THE US SHALE BOOM

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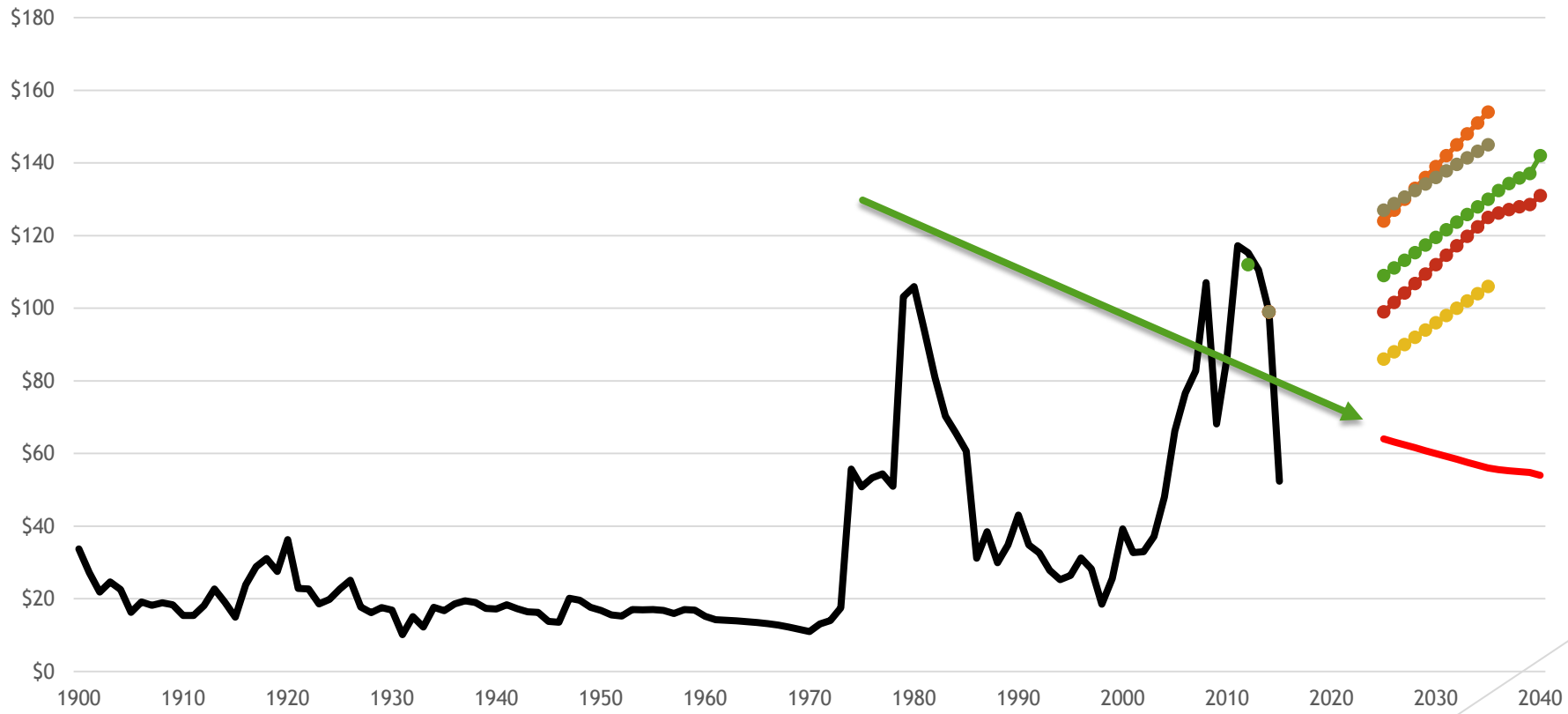
2014 DOE PRICE FORECAST SURVEY

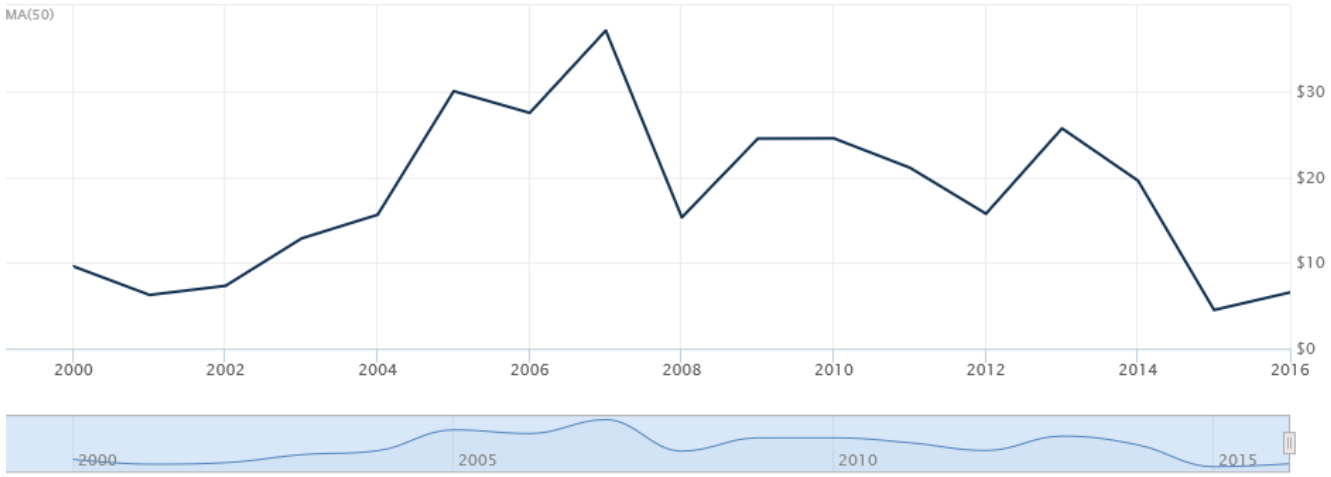


WHAT WENT WRONG (FOR SOME)?

- THE UNEXPECTED
  - MARCELLUS/UTICA KEPT US PRICES VERY LOW
  - DIFFERENTIALS VERY HIGH IN MARCELLUS/UTICA
- WHAT SHOULD HAVE BEEN EXPECTED
  - OIL PRICES $50 OR SO; NATURAL GAS PRICES UNDER $5/MMBTU
  - GAS RISKIER THAN OIL (NO GASPEC IN NORTH AMERICA)
  - HIGH DEBTS, HIGH RISK
    - SMALL COMPANIES
  - MORE PRODUCTION POTENTIAL THAN PRODUCTION (SAMSON)
- IRRATIONAL EXUBERANCE
  - ASSUME PRICES DO WHAT YOU WANT
  - SPEND MONEY CARELESSLY

“SHALE IS GOOD”

- “THE UNCONVENTIONAL RESOURCE PRIZE IS TOO LARGE FOR PRIVATE EQUITY CAPITAL TO IGNORE” (SAMSON DEAL 2012)
- “…land acquisition became the key to capturing the greatest values from the unconventional plays” Aubrey McClendon 2011 Forbes
- Cheapeake stock price

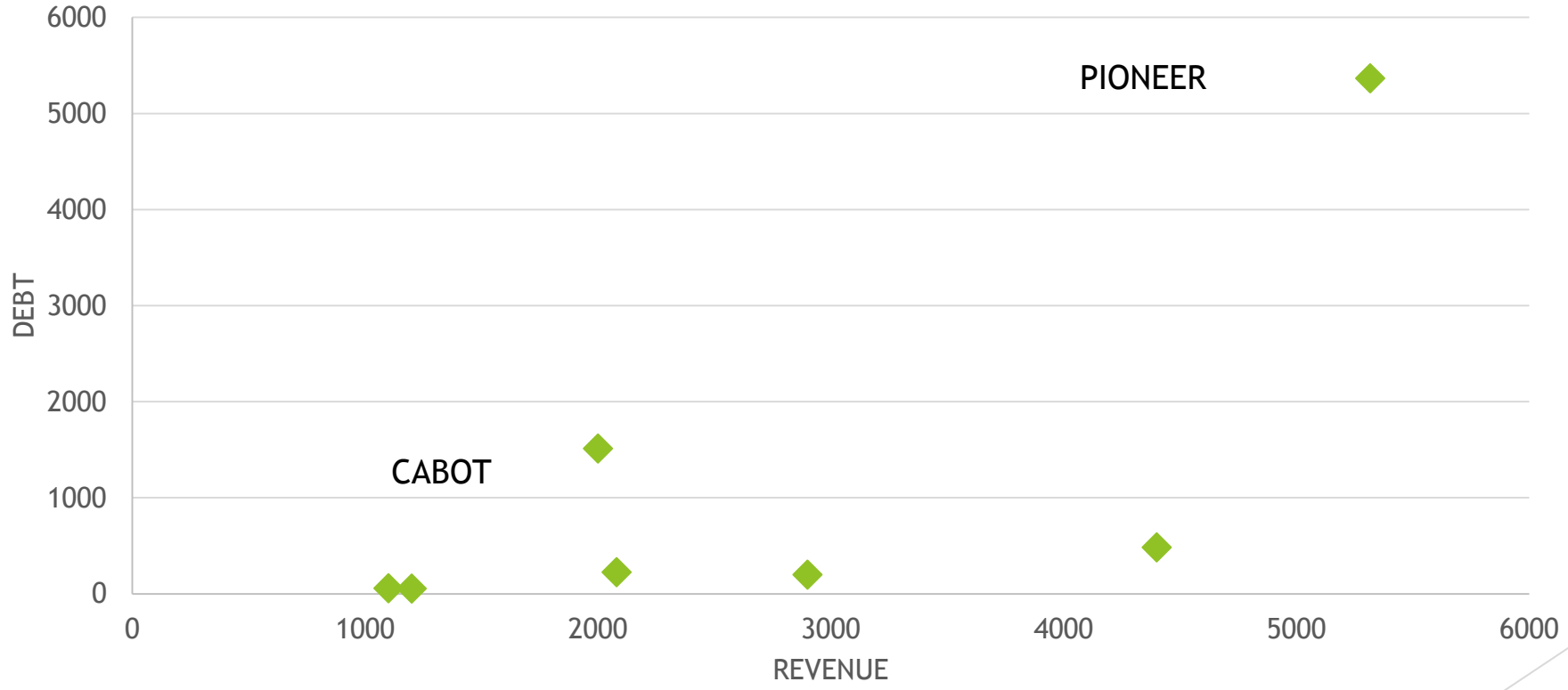


TOO MUCH MONEY INVESTED WITHOUT DUE DILIGENCE.

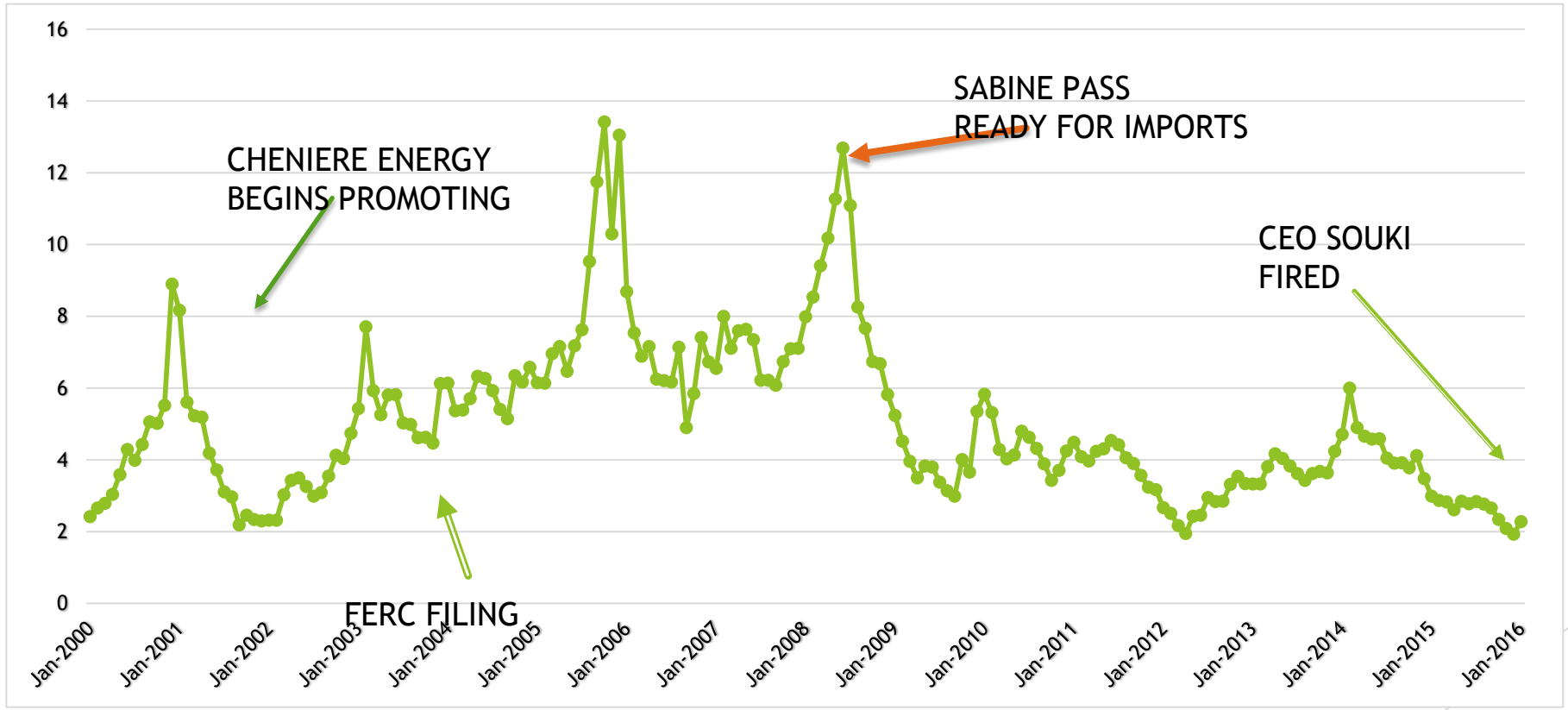
SUCCESS FROM:

- HIGH WELL PRODUCTIVITY
  - GOOD LOCATIONS
    - LUCK
    - GOOD GEOLOGISTS
    - GOOD MANAGEMETN
  - GOOD ENGINEERING
    - REPEATED TESTS
    - EXPERIENCED PEOPLE
- FISCAL CAUTION
  - NOT BUYING AT PEAK
  - NOT ASSUMING HIGH PRICES

DEBT AND REVENUE ($MIL)

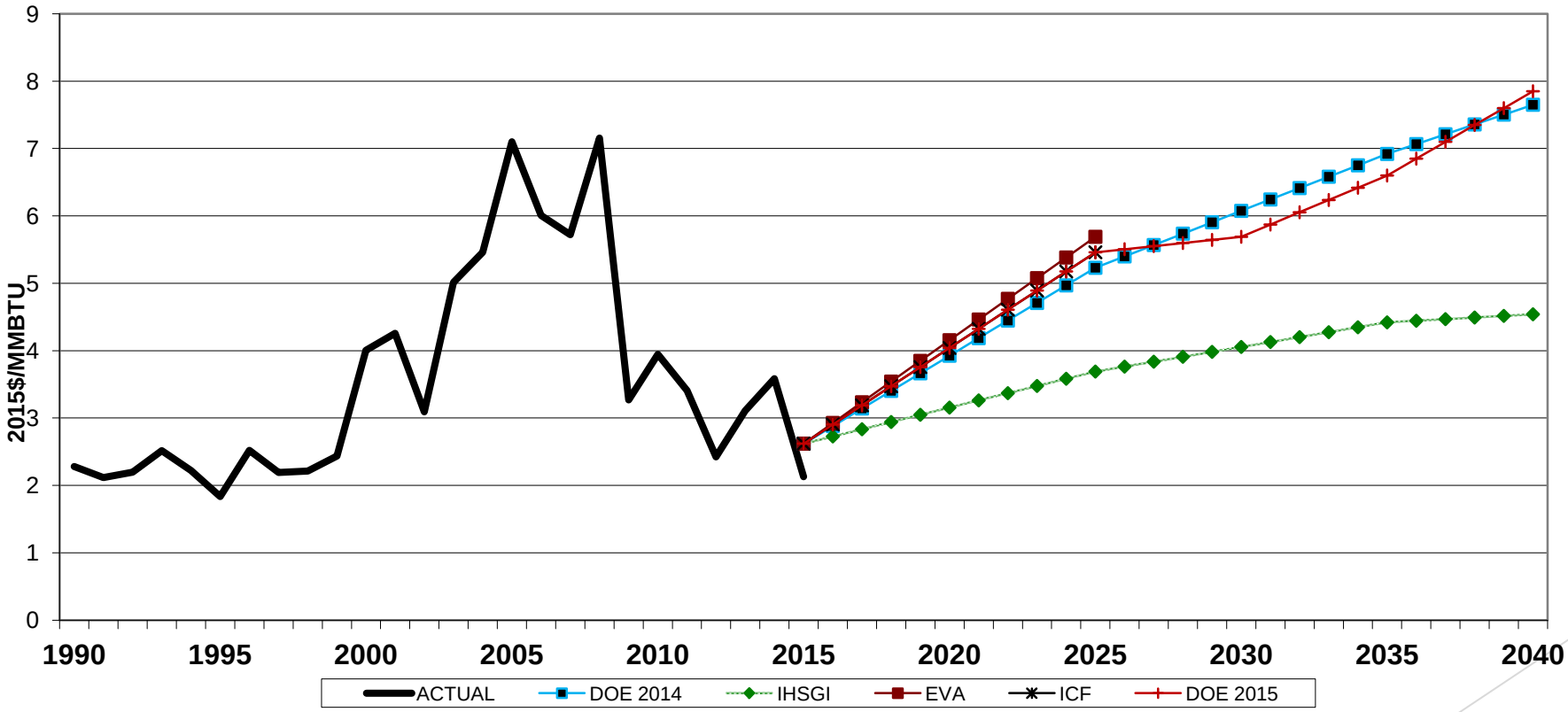


NATURAL GAS AND LNG PLANS

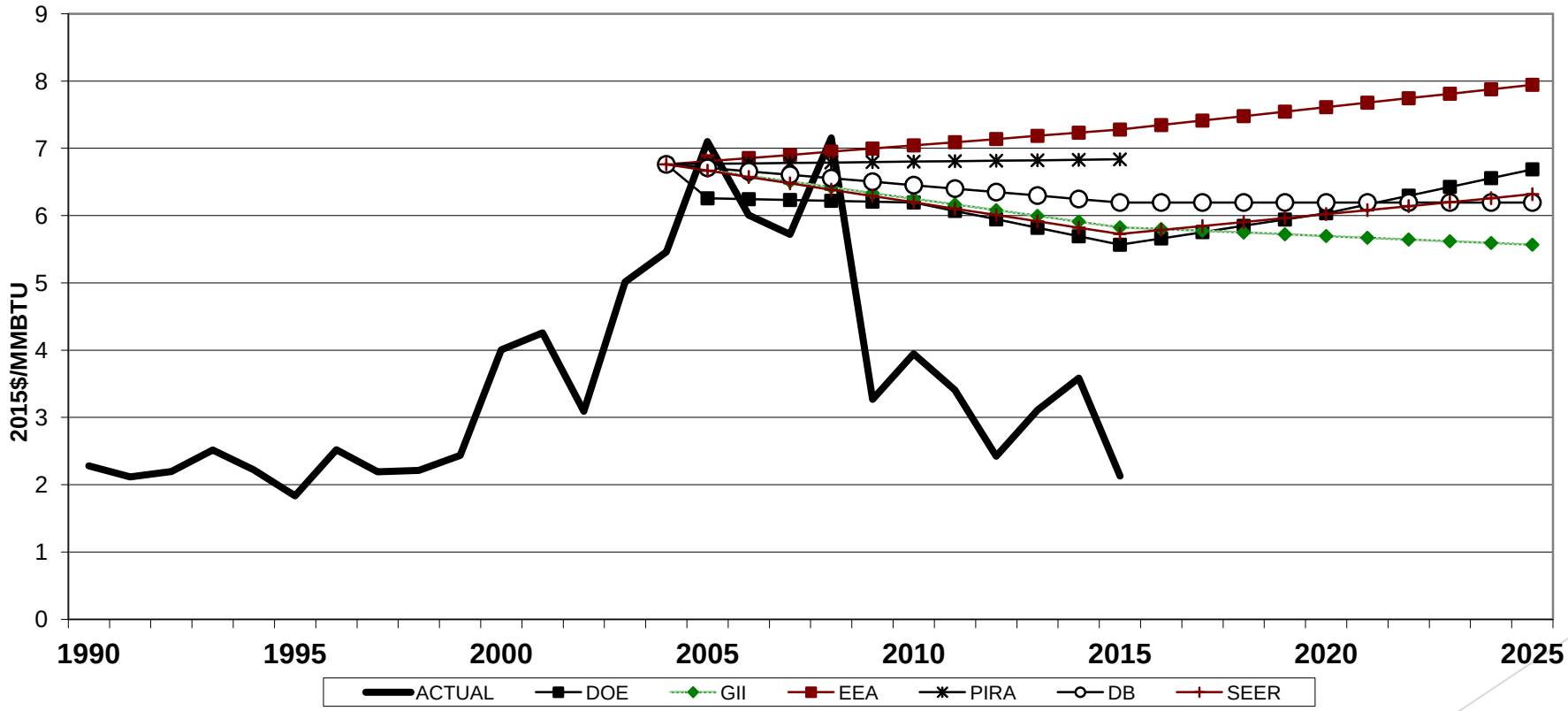


CHENIERE PLANNED IMPORTS WHEN LNG PRICES WERE HIGH.

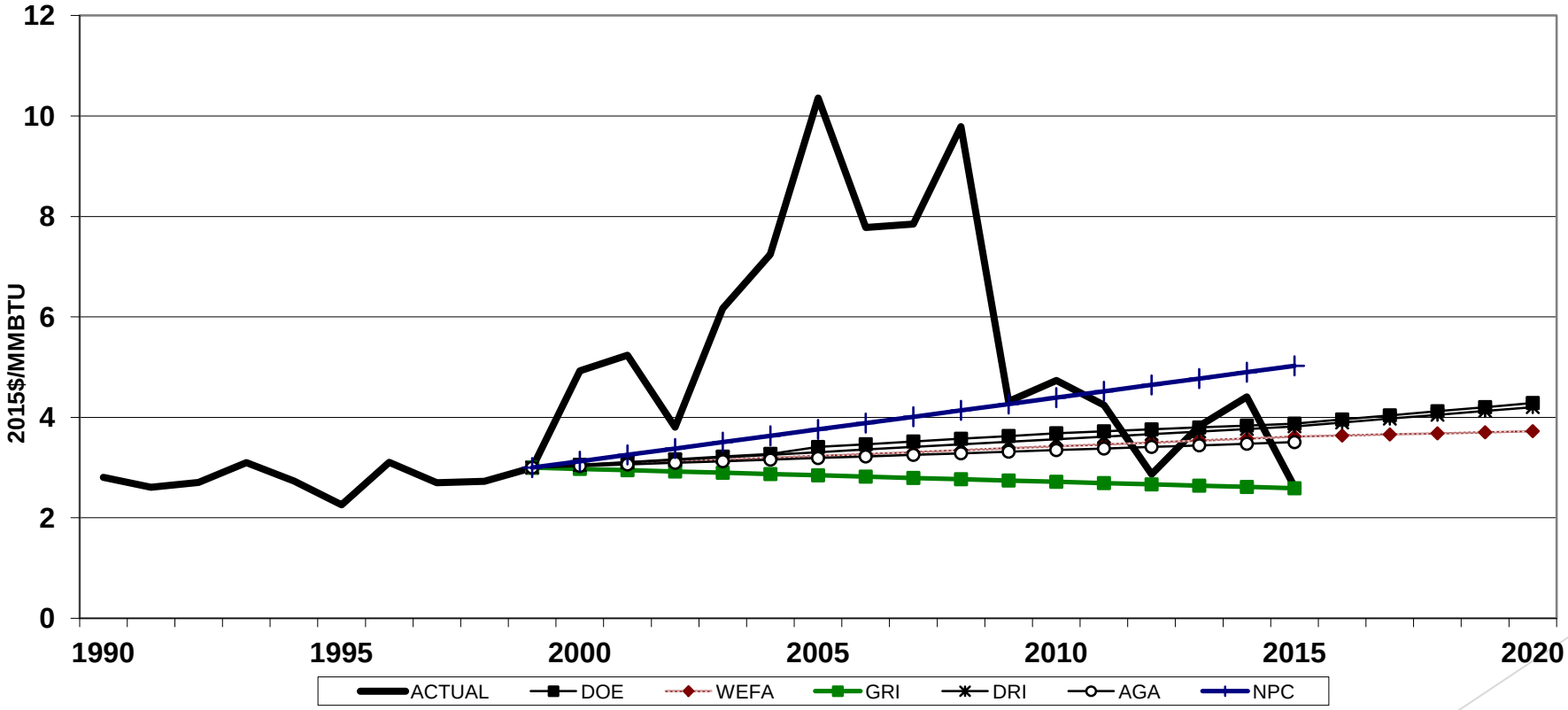
MOST RECENT US GAS PRICE FORECASTS



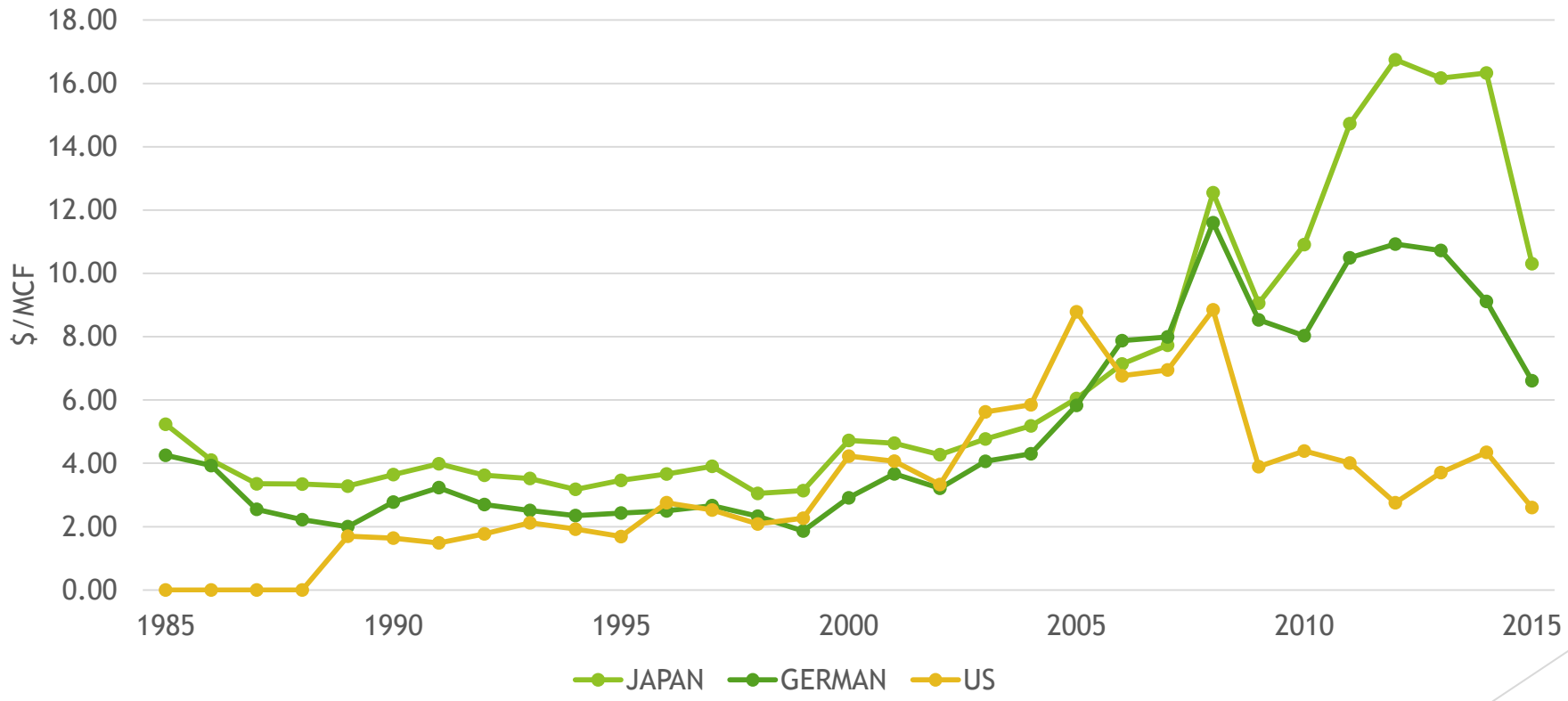
2006 US GAS FORECASTS



GAS PRICE FORECASTS 2001



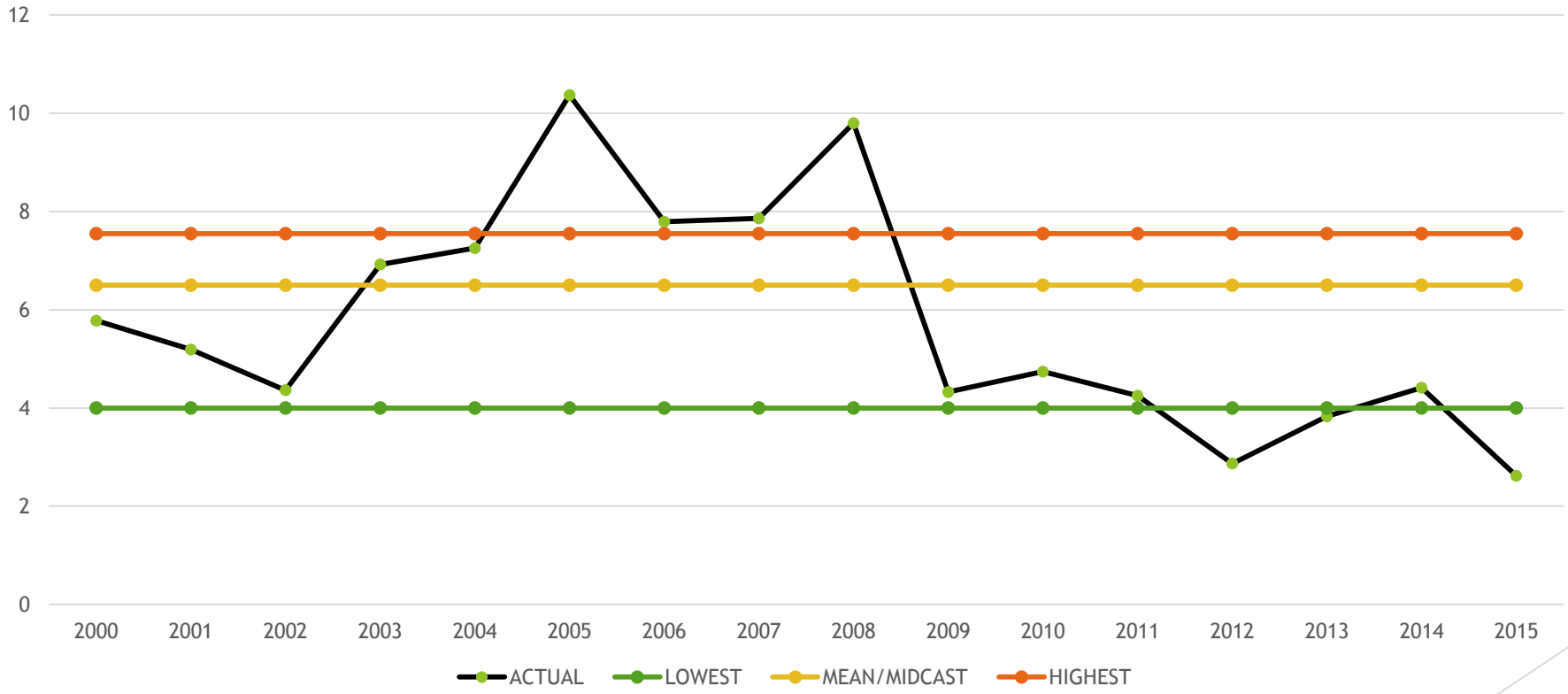
DIVERGING NATURAL GAS PRICES



DUAL VIEWS ON BREAKEVEN COSTS

- NO ONE MAKING MONEY
  - NO FREE CASH FLOW
  - RECYCLING INVESTMENT CAPITAL
  - COSTS ABOVE PRICES
- HIGH PROFITS
  - USUALLY COMPANY VIEWS
  - MIGHT EXCLUDE G&A
  - PRIMARILY HIGH-GRADING

SHALE GAS BREAKEVEN COSTS (PRE-2014)



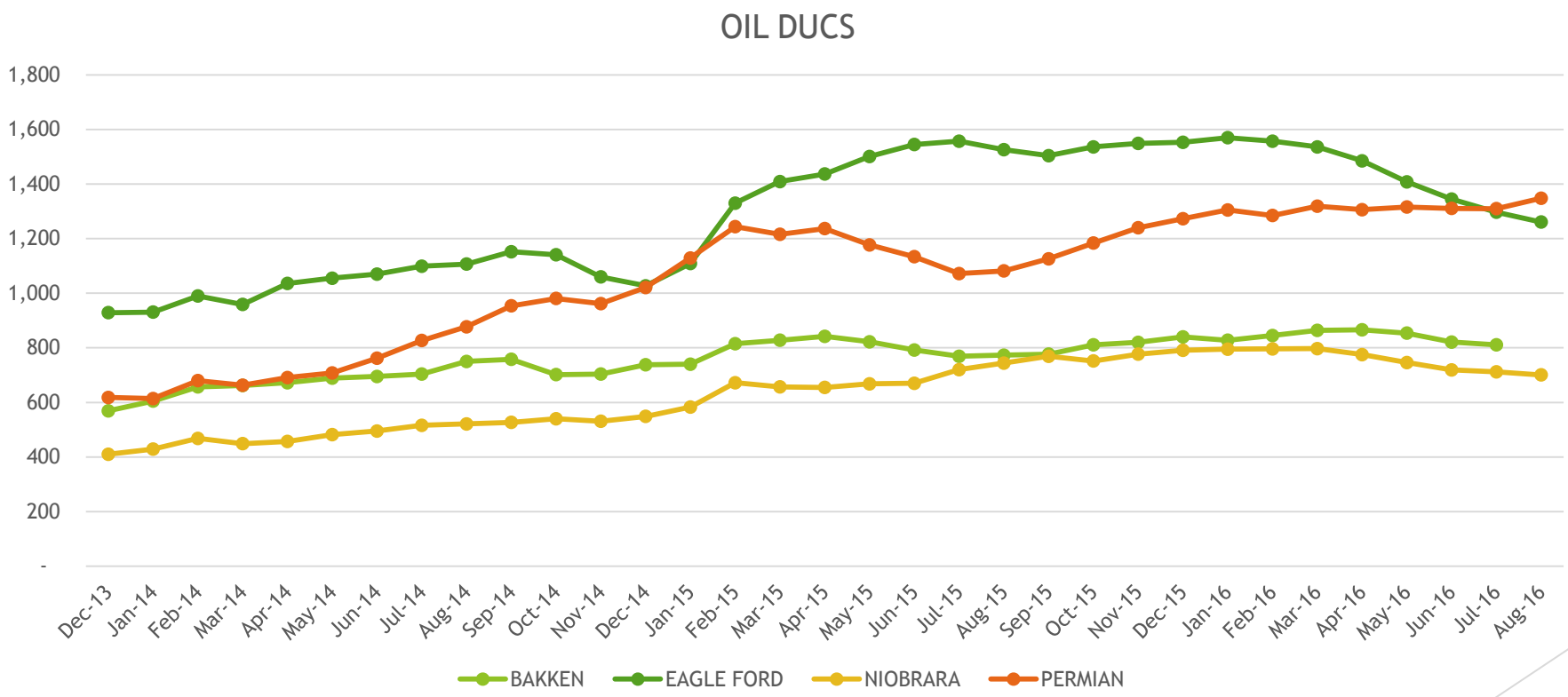
WHY THE MISUNDERSTANDING OF BREAKEVEN COSTS?

- BAD ESTIMATES
  - INCLUDING INTEREST PAYMENTS
  - ASSUMING HIGH LEASE PAYMENTS
  - HISTORICAL AVERAGE VS CURRENT COSTS
- STATIC INSTEAD OF DYNAMIC
  - NUMEROUS WAYS TO LOWER COSTS
    - RAPIDLY CHANGING TECHNOLOGY
    - CYCLICAL COST BEHAVIOR
    - HIGH-GRADING

SOURCES OF COST SAVINGS
(CONSOL IN UTICA, WELL COST IN $MIL)

EARLY COSTS	26.2
Drilling Efficiency	8.2
Service Cost	2.2
Casing Design	0.4
Multi-Well Pad	0.8
Completion Design	1.2
Proppant Optimization	1.1
FINAL	12.3

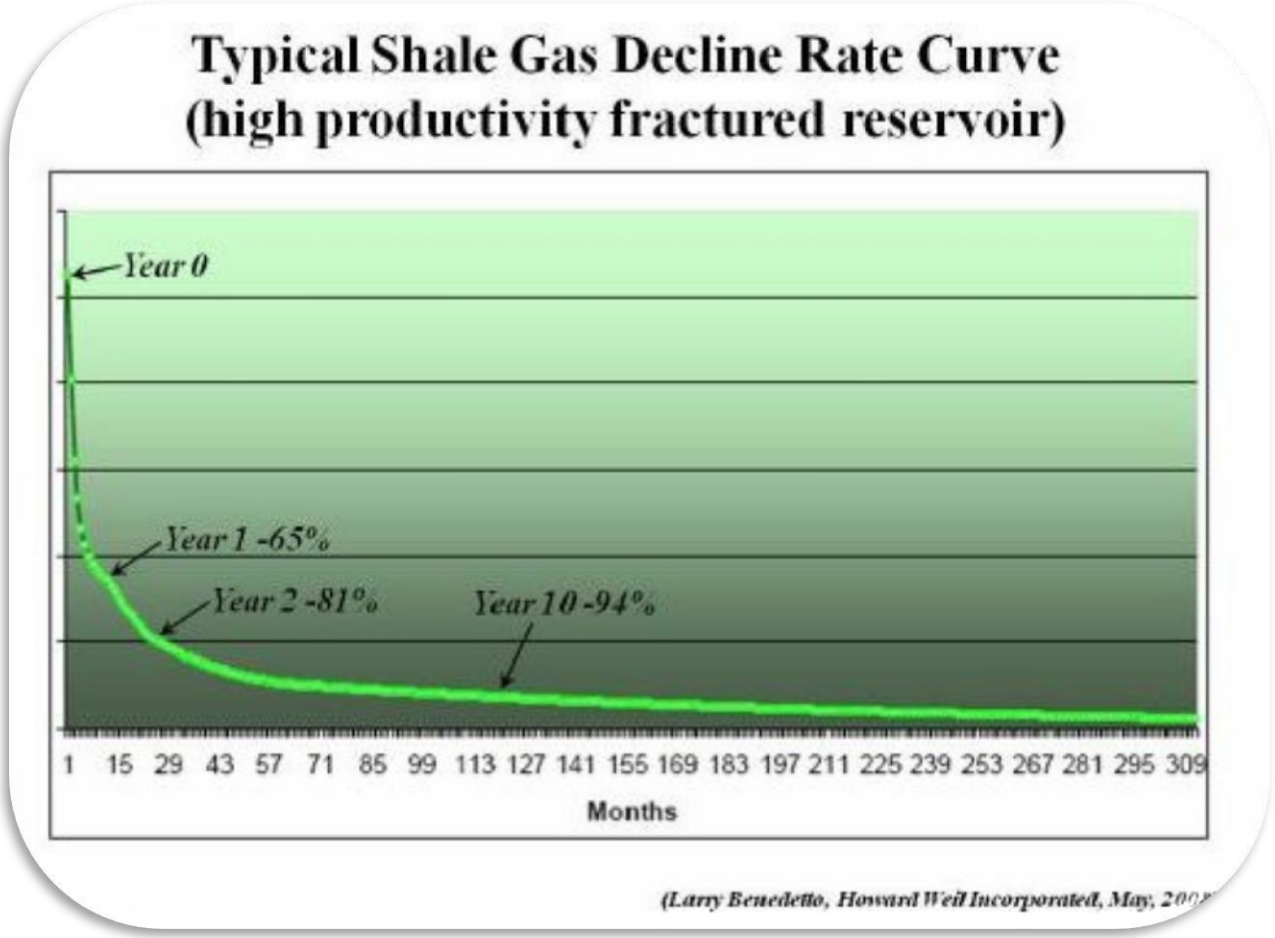
DRILLED AND UNCOMPLETED OIL WELLS



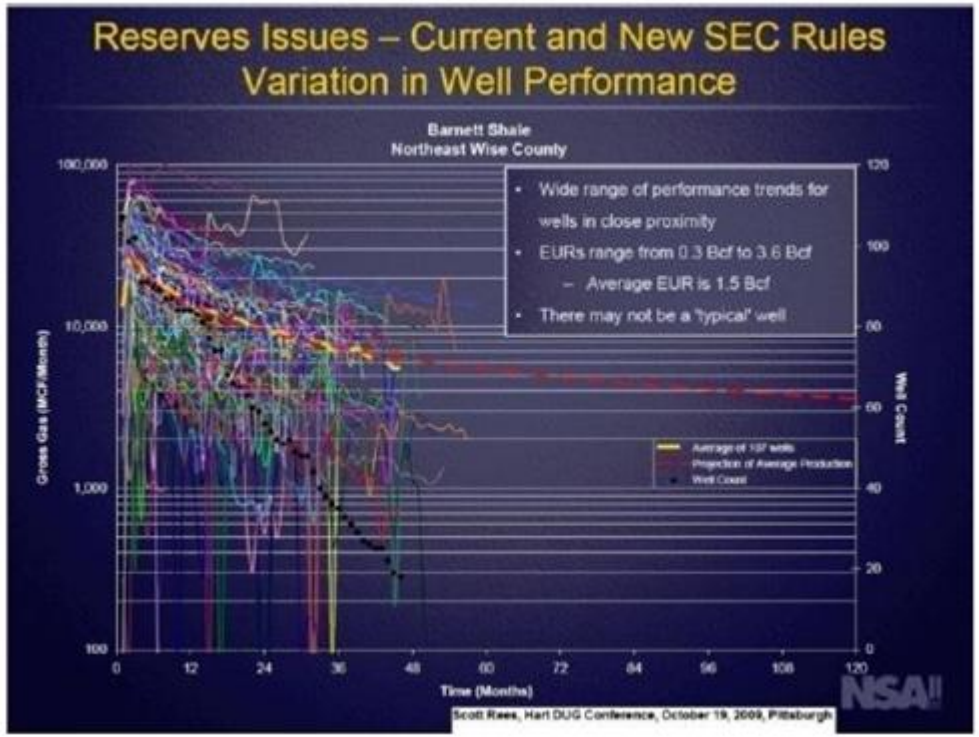
DECLINE RATES

- ONE CERTAINTY: VERY HIGH
- PESSIMISTS CONCLUDE EARLY PEAK, SHARP DECLINE
- OPTIMISTS SEE POTENTIAL TO OVERCOME
- INDIVIDUAL WELLS HIGHLY VARIABLE
- LONG-TERM DECLINE UNCERTAIN

PROJECTIONS OFTEN EXCEED EXPERIENCE



BIG VARIANCE AMONG WELLS



EVOLUTION OF MARCELLUS

	DECLINE RATE	EUR IN BCFe	IP	HORIZ LENGTH	EUR/FT
2008	43.87%	2	1.4	2280	0.88
2009	43.21%	3.3	2.4	2890	1.14
2010	48.52%	4.9	4.0	3800	1.29
2011	49.02%	4.5	4.0	4100	1.10
2012	48.38%	4.2	4.3	4500	0.93
2013	46.22%	5.4	5.8	4751	1.14

SOURCE: SWINDELL 2016.

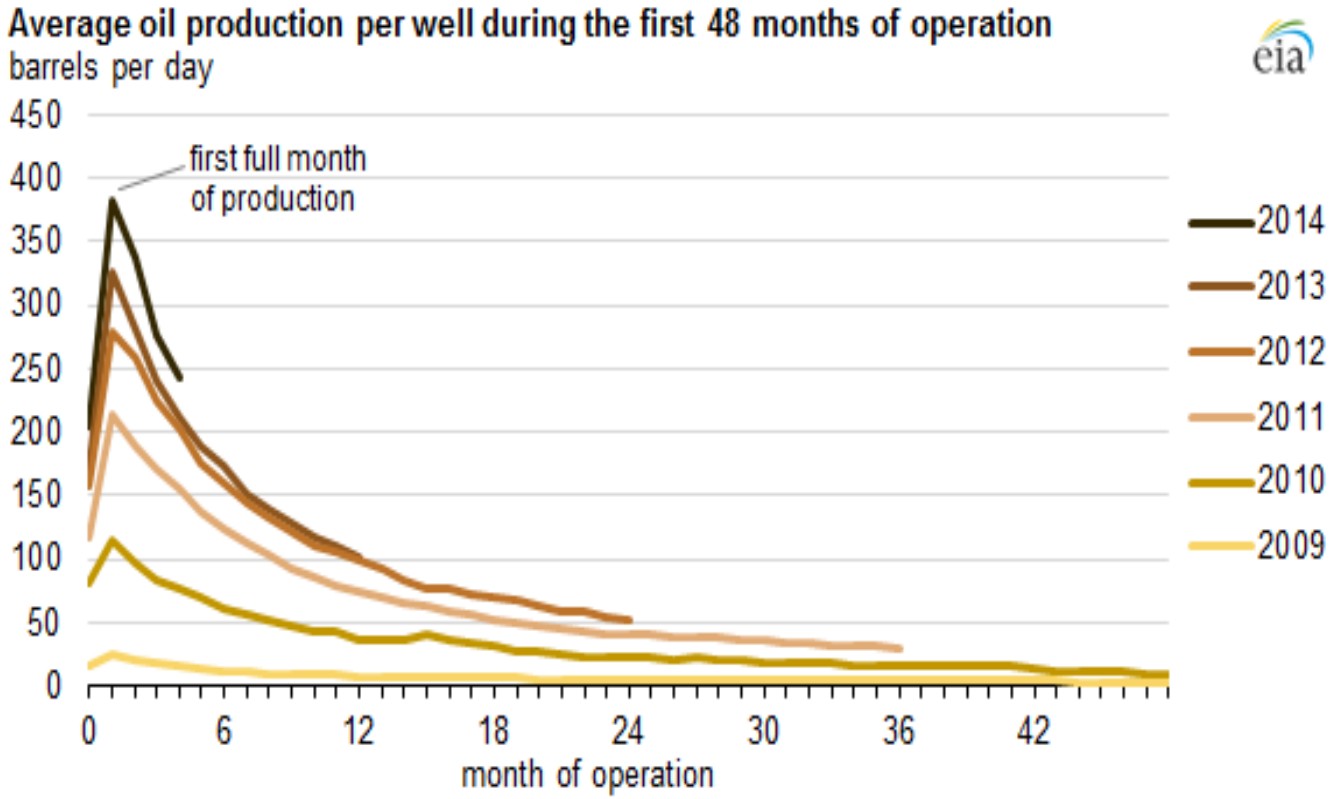
EAGLE FORD SHOWS HIGHER 2ND YEAR DECLINE RATES

Year-over-year decline in production in wells drilled in the Eagle Ford region from 2009-13

	year 1	year 2	year 3	year 4
2009	-70%	-30%	-20%	-20%
2010	-68%	-39%	-28%	-42%
2011	-65%	-47%	-27%	
2012	-64%	-48%		
2013	-69%			

SOURCE: EIA BASED ON DRILLINGINFO DATA.

BUT INITIAL PRODUCTION RATES ARE HIGHER

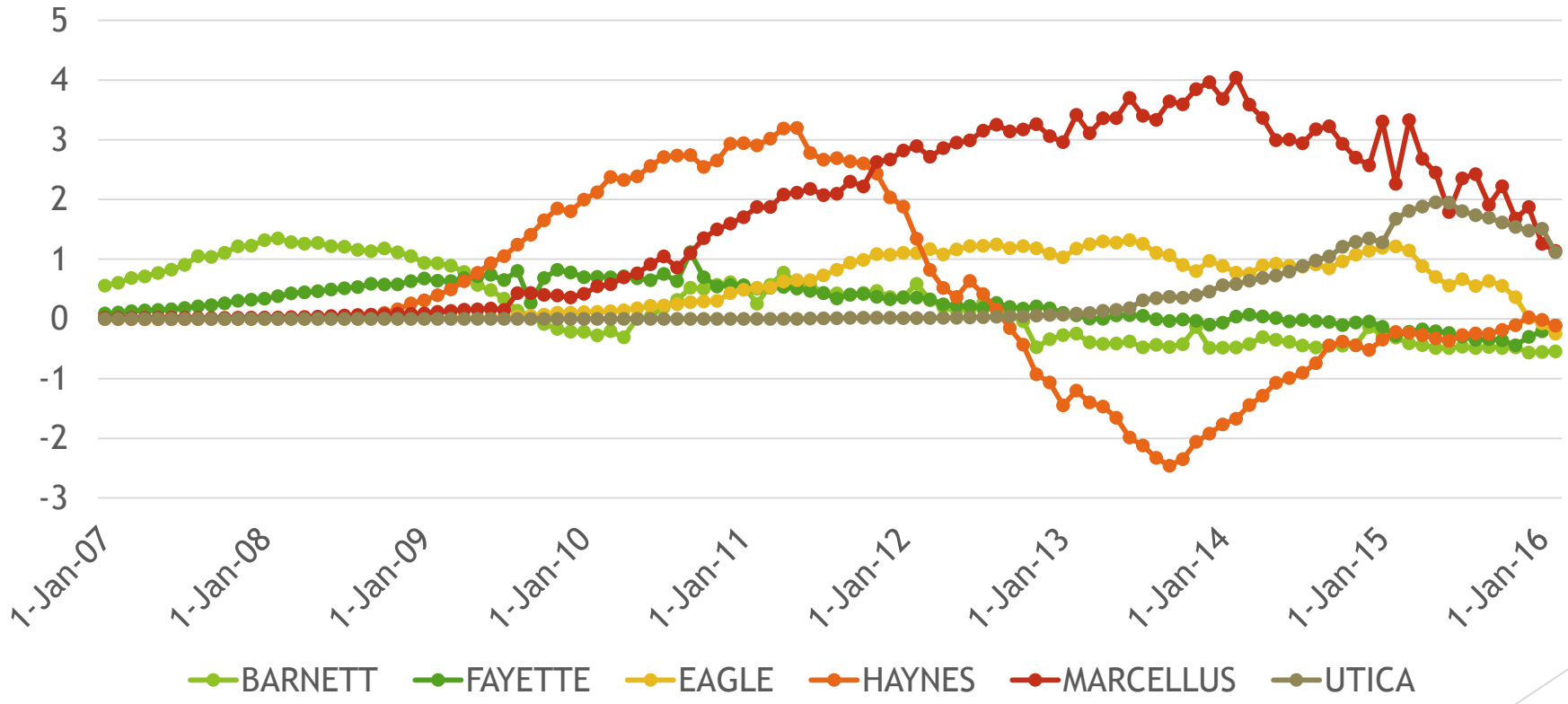


1ST YEAR PROD:
2010: 300 MB
2013: 800 MB

NOW WHERE TO:
VIEW FROM CABOT 2016

- MARCELLUS
  - 52% DROP IN DRILLING COSTS FROM 2012
  - UPGRADED RIGS, MORE EFFICIENCY, BETTER TERMS WITH SERVICE COS.
  - LATERALS INCREASED FROM 5200 FT TO 7000 FT IN 2 YEARS
  - PRE-TAX IRR 132% AT C. $2.25/MMBTU

CHANGE IN GAS PRODUCTION (YEAR ON YEAR, BCFD)



CAN SHALE OIL DO THE SAME?

- DRILLING DECLINE LED TO PRODUCTION DROP
- SHALE OIL FLOWS LOWER THAN SHALE GAS
- SHALE OIL STILL LESS MATURE THAN SHALE GAS
  - ENGINEERING STILL EVOLVING
- QUESTION: CAN PERMIAN DO FOR OIL WHAT MARCELLUS DID FOR GAS?

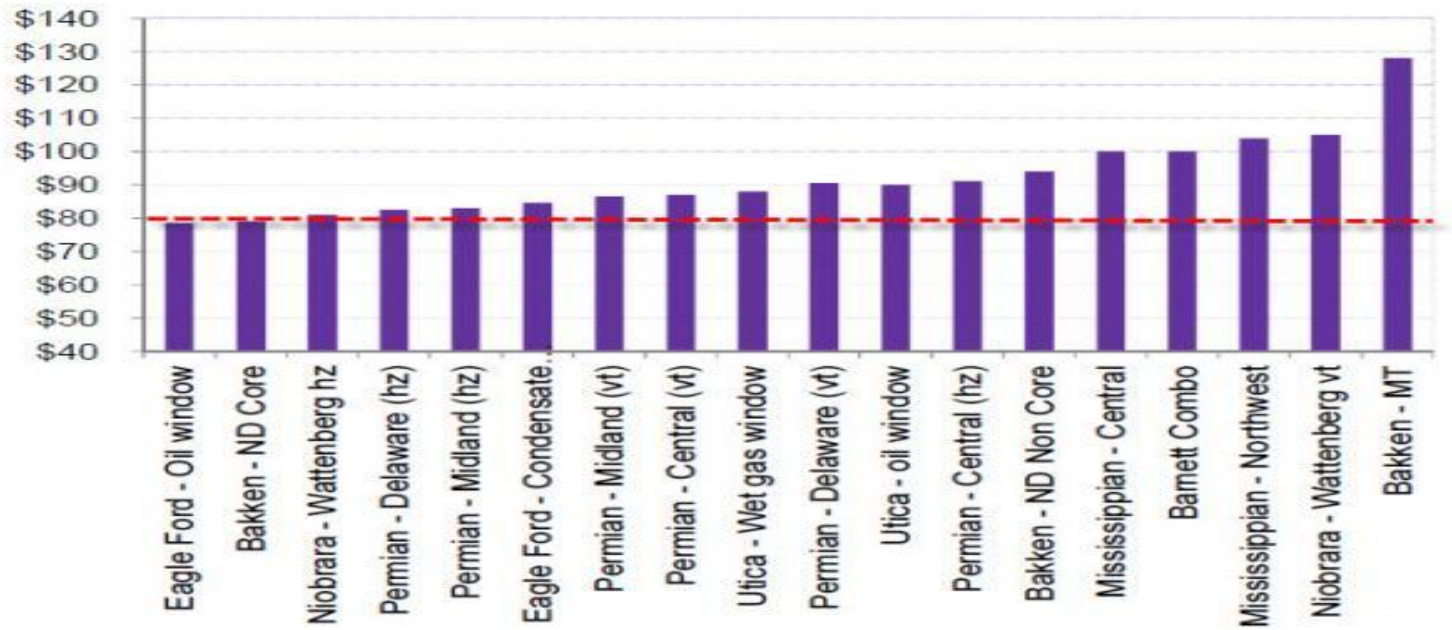
EFFECT OF HIGH-GRADING

	Well Cost	IP
Natural Gas	$mil	mcf/d
Barnett	3.5	1.5
Marcellus	5.7	20
Petroleum	$mil	b/d
Bakken	5.9	425
Permian	7.2	1000

BREAKEVEN PRICE: WHEN DOES PRODUCTION RECOVER?

Exhibit 11: Most fields achieve 11% IRRs in the $80-$90/bbl Brent range; this would fall by about $6/bbl for a 10% reduction in capital costs

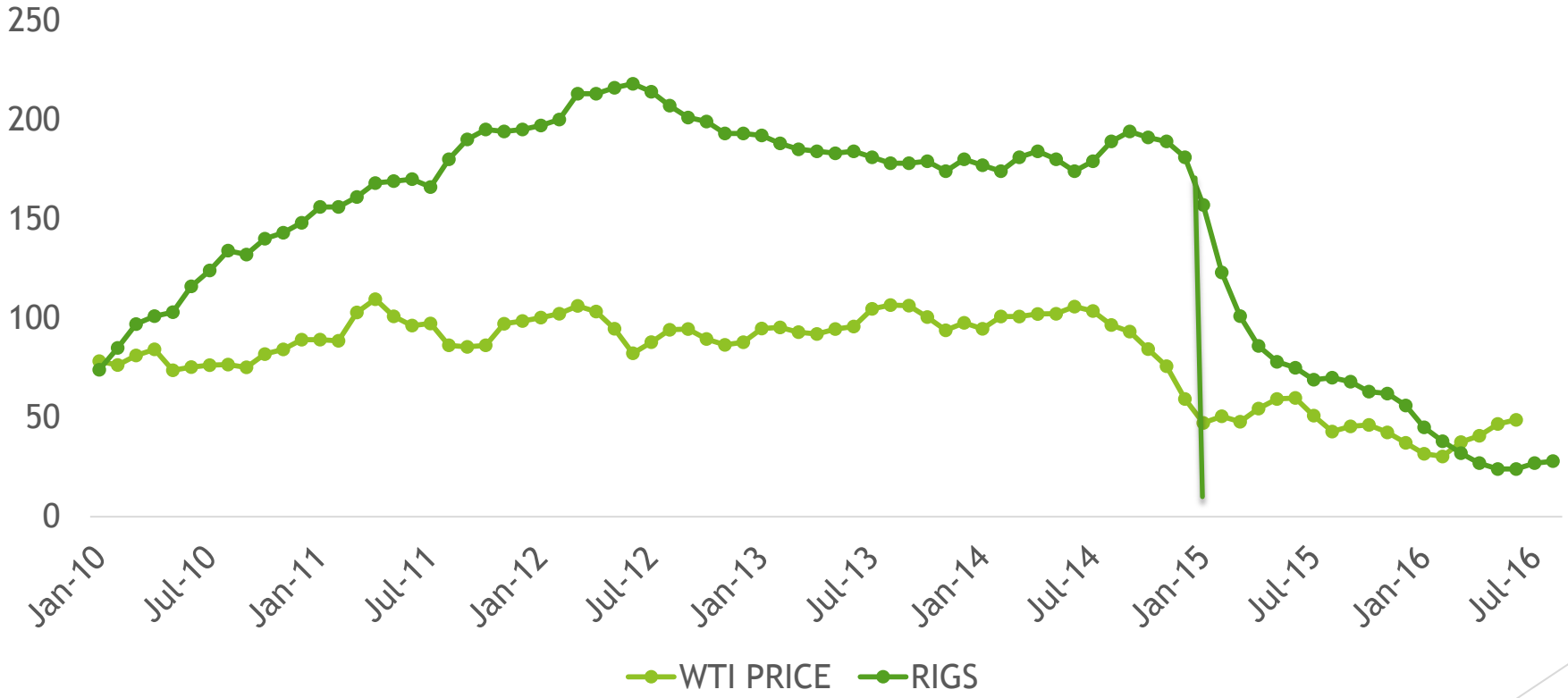
Brent oil price in $/bbl for 11% IRR



Source: Goldman Sachs Global Investment Research.

CALCULATIONS C. 2014.

BAKKEN RIGS AND PRICE

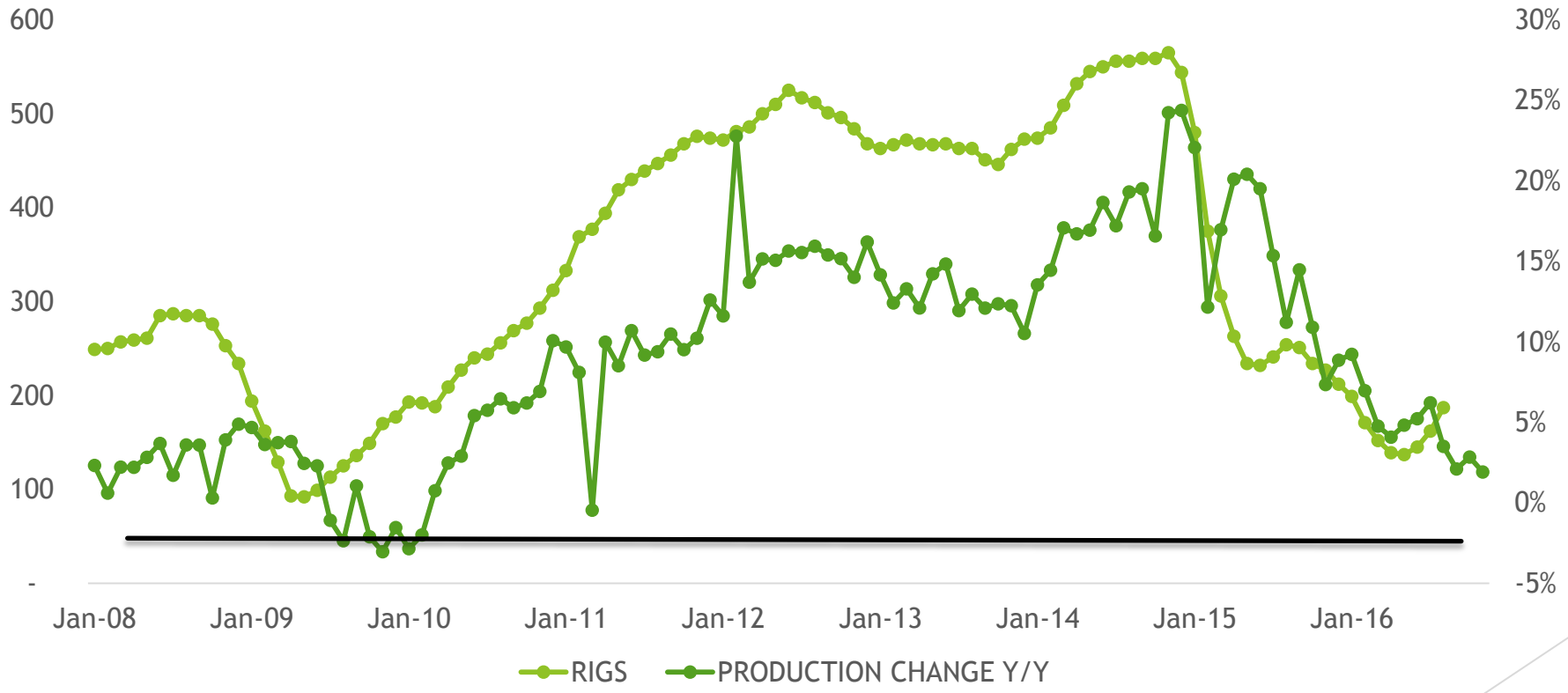


DRILLING DECLINED AT $50 (WELLHEAD).

DIFFERENCE

- BAKKEN 30-DAY IP 2011: 125 B/D
- BAKKEN 30-DAY IP 2015: 425 B/D
- PERMIAN 30-DAY IP 2015: 1000 B/D (SOME REPORTS)
- PERMIAN INFRASTRUCTURE CHEAPER
- PERMIAN TRANSPORT COSTS CHEAPER
  - BUT BAKKEN COMING DOWN

PERMIAN NOT YET IN DECLINE DRILLING RECOVERING



ANOTHER 25 RIGS AND PERMIAN SHOULD OFFSET DECLINES ELSEWHERE

CONCLUSIONS

- SHALE RESOURCE IS LARGE
  - SUPPLY CURVE VERY FLAT
- POLITICS WILL DETERMINE GLOBAL SPREAD
  - INFRASTRUCTURE SECONDARY
- AVOID SIMPLE ANALYSIS
  - “SHALE IS GOOD”
  - “PRICES DON’T GO DOWN”
- BE OPEN-MINDED
- MEASURE TWICE, CUT ONCE

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