



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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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

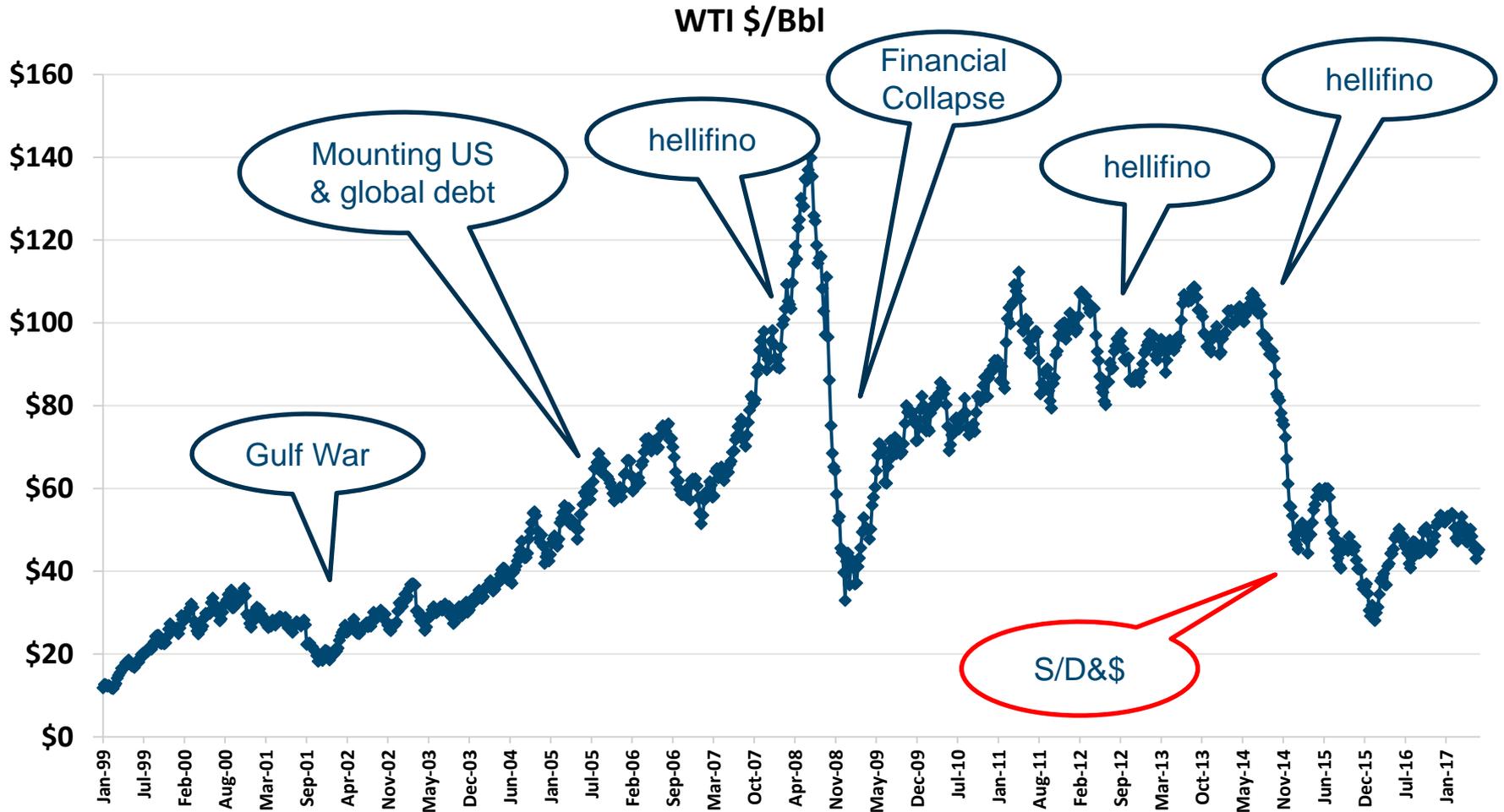
- Current State
  - *How did we get here*
  - *Debt & Equities*
  - *Transactions Markets*
  - *Where do we go from here*

# 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

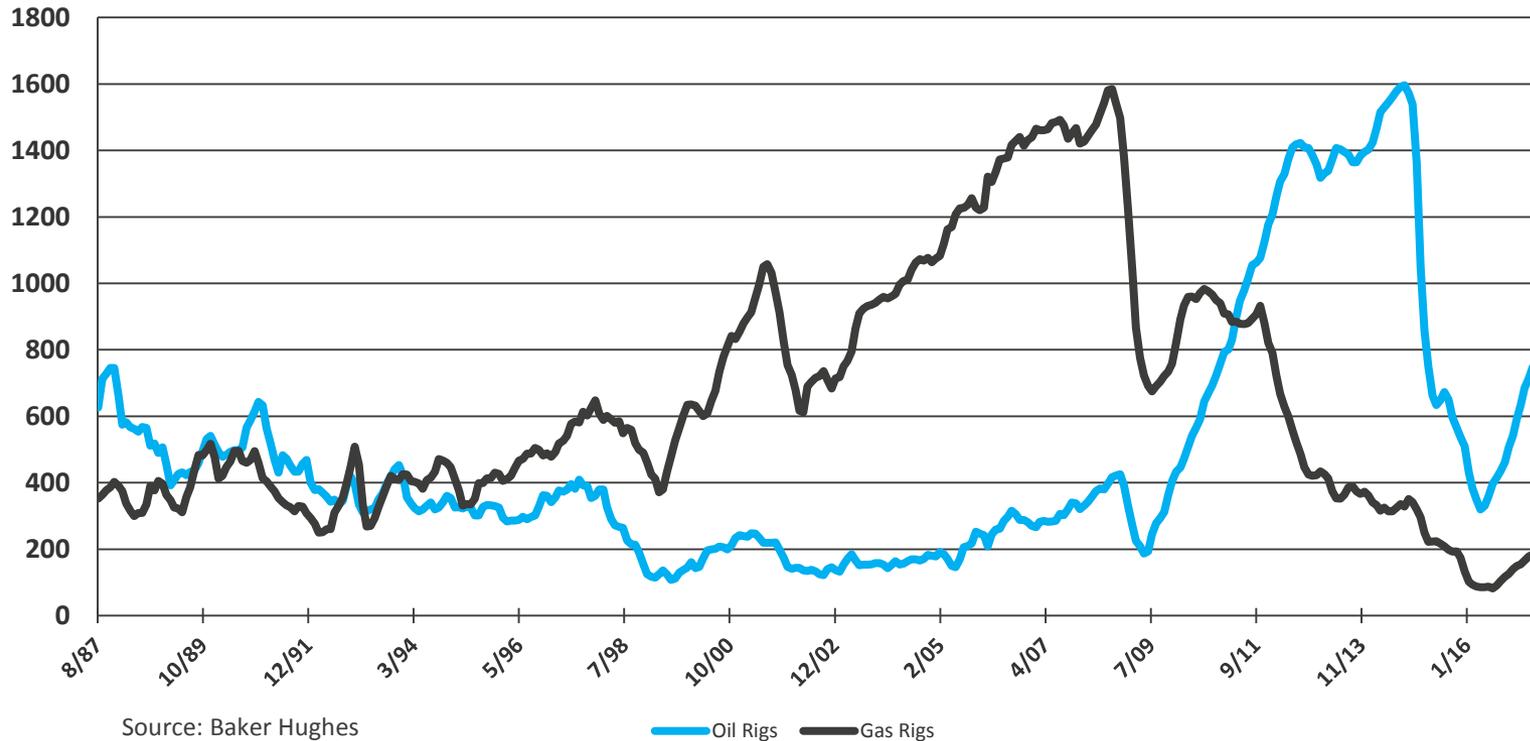
# Oil Prices – Let's beat the old horse a little more



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

## US Rig Count

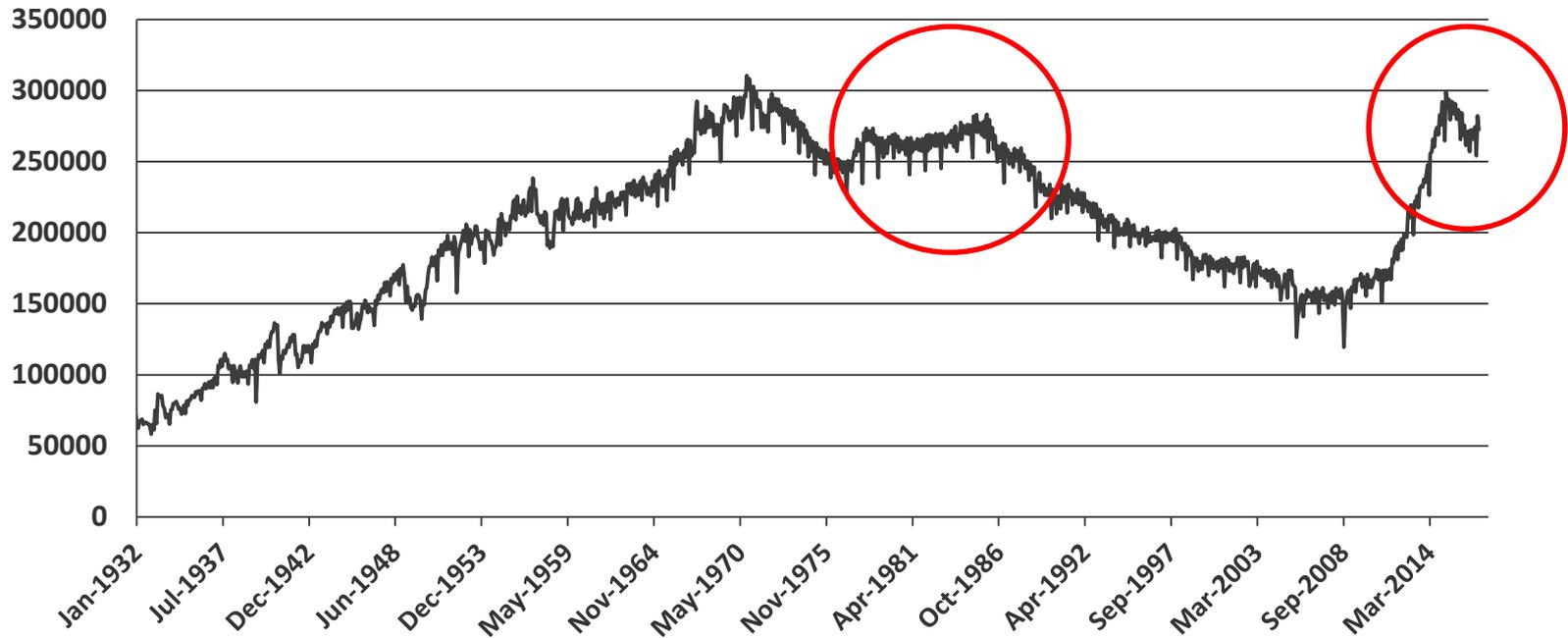
### US Rig Count - Oil and Gas Split



- 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

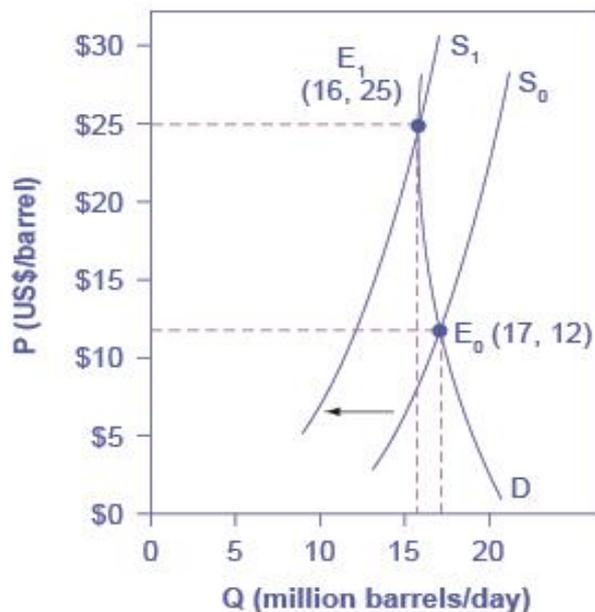
# Drowning in an Ocean of Crude

- 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

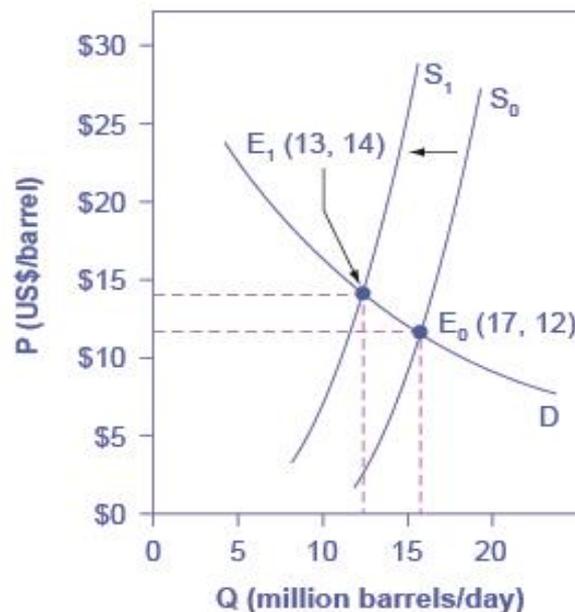


40+ tankers anchored outside Houston Port

# It's Simple Economics – Law of S/D



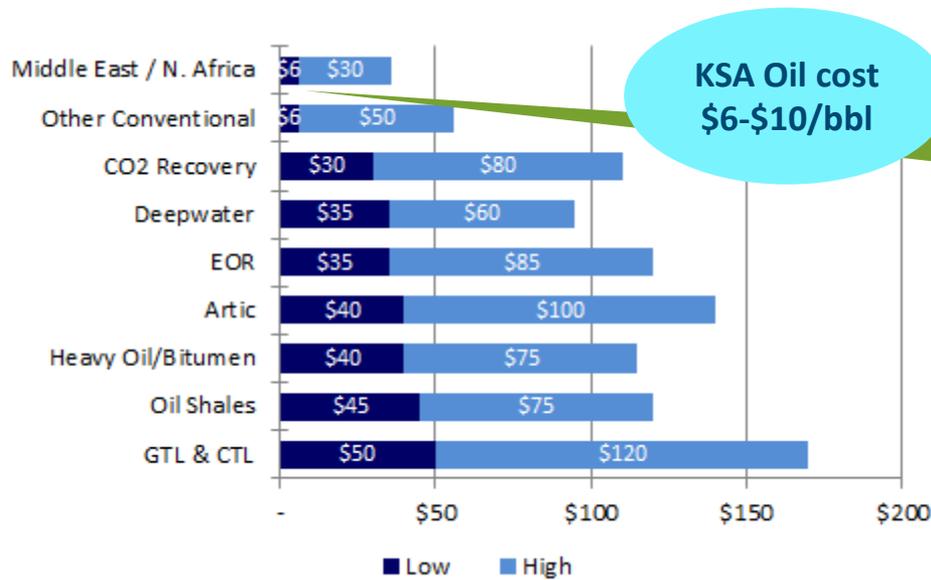
(a)



(b)

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

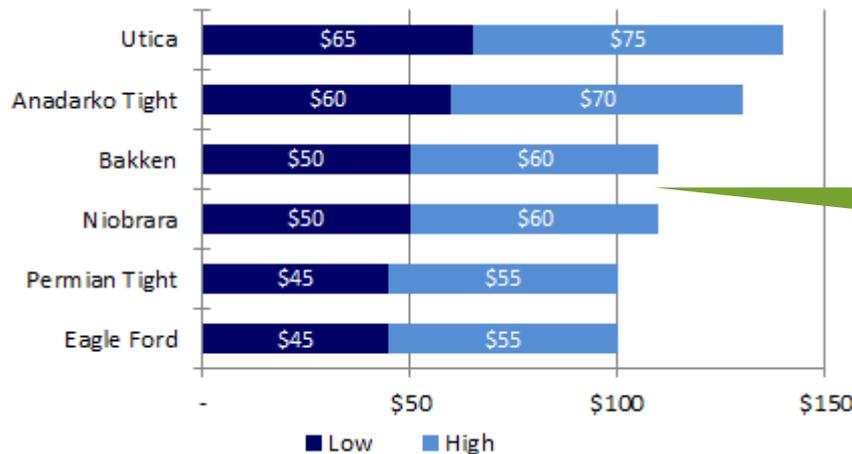
# So Who Cries "Uncle" First... US or OPEC?



Average ME cost/bbl = \$18

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

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



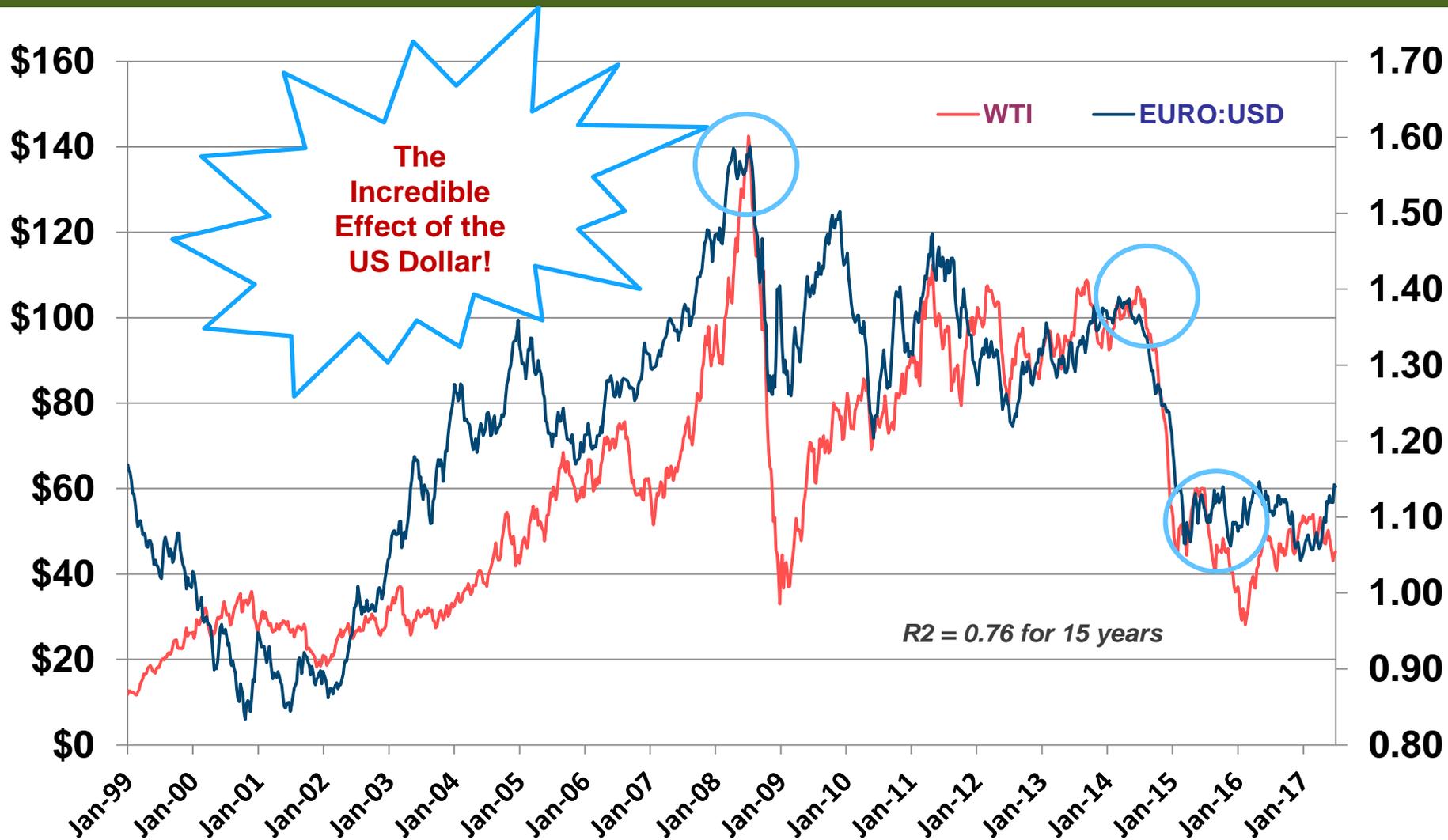
Average US cost/bbl = \$25 to \$40

# Which Bodes the Question...

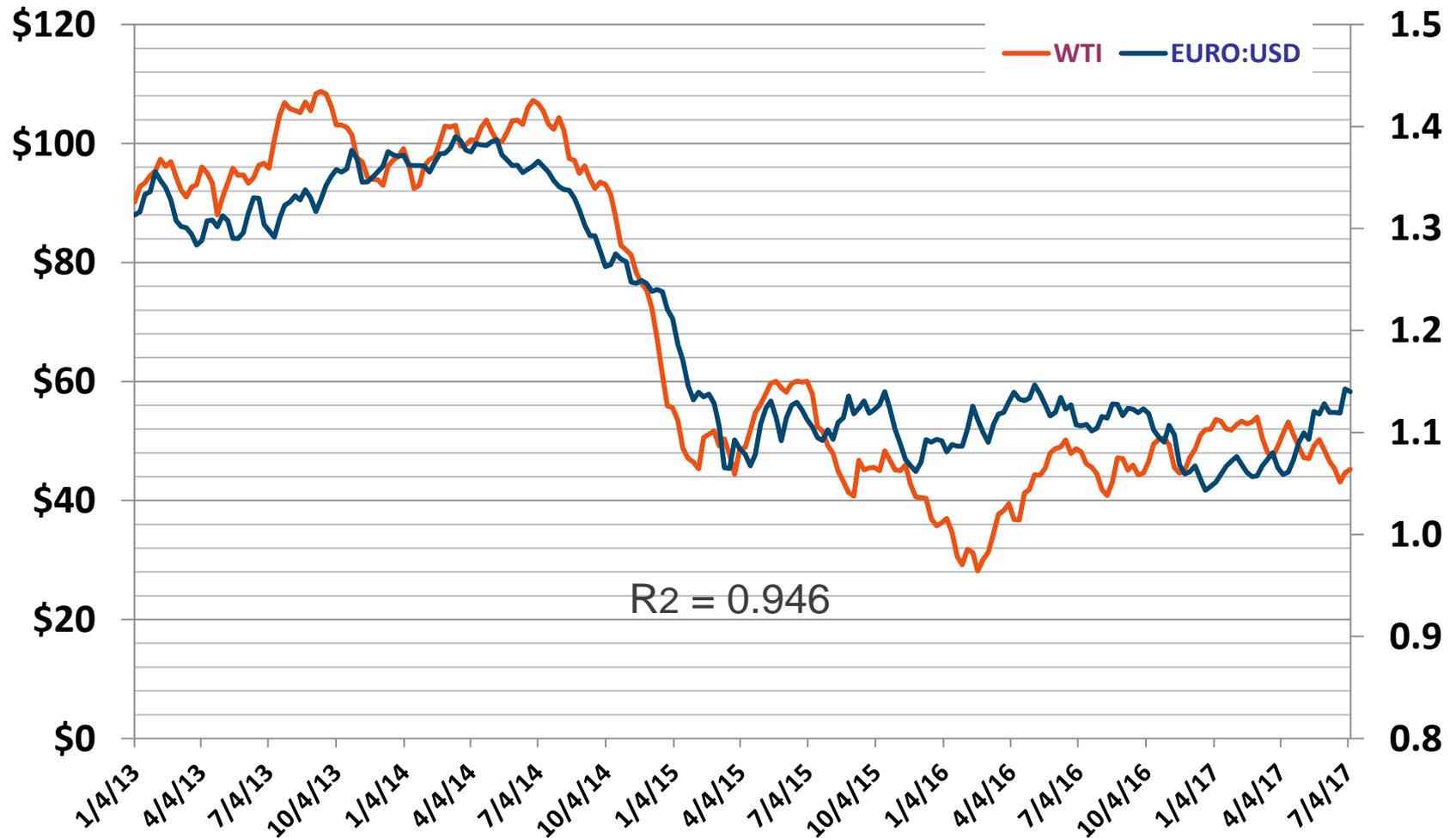
How the heck did our oil get under their sand?

*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

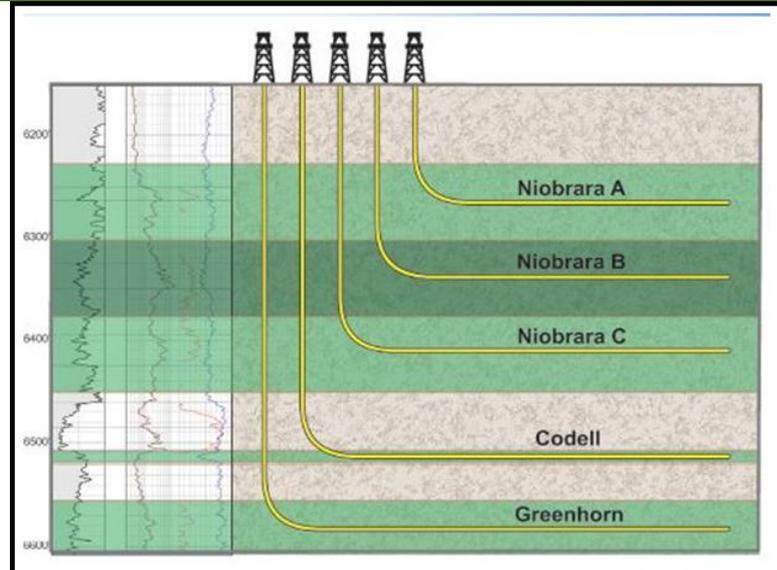
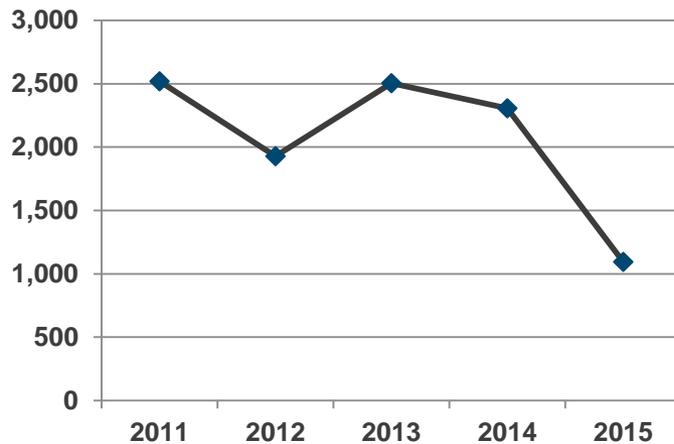
- GDP, payroll and unemployment data (noise?)

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



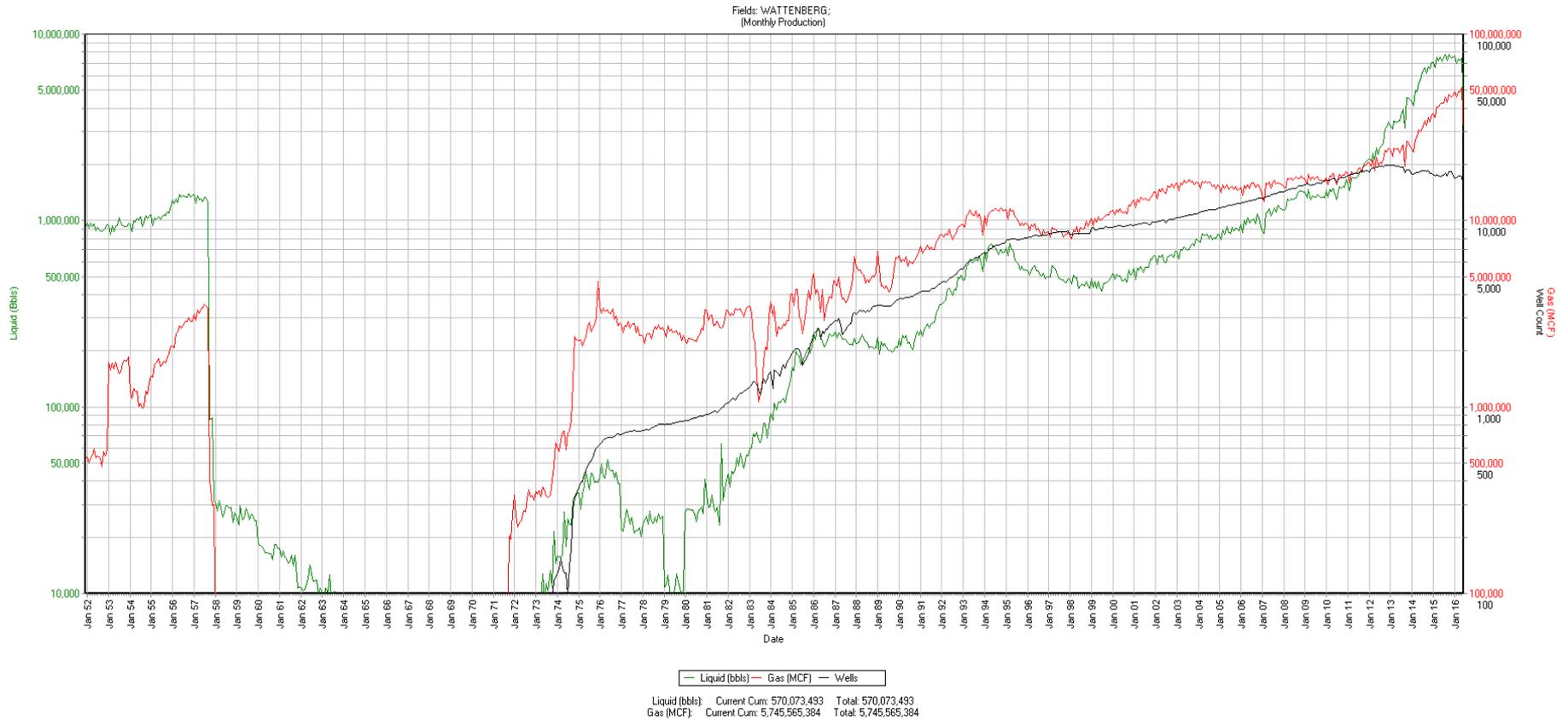
Top 20 2013 Weld County, CO Oil & Gas Producers

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%
	<b>TOTAL</b>	<b>52,473,566</b>	<b>296,709,929</b>	<b>611.6</b>	<b>100.0%</b>

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

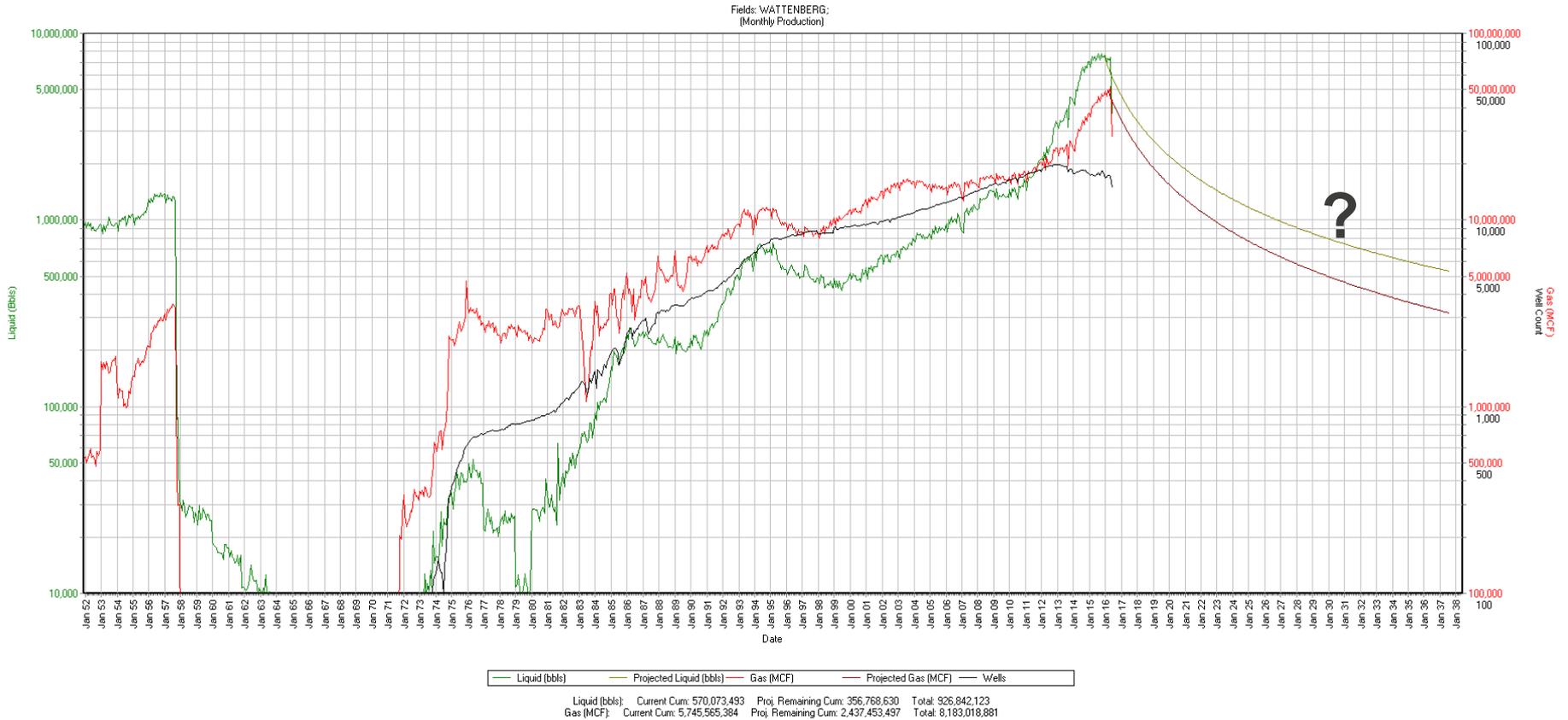
Source: Colorado Oil & Gas Conservation Commission data, NGI's Shale Daily calculations

# Wattenberg Historical Production



© 2016 Drillinginfo

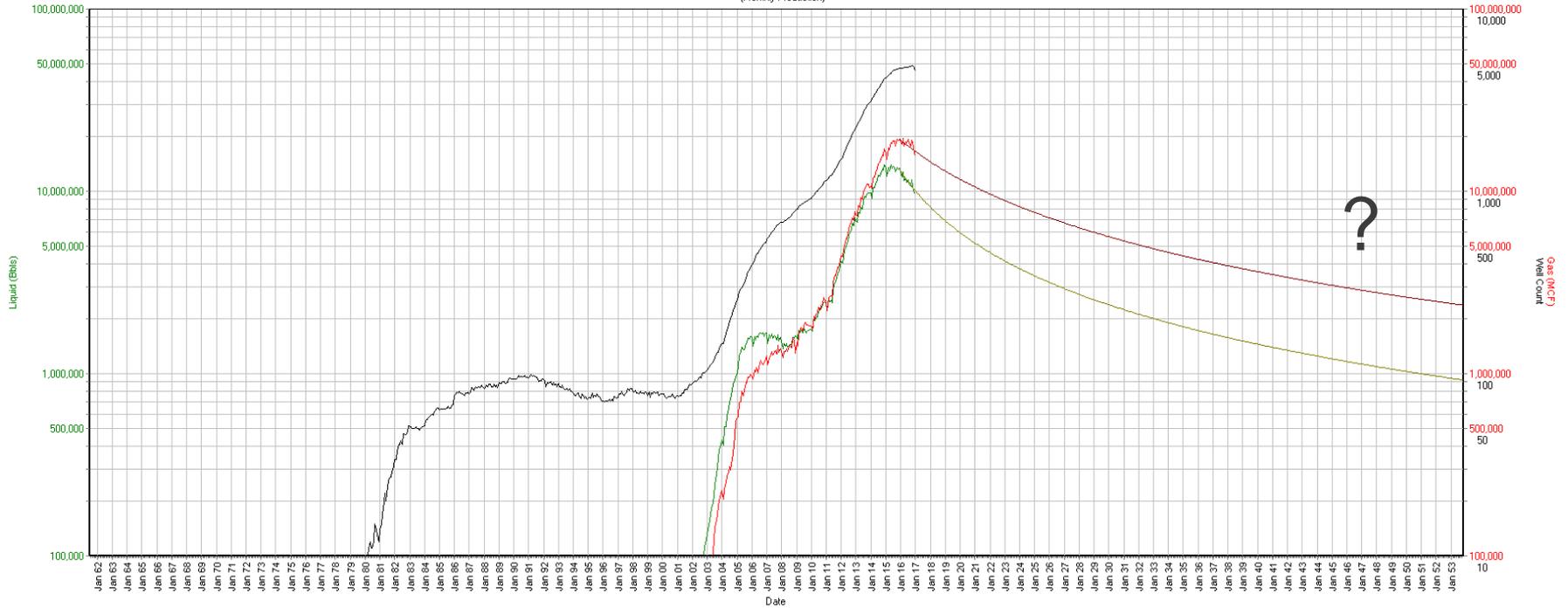
# Wattenberg Future?



## How about other upstart plays?

# Bakken

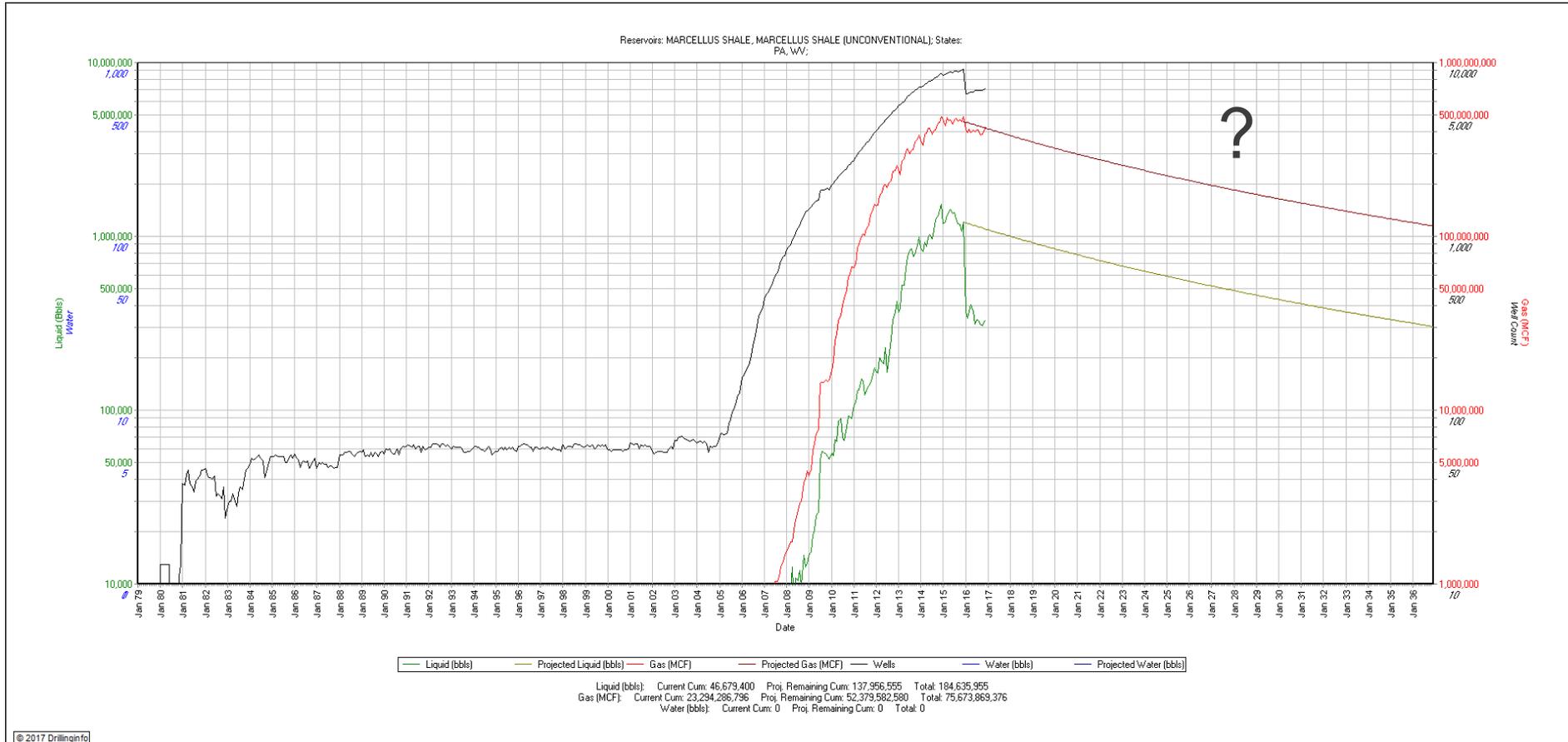
Reservoirs: BAKKEN, BAKKEN POOL, BAKKEN/THREE FORKS POOL, THREE FORKS  
 (BAKKEN POOL); States: MT, ND;  
 (Monthly Production)



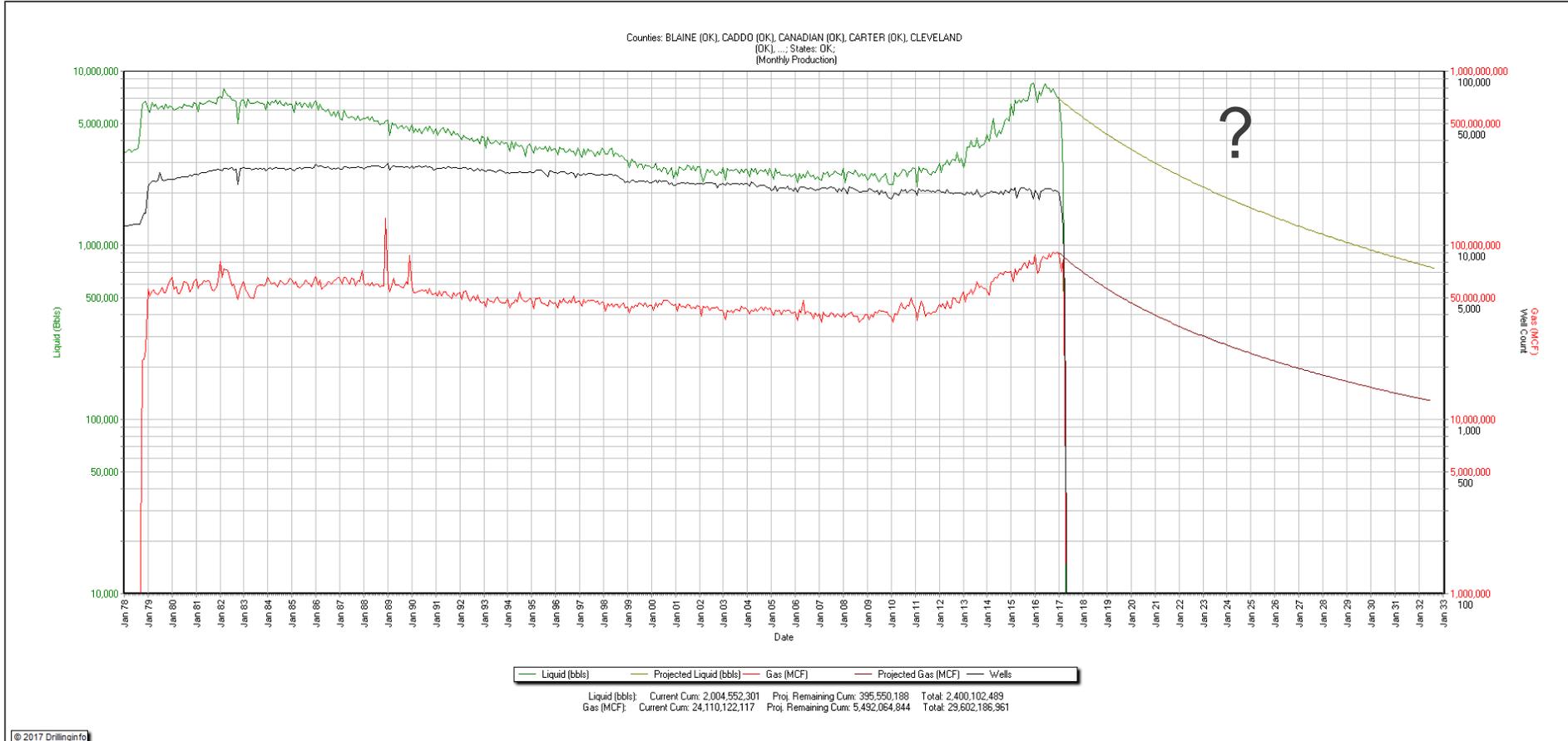
— Liquid (bbls) — Projected Liquid (bbls) — Gas (MCF) — Projected Gas (MCF) — Wells

Liquid (bbls):	Current Cum: 791,215,195	Proj. Remaining Cum: 1,122,065,336	Total: 1,913,280,531
Gas (MCF):	Current Cum: 956,575,757	Proj. Remaining Cum: 2,467,501,340	Total: 3,424,177,097

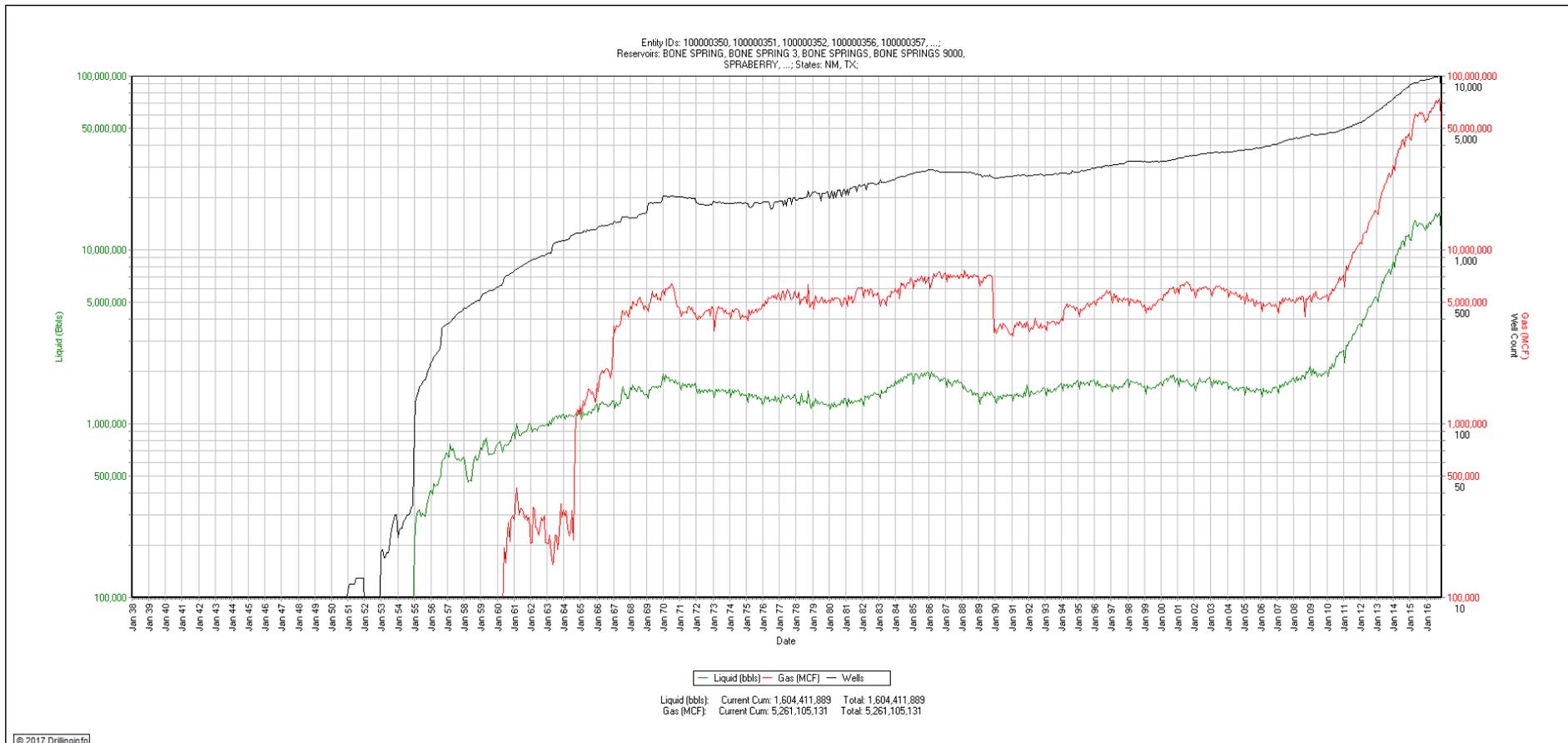
# Marcellus



# 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 2<sup>nd</sup> 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**

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- 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**

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- 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!*

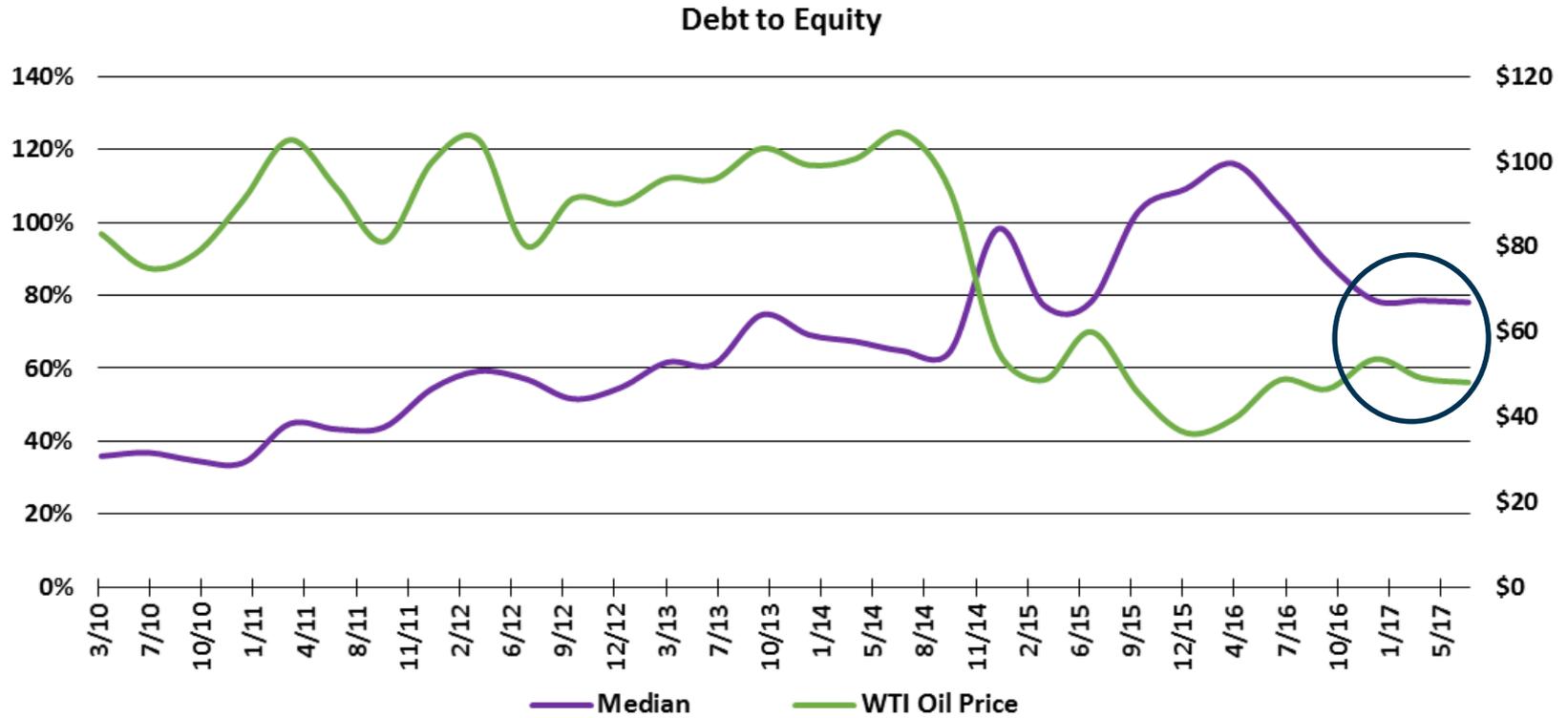
# Bankruptcy – Final Stage of Life for Many

- 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 4<sup>th</sup> quarter of 2016 and only 5 through March 2017.

Data from Haynes Boone – Oil Patch Monitor

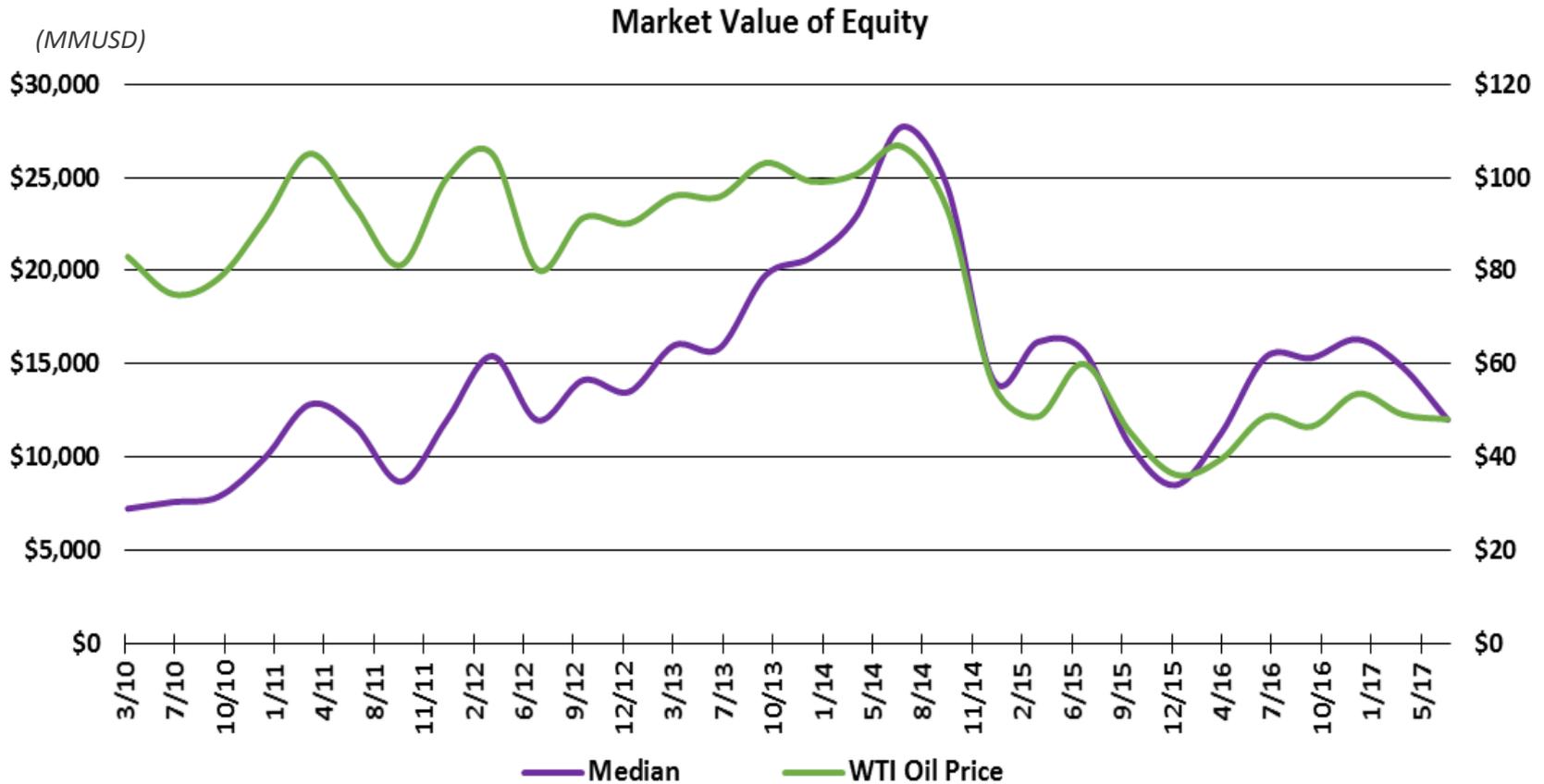
# Current State of Industry- D/E Ratio

- Debt to Equity ratio has increased throughout 2010 to present



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

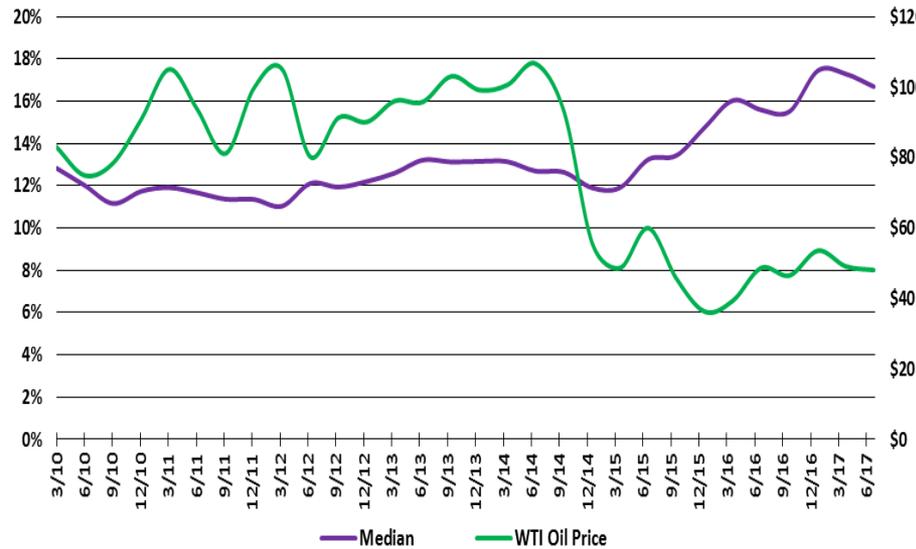
# Current State of Industry- Equity



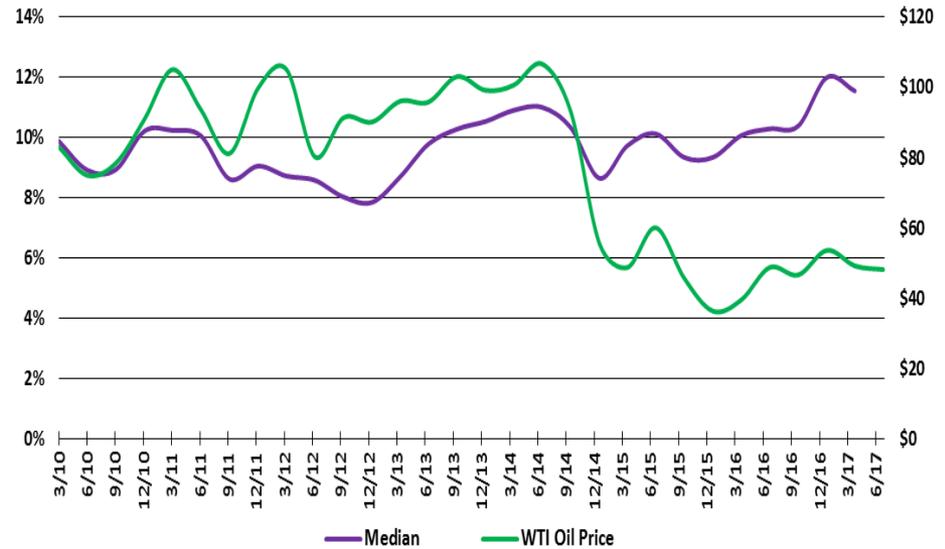
EOG, Devon, Noble, Continental Res., Whiting, Carrizo, Oasis

# Current State of Industry- Cost of Equity & Capital

Cost of Equity



Cost of Capital

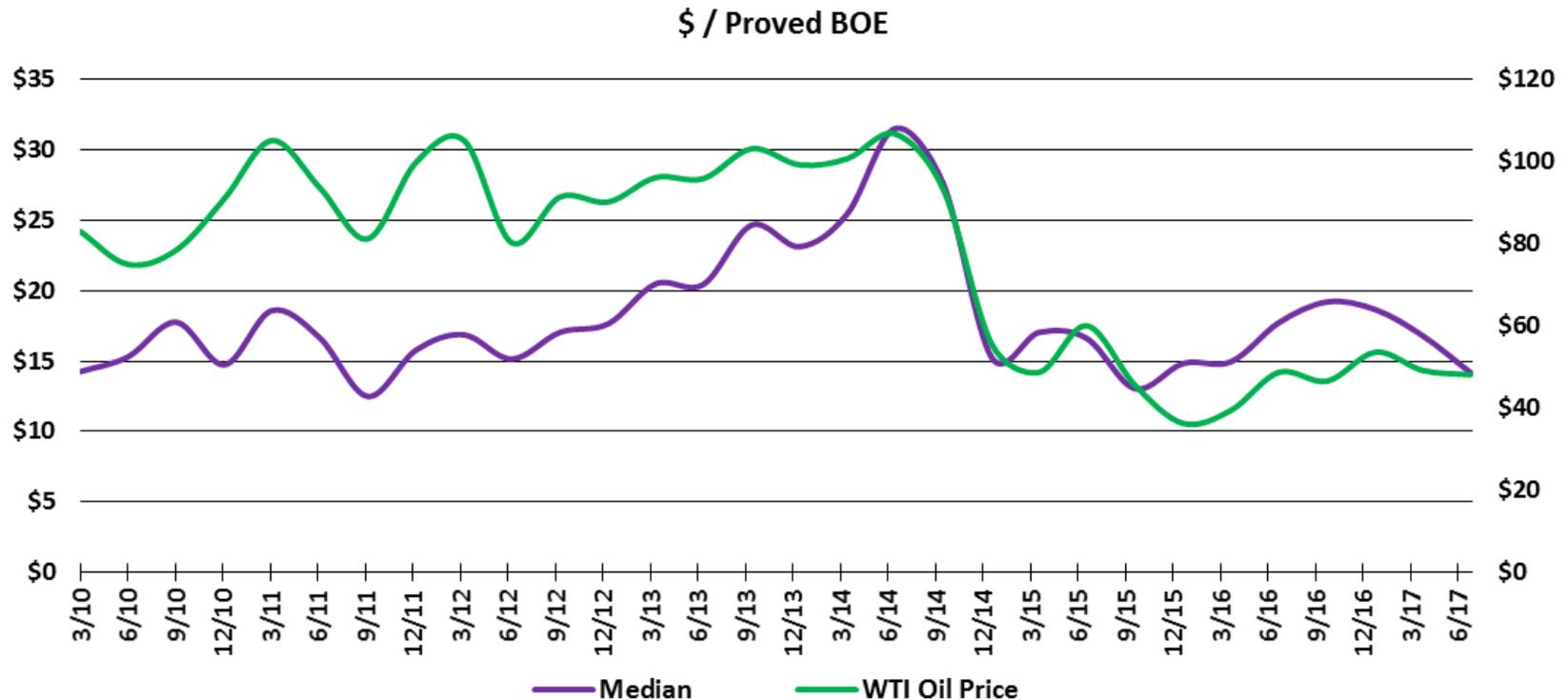


\*Debt not available through 2Q

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

# Current State of Industry- Reserve Carrying Value

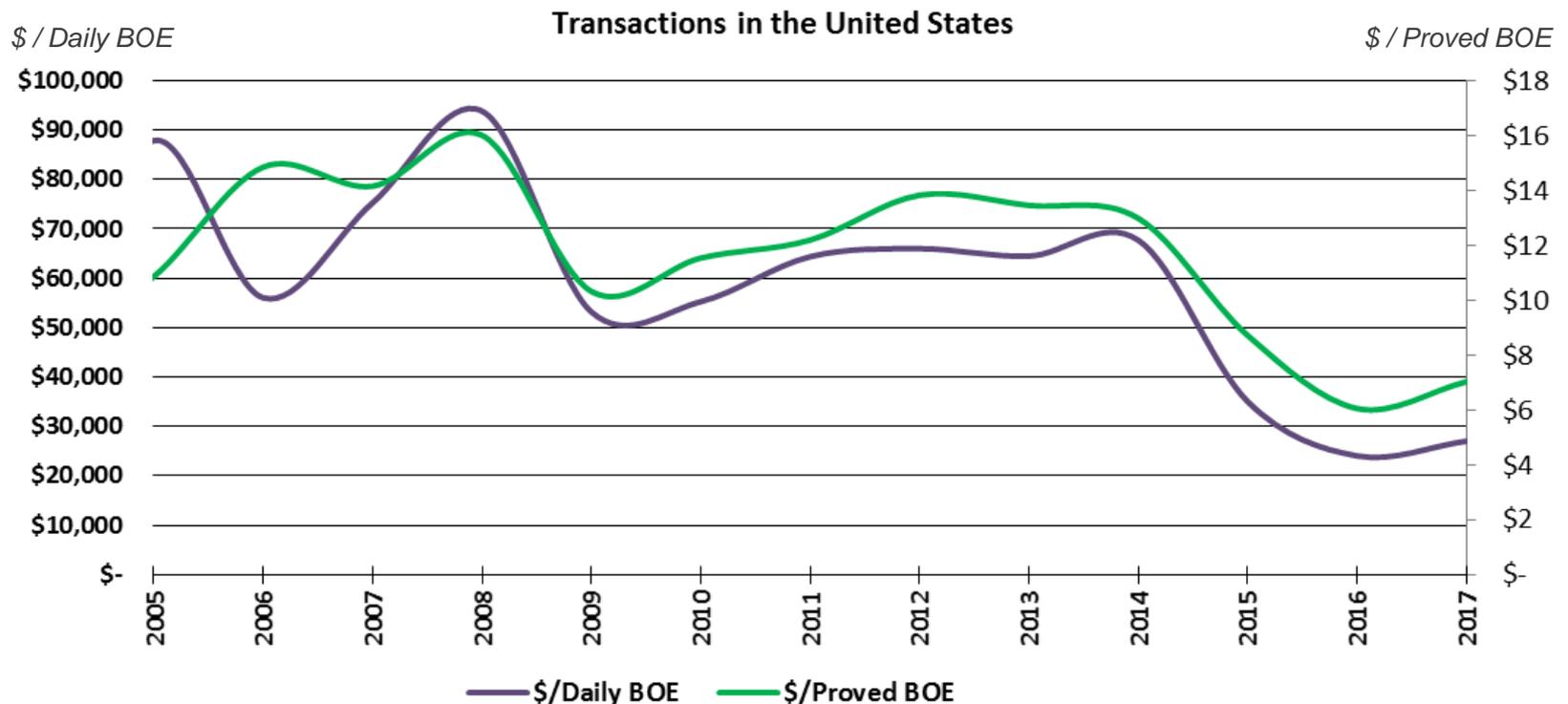
- (EV:BOE) Enterprise Value to Proved BOE ratio reflects the significant decline in oil prices and shift in market dynamics.



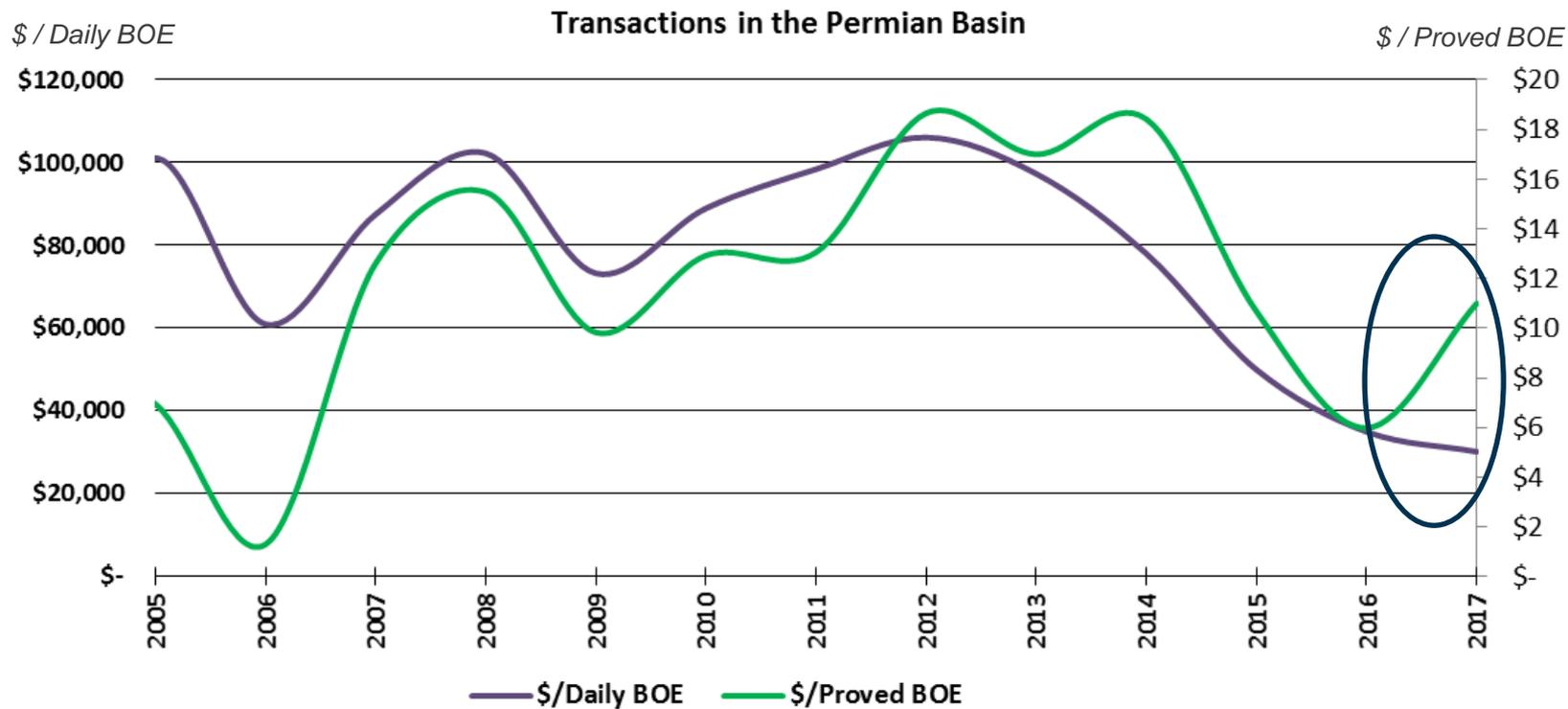
EOG, Devon, Noble, Continental Res., Whiting, Carrizo, Oasis

# M&A Review- US

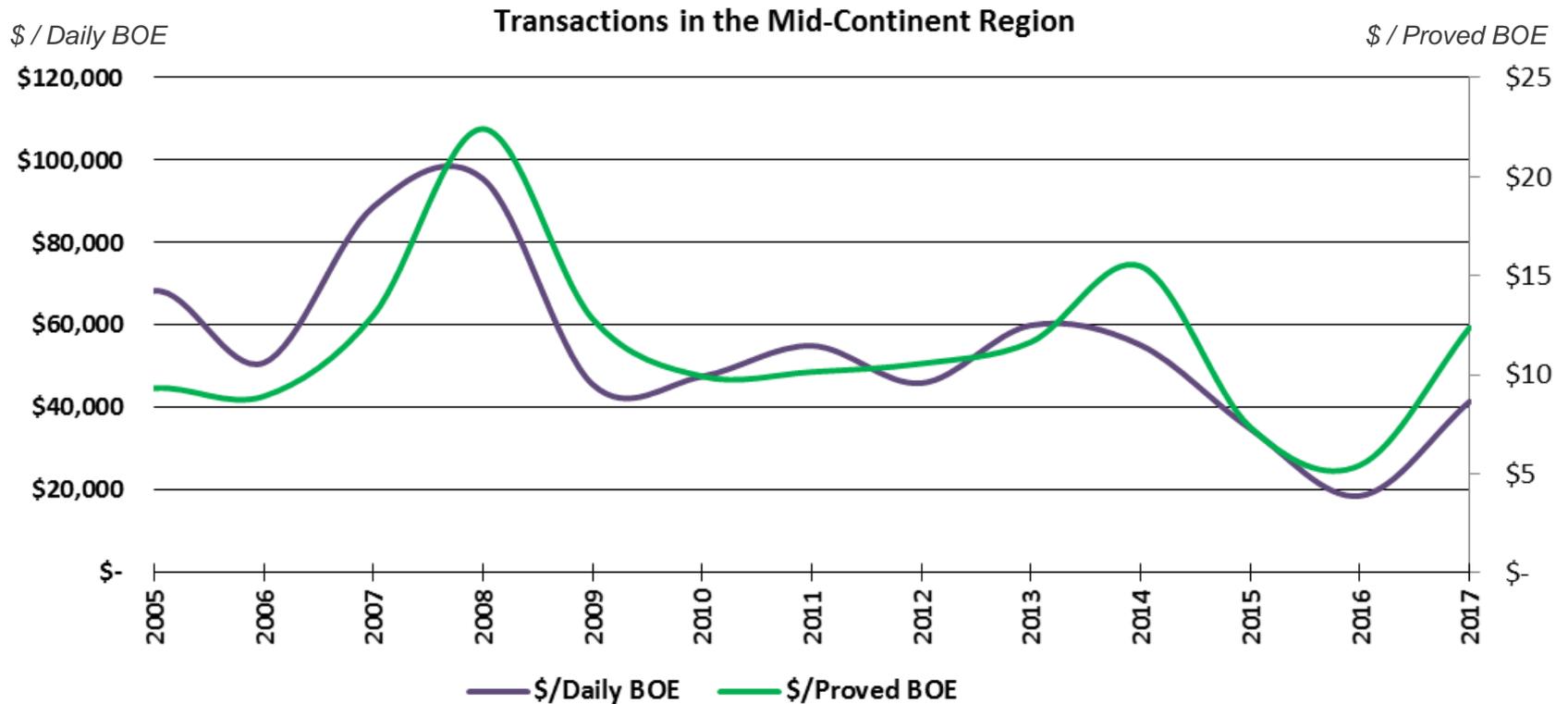
- M&A deal value hit a low of \$5 billion in 2015 but have since picked up. For the first half of 2017, upstream M&A deal value is at \$28.9 billion.
- Overall, US Metrics (\$/BOE & \$/DB) are up a bit in 2017.



# 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

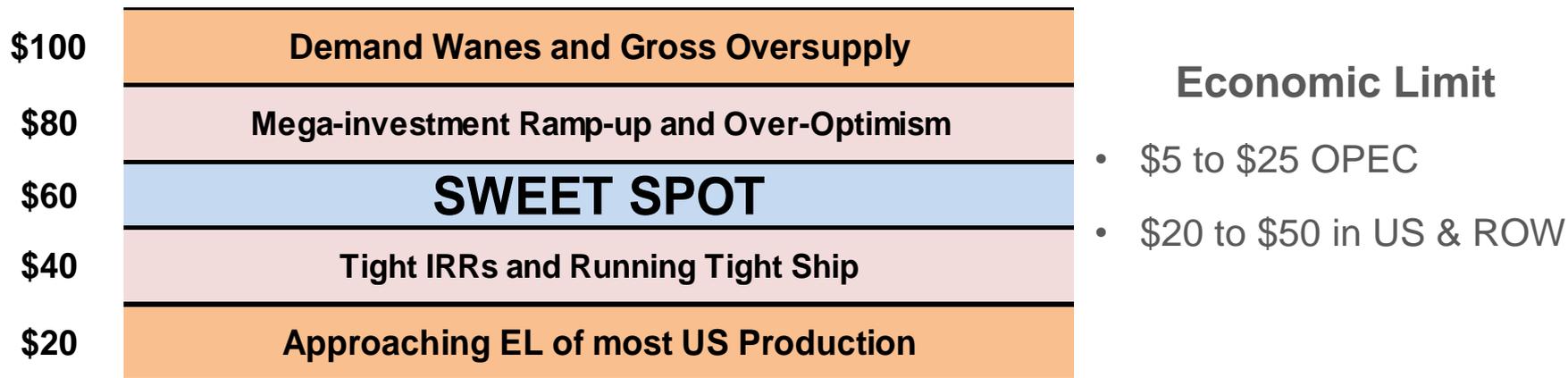
## Exxon Mobil

- 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

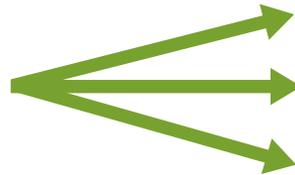
## Lower Price Cases

- 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?