A Sector in Transition
Expert Perspectives on the Oil & Gas Industry
# TABLE OF CONTENTS

1. **Introduction**  
   
2. **UAE – A Case Study In Managing The Energy Trilemma**  
   Suhail Mohamed Faraj Al Mazrouei, Minister of Energy for UAE  
   
3. **No “New Normal” For US Energy Markets; Volatility Is Order Of The Day**  
   Blu Putnam, Chief Economist of CME Group  
   
4. **The Long But Necessary Road To Energy Resilience**  
   Dean Oskvig, President and CEO of Black & Veatch Energy Business  
   
5. **What Deepwater Oil and Gas Companies Can Learn From The Shale Revolution**  
   Bill Heath et al., Oliver Wyman's Energy Practice  
   
6. **Petrostates Face Perilous Future in New Oil Paradigm**  
   Andrew Manners, Visiting Fellow at Future Directions International  
   
7. **Oil Industry Safety, Maintenance at Risk in Wake of Price Falloff**  
   Andrew Herring et al., Marsh  
   
8. **To Bailout or Not Bailout Oil-Dependent Countries**  
   Chris Kuehl, Managing Director of Armada Corporate Intelligence  
   
9. **Despite End of Export Ban, Rough Seas for Oil and Gas**  
   John Koob et al., Mercer and Oliver Wyman  
   
10. **Falling Oil Price Pressures Saudi Arabia, Increases Risk**  
    Lindsay Hughes, Research Analyst for Future Directions International  
   
11. **Progress Toward Balanced, Sustainable Energy World Remains Slow**  
    François Austin, Partner and Head of Energy Practice for Oliver Wyman  
   
12. **US Shale Could Herald Revolution For Regional Oil Markets**  
    Saji Sam et al., Oliver Wyman’s Energy Practice  
   
13. **Risk And Opportunity On The Rise For Oil And Gas Companies**  
    Philip Tenenbaum et al., Mercer  
   
14. **“Digital Oilfield” Vulnerable To Cyber Threats**  
    Silvio Sperzani, Partner at Oliver Wyman  
   
15. **The Oil And Gas Talent Gap**  
    BRINK Editorial Staff  
   
16. **What Ever Happened To Big Oil?**  
    François Austin et al., Oliver Wyman  
   
17. **Top Commodity Traders Revamp Strategy As Industry Matures**  
    Roland Rechtsteiner, Partner and Global Head of the Oil & Gas Practice at Oliver Wyman  
   
18. **The Secret Life Of Railroads**  
    BRINK Editorial Staff  
   

INTRODUCTION

The articles contained in this publication have been selected for the ways in which they examine crucial issues for the oil and gas industry. They provide critical insight into the traditional and emerging risks facing companies in the sector, as well as the opportunities available to those companies that best position themselves to take advantage of them.

All articles first appeared on BRINK – a digital platform that informs global decision-makers on critical growth and innovation topics. BRINK is made possible by Marsh & McLennan Companies and managed by Atlantic Media Strategies, the digital consultancy of The Atlantic. It collates knowledge and expertise from the world’s leading experts on risk and resilience to provide practical and timely insights to top executives and policy leaders worldwide.
How to manage the Energy Trilemma – the balance between secure, affordable, and environmentally sustainable energy – is a critical question facing all countries, regardless of their energy resources.

There is no single right solution to this trilemma and each country develops and adapts its approach and policies taking into account energy resources and needs, economic goals, social needs, and opportunities stemming from new technologies.

The United Arab Emirates offers a case study in the evolution of approaches to balancing the energy trilemma. From an initial focus on using its abundant oil reserves, the UAE has widened its view on energy security to include a diversity of energy sources – including nuclear and renewables – as well as energy efficiency and demand side management. This energy security approach provides affordable energy to fuel a diverse economy and improve overall environmental sustainability. Public acceptance of the country’s plans for demand-side efficiencies may also require a re-examination of its subsidy system.

Today, planning for energy security and sustainability is on the top of our government’s agenda. Energy will continue to be an economic cornerstone of the UAE and will strengthen the country’s competitiveness in the future.

EARLY FOCUS ON LEVERAGING AVAILABLE ENERGY RESOURCES

Since the early days of our union, the government used local oil resources to build a reliable energy infrastructure to guarantee the availability of electricity and fuel to its entire population. As our population and economy grew, the government realised the need to reduce the use of liquid fuel and replace it with natural gas for environmental and cost factors.

Our capital, Abu Dhabi, will be an international hub for renewable energy, new energy, and sustainable technologies, thereby balancing its already strong oil-producing position.
That's also when we decided to diversify the natural gas fuel sources and consider importation.

In 2007, Dolphin Energy, a gas company established by the government in 1999, began importing 2 billion cubic feet per day of compressed natural gas via a subsea pipeline from Qatar, which we also supplied to Oman. Today, natural gas from Dolphin Energy supplies almost half of our electricity requirements and allows us to remain almost 100 percent dependent on natural gas for power generation.

In addition to imports, we have also started developing some of the most challenging unconventional sour gas reservoirs in Abu Dhabi. The gas development is part of a broader production capacity enhancement project aiming to set the country at 3.5 million barrels of oil per day by 2017. The production capacity enhancement will ensure the country's position as a long-term oil supplier to the world and keep up with growing local demand. We also upgraded our refinery output to more than 1 million bopd by the end of 2015 from the previous level of 500,000 bopd.

A GROWING FOCUS ON DIVERSITY OF ENERGY SUPPLY

With rapid economic growth and the rise of oil prices, the UAE government again realised the need to cultivate diverse energy sources – that's when we decided to introduce nuclear power and started a journey with the international community to get the endorsement of a state of the art peaceful, safe and secure nuclear program. The Emirates Nuclear Energy Cooperation is constructing four nuclear plants, which will provide 5600 MW-H of emission-free electricity. This will help the UAE reach its clean energy target of 24 percent by 2020.

In the UAE we believe in the future energy evolution and expect that sustainable energy will play a key role in complementing conventional sources. Our capital, Abu Dhabi, will be an international hub for renewable energy, new energy, and sustainable technologies, thereby balancing its already strong oil-producing position. As an expression of this strategy, Abu Dhabi hosts the headquarters of the International Renewable Energy Agency. As part of its commitment to sustainability, and in order to encourage the development of a knowledge-based, export-oriented renewable energy sector, the Abu Dhabi government has made a commitment to renewable power. This decision supports the ongoing diversification of the country’s economy and is expected to create a domestic renewable energy market.

Sustainable energy is becoming part of our future energy mix, and we are expecting it to contribute at least 5 percent of the energy mix in the near future. Currently, we have three solar projects feeding the grid, and one of them is Shams-1: One of the world’s largest concentrated solar power plants with a capacity of 100 MW-H. The plant is expected to displace 175,000 tons of CO₂ every year, equivalent to planting 1.5 million trees or taking approximately 15,000 cars off the road.

MANAGING ENERGY USE TO INCREASE SECURITY AND SUSTAINABILITY

The Ministry of Energy is mandated to structure the National Energy Conservation Law as part of the UAE's energy policy.

With multiple initiatives for improving the energy efficiency of buildings, we have a good base to start from. Changing consumption behaviour will require some time, and speeding up public acceptance of this plan may require us to re-examine our subsidy system in the UAE.

With the wisdom of our leadership and good planning, we can be an example in the region by building a balanced and sustainable energy policy that ensures security and availability, affordability, and sustainability of resources.

This article appeared on BRINK on December 12, 2014.
NO “NEW NORMAL” FOR US ENERGY MARKETS; VOLATILITY IS ORDER OF THE DAY

Blu Putnam
Chief Economist of CME Group

Energy markets are entering their second year of a low-price environment and that may bring yet more changes in market dynamics, with the major development of 2016 being a slowing of North American production.

This production cutback comes with a significant lag after the price drops, but the lack of new investment in 2015 and few prospects for investment in 2016 and beyond suggest the time has arrived to observe supply adjustments.

Natural gas is more likely to dance to the tunes played by evolving weather patterns. El Niño is strong, and typically there will be some serious droughts, most likely in Indonesia, Malaysia, possibly Australia and India, with a warmer-than-usual winter in the United States that may support low natural gas prices. Strong El Niños, however, are often followed in short order by a strong La Niña, cooler waters in the equatorial Pacific, which might include a very cold 2016-17 winter in the US and reverse the current course of natural gas prices.

And then, there is the BTU pricing gap in the US, where $1 spent on natural gas buys considerably more energy content compared to refined petroleum products, suggesting long-term upward price pressure on natural gas and/or downward pressure on crude oil.

MARKET REACTIONS TO LOWER OIL PRICES

When commodity prices fell in 2008, it was mostly related to a sharp drop-off in demand from the mature industrial countries that were experiencing a financial panic. In late 2014, when oil prices fell by half, the challenge for commodities in general, and oil specifically, was excess supply complicated by weakening demand from China and many emerging market countries.

To the amazement of many analysts, there was not a quick supply

The new development in 2016 may be, at long last, evidence of a supply response in North America to lower oil prices.
response to lower oil prices. Many oil companies have considerable debt, and many oil-producing countries have significant income requirements. Hence, when oil prices dropped, there was a need to keep the cash flowing. Certainly, many of the high-maintenance and expensive wells were shut down; however, increased production was obtained from the more cost-efficient wells. Production overall held up very well.

The new development in 2016 may be, at long last, evidence of a supply response in North America to lower oil prices. During 2015, many new investment projects in the energy sector were cancelled or delayed indefinitely. A year later, though, the lagged impact of the lack of capital investment in energy projects could start to be reflected in oil production in 2016 and well beyond.

While there is certainly a possibility of oil prices revisiting previous market lows, or going to $20 as some analysts have suggested, the probability is declining sharply. The market impact of slower growing demand from China and more Middle Eastern supply, particularly from Iran, is fully incorporated into prices. These factors are old news. Hence, as argued here, the surprise of 2016 may involve less supply.

The NUANCES WITHIN THE ENERGY SECTOR

Within the energy sector, there are some important differences in market dynamics. US crude oil, represented by West Texas Intermediate (WTI), is now gaining favour over North Sea oil (i.e. Brent) in terms of its potential to reassert itself as the global benchmark for oil prices. Brent has been in a production decline for over a decade. Moreover, Brent has been hit harder by lower prices, since the North Sea is a high-maintenance region from which to extract oil. Also, European natural gas long-term contracts were once priced off Brent, but that is happening less and less as natural gas prices dance to their own tune, even in Europe. We expect more volatility in the basis risk between Brent and other oil types, which will make Brent less useful for hedging and risk management relative to WTI.

There is also likely to be movement in the price for natural gas in different regions of the world over the next few years. The US, as a low-cost producer, has the potential to export liquefied natural gas to Asia, especially Japan. While it takes years and billions of dollars to build the liquefaction plants and port facilities, it is all in progress, and over time, this will put upward pressure on US natural gas prices and downward pressure on natural gas prices in Europe and Asia.

Weather matters, too. A strong warming of the Pacific Ocean near the equator approaching South America represents an El Niño weather pattern that has built steadily since March 2015. Warmer waters lead to more evaporation, and that means more precipitation depending on where the winds blow. El Niños, however, also shift wind patterns and raise the potential for a warmer-than-average winter in the US.

Looking further ahead, however, the energy markets need to be thinking about La Niña. The forces

![FIGURE 1 WTI AND BRENT CRUDE OIL PRICES](source: Oliver Wyman analysis)
that created El Niño can dissipate with amazing speed. Indeed, a strong El Niño is often followed in short order by a strong La Niña, meaning much cooler-than-normal waters along the equatorial Pacific.

Put another way, a warmer-than-usual US winter of 2015-16 might be followed by a much colder one in the winter of 2016-17, reversing the weather-related influences on US natural gas prices.

And finally, for the very long-term outlook, one has to consider the BTU pricing gap in the United States. One dollar spent on natural gas in late 2015 buys almost a half-million BTUs of energy, while the same dollar spent on refined petroleum products (i.e. crude oil-derived products) yields less than 150,000 BTU; that’s a threefold-plus ratio in favor of natural gas. Over time, and we mean a long time, this will drive more residential and industrial demand for natural gas relative to crude oil.

The bottom line for energy markets is that a “new normal” is highly unlikely. Instead, markets will adapt to the changing dynamics, driven by everything from economic growth patterns and current global pricing disparities to shifting ocean temperatures. Volatility is the order of the day.

All examples in this report are hypothetical interpretations of situations and are used for explanation purposes only. The views in this report reflect solely those of the author and not necessarily those of CME Group or its affiliated institutions. This report and the information herein should not be considered investment advice or the results of actual market experience.

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THE LONG BUT NECESSARY ROAD TO ENERGY RESILIENCE

Dean Oskvig
President and CEO of Black & Veatch Energy Business

As the world meets in Paris for COP21, the energy sector needs a clear pathway that ends the uncertainty that has cast a shadow over the energy sector for the last decade. Climate change negotiators have an unprecedented opportunity – and also a responsibility – to put us on a sustainable path that will allow the global economy to continue growing while minimising the impact on the environment.

The world risks failing to meet its energy goals and basic goals of economic development if action is not taken now. In its latest publication, The Road to Resilience – Managing Extreme Weather Risks, the World Energy Council points out that the frequency, severity and exposure of energy systems to extreme weather events are increasing and that the world needs to build more resilient energy systems.

The report highlights the pending crisis that the global economy will face if energy systems are not transformed to handle changing climatic conditions.

The occurrence of extreme weather events has quadrupled over the last 40 years, from 38 events in 1980 to 174 events in 2014. Severe storms’ contribution to overall insured losses (last 5 years compared to last 20 years) alone has increased more than 40 percent. Many more events are expected in the future, driven by the increase in global average temperatures.

These climatic conditions are impacting the energy infrastructure and interconnected systems everywhere. As the frequency and severity of extreme weather events increase, the strain on energy supply and demand, production, revenue streams and overall system efficacy is nearing crisis levels. The trends suggest no region is unaffected and no energy system is unthreatened; a global view for energy resiliency is required.

As the frequency and severity of extreme weather events increase, the strain on energy supply and demand, production, revenue streams and overall system efficacy is nearing crisis levels.
The traditional approach for energy infrastructure resiliency needs to evolve to align with the increasingly extreme weather. In the past, the energy sector has relied on “hard resilience” – an approach focused on building “fail-safe” infrastructure systems. Resilience has been viewed as a way to bring single assets back into operation after an event.

“Hard-resilience” measures are no longer sufficient. Rather than preparing energy assets to resume operations after an event, the energy sector needs to be prepared for an event to occur anytime. Adopting a view of “soft-resilience” – one that focuses on preparing for extreme events – is more proactive and enables better planning.

Furthermore, to ensure the reliability of operations, energy systems need to be viewed holistically as opposed to individual assets. This reduces vulnerabilities that may result from unanticipated events in one part of the value chain and also provides opportunities for different sectors to work together to ensure continuity.

Overall, there needs to be a shift from “fail-safe” systems that look at single assets to “safe-fail” systems that take a systemic approach towards the energy value chain and a more strategic approach towards identifying vulnerabilities.

FINANCIAL INVESTMENTS NEEDED TO BOLSTER ENERGY RESILIENCY

There is a significant financial investment required over the next several years to increase the resiliency of energy systems. Current estimates show between $48 trillion and $53 trillion is needed for energy adaptation alone; however this does not include the measures needed to support resilience. Given the magnitude of funding required, the responsibility of resilience is on both the public and private sectors to ensure that costs are managed effectively.

Several challenges currently stand in the way of generating resiliency investment and require the support of various stakeholders to tackle. These include developing goals or metrics to measure adaptation (e.g. sufficient level of resilience) to understand its true costs, and enable governments and companies to track progress; incorporating environmental standards into investment considerations, and designing uniquely tailored financial instruments that create opportunities from extreme weather risk.

Though the road to resilience is long, it is an integral aspect of achieving long-term sustainability. As this report concludes, it calls on various stakeholders to take action and play their part in supporting the future resiliency of energy systems. The report calls on:

► Energy companies and project developers to consider extreme weather in their planning, operations and maintenance, and to implement hard and soft resiliency measures

► Regulators to provide guidance for resilience and market regulations, and to open energy infrastructure to all investors

► The financial services industry to develop models that fully reflect extreme weather risks and include hard and soft resilience measures in their cost benefit analyses

► Insurance companies and banks to create risk transfer options for residual risks

► Long-term and institutional investors to collaborate with other stakeholders to overcome investment barriers

The world is changing. The energy sector is in transition and facing a new world order post-COP, as the global geographic, economic and societal outlook evolves over the next several years, industries and economies need to adapt to survive. There is currently no unaffected region and no economy strong enough to protect its energy assets, nor its citizens; resilience is not an option, it is a must.

This article appeared on BRINK on October 15, 2015.
WHAT DEEPWATER OIL AND GAS COMPANIES CAN LEARN FROM THE SHALE REVOLUTION

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Shale drillers are forging new operating models that will continue to challenge the conventional practices of the oil and gas business in a number of key areas. At first glance, these operating tactics may appear more relevant for managing a Silicon Valley startup than for running an oil and gas company. Like many high-tech startups, shale drillers manage a rapidly changing set of daily activities and must continuously improve technologies across widely dispersed assets and supply chains to remain competitive.

There are four key lessons from the next phase of the shale revolution that deep-water operations can benefit from:

1. Integrate technology and operations more closely. In shale, the winners rapidly deploy the best new technology into the next well by holding local business leaders (asset leaders) fully accountable for technology pilots. They do not have separate technology and operations budgets with years-long cycles.
Team performance metrics are simple and directly reward all contributors for producing profitable barrels or enhancing ultimate recovery. Technology portfolios are focused on innovating in one or two key areas, while at the same time remaining on top of a broader set of best practices used by competitors.

Like shale drillers, conventional oil and gas players should focus on improving the productivity of their sites instead of accepting the status quo. To do so, oil and gas companies should concentrate their resources on those improvement programs that will affect fundamental business metrics, such as well and reservoir productivity. At the same time, they should re-evaluate how they filter ideas from other facilities and operators to implement innovations more quickly.

★ 2 – Become more agile. Shale drillers have learned that the best decisions are made by fully empowered and integrated teams that are not divided by functional lines. Business, technical and safety managers work side by side, wherever possible. A very small corporate centre serves as the knowledge facilitation hub. The team is bound together by a culture of continuous improvement in which it is OK to fail, and where failure does not mean the end to one’s career.

It’s time for conventional operators to finally elevate continuous improvement practices to a new level of effectiveness by eliminating organisational barriers to swift decision-making and rapid implementation of new innovations. They should also strengthen the facility manager’s role to that of integrator and operations manager, running closely integrated teams to realise excellent operations.

★ 3 – Make better use of data analytics. Leading shale operators are implementing factory pull models. They work backward from the new drilling and maintenance drilling inventory requirements to guard against operational disruptions and to ensure that the best technology will be applied as fast as possible. Systems are implemented to provide an integrated team with comprehensive cost and performance data for each well, supported by more sophisticated predictive analytics to find and exploit well performance and supply chain opportunities.

Most conventional oil and gas companies have significant data that is often unexploited. This data can be mined deeper to provide insights for better performance. Digital oil field management systems and other such initiatives have not delivered the value originally promised because they have become overly complex and misaligned with business objectives. Oil and gas companies can streamline these systems and improve their performance by re-examining the biggest opportunities to exploit the operational data to develop higher impact, predictive analytics.

★ 4 – Re-engineer financial structures. Shale operators are structurally altering their cost base in order to thrive in a more volatile and uncertain price environment. At one end of the spectrum, some are considering acquiring critical assets such as pressure pumping equipment and water infrastructure systems at cents on the dollar, and then leasing them back through an arm’s length third party. At the other end of the spectrum, many are considering transferring non-strategic infrastructure into master limited partnerships, with much lower expected rates of return.

Conventional oil and gas companies should also begin to re-examine which assets still make sense to own, and which ones can be dropped down and leased back under more favourable terms. For example, it might make sense for some operators to consider leasing certain topside components – such as compressors, pumps or entire topside facilities – from new industry entrants such as private equity-backed specialist firms.

MORE SUSTAINABLE OPERATIONS

Shale producers may be struggling with challenging business conditions like everyone else in the industry, but they have already changed people’s ideas of what is possible. The improvements that many are putting in place now portend an even more competitive new wave of shale drilling. For those deepwater operators willing to consider these innovations, shale drillers’ improvements to their operations can also be the starting point for more profitable and sustainable conventional oil and gas companies.

This piece first appeared in the Oliver Wyman Energy Journal on April 8, 2016.
PETROSTATES FACE PERILOUS FUTURE IN NEW OIL PARADIGM

Andrew Manners
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With the precipitous plunge in oil prices, major producers are being pushed to the brink. Gone is the boom that lifted the fortunes of oil producers the world over, from Azerbaijan to Angola, the Gulf to Gabon. Instead, the next few months will provide a stern test for some and a fight for survival for others.

Producers are hoping the fall will be followed by an inexorable rise. It’s precedent, after all; peak oil provides finite supply and growing demand will drive prices upward over time.

Except this time, it might not. The Financial Times recently warned that it is “doubtless there will be price spikes but there are strong reasons to believe that the rules have changed.” Indeed, barring a major geopolitical event, prices are likely to remain relatively low. For petrostates around the world, this portends a perilous future.

A NEW OIL PARADIGM?

2016 is not 2009 or even 1986. To be sure, the current glut does bare some resemblance to that of 30 years ago. This includes a surge in oil from outside the Middle East and OPEC driving down prices to fend off competitors. But there are important differences that suggest a new paradigm is emerging. Shale oil, in particular, is a game-changer.

Whereas the early 1980s saw production surges in Non-OPEC regions such as Mexico and China, shale is a different dilemma. Recent reports suggest US shale has the potential to double from 4 to 8 million barrels per day by 2035.

That is, the market could see US shale surpass these predictions. That may seem insignificant; the International Energy Agency (IEA), for instance, forecasts yearly worldwide demand at around 96 million barrels. But consider this: Some analysts claim even a 5 percent cut in global output – around 4.8 million barrels – would raise prices by 50 to 100 percent.

Just as important is the limited time and money needed to set up shale wells. This provides Washington a flexible lever to balance price shocks. It also weakens Saudi Arabia’s influence as a “swing” producer.

Not surprisingly, traditional exporters have plotted shale’s downfall. Yet efforts by Saudi Arabia and others have largely fallen flat. Many have packed up, sure; thousands of workers have been laid off and a wave of bankruptcies is expected this year. But others have tightened their belts, readjusted their strategies and business plans to be more cost-effective, all in an effort not to concede market share to conventional producers wanting to preserve the status quo.

Jim Burkhard, head of oil research at IHS, claims the cost of completing a
shale well fell by almost 40 percent last year. And as technology improves, shale production will only get cheaper; many shale producers are reportedly trying to turn a profit at $50 a barrel in anticipation of a long-awaited rise in prices.

What does this mean for supply? In the short term, the IEA predicts that an extraordinary cutback on oil exploration and investment – worth around $500 billion – will see oil climb to $80 a barrel by 2020 as supply slowly steadies.

In the longer term, however, shale will radically alter the supply side. With shale production far more flexible in terms of money and time than traditional sources, any price recovery will be met by a string of producers coming online. This, in turn, will also act as a cap on prices. So, with global demand growing at a modest pace (see below), the reintroduction of shale producers – once it becomes profitable again – means high supply vis-à-vis demand. This will guarantee that prices remain relatively low.

**SLOWING DEMAND**

The coming shale resurgence will occur just as unprecedented shifts in the energy sector take hold. In December last year, nearly 200 nations agreed to a landmark pact during the COP21 climate talks in order to rein in greenhouse gas emissions. The main pollutants, they said, were coal, gas and oil.

This is key, according to the Intergovernmental Panel on Climate Change: For the world to have even a 50-50 chance of achieving its target goal of 2 degrees Celsius temperature rise, more than two-thirds of the world’s fossil fuel reserves will have to stay in the ground. Similarly, in the lead up to the Paris Climate Summit, the IEA declared oil demand must peak by 2020, gradually declining throughout the next decade.

Leaders around the world now acknowledge nothing short of an epochal transformation can achieve these goals. Whether that happens remains to be seen. But importantly, Paris was the first time ever this level of consensus or cooperation has been achieved.

Moreover, technological changes, including large bets on renewable energy sources and new methods of transportation and heating, should combine to slow demand. The result, says Amy Myers Jaffe, an energy

![Figure 2: 2016 Fiscal Breakeven Oil Price Projections (US$ per Barrel)](source: National authorities, IMF staff estimates and projections | Get the data)

Note: The oil price at which the fiscal balance is zero.
consultant, “is as startling as it is world-changing: Global oil demand will peak within the next two decades.” This might not be 2020, as the IEA has called for, but it suggests the age of oil is coming to an end.

That outcome is not set in stone. Political leaders may backtrack, clean energy investment may stall and emerging market demand could offset the green revolution. More likely, though, is that a structural shift is occurring.

Indeed, the slump in demand for oil, in step with the nascent shale boom in the US, indicates that a new oil paradigm has emerged. Peak demand, not peak oil, will be the best indicator of prices in the future. And on this basis, low oil prices look here to stay.

THE FATE OF THE PETROSTATE?

Petrostates face a foreboding future. With roughly twenty countries dependent on petroleum for at least half of their government revenue – and with many needing oil prices in excess of $50 or $60 a barrel to break even – their political and financial fortunes look bleak.

Financially, most petrostates have utilised currency reserves or made deep cuts already. Some, including Saudi Arabia and Russia, can sell off prized state assets – such as Saudi Aramco – to ease their pain, but others do not have this luxury. In any case, such measures cannot buttress against low prices forever.

These states must clearly diversify, though that route may be tougher than first imagined. For one, there is little precedent of this happening. According to World Bank figures, no country that gets more than 20 percent of its GDP from oil and gas has substantially reduced those resources’ share of their economies in the last three decades. Rather than promoting vibrant economies and producing revenue, their leaders have extracted wealth to build patronage machines and put down unrest.

Furthermore, even if there existed political will, there are strong reasons to believe many would struggle to diversify. Countries such as Nigeria, Angola and Myanmar continue to rank poorly in governance and corruption measures. Others, such as Equatorial Guinea, Chad and Libya, could easily be called fragile states. This will inevitably hamper their ability to diversify; unless these broader challenges are addressed, efforts to differentiate their markets are doomed to fail.

While talk of a “Petro-Spring” would appear overblown, the legitimacy and viability of many of these petrostates will inevitably be called into question, especially if they cannot provide basic services for their people. With these events now beginning to play out, the future for these countries looks perilous indeed.

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OIL INDUSTRY SAFETY, MAINTENANCE AT RISK IN WAKE OF PRICE FALLOFF

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Andrew George
Chairman of the Energy & Power Practice for Marsh

Historical loss trends reveal a potential correlation between significant falloffs in oil prices and increased energy losses. Energy companies must exercise caution when implementing cost-cutting measures designed to counteract or offset the effects of low oil prices to ensure history doesn’t repeat itself.

There is a concern, from the point of view of process safety and loss control, that lower revenues from oil and gas production and falling demand could potentially result in reductions in investment in risk-control measures; the reduction in maintenance and inspection activity could result in a higher rate of accidents.

Historically, in the upstream market, periods of significant pricing falls have been met by:

- New projects being shelved or cancelled
- Increase in redundancies and hiring freezes
- Cuts in infrastructure and maintenance spending
- Less investment in health and safety measures and employee training

These cost-cutting decisions appear to have led to increased losses in the past, according to Marsh research (see Figure 3).

Similar reductions occurred between 1980 and 1986 when Brent crude oil price fell from $35 to $15 per barrel, in the late 1990s when the price fell to less than $10 per barrel and in 2008 when the price fell from more than $100 to $32 per barrel. A period of increased frequency or larger losses has typically followed soon after.

Over the past 20 months, oil prices have fallen by around 70 percent. Already, companies have been cancelling projects and making staffing reductions. It is estimated that projects worth up to $380 billion have been shelved, according to consultancy group Wood Mackenzie. Meanwhile, a recent survey in the Chemical Engineer revealed that the majority of respondents had seen redundancies within their companies. Additionally, 36 percent had seen training budgets cut and 45 percent reported hiring freezes.

While project cancellations and redundancies are easy to quantify due to publicly available information, cuts in maintenance, health and safety measures and employee training are far more difficult to assess. With a prolonged period of low oil prices expected, however, the question now is when will oil and gas companies begin...
spending less on maintenance and health and safety.

With today’s new oil price paradigm, it is important that the industry looks to the past for lessons on how best to manage cost savings in a measured manner that limits any potential downside.

This includes making decisions based on the conclusions of assessments to ensure that any risks of major losses introduced by changes to safety expenditure are reduced and mitigated effectively. For example, any significant organisational changes as a result of staffing reductions should be subject to an organisational management of change assessment – including a risk assessment – to ensure that any risk introduced as a result of loss of knowledge or expertise due to staffing changes is mitigated.

In such instances, it is also important to ensure that critical inspection and maintenance tasks continue to be delivered on schedule. Senior managers should receive regular reports of key performance indicators regarding maintenance and inspection. These should be selected and tracked so that they are indicative of the key tasks required to maintain process safety performance.

Every business decision, especially those involving cutting costs, should be made taking into account the potential risks involved. This way, cost-saving initiatives will have long-term value and impact, rather than simply transferring today’s savings into tomorrow’s major costs.

Many forecasters are predicting that oil prices will remain low for some time to come. It is vital that cost-saving measures implemented by oil companies are considered and measured. Cuts that extend too deeply into an organisation could have a significant impact on loss records and, ultimately, cost more to rectify than they initially saved.

Companies should also be looking to take additional risk off their balance sheets at a time when the cost of insurance capital is at a historic low. Clearly, opportunities exist to reduce overall insurance premium costs, purchase insurance in areas that were previously omitted due to cost and renegotiate coverage terms.

Rather than take advantage of the current soft insurance market to reduce costs, now would appear to be the time for companies to transfer risk off their balance sheets before volatility increases.

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TO BAILOUT OR NOT BAILOUT
OIL-DEPENDENT COUNTRIES

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In the not-too-distant future, there will be some very tough decisions to be made by the International Monetary Fund, World Bank and various other global development organisations. The question will be, “What should we do about the beleaguered oil states?” Does the global development community elect to rescue these nations from the impact of crashing oil prices, or are they allowed to sink?

There are good reasons for both of these strategies to prevail. On the one hand, you have countries that have become highly dependent on oil revenue, which is the only means by which these states have been able to survive financially. Venezuela and Nigeria are both 90 percent dependent on oil money. Indonesia is slashing its budget in an attempt to cope with the loss of oil revenue, as is Algeria. The story is the same in Ecuador, Brazil, Angola and just about every other country that was using oil revenue to sustain its economy.

With oil prices between $20 and $30 a barrel – and expected to climb no higher than $40 to $50 in 2016 – these oil-dependent states are in deep economic trouble and will likely remain so. Most can’t come close to producing oil profitably unless the per barrel price is at least more than $60.

Right now, these oil-dependent states are reeling and have been forced to cut budgets and launch austerity plans. Even Saudi Arabia, often regarded as the most financially secure, has been forced into an austerity budget amid the current oil price crisis.
It faces credit downgrades and has pushed leaders in the country to seek a $10 billion loan, which is unprecedented in modern times for a country that has been historically cash-rich.

Nigeria has been facing stepped-up attacks on its oil infrastructure and may be forced to reduce output by as much as 70 percent.

Development agencies facing these countries in economic distress jump to their first instinct, which is to provide a bailout to get past the crisis. Discussions are under way in all of these institutions to work out a solution to this situation, but there have been strident criticisms of a bailout approach.

The critics point out that oil prices have fallen to record levels for a reason. There is not enough global demand for oil and far too much supply. There are only a limited number of options for altering or adjusting this classic fundamental economic situation. It is conceivable that demand will increase, but any such effort to accelerate growth in demand will be time-consuming. The consumer is not going to rush out to buy a new gas-guzzling vehicle and industry is not going to suddenly resort to consuming power the way it once did. The moves toward energy conservation are hard-wired by now and changing prices for the benefit of oil producers is not going to alter these patterns quickly. That leaves reducing supply as the primary alternative.

There have been many attempts to alter output over the years and the Organisation of Petroleum Exporting Countries (OPEC) was by far the most successful. The system of state quotas established by OPEC ensured that there would not be too much oil hitting the market, and Saudi Arabia had the ability to enforce these quotas. Historically, all the Saudis had to do was threaten to flood the market with oil and they could drive competitors out of business. They could produce oil far more cheaply than anyone else, and if they flooded the market, the price per barrel would drop low enough to force others out. It was a drastic step, but one Saudi Arabia opted for more than once.

Right now, the power of OPEC has been severely weakened. New competition doesn’t give up that easily, and even prices at $20 and $30 have not been low enough to get most of the new shale oil producers to throw in the towel. If the traditional OPEC approach to supply/demand doesn’t work anymore, what are the remaining options? The brutal truth is that some of the weaker oil-producing states will have to be forced out of the market, and that is precisely what is happening now.

**FIVE OIL ECONOMIES IN JEOPARDY**

The current thinking is that at least five countries will see significant economic crisis before the year is out. Venezuela is at the top of that list, as it is now fighting hyperinflation along with the collapse of their oil export market. Some believe that the Maduro government could be overthrown in some sort of an internal coup.

Oil output from Libya has been shrinking due to the chaos prevailing throughout its government. Tribal groups are competing with each other for control of a dwindling oil market and threats from ISIS are keeping the oil sector off-balance. Algeria’s leader has not been seen in public for weeks and is thought to have suffered from a serious medical condition. There is no longer enough money to buy the cooperation of the Berbers in the southern part of the country.

Nigeria is up against increasingly ferocious attacks on its oil infrastructure in the Niger River Delta, and there is not enough money to effect repairs or defend facilities. And lastly, ISIS attacks on oil infrastructure in Iraq have been having a profoundly negative impact as well.

The trillion-dollar question is whether the development groups should step in and rescue these oil states or let nature take its course and remove these oil producers from the equation. If these states drop out or significantly reduce their output, the price of oil will start to climb in anticipation of a future shortage. This would be good for remaining oil states, as they will be able to benefit from the hike in oil prices that would develop. Is it realistic to assume that development groups will employ some system of global triage that allows some to benefit from the sacrifice of others?

It is unlikely that such a decision would be made – at least not overtly. The expected course of action will be to support these weakening economies and hope that collectively, they will reduce oil output through attrition anyway. The problem is that these states have nothing else to turn to for GDP and will do all they can to stay in the oil business, even if it is not profitable in the short- to medium-term.

Oil states were once seen as the next big player in the developed world, states that would be capable of providing vast sums from their accumulated oil income. That is no longer the case and now they have become supplicants and are competing for bailout money. Will they get that help, even if doing so makes the core problem worse?

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DESPITE END OF EXPORT BAN, ROUGH SEAS FOR OIL AND GAS

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When the US Congress voted in December to lift the 40-year-old ban on crude oil exports and President Barack Obama signed that change into law, the landmark legislation capped a year of hurricane-force headwinds for the oil and gas industry. With the price of crude oil – both WTI and Brent – tumbling more than 70 percent from 2014 highs, most, if not all, oil and gas (O&G) companies have had to make hard decisions with short- and long-term ramifications.

In addition to major cutbacks in capital and operational expenditures, most O&G companies have cut permanent and contract staff, totalling more than 250,000 jobs worldwide, according to joint Mercer and Oliver Wyman research and client experience. And while there is an underlying net positive for O&G across the value chain due to the lifting of the ban, it’s not a time for leadership to breathe easy.

While most economists agree that the ability to export crude will lead to greater US production, it is important to understand that the bill alone will have little immediate impact on production levels. Global economic conditions and the global supply-and-demand balance must support and enable crude to be produced, sold, refined or otherwise put into final use to generate energy.

AWASH IN OIL, IN SEARCH OF A MARKET

From a world supply standpoint, we are awash in oil at historic levels. Even if the US can export, it needs to find a market. Oversupply still remains the most critical factor of the current low-price environment. Forward demand, while continuing to increase, is not going to raise the price of crude alone without addressing overproduction. Consider the price of WTI: Open competition will likely cause a nominal rise of WTI while drawing down the price of Brent, essentially eliminating much of the spread between the two and doing little to address – if not exacerbate – “lower [price] for longer.”

While in the short term we see little opportunity, exports may present an advantage in the long term, but companies must be in a position to seize that advantage. With far too many producers unhedged and already net cash-negative for each barrel produced, simply producing more at depressed prices does not change the underlying business fundamentals or change the flow of cash.

In order to seize the advantage of exports and higher production, producers must first optimise their assets and operating models such that they become cashflow positive for every barrel. While significant strides have been made in this area in the past six to ten months, much more is necessary to remain viable in a low-price environment.

Refining or downstream may be equally challenged by the
opportunity the ban lift presents, but here, too, the benefits may be on the distant horizon. On a global scale, while light sweet crude could become more abundant, there is significant cost in upgrading assets to process light sweet vs. heavy sour – or both. Consequently, while higher WTI prices challenge US refining margins on one end, it is likely offset by the tax advantages to refiners currently outlined in the bill.

Midstream, too, is likely to benefit from more product gathering, storage and movement. Here is the question to consider: Is the current infrastructure adequate, or will significant upgrades and investments be required to safely and reliably transfer product across the country? All told, while there may be tremendous upside, there must be a solution to the oversupply problem before those benefits are realised. These potential gains are well off in the future and, undoubtedly, the fierce waves of a tumultuous sea are not yet calmed.

THE HUMAN CAPITAL PERSPECTIVE

As production, infrastructure, margins and healthy, sustainable business eventually return, we fully expect staffing needs to increase, thereby returning lost jobs and creating new ones across the US, in and outside of O&G. Most agree that for every job created in O&G, two to three are created in the general economy.

O&G is historically cyclical and will continue to be so in the future. When, why and how severe the swings will be remain the questions to answer – or at least the questions for which we should prepare.

What should leadership do now in terms of talent or managing human capital? We have long advocated to HR leadership that the very essence of effective human capital strategy and execution is found in workforce scenario modelling and planning. With this change in policy (and other transformative changes known and unknown), the best and right move for HR leadership right now is to partner with business leaders and finance to map out the changes to their business/portfolio and the resulting changes to their workforce – in essence, reshaping the entire enterprise to optimise performance in dynamic market conditions.

Workforce planning remains a capability gap for most organisations. Mercer’s latest O&G Market Disruption survey outlines that 70 percent of respondents

Even if the US can now export oil, it needs to find a market.
neither strongly agree nor disagree, or simply disagree, that their current workforce plans provide managers with the right number of people with the right skills, in the right place and at the right time. Being able to do so is the foundation of good organisational management. Only by doing so can an individual company outline its specific and unique response to changes in the market.

With fundamental workforce needs outlined under various scenarios, HR leadership is challenged to create a balanced strategy, both in how it deploys talent and how it manages, develops and optimises talent in alignment with organisational performance, as described by Mercer’s latest strategic analysis.

Finally, while political change in the US – now the world’s largest oil and gas producer, a seismic world-energy shift – has potentially great benefit from an operational, financial and workforce standpoint, O&G organisations must balance the potential reward against the underlying workforce headwinds that have not abated.

These include an aging workforce and a “great crew change,” by which Mercer analysis shows that more than 500,000 person-years of experience will leave the O&G workforce in the US and Canada in the coming five years.

In addition, the development time-to-proficiency for critical skill O&G jobs takes a great many years to develop, while the sector still faces a future shortage of critical skills on a global scale. Clearly, and despite the positive outlook generated by the end of the export ban, storms continue for the O&G sector. Managing in the short-term with a long-term view is the way to navigate the sea change.

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FALLING OIL PRICE PRESSURES
SAUDI ARABIA, INCREASES RISK

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The price of crude oil continues its precipitous tumble; Morgan Stanley is predicting that prices could go as low as $20 a barrel. Exacerbating the matter, China’s stock market woes and, more specifically, its falling manufacturing figures, have resulted in a reduced demand for oil.

Reduced Chinese demand, however, isn’t the only factor that is causing oil prices to drop. Oversupply is causing its own set of problems. After oil prices began to drop last year, the Organisation of Petroleum Exporting Countries (OPEC) panicked. Saudi Arabia, which was the de facto leader of the cartel, refused to reduce its production in order to force prices back up. Riyadh feared that the nuclear deal that Washington signed with Iran last year would see international (especially Western) trade with Tehran increase rapidly, thus increasing the latter’s importance to the West. The freeing up of around $120 billion in frozen Iranian accounts would, moreover, enable Tehran to carry out desperately needed repairs its oil production infrastructure. This, Riyadh reasoned, would enable Iran to regain its former position as the world’s fourth-largest energy exporter and, consequently, enhance its wealth and pose a reinvigorated geopolitical and ideological risk. Saudi Arabia, therefore, continued to produce oil unabated despite the obvious damage it was doing to the other OPEC member states that, with increasing desperation, asked the Saudis to cap production.

Riyadh had two reasons for continuing to produce oil as usual. First, it knew that it had to retain its market share. It could not run the risk of reducing its production in an attempt to push oil prices up in case non-OPEC states such as Russia increased their oil production and, worse, sold it to Riyadh’s customers. Saudi Arabia reasoned that if that were to happen, it would be very difficult to regain those customers. This would have placed it in an even more precarious position vis-à-vis Iran on the one hand and non-OPEC oil producers on the other.

Second, Riyadh likely believed that by keeping oil prices depressed and retaining its market share, it would force Tehran to compete on very unequal terms, thus making it difficult for Iran to pose any kind of competitive threat. Saudi Arabia was fairly confident that, given its foreign exchange holdings of around $750 billion, it could weather the situation until oil prices rose again. This, however, is a course of action that is fraught with risk.

Despite being the world’s largest producer of oil, and given the economies of scale that flow from that level of production, Saudi Arabia’s ability to extract and refine oil more cheaply than Iran, in some ways, is not as well-placed as Iran is to stand up to sustained low prices.
The international sanctions Iran faced have forced it to diversify its economy, even if its energy infrastructure grew increasingly dilapidated, making it less reliant upon energy exports than Saudi Arabia, whose energy exports account for an estimated 80 percent of its income. Thus, while Iran can sustain oil prices hovering around the $72 per barrel mark, Saudi Arabia needs the price to stay at $106 per barrel to break even. Riyadh, moreover, has had to spend more to sustain its military action against Houthi rebels in Yemen and simultaneously increase domestic spending for political reasons, leading to speculation that it could run out of money by 2020.

A third reason for low oil prices is the appreciation of the US dollar. Oil prices are leveraged to the US dollar, and if the dollar rises by 5 percent, oil prices could tumble by an estimated 10 to 25 percent. While global stocks may have at one point pushed the price of oil towards the $60 mark, the difference between that level and $35 a barrel is the rise in the value of the dollar, according to Morgan Stanley analysts.

The unseasonably warm weather in Europe has also led to decreased demand for energy products. This, in turn, created a glut of oil (in addition to the previous gluts caused by shale oil and tar sands facilities in North America coming online) that is readily available. Oil stocks in Cushing, Oklahoma, the largest oil storage facility in the US with a maximum capacity of 73 million barrels, stood at close to 64 million barrels at the start of 2016. If other storage facilities in North America and elsewhere are similarly close to capacity, the demand for oil can only decrease, putting additional pressure on oil prices. It is these factors that persuade Morgan Stanley that oil prices still have room to fall.

**OIL PRESSURES INCREASE SAUDI RISK**

As noted earlier, Saudi Arabia cannot sustain these low prices beyond 2020, given its current rate of spending, owing to its military actions in Yemen, its proxy war against Iran in Syria, subsidised domestic fuel costs and its efforts to sustain its food production and water management initiatives. Against this backdrop, Riyadh has slashed its subsidies on gas, diesel, kerosene, water and electricity. In addition, it has introduced a value-added tax of 5 percent on all goods and services starting in 2017. It is noteworthy, however, that military purchases have increased significantly, despite its slashing of welfare and public services.

Saudi Arabia, in short, cannot sustain low oil prices for very long. It needs to increase oil prices and simultaneously diminish, if not negate, future geopolitical, ideological and energy competition from Iran and energy competition from Russia and the US.

The fact that it has increased its military spending while cutting back in other areas, coupled with the decidedly harsher, albeit more realistic, perspectives of Crown Prince Muhammad bin Nayef points to ever increasing risk on several fronts for Saudi Arabia’s immediate future.

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Progress Toward Balanced, Sustainable Energy World Remains Slow

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Energy sustainability is not only an opportunity to transform societies and grow economies, but it is also a necessity – a prerequisite to meet growing energy demand in many parts of the world and to reduce the global carbon footprint. In order to build a strong basis for prosperity and competitiveness, individual countries must balance the three core dimensions of what Oliver Wyman and the World Energy Council have defined as the energy trilemma: affordability and access, energy security and environmental sustainability.

The annual Energy Trilemma Index ranks 130 countries on their performance in meeting the energy trilemma and assesses how well countries are balancing the three dimensions.

As highlighted in the 2015 Index released today, the transition towards balanced and sustainable energy systems is slowly taking place. Over the last five years, positive developments have been recorded in access to energy, share of renewables in the electricity generation mix and rate of energy-efficiency improvements. Global energy intensity has decreased by 4.2 percent and CO2 emissions intensity has fallen by 4.5 percent in that time, while the global electrification rate has risen to 85 percent with an additional 222 million people gaining access to electricity from 2010-2012.

Still, many countries face obstacles to achieving a successful balance across the energy dimensions. This year, only two countries, Switzerland and Sweden, managed to obtain an AAA balance score across all three dimensions. The United Kingdom’s score was amended to AAB, as its energy equity performance suffered in comparison to other leading countries.

Several countries, including the UK, Japan and Germany, are identified on the 2015 Watch List as being likely to experience a significant change in Index performance in the near future. These positive or negative changes can be driven by deep transitions in their energy systems – be they of a regulatory nature, concerning the energy supply mix or related to infrastructure changes to improve the resilience of their energy systems. In 2015, South Africa and the US were added to the negative watch list, while the Philippines and Serbia are now on watch for overall positive trends in the coming years.

The energy challenges faced by each country are unique and complex, as evidenced by the variability in performance across the trilemma dimensions and contextual factors. Yet the transnational nature of energy markets and environmental issues necessitates a perspective that extends past the country level. Energy leaders have emphasized the need to adopt regionally coordinated approaches to energy resources, infrastructure and regulation.

Accordingly, the Index report includes regional profiles designed to characterise the challenges and opportunities faced by various regions in relation to the energy trilemma. The growth in global investment in renewable energy in Asia is noted alongside the rapid growth of greenhouse gas emissions there, while Latin America faces increasing challenges driven by changing weather patterns and concerns related to the energy-water-food nexus.

In the lead-up to the United Nations Climate Change Conference
(COP21) in Paris on November 30 through December 11, energy sector leaders have spoken about the need for a clear international dialogue and a robust, sustainable policy framework to ensure research and investment is targeted at delivering sustainable energy systems. Progress across the dimensions of the energy trilemma remains slow, and can only be sped up by creating such frameworks that give certainty to investors.

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US SHALE COULD HERALD REVOLUTION FOR REGIONAL OIL MARKETS

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The striking success of the US shale revolution, could become a global revolution as other areas of the world consider exploiting their untapped shale reserves, looking to the US less as a supplier and more as a harbinger.

The confluence of volatile oil prices, abundant global shale resources, technology to extract these resources, and geopolitics could push companies to produce oil and gas closer to where it is consumed. Such regional markets could upset the political world order in the long term, changing power dynamics between traditional oil producing nations and consumers.

North America, South America, and China are prime candidates for regional markets given the magnitude of technically recoverable unconventional oil and gas these regions hold. Unconventional oil and gas markets have reached maturity in the US, providing a blueprint for other basins around the world. Since the US bans oil exports, the market is already somewhat decoupled from the rest of the world. Local oil trades at a discount to global oil markers.

South America has massive reserves; Argentina, Brazil, and Venezuela together hold close to 250 billion barrels of oil equivalent in unconventional resources, 80 percent of which is gas. Argentina alone holds 65 percent of these resources. In China, the total technically recoverable unconventional resources are estimated at 225 billion barrels of oil equivalent, 85 percent of which is gas.

The US shale revolution will be challenging to replicate. American independent oil companies have enjoyed access to cheap capital in If regions can overcome the politics, environmental concerns, and capital requirements of producing their own resources, they could cut dependence on traditional suppliers, and control their own energy policies.
a low-interest-rate environment. The US oil industry was already well-developed when shale production began. Pipelines and rigs were available, more were quickly built, and high-quality roads allowed smooth transportation of equipment. Water is available in the major US shale basins, and mineral rights laws make drilling possible and very attractive in many communities.

Other regions of the world lack some of those factors, and will have to develop the market in their own ways. A lack of surface infrastructure and water in the regions endowed with shale resources could be challenging for China. Argentina must build market confidence to attract the investment needed to develop the ecosystem to enable a shale revolution, driven by the private sector.

But the technology and existing oil reserves offer hope that the political and infrastructure development is worth the effort. If regions can overcome the politics, environmental concerns, and capital requirements of producing their own resources, they could cut dependence on traditional suppliers, and control their own energy policies. This would mark a historic shift in the long term. Until now, most of the world’s oil has been produced in countries with high political risk, including political instability, conflict, and even insurgency. The list of top ten oil exporting countries includes such high-risk nations as Russia, Iraq, Nigeria and Venezuela. In some cases, the cost for an oil company to mitigate that political risk is high enough to prompt executives to scout for shale opportunities in stable regions instead of investing in risky countries with less attractive fiscal regimes.

OPEC may have intended to squeeze North American shale producers as it has maintained production levels in the face of falling oil prices and protected market share. However, the drop in oil prices doesn’t necessarily put North American newcomers out of business.

UNCONVENTIONAL SHALE PRODUCTION LEADS THE WAY

Unconventional exploration and development in some of the most productive shale oil fields, such as the Bakken in North Dakota and the Eagle Ford Shale in Texas, is competitive with oil produced by conventional methods. In some areas, unconventional shale production has a break-even price as low as about $40 a barrel, on par with some conventional production. Lower oil prices have prompted producers to cut back on capital projects, tempering demand for oil field services and supplies. Renegotiating with suppliers will bring that break-even price further down. In addition, many shale companies are focused intensely on efficiency and technology improvements, pushing the break-even price low enough to put shale...
on par with oil fields of many traditional oil producing countries.

Lower oil prices are instead squeezing some of the traditional producers. Our research shows that $50 oil puts some of the politically unstable oil producing countries under considerable stress as they grapple with lower oil revenue in their national budgets. Those most at risk include Nigeria, Venezuela, Iraq, Iran, and Russia. These countries might try to work with other producers to manage supply volumes in hopes of resurrecting oil prices. The Gulf Cooperation Council producers such as Saudi Arabia, UAE, Kuwait, and Qatar have amassed considerable wealth during the past decade in their reserves and sovereign wealth funds. While these countries could withstand a few years of $50 oil by depleting their financial reserves, they would come under stress after five to seven years of low oil prices. They are betting on the resurgence of global demand to push prices up.

As OPEC countries and other traditional producers come under pressure from oil prices, the US gains political leverage as it becomes less dependent on those suppliers. US dependency on the Middle East may shape perceptions of the region’s vulnerability to security crises, with other countries obliged to play greater roles.

For example, a recent global risk report points out that more widely available liquefied natural gas from the US could undermine the Russian Federation’s negotiating leverage with consumers in Europe and Asia. Washington may use LNG exports to achieve foreign policy goals. Other regions might be able to build their own bases of political influence by producing more of their own energy, reducing their historic dependence on other nations. A number of energy companies have already been testing shale production in various European countries, such as Germany, Poland, Romania, and Lithuania. However, in many places, those operators must overcome deep environmental concerns in the community, and have had varying levels of success.

Many governments and national oil companies are growing interested in developing regional supplies as a key path to energy independence and affordable energy. But those countries will have to sort out a slew of issues, from community concerns and zoning issues, to mineral rights ownership and a new relationship with old suppliers. Local oil prices could react, and it could be a wild ride.

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RISK AND OPPORTUNITY ON THE RISE FOR OIL AND GAS COMPANIES

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Volatile prices have disrupted the oil markets, and the knee-jerk assumption is that layoffs and cutbacks will sweep through the industry. But the future is more complicated.

First, certain segments of the industry, such as companies involved in oil and gas transmission, are not necessarily at risk. For those that are, primarily oil and gas producers and service companies, disruption can be managed and can create significant opportunities for companies to gain competitive advantage.

How? By taking the long view and strengthening the enterprise to compete in what has always been – and always will be – a tumultuous marketplace. Good strategy can reduce the risk of long-term competitive weakness, despite the market’s inevitable swings.

Meanwhile, short-term actions are on the table. Recent Mercer surveys of more than 100 oil and gas industry organisations in the US, Canada and Mexico looked at the business and human capital responses to the oil price decline. In January 2015, only 44 percent of those surveyed planned to cut back on capital expenditures; however, by April, that figure jumped to 68 percent. Similarly, 38 percent planned to reduce selling, general and administrative operating expenses in January, but by April that figure rose to 61 percent.

As for the human toll, 58 percent planned downsizing or layoffs of permanent employees in the April survey, with 45 percent planning cuts or layoffs of contract workers. Reorganisation and restructuring plans soared from 16 percent of surveyed firms in

In any industry, turning disruption into opportunity calls for a process of best action to meet the near- and long-term requirements of the business, customers, employees and stakeholders.
January to 45 percent in April, and the percentage planning to implement broad salary freezes doubled in the same time frame.

The news reflects all this. In April, the Wall Street Journal reported that, since crude prices began tumbling last year, energy companies have announced plans to lay off more than 100,000 workers around the world.

But the rush to pay cuts and staff reductions may prove hazardous over the long term. A better move is a balanced strategy that limits the damage of short-term responses while building capability for tomorrow. Since oil prices are fundamentally rooted in supply and demand, inevitable production cuts will take their toll, demand will outpace supply, and oil and gas organisations will return to growth mode.

They had better be ready for it. Last year, Mercer released a Global Talent Forecast that predicted a shortage of roughly 22,000 petroleum engineers, worldwide, by 2017. Considering that time-to-proficiency for a petroleum engineer can take between seven and 14 years, the likelihood is that the oil and gas industry will be faced with a shortage of critical talent when the markets rebound.

In any industry, turning disruption into opportunity calls for a process of best action to meet the near- and long-term requirements of the business, customers, employees and stakeholders. Sure, companies that require immediate cost savings may have to make workforce reductions, but a farsighted approach to human capital, such as shifting pay to future years or a temporary suspension of some benefits, can produce at least a portion of required savings without impeding the ability to compete once markets rebound.

Suspending a 401(k) match for some period of time, for example, instead of cancelling the retirement plan, can be an alternative.

Frankly, it takes a framework for action more so than an axe. The process begins with evaluation, asking exactly what is the extent and severity of market conditions? It proceeds through option development (over several time frames), strategic choice (the best options for the short and long terms), and ends in good governance, with the right human capital strategy embedded in the business, aided by a full measure of workforce analytics, monitoring, and reporting.

Just as important as a good process are fundamental actions, and oil and gas companies should take them now. First, they must defend their best assets, those critically important employees who might be ripe for poaching by competitors, by making sure the rewards are
sufficient to retain them. Next, they should clarify roles, work and key performance requirements so that employees have a clear view of how to succeed and the skills they need.

And don’t think employees aren’t paying attention: In Mercer’s recent survey of 1,800 North American oil and gas employees, respondents ranked “job security” as their number one preference among a variety of “total rewards” options – even higher than “base pay.” This is highly unusual – base pay almost always tops the list – and speaks to how concerned oil and gas employees are about their immediate job prospects. Employers must know what elements of their total reward packages employees value most in order to make the best decisions about what to change.

Companies also should be investing in high-impact training and development programs and have the capability to codify and transfer the knowledge of senior experts to younger employees. But how to engage and retain workers in a volatile market, with so much media focus on the industry? Companies have no choice but to up their own game in terms of corporate communications and transparency.

Most oil and gas companies have already taken the first round of cost cuts – in most cases, the low-hanging fruit of staff cuts and pay freezes. As they plan for rounds two and three, the challenges rise. For example, social media platforms enable laid-off employees to tarnish corporate brands as never before. So it’s vital to keep employee perspectives in sight and explore strategies that can preserve both financial and human capital, for example, moving from Defined Benefit to Defined Contribution pension plans.

If anything, change is the challenge. The most competitive companies find ways to adapt to it, improving continuously, putting in place workforce planning tools, creating dashboards based on business conditions that signal when resources need to be brought back on, and honing recruiting efforts to attract the right people at the right time – and at the right cost.

It may take enhanced investment in project management offices and cross-functional teams to ensure that important plans, or mergers and acquisitions, go forward. Amidst so much change, companies often struggle to do what they say they are going to do. Staying true to stated values is vital.

Business conditions may still force the hand of the most committed leadership, requiring the layoffs and cutbacks a given strategy seeks to avoid. If market position is to hold and growth is to rebound, the interests of the enterprise and its stakeholders must come first, and often painfully. It’s a tall order, but managing disruption today – rather than simply reacting to and fostering it – is the solution for tomorrow’s oil and gas industry.

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“DIGITAL OILFIELD” VULNERABLE TO CYBER THREATS

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The potential impact of cyber attacks on utilities and the national grids has been frequently discussed. However, the oil and gas sector is also exposed to significant cyber threats. The rise of the “digital oilfield” has left oil and gas companies increasingly dependent on data to sustain production. As these technologies become widespread, the cyber risk for the oil and gas industry will continue to rise, demanding action and preparedness to protect against these threats.

Digital technologies have already been widely implemented across all segments of energy production, driving improved efficiency and increased production by harnessing the power of connectivity and data. The size of the worldwide digital oilfield technology market increased from $18.7 billion in 2011 to $24.6 billion in 2014, for a compound annual growth rate of 9.6 percent between 2011 and 2014. By 2022, the market is expected to be $33.3 billion.

Control rooms, substations and devices used to manage oil and gas plants, refineries and pipelines are now all digital, utilising video-enabled telepresence and high-speed data links. Upstream, digital technologies are used for reservoir modelling, drilling resource dispatching, computer-aided hydraulic fracturing, production optimisation, reliability and preventive maintenance, and supply chain planning analytics.

Downstream, the shift to digital is being realised through supply-demand matching smart grids and new approaches to networking operational systems such as Supervisory Control and Data Acquisition (SCADA). Applications of digital technologies further downstream include trading activities, marketing and business insights.

These technologies are now so crucial to oil and gas operations that, according to the Journal of Petroleum Technology, a large offshore field could deliver more than 0.75 terabytes of data each week, while a large refinery will produce 1 terabyte of raw data per day.

As oil reserves become scarcer and companies scramble to stay ahead of their competitors the industry’s dependency on data will continue to increase.

By harnessing people, information and processes, digital technologies enable companies to achieve
crucial efficiencies and cost savings. For example, by establishing links between operational technology and IT networks (such as linking SCADA operational technology to IT business and desktop applications), companies achieve benefits including remote monitoring and administration. Meanwhile, production data from the field can be matched with demand to maximise earnings.

According to IHS-CERA, digital oilfield-related implementation may result in up to 8 percent higher production rates, as well as up to 25 percent in operating cost savings and 2 to 4 percent lower project costs. This production boost will prove indispensable as oil reserves are depleted and companies find themselves turning to more complex and remote sources. The resulting increased demand for real-time data, distributed sensors, high-speed communications, and data-mining techniques will hasten the adoption and innovation of digital technology.

Given this significant and increasing reliance on data and interconnected systems, the oil and gas industry finds itself vulnerable to cyber attacks, whether conducted by hostile governments, militant groups or private citizens wishing to make political statements or mischief. Numerous such attacks against oil and gas companies have already taken place. Malware and phishing are two common types of cyber threats that have targeted digital oil.

► Malware: Malware includes viruses and other malicious software that targets IT data assets. In July 2014, the Energetic Bear virus was released by a Russian hacking group and targeted oil, gas, power, and energy investment companies.

Prior to its discovery by a cyber security firm, the virus covertly enabled the hackers to monitor energy consumption in real time and disable physical systems.

► Phishing: Phishing is a form of social engineering that uses deception and manipulation to target data assets. Spear phishing uses emails that appear to be from a known individual to target employees and steal data. This technique was used in 2011 by Chinese hackers in a series of cyber attacks targeting oil and energy companies known as “Night Dragon.”

Other types of attacks include insider threats and denial of service attacks. By 2018, an ABI Research study predicts that cyber attacks against oil and gas infrastructure will drive $1.87 billion in cybersecurity spending by the oil and gas sector.

It is crucial that the oil and gas industry develops the necessary capabilities to defend against cyber risk. Taking cues from the utility industry, oil and gas companies should prioritise investment in cybersecurity measures. Furthermore, the industry must seek to implement wide-ranging information sharing and threat intelligence programs to maximise knowledge regarding advanced persistent threats and related solutions.

With necessary resources dedicated to effective risk management, the innovations of the digital oilfield will continue to bring the oil and gas industry into an era of increased efficiency and production, while managing the cyber risk associated with increased digital connectivity.

This article appeared on BRINK on April 7, 2015.
THE OIL AND GAS TALENT GAP

Oil and gas executives won’t be prepared to meet tomorrow’s production demand if they don’t quickly address the one asset about which they know the least: their people. The industry is confronting a chronic, global talent shortfall, according to the results from a study of the talent outlook and workforce practices in the oil and gas industry recently conducted by Mercer.

Addressing the talent gap will require industrywide solutions that start with companies understanding the internal and external market forces at work. As the chart below shows, the talent mismatch is especially acute among more experienced workers. Mercer surveyed 126 participants from 112 organisations with more than one million employees, representing a cross-section of company types in 50 countries.

To fill the gap, many companies plan to recruit workers from their competitors. Not only is this strategy unsustainable, it will most likely be insufficient to meet future demand. In addition, oil and gas firms are competing with companies in other industries for the same pool of talent. Instead, human resource executives need to step up and provide clarity about both the talent gaps that are developing and the creative workforce-building techniques that can solve them.

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WHAT EVER HAPPENED TO BIG OIL?

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Big oil is feeling the brunt of tumbling oil prices. Across the board, earnings are gapping lower, causing the sector to re-think mitigation strategies in order to take the sting out of falling profits. The possibility of sustained lower oil prices has the entire sector considering its options and reevaluating future investments.

Through 2013, oil prices quadrupled since 2001. But many of the world’s largest international oil companies have not kept pace. Instead, their operating cash flow has only doubled over the same period. And most of their stock market valuations have trailed even further behind, underperforming the broader stock market as a group by about 65 percent. (See Figure 8).

There’s an important lesson for oil and gas firms here – but it may not be what you think. The recent downturn in the oil market aside, most international oil companies had already stopped capturing the value of rising commodity prices for shareholders, especially oil prices. That new development alone should set off alarms in the executive suites of international oil majors, since it potentially undermines the reason why most investors want to own stakes in them.

But the bigger lesson is that oil and gas firms urgently need either to break apart or become more vertically integrated. Those are two key ways they can deliver value to their shareholders commensurate with rising commodity prices, and remain the leaders of their industry going forward. Business models that straddle the middle ground don’t seem to be working.

MIGRATING VALUE

The value created from oil field development is migrating to oil field services companies.

At the same time, volume, which has been the favourite measure of growth for international oil companies, is becoming an unreliable indicator of growth in value for shareholders. The traditional correlation between the market valuations of most of the international oil companies and volume is breaking down as more natural gas is traded at a discount to oil prices, fewer petroleum supply agreements are structured around oil prices, and the amount of capital required to renew a unit of production continues to expand.

The relationship between depreciation and capital expenditures is also fundamentally changing, making historic earnings almost meaningless. Until 2000, international oil companies expended roughly as much capital as their assets depreciated. But since then, their capital expenditures have increased by five times, while depreciation has risen by only half as much.

Sooner or later, all that extra capital will have to be depreciated, a factor that is creating a potential new moral hazard for an industry that has been issuing distributions to shareholders based on historic earnings. Many oil majors have paid dividends to shareholders that have met or exceeded their combined cash flow remaining after capital spending – or free cash flow.

So what steps should the supermajors take?
INTEGRATE...

First, they should divert cash flow from capital spending and direct it back to shareholders. Due to the false signal of rising oil prices, capital spending is spinning out of control. More capital is being committed to high-stakes projects. But the hurdle rates to achieve returns on these megaprojects are higher than is generally recognised when adjusted for their greater inherent risks (including cost overruns and delivery delays), especially in today’s increasingly fractured geopolitical environment. These projects may also suffer from a higher failure rate than in the past, in part because the chronic hollowing out of experienced workers and managers has made it more difficult for oil and gas firms to oversee contractors.

Supermajors should also seriously consider investing in a wide range of assets from which they can create value, ranging from oil exploration projects to oil field services. Doing so will require oil majors to forge new paths to make intra-business investment decisions now that oil exploration projects may no longer deliver the highest returns. In the past, an oil exploration investment would not be compared to other types of investments. But in the future, they may need to be.

...OR DISINTEGRATE

Finally, international oil companies could divide up their business portfolios and put some of their assets up for sale. As more oil and gas firms attempt to expand their reach into more types of businesses, they are driving up the valuations of everything from gasoline stations to oil field service equipment. It may make sense for some supermajors to unlock value by selling some assets that do not work together or that could realise greater value by being combined with others to achieve economies of scale. There is a historical precedent for following such a strategy. Seventeen years after the Standard Oil Company was dissolved in 1911, the total market value of the 30 surviving companies of the 33 that were divested had market valuations that were more than five times higher than the original company.

As the business landscape for oil and gas firms radically shifts, supermajors face difficult choices. But they are not impossible, and many companies are already taking action. The industry is in the throes of extreme change – and that calls for extreme measures. The sooner the Big Six can make the profound strategic and operational changes that will enable them to create greater value in a higher-stakes world, the better.

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TOP COMMODITY TRADERS REVAMP STRATEGY AS INDUSTRY MATURES

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Ever since the financial crisis, a group of traditionally slow-moving asset-backed trading giants have been pushing to meld their operational expertise with the entrepreneurial style and culture of independent traders. They are being rewarded handsomely by the new trading model that they have pioneered with rock-solid trading results at a time when the market is stuck at rock-bottom prices for everything from copper to crude oil.

The five top asset-backed traders have been growing their gross margins more than three times as fast as independent traders since the financial crisis. As a result, they have grown their gross margins as a group by more than 15 percent every year since 2010. By contrast, the gross margins of the top five independent traders have expanded annually by only 5 percent.

This revolutionary shift is the outcome of an evolutionary transition of nonconformist commodity trading into a mature industry. The commodity traders that have come closest to achieving established, institutionalised global machines designed to generate earnings reliably in spite of market conditions are now at the head of the pack.

In short, they are industrialising.

THE NEW NORMAL OF COMMODITY TRADING

The “new normal” of commodity trading no longer only hinges on superstar, siloed individuals living off their ingenuity, agility and speed. Instead, today’s standout results are systematically driven by transforming market and competitor intelligence gathered from personal networks into tradable institutional knowledge, offering structured customer solutions and monetising “optionality,” defined as the options available to run, manage and extract the most value from their portfolios globally. Leading players are becoming one-stop shops able to finance, store, transport, refine and distribute commodities globally with machine-like efficiency, avoiding operational or financial strain.

Leading energy companies are now reaping the rewards of refining
their ability to incorporate their longstanding operational expertise into their trading divisions’ cultures. Over the past several years, they have cut costs by standardising, automating, and outsourcing processes. They have also improved their ability to act nimbly by educating all of their stakeholders and breaking down the barriers between logistics operations and their supply and trading divisions.

As a whole, these efforts are having a significant impact. For example, in the first three months of 2015, BP’s profit fell only 20 percent compared to the same period in the previous year, even though crude oil prices were cut in half. Similarly, the trading arms of Total and Shell helped to support their overall group results by taking advantage of favourable forward market conditions and storage capacity along their logistics chains. One leading asset-backed player was able to reduce the ratio of costs to trading income by more than 10 percent simply by standardising and outsourcing more work.

INDUSTRIALISED CULTURE SHIFT

So now, other asset-backed traders and maverick independent traders, too, are attempting to institutionalise their operations without sacrificing nimbleness and entrepreneurial drive. At the same time, they are shifting toward a more rules-based management-run model, with explicitly defined delegations of authority and institutionalised processes around investment decision making and capital allocation. Many are also building out their corporate functions such as corporate finance, strategy and external communications.

Traditionally, private independent commodity traders are starting to involve their compliance and legal departments more in complex issues such as customer relationships. Some are going so far as to outsource and offshore routine administrative work and to publish comprehensive annual reports. Successful strategists are designing large systems and industrialised platforms that can maintain the high degree of entrepreneurship and individual talent required for them to act swiftly on monetising opportunities.

Hence, the question becomes: Will all commodity traders be able to industrialise to the degree required to reach the next level? And if independent commodity traders improve their resilience, will the top asset-backed traders be able to go on building out their capabilities and gaining market share at the same pace?
THE NEXT FIVE YEARS

The commodity-trading industry is moving from its roots as a fragmented band of maverick traders stepping in to smooth out the vast global supply and demand imbalances and information asymmetries to an industrialised group of nimble, global one-stop-shops for multiple commodities, also providing financing, risk management and logistics.

Within five years, we predict that commodity traders will morph into organisations with all the benefits and challenges of other mature industries. And as commodity traders’ business models become increasingly homogeneous, they will be under even more intense pressure to distinguish themselves from the pack.

The recent transformation of top asset-backed traders underscores what leading independent traders and other asset-backed traders need to do in order to grow and become more resilient. If the past is an indicator for the future, independent players will find nimble and swift ways to adapt and lead again.

Conversely, even those asset-backed traders that are presently the industry’s front-runners will need to continue to push the envelope in professionalising the industry and strive to be more agile by exploring new, innovative ways to inexpensively optimise all of the options available in their massive global operations. No one can afford to sit still.

This article appeared on BRINK on October 16, 2015.
Railroads in the US have quietly become the de facto alternative pipeline for the oil and gas industry, moving as much as 1.5 million barrels of oil a day.

Oil by rail increased from 10,000 carloads in 2008 to 408,000 in 2013; shipments are up 9 percent over last year through the first seven months of 2014, according to the Energy Information Administration. This growth is tied to the recent boom in US oil production and insufficient pipeline capacity.

But the increased rail traffic carries great risk. The worst disaster happened last year when a train derailed in Lac-Mégantic, Quebec, just north of Maine. Forty-seven people died and 30 buildings were destroyed. In the US, rail car accidents increased from 8 incidents in 2008 to 119 in 2013; most of these were small, but enough serious accidents have taken place to move federal regulators and the railroad industry to call for improved safety requirements.

In January the National Safety Transportation Board said they were “concerned that major loss of life, property damage and environmental consequences can occur when large volumes of crude oil or other flammable liquids are transported on a single train involved in an accident.”

The NTSB’s concern was underscored in an August GAO report that said despite “generally good safety records, the increased transportation of these flammable hazardous materials creates potential for serious incidents.”

The Department of Transportation has a rulemaking in progress to address many of these safety concerns including:

▶ A new definition identifying a train as a “high-hazard flammable train” when carrying 20 or more tank cars of flammable liquid

▶ Risk assessments for rail routing

▶ Notification to State Emergency Response Commissions when transporting 1 million gallons or more through their state

▶ New standards for rail car construction

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