CREDIT SUISSE

CS Energy Research

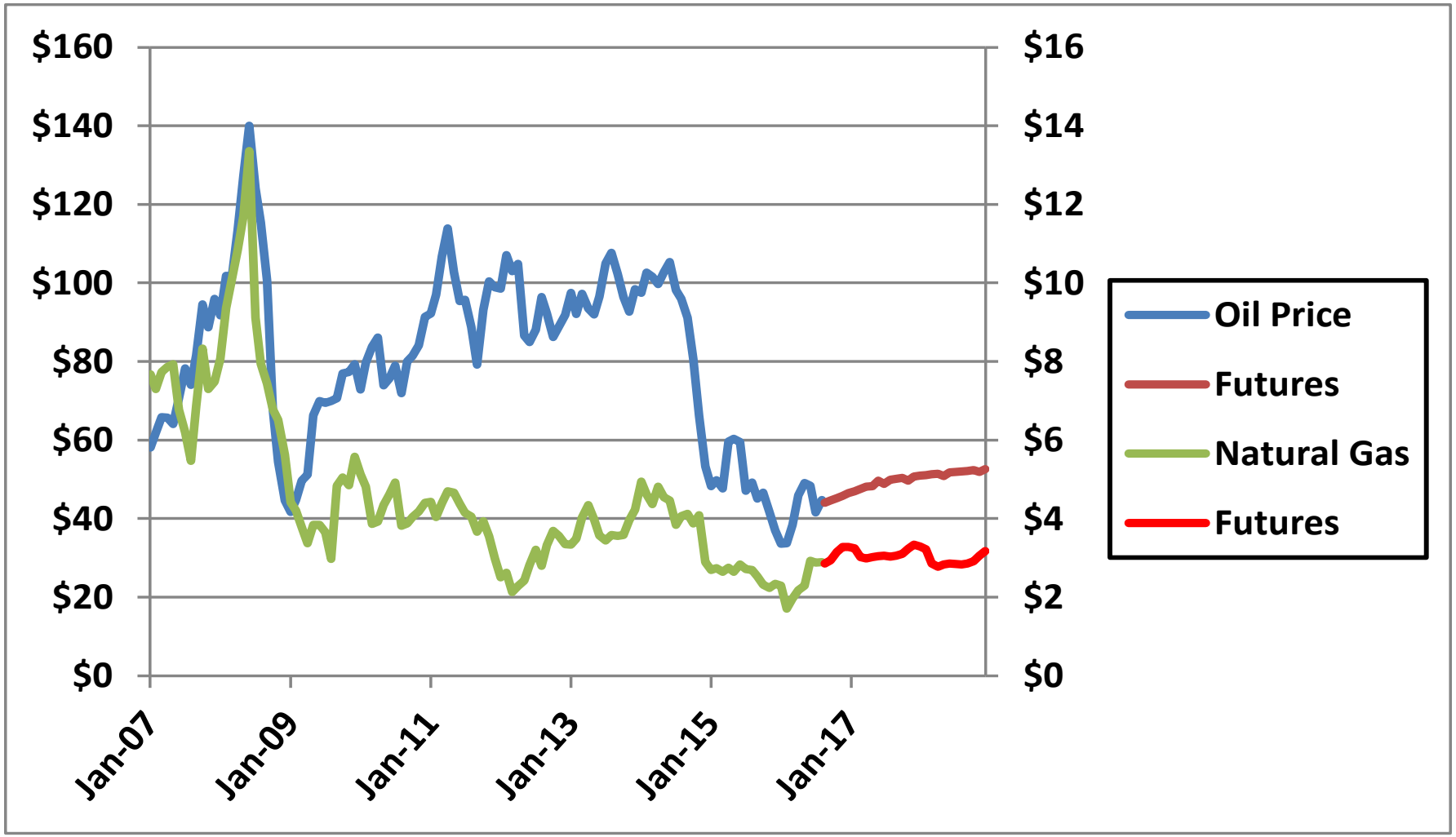
Joint PESA/PBPA Luncheon

State of the Industry & Outlook

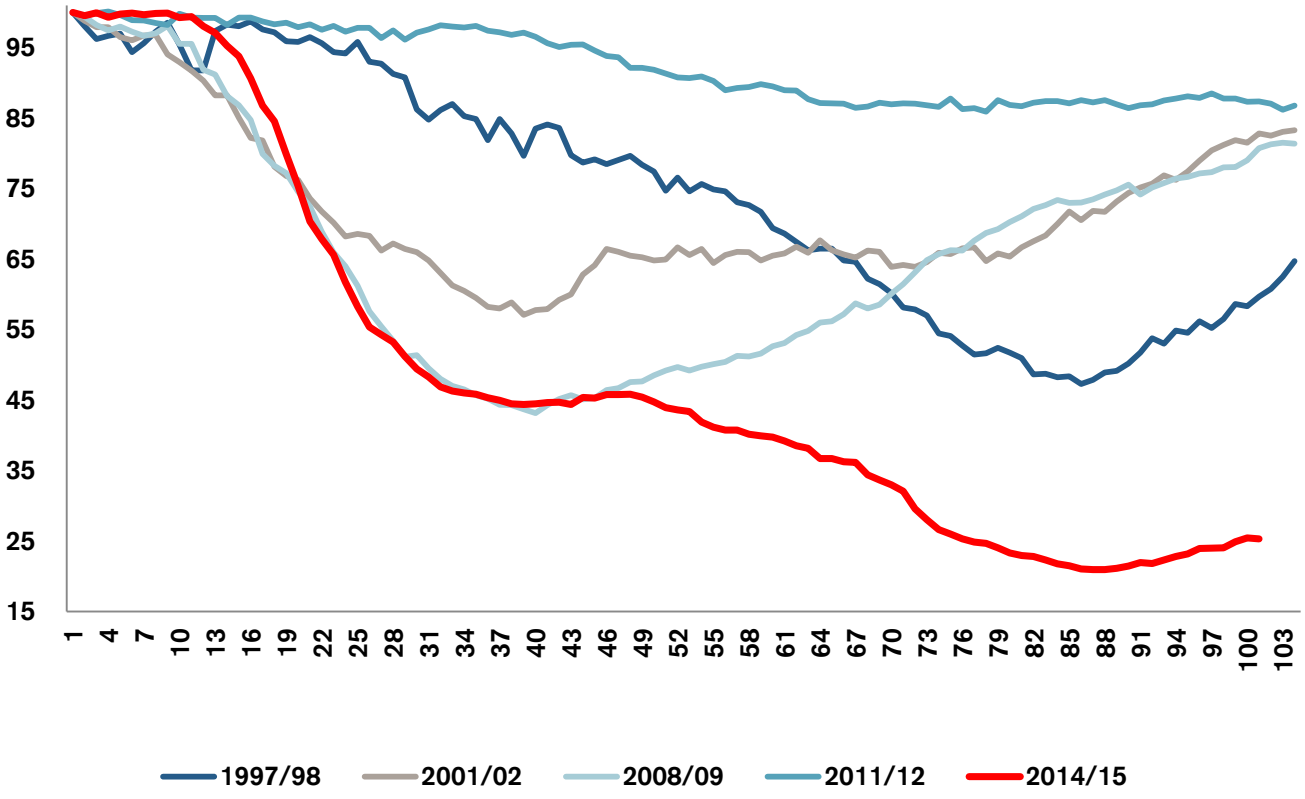
James K. Wicklund, Managing Director, Equity Research

September 2016

First – Oil and Natural Gas Prices



Indexed US Rig Count Downcycles

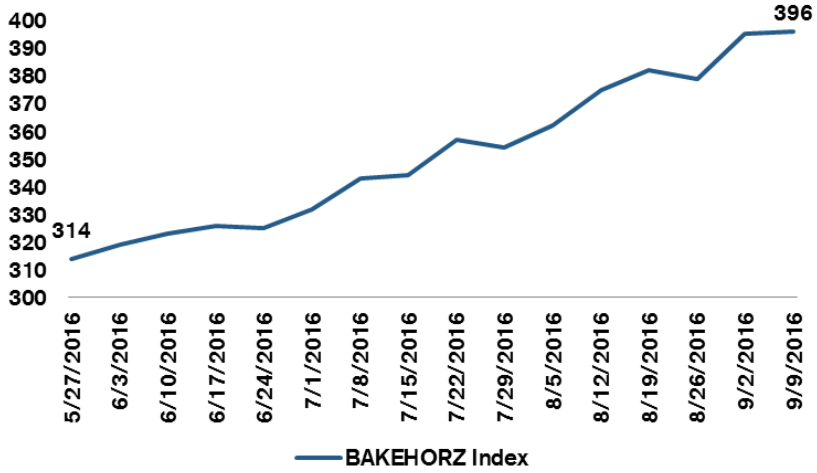


Source: Baker Hughes Rig Count

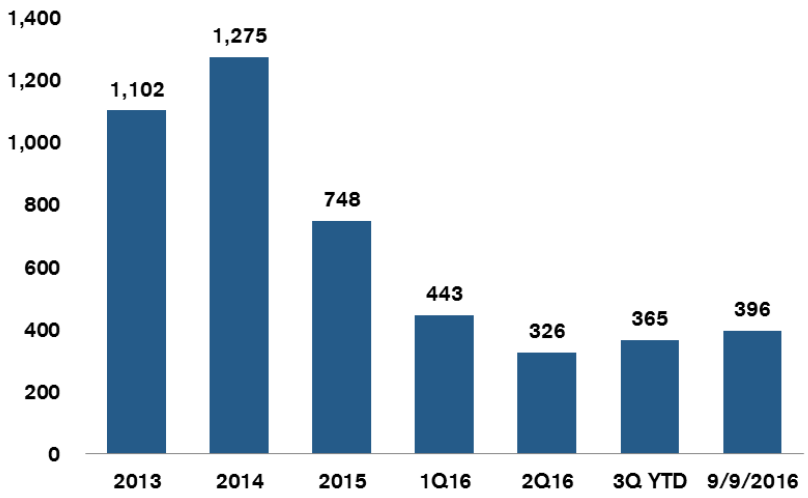
Warning – Don't Expect Too Much During Q3 Results

There is a near-term disconnect between what company's will report and investor expectations

US Horizontal Rig Count since 05/2016



US Horizontal Rig Count since 2013



- The horizontal rig count is up 26%, 82 rigs, with the oil rig count up 31%, 98 rigs, from the bottom; this is a good indicator of future results, but since most companies are still losing money on services, the increased activity just means they lose more money (for now)

- The end of the "plummet" in activity gives companies the opportunity to "catch up" on cost cuts, with reductions still occurring in Q3; this will partially mitigate Q3 margin degradation, but breakeven is still a 4Q16-1Q17 event

- The true spot market for land rigs is still $14,500-$17,000, down from the contracted levels of $24,000-26,000, so the increase in rigs working is still dilutive to average margins for the land drillers

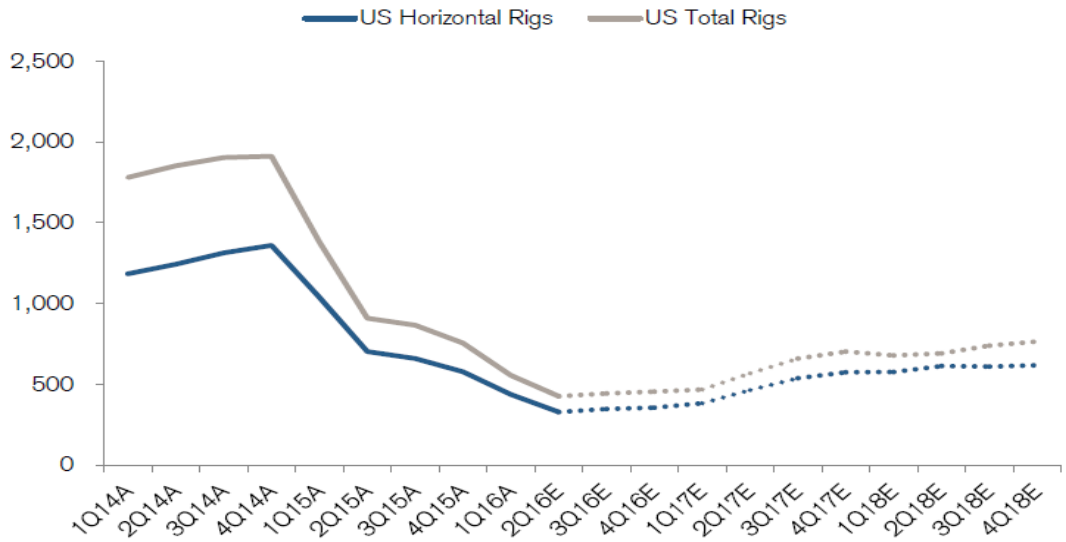
- We would be more aggressive buyers of the group post-Q3 results on any weakness

Sources: Bloomberg, Baker Hughes

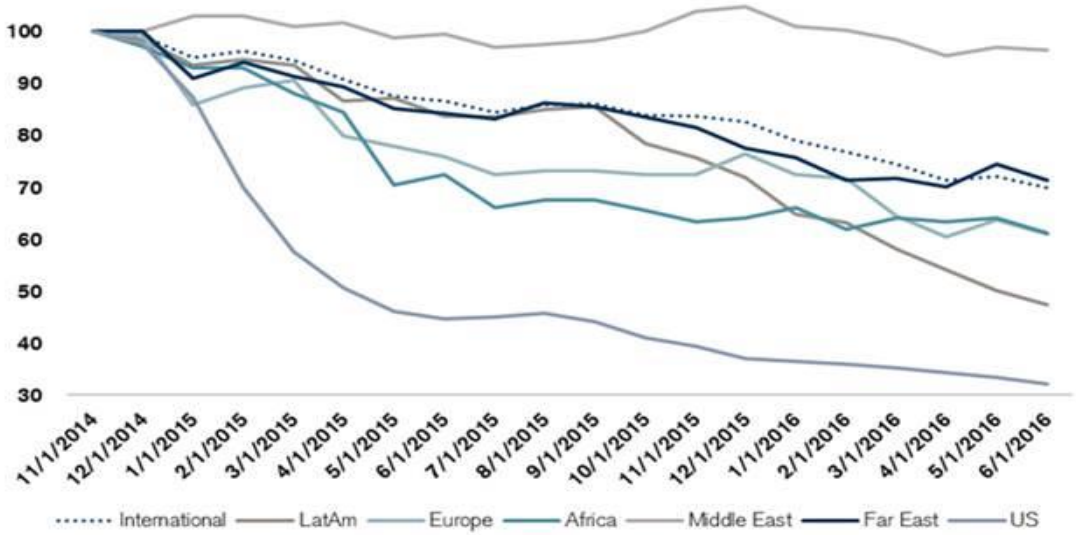
What Goes Down, Must *Grind* Up

CS Rig Count Forecast

The US rig count has drastically underperformed the rest of the world since the start of the downcycle…



Indexed World Wide Rig Count



… We expect US activity to come back first, however, the slope of the recovery will be flat through the back half of 2016 and muted thereafter.

Source: Baker Hughes

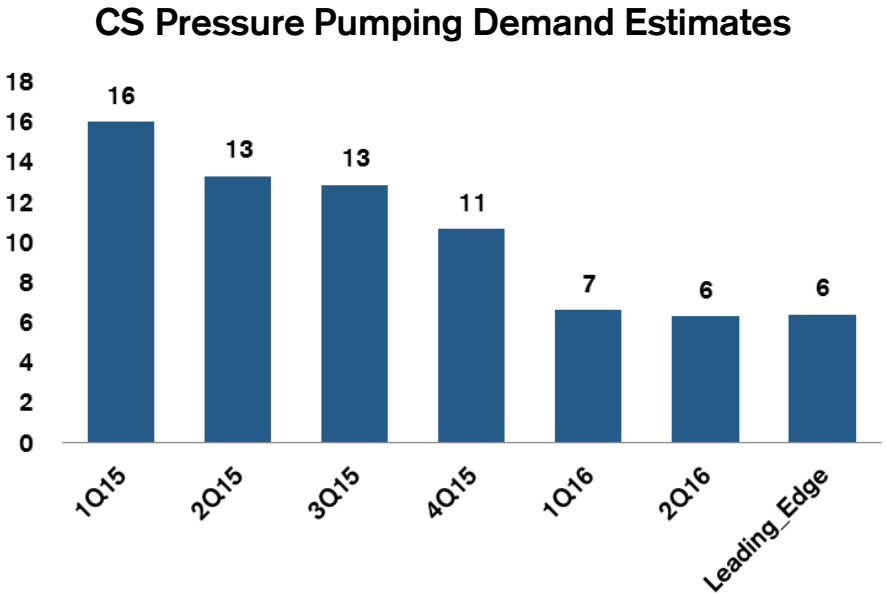
The Land Drilling Rig Market Remains Over-Supplied

- The US rig count exceeded 500 this week for the first time since March after falling from 1,925 in October 2014.
- According to the Reed Rig Consensus, there were only 1,814 SCR & Electric rigs in the market that year so premium rigs were 100%+
- Today, that utilization is 28% and we expect few of those rigs have been scrapped considering a 20 year design life
- 75% of the 102 rigs that have been put back to work since April are Tier 1 rigs, which lowers that % even more.
- When you look at all the rigs available in 2014, 3,254 rigs, that puts total utilization of the available fleet at 16%
- Operators use the best rig for what they need at the best price

Reed Rig Consensus, Baker Hughes

Pressure Pumping – The Focus Continues

Once utilization of active equipment approaches 85% (while working 24/7 30 days/month), it will take a price hike to incentivize service companies to activate an incremental fleet



Assumes 80% of equipment is working 24/7 and 20% is working daylight hours

- "Attrition" sounds permanent but it's not; it is just equipment waiting for a capital injection (estimated at $2-5M per spread) to return to working order

- Equipment manufacturers are already ordering inventory, for first time in over a year, in anticipation of customers ramping-up activity

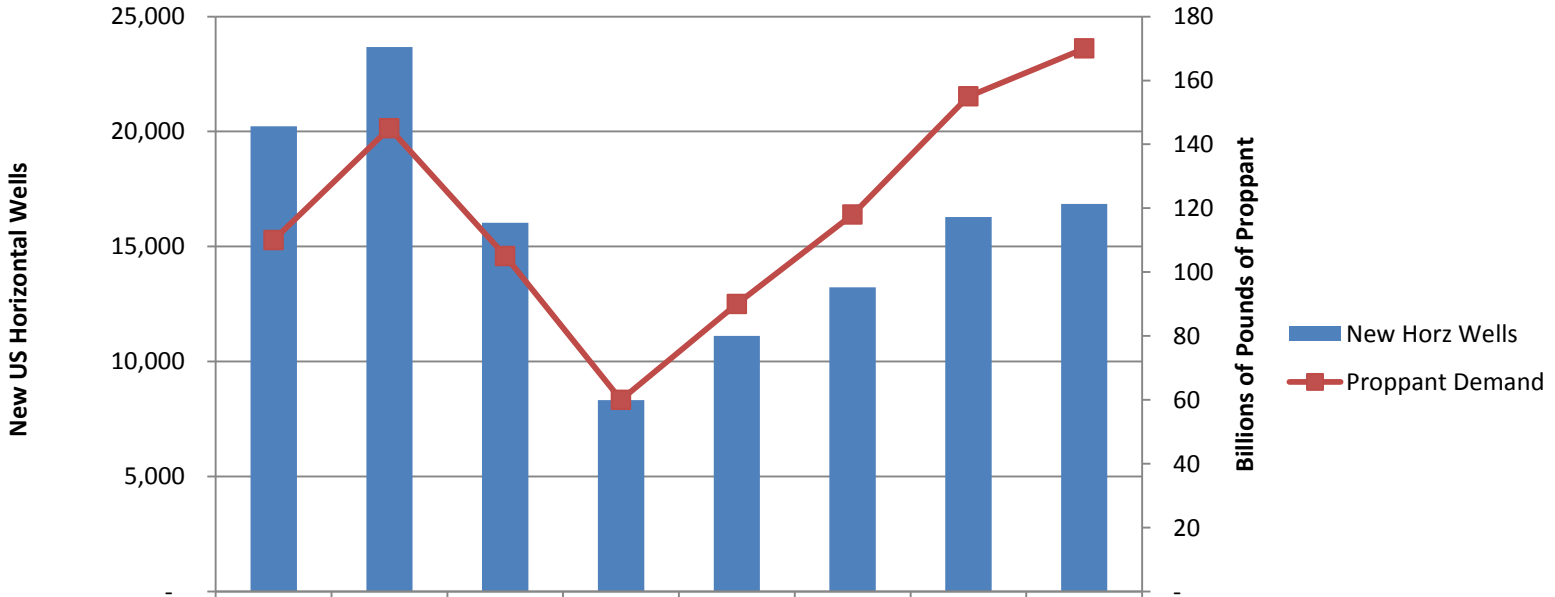
- One recent equipment order appears to be both replacement of equipment and net additive to total horsepower

- Availability of capital and efficient client capture are the two most critical elements to success

Sources: Credit Suisse estimates

Proppant Volume per Well Doubles in 7 Years

This is just one proxy for the increasing completion intensity in the industry

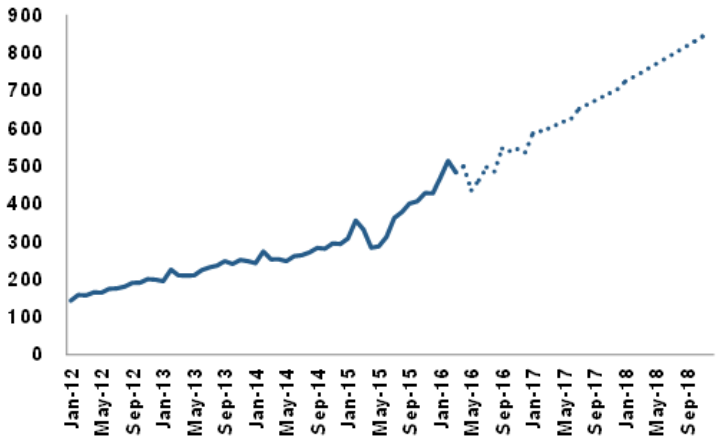


	2013	2014	2015	2016	2017	2018	2019	2020
New Horz Wells	20,236	23,674	16,029	8,331	11,115	13,230	16,280	16,860
Proppant Demand	110	145	105	60	90	118	155	170

The Elephant in the Room

Reasons why the rig count has a celling

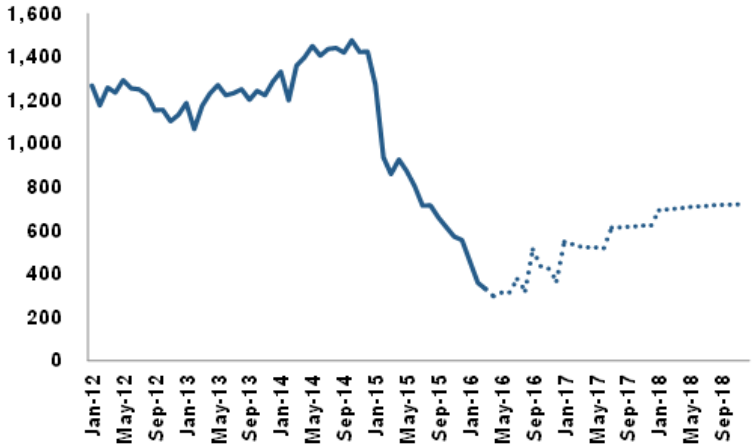
US Shale Basins Production per Well



- It is becoming increasingly clear that as rig efficiency improves, pad drilling accelerates, and completion intensity moves up, fewer wells than previously expected will be needed to meet future production growth requirements

- The Permian Basin (which holds 4-6x the resource potential of any other shale basin) is the focus of operators' attention; all acreage is already held by production with as much as 4,000 feet of productive section; we expect Permian production to double in the next few years

US Shale Basins Well Count



- As the rig count moves up, crude oil prices weaken in anticipation, with the US able to add production faster than anywhere else, modulating oil prices within an economic band, calling the oft-predicted exacerbated oil price volatility into question

- Oil hasn't broken $50 but four days this year; the oil rig count is up 31% (from lows), contradicting the idea of a high oil price spike is needed to get US E&P moving

Sources: DOE, Credit Suisse estimates

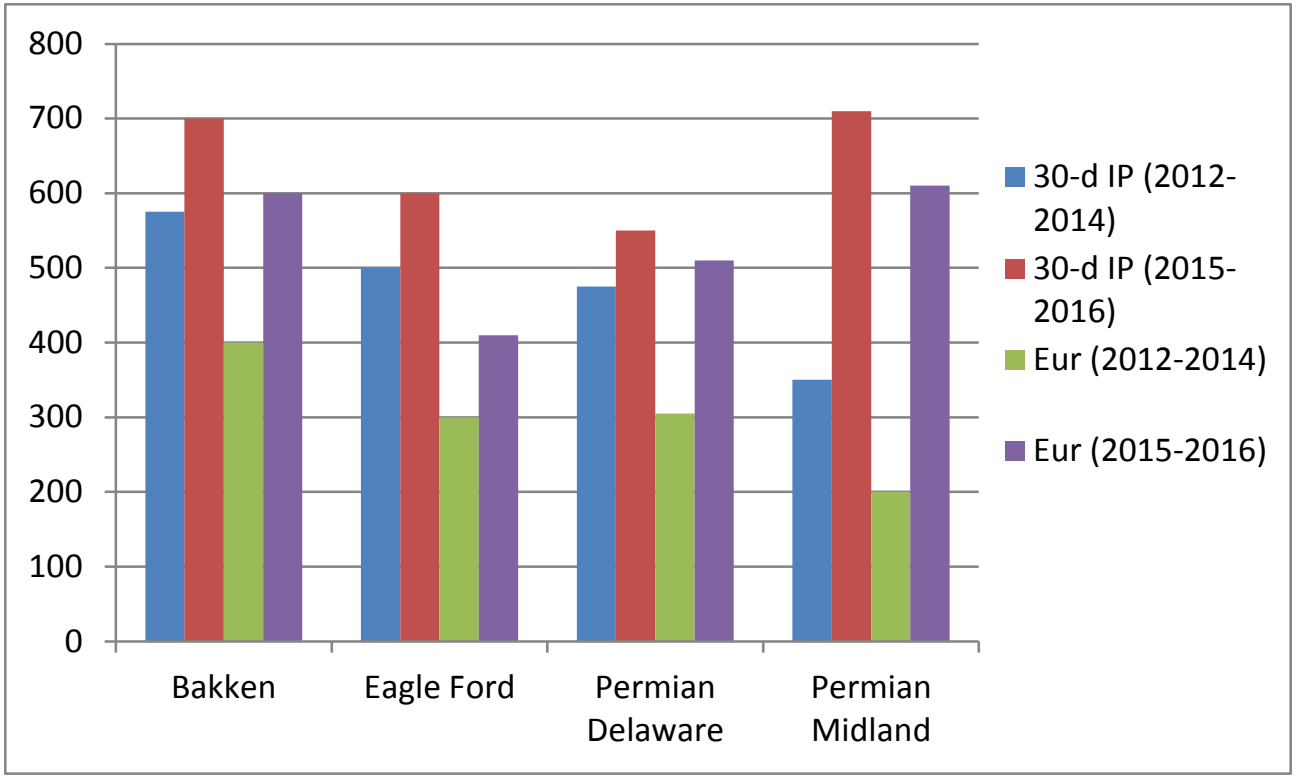
This Defines the Issue with a 1,000+ Rig Count

	Today		Jan-14	
	Rigs	Prod/Rig	Rigs	Prod/Rig
Niobrara	21	959	96	325
Chg%	*-78%*	*195%*		
Permian	187	535	474	179
Chg%	*-61%*	*199%*		
Eagle Ford	40	1,136	260	511
Chg%	*-85%*	*122%*		
Bakken	28	853	177	385
Chg%	*-84%*	*122%*		
Average	**69**	**871**	**252**	**350**
Chg%	**-73%**	**149%**		

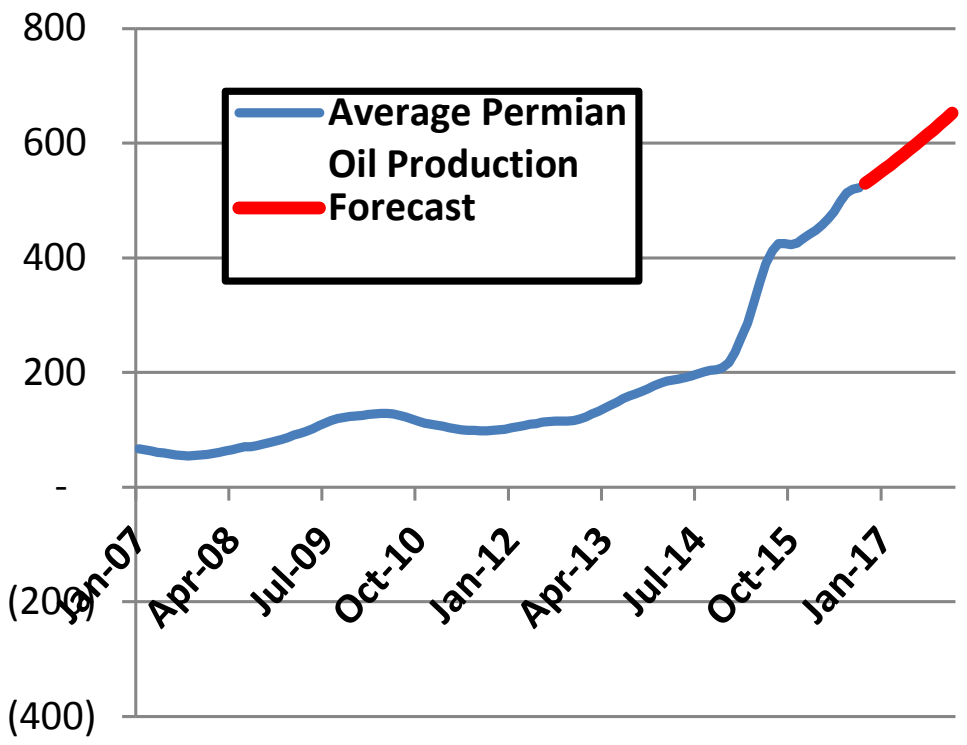
Baker Hughes, Rigdata

Well Performance is Improving, Dramatically

The red and purple columns are the last two years compared to the previous three and shows the dramatic improvement in well performance and reserve potential



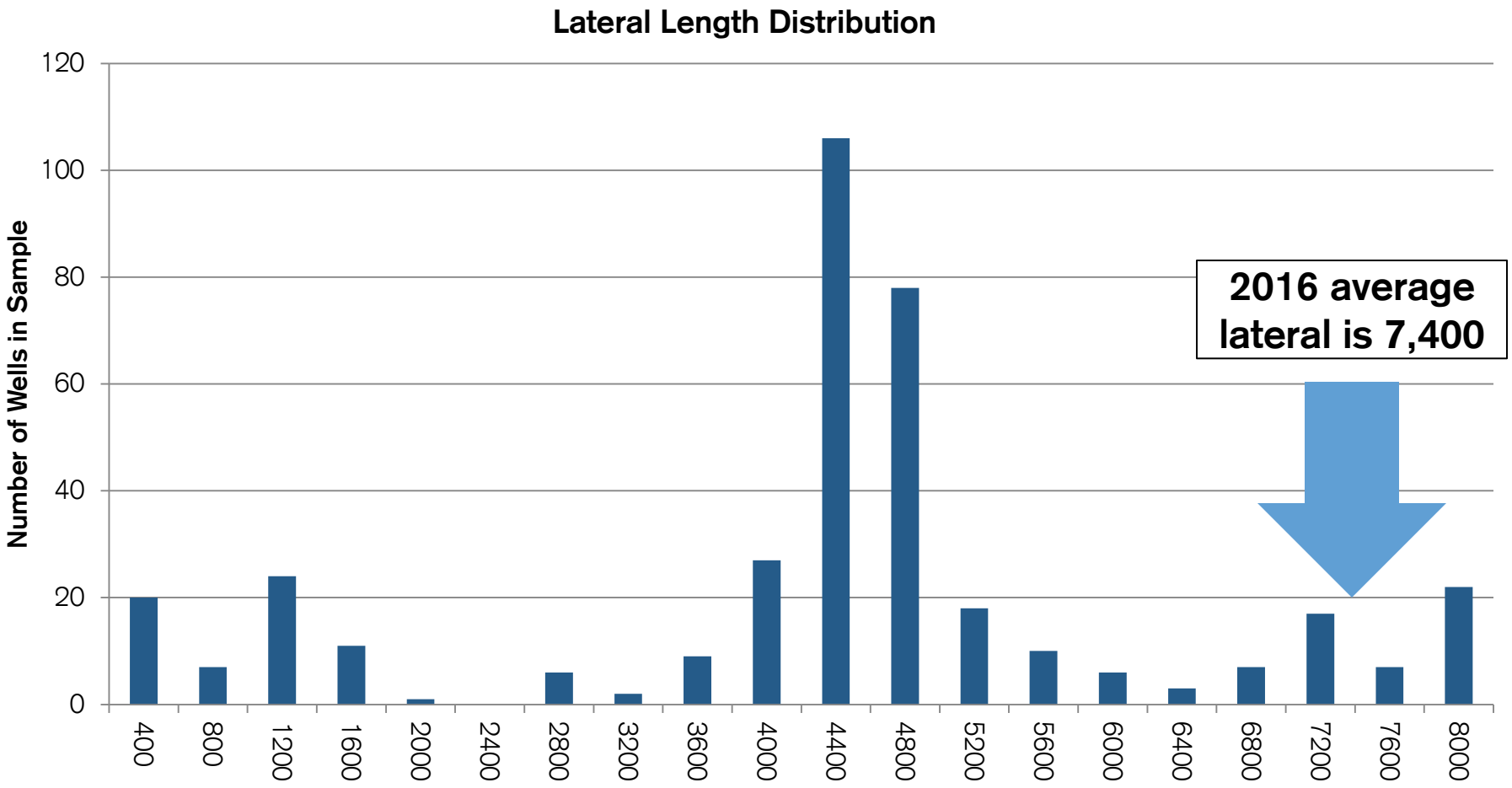
The Permian Will Lead the Recovery



Avg Production per rig in the Permian is up 400%+ since 2011 with our forecast for another 25% through 2017.

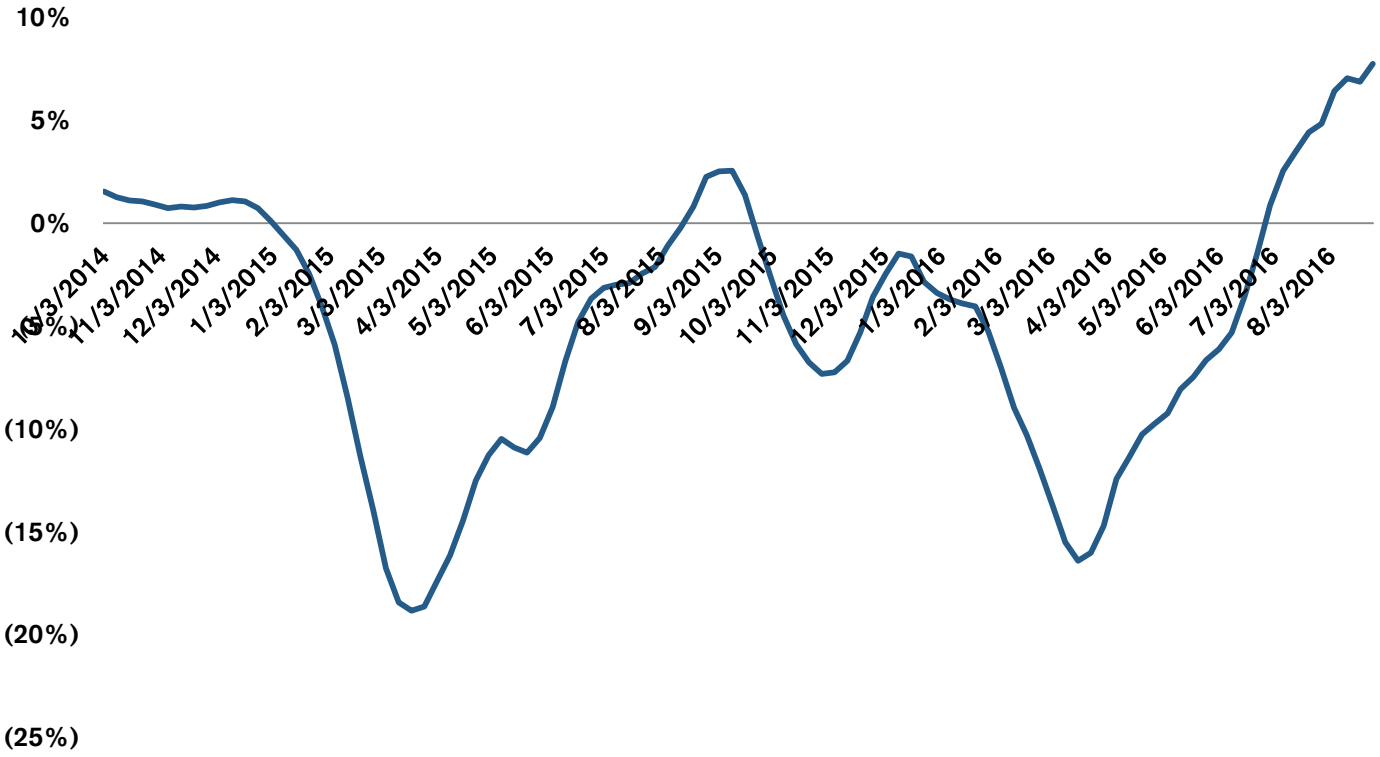
There is a reason Permian acreage is so expensive. It's worth it!

Lateral Length, IP and EUR Continues to Increase Permian



Momentum of US Horizontal Rig Count

The recovery since the April bottom has been impressive but current weakness in oil price could slow the momentum of the recovery near-term



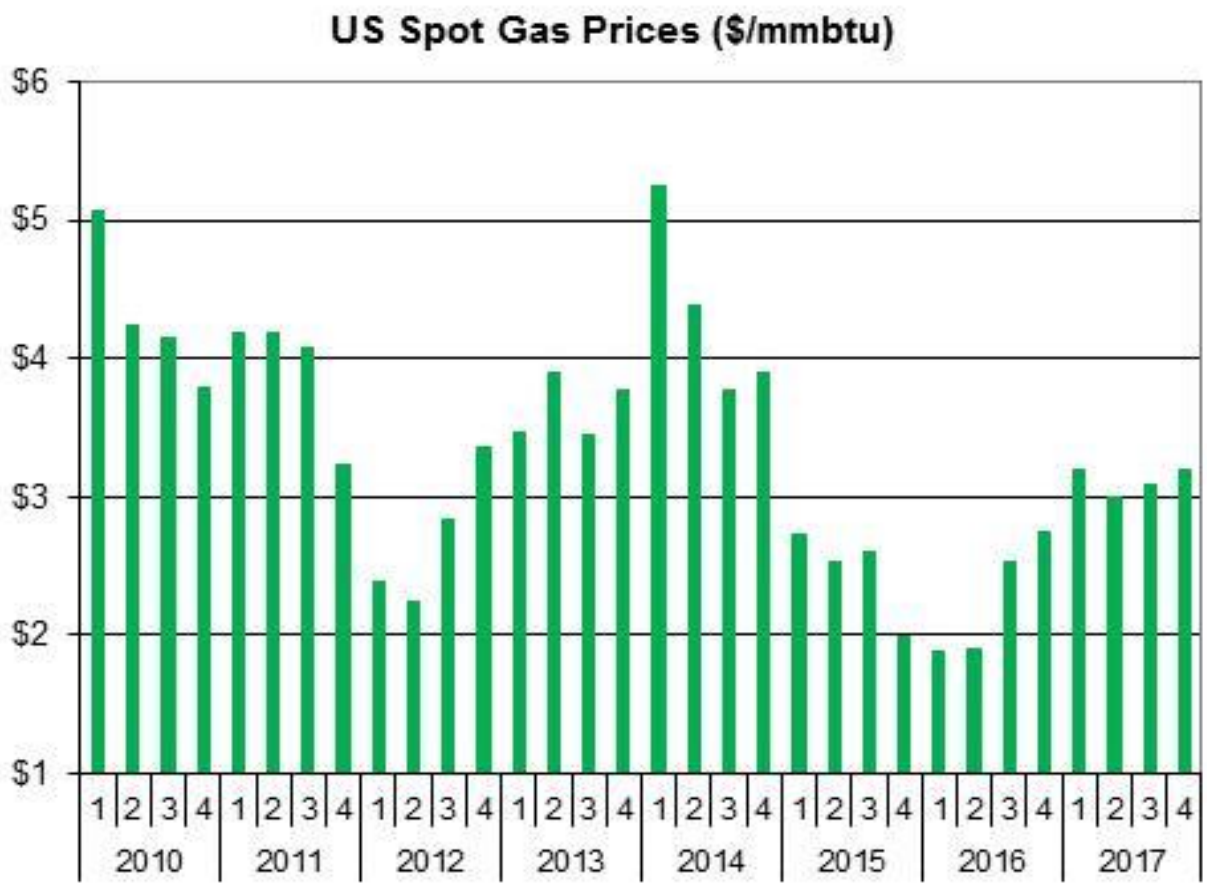
Source: Baker Hughes Rig Count

The Natural Gas Market

- The EIA currently forecasts that US gas demand will average 76.3 bcfd in 2016 (up 1.4%) and 77.2 bcfd in 2017 (up 1.2%).
- US gas exports are forecast average 6.1 bcfd in 2016, up 24%, and 7.0 bcfd in 2017, up 15%.
- LNG exports are projected to average 0.5 bcfd in 2016 and 1.3 bcfd in 2017. Industry observers expect that LNG exports will peak at 5.0-7.0 bcfd by 2020. LNG firms do not expect that the widening of the Panama Canal will have much of an impact on US exports of LNG.
- Pipeline exports are projected to average 5.6 bcfd in 2016 (up 16%) and 5.65 bcfd in 2017 (up 2%). US gas exports to Mexico are estimated to be averaging 3.4-3.5 bcfd this year, up ~40%. About 8.0 bcfd of new pipeline export capacity from the US to Mexico is expected to come online by the end of 2018. Industry analysts expect that US gas exports to Mexico will peak at 5.0 - 5.2 bcfd by 2020.

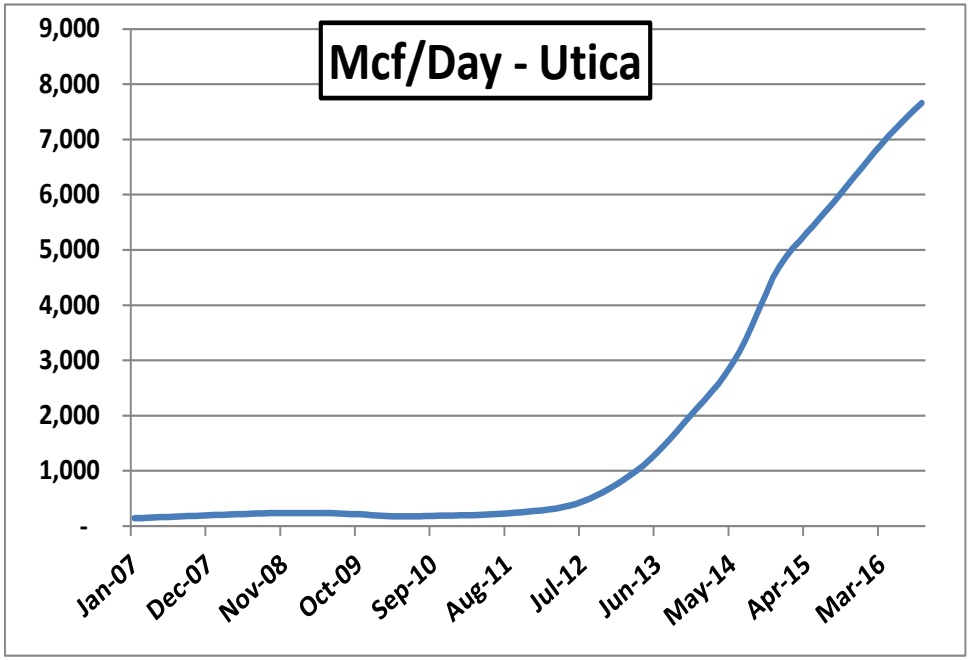
The Outlook for Nat Gas Pricing is Flat at Best

The futures show $3.12 for 2017 and $2.95 for 2018



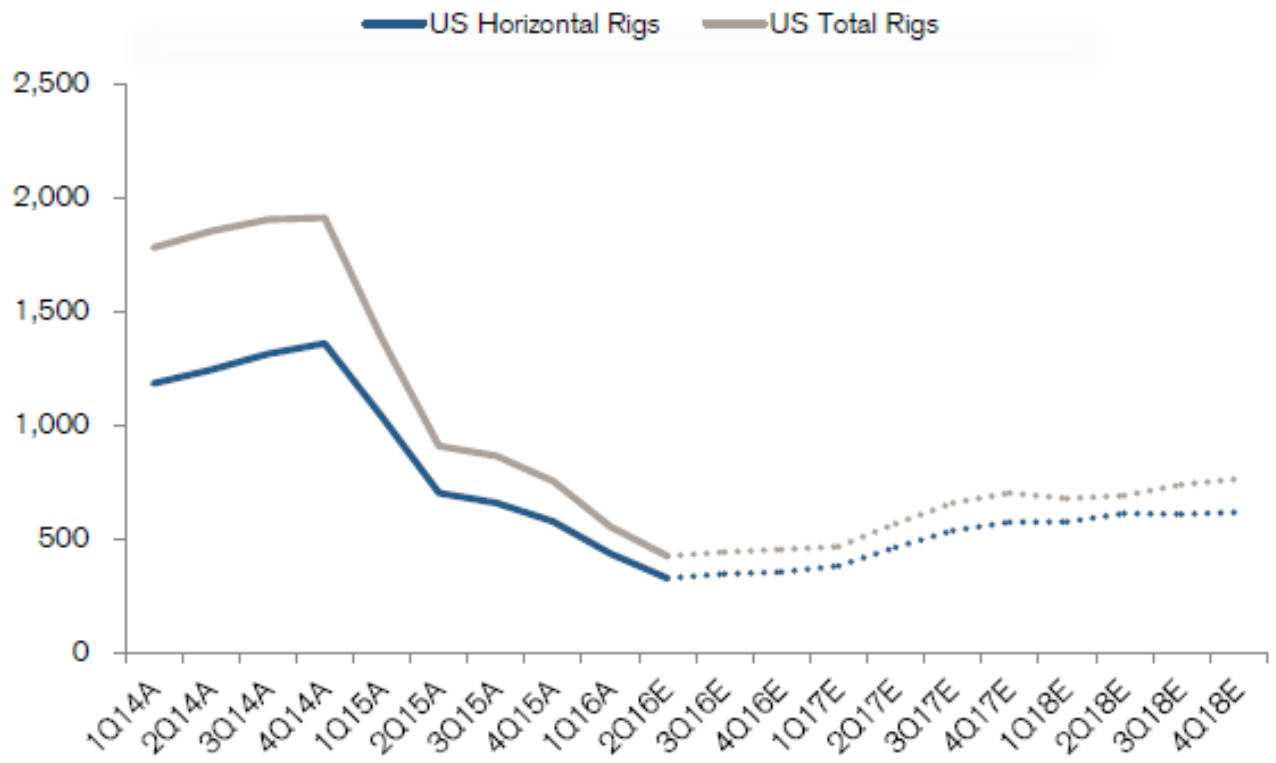
Natural Gas Efficiency Foreshadows Oil

In 2008, there were ~1,600 rigs drilling for natural gas, whereas today, there are 92 and production has been up every year since. 20 rigs drilling leading edge wells in the Utica would meet demand and our forecast of 3% growth

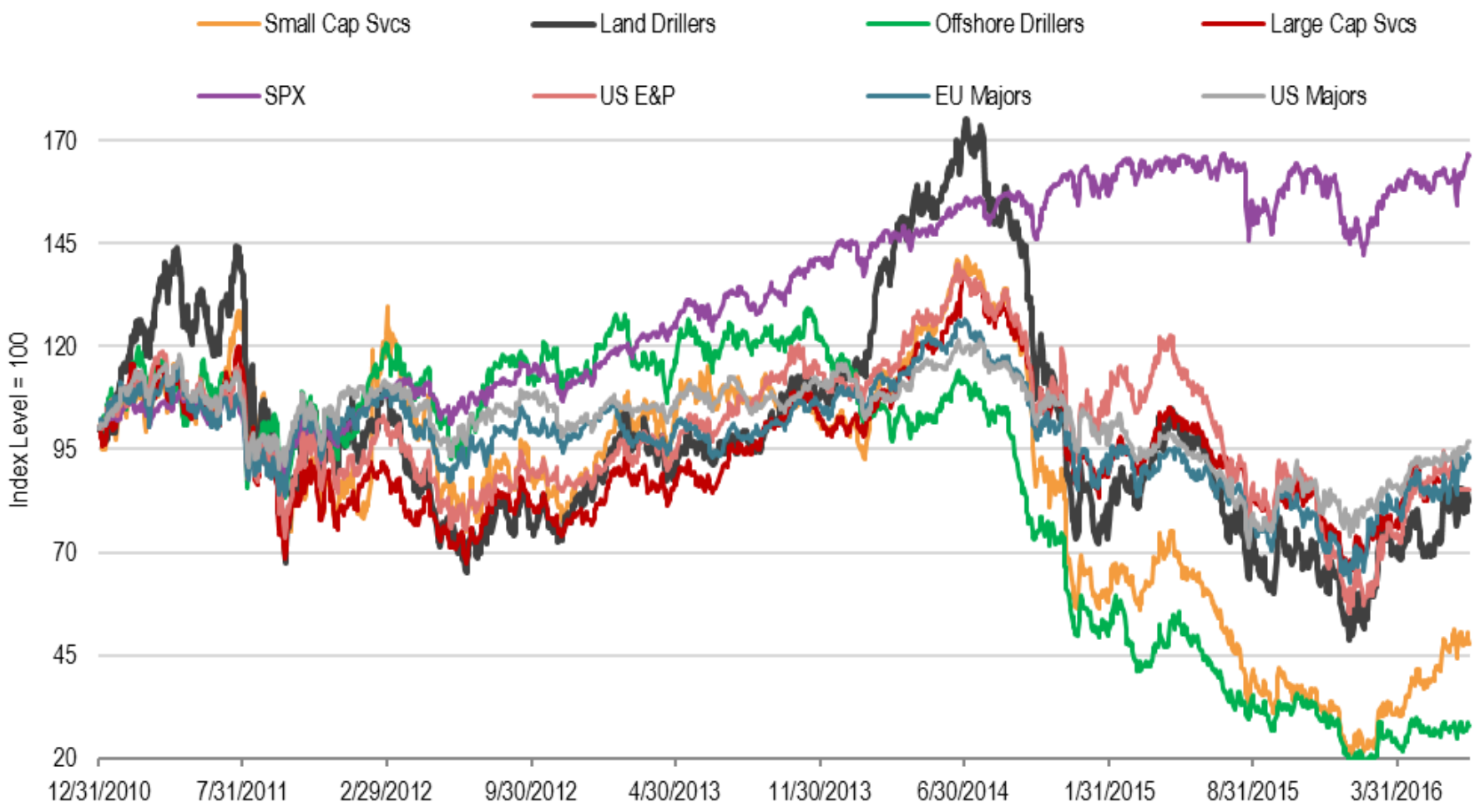


Our Rig Count Forecast

This is the level of activity to grow US production to 12 million barrels per day

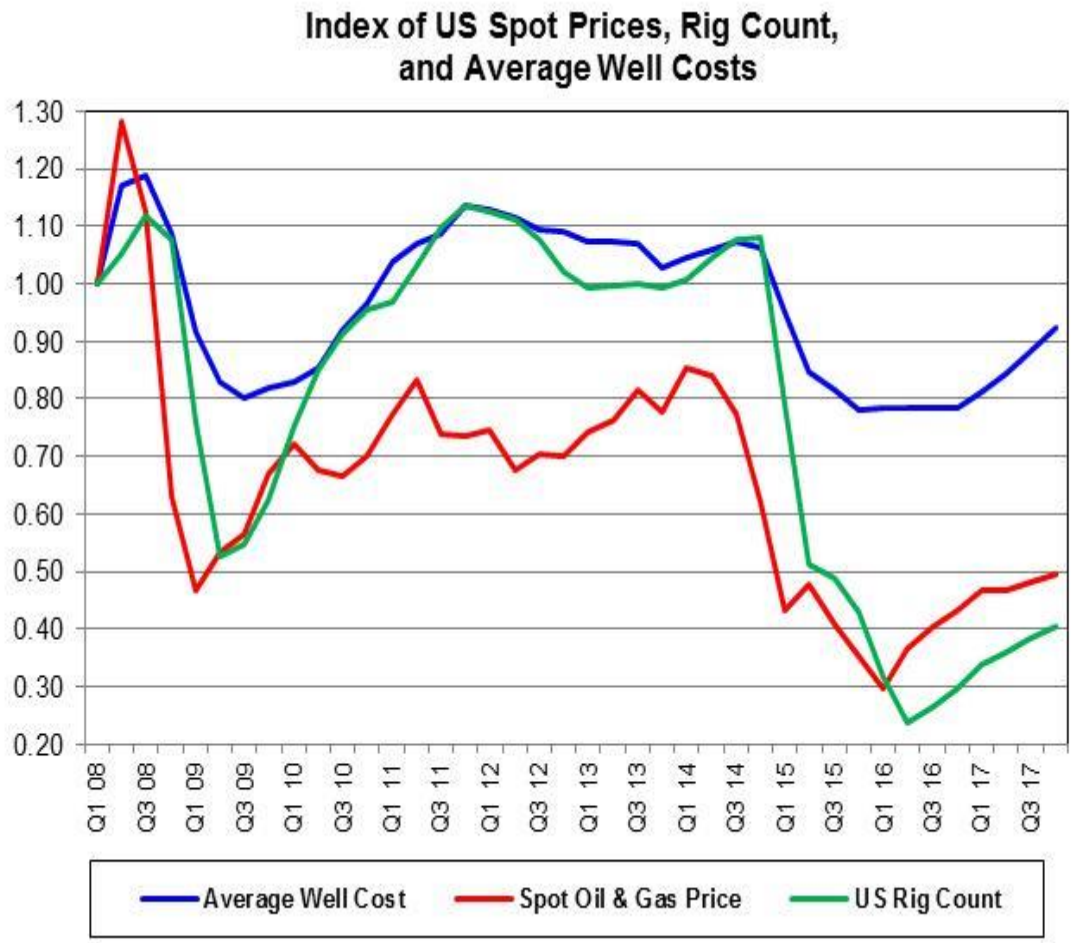


Energy Stocks vs the Market – Offshore & Small Cap Lose



The $64,000 Questions in the Recovery

- E&P deflation is OFS Price
- How much is structural?
- When does this "recovery" begin?
- Technology is both downhole and the way the business is run
- Where will the bottlenecks be felt first?
- What will they be?



Details

- The completion over the coming year of ~3,000 DUCs found in oil shale plays could lift lower-48 onshore oil production by ~300,000 bpd in 2017. (EIA says there are about 5,000 DUCs in total)

- US offshore crude oil production is forecast to average 1.65 million bpd in 2016, up 7%, and 1.85 million bpd next year, up 12%, due to the start-up of deepwater fields in the Gulf of Mexico.

- IEA says upstream investments will be down 24% this year with little improvement in 2017, after a 25% drop last year, with the two year drop totaling $300 billion. Half of the worlds largest oil companies hydrocarbon production is now natural gas and is expected to dominate new output in the coming years.

THE Most Difficult Issue - Employment

- Over 350,000 people have lost their jobs in the last 6 quarters
- The rig count dropped 80% in 20 months
- With improvements in drilling, the immediate transition to pad drilling in the Permian and the effects of continually higher frac intensity means that less than half of the idle rigs won't come back anytime soon
- Corporate-based job loss could be close to permanent as structural changes become embedded
- Field-based job loss will recover but not to 2014 levels anytime soon and employment requirements are becoming more strict

Key Topics of Discussion

- **Based on relative economics of the different shale basins, the Permian should recover first and has, with its rig count up 66 rigs or 2/3rds of all the rigs that have gone back to work. The Permian now accounts for 40% of the total US rig count.**

- **We expect the Permian to double production over the next few years meaning E&P companies operating there have the best growth**

- **The US rig count, down 80% from October 2014, is not likely to reach those levels again for years, meaning the rig companies and equipment rental to drilling will be most challenged**

- **Frac intensity is driving production growth and returns giving completion-related businesses the top spot in the recovery.**

Critical Issues by Sector and Space

- "Hot" and ready to work pressure pumping utilization will hit full utilization in the 1st half 2017, pushing pricing higher to reactivate idle equipment
- Sand is already starting to see pricing improvement and volume growth in 2017 is expected to be up almost 50% from 2016
- The technical "tiering" of land rigs matters but over-capacity of shale-capable rig rigs will stay high with shale-optimal rigs still fighting hard for share and price
- Deepwater is not likely to stage a comeback other than 1-3 well tie-backs until mid-2018 at the earliest
- Shallow water activity will come back first but will be plagued by over-capacity in rigs and boats and less complex wells requiring lower margin services
- As a result, offshore pricing overall will remain challenged for 2-3 more years at least

Jobs & Expertise – The Worst Part of the Downturn

- Recruiters warn that many jobs may not return even when the tentative recovery gains momentum.
- The average age of the geoscientist is 62 years old so now nearing retirement age may get sidelined for good.
- Over the past 25 years industry employment has closely tracked ups and downs in crude prices but this year the sector continues to shed jobs even as prices rallied from around $26 per barrel to over $50 in June
- Oil prices also forced companies to get leaner quickly by making greater use of data and computer models, upgrading the techniques and streamlining operations.
- Drilling and fracking a new well used to take more than a month; in some cases it now takes half that time, or less, which means fewer drilling crews and specialists

The New Normal

- **In 2014, the IOCs shifted their strategic focus from production growth to growth in returns, with major implications to spending**
- **In 2015, ownership of Energy moved from investment *growth* indexes to *value* indexes**
- **These shifted the oil company focus to return on invested capital and generation of free cash flow**
- **Efficiency, and the requirement to "do more with less" changes the relationship of E&P to the OFS sector**
- **Simple and effective technology and operations have streamlined the industry's operating practices and is not likely to reverse**

In Conclusion – The Next Upcycle is Upon Us, But Different This Time

- We will do more with less
- Technology is key, both surface, downhole and in the office
- The US is the Swing Producer now, for good or bad
- The markets will eventually balance but it won't be with 1,600 rigs and $100 oil prices
- Efficiency and return on capital trumps relationships and growth
- Business will get better and the Permian will lead
- It's not the 80's and it's not 2009 but better is better