deal caused hedge funds to stop their selling of oil futures contracts and to step up buying them before the end of last week. The hedge fund moves were based on expectations for higher oil prices in the future, but that outlook was dashed with the news from Vienna on Friday. We have to believe hedge fund selling of futures contracts contributed to the sharp oil price fall on Friday. The oil price drop is delivering bad news for American shale oil producers, especially those in the Permian Basin, the most important oil and gas shale basin in the United States. Does this accelerate the industry downturn and force the start of significant industry restructuring? On the other hand, if OPEC+ does agree to the proposed increase in output cuts and/or extensions of the current 2.1 mmb/d cut for the balance of the year and oil prices rise, will that relieve pressure on shale producers?

Higher oil prices may cause some producers to moderate their planned cutbacks in capital spending, but more likely once those were instituted into company plans, they will not be quickly reversed. For the moment, the fear of oil prices falling into the mid-\$30s a barrel, which would have delivered a deathblow to all the marginal shale oil producers, remains a possibility. Lower oil prices were already leading to more moderate shale oil spending by major oil companies such as ExxonMobil, Chevron, Occidental and others, but their output will continue to grow, just not as quickly as earlier projected. The bottom line is that U.S. shale oil production will still increase, continuing to put pressure on oil prices. Maybe it is possible that OPEC+, especially Saudi Arabia and Russia, foresees oil price uncertainty as the best tool to force a slowdown in capital spending leading to a sustained slowdown in shale oil production, restoring higher oil prices in the future.

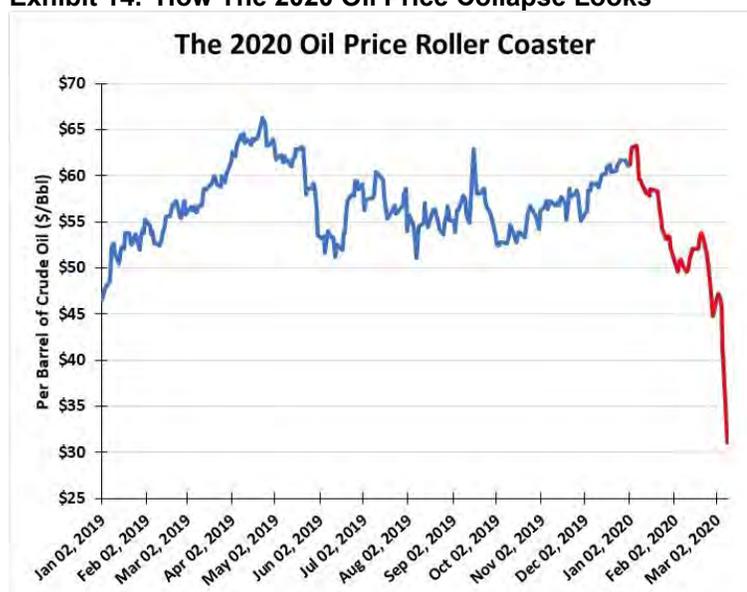
As oil futures trading opened Sunday night, prices fell to levels rivaling the lows of 2016; prices beginning with a “3” rather than a “4” or a “5”

If you subscribe to this view, the oil war that broke out over the weekend, due to the failure of OPEC+ to reach a deal, will confirm that extensive damage is about to be inflicted on American shale producers. The big question is who else might get hurt? As oil futures trading opened Sunday night, prices fell to levels rivaling the lows of 2016; prices beginning with a “3” rather than a “4” or a “5.” The energy world was a whole lot different merely a few days ago. Then, producers were weighing when prices might go higher, as everyone was primed for an OPEC+ deal. Now, they are wondering if companies can survive the fall in oil prices?

All bets are off in the oil market, as Saudi Arabia seems determined to teach Russia a lesson, just as it has taught OPEC members in the past for failing to heed the organization’s quota rules. While this oil war is underway, the world gets an economic lift from the tremendous drop in global oil prices underway. It may be fortuitous that this price drop comes as Covid-19 wreaks havoc on oil demand.

Exhibit 14 gives us a quick look at oil prices since the start of 2019. We can see how far prices have fallen in barely over 60 days.

Exhibit 14. How The 2020 Oil Price Collapse Looks



Source: EIA, PPHB

The risk for managers is not reacting quickly enough to cutting costs

At the moment, we have little confidence in predicting where oil prices will bottom or when. The oil genie has been freed from her bottle, and no one knows if she can be put back. While she is free, the energy business will be chaotic. The risk for managers is not reacting quickly enough to cutting costs. Failure to do so means profitability will be wiped away. Depending on the financial strength of a company, that could spell doom. It also offers opportunities for the bold, but it will likely take time to uncover them.

Does Super Tuesday Mean Fracking Gets A Reprieve?

Mr. Biden's South Carolina victory prompted two competitors to end their campaigns, and after Tuesday, two additional opponents bowed out, leaving the race for the Democratic Party presidential nomination a two-man contest

Former Vice President Joseph Biden (D-DE) had an amazing day on Super Tuesday when he won ten of the 14 state Democratic Party primaries. This came 48 hours following his significant victory in the South Carolina presidential primary, breathing life into his campaign after it was thought to be on life-support following dismal primary finishes in Iowa, New Hampshire and Nevada. Mr. Biden's South Carolina victory prompted two competitors to end their campaigns, and after Tuesday, two additional opponents bowed out, leaving the race for the Democratic Party presidential nomination a two-man contest. On Wednesday, the day after Super Tuesday's results, the stock market rallied by nearly 1,200 points, buoyed by a surprising 50-basis point cut in interest rates by the Federal Reserve, along with indications of support from other nations' central banks, but also in relief that Mr. Biden was likely to be the Democratic Party's presidential candidate rather than Vermont Senator Bernie Sanders.

If a more moderate candidate is to lead the Democratic Party's presidential ticket against incumbent President Donald Trump, should the oil industry breathe a sigh of relief? Maybe yes. Maybe no. What matters in answering this question is whether President Trump is re-elected, since he has been the best thing to happen to the oil and gas industry in a decade.

There are two key election questions to guess the answer to our question. First, will Mr. Biden win the nomination against Senator Sanders? There is still a high likelihood the Democratic Party's nominating convention will be a "brokered" affair, meaning no candidate arrives in Milwaukee with enough pledged delegates to win the nomination on the first ballot. Under the party's convention rules, the super delegates, primarily Democratic Party elected officials, get to vote after the first ballot. Since most of them feel threatened by Senator Sanders at the top of their election ticket, they are overwhelmingly favored to vote for Mr. Biden to lead the party. If Senator Sanders arrives in Milwaukee with more delegates than Mr. Biden but fails to win the nomination, his supporters will claim it was stolen, as they believe it was in 2016.

The second, and more important, question for oil and gas companies is whether the Democratic Party will embrace banning fracturing of wells as a key tenet of its election platform

The second, and more important, question for oil and gas companies is whether the Democratic Party will embrace banning fracturing of wells as a key tenet of its election platform. Fracking is being attacked by climate change proponents as critical for ending the nation's use of fossil fuels. If Mr. Biden wins the presidency, he can use his executive power to ban fracking in wells drilled on federal land. His ability to institute a nationwide ban of fracking, however, will create a serious states-rights battle, which will land in federal courts, and eventually arrive at the Supreme Court. Would fracking be banned during the legal process, or would the courts stay such a ban?

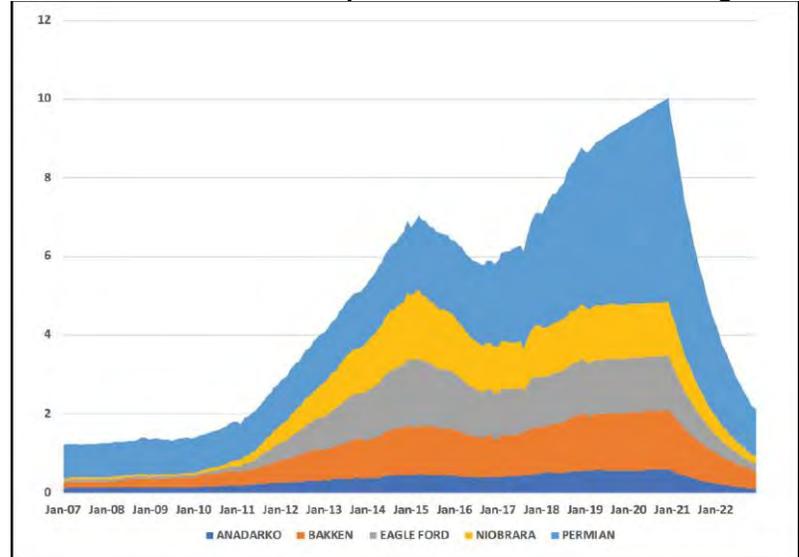
The prospect of a federal fracking ban could reverberate throughout the financial industry, which might become reluctant to lend to companies utilizing the technique due to potential legal risks

The prospect of a federal fracking ban could reverberate throughout the financial industry, which might become reluctant to lend to companies utilizing the technique due to potential legal risks. A slowdown or cessation of fracking due to legal concerns will have serious repercussions for the energy industry and the economy, as well as within the nation's employment market and for the revenues of a number of key states. It will also impact the global geopolitical balance of power.

The report analyzes the impact on oil and gas output and possible commodity prices following a two-year ban of fracking

An extensive report, written by Michael Lynch, president of Strategic Energy & Economic Research and a Distinguished Fellow at The Energy Policy Research Foundation, Inc. (EPRINC) who commissioned the study, was recently released that shows the impacts of a nationwide fracking ban. Contrary to many economic reports, this one attempts to provide a realistic answer to the question of what would be the impact of a fracking ban. The report analyzes the impact on oil and gas output and possible commodity prices following a two-year ban of fracking. The study assumes that the money being invested in fracked oil and gas wells would be shifted into drilling for conventional oil and gas. Shale output falls dramatically, not only because there will be no new fracking, but also due to the inability to replace rapidly declining shale well output with new shale wells, or even lower volume conventional wells.

Exhibit 15. How Shale Output Will Fare Under A Fracking Ban

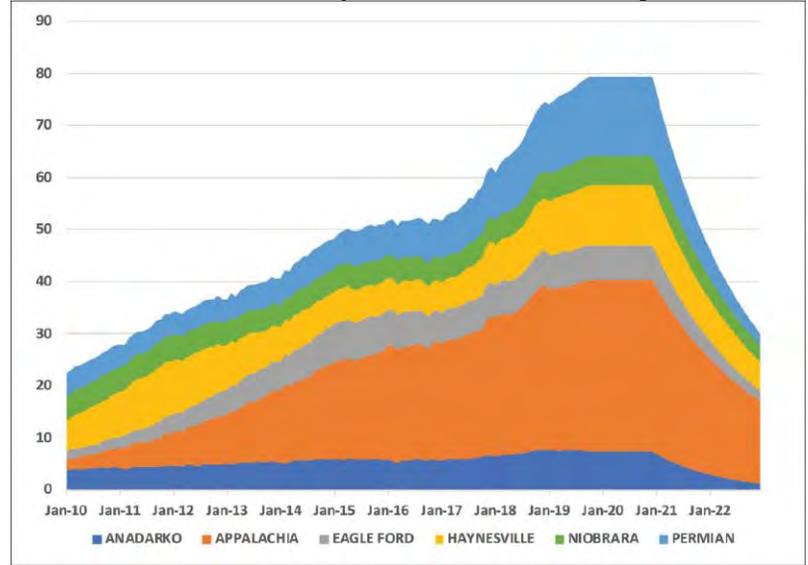


Source: EPRINC

The study projects a loss of six million barrels per day (mmb/d) of tight oil output from nearly 17 mmb/d of production, composed of 13 mmb/d of tight crude oil and 3.9 mmb/d of natural gas liquids (NGLs). (Exhibit 15.) Natural gas production would fall by 11 billion cubic feet per day (Bcf/d) against total dry gas production in 2019 of

92 Bcf/d. (Exhibit 16.) These declines in crude oil and natural gas are significant and would need either conventional supplies or imports to make up the shortfalls in supply that would result.

Exhibit 16. Shale Gas Output Will Fall Dramatically



Source: EPRINC

A fracking ban would also cost a significant number of jobs – maybe not all the oilfield jobs in key producing states, but certainly in the Appalachian basin states of Ohio and Pennsylvania

A fracking ban would also cost a significant number of jobs – maybe not all the oilfield jobs in key producing states, but certainly in the Appalachian basin states of Ohio and Pennsylvania where over 200,000 jobs are associated with the technology. The loss of fracking related jobs isn't the only thing producing states would lose. Some states would lose 'impact' payments, which is currently worth \$250 million for Pennsylvania, and states such as Texas, Oklahoma and New Mexico would lose significant revenue from production taxes on oil and gas output.

To generate this volume of electricity from solar power would require a sevenfold increase in a matter of two years

The fracking ban also means, absent a rise in global oil prices, that the U.S. oil trade deficit could grow by \$150 billion above current levels. In the event the lost U.S. oil production leads to a \$20 a barrel increase in world oil prices, the oil trade deficit would increase by \$200 billion, and U.S. consumers would have to spend an extra \$400 billion for their oil and gas, according to the study.

An interesting section of the report dealt with the fracking ban's impact in the natural gas market. The ban could cost the nation 3.9 trillion cubic feet (Tcf) of gas production from 2020 to 2022, which would most likely impact the power sector the most. In 2018, the U.S. used 12 Tcf of natural gas to generate 1,469 billion kilowatt-hours (kwhs) of electricity. The projected loss of gas supply suggests a loss of about 480 billion kwhs of electricity. To generate this volume of electricity from solar power would require a sevenfold increase in a matter of two years. If the lost gas is to be replaced by

The combined production would need to increase at a five-times faster rate than during the best years to date

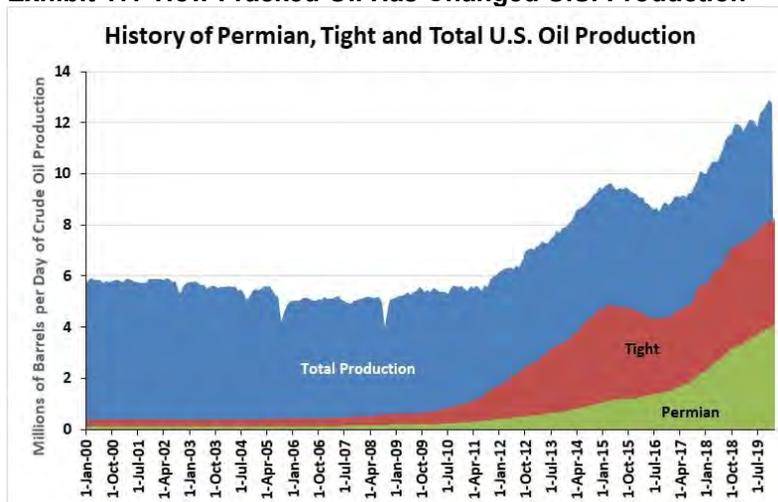
a combination of solar and wind power, there would have to be a 40% increase in the combined capacity in two years. The problem is that the annual increases in production for wind and solar have been running about 45 billion kwhs in the last few years, meaning that the combined production would need to increase at a five-times faster rate than during the best years to date. That is not impossible, but highly improbable. In addition, the cost to build this generating capacity would likely be about \$100 billion.

Reliance on greater solar and wind power would necessitate significant investment in expensive batteries for power backup

There is another scenario that would present a unique challenge for the electric power industry. We currently have an estimated 50-100 gigawatts of natural gas generating capacity that backs up our existing renewable power generation. This backup natural gas generating capacity would be lost, meaning reliance on greater solar and wind power would necessitate significant investment in expensive batteries for power backup. That will boost electricity bills.

Our ability to export LNG to Europe has made it more difficult for Russia to influence countries via its vast natural gas resources

Lastly, the lost U.S. shale oil and natural gas production would likely eliminate our exports, which would alter the balance of power in geopolitical markets and in our dealings with various authoritarian leaders. The fact the United States has become the world's largest crude oil producer and a significant exporter has enabled the U.S. to be less impacted by oil price volatility. Earlier this year, when political tensions with Iran escalated and oil prices spiked, they quickly settled back once it became clear there would be no economic impact on the United States. In addition, our ability to export LNG to Europe has made it more difficult for Russia to influence countries via its vast natural gas resources. Not only would we lose geopolitical leverage against Russia in Europe, but we would quickly find that the benefits from our six operating export terminals, with 9 Bcf/d of capacity, and the terminals under construction, with 8 Bcf/d of capacity, would be lost if exports end. Those export terminals represent between \$25-\$50 billion of capital that would be lost. Additionally, there is oil and gas pipeline infrastructure that could become redundant and at risk of being closed, with the associated investment lost.

Exhibit 17. How Fracked Oil Has Changed U.S. Production

Source: EIA, PPHB

A fracking ban would rapidly cause a U-turn in our energy industry, returning it to a world similar to 2000

It is amazing to think about how radically the energy world has changed since 2000. A fracking ban would rapidly cause a U-turn in our energy industry, returning it to a world similar to 2000. At that time, we were predicted to be hostage to the Middle East for oil imports and significant gas imports from Canada and LNG supplies from abroad. The economic vulnerability of the U.S. to oil price spikes, or losses of supply, was heightened, diminishing the ability for the U.S. to provide military and political leadership in the world. Consumers would also face substantially higher energy bills, sapping their incomes and limiting the economic growth potential of the United States. A fracking ban would harm the Houston economy, which has benefitted from the success of energy and oilfield service companies using and delivering fracking technology.

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