



Society of Petroleum Engineers – Dallas Section

The Oil Price Malaise What's that light at the end of the tunnel?

Trends & Outlook

July 2017

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Certified Public Accountants and Advisors

DENVER | HOUSTON | DALLAS | ORANGE COUNTY

Hein Specialty Services Group

- Valuations
 - Reserves & Acreage
 - Midstream
 - Oilfield Services
 - Businesses
 - Intangible Assets
 - Stock-based Comp, Options and Financial Instruments
- Purchase Price Allocations
- Financial Modeling
- ARO's
- Transactions – Buy/Sell
 - Quality of Earnings
 - Financial Carve-outs
- Post-close Settlement
- Accounting Conversions
- Optimizer
- Solvency Opinions
- Tax Support
- Expert Witness

Topics

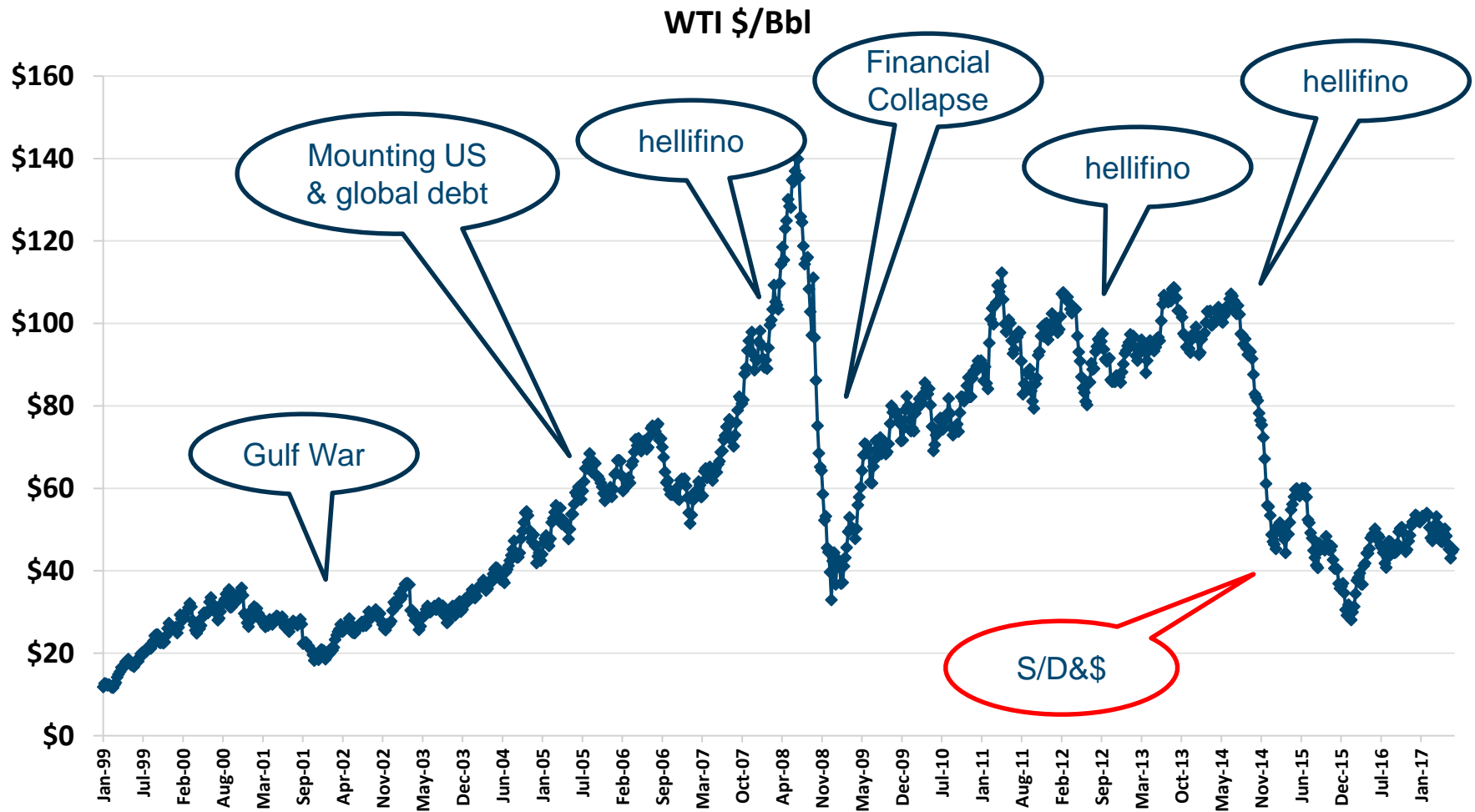
- Current State
 - *How did we get here*
 - *Debt & Equities*
 - *Transactions Markets*
 - *Where do we go from here*

What the Heck Happened and Why Did It Happen So Fast ?

- Global Demand (is inelastic and predictable)
- China's growth stunted
- Russia's currency collapse and geopolitical boldness
- OPEC
 - Iraq production increases (we did ourselves in)
 - Iran's deal and production increase
 - Saudi Arabia – virtually unlimited and cheap supply
- US oil production growth (we're too clever for our own good)

The real answer is two-fold... increased supply and money

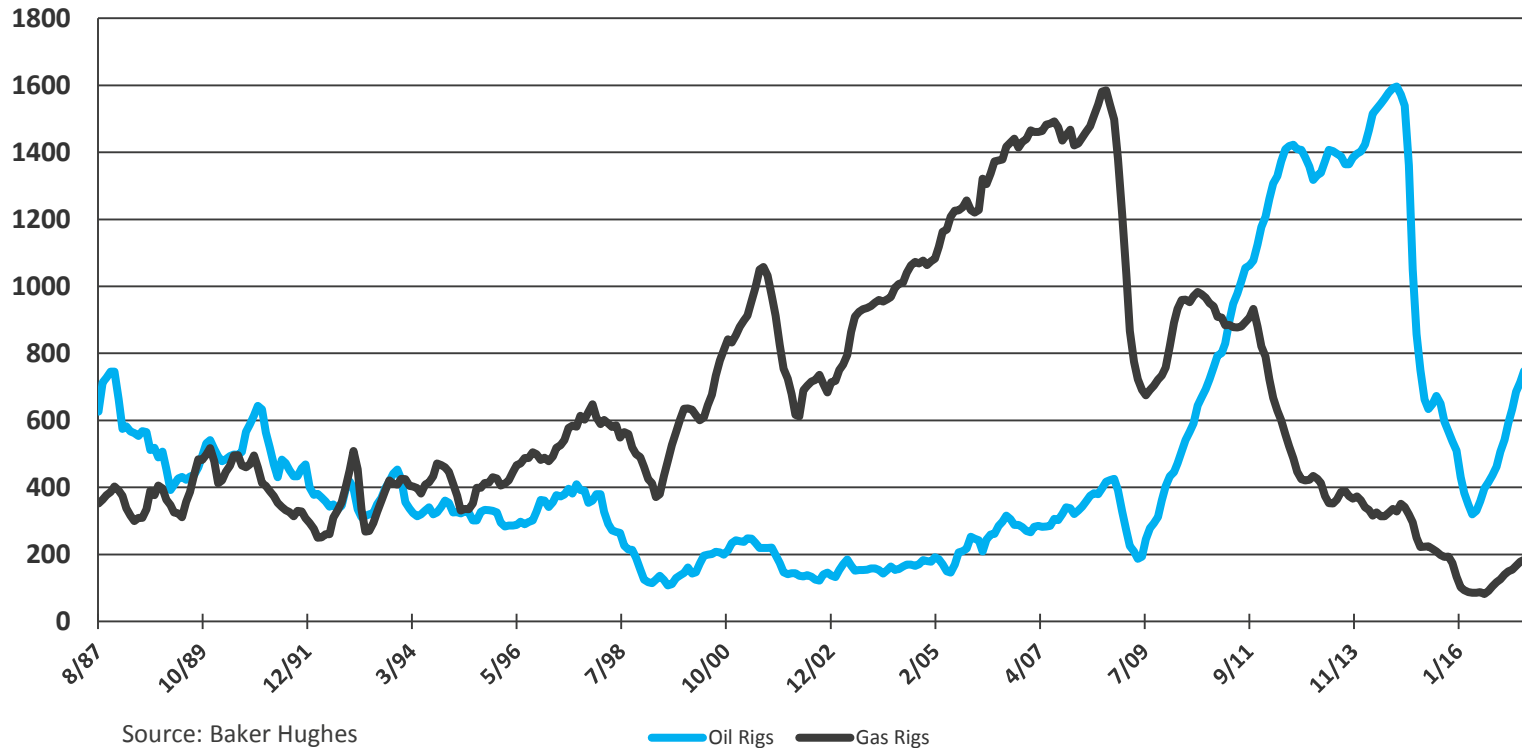
Oil Prices – Let's beat the old horse a little more



And let's kick the dog while we're at it too...

US Rig Count

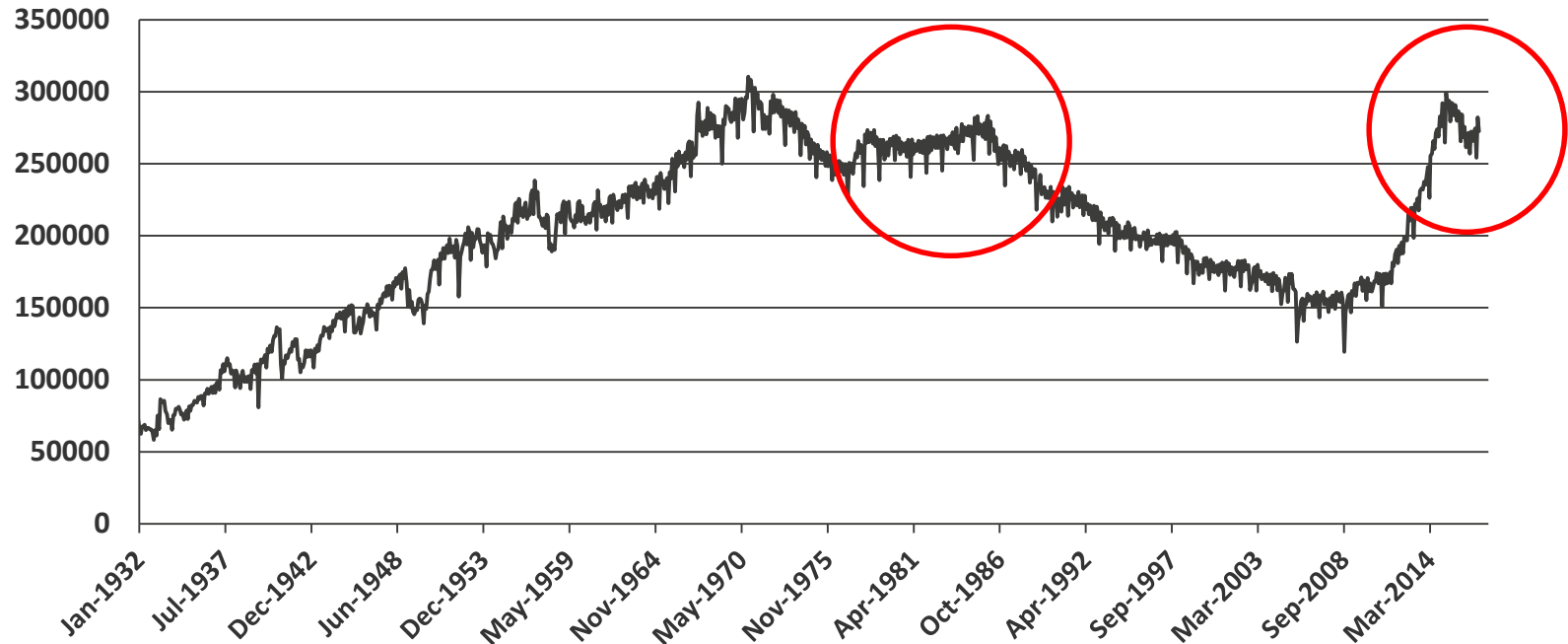
US Rig Count - Oil and Gas Split



- 952 rigs running in the US (up 116% from year ago, but down from 1,928 in 2014)
- 463 rigs running in Texas (369 in Permian), 136 in Oklahoma, 84 in Eagle Ford, 45 in Marcellus
- Rigs drilling natural gas lowest since '70's and will remain low until price >\$5

US Companies Know How to Find Oil

U.S. Field Production of Crude Oil (mbo/mo.)
1932 - April 2017



- If prices wouldn't have dropped in 2014-15, we might have kept this pace up for another few years
- Our technology and efficiency has had the effect of finding another Prudhoe Bay

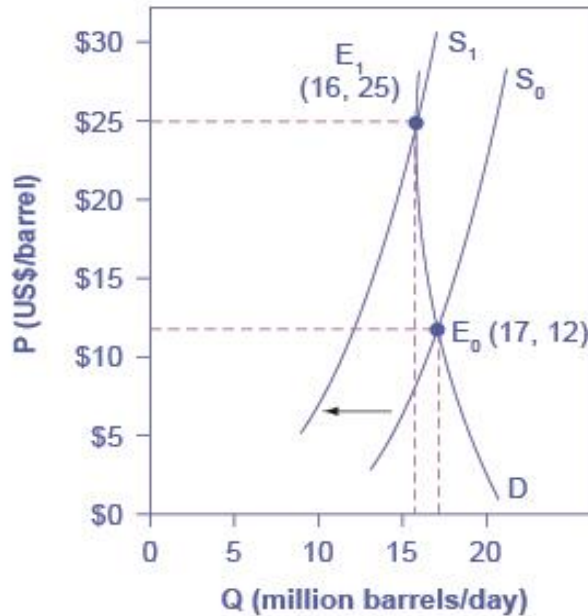
Drowning in an Ocean of Crude

- EIA claims there is a 3 BBO global stockpile of crude.
- Iran has 25 VLCCs at sea, carrying more than nearly 50 MMBO
- KSA raised output to 10mmbd in February
- Non-OPEC output to rise 400 mbd to 58.1 mmbd in '17
- 2017 global production = 98.24 mmbd
- 2017 global consumption = 98.15 mmbd

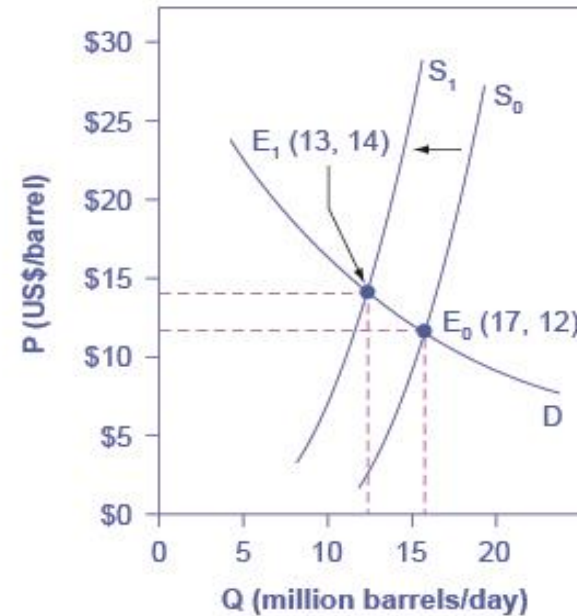


40+ tankers anchored outside Houston Port

It's Simple Economics – Law of S/D



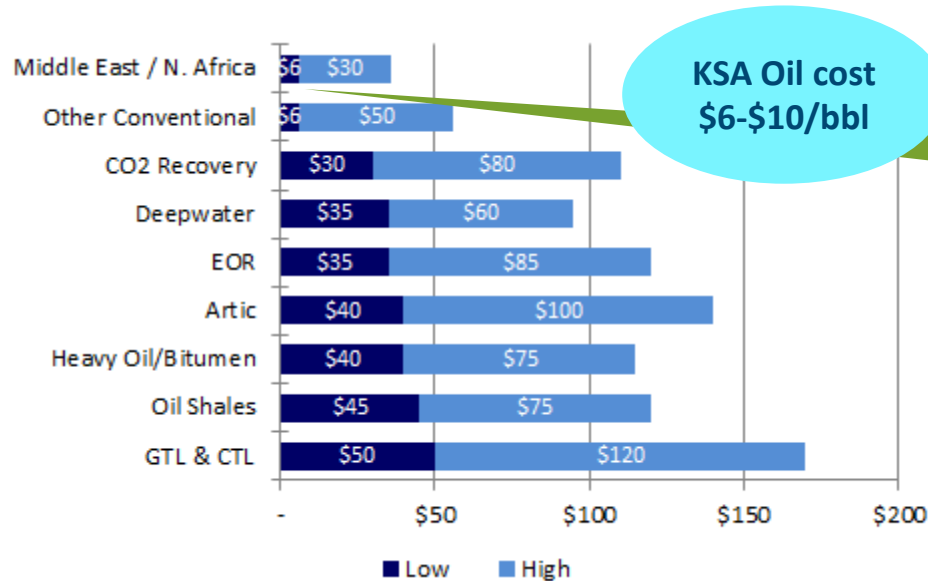
(a)



(b)

- POP QUIZ TIME: Which Law is Prevailing for E&P in 2017 ?

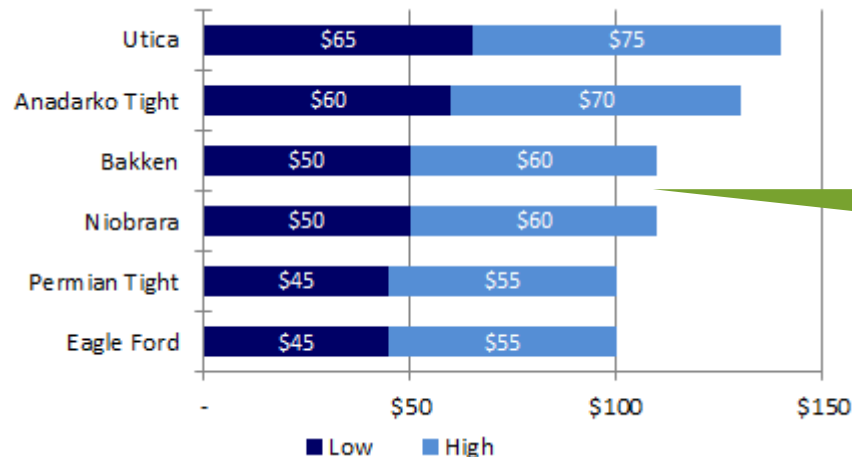
So Who Cries “Uncle” First... US or OPEC?



**KSA Oil cost
\$6-\$10/bbl**

Average ME cost/bbl = \$18

$$EL = \frac{\text{Mo. Op. Costs}}{30.4 \times \text{NI/BOE}}$$



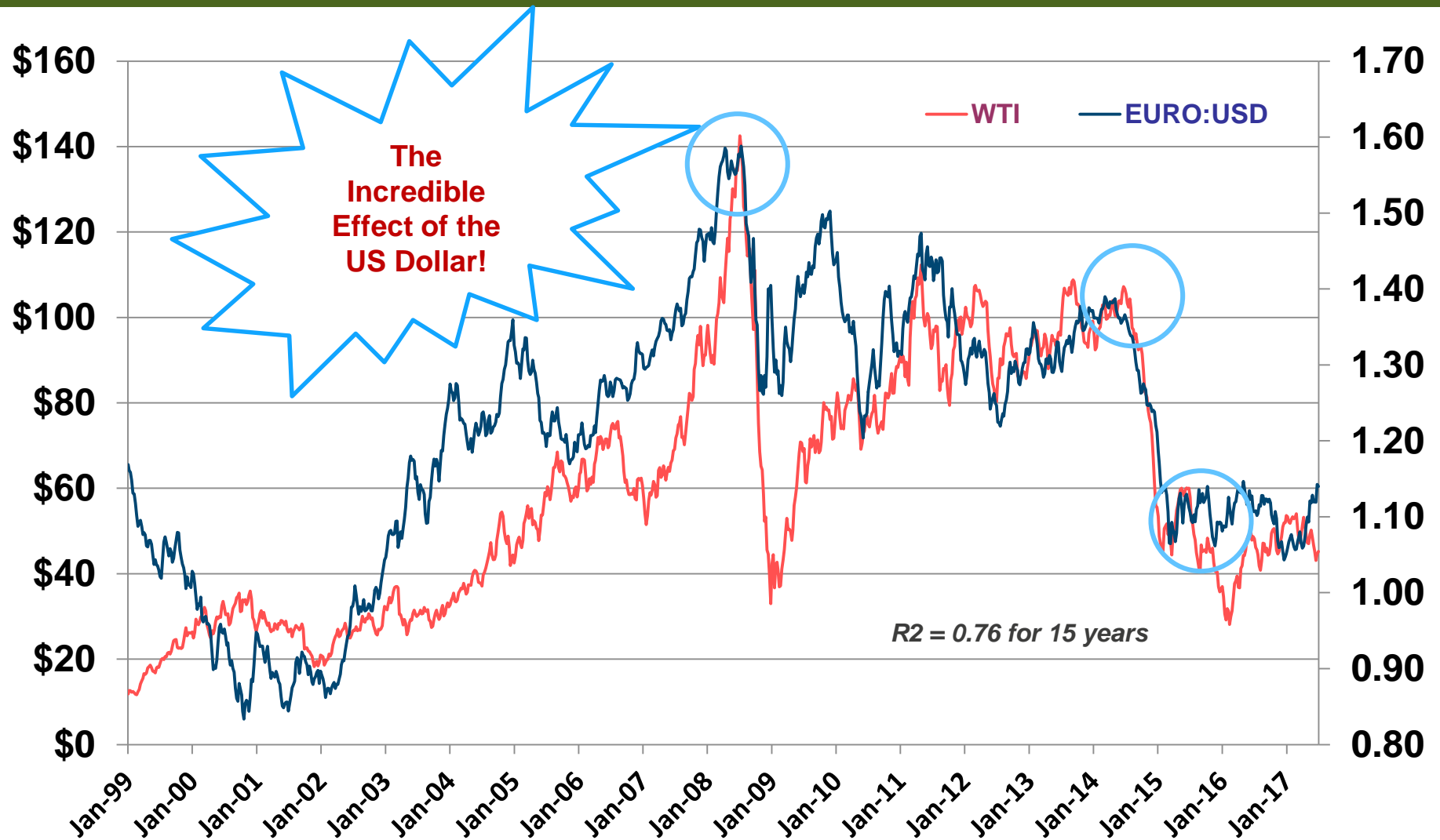
Average US cost/bbl = \$25 to \$40

Which Bodes the Question...

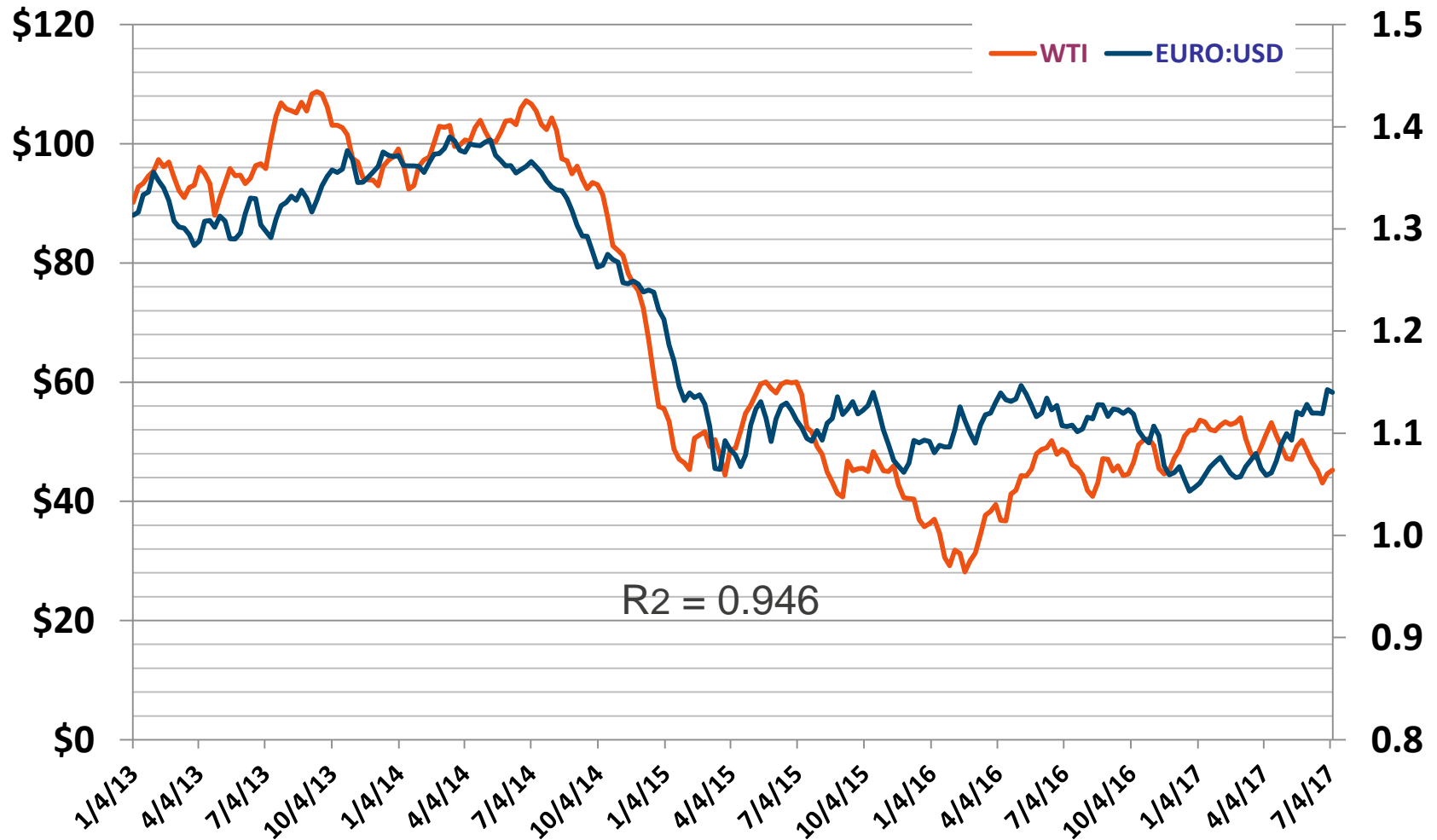
How the heck did our oil get under their sand?

Bumper sticker seen in Houston in 2010

The Other Elephant in the Room...



A Closer Look at the Relationship



What's Driving the Dollar?

1. Supply / Demand for USD

- Foreign buyers of bonds (seeking security or safe harbor)
- Foreign buyers of stocks
- Buyers of commodities that must be paid for in USD (oil)

2. Sentiment and Market Psychology

- Risk or distaste of US policies (usually causing a sell-off)

3. Technical Factors

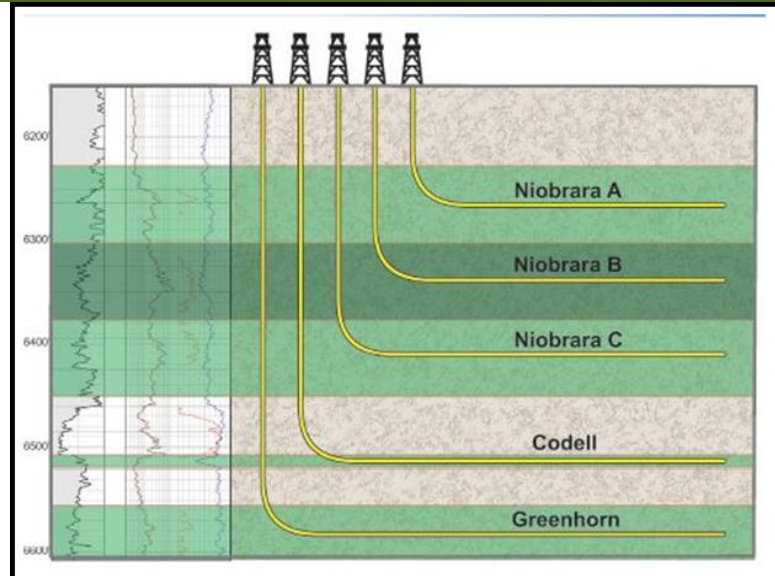
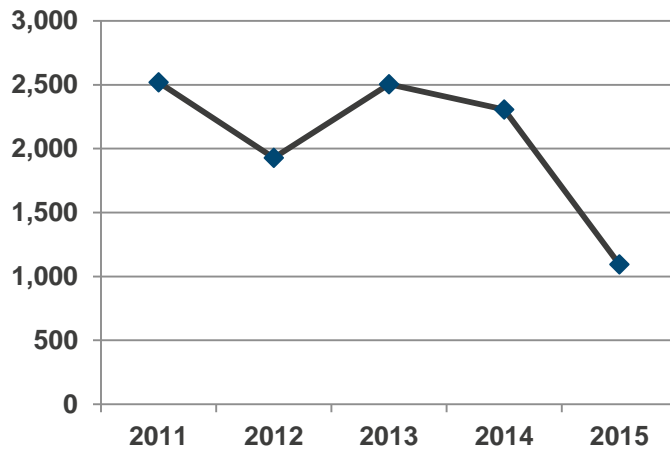
- GDP, payroll and unemployment data (noise?)

USD Index (USDX) measures value of USD against six currencies (Euro, Japan, Canada, Britain, Sweden and Swiss). Of these Euro is ~58% weighted, Yen is ~14%.

USD down ~12% in last 2 months, and was up ~25% in prior 3 years

Supply-Side Case Example: Wattenberg Field

- Discovered in 1970, more than 20,000 wells producing from J Sands, Codell, and Niobrara formation. Approximately 60 miles long. Produced over 4 TCF of gas. Horizontal wells and multi-stage fracs began in 2009.
- Since 2011, 9,260 total permits, 5,160 completions



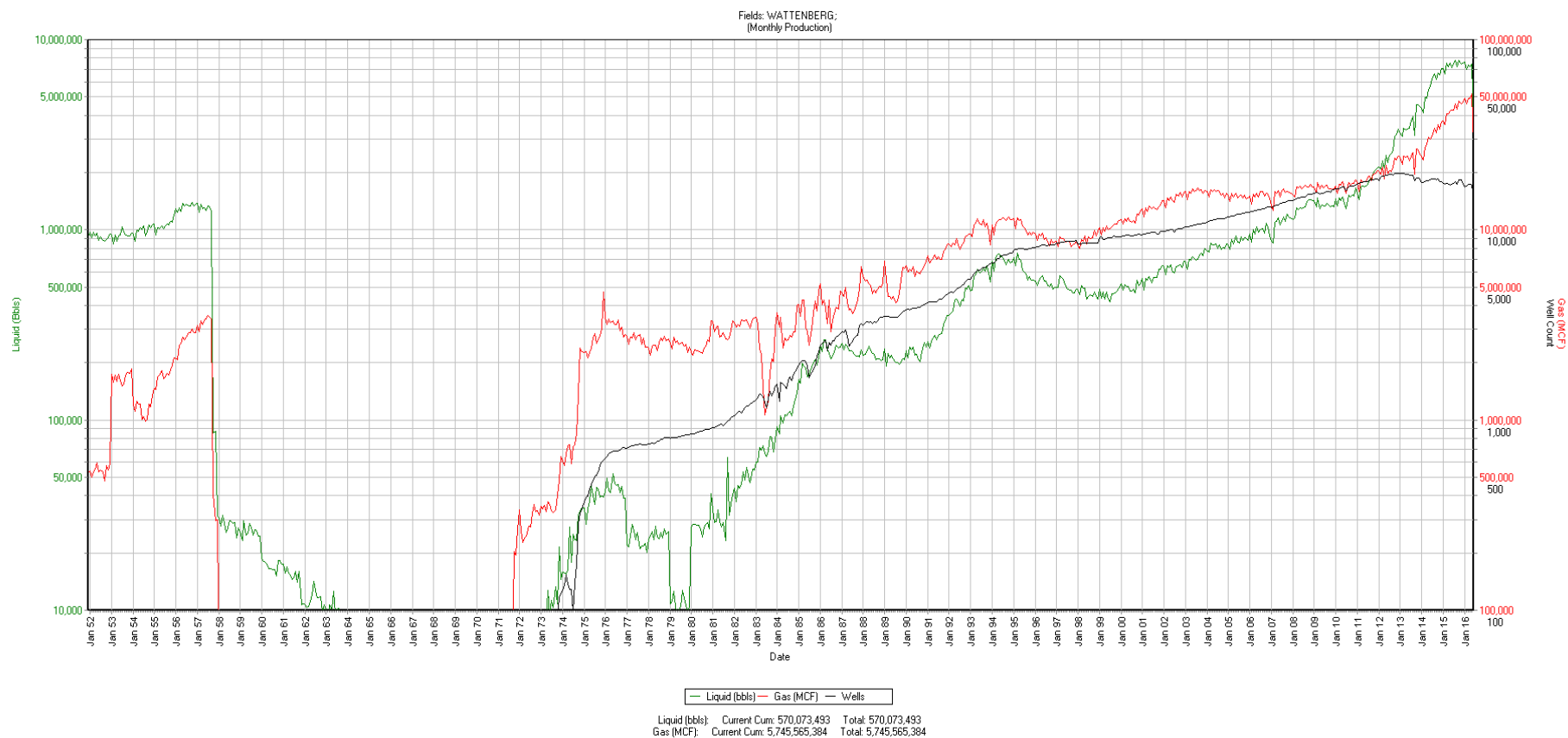
Top 20 2013 Weld County, CO Oil & Gas Producers

Rank	Operator	Oil Sales (barrels)	Gas Sales (MCF)	Total Sales (Bcfe)	% of Total
1	Noble Energy	17,637,154	109,910,859	215.7	35.3%
2	Anadarko Petroleum	16,696,492	111,293,213	211.5	34.6%
3	Encana	3,859,138	31,146,258	54.3	8.9%
4	PDC Energy	3,420,004	17,879,138	38.4	6.3%
5	Bonanza Creek	3,502,841	8,019,632	29.0	4.7%
6	Carrizo Oil & Gas	1,304,144	1,173,031	9.0	1.5%
7	Bill Barrett Corporation	886,154	2,919,012	8.2	1.3%
8	Whiting Petroleum	1,112,418	427,721	7.1	1.2%
9	Synergy Resources	629,093	2,836,795	6.6	1.1%
10	Great Western Operating Co.	554,468	1,976,978	5.3	0.9%
11	EOG Resources	647,596	337,481	4.2	0.7%
12	Bayswater Exploration & Production LLC	461,178	1,261,006	4.0	0.7%
13	K P Kauffman Company Inc	257,658	2,044,633	3.6	0.6%
14	Mineral Resources Inc	196,306	1,576,206	2.8	0.5%
15	Tekton Windsor LLC	217,568	593,461	1.9	0.3%
16	Sundance Energy Inc	153,747	446,513	1.4	0.2%
17	Foundation Energy Management LLC	107,423	459,239	1.1	0.2%
18	Apollo Operating LLC	106,464	265,172	0.9	0.1%
19	Continental Resources	115,181	187,443	0.9	0.1%
20	Marathon Oil	85,956	128,826	0.6	0.1%
	Others	522,583	1,827,312	5.0	0.8%
	TOTAL	52,473,566	296,709,929	611.6	100.0%

Note: We use oil & gas sales as a proxy for marketed production

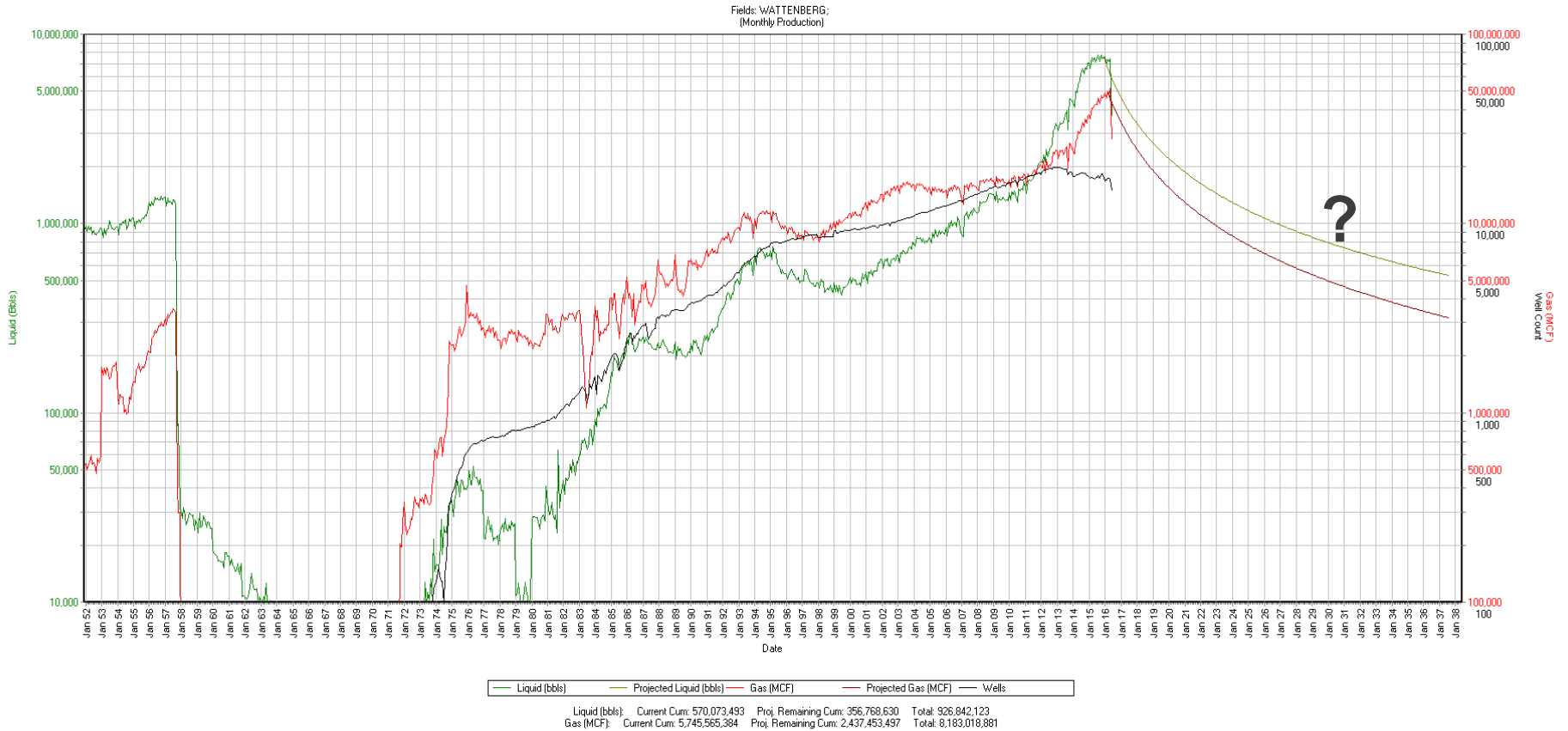
Source: Colorado Oil & Gas Conservation Commission data, NGI's Shale Daily calculations

Wattenberg Historical Production



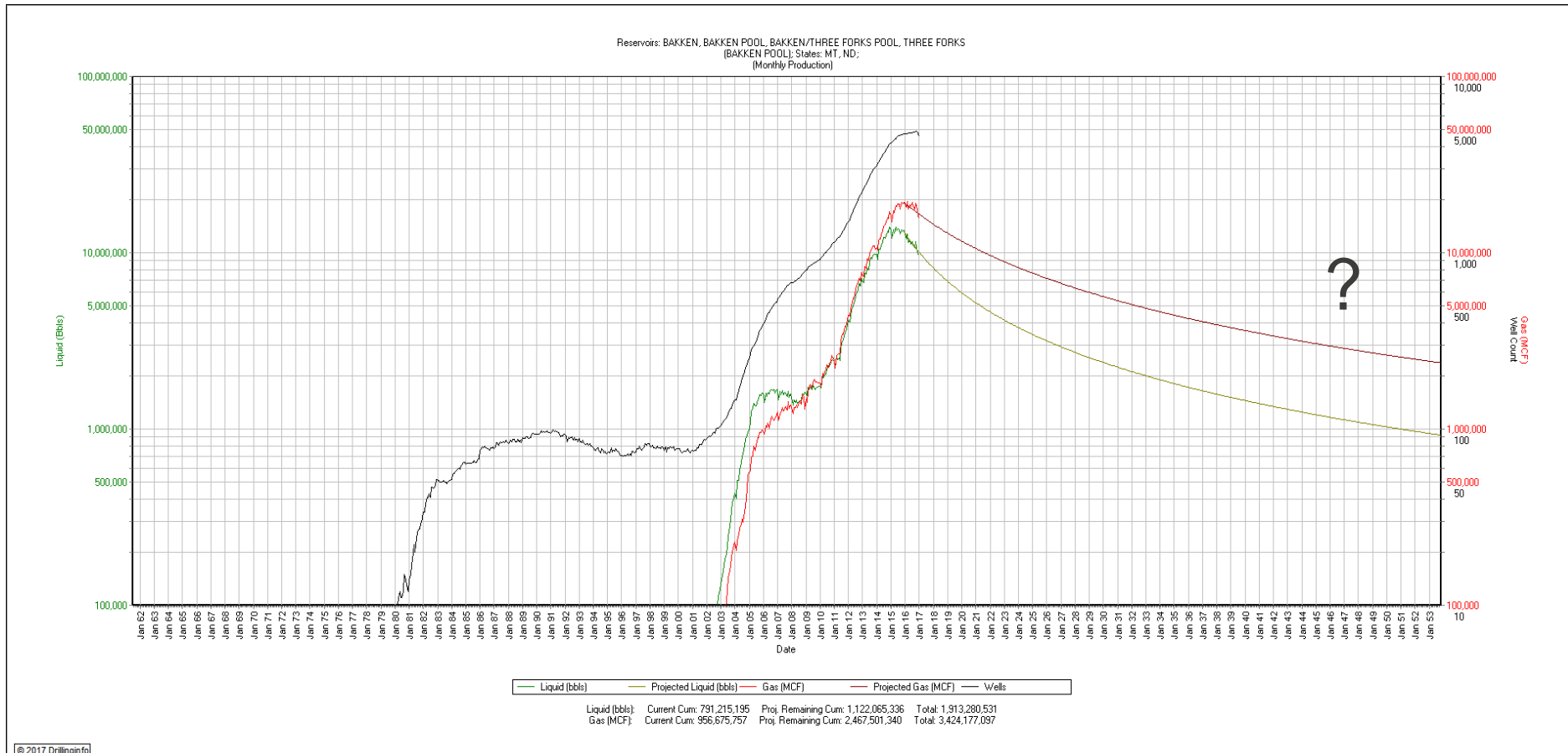
© 2016 Drillinginfo

Wattenberg Future?

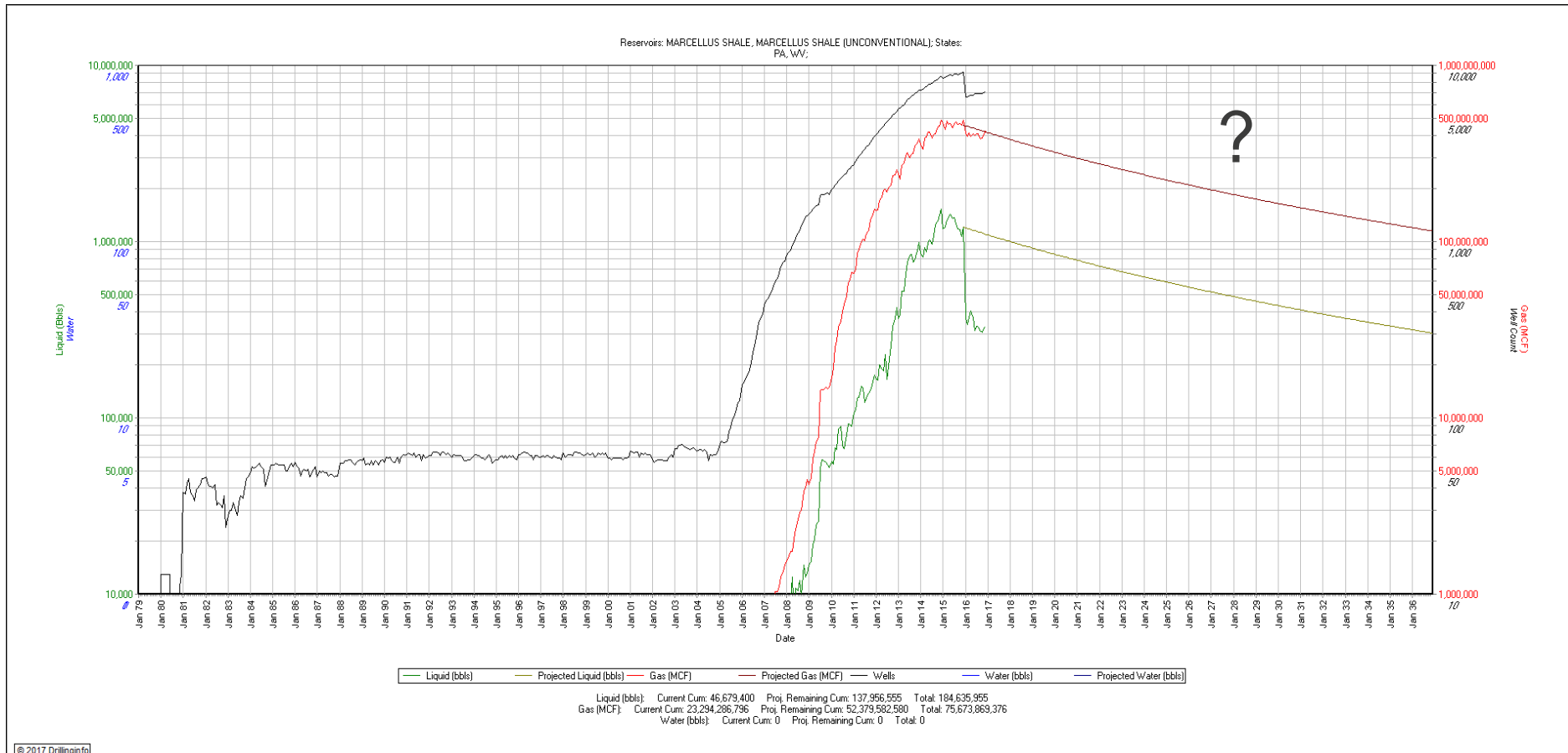


How about other upstart plays?

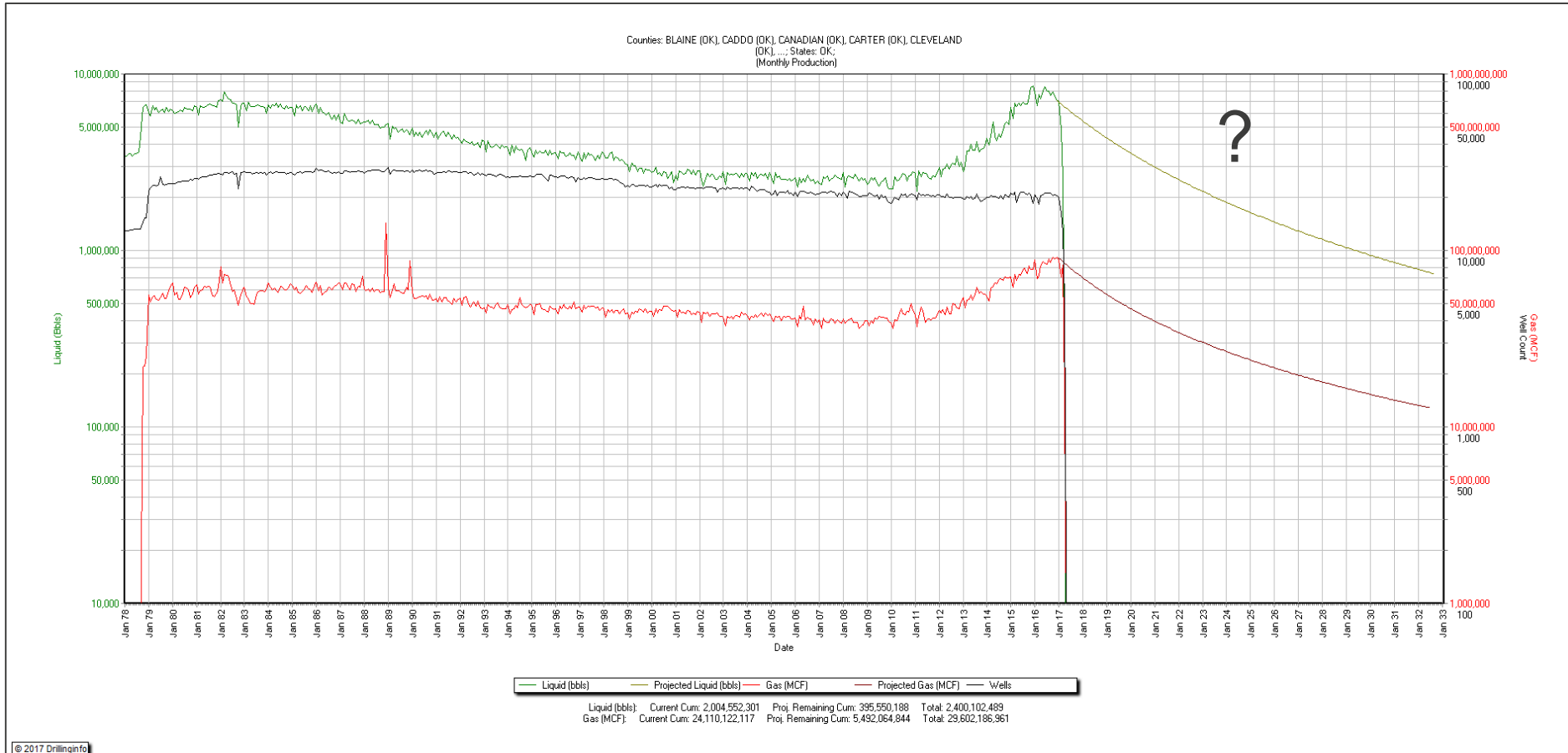
Bakken



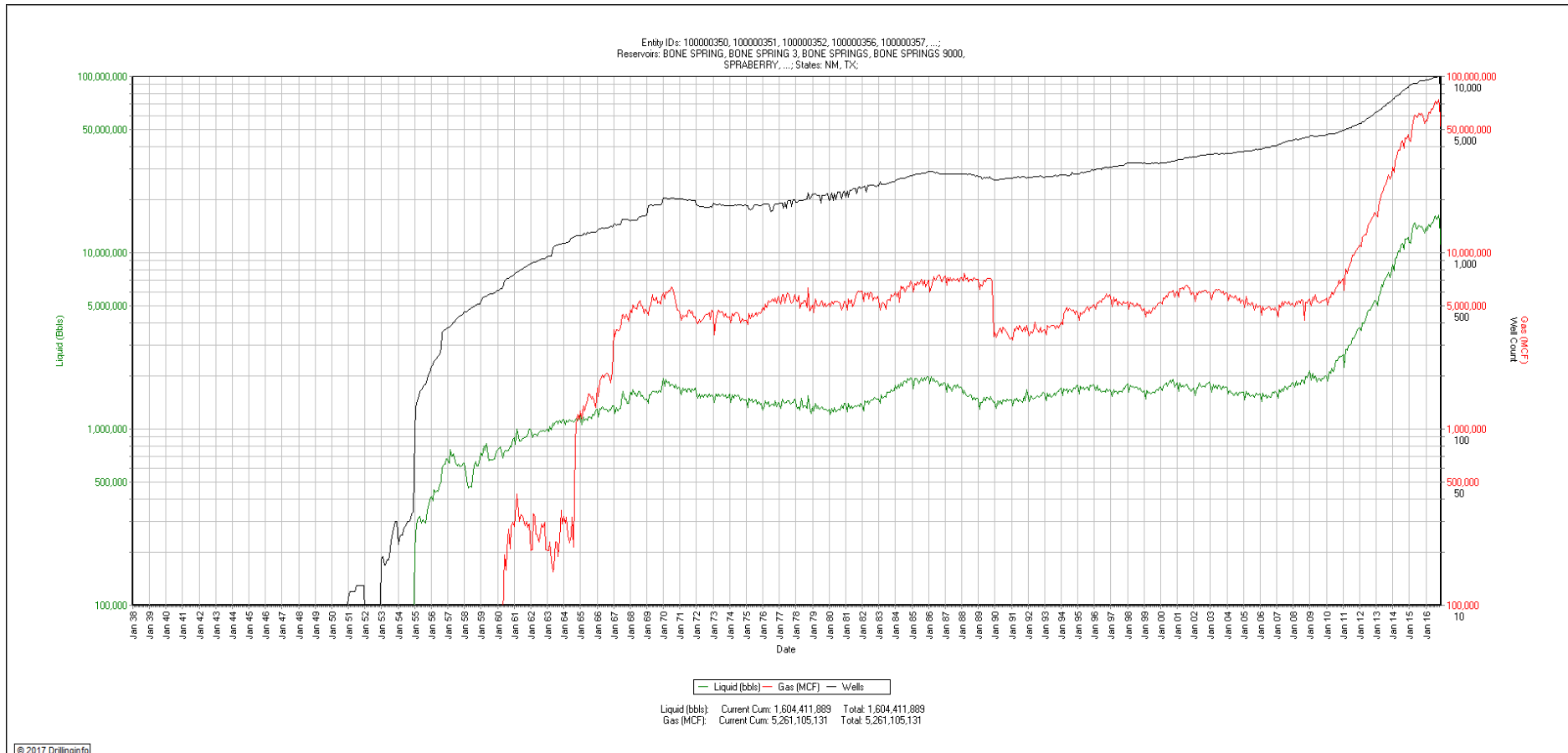
Marcellus



SCOOP/STACK



Permian Basin – is the sky the limit?



A Look at Debt and Equities

“Please don’t tell my mother I work in the oilpatch.
She still thinks I’m a piano player in a bordello.”

Bumper sticker seen in Odessa in 1987

Banks Under Pressure

- The Office of the Comptroller of the Currency (OCC), the Federal Reserve and the FDIC, have reportedly been warning banks to limit their exposure to E&P companies, pressuring banks to tighten and increase the frequency of oil and gas loan reviews, and advising banks that a significant number of outstanding loans to E&P companies should be classified as “substandard” (inferring there is uncertainty as to the underlying collateral value and/or the borrower’s ability to repay the loan).
- These regulatory pressures combined with a volatile price and global over-supply situation, hinder E&P companies’ access to capital at a time when they need it the most.
- OCC issued the “Oil and Gas Production Lending” bank examination booklet (as part of the Comptroller’s Handbook) in April 2014
 - Discusses risks in oil and gas production lending,
 - Outlines supervisory expectations and regulatory requirements related to RBL,
 - Loan terms ranging from three to seven years,
 - Loan advances governed by a borrowing base that is primarily derived from the value of the borrower’s proved reserves and at least semi-annual borrowing base redeterminations (in the spring and fall) that are largely based on an updated reserve report and the bank’s current oil and gas price deck.

Quick Look at Reserve Based Lending (RBL)

- Revolving Lines of Credit necessary for capex, G&A, etc.
- **Redeterminations** – Banks rerun borrower's reserves calculated on bank's price deck and usually include discount to the futures price strip.
- Normally based on proved reserves, **primarily PDP**. PUDs as much as 25% of the total borrowing base.
- Strong scrutiny given to:
 - Exploration, timing, operational and mechanical risks
 - Single well or field concentration
 - Reserve mix (PDP v. PUD)
 - Proposed capex to promote PUDs to PDPs
- Projected cash flows must validate ability to cover G&A expenses, debt service, including payments on other 2nd lien debt, assuming a complete draw of borrowing base with adequate reserve tail cushion.
- Engineering runs are used to develop financial projections that test for compliance with energy lending policy parameters including base case and sensitivity case advance rates; reserve tail tests (based on economic half-life of the reserves or remaining cash flow after projected loan payout); and annual cash flow coverage tests.

Factors Impacting Borrowing Base

INCREASE IN BORROWING BASE

- Higher price deck
- Longer term at prices above price deck
- Reserve acquisition
- Reducing opex and capex, G&A expenses, production taxes
- Promoting PDNPs and PUDs to PDPs
- Upward reserve revisions

DECREASE IN BORROWING BASE

- Lower price deck
- Rolling off hedges with strike prices above price deck
- Reserve divestiture
- Declining and not replacing PDP
- Increased operating costs, G&A expenses, production taxes, drilling / completion CAPEX
- Downward reserve revisions

Insolvency – A Walk on the Dark Side

2 Types of Insolvency Tests

– Equitable

- Ignores BS and focuses only on ability to pay current debts. Sort of akin to a credit score.
- Accounting perspective measuring default risk, write-off potential, vendor credit, potential asset sales, etc.

– Balance Sheet

- “A deficiency of assets below liabilities with no *reasonable* prospect that the business can be successfully continued in the face thereof.”
- Valuation of assets and liabilities, using 3 Approaches to value: Income (DCF), Market Transactions and Cost.

Big differences between the two, as beauty is in the eye of the beholder!

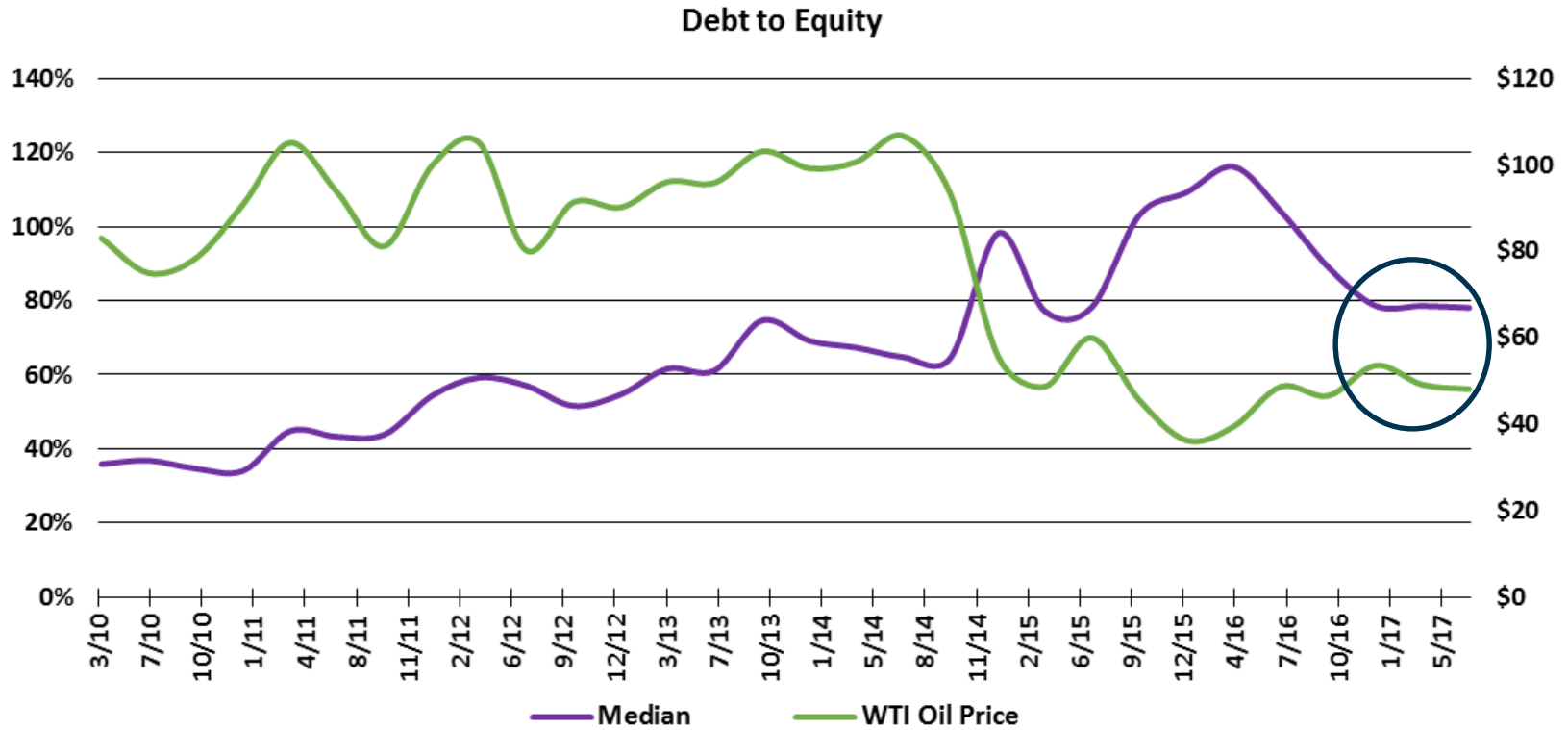
Bankruptcy – Final Stage of Life for Many

- Approximately 120 E&P's have filed for bankruptcy since January 2015
- Total secured and unsecured debt of ~\$80 billion
- Fortunately, that number is slowing down, with only 12 filings in 4th quarter of 2016 and only 5 through March 2017.

Data from Haynes Boone – Oil Patch Monitor

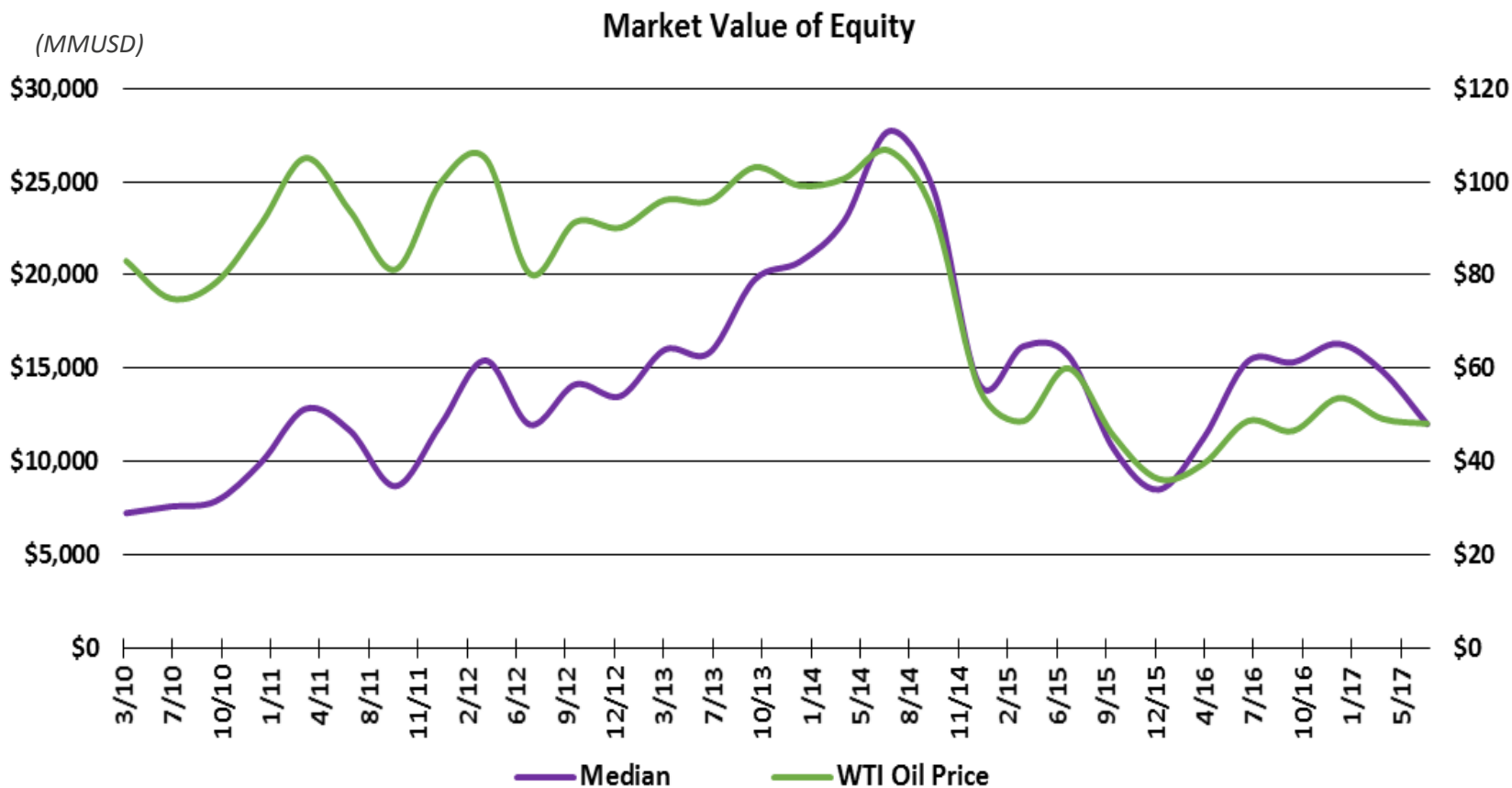
Current State of Industry- D/E Ratio

- Debt to Equity ratio has increased throughout 2010 to present



EOG, Devon, Noble, Continental Res., Whiting, Carrizo, Oasis

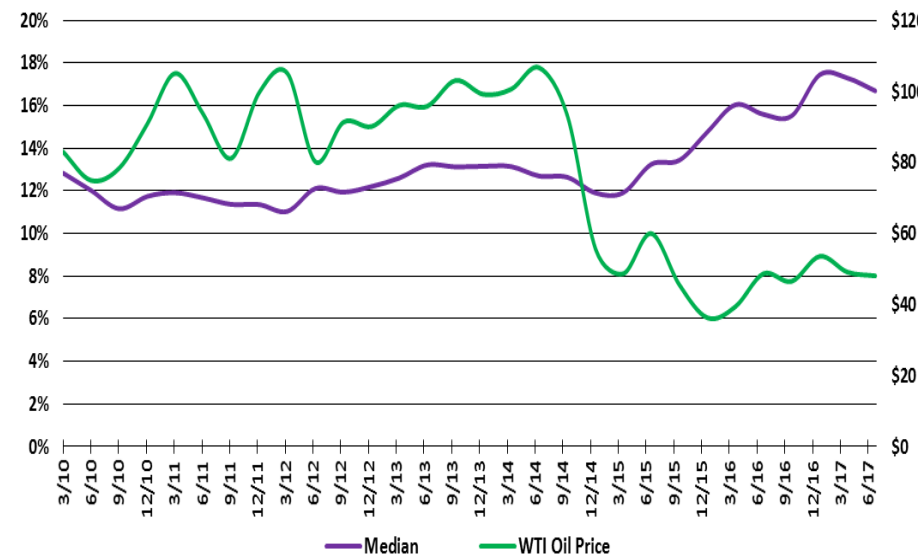
Current State of Industry- Equity



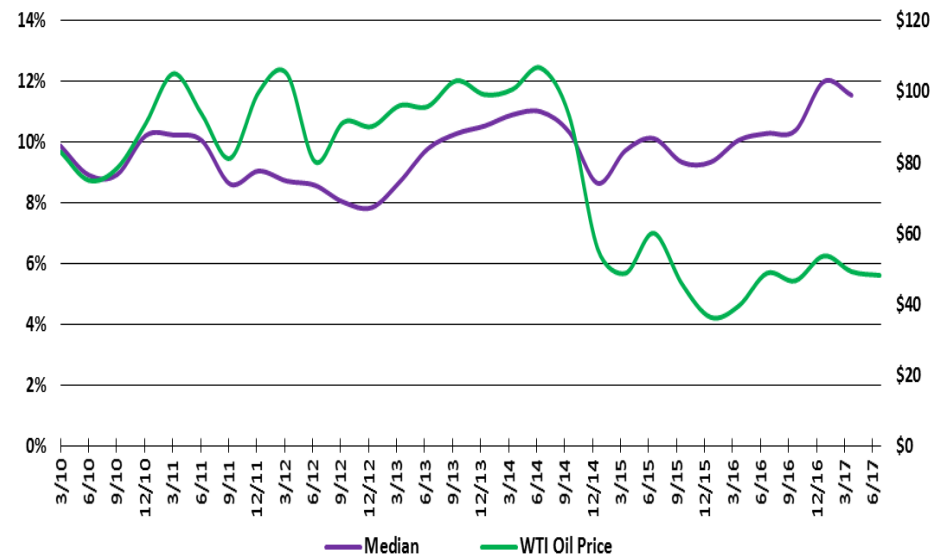
EOG, Devon, Noble, Continental Res., Whiting, Carrizo, Oasis

Current State of Industry- Cost of Equity & Capital

Cost of Equity



Cost of Capital

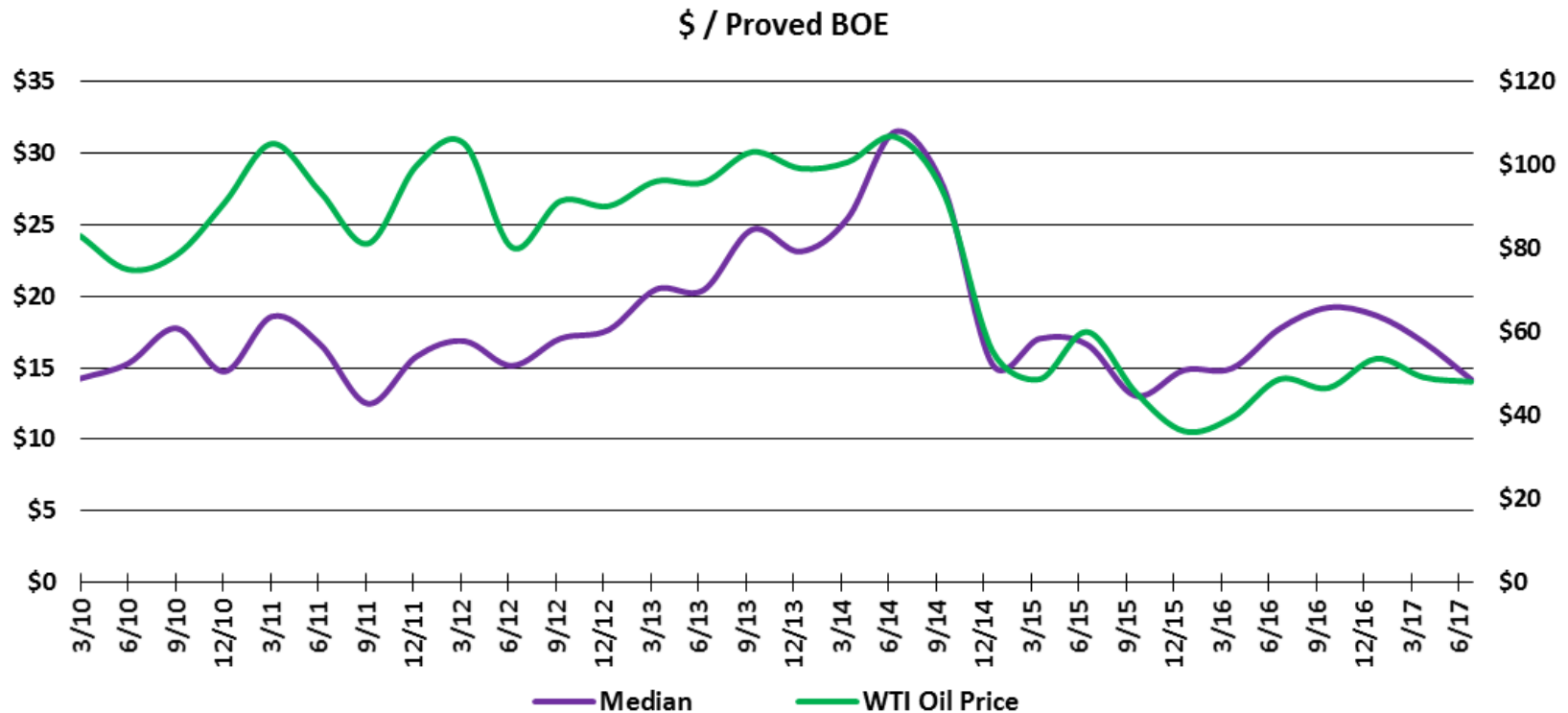


*Debt not available through 2Q

EOG, Devon, Noble, Continental Res., Whiting, Carrizo, Oasis

Current State of Industry- Reserve Carrying Value

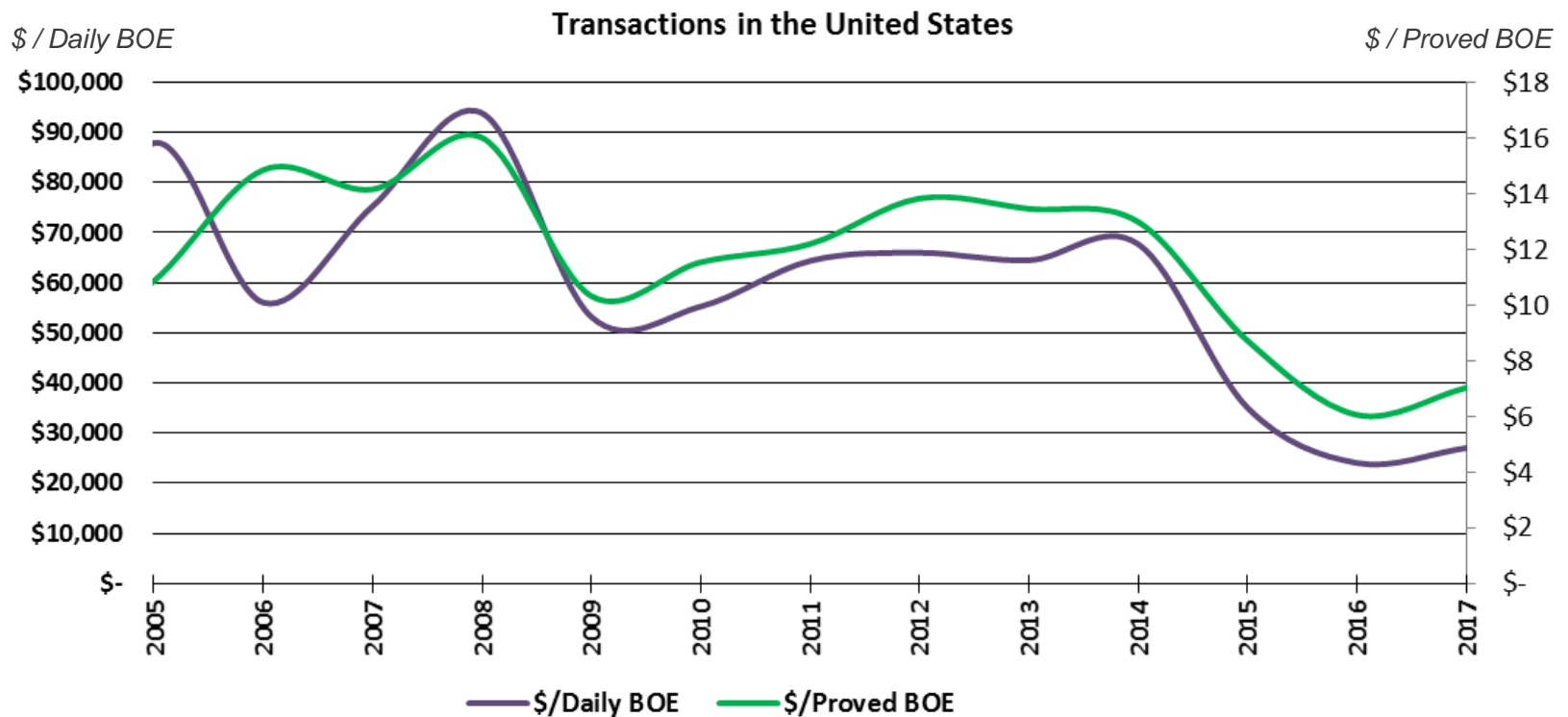
- (EV:BOE) Enterprise Value to Proved BOE ratio reflects the significant decline in oil prices and shift in market dynamics.



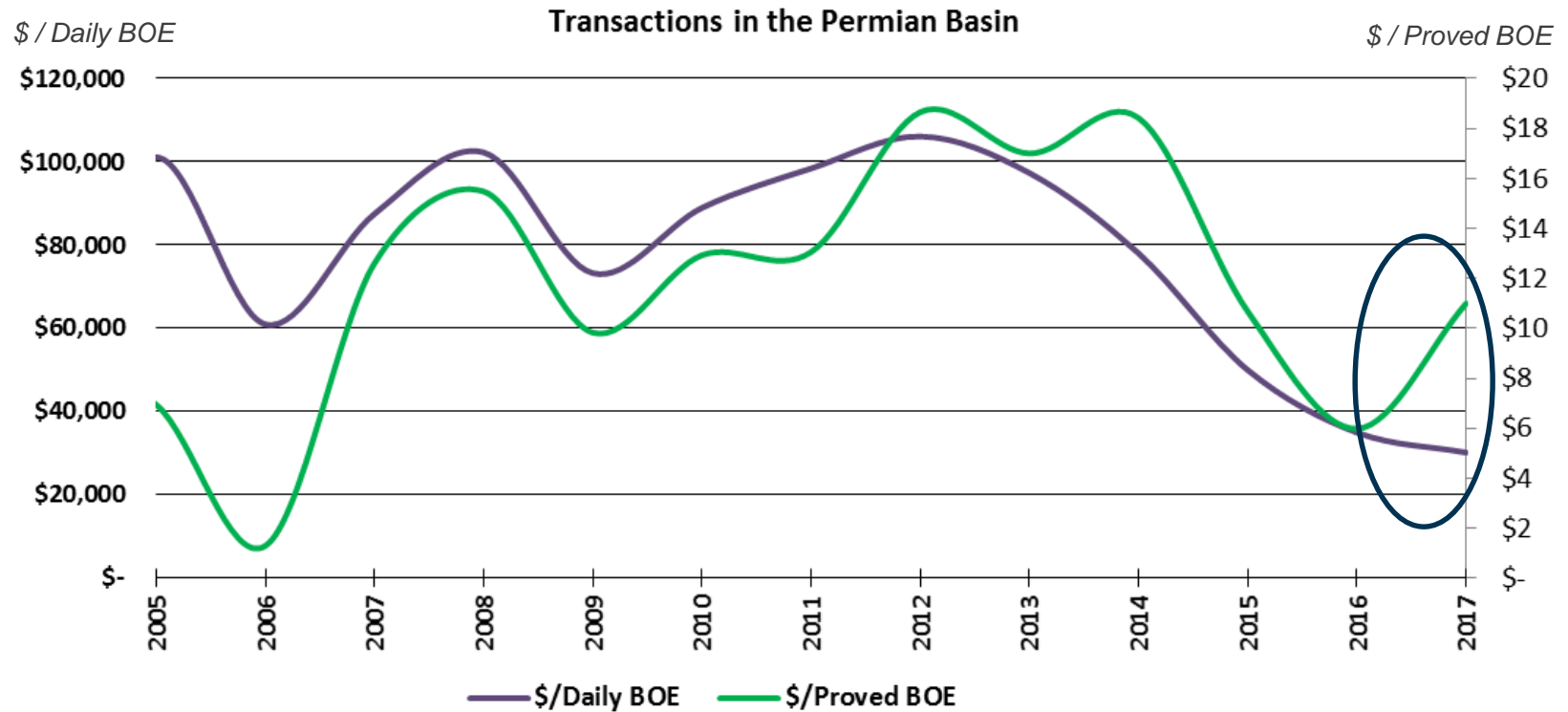
EOG, Devon, Noble, Continental Res., Whiting, Carrizo, Oasis

M&A Review- US

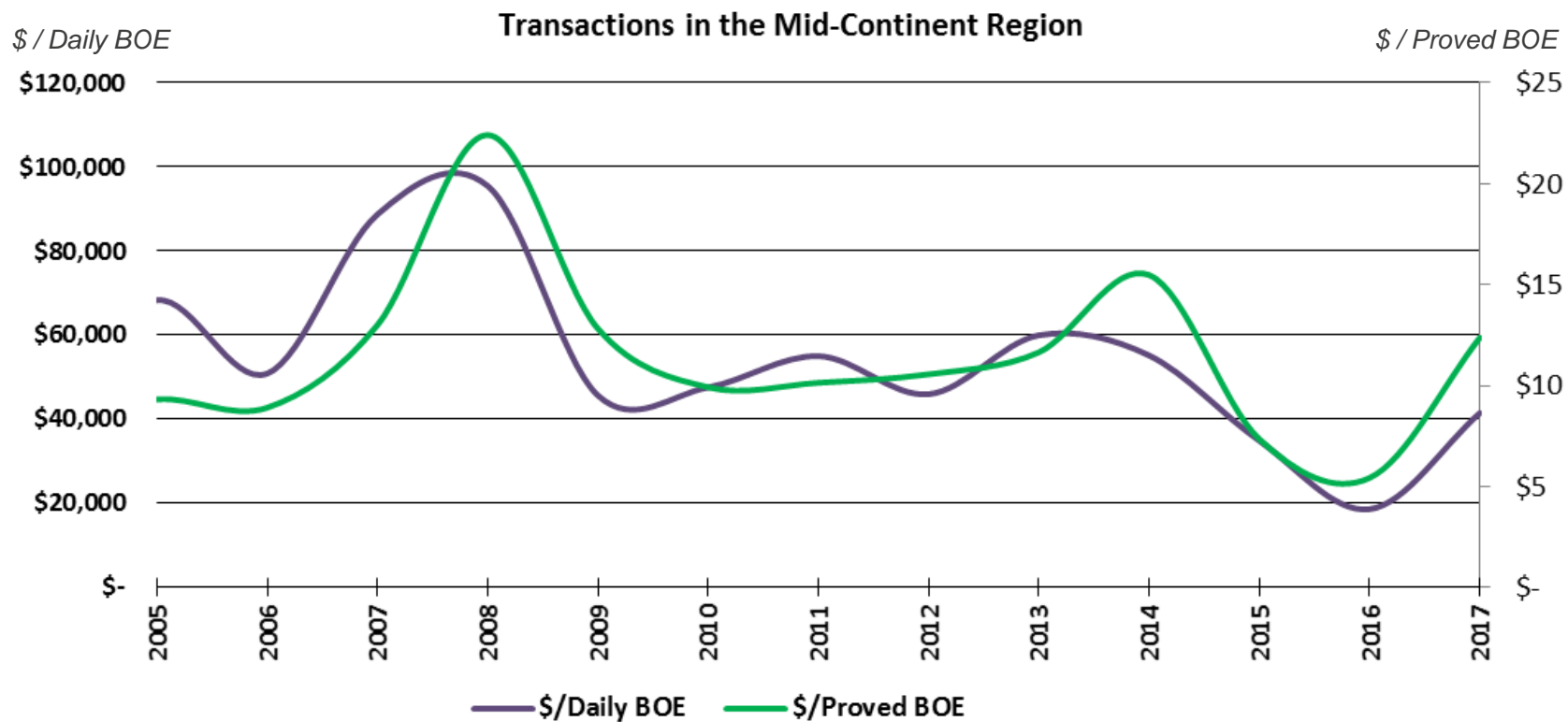
- M&A deal value hit a low of \$5 billion in 2015 but have since picked up. For the first half of 2017, upstream M&A deal value is at \$28.9 billion.
- Overall, US Metrics (\$/BOE & \$/DB) are up a bit in 2017.



M&A Review- Permian



M&A Review- Mid-Con



One Last Possible Game Changer

Top 10 Companies by Market Cap

2011

1. Exxon Mobil
2. PetroChina
3. Apple Inc.
4. ICBC
5. Petrobras
6. BHP Billiton
7. China Construction Bank
8. Royal Dutch Shell
9. Chevron Corporation
10. Microsoft

6 Oil Companies

2017*

1. Apple Inc.
2. Alphabet Inc.
3. Microsoft
4. Amazon.com
5. Berkshire Hathaway
6. Johnson & Johnson
7. Facebook
8. Tencent
9. Exxon Mobil
10. JPMorgan Chase

1 Oil Company

*As of June 30, 2017

Marked shift in most valuable companies from Energy to Technology

Saudi Aramco IPO (the game changer)

Saudi Aramco

- Plans to IPO 5% of company in 2018
- IPO estimates \$100 Billion, yielding a company value of \$2 Trillion
- 12.5 MMBoe/day
- 260 BBbl proved reserves
- 298 Tcf proved reserves
- 310 BBoe proved reserves
- **\$160,000/daily BOE**
- **\$6.44/proved BOE**

Comparing Downstream

- Aramco refining capacity of 3.1MMbpd
- Exxon Mobil capacity of 5.1 MMbpd
- Chevron capacity of 1.8 MMbpd

أرامكو السعودية
Saudi Aramco



2 Major US Company Values

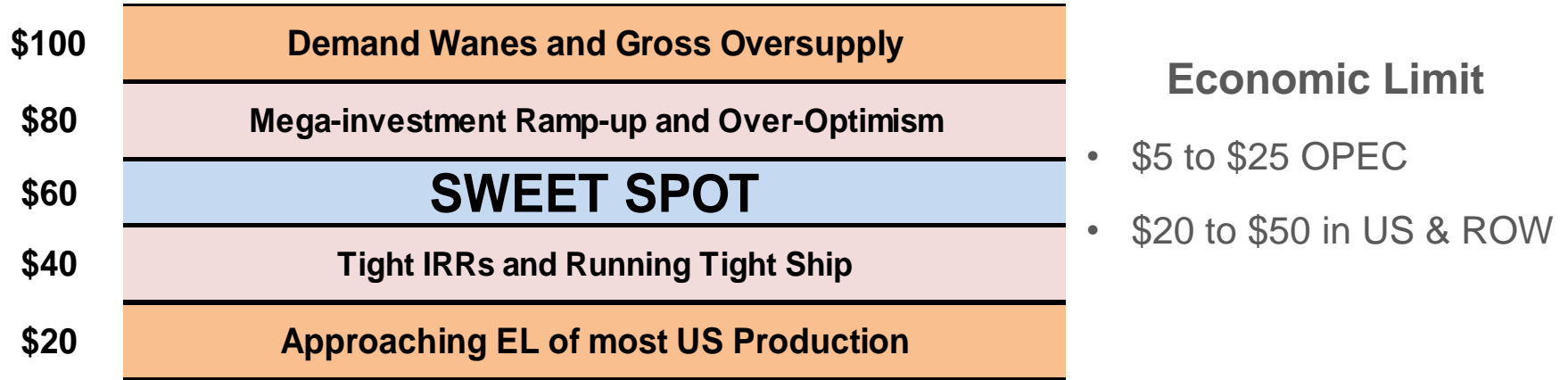
Exxon Mobil

- 342,625 MM \$USD Market Cap
- 774 MMBbl oil in 2016
- 20 BBoe proved reserves
- 4,053 KBoe/day
- **\$84,500/daily BOE**
- **\$17.15/proved BOE**

Chevron

- 197,431 MM \$USD Market Cap
- 629 MMBbl oil in 2016
- 11 BBoe proved reserves
- 4,448 KBoe/day
- **\$44,400/daily BOE**
- **\$17.75/proved BOE**

Macro Outlook – Price Collars



Playing Field is Not Even

- US\$ purchasing power
- NOC's and Subsidies
- Variances between economies of global producers and consumers
- Service costs and technology

Crude Price Outlook- Fundamental Cases

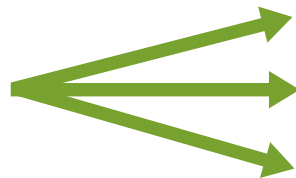
Lower Price Cases

- Chinese demand drops as their economy cools (true).
- EU economy is worse than thought and US\$ strengthens (true).
- OPEC, particularly KSA, has shown that they can easily replace lost production (true).
- OPEC is prone to fragment and members ignore production quotas when they need money (probable).
- US\$ strengthens even more (possible).

Higher Price Cases

- US debt continues to grow (probable).
- EU economy gets back on track (probable).
- Global crude steady decline (possible).
- OPEC sustains quotas (speculative).
- Geopolitical event trigger wilds speculation (likely, but price collared).
 - ✓ North Korea
 - ✓ Russian aggression in ME & Ukraine
 - ✓ China's new "islands"

Currency Cases



1.20 US\$:€ crude price = ~\$55

1.10 US\$:€ crude price = ~\$45

1.00 US\$:€ crude price = ~\$35

7-17-2017

WTI = \$46.28 Euro:USD = 1.155

So Where Do We Go From Here?

- Oil prices will languish until the rest of the world's economy improves – or the US weakens – and the USD further weakens. This is happening now.
- Our new “Prudhoe Bay” is declining quickly and without \$60 WTI, cheaper imports will again prevail over next 3 years
- Look for oil to hover in low \$50's for rest of 2017 and \$60's by 2020 (of course, that's in an *efficient* market)
- It is what it is, so try to hang on. I think it'll be worth it.

	2017	2018	2019	2020	2021
EURO:USD	1.15	1.20	1.25	1.30	1.35
WTI	\$50	\$55	\$65	\$70	\$80

Potential scenario

Thank you

**“Lord, Please give me one more oil boom.
I promise I won’t piss it all away this time”**

Bumper sticker seen in Oklahoma City in 1986

Questions?