The Arab Gulf States
Institute in Washington
Building bridges of understanding

Navigating the New Oil Era

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The Arab Gulf States Institute in Washington (AGSIW), launched in 2015, is an independent, nonprofit institution dedicated to increasing the understanding and appreciation of the social, economic, and political diversity of the Gulf Arab states. Through expert research, analysis, exchanges, and public discussion, the institute seeks to encourage thoughtful debate and inform decision makers shaping U.S. policy regarding this critical geostrategic region.

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About the Author

Diane Munro is a non-resident fellow at the Arab Gulf States Institute in Washington, where she specializes in international oil markets and geopolitical issues driving OPEC and Gulf Cooperation Council energy policies. She is also a vice president at Foreign Reports. Previously, she served with the Paris-based International Energy Agency, where her work centered on developing global oil market forecasts, policy analysis of IEA and OPEC member countries, and energy security strategies such as IEA simulations and war-gaming exercises among member countries in the event of major oil supply disruptions. Munro has written on energy issues for more than 30 years, with her work published by Bloomberg, Middle East Economic Survey, Reuters, Al-Hayat, Energy Compass, and Petroleum Intelligence Weekly. Previously, she was president and editor-in-chief of The Oil Daily Co, now known as Energy Intelligence Group.

Executive Summary

The global energy industry is in the midst of writing a new chapter in its long-storied history as oil producing companies and countries reset their strategies and policies to meet the challenges of a technology-driven, lower oil price era.Industry expectations that prices would steadily strengthen by the end of 2017, as oil inventories contracted and production cuts took place with reduced capital investment curtailing supply, gave way to a soberer mindset. The prevailing industry narrative now sees $50-60/bbl as the new normal through the end of the decade, and possibly longer.

Spearheaded by high-level diplomatic initiatives from Saudi Arabia and Russia, the OPEC and non-OPEC production cuts implemented on January 1 aimed at hastening a drawdown in high global stock levels initially triggered a sharp rise in oil prices on expectations of tighter markets. However, the unexpected, robust resurgence in U.S. shale (or tight oil) production has partially undermined OPEC's strategy and led to a much slower than expected decline in inventories. The rapid rebound in shale took the group by surprise, prompting the producer alliance to undertake a review of its options to support stronger markets.

Pressured by prices trading some 50-60 percent below peak levels posted three years ago, producers of relatively higher cost U.S. tight oil exceeded industry expectations yet again by developing even more innovative applications of technology to improve operational and cost efficiencies, increasing production to levels unimaginable just a year ago. The imperative to improve cost economics across the industry has also led international companies to re-engineer their operations by implementing more advanced technologies to develop new best business practices. Once again, the arsenal of more innovative and advanced technologies unleashed by the shale revolution continues to transform the global oil industry.

Introduction

The same small, independent U.S. drillers that pioneered the game-changing shale oil era are now driving a new industrywide focus on improved project economics to compete in a lower-for-longer oil price environment. Innovative development of more advanced technologies is enabling a significant improvement in cost efficiencies, productivity, and operational best practices. Projections circa 2014 that a price range of $60-90/bbl was needed to sustain U.S. shale (or tight oil) production have now been lowered to $30-65/bbl, with the average cost for the fast-cycle, flexible crude of $50/bbl effectively setting a lower marginal price for the industry.

No longer unique to the shale oil patch, new technology-driven best business practices are enabling international oil companies to expand supplies of conventional oil, including traditionally more expensive deepwater projects, and nonconventional resources, by improving project economics and increasing recovery rates at much lower cost levels. National oil companies in the Gulf Cooperation Council states are also aggressively restructuring their operations, which is made more challenging by the need to reduce bloated bureaucracies and at the same time create new skilled jobs for their exploding populations. Moreover, some state oil companies have been behind the curve in the application of even the most standard

technologies long used by the international industry, and severe budget constraints in the wake of lower prices will limit their ability to take advantage of the new advancements.

A prolonged lower oil price scenario of between $50 and $60/bbl will also have far-reaching implications for the political agendas and economic fortunes of the Gulf states and oil producing countries around the world. Chronic civil unrest in OPEC members Libya, Nigeria, and Venezuela continues to inject a high level of uncertainty in global supply forecasts. U.S. President Donald J. Trump's vow to withdraw from the controversial Iran nuclear agreement is undermining Tehran's efforts to attract foreign investment to its oil sector, which effectively will constrain its future supply growth.

New leaders are assuming control and rewriting the playbook for the region in a way that could have significant implications for energy geopolitics.

At the same time, a new generation of leaders in the Gulf is upending political agendas and government policies that have long guided relationships among the GCC states, regionally, and internationally.[1] From an unprecedented economic embargo on Qatar by some fellow GCC states to the Riyadh-led diplomatic overtures to Iraq, new leaders are assuming control and rewriting the playbook for the region in a way that could have significant implications for energy geopolitics.

Meanwhile, oil markets are casting a critical eye on the new Saudi-Russian oil axis, given its pivotal role in achieving and sustaining the unprecedented OPEC and non-OPEC cooperation agreement on production policy. Success of the accord is critical for GCC states as they struggle with economic imperatives and political agendas competing for limited oil revenue. The OPEC and non-OPEC agreement is providing a welcome boost to government coffers with relatively stronger oil prices increasing revenue by an estimated 10 percent from January to June 2017 over the last six month of 2016.[2]

OPEC's new market management strategy is not only strengthening oil prices for the industry but the Saudi- and Russian-led production pact is helping government officials better navigate geopolitical strategies and economic reform plans.

OPEC and Oil Market Dynamics

Despite some unforeseen setbacks, OPEC's unprecedented agreement with non-OPEC partners has been a success: It averted a price collapse and is on track to deliver a revenue increase of around 20 percent to member countries in 2017. The creation of this powerful alliance signaled a major shift by OPEC toward a more dynamic market management policy aimed at navigating this new era of technology-driven lower prices.[3] The historic agreement inked on December 10, 2016 committed the OPEC and non-OPEC producers to reduce supplies by just over 1.7 million barrels per day (mb/d), effective January 1, 2017, for six months, which

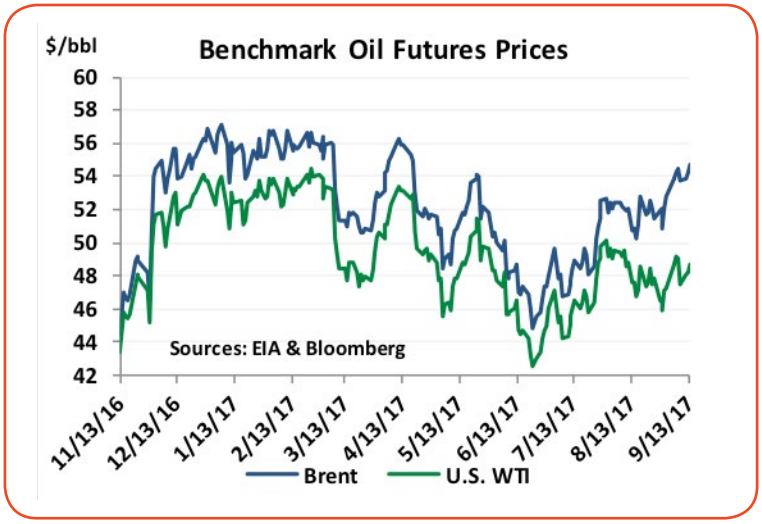
1 Kristin Smith Diwan, "New Generation Royals and Succession Dynamics in the Gulf States," *Arab Gulf States Institute in Washington*, March 21, 2017.

2 Alex Lawler, "Despite Weak Oil Prices, OPEC Still Pockets More Dollars," *Reuters*, June 28, 2017.

3 "OPEC Press Release," *OPEC Secretariat*, December 10, 2016.

was later extended to March 2018. OPEC members agreed to reduce production by almost 1.2 mb/d while non-OPEC oil producing countries committed to cutting supplies by 560,000 barrels per day (kb/d). The 22-member alliance accounts for just over 50 percent of global oil supplies.

The agreement initially propelled oil prices 20 percent higher but by March a more bearish outlook emerged, reflecting market frustration that the anticipated rebalancing of oversupplied markets had yet to materialize. The weaker market sentiment was also fueled by growing concerns a surge in drilling rig activity in shale oil fields would soon lead to a strong rebound in U.S. production. Prices have ebbed and flowed with shifting market sentiment in a relatively wide $12/bbl range since the new production accord took effect. Futures prices have edged lower from the loftier levels posted in the first three months immediately following the announcement of the agreement but nonetheless were significantly stronger from January to mid-September above the 2016 levels. International Brent has averaged $8.50/bbl higher this year while U.S. West Texas Intermediate (WTI) has gained a smaller $6/bbl. The relatively weaker increase for WTI in large part reflects a combination of increased shale production for domestic markets and the lifting of exports constraints, which has made prices more competitive while Brent has benefited from tighter markets in Europe and Asia due to the cutback in OPEC supplies.

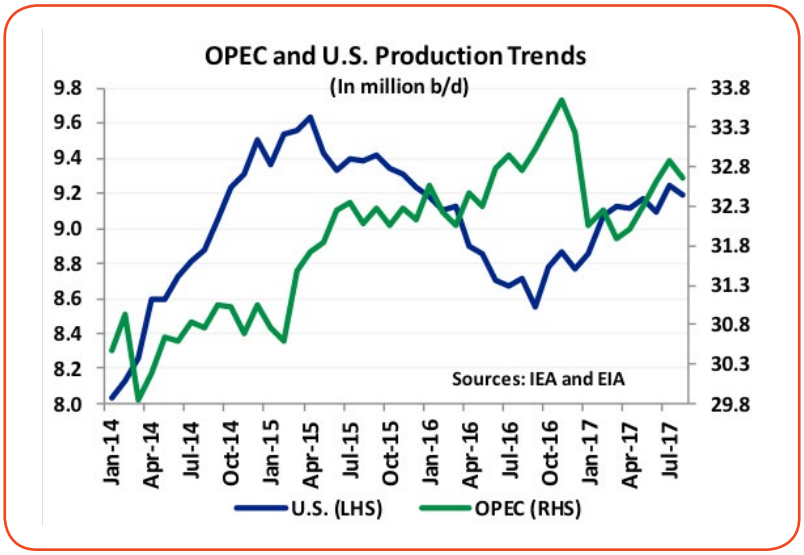


The OPEC and non-OPEC pact has achieved exceptionally strong compliance with new lower production targets, much to the surprise of many analysts. OPEC members, excluding Nigeria and Libya, which are exempt from the agreement, have posted compliance rates of around 90 percent. By contrast, non-OPEC compliance was a much weaker 60 percent on average. Combined, the groups have removed 1.4 mb/d from the market since January, with compliance just over 80 percent.

However, the corresponding resurgence in tight oil production in the United States has partially undermined the success of the accord.[4] Led by a jump in output from the oil-rich Permian Basin in Texas and New Mexico, U.S. production of tight oil has surged by over 900 kb/d since the end of 2016. Production is on track to increase by around 550-600 kb/d in 2017 over year-ago levels, with the pace of growth accelerating to 1 mb/d in the second half of the year. Moreover, OPEC may be facing even stronger headwinds in 2018 with a growing contingent of industry analysts forecasting the relentless rise in U.S. shale will lead to a large build in global stocks in the first quarter of 2018 and then flatline for the remainder of the year, effectively

4 Spencer Jakab, "Effort to Crush Shale Producers Only Made Them Stronger," *The Wall Street Journal*, June 9, 2017.

marginalizing the impact of the production pact.[5] Forecasting future supply is fraught with problems, with projections regularly revised higher or lower as new data becomes available. In the past year, the unexpected resilience of shale oil output has led to upward revisions in non-OPEC supply on an almost monthly basis while global demand growth has far exceeded levels forecast just a year ago.



OPEC and Non-OPEC Compliance Fraying

The markets' confidence in the ability of the alliance to maintain adherence to the lower production targets started to wane in June after data showed supplies from the group edging higher. OPEC compliance was a strong 95-105 percent in the first five months of the year, in part because Saudi Arabia made much sharper cuts than required to make up for countries exceeding their targets. However, by July the group's production rose to the highest level in 2017 with compliance falling to a 2017 low of 75 percent before posting a modest recovery to 83 percent in August. Exceptionally weak compliance by Iraq, the United Arab Emirates, and Venezuela have partially undermined the credibility of the accord. Iraq's compliance has averaged just 38 percent since the agreement went into effect. Iraq argued in November 2016 that it should be excluded from the agreement since the country has incurred substantial financial costs in its fight against the Islamic State in Iraq and the Levant, which benefits the entire region, but to no avail. Iraqi oil officials are also disputing the reporting of Iraq's production levels by secondary sources, which they say are distorted by inclusion of northern production by the Kurdistan Regional Government.

Faltering market confidence in the sustainability of the production accord and projections for a continued increase in U.S. production to record levels have led a growing contingent of industry analysts and experts to conclude that OPEC is facing a no-win battle with shale oil.[6] With history as a guide, however, it may be unwise to assume OPEC has few options left

5 Grant Smith, "OPEC's Oil-Glut Fight Could Last Years," *Bloomberg*, August 15, 2017.

6 John Kemp, "OPEC Should Let Oil Prices Rebalance the Market," *Reuters*, June 28, 2017.

to engineer an unexpected increase in oil prices. OPEC's new market management strategy includes a much stronger, proactive, and market-savvy leadership that is working to support the new agreement. Saudi Minister of Energy, Industry, and Mineral Resources Khalid al-Falih, Russian Minister of Energy Alexander Novak, and OPEC Secretary General Mohammad Sanusi Barkindo have participated in dozens of gatherings, both formal and informal, to assess the market response to the agreement and encourage stronger compliance with new targets.

OPEC & Non-OPEC Production Profile: 2017 January-Aug Averages

OPEC-12	Production	Chg v Baseline	Compliance	Non-OPEC	Production	Chg v Baseline	Compliance
Algeria	**1.06**	-0.032	64%	Russia	11.37	-0.223	74%
Angola	**1.64**	-0.107	137%	Azerbaijan	0.78	-0.036	103%
Ecuador	**0.53**	-0.019	75%	Kazakhstan	1.80	0.021	-104%
Equatorial Guinea	**0.12**	-0.015	127%	Oman	0.98	-0.043	96%
Gabon	**0.20**	0.000	-2%	Sudan*	0.19	0.008	-63%
Iran	**3.78**	0.073	n/a	Bahrain	0.20	-0.006	55%
Iraq	**4.48**	-0.080	38%	Mexico	2.31	-0.094	94%
Kuwait	**2.71**	-0.129	99%	Brunei	0.12	-0.019	466%
Qatar	**0.61**	-0.035	117%	Malaysia	0.71	0.021	-107%
Saudi Arabia	**9.94**	-0.601	124%	**OPEC-12**	**30.08**	**-1.03**	**87%**
UAE	**2.94**	-0.076	55%	**Non-OPEC**	**18.45**	**-0.371**	**68%**
Venezuela	**2.06**	-0.006	6%	**Total**	**48.53**	**-1.40**	**81%**

Source: IEA. Nigeria and Libya exempted from agreement. *Sudan estimates include South Sudan.

When oil prices plummeted to 2017 lows in late June on reports of higher OPEC production, Saudi Arabia stepped into the breach with a pledge to reduce crude oil exports in August, which in turn boosted prices.[7] Government reporting of weekly data on stocks, imports, and production in the key U.S. market provides one of the most visible indicators of price direction, especially when compared to other key countries where data lags by anywhere from one to six months. The more transparent, albeit preliminary, weekly U.S. data can have an exaggerated impact on oil futures price movements. Nonetheless, recognizing the importance that weekly U.S. data can have on market sentiment, OPEC now appears prepared to respond to developments as market conditions warrant rather than the more passive and dismissive approach seen in the past.

Equally, the latest OPEC and non-OPEC agreement has a much stronger foundation than previous deals. The first joint pact by the two producer groups in 15 years, its hard-won production cuts were in large part due to cooperation among the unlikely trio of Saudi Arabian Deputy Crown Prince Mohammed bin Salman (currently crown prince), Russian President Vladimir Putin, and Iranian President Hassan Rouhani, with Moscow acting as a key negotiator with Tehran. For all three countries, the devastating financial impact of lower oil prices and the worsening economic outlook proved to be the uniting factor for a shared goal of reaching an agreement, despite other divisive political issues.

Crucial to the success of the accord has been the establishment of a formal monitoring

7 Myra P. Saefong, "Oil Edges up on Talk of Potential Cuts to Saudi Exports," *MarketWatch*, July 18, 2017.

group, the Joint Ministerial Monitoring Committee, which is supported by a technical group of experts, to monitor compliance for the first time in OPEC's history. The more formal and public monitoring of production levels has added a much higher level of transparency than in the past, which in turn has increased the group's credibility. Falih and other officials are also actively engaging in rounds of shuttle diplomacy to hammer home the need for greater compliance. In a move that underscored high-level Saudi support for the deal, Crown Prince Mohammed bin Salman and Falih met with Iraqi Oil Minister Jabar Ali al-Luaibi in Jeddah on August 10 to discuss OPEC policy, which likely included the country's high level of production.[8] The meeting came against the backdrop of a growing rapprochement between Riyadh and Baghdad following a series of high-level meetings since February.[9] As OPEC's second largest producer, it is critical to the credibility of the agreement to bring Iraq in line with its quota.

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OPEC Dilemma

Market disappointment with the OPEC and non-OPEC agreement also stems from the group's apparent unwillingness to date to make deeper production cuts amid a much slower market balancing. However, OPEC still has an array of options and a history of adjusting previous agreements as market conditions warrant, especially during periods of acute financial crises. During the Great Recession in the late 2000s, OPEC held three separate meetings in 2008, each time agreeing to more severe cuts in response to worsening market conditions, with a massive 4.2 mb/d reduction implemented by January 2009.

Industry analysts concede that OPEC may yet surprise the market by implementing deeper cuts for a period of time and spark a rise in price levels nearer to $60/bbl but argue the gains would be short lived. With the current marginal per barrel cost of fast-cycle shale production hovering around $40-50/bbl, an OPEC-engineered price increase would unlock even more production from the United States and quickly tamp down prices. The complex OPEC-shale dilemma continues to reinforce industry views that, barring any significant unplanned supply disruptions or international crisis, technology-driven improvements in the United States and other non-OPEC countries will keep prices range bound at $40-60/bbl through the end of the decade, and possibly longer.

Oil Company Strategies in a Challenging Oil Price Environment

New technologies and adoption of rigorous best business practices pioneered by U.S. drillers have set a new, higher standard for project economics across the industry and enabled companies to slowly increase capital spending in 2017. A sharp reduction in capital expenditures

8 Taimur Khan, "Iraq's Oil Minister Meets Saudi Crown Prince in Jeddah," *The National*, August 10, 2017.

9 Ali Mamouri, "Saudi Arabia Engages Iraq at Iran's Dismay," *Al-Monitor*, August 18, 2017.

from 2014-16 has led some experts to warn a supply crunch is on the horizon. Others see a more nuanced recovery in the supply outlook, with new short-cycle, nonconventional oil, and low cost Middle East supplies meeting any projected shortfall. Near term, long-planned non-OPEC projects are expected to come online in 2018-19, totaling just over 1 mb/d for the period, which will add further pressure on markets. After a 44 percent plunge between 2014 and 2016, upstream oil and gas investments are forecast to increase in 2017, according to the International Energy Agency.[10] Investments in the U.S. shale industry are forecast to increase by a steep 53 percent and resilient spending in major producing regions such as the Middle East and Russia will boost overall upstream investments by 6 percent in 2017.

A number of factors have converged to deliver an industrywide improvement in efficiency gains, some opportunity based and others structural.

A number of factors have converged to deliver an industrywide improvement in efficiency gains, some opportunity based and others structural. Across the industry, cost savings have been captured by improvements in how projects are designed, built, and operated by reducing drilling and completion times, decreasing total well development costs, and increasing overall well production performance. A shift in focus to high quality, low cost plays, or "high grading," also is supporting improved project economics. In the United States, there has been a massive influx of new drillers in the premium Permian Basin but the pace of growth may slow beyond 2018 because much of the high grading has already taken place and companies will be forced to shift their focus to less attractive, more difficult shale plays. Globally, high grading of projects will continue to deliver cost efficiencies, as international oil companies prioritize limited investment capital toward the most attractive projects in their portfolios and focus on expanding existing projects that can take advantage of expensive in situ infrastructure.

U.S. Drillers Set New Standards for Operational Excellence

Drawing on its unique flexible, fast-cycle development period, U.S. tight oil has set a lower marginal price of $50/bbl for the market, with companies steeped in developing new technologies achieving even lower $30-40/bbl production costs.[11] Many of the U.S. independent companies operating in the shale oil patch are traditional explorers and drillers so they have to hire specialized oil service firms to do the actual fracking and well completion. Though some cost inflation is expected in the oil service industry over the course of 2017 and 2018, marginal cost increases are not expected to materially affect plans because of offsetting factors such as improved production per rig with deeper and longer lateral drilling and computer-driven accuracy in identifying the most prolific areas to target, among many other new operating practices that are delivering efficiency gains.

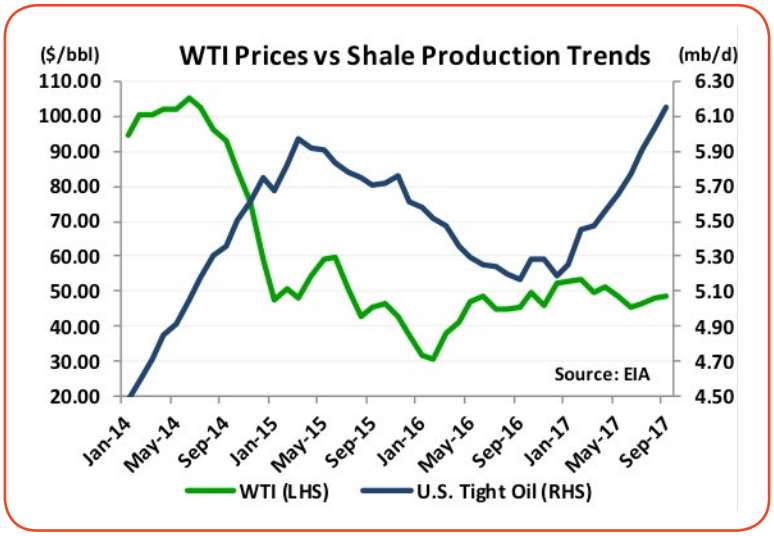
While OPEC's production agreement has been singled out for triggering the resurgence in U.S. tight oil production in 2017, the latest drilling boom was aided and abetted by a wave of fresh investment capital from Wall Street starting some 18 months ago. High-profile industry

10 International Energy Agency, *World Energy Investment Report 2017* (Paris: International Energy Agency, July 2017).

11 John Kemp, "U.S. Shale Breakeven Price Revealed around $50," *Reuters*, August 9, 2017.

forecasts projecting the sharp reduction in capital spending on projects in 2014-16 would lead to a global supply crunch as early as 2020 emboldened banks and financial firms to increase activity in the energy sector. An influx of cash from company stock sales, high-yield debt, and private equity funds, among other financing tools, combined to fuel a surge in drilling activity in 2016. One estimate pegs Wall Street funding at a staggering $57 billion over the last 18 months.[12]

U.S. tight oil production growth is projected to more than double in the second half of 2017, with output from the Permian Basin accounting for the lion's share of the increase. A large number of U.S. independents operating in the Permian Basin hedged their production with WTI contracts at around the $50/bbl mark for 2017, which is supporting current higher production levels, according to IHS Markit.[13] However, industry outlooks for tight oil production growth in 2018 and beyond are wide ranging. The diverging views are, in part, due to ongoing revisions to production data. More optimistic analysts see growth rates of a strong 1.2 mb/d plus for 2018.[14] Industry consensus is currently coalescing around 700-800 kb/d. Persistent large revisions to data have led some analysts to conclude that production in 2017 will be below forecast levels.[15] Analysts forecasting weaker market balances and prices falling below $50 are capping supply growth in tight oil at a low 300-400 kb/d.



Forecasts could be revised higher if workforce shortages hindering well completions are improved. U.S. rig activity surged from 6,820 in January 2016 to a peak of 9,522 in October, and largely plateaued around these levels until March 2017. Activity edged lower to around 9,200 from July to September but the slowdown in part reflects deliberate decisions by companies to curtail activity due to a shortage of fracking crews to bring the wells already drilled to completion and a corresponding increase in drilled but uncompleted wells. The "fracklog" rose to record levels of 1,232 in July over year-ago levels, with the prime Permian Basin accounting for a steep 90 percent of the increase. This fracklog effectively creates a tertiary level of inventories that can be tapped if market conditions warrant, with production from these wells potentially adding some 300-600 kb/d within 20-40 days.

With their war chests replenished and secured by hedging, pioneering U.S. drillers are

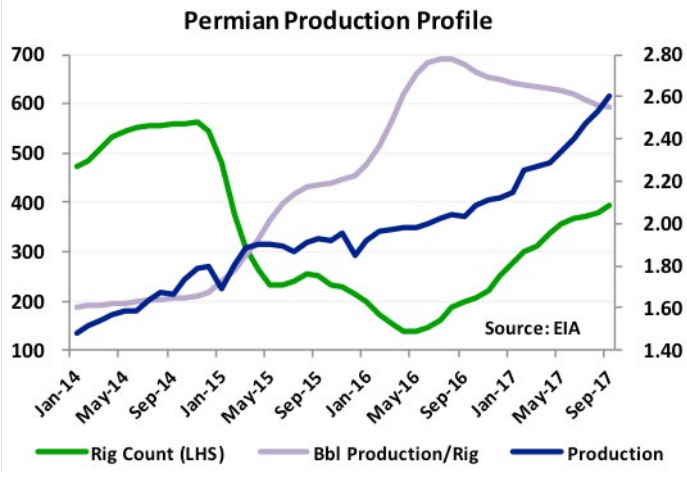
12 Bradley Olson and Alison Sider, "Wall Street Cash Pumps Up Oil Production Even as Prices Sag," *The Wall Street Journal*, July 7, 2017.

13 "Permian Oil Operators' Lofty Production Targets Supported by Strong Hedging, IHS Markit Says," *IHS Markit*, July 25, 2017.

14 David Sheppard and Anjli Raval, "Oil Traders Grapple with US Crude Conundrum," *Financial Times*, August 4, 2017.

15 Nick Cunningham, "How EIA Guestimates Keep Oil Prices Subdued," *OilPrice.com*, September 3, 2017.

advancing to the next stage of fracking, with much of their focus on the Permian Basin and the new hot play of the Anadarko region, which straddles Oklahoma and Texas. The Permian has accounted for more than half of new tight oil supply since January 2014, with production surging 75 percent to a staggering 2.6 mb/d by September 2017. Production per rig has more than tripled over the same period, rising to 600 kb/d. Permian output is slated to rise to 2.8 mb/d by the end of 2017, almost double January 2014 levels, and by a further increase of 500 kb/d in 2018.



With the new mantra of producing more with less, companies are developing everything from proprietary drill bits to new computer applications on their smartphones to pinpoint the sweet spots in their oil plays.[16] Independent U.S. oil companies are also pushing new frontiers by redeveloping old conventional oil fields with the latest technology.[17] With cost inflation for land, labor, and equipment in the prime tight oil plays on the rise, some oil companies are opting to deploy the latest technology to extracting stranded oil in century-old fields. Redevelopment of the older fields typically costs less than $1 million compared to $6-8 million for a new shale well.

International Oil Companies Achieve Better Economies of Scale

After implementing short-term cost savings following the price collapse in mid-2014 by sharply cutting capital expenditures, canceling or postponing projects, reducing staff levels, and renegotiating service contracts, international oil companies are now focusing on structural operational changes and new best business practices to meet the challenges of a lower-for-longer $50/bbl oil price. Companies are imposing cost discipline and realigning their portfolios of more traditional capital-intensive megaprojects to include some short-cycle developments, especially in the U.S. shale patch.[18] With their larger, more geographically diverse business operations, IOCs also are achieving economies of scale by standardizing project materials and execution plans. When oil prices appeared to be on an ever-rising upward trajectory and conventional wisdom viewed the industry as one of growing supply scarcity, companies adopted increasingly costly custom solutions for complex projects in their quest to maintain production volumes on their balance sheets. As a result, the cost of producing oil and gas after

16 J.P. Morgan Energy Equity Conference, "EOG Resources," June 2017.

17 Lynn Cook, "Old Oil Is New Again," *The Wall Street Journal*, August 20, 2017.

18 Bradley Olson, "Big Oil Firms Are Exploring a New Frontier in Shale: Profits," *The Wall Street Journal*, June 16, 2017.

drilling is complete more than quadrupled from 2000-12, according to IHS Markit.[19]

Improved cost efficiencies have enabled IOCs to increase their capital spending in 2017 after two years of severe cuts and stepping up investments in conventional and deepwater projects.[20] Reviving plans for more conventional projects is seen as critical to maintain long-term supply growth given their much larger production volumes relative to U.S. tight oil. IOCs are now expanding offshore developments, albeit with smaller, less costly projects that tie in to existing infrastructure. More than a hundred multibillion-dollar megaprojects that typically take a decade to develop were postponed in the wake of plummeting oil prices. While development costs run into the billions, the much larger production rates and long life of the fields make offshore projects more lucrative over time. A recent survey by IHS Markit of five major oil supply sources showed the full-cycle cost of a representative project declined by an average 34 percent between 2014 and 2016.[21] The breakeven price of a representative project ranged from less than $15/bbl for Middle Eastern onshore developments, around $40/bbl for both global deepwater projects and U.S. tight oil, $45/bbl for Russian onshore, and just over $50/bbl for Canadian oil sands.

State Oil Companies Treading Water

National oil companies in the Gulf states are also restructuring their business operations toward a more profit-oriented model to fully monetize their hydrocarbon resources. However, unlike the more competitive IOCs, state companies have a higher learning curve to overcome in changing their operating structures, from shedding bloated bureaucracies to streamlining operations for improved cost efficiencies while at the same time creating skilled employment opportunities for their growing populations.

Unlike IOCs, which only answer to their shareholders, an overriding imperative to maintain and increase production capacity is paramount to securing future government oil revenue. State oil companies in the Gulf have maintained investments in projects through the downturn, but, with the exception of those in the UAE, most are designed to sustain current production levels and much more is needed to increase growth. Production in the GCC's four OPEC member states is forecast to increase by a meager 650 kb/d from 2016-22, with the UAE accounting for just over half of the growth, according to the International Energy Agency.

With investment capital severely constrained by competing demands for oil revenue from governments, national oil companies are tapping international debt markets, embarking on partial privatization plans, and securing alternative project financing to fund the maintenance or expansion of production capacity. Saudi Arabia's unprecedented initial public offering of under 5 percent of Aramco is the most highly-watched privatization. With the potential to make history as the world's largest IPO with valuation estimates ranging from $500 billion to

19 Nicholas Cacchione, "Escalating Costs Drive Diminishing Returns for Oil Companies," *IHS Markit*, November 4, 2014.

20 Tayvis Dunnahoe, "WoodMac: Deepwater Projects May Soon Compete with US Tight-Oil Plays," *Oil & Gas Journal*, March 31, 2017.

21 Jeff Meyer, "Making Ends Meet: How the Oil Industry is Cutting Costs to Make Up for Lower Prices," *IHS Markit*, May 16, 2017.

over $1 trillion, Saudi Arabia has a strong incentive to support stronger oil prices in late 2018, when the flotation is scheduled to take place. Other state oil companies in the region will be closely following the Aramco IPO as officials eye the potential for partial privatization of their own state firms.

State Companies Forge New Partnerships

Of critical importance to state oil companies is attracting foreign company participation with their advanced technology to support future growth, which in many cases will require improved investment terms. Abu Dhabi has been at the forefront of attracting foreign participation. When he took over as director general of the Abu Dhabi National Oil Company in 2016, Sultan Al Jaber embarked on an aggressive restructuring of the state oil company in a bid to transform it into a more commercial, profit-oriented business, and at the same time resurrected long-delayed negotiations for award of onshore oil concessions.

Forging new business models, Abu Dhabi inked a landmark $2.2 billion share swap with legacy partner BP on December 17, 2016. The unique model for a joint venture gives Abu Dhabi a 2 percent stake in BP in exchange for a 10 percent share in ADNOC's main onshore oil concession. Jaber noted, "The agreement marks a milestone in our efforts to forge new partnership models that bring technology, expertise and financing aimed at maximizing the value of our resources and supporting the transfer of knowledge."[22]

The OPEC-orchestrated rise in revenue combined with new budget and fiscal policies have reduced the marginal price of oil GCC governments need to cover expenditures.

While some national oil companies look to outside oil service companies to help maintain production, a strategic shift to building more long-term partnerships with foreign companies with shared technology will enable them to make major improvements toward a more commercial, profit-oriented approach much faster and ultimately deliver higher oil revenue to their governments.

Geopolitical and Economic Flashpoints

Critical geopolitical issues and major economic reform efforts amid a low growth, low oil price outlook have created challenging environments for government leaders in the GCC region and OPEC countries. Relatively stronger oil prices so far this year are expected to increase net oil export revenue by 25 percent to $540 billion in 2017 after posting a decline of 15 percent in 2016.[23] The OPEC-orchestrated rise in revenue combined with new budget and fiscal policies have reduced the marginal price of oil GCC governments need to cover expenditures. After implementing short-term strategies of budget cuts, reduced subsidies, and increased taxes, among other measures, progress in implementing structural changes needed to attract foreign investment, improve the business environment, and generate private sector jobs for the rapidly growing labor force is critical but has been slow and uneven.

22 "BP Awarded 10% Interest in Abu Dhabi's ADCO Onshore Concession," BP, December 17, 2016.

23 "OPEC Revenues Fact Sheet," *U.S. Energy Information Administration*, May 15, 2017.

New Rules of Engagement

A generation of more aggressive Gulf leaders is resetting long-standing political agendas that are shifting the power dynamics in the region. Saudi Arabia and the UAE took the unprecedented initiative to impose an economic embargo on Qatar in a bid to coerce a more unified and cooperative policy on regional issues. Months into the embargo, the standoff continues. Equally, Saudi Arabia and other GCC states have been working to improve relations with Baghdad after decades of discord, in large part to limit Iranian influence in a post-ISIL Iraq.[24]

A lower-for-longer oil price scenario is also compounding already vexing problems in a number of oil producing countries. Ongoing or escalating civil unrest in OPEC members Libya, Nigeria, and Venezuela continues to inject a high level of uncertainty in global supply forecasts, which could yet alter the current oil price outlook. Libya and Nigeria, which are exempt from the current production accord, have effectively become swing producers given the chronic disruption to their oil supplies. Local and international efforts to find political solutions to resolve their festering problems have so far failed. As a result, an estimated 1.2-1.8 mb/d of production remains vulnerable to disruptions.

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Meanwhile, Iran is under increasing pressure from a more confrontational and unpredictable Trump administration, which is undermining investor confidence in the country's plans to attract foreign companies to its oil and gas industry, a key driver of much-needed economic growth. Iran signed its first major energy investment contract in early July with French energy giant Total but expectations that the deal would be the first of many have been dashed by the worsening political climate triggered by new sanctions imposed on Iran by the United States.[25] The Trump administration reluctantly recertified in July that Iran was compliant with the nuclear accord, which is required every 90 days by Congress. However, Trump has indicated he will not recertify Iran's compliance when the next review comes due in October.

Conclusion

For the oil industry, the next chapter is being written, rewritten, and edited every day. Forecasting the future trajectory is treacherous work. Imperfect data regularly alters and distorts supply and demand projections, rapidly evolving technology is pushing new frontiers in development and production best practices, and the constantly changing knowledge base for the evolution of tight oil production continues to confound forecasters.

At the same time, heightened geopolitical tensions have injected a new, higher risk factor into oil markets, with the escalating war of words between Washington and Tehran, a more

24 Ahmed Rasheed and Sylvia Westall, "With a Wary Eye on Iran, Saudi and Iraqi Leaders Draw Closer," *Reuters*, August 15, 2017.

25 "Countering America's Adversaries Through Sanctions Act," *Congress.gov*, July 24, 2017.

interventionist Russia, and shifting power dynamics among GCC states and their neighbors. Severe political instability in the key oil producing countries of Libya, Nigeria, and Venezuela is also buttressing chronic uncertainty to the global supply outlook.

What is clear is that the innovative development and application of ever-expanding technology has reduced the marginal cost of U.S. tight oil and, combined with its unique fast-cycle development, has set a lower price floor. Companies are now operating on the basis that $50/bbl is the new normal. Industrywide, oil prices are forecast to largely remain in a price band of $50-60/bbl through the end of the decade. Contrary to industry skeptics, however, OPEC still has an array of options to support stronger prices at the higher end of the range. The OPEC and non-OPEC cooperation pact is providing a strong foundation for oil producing countries as they restructure their economies to thrive in a lower oil price scenario, but significant challenges lie ahead.

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