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ENERGY INVESTMENT BANKING

MUSINGS FROM THE OIL PATCH

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

Summary:

The Rhyme Of Oil History Should Be Heard And Studied – Part 2

Part 2 of our series examining the similarities and differences between the oil industry downturn of the 1980s and the current one we are experiencing looks at the long-term trend in oil prices. We then dissect how oil price jumps in the 1970s boom kicked off an industry-wide boom that eventually took everyone over the cliff when oil prices collapsed under Saudi Arabia's guidance. Future parts in this series will examine the 1980s oil industry bust, its subsequent recovery and the recent industry cycle.

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Is California Ground Zero For The Green New Deal?

PG&E has begun implementing rolling blackouts to help prevent the start and spread of wildfires such as California experienced last year that led to the company's bankruptcy. Is this a preview of life under the Green New Deal parameters and its push for a 100% renewable energy powered economy?

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Other Climate Change News

The ExxonMobil climate change fraud trial in New York has started, and its first result was the filing of a similar suit by Massachusetts. In Minnesota, environmentalists have successfully challenged the expansion of a dairy farm until it completes an environmental assessment report. Is this the new world for agriculture?

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The Rhyme Of Oil History Should Be Heard And Studied – Part 2

We are looking at either 29 or 33 years between downturns, which afforded the industry and economies time to create shock absorbers that did not exist in the 1980s

Is the current oilfield downturn more disastrous than the one experienced in the mid-1980s? That is the question we set out to examine in Part 1 of this series of articles. Depending upon when we declare the start of the 1980s oilfield bust, we are looking at either 29 or 33 years between downturns, which afforded the industry and economies time to create shock absorbers that did not exist in the 1980s. As a result, five years into this downturn, we have yet to see the degree of widespread personal suffering associated with the 1980s collapse, especially in the booming oilfields and cities home to oil and gas companies and oilfield service providers. We have yet to see the neighborhoods with abandoned homes and overgrown lawns, although those conditions may still arrive should oil and gas prices dive significantly lower.

Is there any way to gauge how the current downturn might unfold from here? We were recently reminded of a paper written in 1849 by French economist and writer Frédéric Bastiat who favored the economic ideas of Adam Smith. His ideas had a lasting impact on the Austrian school of economics that promotes free markets. The paper was published in 1850, the year of his death, and was titled "That Which is Seen, and That Which is Not Seen." It contains his parable of the broken window that introduced the idea of opportunity cost in economic analysis.

The introduction to his paper included the following discussion:

"It almost always happens that when the immediate consequence is favorable, the ultimate consequences are fatal, and the converse"

> "In the department of economy, an act, a habit, an institution, a law, gives birth not only to an effect, but to a series of effects. Of these effects, the first only is immediate; it manifests itself simultaneously with its cause — it is seen. The others unfold in succession — they are not seen: it is well for us, if they are foreseen. Between a good and a bad economist this constitutes the whole difference — the one takes account of the visible effect; the other takes account both of the effects which are seen, and also of those which it is necessary to foresee. Now this difference is enormous, for it almost always happens that when the immediate consequence is favorable, the ultimate consequences are fatal, and the converse. Hence it follows that the bad economist pursues a small present good, which will be followed by a great evil to come, while the true economist pursues a great good to come, — at the risk of a small present evil."

Mr. Bastiat went on to write about the challenge of dealing with the unforeseen:

> "This explains the fatally grievous condition of mankind. Ignorance surrounds its cradle: then its actions are determined by their first consequences, the only ones which, in its first stage, it can see. It is only in the long run that it learns to take account of the others. It has to learn this lesson from two very different masters — experience and foresight."

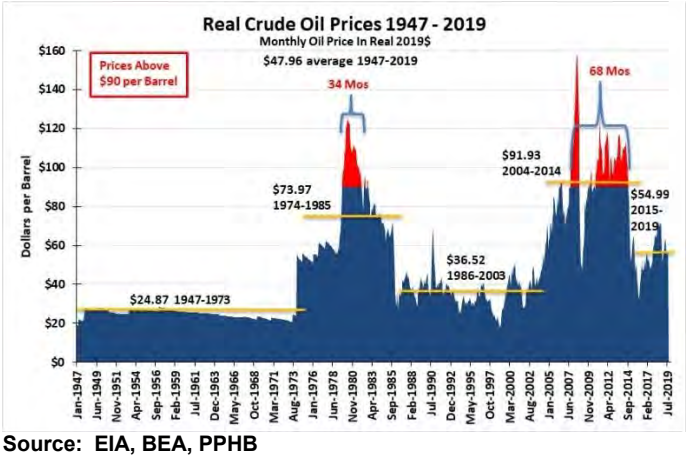
The oil companies wanted the lowest posted prices possible, while the governments were seeking to maximize their incomes

Having been an analyst of the energy business since the early 1970s – several years before the U.S. suffered the wrath of the Organization of Petroleum Exporting Countries (OPEC), which had been formed in 1960 to counter the power of the major international oil companies – I lived this era. OPEC emerged from a struggle between the Seven Sisters, as the group of major international oil companies were known, and the countries producing crude oil over the price of their output, which influenced that amount of taxes and royalties the companies would have to pay. As one would expect, the oil companies wanted the lowest posted prices possible, while the host governments were seeking to maximize their incomes.

For as long as the United States was oil self-sufficient, it held sway over global oil pricing

For as long as the United States was oil self-sufficient, it held sway over global oil pricing. That power slowly ebbed away and disappeared completely by the start of the 1970s, as domestic oil production peaked. U.S. petroleum imports grew, conceding oil pricing power to OPEC. This shift became an example of Mr. Bastiat's fundamental point: We knew the immediate impact of the peaking of domestic oil production, but we didn't foresee the use of oil pricing and its offshoot – embargoing supplies – as political weapons to be used against the U.S. economy.

Exhibit 1. Real Oil Prices Show The Two Oil Price Booms



Source: EIA, BEA, PPHB

We will employ a series of charts to explore the similarities and differences between the 1980s downturn and the current one. To put into perspective the history of the industry environments

experienced over the past nearly 50 years, it is first helpful to see the entire history of real oil prices since 1947. It provides an opportunity to examine past activity responses in periods of similar real oil prices despite years of time between the periods.

The 72-year span 1947-2019 has produced an average real oil price in 2019 dollars of $47.96 per barrel

The 72-year span 1947-2019 has produced an average real oil price in 2019 dollars of $47.96 per barrel. That price is not far from current oil prices. What is seen in Exhibit 1 is the extended periods of time when oil prices were generally similar, and usually due to the same driving forces. The period with the lowest price ($24.87 per barrel) reflected the time from 1947 up until OPEC began exercising its pricing power in 1973. We then experienced the 1970s boom, which we define as 1974-1985. That period's real oil price averaged $73.97 per barrel. Those were certainly heady days for the energy industry, which was reflected by the fact that during this period there were 34 months when the real oil price averaged $90 or above, certainly a level that spurred increased activity and investment, along with increased risk-taking by industry players. We will be exploring the relationship between these months of extraordinarily high real oil prices and the subsequent fallout with our more recent history since the early 2000s.

Most of us are familiar with the global oil price collapse in the mid-1980s engineered by Saudi Arabia to teach its fellow OPEC members that cheating on production quotas was the quickest way to undercut oil price strength and prove harmful to all members of the cartel. The fallout from the price collapse was an extended period of lower oil prices, as the excesses of the 1970s boom were extinguished from both the industry and economies, thus allowing the global oil industry to begin to recover. During 1986-2003, the real oil price averaged $36.52 per barrel, about half of the average price experienced during the boom.

When China emerged as the driver of global oil demand in the early 2000s, prices responded as both a rationing tool and a stimulant driving the discovery and production of greater volumes of oil

When China emerged as the driver of global oil demand in the early 2000s, prices responded as both a rationing tool and a stimulant driving the discovery and production of greater volumes of oil. That environment lasted between 2004 and 2014, although it was interrupted briefly by the Financial Crisis of 2008 and the Great Recession of 2009. Demand was cut and oil prices fell during those years as the lack of financial liquidity due to the instabilities of the global finance industry, coupled with fear about the world heading into a global depression, impacted economic activity and demand for oil. Once governments stabilized the global banking system, economic conditions improved, setting the global energy business back on its prior price trajectory. During this period, real oil prices remained at or above $90 per barrel for 68 months, exactly twice as many months as were experienced in the 1970s.

By Thanksgiving Day in 2014, global oil prices had been sliding from their June peak of over $100 per barrel. When OPEC convened its meeting in Vienna, the handwriting was on the wall that global oil

There was a dynamic at work in the global oil market that was frightening Saudi Arabia

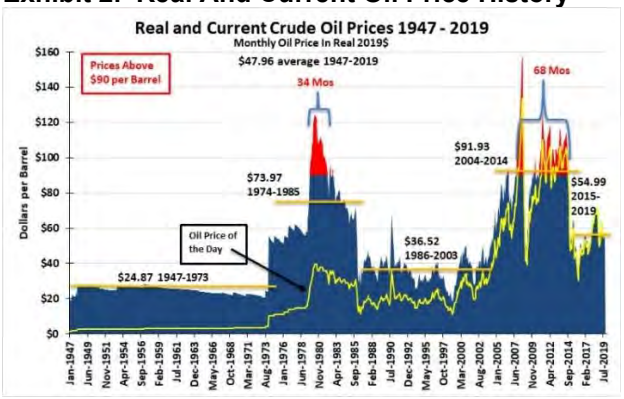
inventories were building at a rapid pace. Despite OPEC's best efforts, especially led by Saudi Arabia, non-OPEC oil supplies were gaining market share, pressuring OPEC's sales. The biggest loser was Saudi Arabia, who then surprised its fellow OPEC members by deciding it would not accept continuing to lose market share, especially in Asia. There was a dynamic at work in the global oil market that was frightening Saudi Arabia, especially concerning its heavy oil exports. Increased Canadian oil sands and heavy oil output volumes were taking market share in the U.S. Additionally, Mexico was increasing its heavy oil exports to the U.S. and elsewhere. These two countries were more than offsetting the heavy oil output decline of Venezuela, which was beset with internal economic and political turmoil.

Lowering prices was considered the best way to regain whatever Asian market share Saudi Arabia had lost

As Saudi Arabia experienced losing U.S. market share, it was also battling growing Canadian oil sands volumes flowing into the European market. When the European Union reversed its previously articulated view that oil sands bitumen was "dirty oil" and thus should be banned from the continent, Saudi faced the prospect that it would likely lose substantial market share there, also. This left the kingdom having to base its oil export policy around Asian oil market dynamics, a market also being targeted by Iran and Russia. Saudi Arabia's strategy shifted from supporting OPEC's oil prices to aggressively seeking to restore lost market share. Lowering prices was considered the best way to regain whatever Asian market share Saudi Arabia had lost, as well as potentially some of the lost share in Europe and possibly the United States. This thinking drove Saudi Arabia to abandon its strategy of cutting output and foregoing income, in order to support OPEC's marker price.

This revision to the kingdom's oil strategy came almost 30 years after it last reversed its strategy, and based on virtually the same industry dynamics – conceding market share in support of OPEC's official oil price that benefitted all the other members while costing Saudi Arabia. What has been cited as the trigger for the first great oil industry bust in 1985, was now being repeated.

Exhibit 2. Real And Current Oil Price History



Source: EIA, BEA, PPHB

In keeping with the big picture of the oil market over the past seven decades, Exhibit 2 (prior page) shows the same real oil price history as in the previous chart, but adds the history of oil prices measured in dollars of the day (yellow line). This additional price history mirrors that of real oil prices, which is traditionally our focus when analyzing the past, but interestingly, it highlights how dramatically oil prices changed at key turning points in the past. As the chart shows, in dollars of the day, the historical price ranged from a low of $1.60 per barrel in 1947 to a high of $133.93 in 2007. Who among us in the industry can forget the forecasts as oil prices were peaking that we were headed for prices of $150 per barrel or even higher before long?

The dramatic price changes experienced in 1973 and 1979, conveyed to industry participants, investors, and importantly, government policymakers that the then-current price trends would not change anytime soon

Just as those forecasts proved overly optimistic, so have most oil price forecasts made throughout history. Too much of the forecasting is based on extrapolating the then-current trends, as it seems impossible for forecasters to consider that anything different might lie around the bend. What our historical price charts drive home is that the dramatic price changes experienced in 1973 and 1979, conveyed to industry participants, investors, and importantly, government policymakers that the then-current price trends would not change anytime soon. Industry players and investors plotted how to capitalize on these trends, while governments worried about how they could control the price rises.

One misconception about oil pricing during the 1970s was that they rose steadily throughout that era. What actually happened was that prices moved up in two discrete jumps – 1973 and 1979. In the interim, crude oil prices actually traded sideways and/or declined during parts of that period until the Iranian Revolution upset the global oil supply/demand balance once more by removing a significant volume of oil from the market. One wonders what would have happened to the global oil industry had Iran's government not been overthrown and a reactionary theocratic government installed?

"It often happens, that the sweeter the first fruit of a habit is, the more bitter are the consequences"

To begin addressing how much of the industry's later pain came from knee-jerk reactions to the oil price signals sent by the Iranian Revolution, we turn again to Mr. Bastiat's essay. He wrote: "It often happens, that the sweeter the first fruit of a habit is, the more bitter are the consequences." He went on to write, "When, therefore, a man absorbed in the effect which is seen has not yet learned to discern those which are not seen, he gives way to fatal habits, not only by inclination, but by calculation."

As we will see, this last statement became reality to the sorrow of virtually everyone actively involved in the energy business, and many people tangentially associated. While we hope that the current generation of energy company managers will not suffer the same fate of those managers operating in the 1980s, it is entirely possible that before the next industry upturn arrives, they will meet similar fates.

The Automobile Era as well as the Age of the Suburbs were born

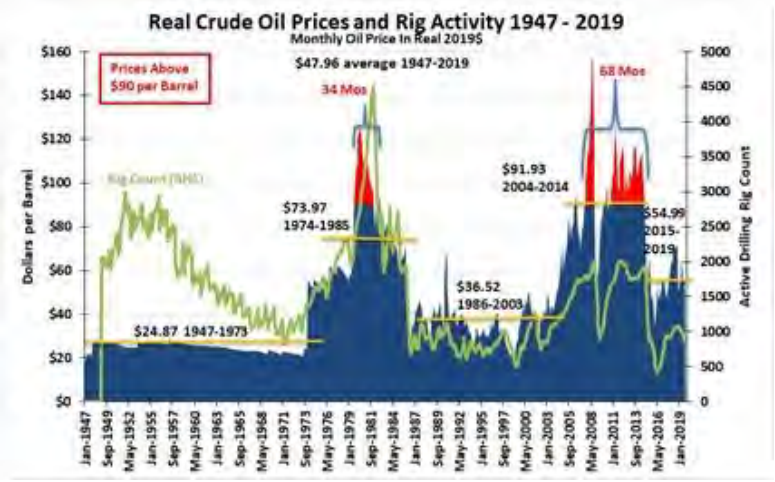
The final oil price chart covering 1947-2019 shows both the real oil price history along with the U.S. drilling rig count from Baker Hughes commencing in 1949. As the U.S. economy returned to normalcy after World War II, there was a significant increase in oil consumption. The Automobile Era as well as the Age of the Suburbs were born. The oil industry responded and drilling activity climbed sharply until 1950 and then suffered from economic slowdowns and fallout from the Korean War.

Following a significant recession in 1958, oil and gas drilling slowly declined as cheaper oil imports grew, meeting more of America's needs. Slow drilling activity was also a response to depressed natural gas prices. After securing some relief from the growing oil imports, the industry began to step up its drilling in response to improved economics and in an attempt to offset declining production. In 1973, the oil world changed, or at least how we anticipated it would unfold. Little did people appreciate how the Yom Kippur War would alter energy policy for decades, and even today, it overhangs the oil market.

Oilfield activity, beginning in 1974, was propelled by the quadrupling of oil prices in late 1973

Oilfield activity, beginning in 1974, was propelled by the quadrupling of oil prices in late 1973. Activity exploded again when oil prices doubled in 1979 following the Iranian Revolution and the loss of Iran's oil output for a while. These events drove drilling activity to a peak in late December 1981 when over 4,500 drilling rigs were working in the United States.

Exhibit 3. How Rig Count Responded To Oil Price Shifts



Source: EIA, BEA, Baker Hughes, PPHB

Drilling activity closely tracked the movement of crude oil prices

What is interesting about Exhibit 3 is that the 1981 rig count spike mirrored the spike in real oil prices that had occurred barely two years prior. As the chart establishes, drilling activity closely tracked the movement of crude oil prices. That pattern continued until the 2000s when drilling activity mirrored the movement in oil prices, but activity never rose to levels comparable to those witnessed during

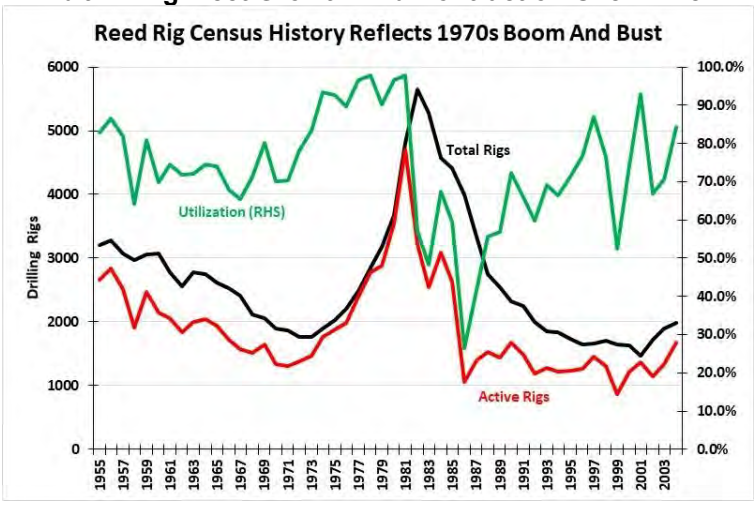
the 1970s drilling boom. This muted activity response to higher real oil prices likely reflected the impact of technological improvements in drilling, as well as the advent of the shale revolution that altered how drilling was conducted.

Exhibit 4 shows a history of the Reed Rig Census, an annual survey of the U.S. drilling rig population and its activity level. While the chart is not current due to an inability to access the latest data, it doesn't hurt our analysis. For those unfamiliar with the Reed Tool Company, it was one of the big three manufacturers of drill bits. The giant was Hughes Tool Company, owned by the reclusive Howard Hughes, which had been founded by his father and a partner in 1908 and went public in 1972. The history of these companies, as well as their eventual owner, will be dealt with later, as their fates were a reflection of the 1980s downturn.

This survey represents the most accurate assessment of the size of the U.S. drilling rig fleet annually and how many rigs of the fleet were "active" over much of the industry's history

The Reed Rig Census involved surveying companies during a 45-day summer period to determine how many drilling rigs existed and then how many had been active at any time during that time span. As diligent as the Reed Tool people tried to be when canvasing the industry, they occasionally missed some rigs that existed. They were always discovered in later surveys, but the past results were not modified to correct for the new data. Accepting that caveat, this survey represents the most accurate assessment of the size of the U.S. drilling rig fleet annually and how many rigs of the fleet were "active" over much of the industry's history The "active" measure is more a reflection of the ability of a rig to work, in contrast to the more familiar Baker Hughes weekly rig count, which measures rigs actually "turning to the right" each week.

Exhibit 4. Rig Fleet Growth And Contraction Over Time



Source: Reed Rig Census, PPHB

What the chart shows is that from a fleet of something over 3,000 rigs in 1955, the contraction of the oil and gas industry during the

Activity peaked the prior year at over 4,700 rigs, or 97.9% of the available fleet working that year

1960s led to the fleet shrinking to fewer than 2,000 rigs by the early 1970s. When the oil price spiked in 1973 and again in 1979, the rush was on to add new drilling rigs in response to the increased profitability the industry was enjoying. The fleet size peaked in 1982 at over 5,600 drilling rigs. Activity peaked the prior year at over 4,700 rigs, or 97.9% of the available fleet working that year. That was the highest fleet utilization ever recorded. It is also telling that between 1974 and 1981, virtually every rig available was working as the fleet recorded utilization rates consistently in the mid-90%. Remember that the Reed Rig Census measured activity by a rig actually working in the survey timespan and not whether it was idle due to weather conditions, well completion work, or being between jobs. Those activity measures are what is captured by the Baker Hughes weekly rig count surveys.

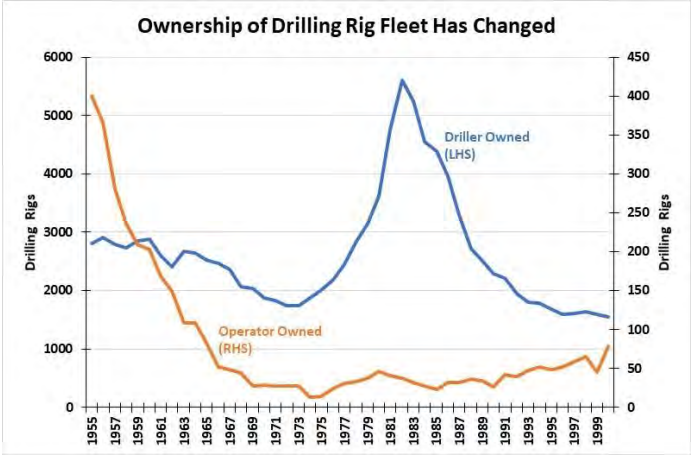
Over time, producers found that contractors who specialized in operating drilling rigs as a business, rather than as an experiment or a tool, were more efficient and more skilled

Another long-term drilling rig trend shows how the oil companies and the oilfield service companies evolved with respect to rig ownership. A student of oilfield history knows that most oil and gas producers were explorers by nature, but they owned a few rigs as tools for operating their businesses. These explorers were headed by entrepreneurs who believed they knew the secret to locating underground hydrocarbon resources. Their challenge was how to reach and extract those hydrocarbons. Owning and controlling the drilling rig provided the producer the opportunity to experiment in well drilling. Over time, producers found that contractors who specialized in operating drilling rigs as a business, rather than as an experiment or a tool, were more efficient and more skilled. By not operating rigs as a business, producers found that the inefficient operation of their rig fleets resulted in higher drilling costs than if the producer utilized dedicated drilling contractors. This efficiency move was the primary reason why producers began to sell and/or retire their drilling rigs, opting instead to employ dedicated drilling contractors for their work.

A few large international integrated oil companies maintained small drilling rig fleets up until the late 1970s as teaching tools for their young drilling and petroleum engineers

An interesting point was that a few large international integrated oil companies maintained small drilling rig fleets up until the late 1970s as teaching tools for their young drilling and petroleum engineers. By gaining hands-on drilling rig experience, it was felt these engineers would become better at their trade. We are not sure anyone could ever prove that belief contributed to improved financial results, but it was a core belief. Exxon Corp. was one of the last major American oil companies to dispose of its drilling rig fleet.

Exhibit 5. Changing Dynamics Of Rig Fleet Ownership



Source: Reed Rig Census, PPHB

Shifting our focus to shorter time spans allows for more in-depth analyses of the events that drove industry activity, thus enabling a better understanding of their ramifications on the oil business.

A huge amount of America's gasoline supply shifted from the tanks of gas stations to the tanks in cars and trucks

The period 1974-1985 captures the industry boom that was driven by the Arab Oil Embargo of late 1973 and then the Iranian Revolution in 1979. Following the 1973 quadrupling of domestic oil prices, America and the world experienced a significant recession. Gasoline and heating oil prices shot up, severely impacting consumer budgets. Additionally, there were shortages of gasoline supplies due to the crude oil export cuts by Arab oil producers. Even though the U.S. worked with those western allies who were not embargoed by Arab producers, spot gasoline shortages emerged in the U.S., forcing consumers to line up and wait for access to gasoline station pumps. An interesting discovery was made in later research of consumer reactions to the gasoline shortages. Prior to the shortage, the typical driver waited until he reached a quarter of a tank of gasoline remaining before filling up. In response to the embargo, drivers started refilling their tanks once it fell below three-quarters. In effect, a huge amount of America's gasoline supply shifted from the tanks of gas stations to the tanks in cars and trucks. This supply management shift helped to create an even greater supply shortage phenomenon than did the actual Arab country supply cuts.

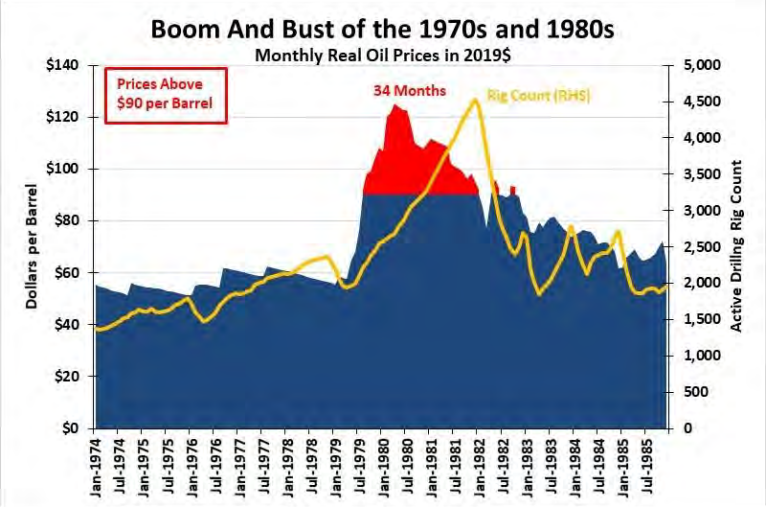
Playing around with some numbers produced an interesting analysis. According to the U.S. Department of Transportation's Federal Highway Agency, in 1970 there were approximately 88 million autos and seven million trucks and buses (estimated from a published chart). Based on multiple articles about vehicle gasoline tank sizes, they ranged from 12 to 25 gallons depending on fuel efficiency and the desire of auto manufacturers to sell vehicles with about 350 miles of range on a full tank of gasoline. If we assume an average of 20-gallon tanks (remember, cars were bigger in those

If people went from keeping one-quarter to three-quarters of their gasoline tank full, that boosted demand by an incremental 1.05 billion gallons

days and averaged fewer miles per gallon than today), that made the "mobile" gasoline storage capacity roughly 2.1 billion gallons then. If people went from keeping one-quarter to three-quarters of their gasoline tank full, that boosted demand by an incremental 1.05 billion gallons, equal to close to 2% of gasoline consumed in 1975. While that might not seem like a lot, it happened quickly and during a period of tight gasoline supplies.

Home heating oil prices also spiked, which disproportionally impacted residents in New England where its use was the highest. Homeowners moved to lower thermostat temperatures to reduce the amount of fuel oil used. They also resorted to using their fireplaces and adding insulation to their homes. On a personal note, we were working and living in the Hartford, Connecticut area at this time. Two of our co-workers competed to see who could have the lowest fuel bill for the 1973-74 winter. Besides using their fireplaces, they often slept in the living room, and wore heavy sweaters, coats and hats inside their homes. The winning family never used its furnace! A Pyrrhic victory at the expense of being cold all the time?

Exhibit 6. Oil Prices And Rig Count In Boom And Bust



Source: Baker Hughes, EIA, BEA, PPHB

During 1974-1979, real oil prices would increase and then slide lower, at which point the cycle would repeat

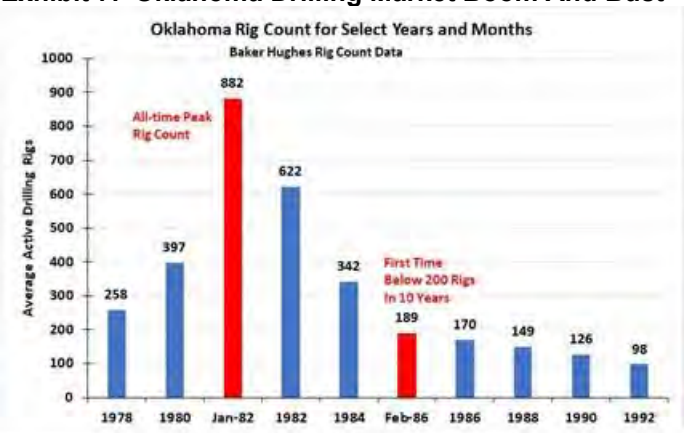
What is seen in Exhibit 6 is that along with the real oil price we plotted the monthly Baker Hughes rig count, which peaked in activity at the end of 1981 at 4,500 rigs drilling. To our earlier comment about the perception that oil prices rose steadily throughout the 1970s, note that during 1974-1979, real oil prices would increase and then slide lower, at which point the cycle would repeat. There were many twists and turns in American energy legislation and regulatory enforcement that influenced oil and gas prices in the short-term during that time. As a result, we see that oil price volatility often impacted drilling activity for brief periods of time, but within an overall rising drilling activity trend.

In the span of the revolution's arrival, its cutting oil supply and the seizing American diplomats to be held as hostages, global oil prices jumped from $13 per barrel to $34

The 1979 Iranian Revolution, which resulted in the removal of 3.8 million barrels a day of Iran's output from the world market - (roughly equal to 6% of world supply) - created a huge oil price spike in response. In the span of the revolution's arrival, its cutting oil supply and the seizing American diplomats to be held as hostages, global oil prices jumped from $13 per barrel to $34. This price explosion created the boom that ultimately destroyed the industry in the subsequent downturn.

To gain a better understanding of the impact of the dramatic price rise on drilling, we can look at what happened in Oklahoma. While the jump in oil prices in 1973 started the industry's upturn, it was the impact on prices from the Iranian Revolution that added the high-tech fuel to the fire. In Oklahoma, the annual rig count went from 258 rigs in 1978 to 397 two years later. By the time of the industry's peak was reached at the end of 1981, Oklahoma had 882 working rigs in January 1982. From that peak, the slide in oil prices, and the realization that prices were likely heading lower, the Oklahoma rig count collapsed to 189 in February 1986, the first time in a decade that the state's rig count had dropped below 200 rigs.

Exhibit 7. Oklahoma Drilling Market Boom And Bust



Source: Baker Hughes, PPHB

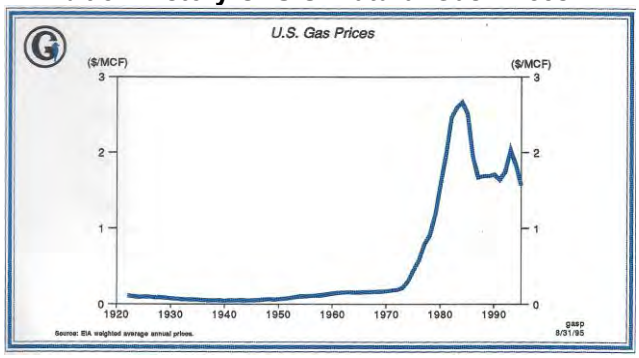
From 23-cents per thousand cubic feet (Mcf) in 1974, they rose to $1.49 by 1980

Although oil prices were a prime driver of drilling activity, Oklahoma turned out to be a major beneficiary from natural gas market improvements, also. As we discussed in Part 1, regulatory control of natural gas prices at the wellhead had been mandated by the 1954 U.S. Supreme Court ruling in the Phillips Petroleum case, keeping gas prices depressed and thus limiting the amount of gas drilling being done. As gas supplies fell short of demand, the government began working to lift prices. While this was judged to be the quickest way to stimulate the development of additional gas supply, prices continued to lag those available in deregulated gas markets. In 1978, Congress deregulated the price interstate pipelines could pay for natural gas. Prices took off. From 23-cents per thousand cubic feet (Mcf) in 1974, they rose to $1.49 by 1980.

Natural gas prices for this latter class of supply shot up to $8 and $9/Mcf because these wells were often tapping huge new supplies that customers desired to lock up for long periods

Other gas regulatory changes mandated different prices for "old" gas, "newly drilled" gas and gas from deep zones (found below 15,000 feet). Natural gas prices for this latter class of supply shot up to $8 and $9/Mcf because these wells were often tapping huge new supplies that customers desired to lock up for long periods. The cost of drilling these wells was high, but the elevated gas prices proved highly rewarding for those producers operating in select regions of Oklahoma. High gas prices arrived at the same time rising oil prices were driving the drilling boom adding fuel to the energy bonfire.

Exhibit 8. History Of U.S. Natural Gas Prices



Source: Global Marine

An October 12, 1995, presentation by Dave Herasmichuk of Global Marine to the fall conference of the National Association of Petroleum Investment Analysts (NAPIA) entitled "Has Technology Made the Gas Bubble Permanent?" showed the chart in Exhibit 8. Natural gas prices were low, and declining from the 1920s until after World War II. From that point forward, prices began rising slowly until the early 1970s, at which point they rose dramatically. Natural gas prices peaked in the early 1980s before falling back by almost $1.00/Mcf in the late 1980s. Despite a brief jump in the early 1990s, natural gas prices remained essentially flat from the mid-1980s to the mid-1990s, prompting the question the presentation was designed to address.

The true impact of inflation was a decline in energy demand

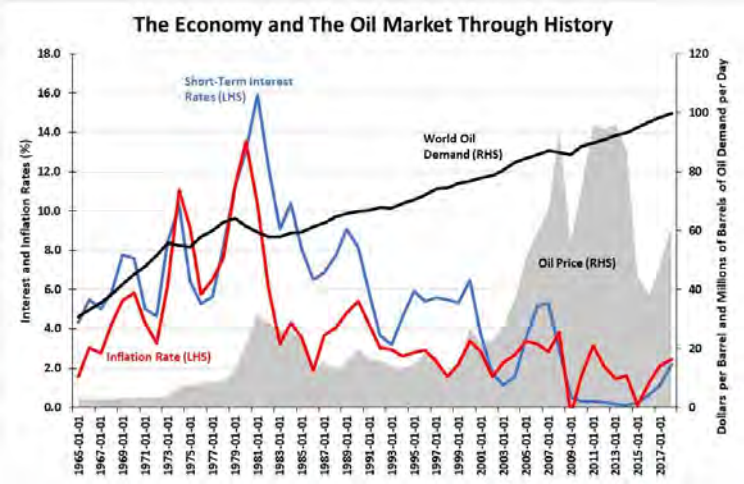
The recognition that the U.S. needed more oil and gas production helped fuel higher commodity prices. Higher prices were also helped by the increase in overall inflation in the nation's economy, partially fueled by higher energy prices. The true impact of inflation was a decline in energy demand. However, the new economics of oil and gas attracted significant capital seeking high returns in keeping with the high interest rates being utilized by the Federal Reserve to attack inflation.

Exhibit 9 on the next page shows a long history of short-term interest rates, the weapon of monetary policy, as well as inflation, which was impacted by oil prices especially in the 1970s and world oil demand. In the 1970s, one sees two spikes in inflation at the same time oil

Each time oil prices spiked in the 1970s, world oil demand fell

prices jumped. Interest rates in that time period also reflected the oil price spikes. After the peak in short-term oil prices, which was used to break the inflation spiral, we have been in a long-term bull market for debt as interest rates have steadily declined. We would point out that each time oil prices spiked in the 1970s, world oil demand fell. The only other time there was a notable decline in demand came with the Financial Crisis and Great Recession in 2008-2009. Demand surprisingly has not been impacted by the $100+ per barrel oil prices in the 2000s.

Exhibit 9. Interest Rates And Inflation Impacted Oil Market



Source: St. Louis Fed, BP plc, EIA, PPHB

"You could finance just about anything at that time. I thought that was normal. In hindsight, it wasn't."

In an interview for a special report on Oklahoma's oil and gas industry by *Oil and Gas Investor* magazine, Mark Lester, then executive vice president of Chesapeake Energy Corp., commented on the environment in 1975. He told the magazine, "When I graduated in 1975, more jobs were being offered in the oil patch. All the major companies were hiring. The enthusiasm and the flow of money were just tremendous. Real estate people were becoming landmen, and people were switching jobs from oil company to oil company. You could finance just about anything at that time. I thought that was normal. In hindsight, it wasn't."

An Oklahoma bank located in a shopping center, Penn Square, was a great example of the wild west in energy banking

The rush to inject capital into the energy business quickly grew from a trickle to a tsunami. Every commercial bank and near-bank set up or expanded its energy lending practice. They were only constrained by regulatory limitations on industry concentration, but creative descriptions were often employed to hide the energy association of some borrowers. An Oklahoma bank located in a shopping center, Penn Square, was a great example of the wild west in energy banking. It became famous for its operating style and its disastrous end.

Why wouldn't banks be wanting to participate in this rapidly expanding industry – one promising a bright long-term future? While

Total industry capital expenditures by the industry grew from $19.8 billion in 1969 to $149.2 billion in 1981

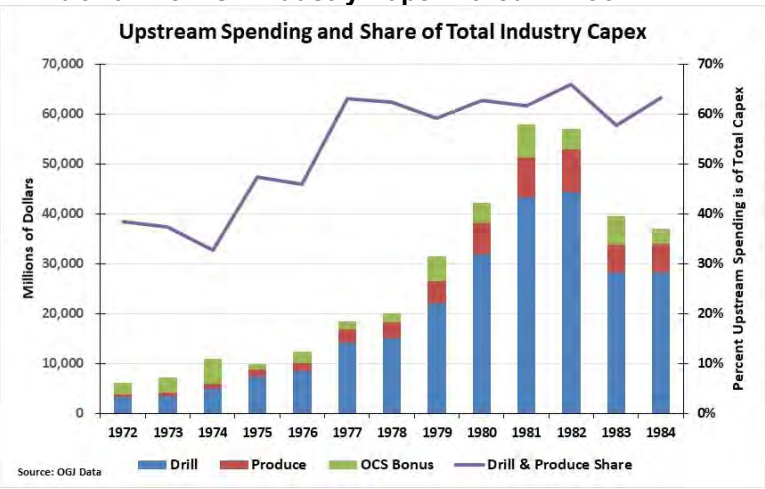
oil prices were soaring to the $30s per barrel, there were forecasts of $85 by 1985, and maybe even $100 a barrel at some point in the future. The oil and gas industry was optimistic about its future and putting dollars where its expectations were going. According to data from the Petroleum Department at Chase Manhattan Bank, one of the nation's leading oil industry lenders, total industry capital expenditures by the industry grew from $19.8 billion in 1969 to $149.2 billion in 1981, before declining slightly in 1982.

Of that spending, Exploration and Production spending went from $8.5 billion to $96.0 billion during the same time. E&P spending actually increased further in 1982, rising to $98.4 billion, a 2.5% increase over 1981 spending. The most interesting point about this spending record was that the share of total spending represented by the E&P component rose from 42.8% in 1969 to 66.0% in 1982.

It shows that this spending, which accounted for 30%-40% in the early 1970s, rose not only in absolute terms, but also in percentage terms, jumping into the 60% range

Another data set provides a slightly different perspective, but is generally consistent. The *Oil & Gas Journal* database breaks down upstream spending for the industry between drilling, production and offshore continental shelf (OCS) lease bonuses. We show how the overall upstream spending rose during 1972-1981 in Exhibit 10. Spending on drilling and production actually increased further in 1982, before dropping significantly in 1983. We also show the share of total industry capital spending represented by the drilling and producing expenditures. It shows that this spending, which accounted for 30%-40% in the early 1970s, rose not only in absolute terms, but also in percentage terms, jumping into the 60% range. Such a spending increase was clearly a reflection of the industry's belief that its future had changed, and that these more favorable conditions would continue well into the future.

Exhibit 10. How Oil Industry Capex Fared In Boom



Source: OGJ, PPHB

The forecast was based on an assessment that there was a greater impact on oilfield activity from the 1979 Iranian Revolution than the 1973 Arab Oil Embargo

The industry's long-term optimism can be further demonstrated by a talk given by E. H. Clark, Jr., President and Chairman of Baker International Corporation, a leading oilfield service company, to the Second Annual IADC/PESA Marketing Seminar in August 1980. Mr. Clark was considered one of the industry's premier "thought" leaders during this era. His talk, which was based on research and strategy planning by his management team, was considered conservative, although it proved drastically wrong. The forecast was based on an assessment that there was a greater impact on oilfield activity from the 1979 Iranian Revolution than the 1973 Arab Oil Embargo. Mr. Clark argued:

> "The 1979 revolution in Iran has had a much more dramatic and profound impact on people and governments than did the events of 1973 – because the entire consuming world had to face the specter of uncontrollable shortages. The resulting increases in activity in our businesses will be about 50% greater in the first half of the 1980s than were those in the five years following 1973. This means some very healthy growth rates."

In the typical sober and intellectual presentation associated with Mr. Clark, he had begun his talk with the following observations;

> "Analyzing and forecasting our industry by key indices is a continuing process at Baker International. In December of 1979, when we reviewed the 1980 through 1984 five-year activity forecast, the predicted growth rates were so high, when compared to other industry forecasts, that I felt we must be on the lunatic fringe. During the summer, however, others began to report similar expectations for the markets in which we participated, and now, reinforced by the growth in activity during the year, we are very optimistic that the upcoming five years will be better than we forecast and we will experience even greater growth than during the five years following the embargo of 1973."

"Let the good times roll" quickly became the operating and investing mantra for the global oil and gas industry

As they say in New Orleans: Laissez les bons temps rouler! "Let the good times roll" quickly became the operating and investing mantra for the global oil and gas industry. Little did we realize how the flood of money coming into the industry would send it over the cliff when the global oil supply/demand balance got out of whack.

Several of the charts from Mr. Clark's presentation set forth the prevailing view of how and why oilfield activity would be so strong. Much of it was predicated on the view that the western world could not depend on the security of Middle East oil, therefore other areas needed to develop their resources. Unfortunately, these other regions, including the United States, were not as well endowed with hydrocarbon resources. Thus, looking at the number of wells that needed to be drilled to offset one Saudi Arabian or Iranian oil well

suggested that there would have to be substantial drilling. The numbers get even more dramatic when translated into the wells needed to produce one million barrels a day of oil.

Exhibit 11. Wells Needed To Replace Saudi Wells

	NO. OF WELLS TO REPLACE 1 SAUDI-IRANIAN TYPE WELL	NO. OF WELLS TO PRODUCE 1 MILLION BBL/DAY
UNITED STATES*	274	20,963
CANADA	207	15,823
MEXICO	30	2,317
VENEZUELA	68	5,177
BRAZIL	18	1,376
ARGENTINA	188	14,376
UNITED KINGDOM	1.5	118
NORWAY	5	358
LIBYA	7	561
ALGERIA	12	946
NIGERIA	9	684
INDONESIA	30	2,304
AUSTRALIA	12	925
* NON STRIPPER	BASED ON 1979 PRODUCTION	
	SOURCE: WORLD OIL	

Source: Baker International, PPHB

Over the five-year period, the total rig count needed to increase by 65%, or more than a 10%-per-year growth rate

Given the expected amount of drilling that would be needed based on offsetting Saudi and Iranian oil, the analysis led to a forecast of working rigs needed by region in 1984, compared to those that had been active during 1979. Over the five-year period, the total rig count needed to increase by 65%, or more than a 10%-per-year growth rate. The U.S. was expected to have the highest growth rate with the international market second.

Exhibit 12. Drilling Rig Forecast For 1980s

WORKING RIG ANALYSIS

GEOGRAPHIC SEGMENT	FISCAL 1979	FISCAL 1984	COMPOUND GROWTH RATE (%)
U.S.	2139	3692	11.6
CANADA	332	485	7.9
INTERNATIONAL	1075	1682	9.4
TOTAL	3546	5859	10.6

Source: Baker International, PPHB

The increase in drilling rigs would generate a nearly 72% increase in footage drilled.

Exhibit 13. How Much More Drilling Was Needed

FOOTAGE DRILLED FORECAST*

GEOGRAPHIC SEGMENT	1979	1984	COMPOUND GROWTH RATE (%)
U.S.	228.2	402.4	12.0
CANADA	28.0	41.7	8.3
INTERNATIONAL	51.6	84.3	10.3
TOTAL	307.9	528.4	11.4

*Millions Feet Drilled

Source: Baker International, PPHB

This became an excellent example of how "group think" gets you into trouble

The Baker International analysis produced growth rate forecasts for U.S. activity for the next five years that were significantly greater than experienced during the previous five-years, with the exception of the total drilling rig fleet. It was these growth rates that Mr. Clark referenced in his opening comments about wondering if he and his management team were on the "lunatic fringe"? As he commented, his optimism eventually was shared by managements of most other oilfield service and oil and gas companies. This became an excellent example of how "group think" gets you into trouble.

Exhibit 14. The Optimism Of 1980 Oil Industry

UNITED STATES

COMPOUND ANNUAL GROWTH RATE

OF ACTIVITY INDICATORS

	74 - 79	80 - 84
TOTAL RIG POPULATION	11.1%	9.1%
ACTIVE RIGS	8.0%	11.6%
YEARLY FOOTAGE DRILLED	8.3%	12.0%
TOTAL WELLS DRILLED	8.5%	11.8%
OIL WELLS COMPLETED	5.6%	11.9%
GAS WELLS COMPLETED	13.9%	12.0%

Source: Baker International, PPHB

These changes were conceived to help capital-intensive companies raise money easier

Given the optimism for the long-term future of the oil and gas and oilfield service industries, the challenge would be securing sufficient people and equipment to fulfill the forecasts. A significant hurdle was financial. Investors in the 1970s were saddled with high personal income tax rates. To encourage capital investment, tax policy changes were considered necessary in order to enhance the speed with which capital assets could be depreciated, as well as to provide immediate investment tax credits. These changes were conceived to help capital-intensive companies raise money easier. Wall Street embraced the tax law changes and started marketing investments that provided ways to shelter significant amounts of current income of high net worth individuals, while promising significant long-term returns. Individuals suddenly were investing in cattle and railroad tank cars, and before long, they were partners in

newly constructed land and offshore drilling rigs and supply vessels. Not only did these investments offer huge depreciation charges to shelter current income, but they were viewed as solid long-term investments given the need for greater exploration and development activity for as far into the future as one cared to project.

This limitation became a hurdle when the cost of newly built offshore rigs and boats escalated

The oilfield equipment tax-shelter partnerships carried restrictions on the number of investors who could participate. This limitation became a hurdle when the cost of newly built offshore rigs and boats escalated dramatically, pushing up the investment required by each investor.

This funding mechanism guaranteed that government funding would find its way to supporting job creation in the lending country as their shipyards filled up and new ones opened

Governments around the world were also interested in becoming involved in funding the new equipment needed for the rapidly growing global energy industry. For many governments, the easiest way to participate in the business was to provide cheap financing for constructing offshore drilling assets as long as they were built in local shipyards. This funding mechanism guaranteed that government funding would find its way to supporting job creation in the lending country as their shipyards filled up and new ones opened. Even the U.S. got involved through expanding the loan guarantees available under the Maritime Administration. The avalanche of capital flowing into the energy business in the 1970s was amazing, and we are endeavoring to quantify its impact.

Exhibit 15. Tax-Shelter Money Funding Drilling Rigs

NEW ENTRY OFFSHORE DRILLING COMPANIES
FINANCING RIGS THROUGH U.S. LIMITED PARTNERSHIP ARRANGEMENTS
As of December 31, 1982

Rig Owner	No. of Rigs
Bailey-Shannon	2
Bonito Offshore	2
Broughton Drilling	2
Chiles Drilling	4
Griffin-Alexander	6
Houston Offshore International	5
Houtech Energy	3
Huthnance Drilling	3
Keyes Offshore	6
Magnum Marine	4
Nordrill	4
Phoenix Seadrill	2
Savage Drilling	1
Temple Drilling	3
14 companies	47 rigs
	(6.6% of mobile rig fleet)

NOTE: New entry = entered the business in the last 5 years
All units are jackups
Marine Drilling and Penrod Drilling may have financed several rigs through limited partnerships which were private offerings.

Source: Offshore Data Services, PPHB

As of December 31, 1982, 14 new entrant companies had financed 47 mobile drilling rigs, or 6.6% of the fleet, with U.S. limited partnership arrangements

One area where we can quantify the impact is the offshore mobile rig industry. As of December 31, 1982, 14 new entrant companies had financed 47 mobile drilling rigs, or 6.6% of the fleet, with U.S. limited partnership arrangements. These companies were considered new entrants because they had been formed within the prior five years, or since 1977. It was believed that two other drilling companies – Marine Drilling and Penrod Drilling – had financed rigs through limited partnerships, but they utilized private offerings so no specifics were available.

That translates into a $676.8 million investment in the 47 jackups built under limited partnership arrangements

To appreciate the magnitude of the investment, we utilized data from Offshore Data Services from 1983. Based on its analysis, the average cost of newbuild jackups in the early 1970s was $8.0 million each, which rose to $13.8 million for those built in the mid-1970s, and $21.3 million for those in the late-1970s. Early 1980s jackups cost $33.5 million on average. These cost escalations reflected the impact of demand on shipyards, along with the increased capabilities of the rigs and the cost of the materials needed to build them. If we average the cost of jackups for the entire 1970s, it averages $14.4 million per rig. That translates into a $676.8 million investment in the 47 jackups built under limited partnership arrangements. Since we don't have the exact dates for these rigs, our sense is that our total cost estimate is conservative. Eventually each of these jackup partnerships wound up in bankruptcy and were acquired by other contractors.

Exhibit 16. High Oil Prices And Offshore Fleet Growth

RANKING OF THE MAJOR MOBILE RIG OWNERS
(Total Includes Existing and Under Construction Units)

Year End	Total Companies	No. of Rigs in Fleet	Analysis:
1970	51	212	16 companies (31%) own 149 rigs (70%)
			13 American (U.S.) compnaies - 140 rigs
			2 Foreign companies - 6 rigs
			1 National oil company - 3 rigs
1975	99	431	25 companies (25%) own 299 rigs (69%)
			18 American (U.S.) companies - 264 rigs
			5 Foreign companies - 24 rigs
			2 National oil companies - 11 rigs
1979	109	544	25 companies (23%) own 380 rigs (70%)
			18 American (U.S.) companies - 303 rigs
			3 Foreign companies - 25 rigs
			4 National oil companies - 52 rigs
1982	132	780	24 companies (18%) own 501 rigs (64%)
			16 American (U.S.) companies - 374 rigs
			3 Foreign companies - 36 rigs
			5 National oil companies - 91 rigs

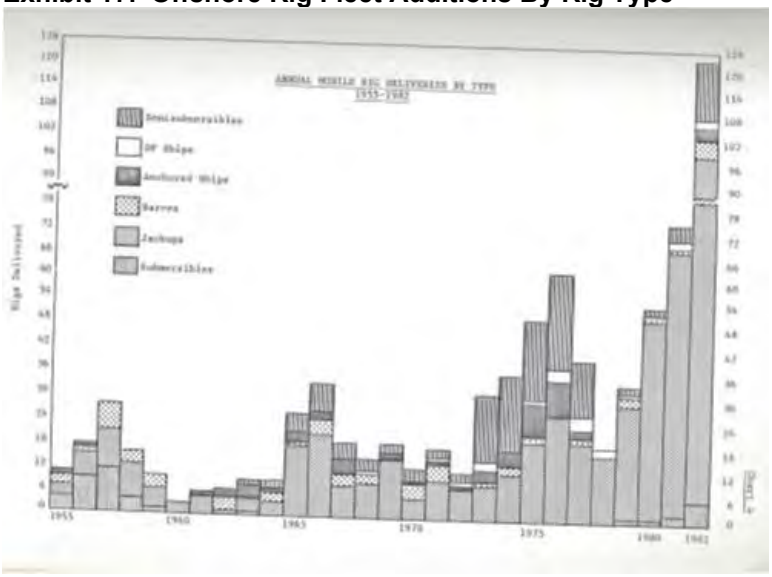
Source: Offshore Data Services, PPHB

Between 1970 and 1982, 81 new drilling rig contractors (including oil companies) were created

One more example of the 1970s boom environment was the overall growth of the offshore mobile rig fleet. Between 1970 and 1982, 81 new drilling rig contractors (including oil companies) were created. The total rig fleet increased by nearly 370%, with more rigs coming in the following few years. Exhibit 16 (prior page) shows the details of the rig fleet growth. The table also shows how a small number of companies increased their fleets, but as a share of the total, they fell slightly.

A chart from an Offshore Data Services report on the mobile drilling rig market we helped author shows how dramatically the number of new rigs entering the fleet increased in response to higher oil prices and expansion of global offshore drilling during 1955-1982. While the details in the chart are difficult to see clearly, we call your attention to the growth in the number of jackup drilling rigs and semi-submersible rigs. The former were the preferred rigs built in the late 1970s and early 1980s, while semis dominated the new rig deliveries in the early- to mid-1970s. The difference in the timing of the fleet expansions by these two types of rigs was in direct response to the growth in the North Sea market in the 1970s and the impact of rising U.S. natural gas prices and the move to area-wide leasing in the Gulf of Mexico at the end of the 1970s and early 1980s.

Exhibit 17. Offshore Rig Fleet Additions By Rig Type



Source: Offshore Data Services

There are numerous similarities between the two downturns, but there are also differences

We will have more to say about the evolution of each of these markets as we study the shift from the boom to the downturn and eventual industry recovery. There are numerous similarities between the two downturns, but there are also differences, which will become clearer as we move into the next stage of the industry history.

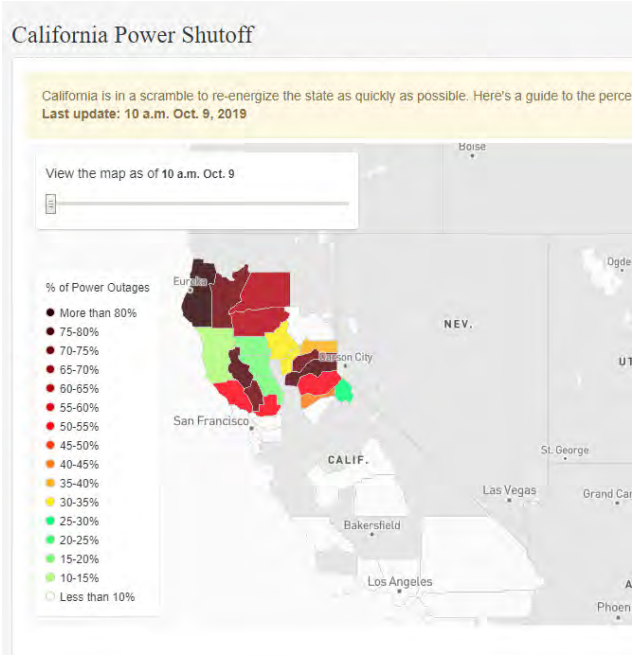
Is California Ground Zero For The Green New Deal?

In November 2018, sparks from an electricity transmission line started the Camp Fire, which became one of the deadliest and most destructive fires in California history

The idea of turning off electricity in order to prevent wildfires has been tried before, but nothing on the scale that Pacific Gas & Electric (PG&E) is doing to try to prevent new fires. In November 2018, sparks from an electricity transmission line started the Camp Fire, which became one of the deadliest and most destructive fires in California history. The fire claimed the lives of 85 people, burned 153,336 acres and destroyed 18,804 structures. At an estimated cost of $16.5 billion, Camp Fire ranked as one of the world's costliest natural disasters that year. It also precipitated the bankruptcy of PG&E, which faced liabilities of an estimated $30 billion due to the fires it was responsible for starting.

The issue of wildfires in California has become a serious issue given the dry spell the state has experienced that is being blamed on climate change. History shows that the state has experienced longer and more severe heat and dry spells that had nothing to do with climate change. A cause of wildfires has been sparks from the steel hangers that hold above-ground electric transmission lines that crisscross the state. An easy way to prevent these fires from starting is to deactivate the transmission lines when heat and dry conditions coupled with high winds increase the risk that fires can start and spread rapidly, turning small brush fires into widespread wildfires.

Exhibit 18. First California Blackout Scale



Source: ***USA Today***

The ability to provide significant advance warning is limited since forecasting weather conditions doesn't provide long lead times

As PG&E attempts to exit from bankruptcy, it has established a formal policy of shutting down power in areas susceptible to fires when conditions are ripe for them to start and spread. The ability to provide significant advance warning is limited since forecasting weather conditions doesn't provide long lead times. Thus, a few weeks ago, although warned that rolling blackouts were likely as weather models forecast winds would increase and dry conditions existed, nearly 700,000 homes and businesses, accounting for approximately two million people, lost their power.

PG&E had informed state officials that it might shut off power to a large area of Northern California on a Friday, only to have to actually implement the scheme faster than anticipated. The public was only informed of the potential for blackouts on Monday, and people actually woke up Wednesday morning in the dark. Most of the people had their power restored by noon on Friday, but they acknowledged that the experience wasn't fun, and for many small businesses, very costly.

Schools and businesses closed disrupting the lives of families and hurting the incomes of many workers

With power shut down for large areas, schools and businesses closed disrupting the lives of families and hurting the incomes of many workers. In addition, the lives people have become adjusted to living are suddenly altered in ways they are not prepared for nor have experienced other than during natural disasters.

The latest major blackout hit the San Francisco area, impacting one of six people living in the region. For an example of how California residents are having to adjust and plan for living in the future, the local ABC 7 station in San Francisco published the following list of steps to be taken to prepare to survive the ordeal.

> "Here are some tips to prepare for a power outage.
>
> "Keep your smartphone fully charged.
>
> "Use an external battery charger that can charge your phone several times. If possible, purchase a more robust battery charger that can charge several devices at a time.
>
> "Turn your car into an emergency generator by using a power inverter that turns DC current from your vehicle to AC current to power home devices from your car.
>
> "Store plenty of batteries to power LED flashlights and portable radios. Remember, streaming services won't work without electricity.
>
> "Refill your car's gas tank when it reaches half a tank to avoid being caught without gasoline during a prolonged blackout. Gas pumps rely on electricity to function. If you own an electric vehicle, keep it fully charged.

"Keep plenty of cash on hand since ATM machines likely won't work during a power outage. Credit card machines also require electricity.

"Disconnect your computer and use a surge protector to avoid damage from a power surge when the electricity comes back on.

"Learn to operate your garage door without electricity. Pull on the red handle that should be dangling from the garage door unit. This will unhinge the door from the rail so that you can manually lift the door. Some doors have a key so they can be opened from the outside during a power outage.

"Freeze water in plastic containers so that they will keep food cold during a temporary outage. A freezer can keep food safe for 48 hours if the door is unopened. The refrigerator should maintain cool temperatures for about four hours if the door is not opened.

"Make sure every member of your family has an emergency contact list printed out in case a cellphone battery dies.

"Store non-perishable foods and drinking water for you and your family. Items like crackers, trail mix, canned tuna and dried fruit do not require a stove or electricity to prepare.

"Consider your family's medical needs. Store necessary medications and prepare an emergency power source for any medical devices that require electricity.

"Your emergency kit should have enough supplies to sustain you and your family for three days. ABC7 News produced this video detailing what an emergency kit should contain for this piece on earthquake preparedness."

Rolling blackouts may last for up to a decade

With PG&E predicting rolling blackouts may last for up to a decade before the utility can fully maintain its transmission lines sufficiently to not have to be overly concerned about dry conditions and high winds starting off new fires, residents in its service area are now contemplating a very different lifestyle than they had been living. Intermittent power, whether caused by mandatory blackouts or renewable electricity, results in the need to adjust and plan for those eventualities.

People are wondering whether Northern California will provide a template for how life under the Green New Deal will unfold

People are wondering whether Northern California will provide a template for how life under the Green New Deal will unfold. As residents are telling the media, they are not happy about how their lives are being disrupted. What they don't know, or likely appreciate, is the economic cost of these blackouts. According to Michael Wara of the Stanford Woods Institute for the Environment, the economic cost of the initial power shutdown could reach $2.5 billion.

"If one sums residential and small C&I [commercial and industrial] losses, the total is $2.5 billion in outage costs"

He told *CNBC* that "If one sums residential and small C&I [commercial and industrial] losses, the total is $2.5 billion in outage costs. If one assumes only residential customer impact, $65 million." He arrived at his estimate using the "Interruption Cost Estimate Calculator" created by the Lawrence Berkeley National Laboratory and Nexant, which compiles data on the estimated costs of power interruption.

PG&E officials have stated that every inch of a deactivated power line needs to be inspected before resuming service

Power outages often hit local businesses the hardest since they don't always have the same large-scale infrastructure and power generators that bigger businesses might have. Therefore, a day of lost business can also have a greater impact on their bottom line, since it's a larger portion of annual revenue. Additionally, the dollar impact could be much greater if power isn't restored in a timely fashion. PG&E officials have stated that every inch of a deactivated power line needs to be inspected before resuming service, which could take days to complete. That additional downtime comes after the blackout need has ended, adding potentially up to 48 hours of blackout time before power restoration can begin. That is why PG&E suggests customers prepare for outages lasting several days.

It will be interesting to see how Californians respond to the rolling blackouts and higher electricity rates, and how they react to their political leaders and their climate change agendas, after 6-12 months of this experiment

Will this become the "new normal"? Possibly, since the battlefield has become climate change and the desire of politicians to use the utility to drive their agenda. A recent editorial in *The Wall Street Journal* makes the case that PG&E has had to direct more of its spending to meet the state's mandate for 33% of electric generation coming from renewables by 2020 and 60% by 2030. Additionally, it has to spend hundreds of millions of dollars to reduce the cost of green energy for low-income households. It also is spending millions to install 7,500 electric-car charging stations and offers drivers a $800 "clean fuel" rebate. Given this approach to complying with California's renewable energy mandate and operate its system, the utilities' rates are twice those of utilities in Oregon and Washington. It will be interesting to see how Californians respond to the rolling blackouts and higher electricity rates, and how they react to their political leaders and their climate change agendas, after 6-12 months of this experiment. The *WSJ* asked how a first-rate economy can have a third-world power system.

Other Climate Change News

The start of the New York trial encouraged Massachusetts to sue the company

The climate change legal attacks on the oil industry, and especially Exxon Mobile Corp. (XOM-NYSE), continue. The New York case against ExxonMobil for defrauding investors by maintaining a different internal cost estate for carbon emissions than it stated publicly recently began. The start of the New York trial encouraged Massachusetts to sue the company, too. Additionally, courts have ruled that several of the state lawsuits against the oil companies for failure to educate the public about the dangers of carbon emissions can move forward in state courts rather than being shifted to federal courts. These latest decisions, all in the East, contrast with court

Expect the climate change lawsuit news to be a constant drumbeat

rulings in similar cases in the West that ruled the cases needed to be in federal courts, because the issue is national (international?) in scope and beyond the purview of individual states. Expect the climate change lawsuit news to be a constant drumbeat with a negative impact on the image of the petroleum industry, as well as costing the companies significant amounts to defend themselves.

It was also interesting to learn that the Minnesota Court of Appeals issued an opinion in In the Matter of the Decision on the Need for an Environmental Impact Statement for the Proposed Daley Farms of Lewiston, LLC – 2018 Dairy Expansion Utica Township. Daley Farms wants to expand its dairy operation, and dutifully went through the permitting process with the Minnesota Pollution Control Agency, which granted the necessary permits. A far-left organization, the Minnesota Center for Environmental Advocacy, appealed the granting of the permits, arguing that the agency hadn't taken into account the methane emissions that more cows would generate. The Minnesota Court of Appeals found the objection persuasive and sent the matter back to the agency for further proceedings.

If this decision stands, every famer in Minnesota who wants to add more cows to his farm will have to pay for the preparation of an Environmental Impact Statement

The bottom line is that if this decision stands, every famer in Minnesota who wants to add more cows to his farm will have to pay for the preparation of an Environmental Impact Statement that calculates the effect of the additional farm animals on the Earth's average temperature. The most telling aspect of this ruling is that Daley Farms began its expansion effort in July 2017 and has spent substantial sums in that effort. This may be one of the first successful efforts to begin forcing people to stop eating meat and drinking milk in the name of climate change.

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