# A Certain Uncertainty

Nobody in business likes uncertainty. That is not reality. The reality is that uncertainty is the only thing that is certain. The *"known knowns"* break down periodically and bring periods of upheaval that appear to break all the old rules considered concrete even a short time ago. Technological advancements often have the strongest pull on certain segments of business activity and this causes the perceived rule structure to change. Business investors therefore must adapt to new rules of the present reality.

One would think that technological advancements would always be a positive effect on the energy industry. Advancements in computer processing, seismic research, design and construction technologies, along with a myriad of other humanly-divined efforts, have allowed for less costly and more productive systems to be created and employed than in the past. Continued technological advancements are widely considered to be a certainty. Over the past half century these efforts continually made it cheaper and more efficient to find, extract and move fossil fuels, whether oil, gas or coal, to its final market. In business this is generally considered good. One can more easily predict one's efforts taking into consideration the certainty that the growing world economy and its demand for energy will continue to require more and more oil and gas to satisfy its never-ending development. Occurring in a world of limited and perceived finite resources, one would expect that the value for the product would be maintained at an ever increasing profitable level. Transportation is still the major and fastest growing consumer of fossil energy, currently using well over 50% of oil produced world-wide. The US is the largest consumer, but emerging economies, mainly China and India with their rapid growth, have driven much of this peaking demand in the past 30 years. However, there is another side to this technology coin and when it brings a certainty, there will be yet another side causing certain uncertainties to develop.

Since the advent of the computer each technological breakthrough seems to occur more frequently and have a greater consequence than the last. The life blood of industry and transportation revolves around fossil fuels and the marine market is no exception. It's likely that fossil fuels will continue to drive this sector and the growth in demand will continue. Technological advancements cannot be stopped and breakthroughs related to extraction of resources, such as minerals and fossil fuels, should help the general progression of business and society. However, in the business of doing business, is too much good technology sometimes a bad thing?

In recent years, developments in technology related to the tight oil (fracking) play, concentrating mainly on land-based petroleum and gas reserves in the United States, have caused a major disruption in the certainty of past traditionally expected availability and price of oil and gas. There is more oil being produced in the world today than in the past with more continuing to be found for future exploitation. At the same time perceived and realized global demand, although continuing to increase, is flattening and economic disruptions can cause even further downward (and sometimes upward) pressure on demand. Coupled with continued development plus the advent of alternative technologies available to industries and consumers alike, these factors are affecting our perceived certainties in the supply and demand equation for oil, gas and coal. Natural gas, solar, wind and other technologies used in electrical power generation are becoming more economically viable than ever, making many vintage coal and heavy oil power plants obsolete. The advent of electrical cars will also continue to replace gasoline and diesel powered vehicles as we move into the middle of the 21$^{st}$ century. This is likely to continue to disrupt the traditional supply and demand equation which in the past stabilized oil and gas prices.

After the major oil price collapses in the 1980s and late 1990s, the offshore oil and gas industry was driven by a well-known adage that sources were becoming tighter each year, and the world's economy would continue to demand more and more to satisfy its growth. Between Spring 1980 and Spring 1986, oil fell from a high of over US $100/BBL (about US $247/BBL in today's US $) to about $20/BBL. High prices, due mainly to the oil embargo by OPEC members in the 1970s, caused the US and others to enter into major offshore oil and gas developments in other regions so as to not rely as much on OPEC suppliers. Offshore developments, including the Arctic, were beckoning with newly discovered and potentially massive un-exploited reserves. Increased improvement in technology allowed us to exploit these resources. Oil prices dropped in the 1980s mainly due to the development of these new sources causing a supply shock to the market that pushed prices back down to $30-40/BBL. This effectively wiped

out the growing offshore oil and gas industry and its service providers at that time. Values of assets plummeted and vessels were seized and often sold for 10 cents on the US $1.00 during this period. The demand to source and develop this new and expensive source of oil just wasn't there to support the costs of the new technology needed to make it happen.

After the collapse, the comeback of the offshore oil and gas industry over the next 10-20 years was accompanied by a mostly stable and lower oil price environment, with the price of oil running in the US $20-30/BBL range. There were a few peaks and valleys, such as highs in the $60/BBL range for a brief period in the summer of 1990, and then bouncing around in the US $20–30s/BBL into the late 1990s. Variances were mostly due to geopolitical issues such as the invasion of Kuwait by Iraq in 1990, and then of Iraq by the US in 1992. Oil also fell below $20/BBL for short periods during the latter months of 1997 into Spring 1999 due to Asian economic crises. However, the price always bounced back relatively quickly and these cycles of uncertainty only lasted a few years.

Things changed drastically in the early to mid-2000s when the price of oil skyrocketed from about US$ 27/bbl in November 2001 to over US$ 156/bbl by June 2008. Prior to the price jump, oil industry investments were mostly measured and relatively cautious. Oil maintained a relatively flat price and profits were predictable as one knew the cost to extract and process the resource. The low price environment of the late 1990s into very early 2000s caused a decline in E&P spending as the expense wasn't covered by existing profits. As a result of the lack of new exploration, there wasn't enough growth in oil supply to meet the increased global market demand triggered predominantly by the rising economies of Asia. Besides lack of investment, the 9/11 terror attacks in the U.S. with resulting invasions and increased military activity in the Middle East further restricted supply. The lack of oil supplies combined with the increase in demand caused a major spike in prices. As a result of the increasing prices, which started the pricing cycle over again, there was an unparalleled rise in E&P activity via newer technologies to satisfy the developing new world economies and the seemingly insatiable demand for oil and gas consumption. Driven by the lack of supply to cover the high demand, prices topped out at close to US $150/BBL by June 2008. Investments in high risk and high expense offshore plays took precedence as supplies appeared unable to meet the ever-increasing demand. The idea of oil prices dropping to the low levels of the previous decade was a far distant thought.

Then the greatest US economic recession since the Great Depression of the 1930s occurred resulting in a massive decrease in consumption from the US and corresponding world economies. The subsequent impact was the decline of oil prices by over 60% by the end of 2008 and into beginning of 2009. Prices did bounce back relatively quickly starting in Spring 2009, ending around US $100/BBL. Therefore, it was back to business as usual with continued high expectations for prices based upon the perception of not having enough supply to meet oil and gas demand driven by increasing world economic activity. The generally perceived stabilization of high prices around US $100/BBL drove technology investment in deep water and other remote oil markets and in non-conventional sources, such as oil sands, tight oil and Arctic fields, which allowed for extensive growth in deep water. More and more money was spent to find new sources of oil in high risk plays. Offshore fleets were designed and financed to expand and accommodate the increasingly difficult exploitation needs in these regions. High expenditures of new E&P money matching the price of oil extracted generally allowed for continued profits despite the high risk involved. New technology also developed during this post-2000 era in the tight oil segment of land-based fracking and extraction. This technology caused a renaissance in the land-based shale / tight oil market with more oil than ever located and brought to the U.S. market. Continued improvements in tight oil developments eventually culminated in the transformation of the world oil market to one that was once again flooded with product.

The US tight oil shale market activity pushed the US to become one of the leading producers of oil in the world. Therefore, OPEC was no longer the market setting entity that it had been since the 1980s. In 2014 a battle over control of market pricing between the main producers caused OPEC to push to out-produce the shale market. The idea was to drive down oil prices to make production unprofitable for US shale producers, in turn forcing them to cut production. This obviously didn't work. The shale producers were ever-tightening their costs of production and had the ability to *"turn on and turn off"* production in a matter of weeks versus months needed for offshore related production. The quicker ability of this tight oil player

to exit and enter the market was continually underestimated by its rivals. In late 2016 we saw the OPEC group and Russia cut production in an effort to stabilize market oil prices. Shale and offshore drillers were forced to cut costs and reduce production in order to stay alive in the new low price environment. Already at a disadvantage, the offshore market suffered the most from 2014 through today. According to the IEA, offshore market investments were curtailed roughly 25% in 2015 and another 26% in 2016. Production costs, including technology and labor, have dropped as a result of the current climate, as they tend to do in reaction to falling oil prices. Most recent developments are pointing to some stabilization around US $50/BBL. This environment of reduced investment in new oil development and the ever continuing rise in demand for oil and gas looks to be starting to turn the market again. Some are predicting that the lack of new investment will cause a shortage in supply as a result and a price surge will be seen in the next few years. Others, however, advise that a continuing and potentially increasing recovery of US oil output will continue to curtail prices over the next several years.

In the offshore market, the general conventional wisdom advises that prices around US $60-$70/BBL on a sustained basis should allow for profitable development and this would be a reasonable price level for profitability to return and be maintained. The International Energy Agency forecasts that oil demand will grow steadily year-on-year at an average rate of 1.2 million b/d per annum through 2022. With new oil sources having been seriously curtailed, we expect that prices will continue to rise in this environment. With the shale market able to quickly adjust production, offshore investments are tending to look at short-cycle projects versus major long-cycle projects. This will allow oil investors quick and sure returns. The choice of short-term or short-cycle projects may work in meeting current demand, but it is expected by many that retraction of long-term investments will lead to an eventual shortfall in production going into the next decade since consumption continues to grow. This projected shortfall remains to be seen and each year brings another prediction of things turning around for the offshore market towards the end of _____ (insert desired year here). Technology has been fooling our predictions for a long time and it is truly anybody's guess how it will play out over the next few years. Until a strong pattern emerges which buoys and holds oil prices at a profitable level, the uncertainty of the market will continue to loom over long-term decision making.