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## MUSINGS FROM THE OIL PATCH

September 10, 2019

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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

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### Summary:

#### **Energy Green-Shoots Appearing In Low-Interest Rate World?**

Energy share prices reflect investors hate for them. Capital destroyers with a growth at any cost view have turned off investors. Living within cash flow is now working. Could it shift sentiment and lead to higher prices?

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#### **The Promise Of Renewables And Carbon Emissions Goals**

Wind farms have been central to the success of renewables. The UK electricity blackout, combined with Germany's wind energy policy issues, and now U.S. offshore wind delays are impacting this fuel's future.

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#### **Entering A New Phase For Oil Company Business Strategies**

BP's Alaska asset sale, along with ExxonMobil, Chevron and ConocoPhillips exiting the North Sea suggest that the industry is moving into a new phase of realignment of assets and opportunities that will dictate E&P activity.

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#### **Is There Trouble, With A Capital "T", In EV City?**

Global electric vehicle sales fell in July for the first time ever. Chinese subsidy adjustments contributed, but U.S. subsidies are also a cause. Do we need more subsidies? What is the future for EVs if subsidies end?

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#### **For Natural Gas Investors – Winter Can't Come Soon Enough**

Maybe the calendar actually has a message for natural gas investors and producers.

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## Energy Green-Shoots Appearing In Low-Interest Rate World?

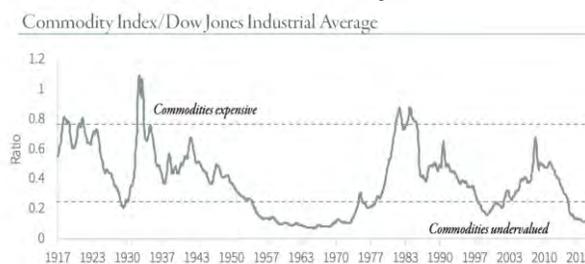
**“End the Fossil Fuel Era” is their goal**

Is it possible that the despair that has enveloped the exploration and production (E&P) sector, much like a 1950s' London fog, might be ready to lift? That thought is almost beyond reality, as the predicted future for the energy business – especially the fossil fuel sector – is supposedly very bleak. According to environmentalists, supported by the political class, we must move to a decarbonized economy as quickly as possible. “End the Fossil Fuel Era” is their goal. While that sentiment may be important, possibly a more significant lesson for energy investment sentiment was the one learned by John Menard Keynes in 1920 when his speculative currency trading based on long-term research turned a £14,000 (\$51,240) profit into a £13,125 (\$48,404) loss in a matter of days. After revising his investment strategies (becoming more prudent) he amassed a fortune of £57,797 (\$211,537). He said he learned that “markets can stay irrational longer than you can remain solvent.”

**During the 100-year span, commodities have been severely undervalued three times before now – 1929, 1965 and 1999**

Life, as well as nature, driven by cycles – minutes, hours, days, weeks, months, years, decades and even centuries. The challenge is knowing how long a cycle will last. With regards to energy and commodities, their cycles may have indeterminant lives. A chart showing the relationship between an index of commodities and the Dow Jones Industrial Average over the 100 years of 1917 through 2017 demonstrates this reality. During the 100-year span, commodities have been severely undervalued three times before now – 1929, 1965 and 1999. What do those past lows have in common? First, they happened at the same time there were investment manias gripping the stock market, while a strong belief was that commodities represented the “old economy” and had no place in investor portfolios. Sounds familiar.

### Exhibit 1. Commodities Underperformance History



Source: Bloomberg, Barron's, G&R Models

**Source: Goehring & Rozenwajg**

In 1929, the investment mania was the overall stock market bubble driven by the “new economy” stocks such as communications company RCA (Radio Corporation of America), appliance makers, automobiles, and movie picture makers, to name a few. The mania surrounding these stocks mirrored society’s Roaring Twenties, as commodities sank throughout the decade.

**The investment mania reflected the belief that these growth stocks were one-decision stocks – you only needed to buy them**

In the mid- to late-1960s, the stock market was driven by the Nifty-Fifty growth stocks, which did include two oilfield service stocks – Schlumberger Ltd. (SLB-NYSE) and Halliburton Company (HAL-NYSE). These stocks, as well as others such as Gillette, Polaroid, and Avon Products and the other 45 growth stocks sold at extremely high price/earnings multiples. The investment mania reflected the belief that these growth stocks were one-decision stocks – you only needed to buy them. As this mania was peaking, commodities were sinking to substantially undervalued status.

The last time an investment mania drove shares to peaks while commodities sank was in the late 1990s. At that time, the dot-com stocks were the darlings of the stock market because they were introducing and popularizing new technologies. Once again, commodities were considered “old economy” and no longer investable. This environment is being repeated at the present time, as FAANG technology stocks have dominated the growth sector of the stock market, while commodities sink into oblivion.

**The energy weighting hit an historical low at the end of the second quarter**

We have written in the past about the abysmal performance of the energy sector within the Standard & Poor’s 500 Index. The energy weighting hit an historical low at the end of the second quarter. Energy stocks fell in July by 2.37%, while the S&P 500 rose 1.31%. As August ended, popular trading vehicles for energy and the overall stock market showed that energy fell 8.3% for the month, while the overall index fell 1.7%. Barring a strong recovery for energy shares in September, although the sector is having a good start for the month, energy’s weighting in the S&P 500 Index likely will fall to another new low at the end of 2019’s third quarter.

**Exhibit 2. History of Declining Energy Weighting In Index**



Source: S&P, PPHB

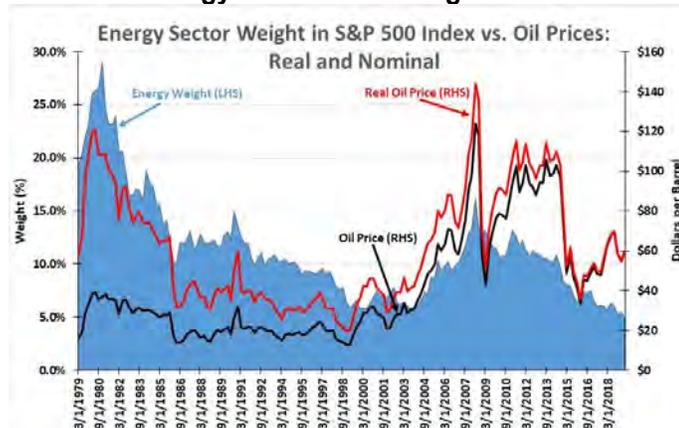
The dismal performance of the energy sector since the last gasp of the first bull market for energy shares in 1979, has largely continued over the subsequent 40 years, interrupted by brief periods of spectacular performance. As Exhibit 2 shows, there was a strong

**Is this disconnect a temporary phenomenon, or a permanent change?**

recovery in energy shares during the years leading up to the Financial Crisis in 2008 and the Great Recession of 2009, in both cases helped by soaring crude oil prices. Even with that earlier weighting lift, and its rapid recovery following the end of the 2009 recession, energy's weighting has slid steadily lower.

What is confounding traditional energy investors, as well as virtually everyone working in the industry, is the recent disconnect between the energy weighting (energy share performance) in the S&P 500 Index and the performance of crude oil prices – either in nominal or real terms. Is this disconnect a temporary phenomenon, or a permanent change?

**Exhibit 3. Energy Continues Falling While Oil Prices Rise**

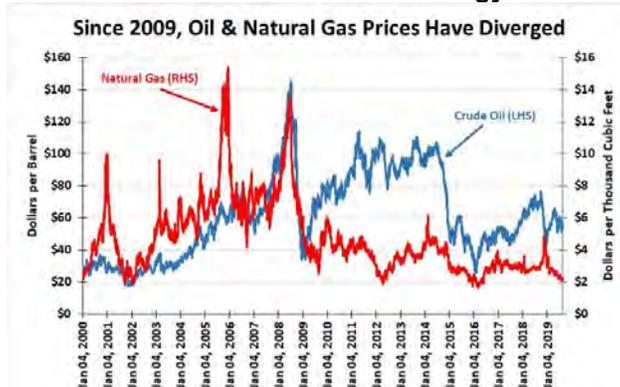


Source: S&P, EIA, PPHB

**One possibility is that natural gas prices, flirting with decade-low levels, may be creating weak financial outlooks for E&P and oilfield service companies**

If energy shares are not being traded based on the movement of crude oil prices, their performance suggests other considerations are overwhelming the positive impact higher oil prices are having on company operations and profitability. One possibility is that natural gas prices, flirting with decade-low levels, may be creating weak financial outlooks for E&P and oilfield service companies. Exhibit 4 (next page) shows just how dramatically crude oil and natural gas prices have diverged since the end of the Great Recession in 2010.

As the chart shows, during 2009, crude oil prices began to climb, ultimately returning to the \$100-per-barrel level they had reached prior to the 2008 financial crisis. Natural gas prices, on the other hand, after a brief rally, started sliding. The slide, which was broken by periodic uplifts in response to cold winters, ultimately brought them down by nearly two-thirds since late 2009, from \$6 per thousand cubic feet (Mcf) to \$2. During that time, the U.S. began exporting liquefied natural gas (LNG), volumes that have grown steadily over the past three years and are projected to grow further. The continuing surge in natural gas output has not only pushed gas prices lower, hurting gas-focused E&P company financial results, but also is depressing drilling and well-completion work.

**Exhibit 4. Weak Gas Prices The Energy Problem**

Source: EIA, PPHB

To appreciate the severity of energy share underperformance, consider the condition of several energy exchange-traded funds (ETF). These ETFs are collections of securities that track an index. The best-known example is the SPDR S&P 500 ETF (SPY), which tracks the S&P 500 Index. Two popular energy ETFs are the VanEck Vectors Oil Service ETF (OIH) and the SPDR S&P Oil Exploration & Production ETF (XOP). One measure of the degree of underperformance, or more appropriately investor hate for the companies that compose these indices, is the degree to which investors have shorted the ETFs. Shorting means investors sell an ETF they do not own (borrowing shares from owners), but are willing to risk that the ETF's price could rise before the short-seller can repurchase the shares and return them to their owner, thereby covering their short position. In that case, a short-seller suffers a loss, when he assumed the ETF's price would fall, yielding a profit.

**Short-squeezes have the potential to become explosive, as short-sellers scramble to repurchase shares**

In the case of the OIH, the statistics, as of late August, showed it had a 35% short interest, meaning that over a third of the outstanding ETF shares had been borrowed and sold. The XOP's short interest is significantly higher. Its ratio was 101%, meaning that more than all the outstanding shares of the ETF had been borrowed and sold. What's the significance of these ratios? They signify the potential for a classic "short squeeze," which means that those who had sold the shares short would be forced to compete aggressively to repurchase them if sentiment shifted and the ETF prices began rising. Short-squeezes have the potential to become explosive, as short-sellers scramble to repurchase shares. Their aggressiveness in repurchasing shares reflects the short-seller's exposure to an unlimited potential loss, as share prices could rise forever.

The significance of these large short-interest positions is that they reflect what is known on Wall Street as a "crowded trade." It means large numbers of investors are acting on the "conventional" wisdom that oil and gas prices will never improve, and are likely to go lower,

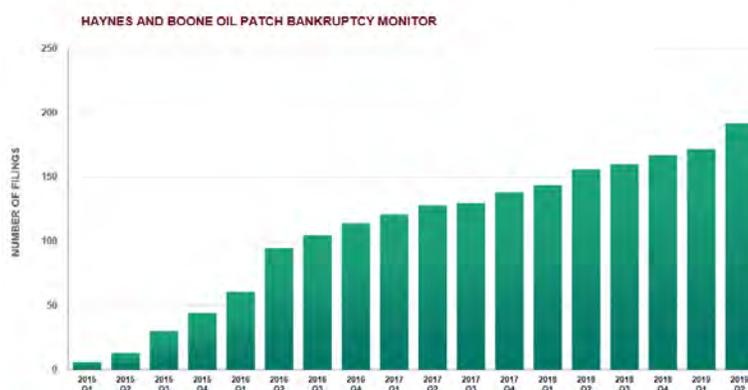
### When the conventional thinking shifts, stocks often react violently

further damaging oilfield activity and the financial results of companies in these sectors. This “group-think” position has a tendency to encourage other investors to jump on board without thinking clearly of the risk they are assuming by embracing popular investment positions. When the conventional thinking shifts, stocks often react violently, in this case to the upside as investors scramble to repurchase shares borrowed and sold short.

Is it possible something might be changing within the energy sector that would cause a reversal in the conventional wisdom about the industry’s near-term prognosis? News stories in recent weeks have focused on the natural gas glut in the U.S. that is being exported to the world in the form of lower LNG prices in Asia and Europe. The media has also been writing about the heavy debt loads of many small E&P and oilfield service companies, which is leading to an increase in energy company bankruptcies, a statistic captured and reported by law firm Haynes and Boone. In its quarterly report, the lawyers report the cumulative number of North American E&P bankruptcy filings since the start of 2015. As their tally shows, there was a jump in bankruptcies filed during the second quarter.

#### Exhibit 5. E&P Bankruptcies Have Been Growing

2015-2019 CUMULATIVE NORTH AMERICAN E&P BANKRUPTCY FILINGS

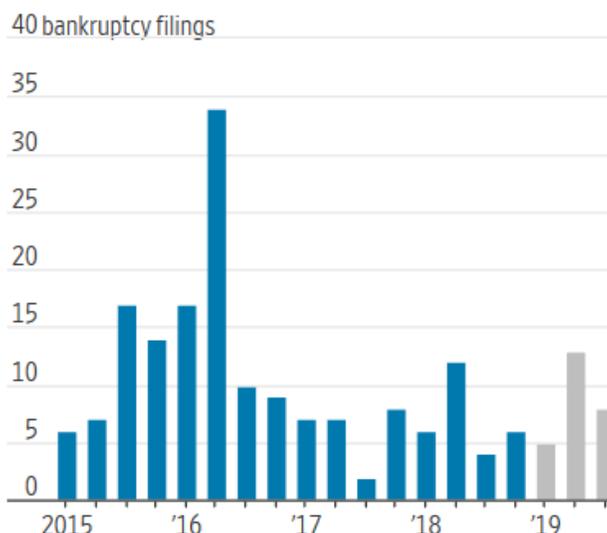


Source: Haynes and Boone

**As it became evident they would not be able to repay their debts, especially given the amount of money they needed to continue spending to operate, let alone boost output and increase income, bankruptcy was the only option**

When the number of bankruptcies is plotted by quarters, one can see the jumps recorded in each year’s second quarter. While an interesting pattern, it likely reflects the realization by managements and their bankers and bond owners that the magnitude of fundamental improvement anticipated at the end of the prior year was not materializing. In other words, the expected recovery was not going to bail out the companies plagued by severely leveraged balance sheets. As a result, as it became evident they would not be able to repay their debts, especially given the amount of money they needed to continue spending to operate, let alone boost output and increase income, bankruptcy was the only option.

**Exhibit 6. 2Q2019 Saw E&P Bankruptcies Jump  
North American oil-and-gas-producer  
bankruptcies\***



Source: Haynes and Boone

**Investors want to see a change in the DNA of E&P managers, who have always been lured by the siren song of higher commodity prices to ramp up their capital spending**

It has been the over-leveraged financial condition that has caused investors to shun energy company securities. Too much debt has spurred investors to pressure managements to reduce their capital spending to within their cash flows, and to even give some of that surplus cash flow back to shareholders in the form of dividends and/or share repurchases. While companies have declared their embrace of “living within cash flows,” investors remain skeptical they actually will. Investors want to see a change in the DNA of E&P managers, who have always been lured by the siren song of higher commodity prices to ramp up their capital spending. Living within cash flows will need to be demonstrated for many quarters. The industry’s traditional DNA is to spend as much as possible in growing reserves (asset value) and increasing production (income and profits), which is expected to translate into higher share prices, the ultimate goal of E&P CEOs. This DNA needs to be changed.

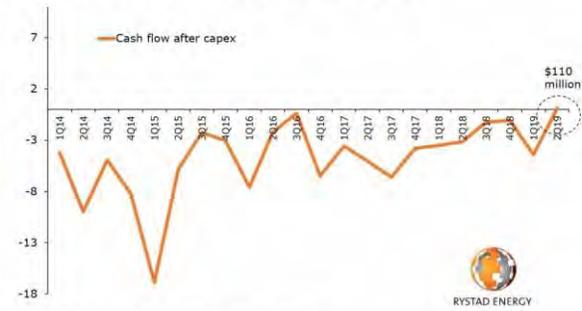
The recent improvement in oil prices and reduced industry capital spending has begun to turn the tide of profitability, or at least has improved companies’ free cash flows. Recently released studies by Rystad Energy and RBN Energy demonstrate the improvement. A third report by the Sightline Institute and the Institute for Energy Economics and Financial Analysis (IEEFA) showed improvement in the second quarter of 2019 by companies focused on fracking operations, but its conclusion was that the companies continue disappointing investors by producing too much natural gas (glut) and not enough cash flow.

**The recent financial performance of the 40 U.S. shale oil companies is much better than even in the days of \$100 oil in early 2014**

While no one is handing out trophies to E&P managers for their improvement, it is important to note the trajectory of the cash flow after capex numbers for these companies. In fact, the recent financial performance of the 40 U.S. shale oil companies is much better than even in the days of \$100 oil in early 2014. Following the crash of oil prices at the end of 2014 and in early 2015, it was not surprising that this group of companies lost nearly \$18 billion in the first quarter of 2015. After nearly reaching breakeven in 3Q2016, for the group to actually report \$110 million of positive free cash flow is significant.

**Exhibit 7. Rystad Energy E&P Universe Finally In Black**

**US shale oil peer group cash flow statement evolution**  
Cash flow after capital expenditure (capex). Billion USD



Based on a peer group of 40 dedicated US shale oil companies  
Source: Rystad Energy research and analysis  
Source: Rystad Energy

**The key to the group's performance was that of one company, EOG Resources, who reported \$1.1 billion in free cash flow for the quarter**

As mentioned above, the improved financial results of fracking companies did not completely wow some analysts, especially the Sightline and IEEFA people. Their report highlighted that the group of E&P companies reported only \$26 million in free cash flows from April through June 2019, which contrasts with the group's over \$100 billion in long-term debt. The key to the group's performance was that of one company, EOG Resources (EOG-NYSE), who reported \$1.1 billion in free cash flow for the quarter, a swing of nearly \$1.5 billion from the prior quarter.

**Exhibit 8. Profitability Didn't Alleviate Investor Criticism Free Cash Flow at 29 Fracking Companies**



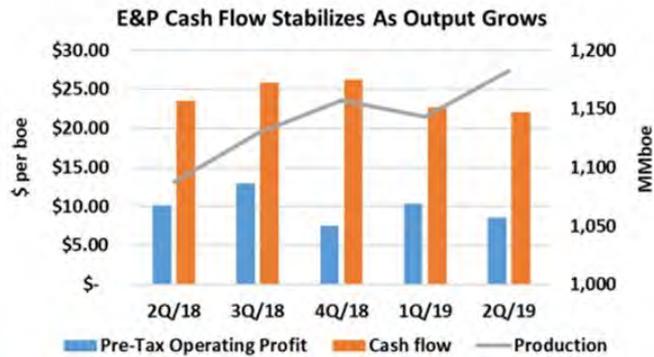
Sources: Morningstar; company reports  
Source: IEEFA.org

**This is an industry with a questionable long-term outlook**

Given the group’s weak financial performance, the ability of companies to tap debt and equity markets is nearly non-existent. Although the IEEFA analysts acknowledged the improvement in cash flows, they warned investors to continue to remain skeptical that any meaningful cultural change has occurred and to treat the sector as highly speculative. This attitude is representative of the conventional wisdom surrounding energy, and E&P companies in particular. With global energy demand uncertain due to the trade war and deteriorating economic growth in Europe and Asia, and prospects that fossil fuels will remain under intense environmental attack, with the support of politicians in many countries around the world, this is an industry with a questionable long-term outlook.

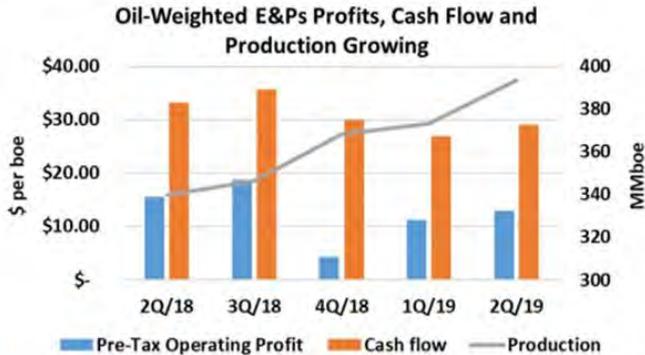
Despite the industry “doom and gloom” outlook from many, Rusty Brazier’s RBN produced a report showing the improvement in financial and operational performance. The report contained a number of charts showing the overall sector’s results, and also by segmenting the universe of companies by whether they were oil-focused, diversified, or gas-focused. Each group showed noticeably different results, largely due to weak natural gas prices.

**Exhibit 9. Improved E&P Results And Production**



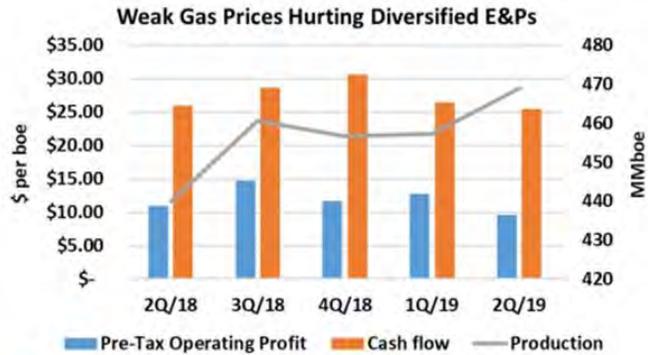
Source: RBN Energy

**Exhibit 10. Oily E&Ps Are Improving Faster**



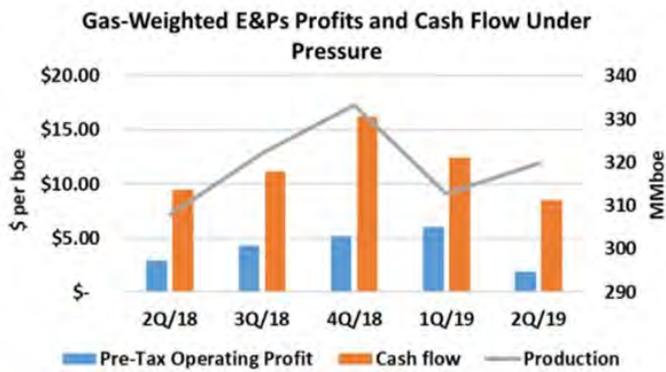
Source: RBN Energy

**Exhibit 11. Gas Prices Holding Back Some E&Ps**



Source: RBN Energy

**Exhibit 12. Weak Gas Prices Hit Gassy E&Ps**



Source: RBN Energy

We thought the RBN report’s conclusion was noteworthy. The RBN analyst wrote:

“There’s clearly a divergence between investors’ apparently dim view of the E&P industry and the quarterly results, which seem to show a sector that, while challenged by relatively weak commodity prices, remains generally stable and operationally profitable. As we’ve blogged about often, most E&Ps have been working hard to manage their capital outlays and reduce costs in order to return as much money as possible to shareholders. Still, Wall Street seems to see an industry on the precipice. We will continue to monitor the progress of our E&P universe in the coming quarters and see which side is right.”

**The uncertainty about the degree of success of the new religion for how E&P companies should operate, and its sustainability, will limit their share price improvement**

The uncertainty about the degree of success of the new religion for how E&P companies should operate, and its sustainability, will limit their share price improvement. At some point, investors will determine that the new religion is governing the sector’s outlook and that the shares are worthy of higher valuations. When this happens, we fully expect energy share prices to jump, given the extent that

investors have dismissed the potential for any improvement in the industry's fortunes. The 101% short position of the XOP signals that it won't take much for a swing in sentiment to change the energy share price narrative. An exogenous event, or merely the passage of time under the new DNA – which will it be?

## The Promise Of Renewables And Carbon Emissions Goals

**Steel yourself for an avalanche of climate change emergency rhetoric during the next few weeks**

Steel yourself for an avalanche of climate change emergency rhetoric during the next few weeks. September is the highpoint of activity at the United Nations. The global deliberative body will be holding its 74<sup>th</sup> session of the UN General Assembly, a time when leaders from around the world descend on New York City, paralyzing traffic and everyday activities. This year, though, the climate change emergency movement is taking center stage. While the UN has just finished its Civil Society Conference in Salt Lake City, which focused on “Building Inclusive and Sustainable Communities,” the emphasis was on climate change and the need to do something about it. That theme will be amplified in September and be the centerpiece of the 25<sup>th</sup> session of the Conference of the Parties (COP25) to the United Nations Framework Convention on Climate Change (UNFCCC) in Santiago, Chile in December.

**Extreme rhetoric is what is needed since the public continues to not be overly concerned about climate change**

While we will hear much about the cataclysmic future the planet is facing unless we stop using fossil fuels with their dangerous emissions, there will be little balance in the solutions presented. It is “irrational” to suggest that any of the “science” underlying global warming might be wrong or extreme. Extreme rhetoric is what is needed since the public continues to not be overly concerned about climate change unless specifically asked about it.

**The trip was to demonstrate her commitment to reducing her carbon footprint when crossing the Atlantic Ocean**

September's climate change emergency news will be highlighted by the appearance of Swedish teenager Greta Thunberg, who led the student Fridays For Future movement necessitating students skip classes on Fridays to protest the lack of political action in dealing with climate change. The movement spread widely (showing students are always happy to skip school) and turned Ms. Thunberg into a celebrity and the face of the climate change emergency movement. She recently completed a two-week trip by sailboat from Europe to New York City to attend the UN events. The trip was to demonstrate her commitment to reducing her carbon footprint when crossing the Atlantic Ocean. Few people are aware, however, that two of the sailboat's crew had to immediately fly home and were replaced by two others who flew from Europe to take the boat home.

Part of the September UN events will be acceptance of the reports from the nine coalitions appointed to study key topics impacting solutions for dealing with climate change. The topics include: 1) social and political drivers of change; 2) transition to renewable energy; 3) industry; 4) infrastructure, cities and local action; 5)

**The biggest questions seem to be about wind power, especially following the August 9th evening rush hour UK electricity blackout**

nature-based solutions; 6) resilience and adaptation; 7) mitigation; 8) finance and carbon pricing; and 9) youth and citizen mobilization. Key to these topics will be the banning of fossil fuels and replacing them with renewables. The record of renewables, however, has become more questionable in recent times.

The biggest questions seem to be about wind power, especially following the August 9<sup>th</sup> evening rush hour UK electricity blackout that impacted nearly 2% of the country's residents. The event began with a lightning strike that reportedly took down two power sources. According to the preliminary report on the incident from National Grid (NNG-NYSE), Britain's primary electricity supplier, the system is designed to deal with lightning strikes, but something happened this time that overwhelmed the protective systems of the power grid, dropping its performance with severe ramifications.

According to National Grid's report:

"The lightning strike and rapid frequency fall caused the loss of ~500MW [megawatt] of Distribution connected generation, likely to be solar and some small gas and diesel fired generation, due to the operation of the generation sources own protection systems (Loss of Mains Protection).

"Hornsea One offshore wind immediately lost Hornsea modules 2 and 3, totaling 737MW. Module 1 continued to operate smoothly at 50MW throughout the event.

"Little Barford Gas Power Station – near immediate loss of the Steam Turbine unit (244MW) and then, as a result of the loss of the steam unit, loss of the two Gas Turbine units (total station loss of 641MW) over the following 90 seconds."

**Customers were inconvenienced anywhere from 15 to 50 minutes**

The problem was twofold – first, the magnitude of the power loss exceeded the system's backup power supply, and secondly, the lost power contributed to a reduction in the system's frequency to 48.8 Hz, pushing it outside the bounds of stability (50.5-49.5 Hz) and causing its power-shedding protocols to disconnect approximately 1 gigawatt [GW] of demand, equal to 5% of the nation's power supply, in order to protect the remaining 95%. The system was able to begin recovering in five minutes, and was fully restored 31 minutes later. Customers were inconvenienced anywhere from 15 to 50 minutes, although in the case of railroads, many of the trains could not be restarted automatically, necessitating engineers be sent out.

**One issue identified with the wind farm is that all its power flows through a single transmission cable**

While additional study will be undertaken, one issue identified with the wind farm is that all its power flows through a single transmission cable, making the nation's largest offshore wind farm vulnerable to systemic failure if there is any issue with any single component of the system. Will this add to the cost of the system, which is still being constructed, as backup issues are resolved?

**Another issue that needs to be addressed is the amount of power backup maintained to protect against the loss of electricity generating capacity**

Another issue that needs to be addressed is the amount of power backup maintained to protect against the loss of electricity generating capacity. The total generation lost from the two transmission-connected generators was 1,378MW. The operator of the grid was keeping 1,000MW of automatic “backup” power at the time, a level required under the regulatory-approved Security and Quality of Supply Standards and designed to cover the loss of the single biggest generator to the grid. The backup power included 472MW of battery storage. This power-loss will likely force the power regulators to revisit the magnitude of backup power that will be needed. How much of an increase is needed is unknown, but logically the amount will grow in the future. What will this cost?

**The cost of UK’s wind power was raised in a recent article in the Telegraph newspaper that reported £173 (\$210) million in “constraint payments” made by National Grid to wind farm operators**

The cost of UK’s wind power was raised in a recent article in the *Telegraph* newspaper that reported £173 (\$210) million in “constraint payments” made by National Grid to wind farm operators in its latest financial year. The payments are made in lieu of purchasing power when electricity supply and demand are in balance, or when high winds cause wind turbines to produce too much electricity. National Grid claims these payments actually save rate-payers money because the power company doesn’t need to construct additional infrastructure to transmit or store the surplus power. The payments are clawed back from domestic energy companies and the benefits passed on to ratepayers in later bills. Wind currently supplies about 20% of the UK’s electricity, which is projected to grow by 50% over the next 5-10 years, as more wind farms are built to capitalize on generous government subsidies, raising constraint payments to a projected £1 (\$1.2) billion in the foreseeable future.

The magnitude of the constraint payments came to light when it was reported that National Grid paid Ørsted, the operator of the Hornsea Wind Farm, £100,000 (\$120,000) to reduce power it supplied in the days immediately after the incident that created the UK power blackout. National Grid and Ørsted deny that the payment was related to the power incident, but the details behind the payment have not been revealed.

**This continues a trend of declining bidding interest, as a February sale saw 71% of the capacity offered awarded, but May’s sale reached only 45%**

On the continent, wind energy is facing a challenge in Germany as the shift in licensing has created uncertainty among wind farm developers leading to a sharp slowdown in new turbine installations. In early August, only 208 out of 650MW of onshore wind tenders were awarded in an auction due to low bidder turnout. This continues a trend of declining bidding interest, as a February sale saw 71% of the capacity offered awarded, but May’s sale reached only 45%. With just 30% of the capacity offered amount awarded in the latest sale, industry players are calling for changes to Germany’s energy plan, as well as its carbon emissions reduction targets, if the country’s plan for a green economy is to be reached.

According to wind energy association BWE, 15,800MW of onshore wind capacity has been blocked by licensing problems, locations too

**The German wind industry has already shed 26,000 jobs in the last year**

close to aviation infrastructure and ongoing lawsuits. This blockage prompted Danish wind turbine manufacturer Vestas to call for a national wind industry action plan. The German wind industry has already shed 26,000 jobs in the last year. The reduced labor force is a reflection of the fact that only 35 turbines were constructed during the entire first half of 2019. These turbines equaled 290 MW of new capacity, a decline of 80% compared to the first half of 2018. This installed volume is the lowest total in almost two decades. For 2018, Germany installed wind farms with a total capacity of 2,800MW, which was down from the 5,000MW of capacity installed in 2017.

Part of the problem is that wind farms are concentrated in certain regions of Germany and the locals are becoming upset with the prospect of more being constructed. This is only one reason for the slowdown. There is a lack of available space for new wind farms, plus some of the new wind farms are planned too close to aviation facilities, as well as environmental opposition due to concerns about the impact of turbines on wildlife.

**Under the government’s long-term energy plan, renewables are supposed to account for at least 65% of the country’s electricity needs by 2030, up from about 47% today**

The dramatic drop in wind farm installations has upset the government’s plans for its carbon emissions reduction. It prompted a “wind summit” in Berlin last week hosted by Peter Altmaier, the Germany industry leader. Under the government’s long-term energy plan, renewables are supposed to account for at least 65% of the country’s electricity needs by 2030, up from about 47% today. The plan calls for a phasing out of nuclear power by 2022 and coal power by 2038, and replacing that electricity with power produced by renewables. According to a study by researcher Agora Energiewende, about three-quarters of additional renewable energy capacity needed in Germany by 2030 will have to come from wind.

Wind power has been the preferred renewables option in Germany. According to the Fraunhofer research institute, wind power accounted for more than 25% of Germany’s electricity output in 2019’s first half, ahead of lignite with 20% and nuclear at 13%. Solar power contributed just 10%. Renewables have benefited from feed-in tariffs with tax subsidies guaranteed for 20 years. These

**Exhibit 13. Germany Electricity Prices Highest In EU**



Figure 2 — Household electricity prices in 2017 (most representative consumption band) — Source: DG ENER in-house data collection<sup>3</sup>

Source: *Clean Energy Wire*

**The renewables surcharge has actually declined in the past two years, but still accounts 20% of the total electricity price**

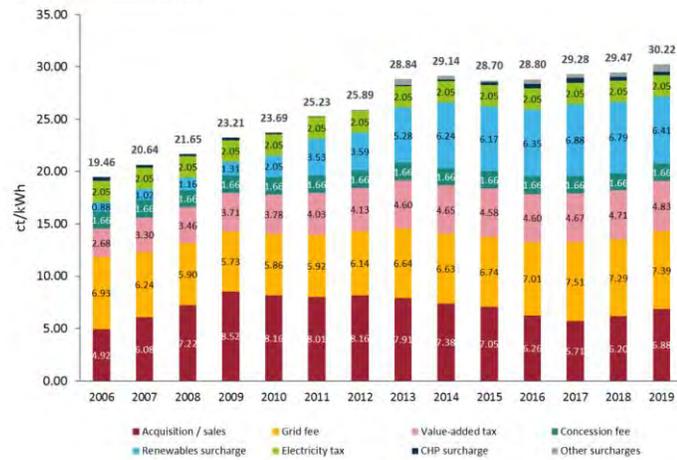
subsidies are paid from a levy on rate-payor bills, which has lifted German electricity bills to the highest in the European Union (EU). Exhibit 13 (prior page) shows household electricity prices in 2017 for all countries in the EU. Germany is the first column on the left of the chart, which towers over most its fellow EU members.

To appreciate the history of Germany's increasing electricity prices, Exhibit 14 shows the household rate by component from 2006 to 2019. We call your attention to three of the cost categories. The red portion of the columns represents the profit margin and cost of acquiring power in the wholesale market, which has been declining in recent years. Offsetting that reduction has been the increase in the grid fee (yellow), which reflects the cost to use the power grid. Additionally, there has been a sharp rise in the renewables surcharge (light blue) over time, which pays the government's guaranteed power price to developers of renewable generating facilities. The renewables surcharge has actually declined in the past two years, but still accounts 20% of the total electricity price.

**Exhibit 14. What Is Driving German Electricity Prices Up**

Composition of average power price in ct/kWh for a German household using 3,500 kWh per year, 2006 - 2019.

Data: BDEW January 2019.



Source: Clean Energy Wire

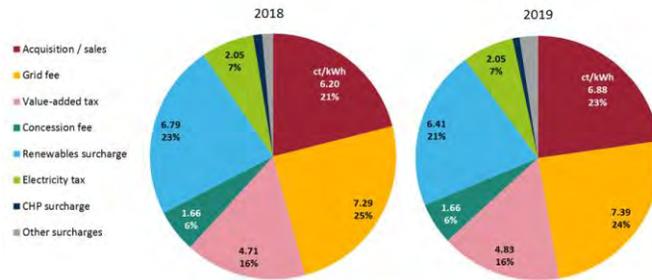
**Offsets what grid operators must pay in damages should they fail to connect offshore wind farms in a timely manner in order for them to sell their power**

We were intrigued to see how households are required to finance certain costs that should be paid by others, in particular, industry. There is an offshore liability levy, accounting for 1.4% of the electricity bill, that offsets what grid operators must pay in damages should they fail to connect offshore wind farms in a timely manner in order for them to sell their power. These costs are passed on to consumers. Then there is the surcharge for combined heat and power plants (0.9% of the bill) that reimburses them for the difference between the guaranteed price for the electricity they sell and the actual price they receive on the market. Lastly, there is a levy for the industry rebates on grid fees (1.0% of the bill) for large

power consumers who are partially or totally exempt from this expense. These costs are distributed among the other consumers on the grid.

**Exhibit 15. After Pause, Renewables Surcharge To Rise**

Composition of power price for German households using 3,500 kWh per year in 2018 and 2019.   
Data: BDEW January 2019.



Source: *Clean Energy Wire*

**The rate is projected to peak in 2021 at around 7 cents/kWh**

According to Agora Energiewende, the renewables surcharge, which is 6.41 cents per kilowatt-hour (kWh) this year, will rise to between 6.5 and 6.7 cents/kWh in 2020. The rate is projected to peak in 2021 at around 7 cents/kWh. That will be about when the first renewable energy projects will have out-lived their 20 years of guaranteed feed-in payments under the Renewable Energy Act. The surcharge is expected to begin declining after 2021, as more projects end their guaranteed payments. The ending of these payments comes just as Germany will be pushing to raise its renewable energy share to 65%, so will new subsidies be needed?

**Estimates from several years ago suggested the cost might be €65 (\$86.5 based on \$2014) billion, but there has been another estimate of additional costs of €26 (\$28.6 based on \$2019) billion that must be borne by the owners of the nuclear plants**

An important unknown is the total cost of the country's nuclear and coal power phase-outs. The country's nuclear power phase out is due to be completed in 2022 at undetermined cost. Estimates from several years ago suggested the cost might be €65 (\$86.5 based on \$2014) billion, but there has been another estimate of additional costs of €26 (\$28.6 based on \$2019) billion that must be borne by the owners of the nuclear plants. The government's plan to end coal power is targeting 2038, 19 years from now. The proposal has been a political battle within Germany, while the country's carbon emissions reduction plan has pitted the country and the EU bureaucracy. The coal phase-out has now been embraced by the coal mining states in Germany, but it came with expectations that the federal government will shovel over \$45 billion in economic payments their way.

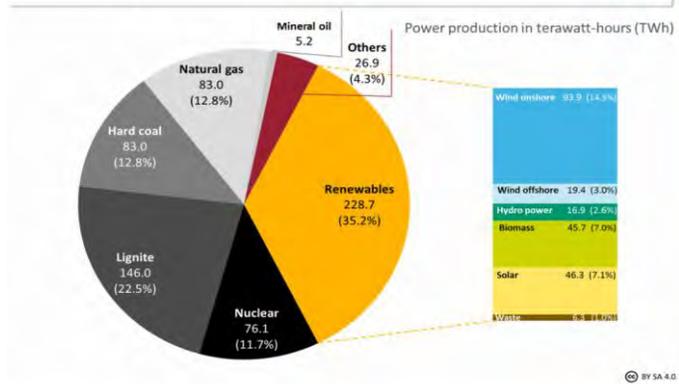
To appreciate the magnitude of the fossil fuel phase-out, Exhibit 16 (next page) shows Germany's 2018 power generation by fuel. Lignite and hard coal, combined, generated as much energy as all

**For Germany to reach its 2030 wind power contribution, five 3-MW turbines need to be installed every single day from now until then**

renewables. Nearly an additional 12% of the country’s power came from nuclear. A recent study suggested that for Germany to reach its 2030 wind power contribution, five 3-MW turbines need to be installed every single day from now until then, and the additional power will only meet the country’s target if power demand does not grow. That might actually happen if Germany’s economy weakens and the country’s population growth continues to falter.

**Exhibit 16. Renewables With Government’s Help Fights Coal**

Share of energy sources in gross German power production in 2018.  
Data: AG Energiebilanzen 2018, preliminary.



Source: *Clean Energy Wire*

**Between 1990 and 2018, Germany’s use of energy fell 13%**

Germany may be Europe’s strongest industrial economy, but last year saw the country’s power consumption falling 3%. In 2019, consumption fell 3% in the first quarter compared to a year ago. With the country’s economy contracting in the second quarter, it is likely Germany’s energy consumption also fell. The declines in energy use began before the latest reported weak economic activity. Between 1990 and 2018, Germany’s use of energy fell 13%. That decline was not all due to improved energy efficiency, high electricity costs also contributed to savings. However, there has also been a change in the economy’s composition, which is reflected by the fact that industrial production is 5% lower than in 1990.

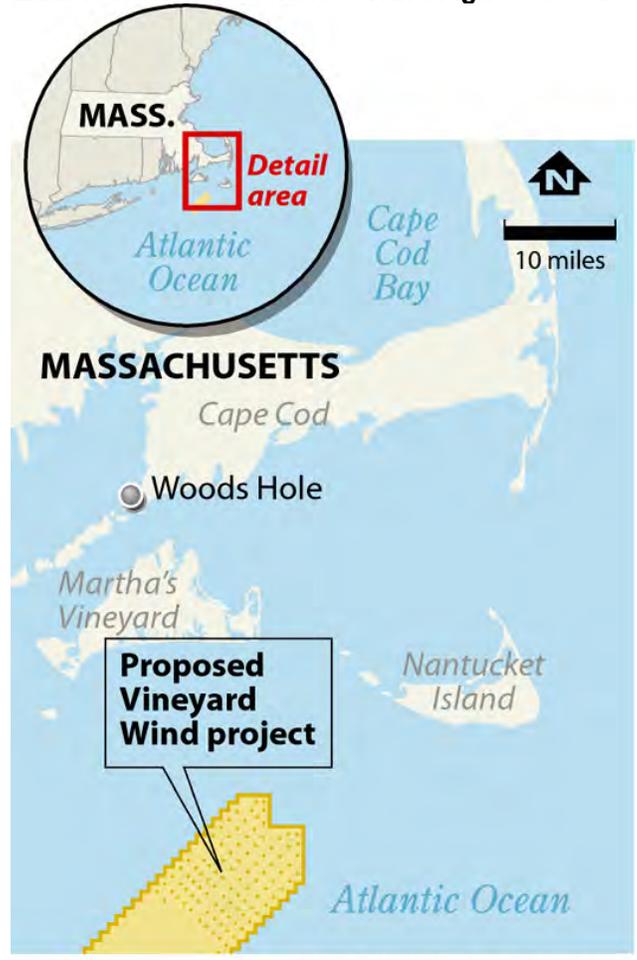
**Gas plants will likely need government subsidies if they are to remain viable investments for their owners, and be available to backup renewable energy**

If Germany falls into a full-fledged economic recession, it will be interesting to see how much further the country’s energy use falls. It will also help boost the share of energy from renewables, as they are favored by government policies, despite their low capacity utilization. This was highlighted by a paper from Deutsche Bank showing that capacity utilization was lowest at wind and solar facilities. Utilization is also low (40%) at natural gas generators, but they are needed for backup power for renewables. The Deutsche Bank paper says that gas plants will likely need government subsidies if they are to remain viable investments for their owners, and be available to backup renewable energy. This may become the next big political battleground for energy, further adding to the cost of electricity and further distorting Germany’s economy.

**The loss of that tax credit could alter the project's economics, impacting the power price agreements reached with Massachusetts and Rhode Island and the financial returns for the project's developers**

In the United States, offshore wind projects are facing delays as the federal environmental review needs further research. The Bureau of Ocean Energy Management (BOEM) said it was expanding its review of the environmental impacts of the Vineyard Wind project to include a "more robust" analysis of the potential cumulative impact if other offshore wind farms are built. This new review is actually being applauded by some offshore wind farm proponents, as it will likely produce a document that can better withstand legal challenges. However, Vineyard Wind, the developer of the \$2.8 billion, 84-turbine offshore project, is seeing its planned timeline to start construction before the end of 2019 (when the offshore wind tax credit ends) derailed. The loss of that tax credit could alter the project's economics, impacting the power price agreements reached with Massachusetts and Rhode Island and the financial returns for the project's developers.

**Exhibit 17. Where Offshore Wind Fights For Success**



PAUL HORN / InsideClimate News

Source: *Inside Climate News*

**The area where the wind farm is targeted is a major fishing region where the vessels need room to maneuver their nets and for safety should a vessel lose power**

The key aspects of the new project review relate to issues impacting the fishing industry in the area and potential marine safety. The area where the wind farm is targeted is a major fishing region where the vessels need room to maneuver their nets and for safety should a vessel lose power. These issues impact the location of turbines, and especially if additional wind farms are constructed, as planned. Any accidents in such a crowded area could also complicate search and rescue efforts, something explored two weeks ago during a Coast Guard search and rescue exercise conducted near the 5-turbine wind farm off Block Island.

**This uncertainty is rapidly becoming a global concern**

The fishing industry is also concerned about the extent of the research on the impact on marine life in and around the Vineyard Wind farm. The fishing industry, which has generally supported offshore wind development, worries that fishing stocks will be impacted by disturbances of their food chain. The results of the BOEM review will set the stage for the reviews of other offshore wind farm projects currently in the queue. The timing delay of the Vineyard Wind review will have a knock-on effect on those other projects, especially the planned New York offshore wind project that is designed to provide electricity to replace what will be lost when the Indian Point nuclear power plants are shut down. Wind energy and offshore wind power, will continue to play a role in U.S. energy markets, but the timing of the impact is becoming more uncertain. This uncertainty is rapidly becoming a global concern.

## **Entering A New Phase For Oil Company Business Strategies**

**The oil industry was shocked by the recent announcement of BP plc selling its Alaskan assets to Hilcorp Alaska**

The oil industry was shocked by the recent announcement of BP plc (BP-NYSE) selling its Alaskan assets to Hilcorp Alaska, a subsidiary of privately-owned Hilcorp Energy Co. of Houston, for \$5.6 billion. The deal includes BP's stakes in the Prudhoe Bay field, the 800-mile trans-Alaska pipeline, the Point Thomson and Milne Point fields, and leases in the Arctic National Wildlife Refuge, on land owned by an Alaska Native village corporation. Not included in the transaction is BP's oceangoing tankers that move crude oil from Alaska, although the parties are reportedly discussing them.

**BP moved into Alaska, with the backing of its UK government owners, via a joint venture with U.S. independent Sinclair Oil**

BP has been involved in Alaska since 1959 in response to the 1955 Middle East oil crisis that exposed the company's vulnerability to total dependency on that region for its oil supply. BP moved into Alaska, with the backing of its UK government owners, via a joint venture with U.S. independent Sinclair Oil and drilled six expensive wells on the North Slope that were dry, before abandoning the effort.

Over the years, as the global oil industry consolidated, BP acquired many of the key players involved in the discovery and development of the North Slope's Prudhoe Bay oil field, ranked by consultant DeGoyler and McNaughton as the largest oil field ever discovered in North America, one-and-a-half times larger than the East Texas field found by wildcatter Dad Joiner in the early 1930s.

**It is interesting that earlier this year BP conducted the first-ever three-dimensional seismic shoot over the entire Prudhoe Bay field, seeking hidden pockets of oil**

BP has been reducing its Alaskan presence in recent years. It sold two fields to Hilcorp in 2014, along with portions of two other fields. In 2018, the company sold its interest in the Kuparuk field to ConocoPhillips (COP-NYSE). Through these transactions, BP's oil production has dropped from 125,000 barrels per day (b/d) in 2014 to an estimated 74,000 b/d this year.

It is interesting that earlier this year BP conducted the first-ever three-dimensional seismic shoot over the entire Prudhoe Bay field, seeking hidden pockets of oil. That was part of the company's plan for the long-term. The plan was referenced in an email to employees announcing the sale from BP Alaska President Janet Weiss. She wrote, "Saying goodbye won't be easy, but we can all be very proud of how we have set the field up for 40 More (years) as a new chapter begins for Prudhoe." That is a significant statement given Hilcorp's record of bringing new life to mature fields.

The ownership transition requires a psychological adjustment by Alaskans as well as BP employees, which was pointed out by Larry Persily, a former federal gas official for Alaska. North Slope oil production today is about a quarter of its peak output of two million barrels per day in the 1980s. As he put it, "BP has been here since the dawn of time. For some people it's a smack in the head that the North Slope is in decline."

**After almost 50 years in the region, ExxonMobil now only accounts for about 5% of UK's oil and gas output**

Rumors are that Exxon Mobil Corp. (XOM-NYSE) is considering selling its Alaskan interests, also. That would come following the announcement the company is contemplating selling its UK assets for potentially £1.6 (\$1.9) billion. After almost 50 years in the region, ExxonMobil now only accounts for about 5% of UK's oil and gas output from 40 fields, including the iconic Brent field, brought into production in the 1970s. The assets are part of a joint venture operated by Royal Dutch Shell (RDS.A-NYSE) begun in the 1960s. ExxonMobil has indicated an agreement to sell its Norwegian assets for roughly \$4 billion, ending a decades-long history in the country.

ExxonMobil's contemplated North Sea sale would mark the third major oil company to depart this year. In April, ConocoPhillips sold its assets to Aberdeen-based Chrysaor for \$2.67 billion. Two years earlier, the independent had bought Shell's North Sea assets for \$3.8 billion. In May, Chevron Corp. (CVX-NYSE) sold its assets to Israeli-owned Ithaca Energy for \$2 billion. One outcome of these sales is a dramatic shift in who are the leading producers in the North Sea now, and the outlook for spending in the basin.

**Indications are that much of the cash raised in these sales is targeted for shale developments**

Indications are that much of the cash raised in these sales is targeted for shale developments. The key deciding factor is likely the abandonment liabilities of North Sea assets. ExxonMobil's UK liability is estimated at \$1.5 billion against an estimated sale value of \$1.6 billion. Increasing investment in shale assets is another question, but it is reserved for another time.

**Exhibit 18. Production Is Changing Even More In 2019**

**TABLE 1** Leading North Sea producers in 2018 (bd)

CNOOC	235 000
Chrysaor	120 000
Total	179 000
Shell	120 000*
BP	100 000*
ConocoPhillips	75 000
Chevron	50 000
Enquest	56 000 (boe)

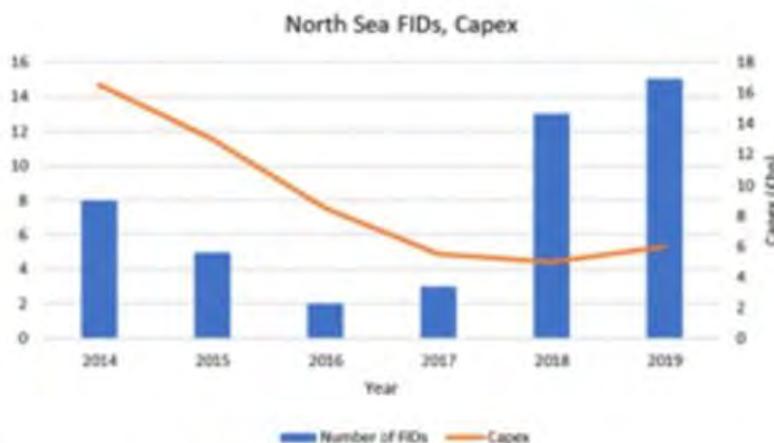
\*Estimate. Not an exclusive list.  
Source: Various.

Source: Oil and Industry Trends

**Smaller, nimbler E&P companies, often backed by private equity have entered with a goal of maximizing the remaining reserves and resources**

Another North Sea sale was Total's (TOT-NYSE) sale of several fields and interests in others to Petrogas for \$635 million. These assets were acquired as part of Total's 2017 purchase of Maersk Oil. As more of the long-term players, who pioneered and grew the North Sea into a significant oil and gas exploration and production basin, exit, smaller, nimbler E&P companies, often backed by private equity have entered with a goal of maximizing the remaining reserves and resources.

**Exhibit 19. North Sea Ownership Change Boosts Capex**



**FIGURE 3** FIDs and Capex. Average project size down sharply since 2014; more projects for less money. Source: Oil & Gas UK, S&P Platts; 2019 estimated

Source: Oil and Industry Trends

**The first couple of years after OPEC's decision were spent downsizing operations, including ending long-term contracts, disposing of easily-sold assets, shoring-up balance sheets, and determining where the industry's future growth lay**

What we are witnessing is the next phase of oil and gas companies reorienting business models in response to the new era ushered in by the 2014 oil price crash. As we approach five years since the infamous Thanksgiving Day OPEC meeting at which oil pricing was tossed to the winds, the major oil companies are evolving new business strategies. While some might question why it took so long for this to happen, the reality is that turning "ocean liners" takes time and room. The first couple of years after OPEC's decision were spent downsizing operations, including ending long-term contracts, disposing of easily-sold assets, shoring-up balance sheets, and determining where the industry's future growth lay. There have been other significant industry moves, as well as senior management changes, all driven by the need to adjust business strategies. Below the surface is the growing round of E&P bankruptcies, although most of them today involve reorganizations and not liquidations, although the companies' new owners may be very willing to capitalize on sales and/or mergers.

Total CEO Patrick Pouyanne pointed to continuing volatility in markets as the reason for his company's reassessment. By the time of Total's North Sea asset sale announcement, Brent had averaged \$69 a barrel in 2Q2019, but natural gas prices were down 36% in Europe and 26% in Asia. The deal came only months after crude oil's volatile 4Q2018 price action.

**The company's focus going forward will be to invest in low-breakeven projects that can weather weak oil prices**

As part of Total's new strategy, it plans to sell \$5 billion of assets (including the recent sale), with \$3 billion coming from the company's upstream operations. It is targeting assets that can only break even at high oil and gas prices. The company's focus going forward will be to invest in low-breakeven projects that can weather weak oil prices. At the same time, it will continue expanding in natural gas and electricity, with a particular focus on its core strengths in natural gas and deepwater. The company's governing philosophy is to consider projects with an organic pre-dividend breakeven below \$25 a barrel, while the organic post-dividend breakeven (allowing Total to pay dividends and continue making investments) is below \$50 a barrel. Is this the epitome of "lower for longer?"

**Before it is over, the changes may resemble how the merger mania of 1997-2001 altered it**

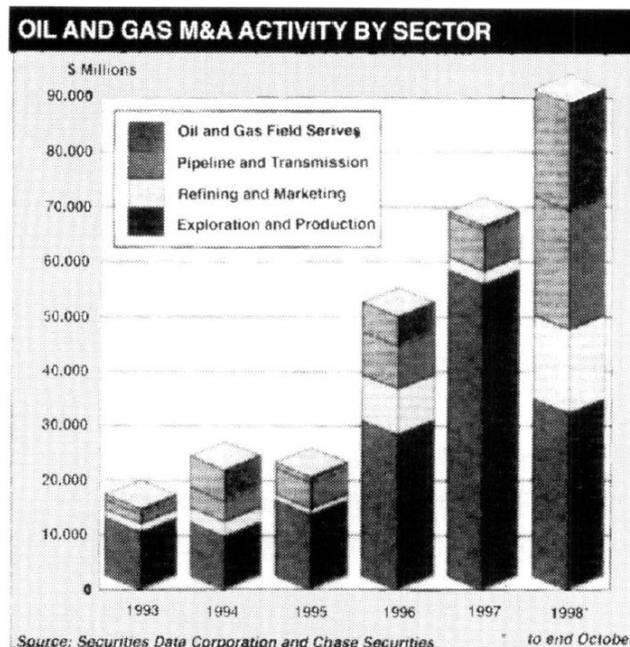
We are likely in an early phase of restructuring the global oil and gas industry. Before it is over, the changes may resemble how the merger mania of 1997-2001 altered it. That was when BP acquired Amoco and ARCO, Exxon merged with Mobil Oil, French oil companies TotalFina and Elf ended their takeover struggles and merged, as well as Chevron purchasing Texaco. And that was only at the top end of the industry food chain.

Change in the oil patch has been a constant since its founding, as new players enter and existing ones exit. The magnitude of merger and acquisition activity in the oil and gas sector in the latter part of the 1990s is shown in Exhibit 20 (next page). The chart doesn't

**All of this M&A activity came as oil prices were finally recovering from the mid-1980s collapse in their eventual march to nearly \$150 per barrel in a matter of five years!**

reflect the \$27 billion BP/ARCO deal, nor the \$39.5 billion Chevron/Texaco transaction done after 2000. In 2002, Conoco and Phillips merged in an \$18 billion deal to form ConocoPhillips, and three years later, it purchased Burlington Resources for \$33.8 billion. All of this M&A activity came as oil prices were finally recovering from the mid-1980s collapse in their eventual march to nearly \$150 per barrel in a matter of five years!

**Exhibit 20. Oil & Gas M&A Soared At End of 1990s**



Source: SAGE Journals

**Unknown is how important natural gas will become, as well as renewables and electricity**

At this point, no one knows who and how many energy companies will be involved in the industry's restructuring activity, or exactly how the industry will look in the future. What we can say is that no industry segment will be untouched by change. Areas of the business once thought to have bright futures may be dulled. Unknown is how important natural gas will become, as well as renewables and electricity. All of them will be more significant in the oil company of the future. As painful as the transition may prove, it may lead to a more profitable business. Bigger is not always better, but greater profitability is always rewarded.

## Is There Trouble, With A Capital "T", In EV City?

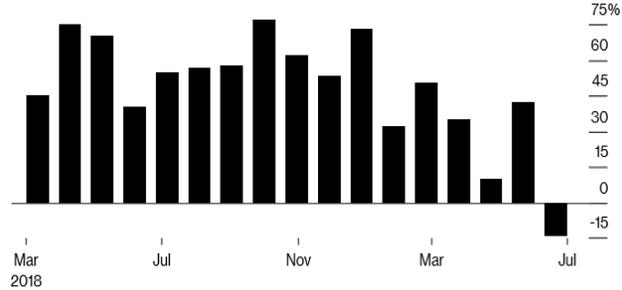
**Global electric vehicle (EV) sales fell 14% in July**

Bloomberg reports about a research report from investment firm Sanford C. Bernstein that global electric vehicle (EV) sales fell 14% in July, as China's revamped car subsidies hurt purchases. The news is noteworthy because it marks the first monthly sales decline

**The report says that sales fell in both China and North America, while rising in Europe**

in the history of EVs. According to the report, there were only about 128,000 EVs sold worldwide during July, based on the investment firm’s assessment of sales by the leading EV manufacturers. The news, if correct, shows just how sensitive EV sales are to tax subsidies, as well as how important the China market is for the future of EVs. The report says that sales fell in both China and North America, while rising in Europe.

**Exhibit 21. Year-Over-Year EV Sales Gains**

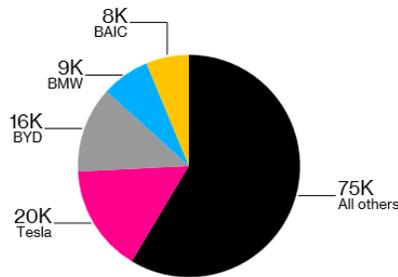


Source: Bloomberg

**For the first seven months, Bernstein says sales increased by 35%**

The report contained the chart in Exhibit 21 showing the year-over-year increase in global EV sales. Even with the surprising July sales decline, Bernstein anticipates global sales to increase between 23% and 48% to 2.4 to 2.9 million units for all of 2019. For the first seven months, Bernstein says sales increased by 35%. While we don’t know the actual source of Bernstein’s estimates, there was another chart showing EV sales by major automaker.

**Exhibit 22. Who Is Building The World’s EVs**



Source: Bloomberg

A different data service that tracks EV sales, *insideevs.com*, has yet to report July’s global sales figure, although they have posted domestic EV sales for the month. Based on their July 2018 sales data and the Bernstein estimate for this July, the year-over-year decline would be 11.7%. The year-to-date figures for the respective years translate into a 37.4% increase. Unless there are further monthly declines during the balance of this year, the *insideevs.com* seven-month gain, if extended for the full year, is well within Bernstein’s projections for all of 2019.

**The July sales decline comes as U.S. carmakers are leaning on Washington politicians from leading auto manufacturing states for a new EV subsidy**

The July sales decline comes as U.S. carmakers are leaning on Washington politicians from leading auto manufacturing states for a new EV subsidy. The current subsidy was part of the federal government's stimulus plan from the financial crisis in 2008. It offers an EV buyer a tax credit of up to \$7,500 per vehicle in the year the car is purchased. The full tax credit is offered for the first 200,000 units sold by a carmaker, after which the tax subsidy is cut in half for six months, before being cut in half again for the following six months, and then ended. Starting this year, both Tesla, Inc. (TSLA-Nasdaq) and General Motors (GM-NYSE) are having their subsidies reduced after having crossed the 200,000-unit threshold last year. Tesla's sales so far this year have produced mixed results, possibly reflecting the impact of the reduced tax subsidy, which seemed to boost sales in late 2018 prior to the ending of the full credit.

**An Ernst & Young study estimates the credit expansion would cost taxpayers nearly \$16 billion over the next decade**

The auto manufacturers now want to extend a \$7,000 buyer tax credit for another 400,000 units once the 200,000-limit has been reached. An Ernst & Young study estimates the credit expansion would cost taxpayers nearly \$16 billion over the next decade. This is consistent with estimates that the current tax subsidy program will cost about \$7.5 billion over 2018-2022, or about \$1.5 billion per year. This tax subsidy is viewed as critical to the success of the EV industry, as most manufacturers are losing money on every EV built and they are forced to sell these cars in states like California at a loss due to government mandates.

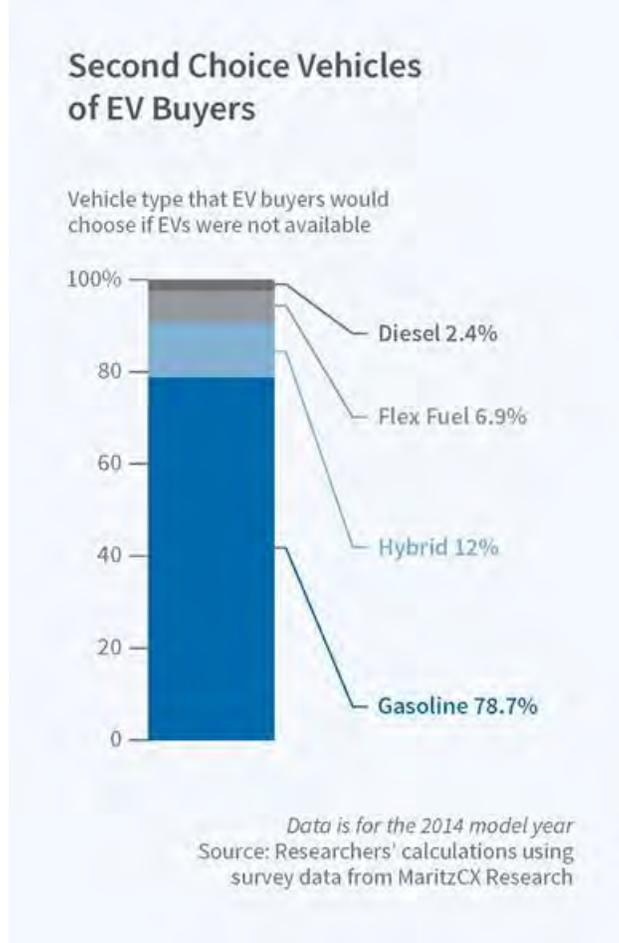
**Nearly 80% of the credits were claimed by households with adjusted gross income of more than \$100,000**

There are numerous projections for when EVs and internal combustion engine (ICE) cars will reach price parity, but the key to it happening is the assumption of continuing reductions in EV battery costs. Scale is what the EV proponents suggest is needed to reach the price parity, so therefore they lean on politicians to mandate EVs to address climate change, as well as banning ICE cars. Tax subsidies become the grease necessary to make this all work.

One of the major criticisms of the tax subsidies is their disproportionate help for financially well-off EV buyers. According to a recent Congressional Research Service study, nearly 80% of the credits were claimed by households with adjusted gross income of more than \$100,000. There is a simple reason. Those are the households that will have sufficient federal income tax liabilities to utilize the tax credit.

What is quite interesting is a National Bureau of Economic Research working paper examining the impact of federal tax credits. The researchers found that the tax credits induce EV sales, but that the majority of the credits went to households that would have purchased an EV without any tax incentive. The study examined the 2010-2014 government household survey data, which included information on households' car purchases, as well as the other vehicles the household considered buying, to create a counterfactual scenario without EV tax incentives.

Exhibit 23. EV Buyers Have Many Other Choices



Source: NBER

**Without the tax subsidies, the researchers found that EV purchases would have fallen by about 29%**

Without the tax subsidies, the researchers found that EV purchases would have fallen by about 29%. Additionally, they found that high-income household were more likely to reap the benefits of the tax subsidy, but also were more likely to buy EVs in the absence of an incentive, relative to lower-income households. The study also estimated that a modified subsidy program that provided a larger tax incentive for low-income vehicle buyers, who are more price-sensitive than their high-income counterparts, could have induced the same increase in overall EV purchases at a smaller cost to taxpayers.

**EVs will reduce energy-related U.S. carbon emissions by less than 1% by 2050**

A key issue is that the EV subsidies are needed to boost sales of vehicles “critical to lowering our emissions and limiting climate change.” However, researchers at the Manhattan Institute found that EVs will reduce energy-related U.S. carbon emissions by less than 1% by 2050. They also found that the spread of EVs would actually increase other harmful pollutants like sulfur dioxide and

**Now, Mr. Musk has joined the other EV manufacturers urging the tax credit extension**

nitrogen oxides. Their conclusions were supported by calculations by the International Energy Agency (IEA) and other independent analysts. Even if the number of EVs in the U.S. grew substantially faster than current projections, their cumulative impact on climate trends would amount to a rounding error.

As the *Wall Street Journal* pointed out in its editorial about the tax credit extension, Elon Musk, CEO of Tesla, said that while his competitors want the subsidies, his company didn't need them. That was until the tax credit phase-out began to impact Tesla's sales. Now, Mr. Musk has joined the other EV manufacturers urging the tax credit extension. This may be another example of why subsidies, once begun, are impossible to end.

**“Various power sources offer various results in charging times for the Niro: A regular household outlet might mean a weekend for a full charge, while a 240-volt charger will do the job in less than 10 hours”**

What no one considers when promoting EVs is the cost of recharging them, especially on long trips. We are not talking about the price of the electricity, but rather the value of the time when the car is parked and plugged in. We were amused to read the comment under a picture of the 2019 Kia Niro EV, which received a very positive review in the “Cars” section of the *Providence Journal*. The commentary stated: “Various power sources offer various results in charging times for the Niro: A regular household outlet might mean a weekend for a full charge, while a 240-volt charger will do the job in less than 10 hours.”

Further to the charging issue, we were told of a Tesla owner who drove from Houston to Dallas and had to recharge partly there. It cost the driver 45 minutes. He also had to find a high-speed charger located on the second floor of a parking garage. How much was his time worth?

**How is the 45 minutes to 10 hours of charging time factored into an EV's ownership cost, compared to the 5-minute refueling stops for ICE vehicles?**

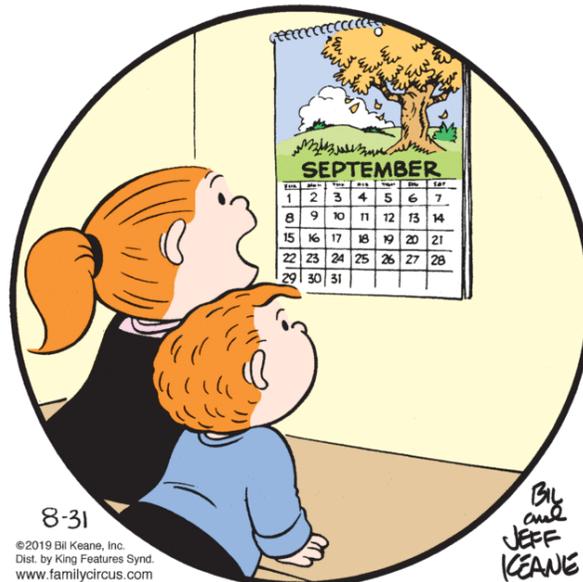
We have read articles by drivers who have driven their EVs across America to prove that such a trip can be done. The narrative points out that advance planning is needed in order to locate the proper charging stations (more of them are being built at highway service plazas) and to time the recharges to coincide with lunch, dinner or a shopping expedition, to offset the idle time. The drivers also needed to find hotels with charging stations to fill-up overnight. We recently stopped at a hotel where there was no EV charger, so an EV was parked near the lobby door with an extension cord extending inside to a wall outlet. Maybe the joy of driving an EV is worth the hassle of planning recharging stops. How is the 45 minutes to 10 hours of charging time factored into an EV's ownership cost, compared to the 5-minute refueling stops for ICE vehicles? Plus, there likely is a gasoline station close by.

There definitely is a market for EVs in urban areas and for use by people who can control their recharging needs. We find it hard to believe that countries are going to go totally electric for vehicle transportation in the timeframe the EV cheerleaders project, without

major technological breakthroughs in battery technology. Until then, remain skeptical of the explosive EV growth scenarios, and their corresponding view that there is no future for the oil industry.

## For Natural Gas Investors – Winter Can't Come Soon Enough

### Exhibit 24. What Gas Producers Are Counting On



**“Starting tomorrow, all the months end with ‘brr’ because it’s getting colder.”**

Source: [familycircus.com](http://familycircus.com)

Contact PPHB:  
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