

December 2014



# **KIMMERIDGE** Energy

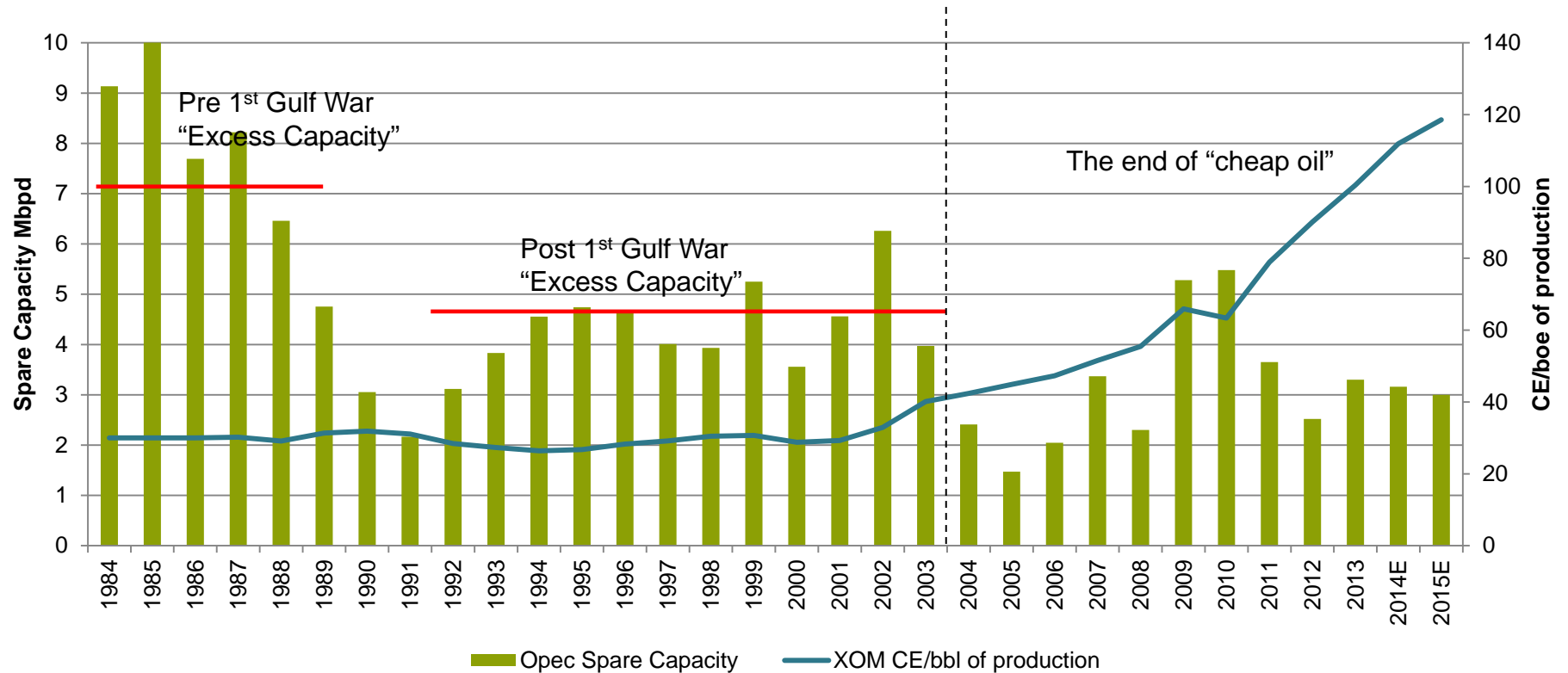
**Welcome to the Trough  
The Outlook for Commodity Prices**

# Kimmeridge Commodity Outlook Framework

- Over the long term, oil and gas prices have trended in line with the capital intensity of the industry. Since 1998 the capital intensity of the industry has expanded at circa 8% per annum on a per barrel basis, despite the shale revolution.
- While prices have trended with the marginal cost, they have also been reflective of near-term supply/demand trends, such that when spare capacity is tight, operators earn outsized returns and are incentivized to add production. In contrast, when demand is low, prices tend to trend below the marginal cost, leaving the high-cost players to reduce volumes.
- Today, oil and gas prices are trending below the marginal cost of supply, with prices softening in the face of weak GDP. While supply concerns exist, they appear peripheral to price. At \$80/bbl, over 4Mboepd of US production is unable to replace itself, suggesting there will be significant stress in the E&P space.
- While we believe these are cyclical troughs, lessons from the gas market suggest these can be artificially extended by policy, liquidity, lease dynamics and irrational operator behaviors.

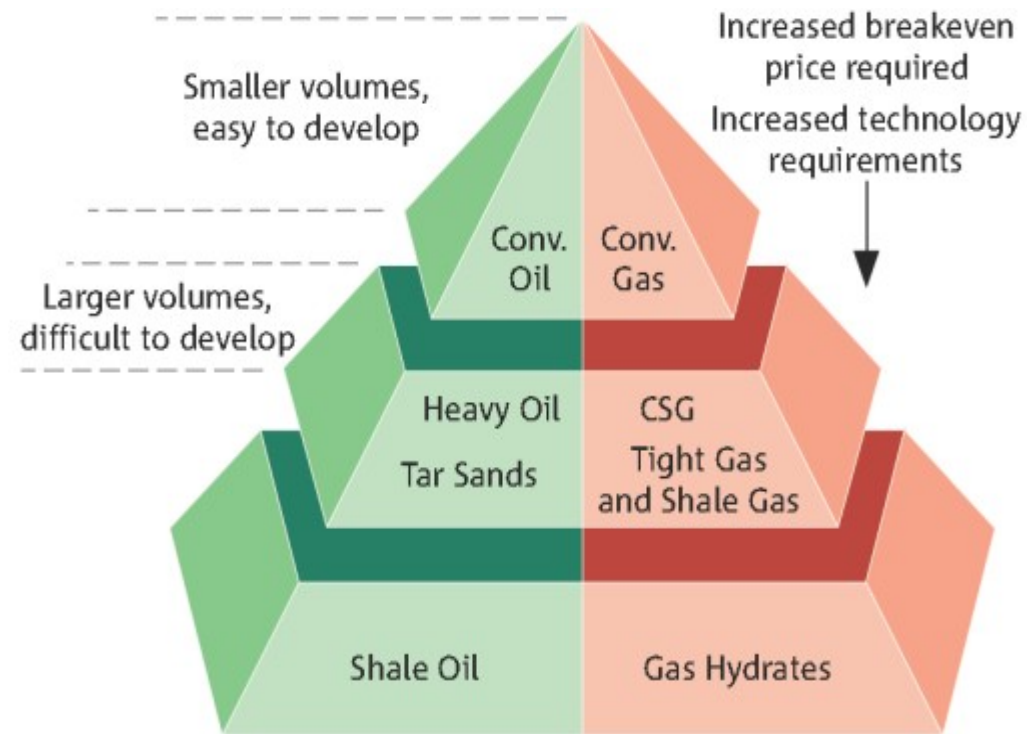
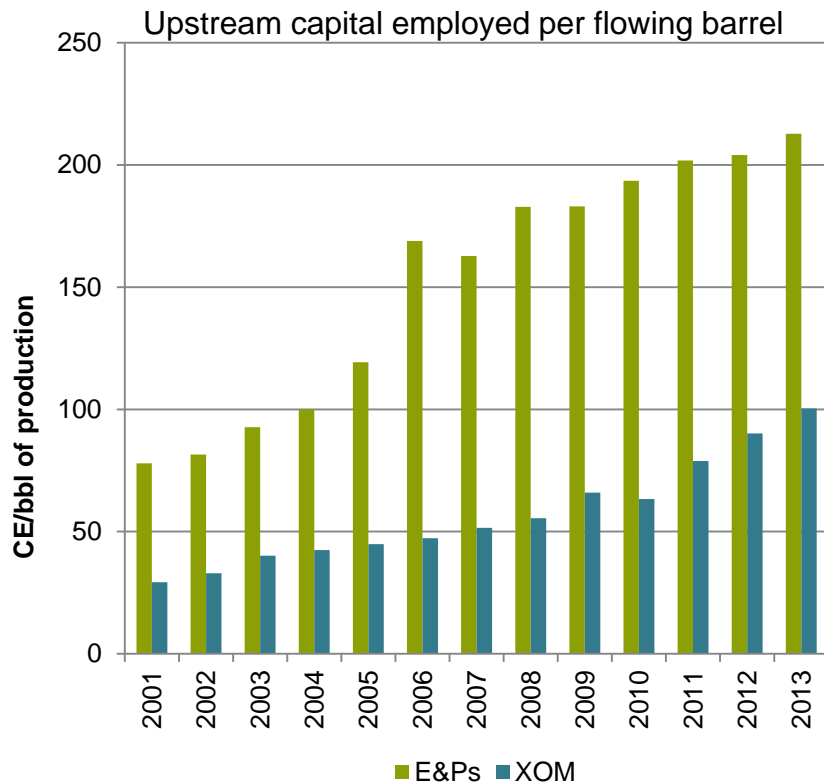
# Capital Intensity and Spare Capacity

- Since 2004 the oil industry has seen a step change in capital intensity as reserve additions have become more “expensive”. This trend emerged as global spare capacity declined.



# The Trend of Rising Capital Intensity Has Come from Moving Down the Resource Triangle

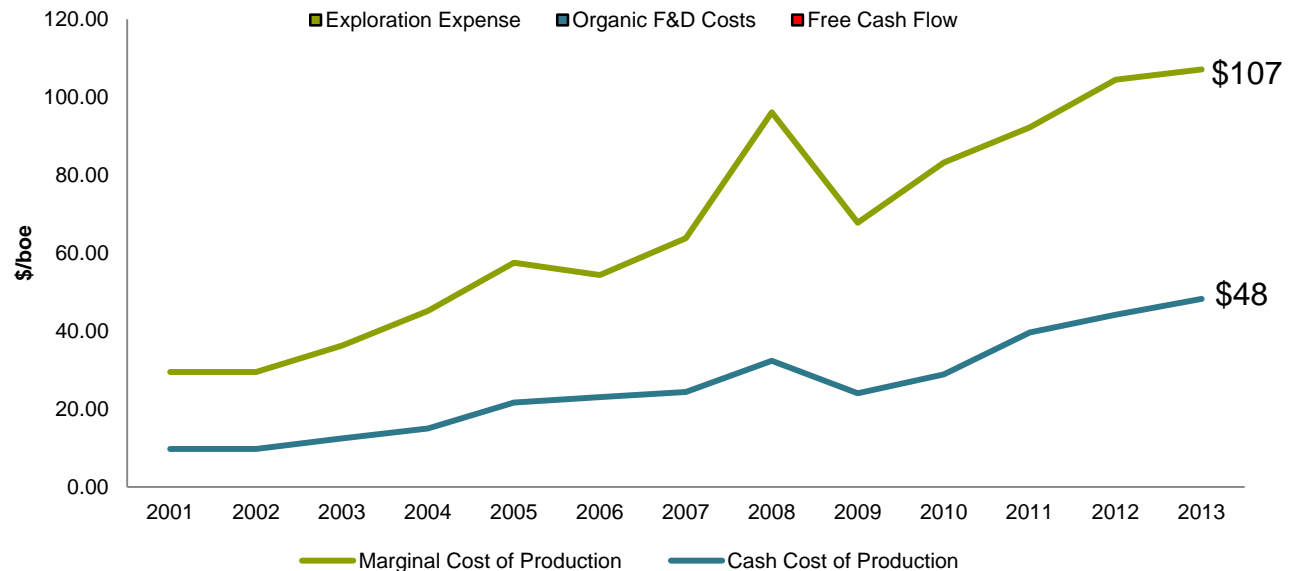
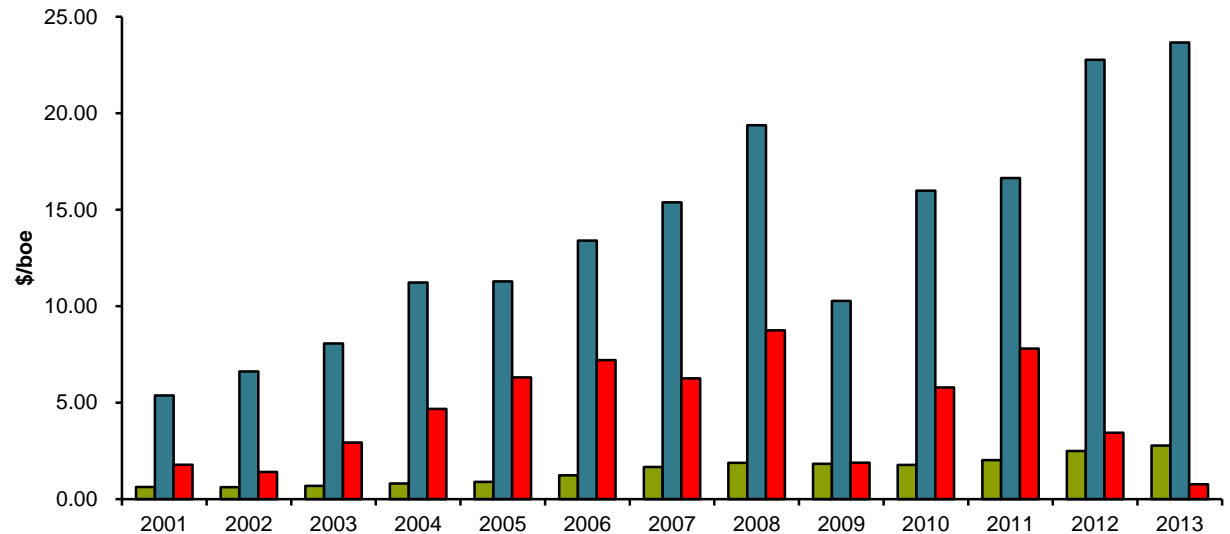
- Capital employed per barrel of production has expanded for all companies. While XOM's has risen from \$30 per flowing barrel to \$100 per flowing barrel, the US E&P group has gone from \$78/boe to \$212/boe.



# Global Cost Trends and Global Marginal Cost

■ Globally, integrating all of oil industry upstream segments shows that there has been a clear trend of rising F&D and decreasing Free Cash Flow.

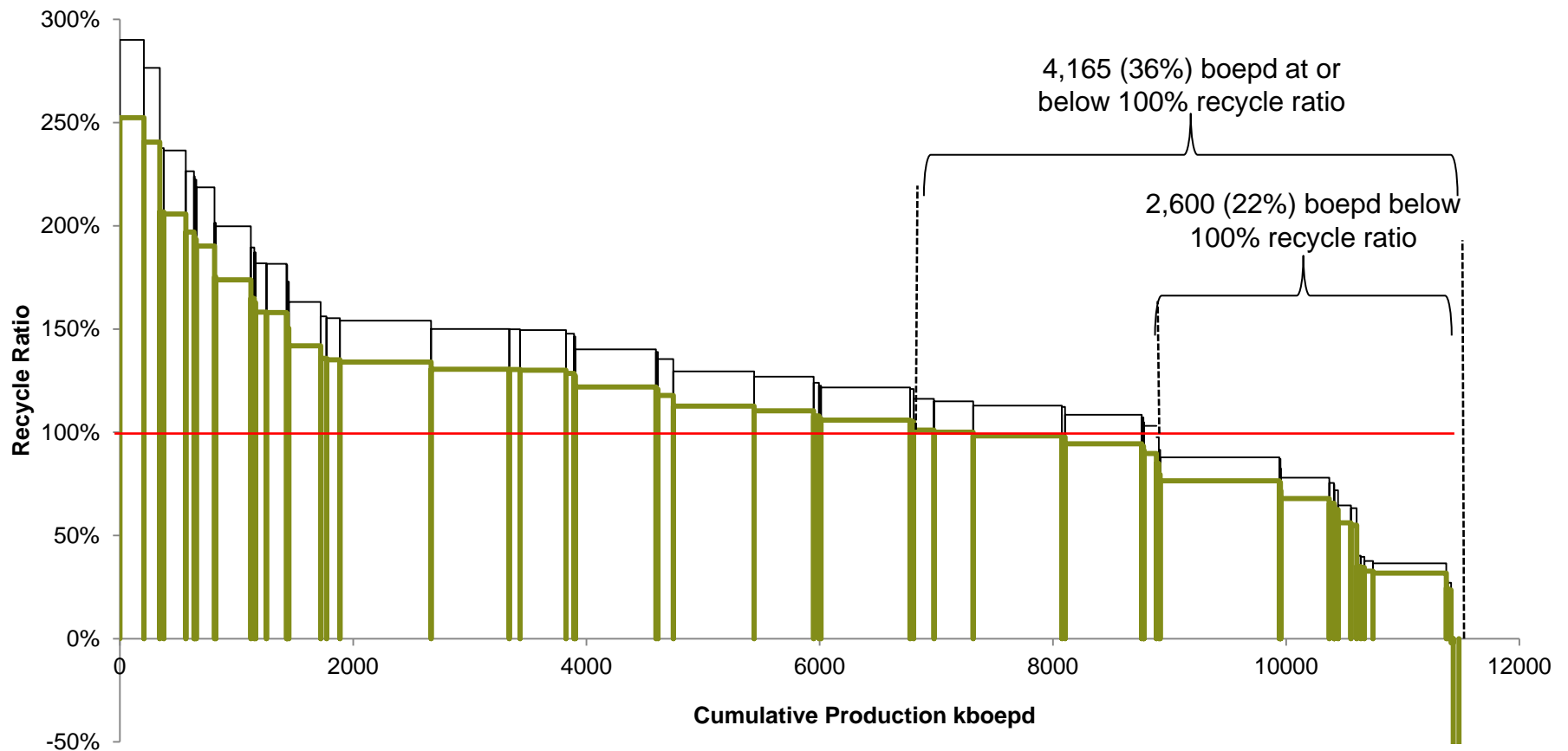
■ The result has been that the price required globally for companies to replace their reserves has increased to \$107/bbl with production costs now at \$48/bbl.



Source: Bernstein Research, Kimmeridge Energy

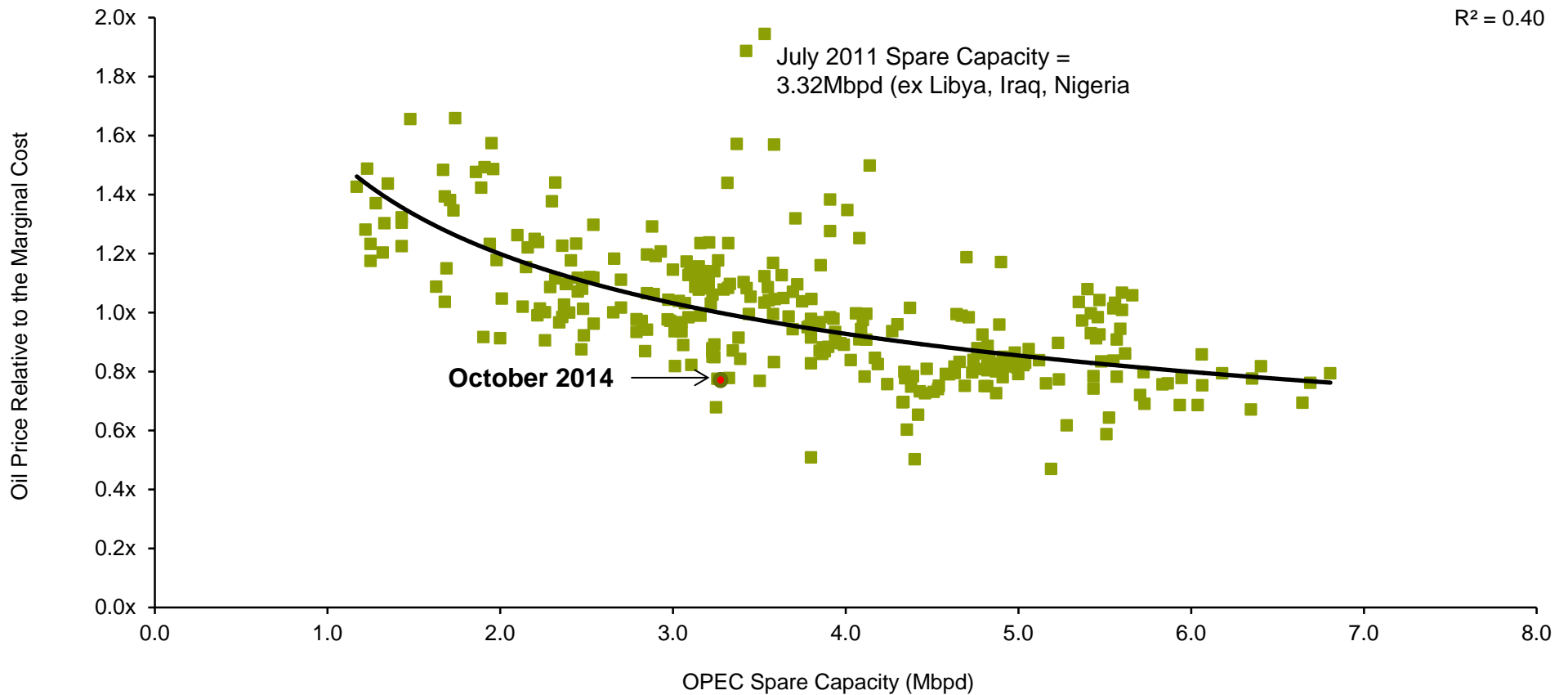
# Recycle Ratios Imply Comparable Economics but Show the Industry Dispersion

- The Recycle Ratio (operating cash flow per barrel over proven developed F&D) measures the industry's ability to generate enough cash to replace its production – above 1 = growth; below 1 = decline. At \$80/bbl WTI, almost 36% of the US E&Ps fall below 1.



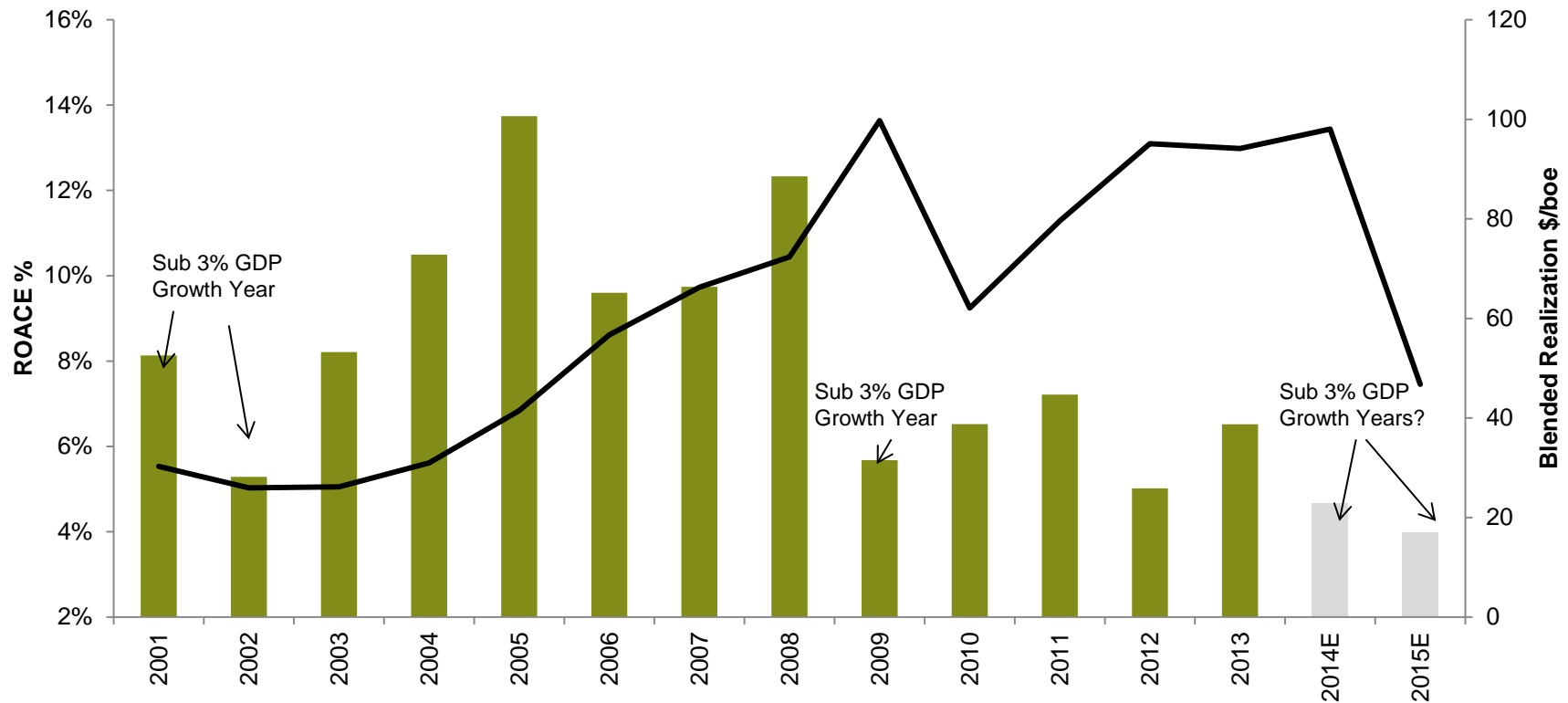
# Oil Prices Relative to the Marginal Cost

- While rising capital intensity implies higher prices, prices remain cyclical around this average. As such, near term supply/demand dynamics remain critical.



# Rising Capital and Falling Prices = Marginal Returns

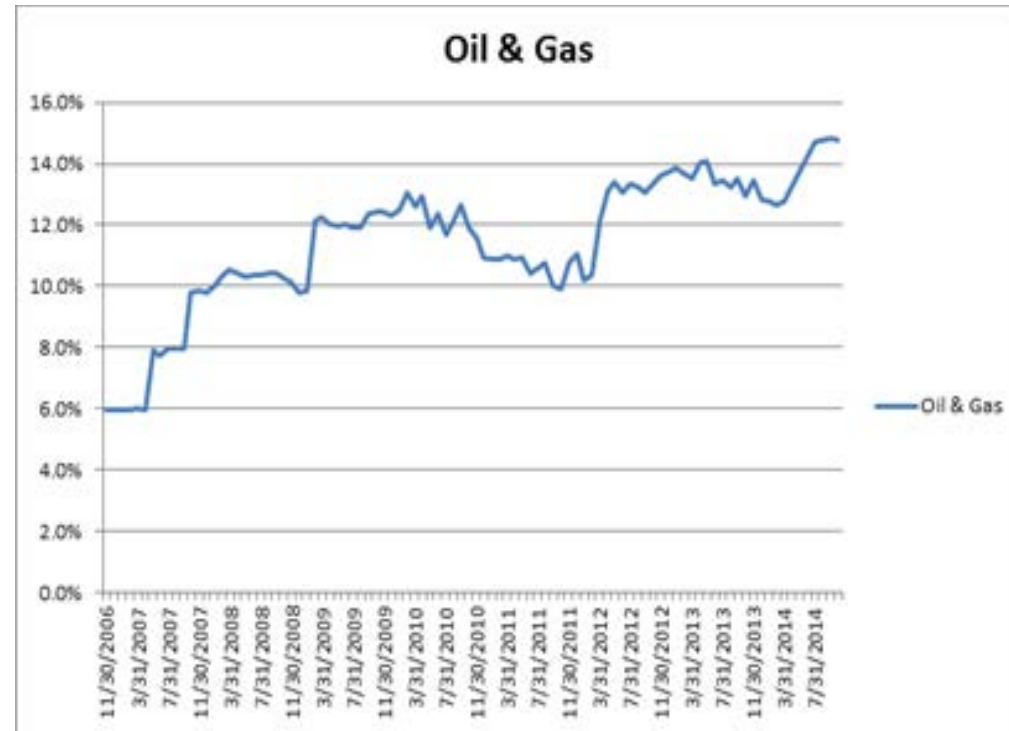
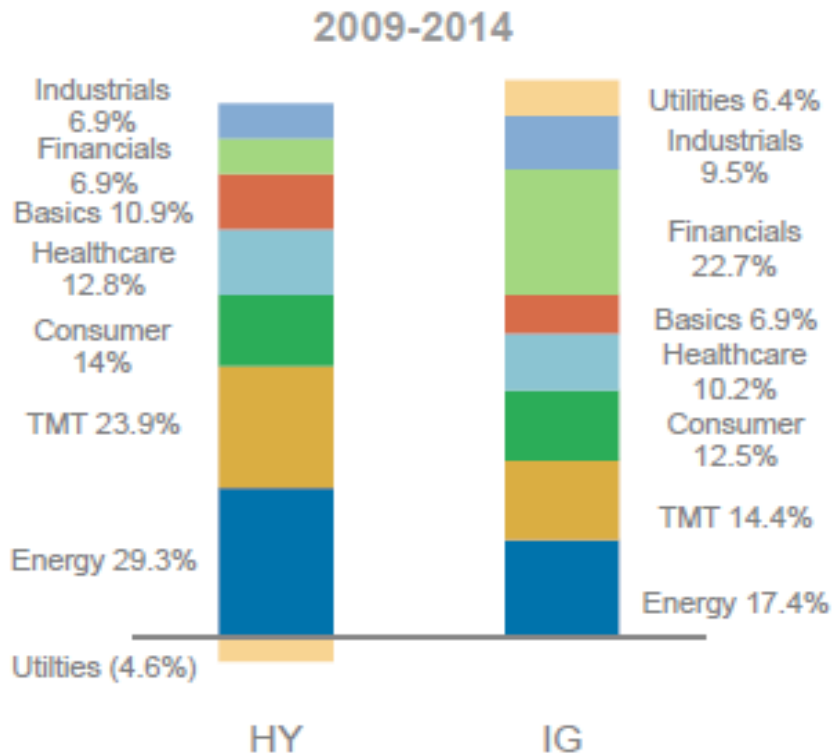
- If current pricing persists (\$77/bbl and \$4/mcf gas), then 2015 ROACE would be lowest for the peer group since 1999 and the lowest in 20 years without a recession. This is indicative of a cyclical trough





# Energy Sector Has Limited Capacity to Finance Growth through Balance Sheet Expansion

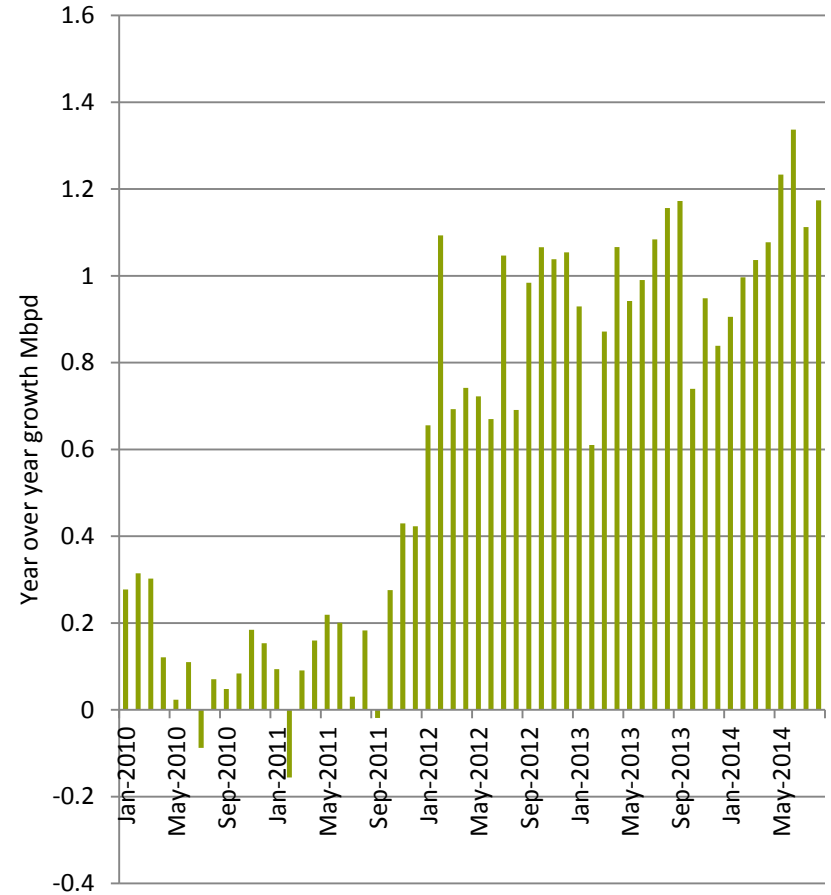
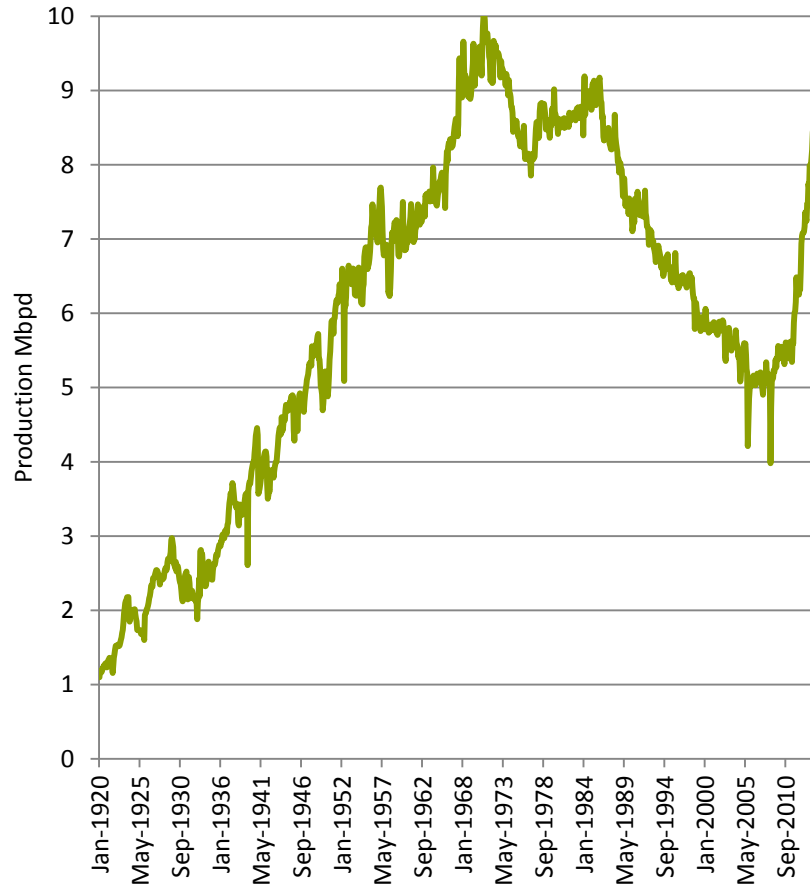
- Energy sector leverage has increased significantly since 2009 and the percent of energy in the HY Index is at historical highs, limiting growth through balance sheet expansion.



Source: Morgan Stanley Research, the Yield Book

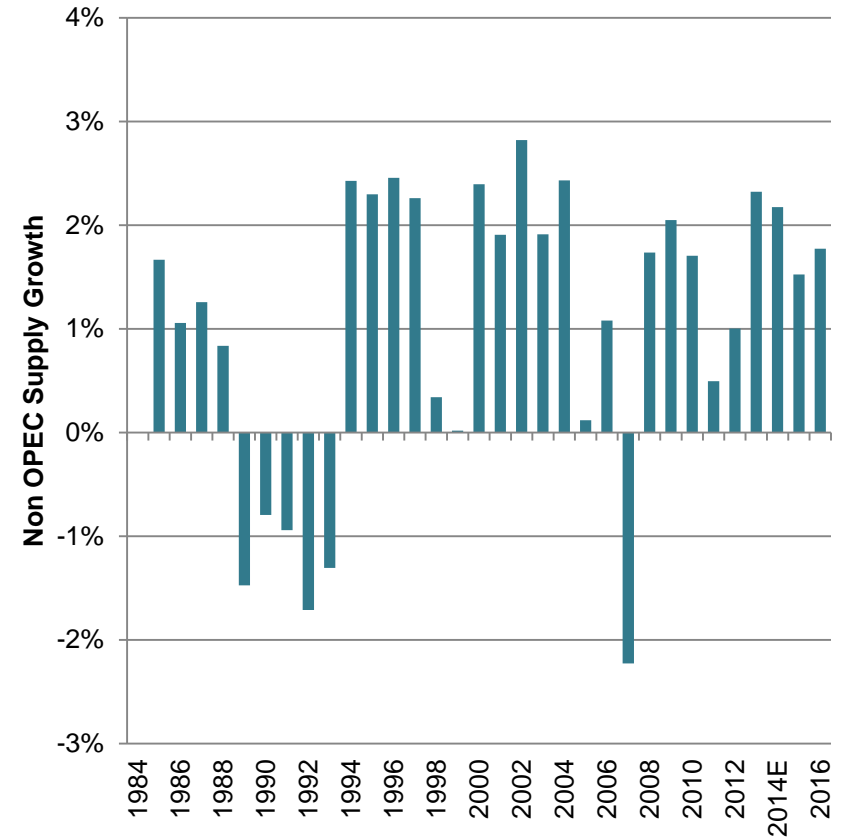
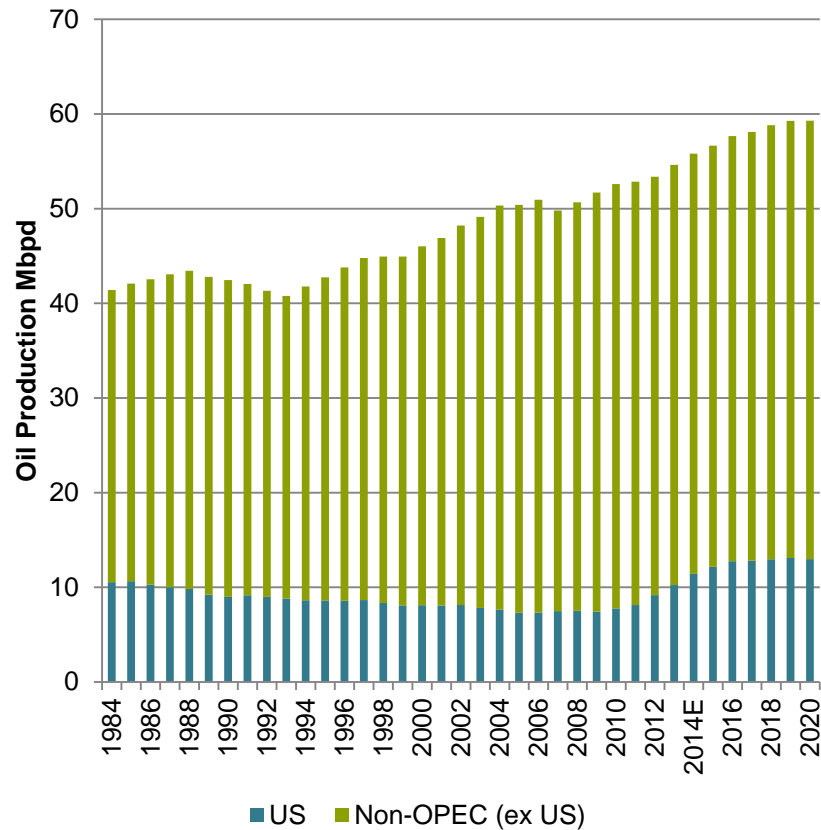
# Global Supply: The US Flood

■ Investors are concerned about US volume growth for good reason.

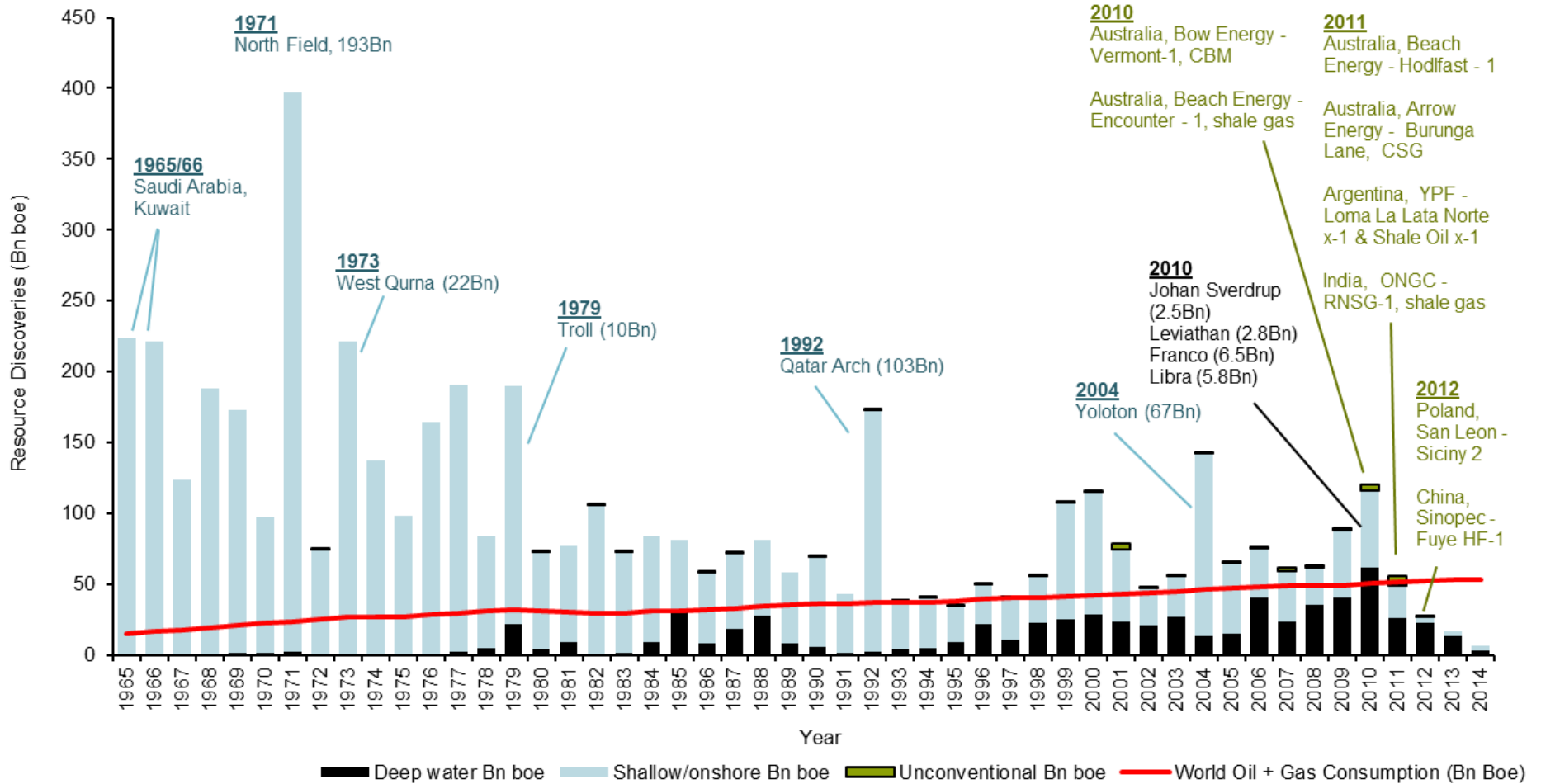


# Global Supply: The Non-US/Non-OPEC Trickle

- However, overall, non-OPEC supply growth has been in line with history due to limited international growth.

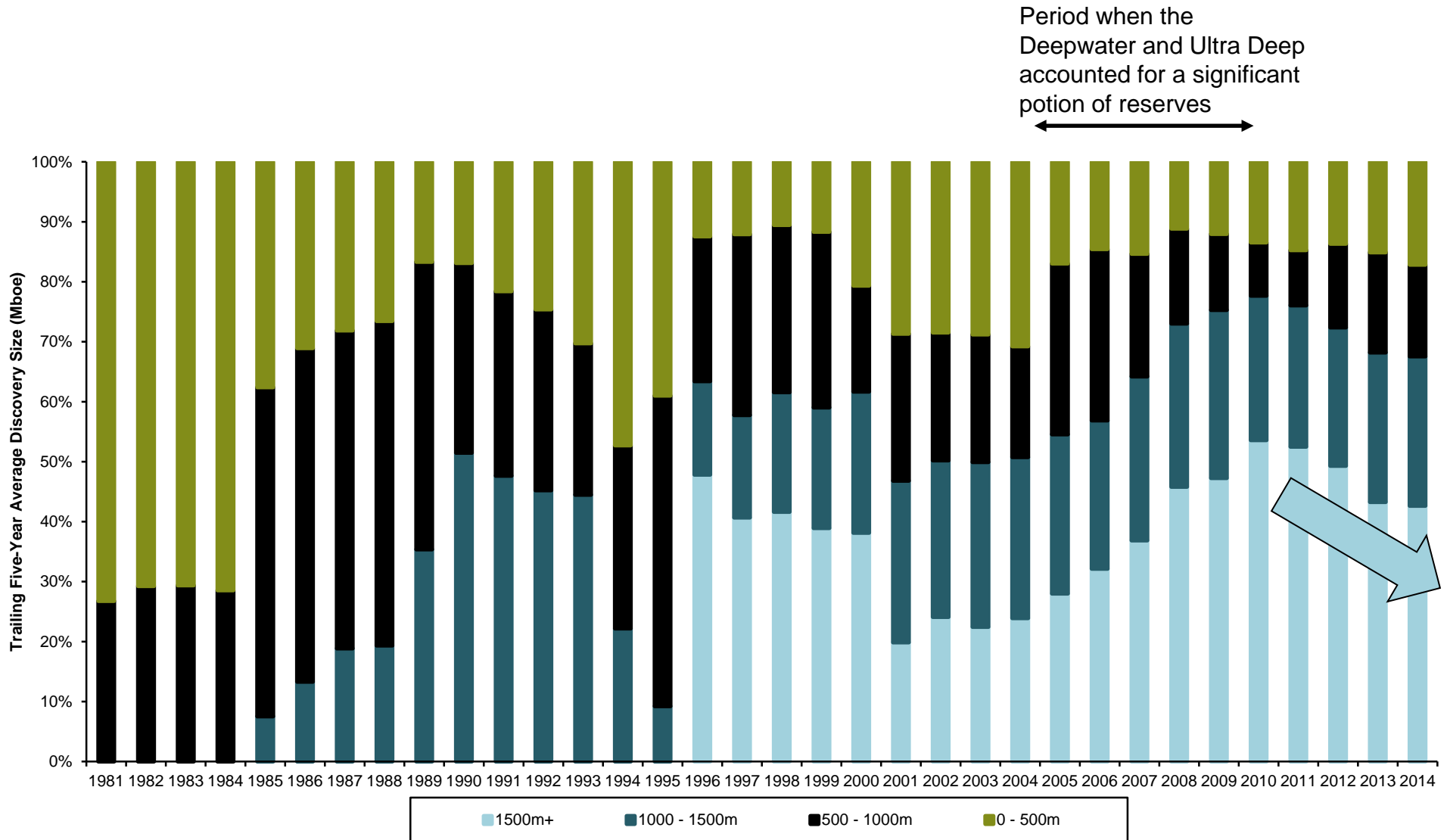


# Global Discoveries: The Rapid Recent Downward Shift in Discoveries has Meant Non-US/Non-OPEC Growth is Limited



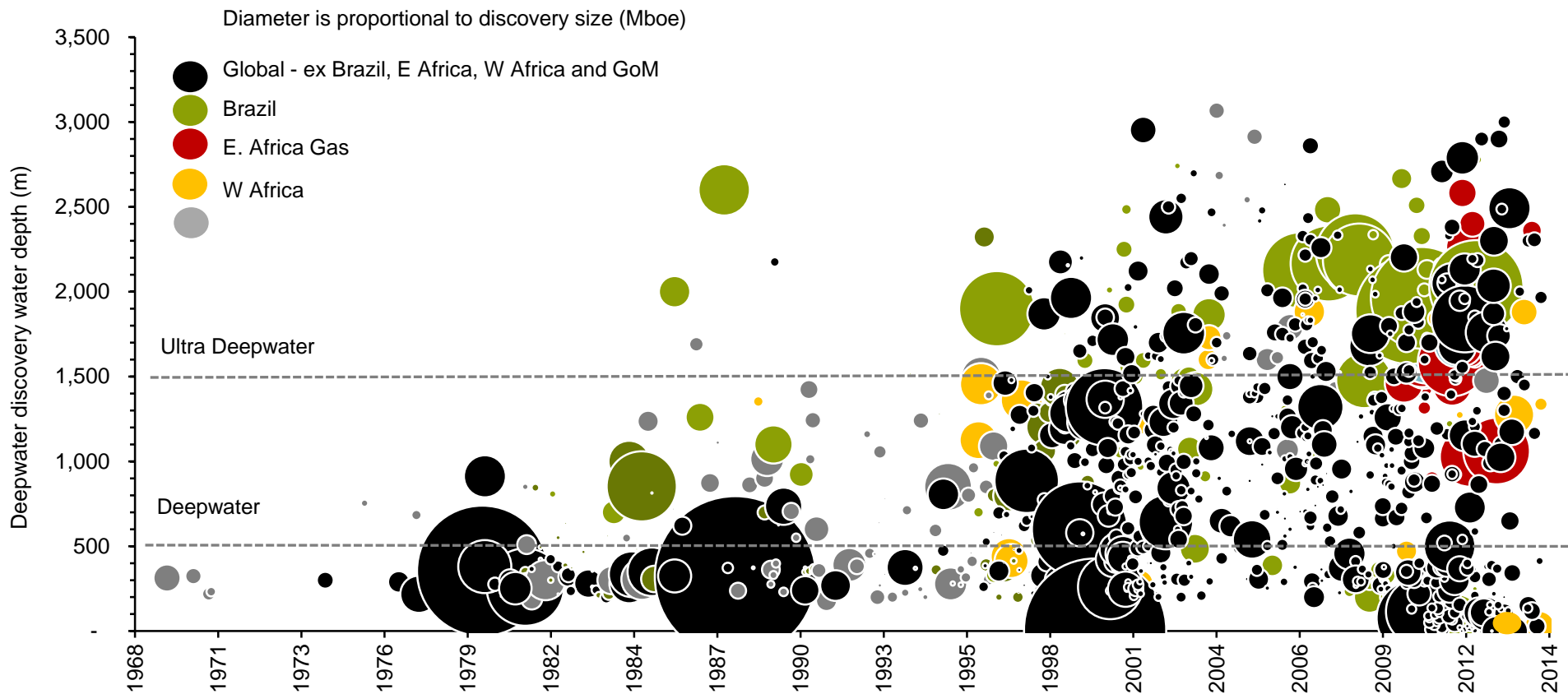
Source: Bernstein Research, Kimmeridge Energy

# Proportion of Discoveries from the Deepwater Has Stalled



Source: Bernstein Research, Kimmeridge Energy

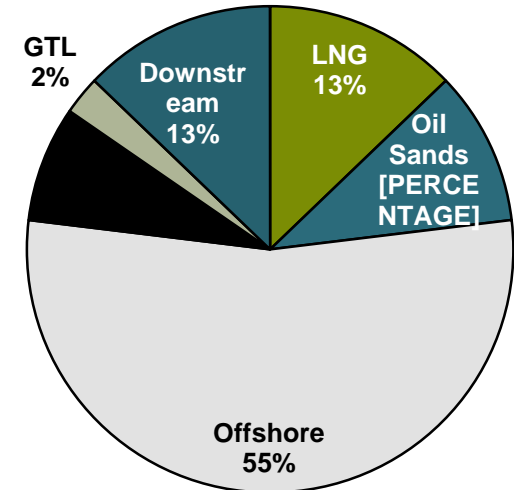
# Deepwater Discovery Trends: Recent Volumes Boosted by East Africa Gas



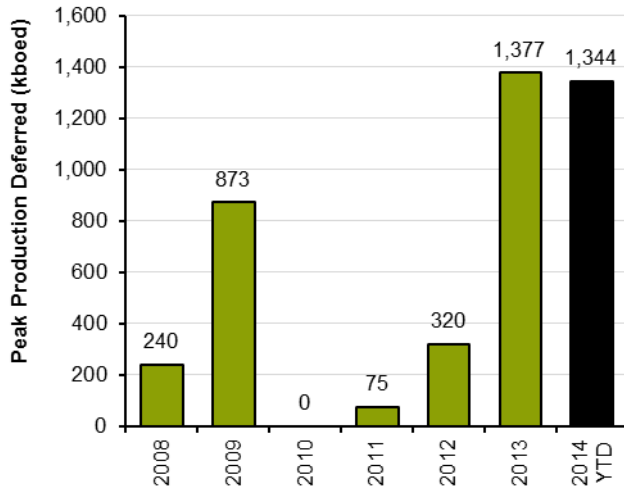
Source: Bernstein Research, Kimmeridge Energy

# Significant Project Slippage in the Last Two Years

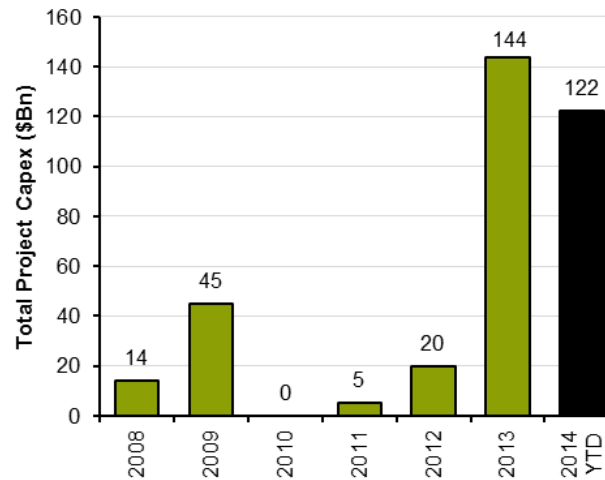
- Project slippage has always had a huge influence on future oil production growth.
- Recently, the volume of production that has been pushed out has grown rapidly in part due to marginal economics.
- Offshore production is the most affected from discoveries made over the last 10 years.



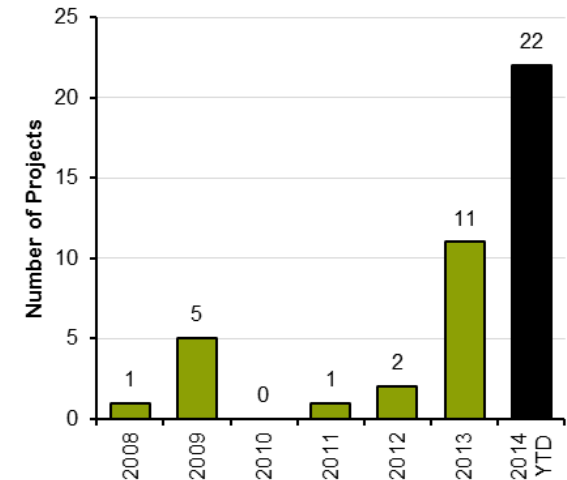
Production Deferred / Cancelled



Capex Deferred / Cancelled



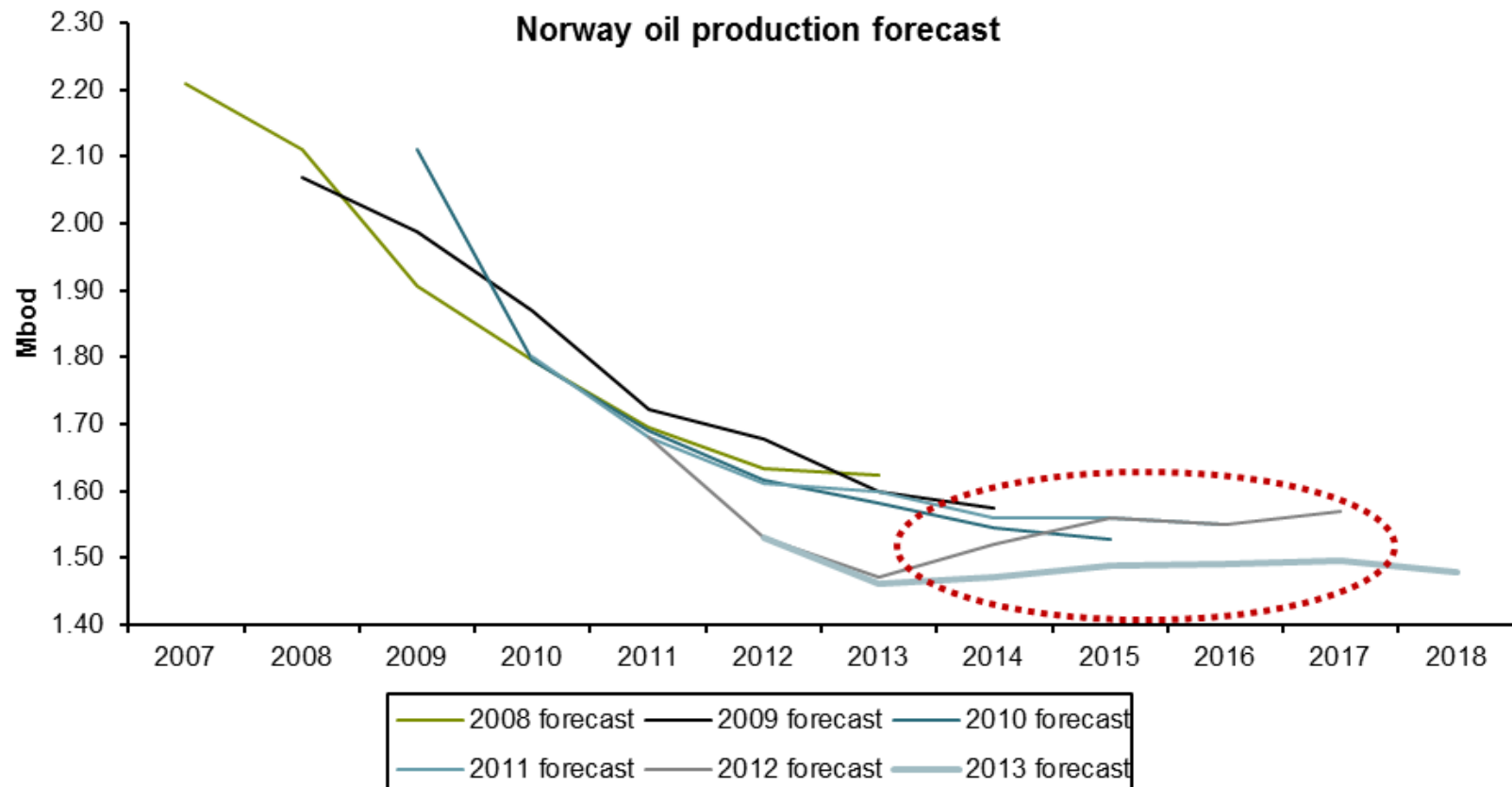
Number of Projects Deferred / Cancelled



Source: Bernstein Research, Kimmeridge Energy

# Country Forward Production Guidance Continually Revised Down

- Offshore production slippage has had a dramatic impact on Norway's forecast production in the past.
- We suspect most production forecasts anchored by offshore projects are currently too high.

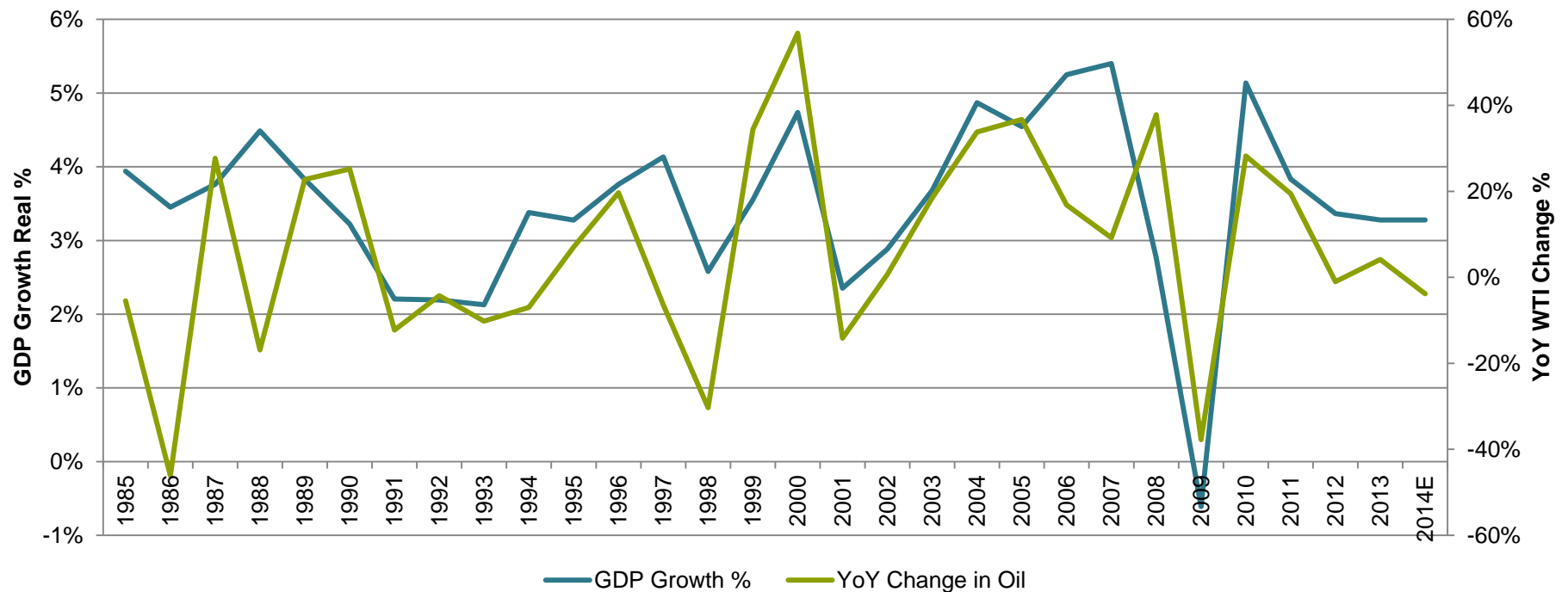


Source: Bernstein Research, Kimmeridge Energy



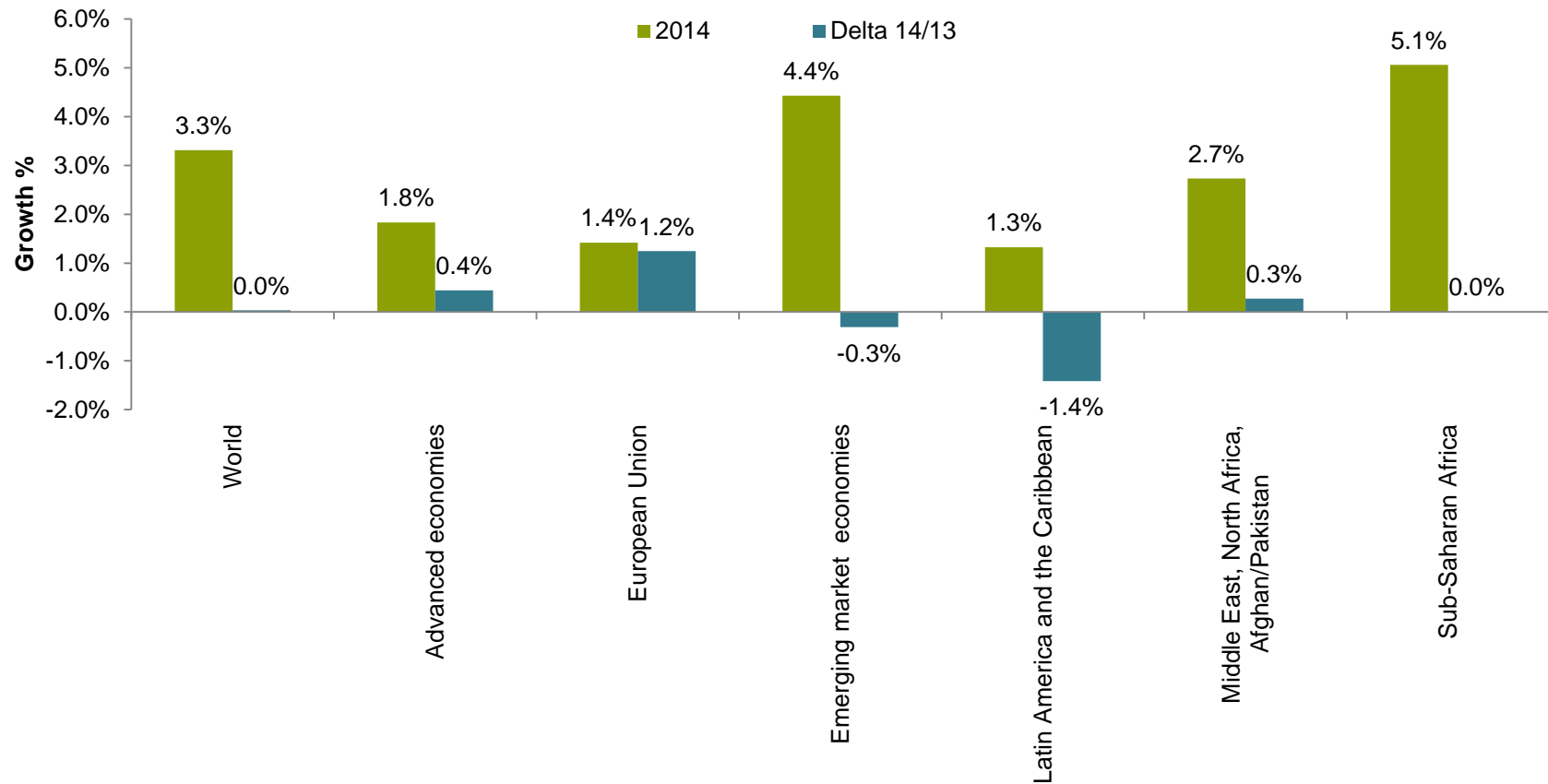
# Global GDP and the Demand Problem

- While the focus has been on US supply, the real challenge to oil prices is demand which has seen negative revisions since mid-year. Currently, 2014 estimates are fractionally above 3%.
- Historically (only one in nine times), prices have risen with GDP below 3%.

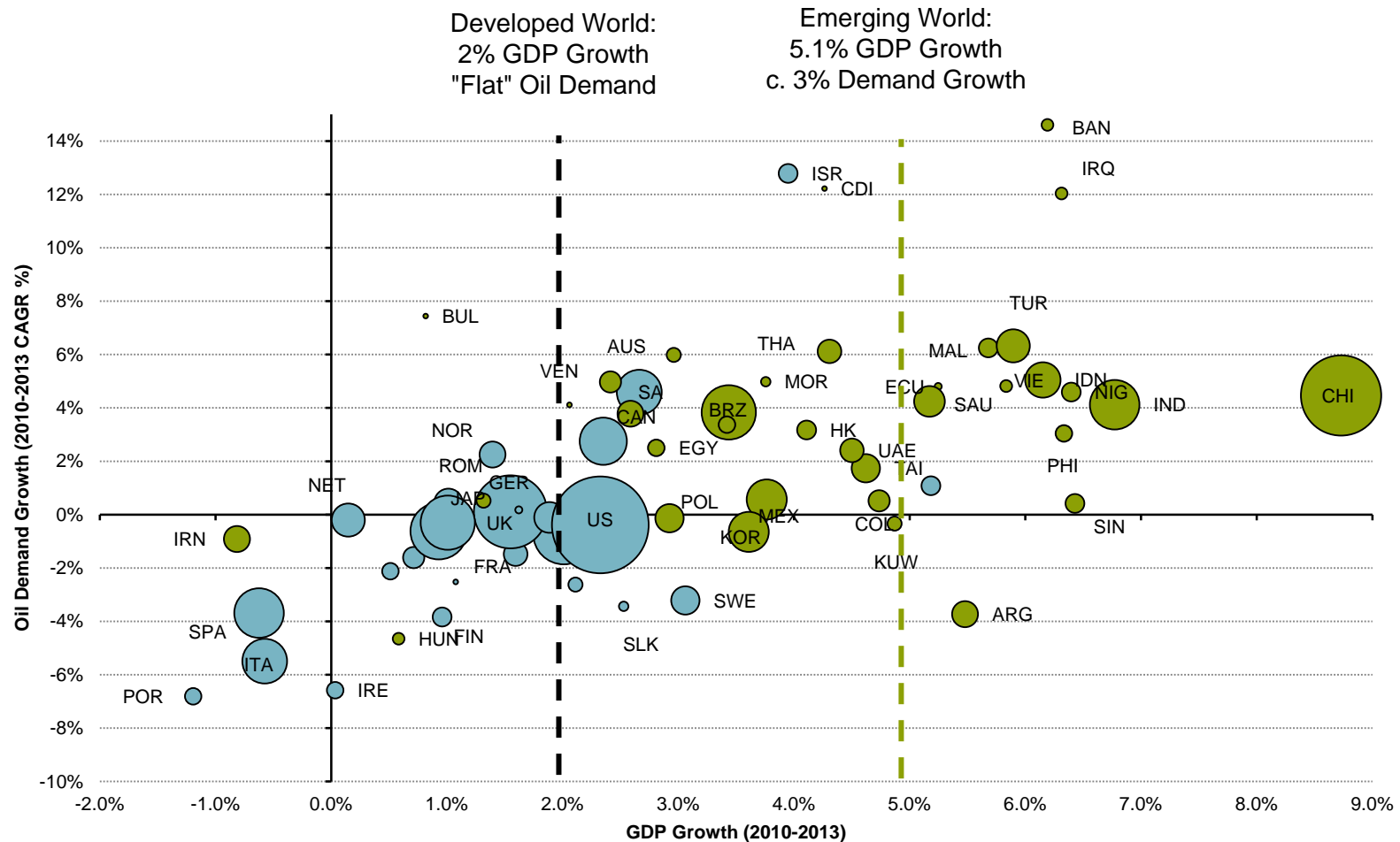


# Global GDP: A Decelerating Recovery?

■ IMF forecasts for 2014 and 2015 have been revised down, projecting a stalled recovery.

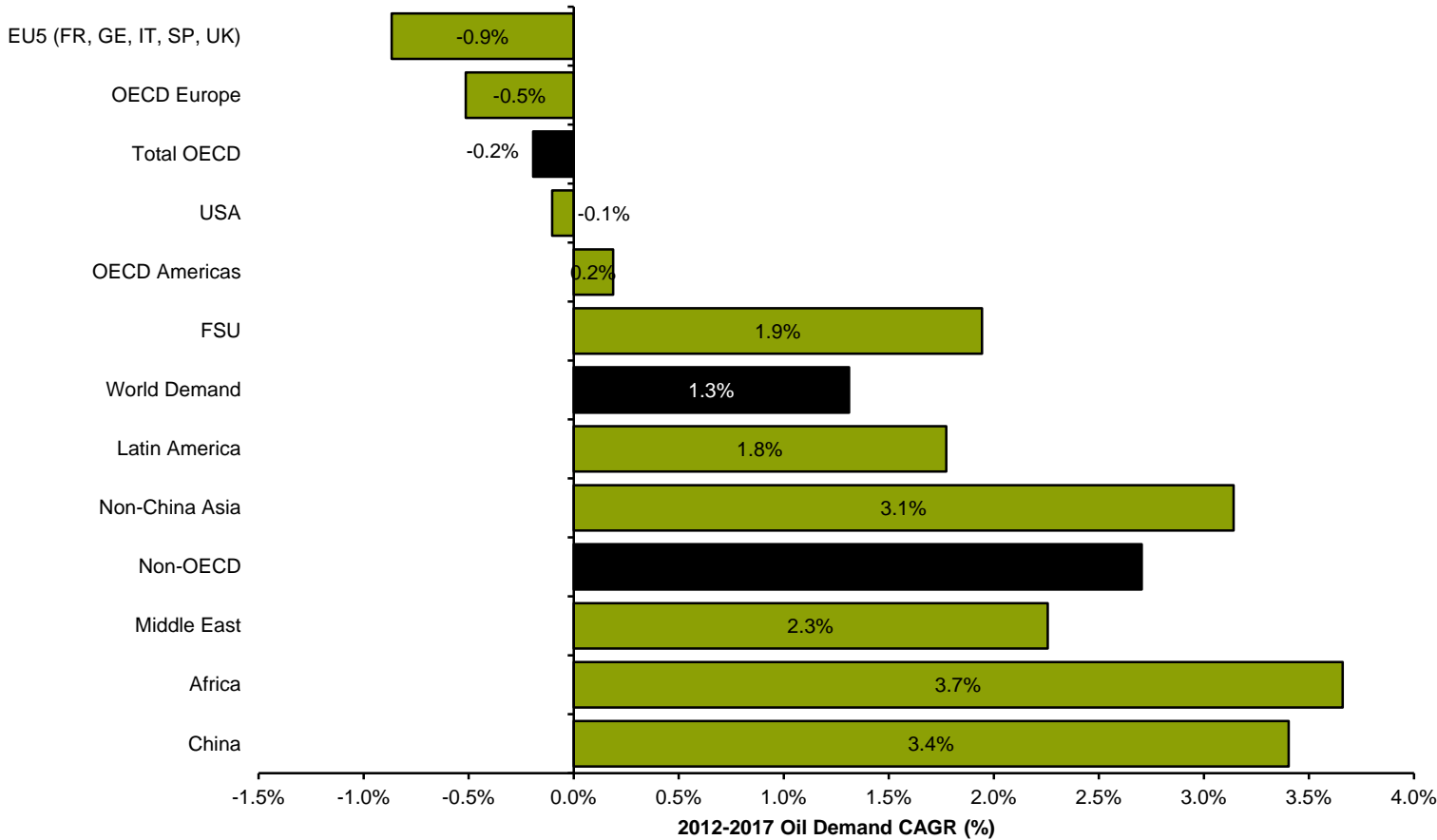


# Demand Growth Breakdown by Country 2010-2013



Source: Bernstein Research, Kimmeridge Energy

# World Oil Demand Growth Estimates: 1.3%/Year 2012-2017

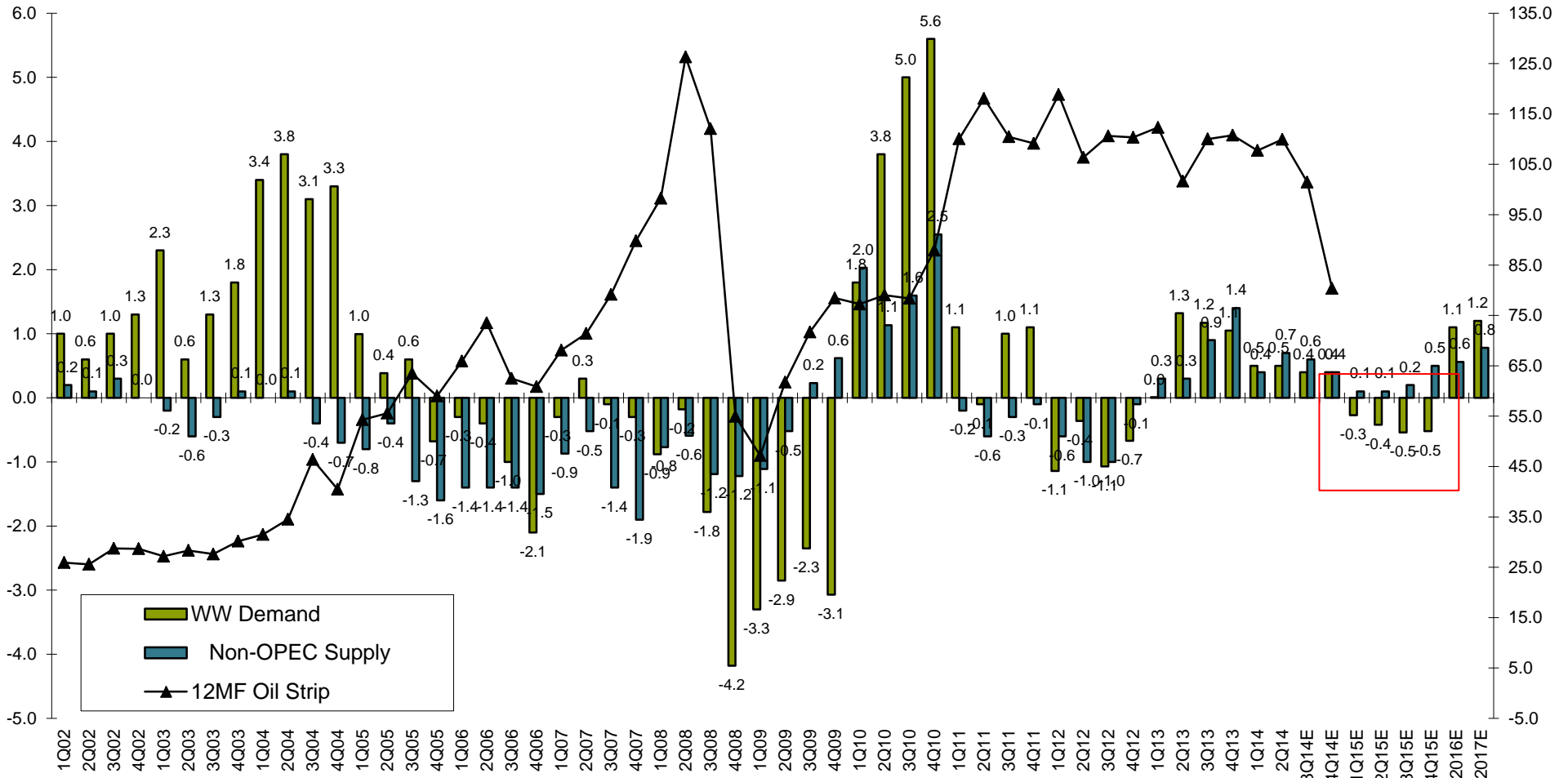


Source: Bernstein Research, Kimmeridge Energy

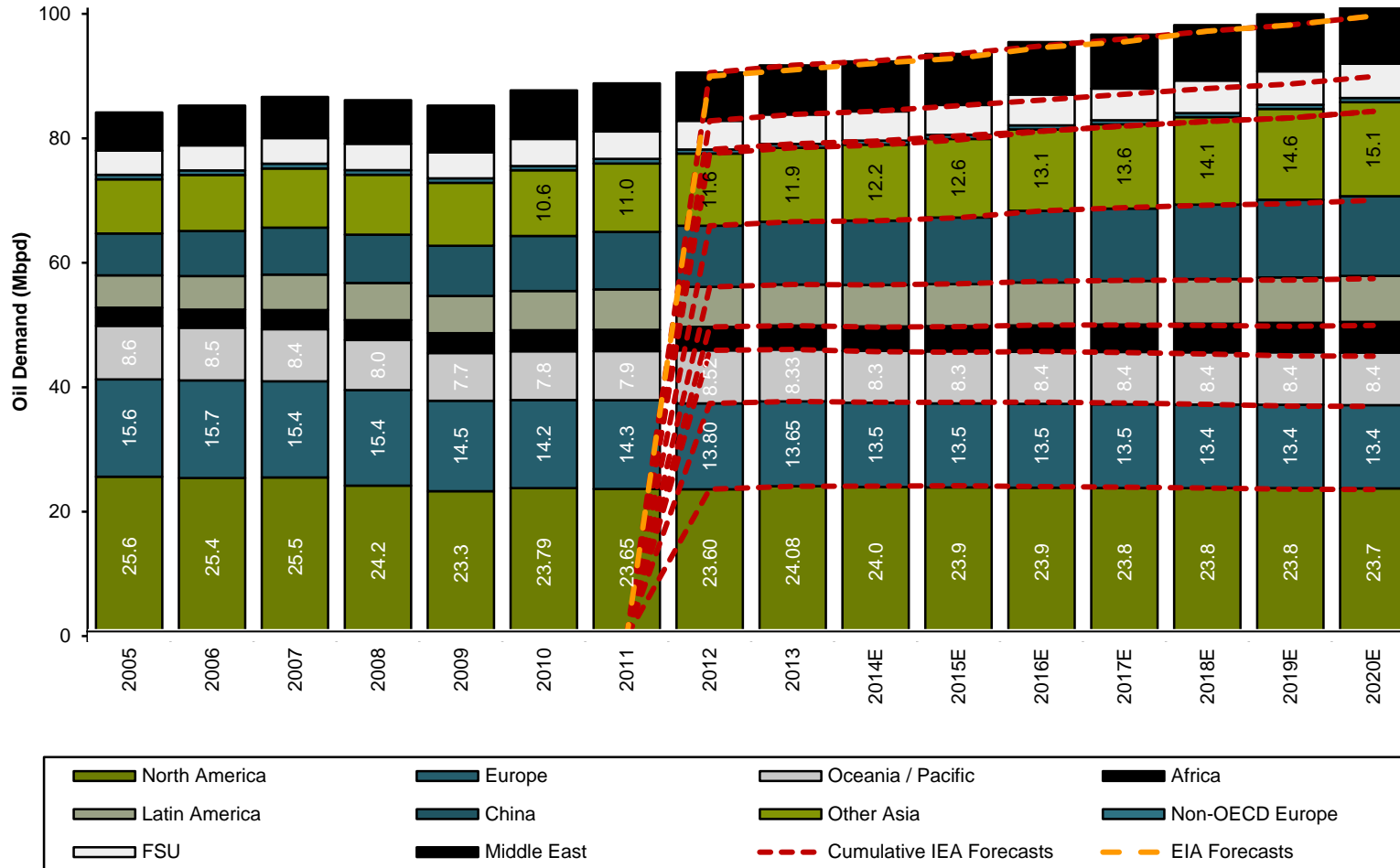
# Moderating GDP is Driving the Sell Off

■ Change in global GDP outlook will drive the recovery of the oil price, not supply reductions.

IEA Oil Non-OPEC Supply & WW Demand Revisions Final #s -- Original #s vs. Oil Price

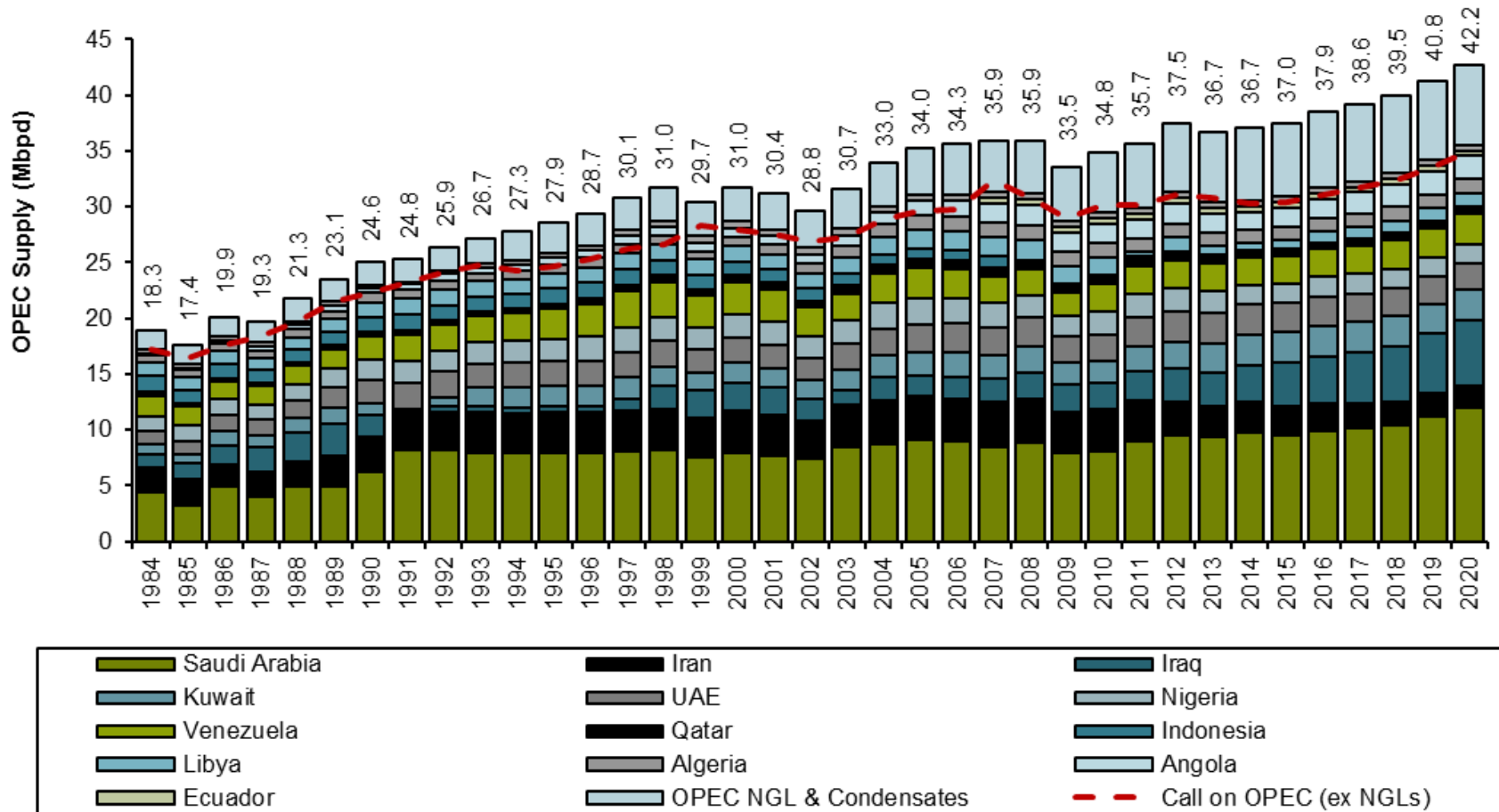


# Oil Demand Outlook: Non-OECD Growth Offsets OECD Decline



Source: Bernstein Research, Kimmeridge Energy

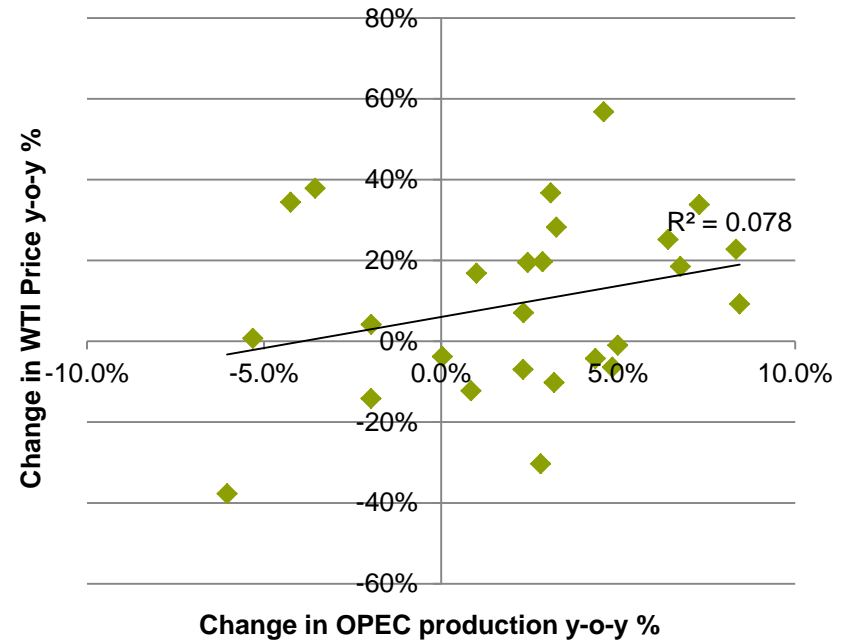
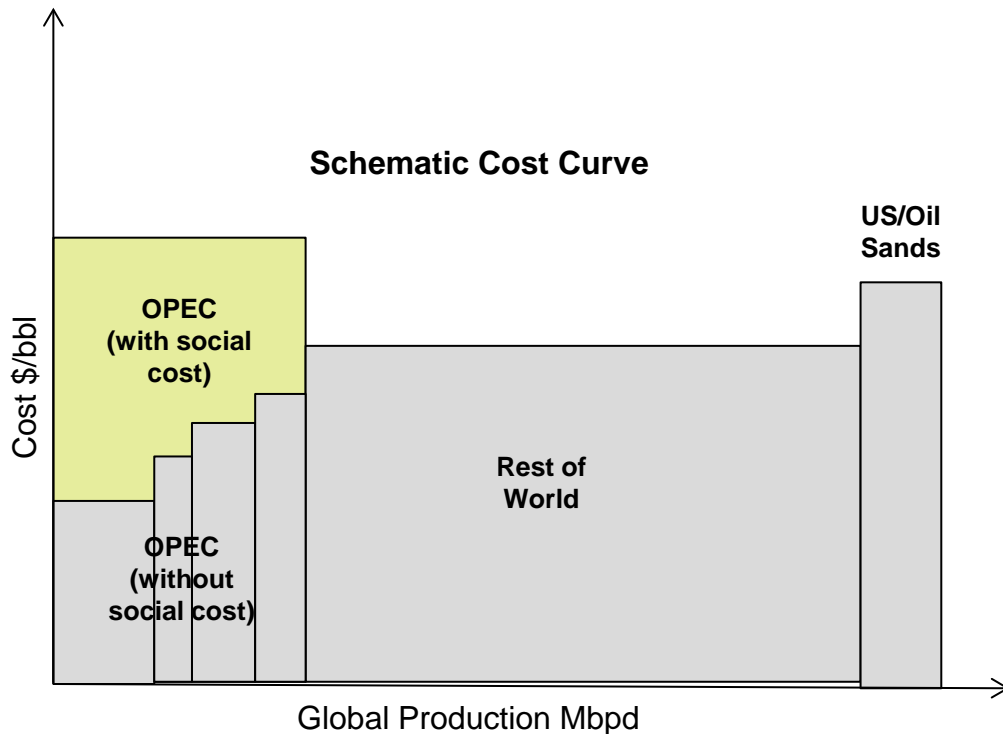
# Longer Term the Call On OPEC Must Rise



Source: Bernstein Research, Kimmeridge Energy

# The Role of OPEC

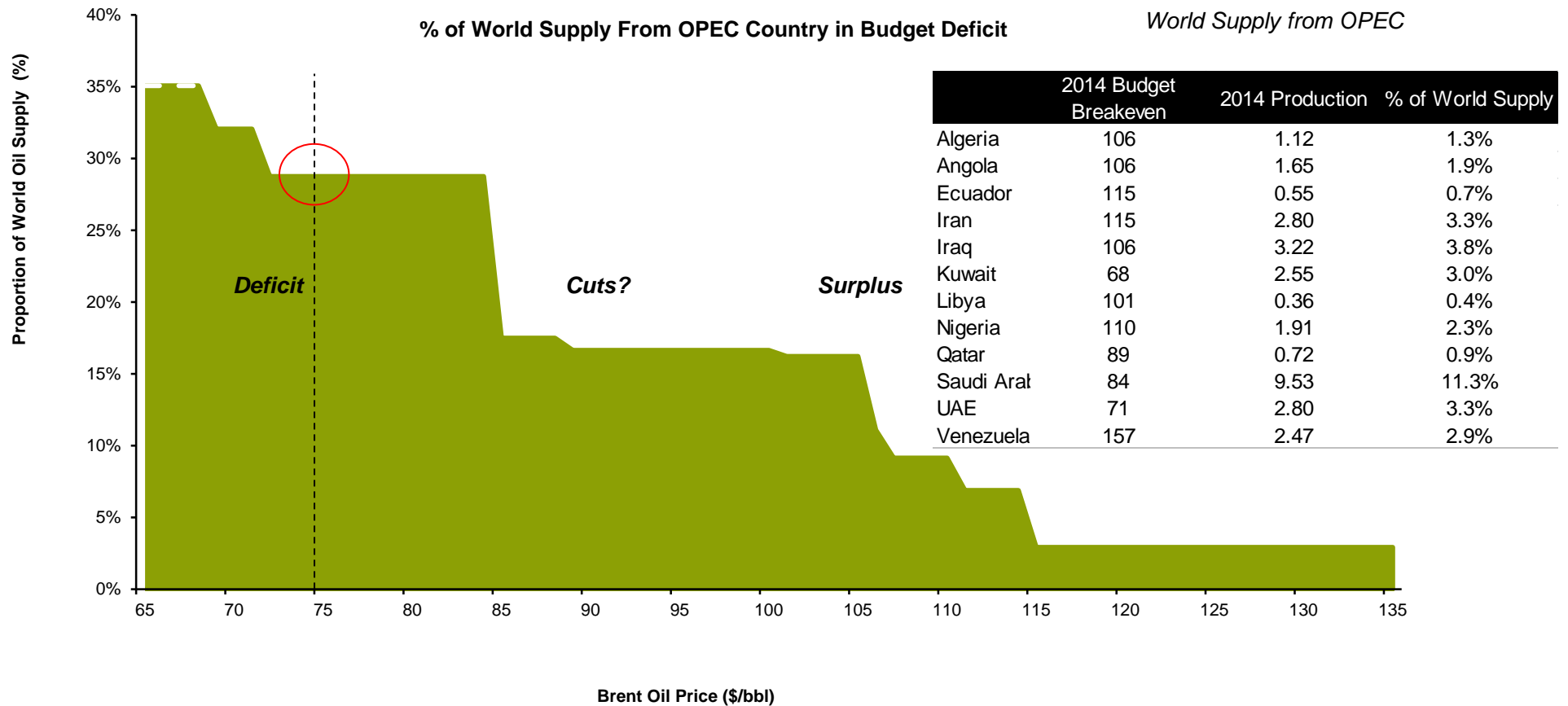
- Fundamentally, OPEC acts to counter the marginal producer, cutting when demand is weak and increasing production when demand is strong.
- However, whether the net oil is above or below ground is largely irrelevant and there is limited data to suggest that OPEC cuts show any correlation with prices.





# OPEC Budget Does Not Work at Current Oil Prices

Between \$73-85/bbl, the countries that supply nearly 30% of global oil supply are running a budget deficit.



Source: Bernstein Research, Kimmeridge Energy

# A Questionable Outlook

- Growth in US oil supply and worries of declining GDP have lowered prices, and the outlook for returns and recycle ratios of US E&Ps is bleak if the status quo remains.
- A significant portion of this new crude supply does not work in this pricing environment and long-term production growth from tight oil will be challenging without increased capital investment.
- Unlike the last decade, discoveries from the deepwater have declined and have been dominated by gas, suggesting new deepwater developments will also need higher pricing to move forward.
- The 2015 outlook will be highly sensitive to GDP trends. If demand continues to decelerate then prices will remain low despite improving supply dynamics. Key inflection points will be a recovery in European growth expectations and a bottoming out of IEA oil demand forecasts
- From 2015 onwards, to balance the market, OPEC will need to increase production for the first time since 2012.

# **Appendix: Recycle Ratio Background**

# Kimmeridge Framework: The Recycle Ratio

- The oil and gas business is inherently simple. The key to success is finding oil and gas cheaply and generating a high cash margin. We define this as a recycle ratio: measured as operating cash flow per barrel divided by proven developed finding and development cost.

$$\frac{\text{Operating Cash Flow per Barrel}}{\text{PD F\&D Cost}^*}$$

Operating cash flow divided by annual production

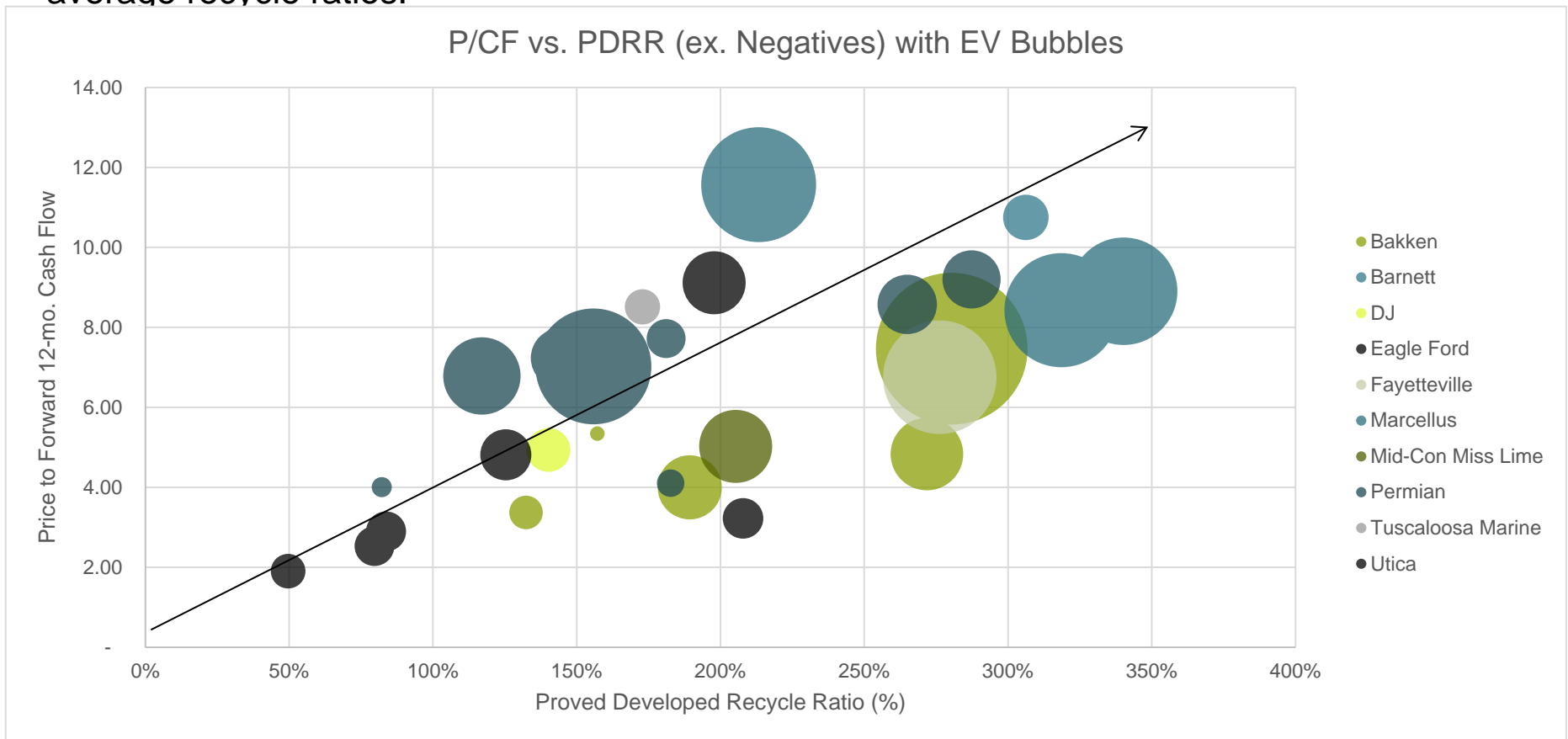
Capital costs of a well divided by net reserves added by the well (excluding PUDs)

- This is a capital efficiency measure which shows for each barrel produced how many barrels can be added to grow the reserve base.

\*Cost of drilling and land divided by proven developed reserves added

# Kimmeridge Framework: The Recycle Ratio II

- Wells, assets or companies with high recycle ratios tend to deliver high returns, high growth on a debt-adjusted basis and premium valuations since they can grow faster than their peers with average recycle ratios.



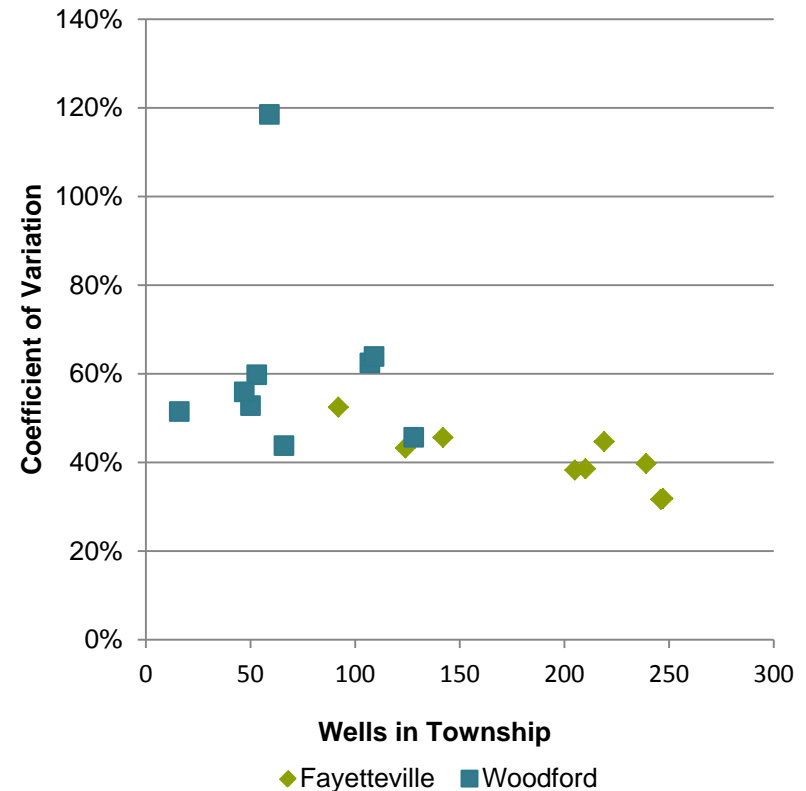
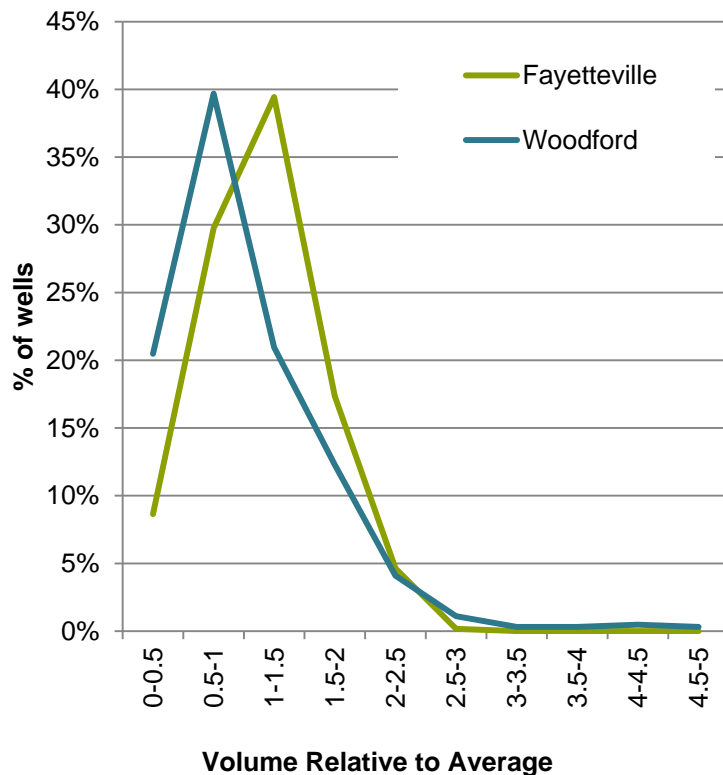
# Kimmeridge Exploration Framework

- This philosophy applies to the exploration business in the same way it does to the development and production business.
- Value is created by demonstrating that a well can be economic with a high recycle ratio.
- The delta between the return on the well and a 10% unlevered pre-tax return is the value to the leaseholder.

Good Well			
Acreage	160	WTI price \$bbl	80.0
Wells drilled	1	HH Price \$/mcf	4.0
Well Cost (\$)	\$ 9,500,000	Cushing differential \$/bbl	5.0
EUR/well	\$ 850,000	Realized Price	49.5
PD F&D	\$ 14.90	Operating Costs \$/boe	9.0
NPV10M	\$ 5,062,630	SG&A \$/boe	2.0
IRR	32%	EBIT \$/boe	38.5
\$/acre value	\$ 31,641	Cash Tax (25%)	9.6
Recycle Ratio	194%	Operating CF/bbl	28.9
Bad Well			
Acreage	160	WTI price \$bbl	80.0
Wells drilled	1	HH Price \$/mcf	4.0
Well Cost (\$)	\$ 13,000,000	Cushing differential \$/bbl	5.0
EUR/well	\$ 750,000	Realized Price	49.5
PD F&D	\$ 23.11	Operating Costs \$/boe	9.0
NPV10M	\$ 269,165	SG&A \$/boe	2.0
IRR	11%	EBIT \$/boe	38.5
\$/acre value	\$ 1,682	Cash Tax (25%)	9.6
Recycle Ratio	125%	Operating CF/bbl	28.9

# Kimmeridge Exploration Framework II

- In exploration, the value of any individual well can be expanded across an asset if there is a high degree of lateral continuity. The more contiguous the asset, the faster the value appreciation.



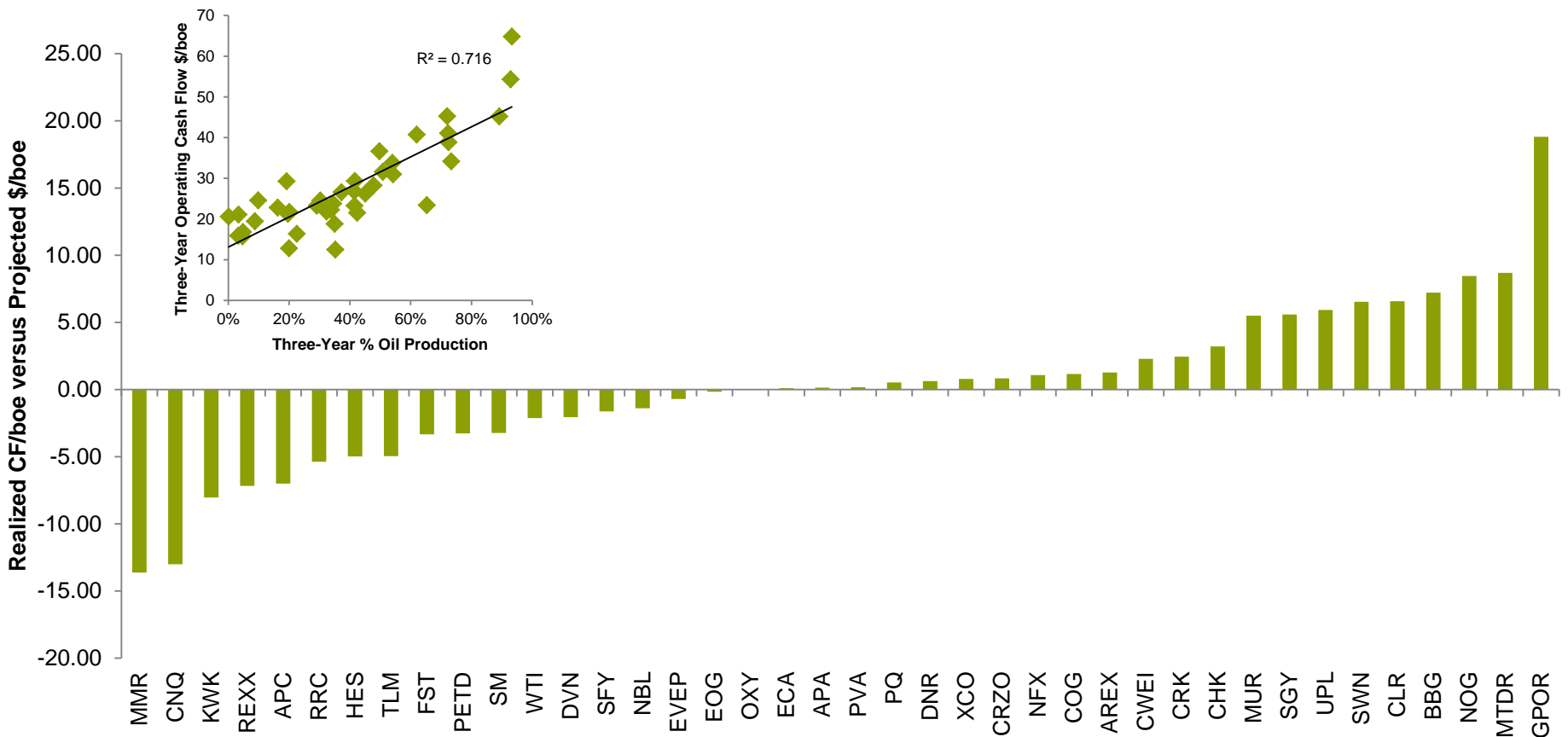
# Kimmeridge Exploration Framework II

- Essentially the de-risking process is about:
  - Moving a well's recycle ratio down the cost curve
  - Demonstrating that individual well results are repeatable across an area
- Both elements can be measured statistically, albeit with limited data availability for early-stage assets.
- Developing an asset and moving it down the cost curve has driven value appreciation for the landowner irrespective of commodity prices.
- In contrast, assets at the top of the cost curve are marginal, highly sensitive to commodity price fluctuations and, consequently, prime candidates for abandonment in cyclical downturns when commodity prices drop.



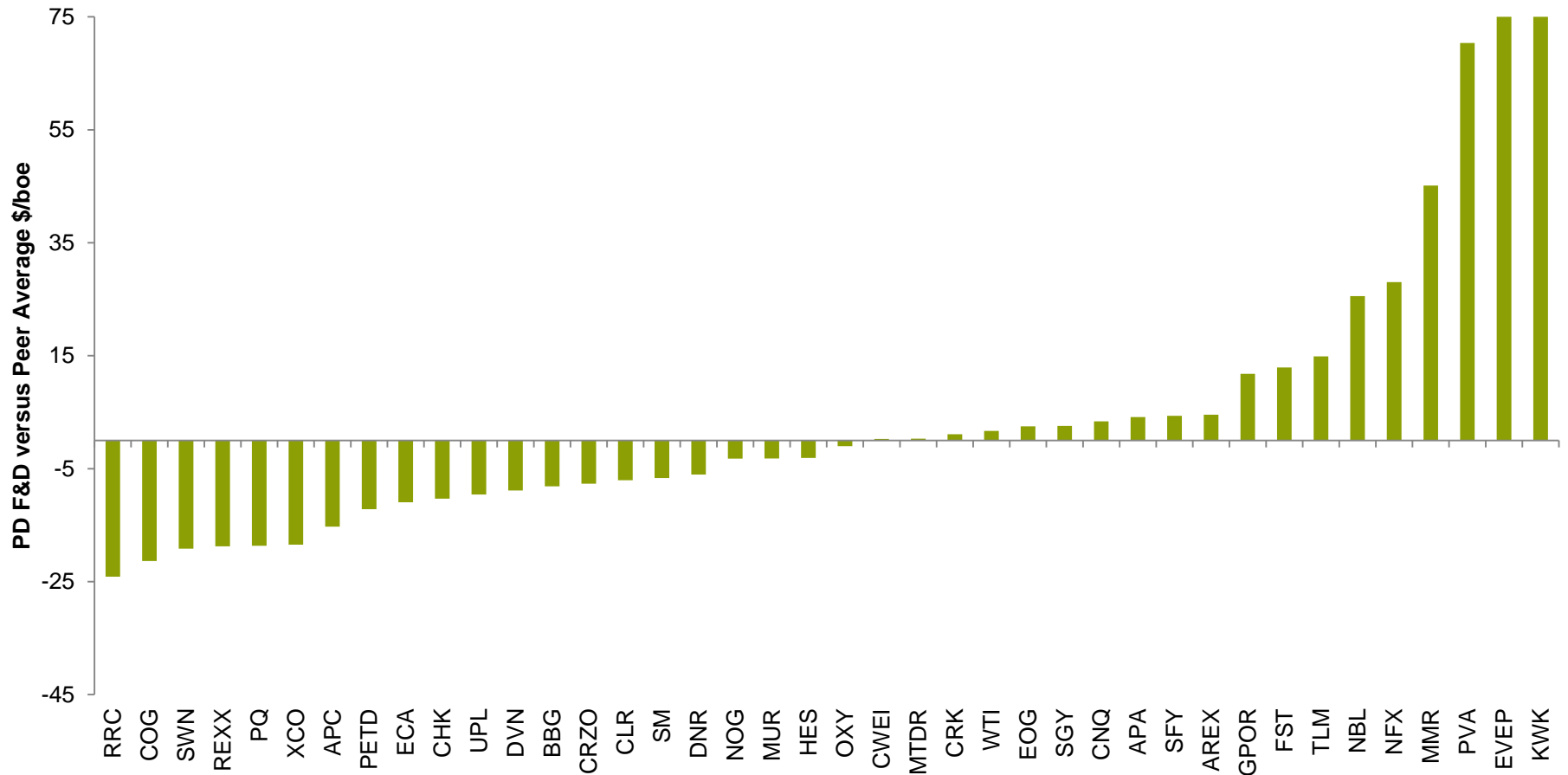
# What Drives the Recycle Ratio

- Between the two elements of operating cash flow per barrel and PD F&D, the inter-play variation in cash flow per barrel is significantly smaller than F&D, once adjusted for production blend.



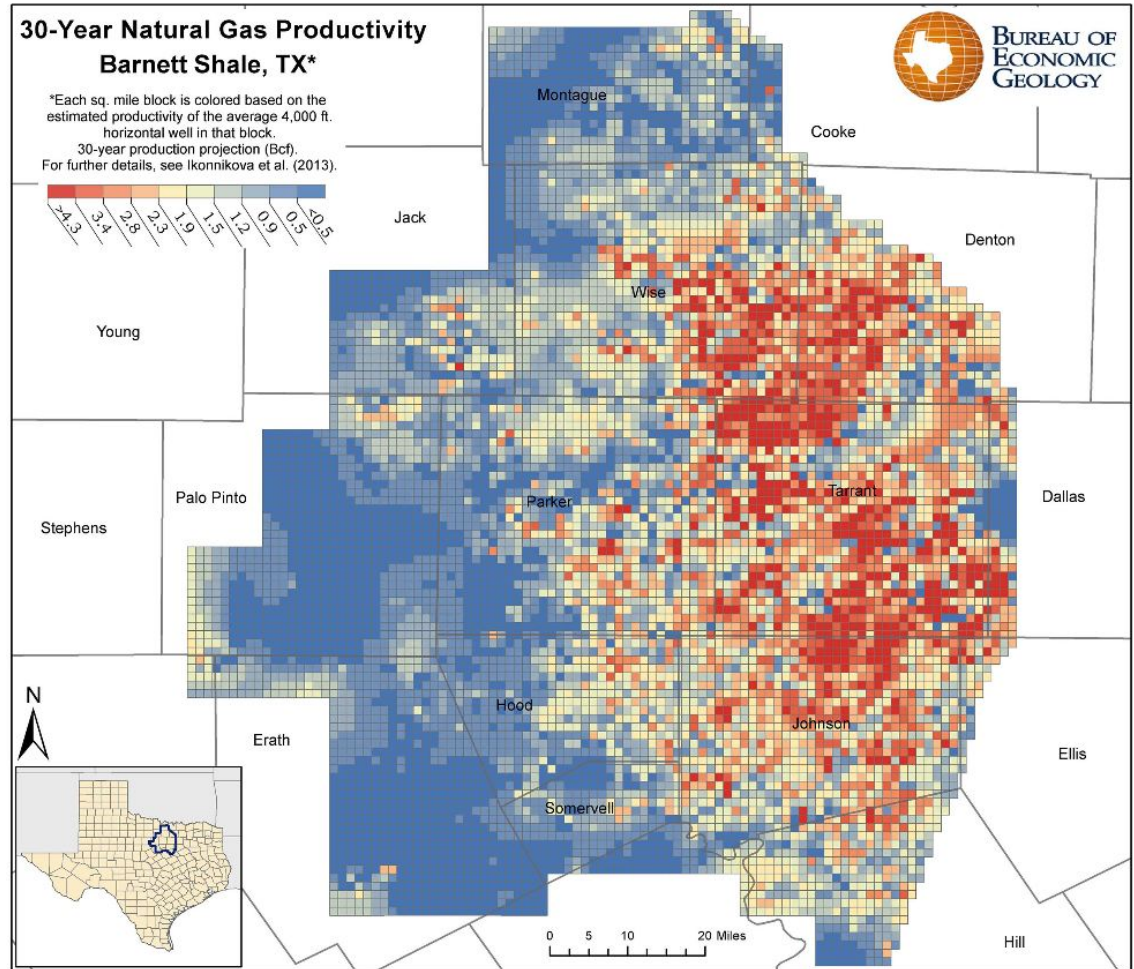
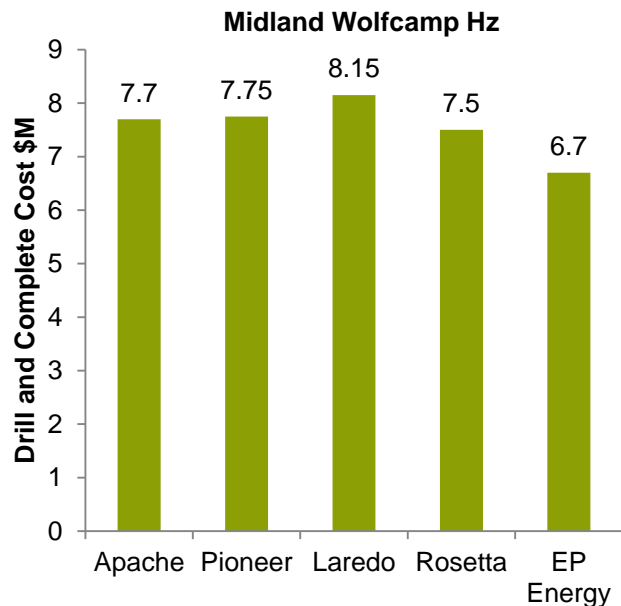
# What Drives the Recycle Ratio II

■ For example, while operating CF/bbl ranges between +/- \$15/boe, PD F&D ranges +/- \$50/boe.

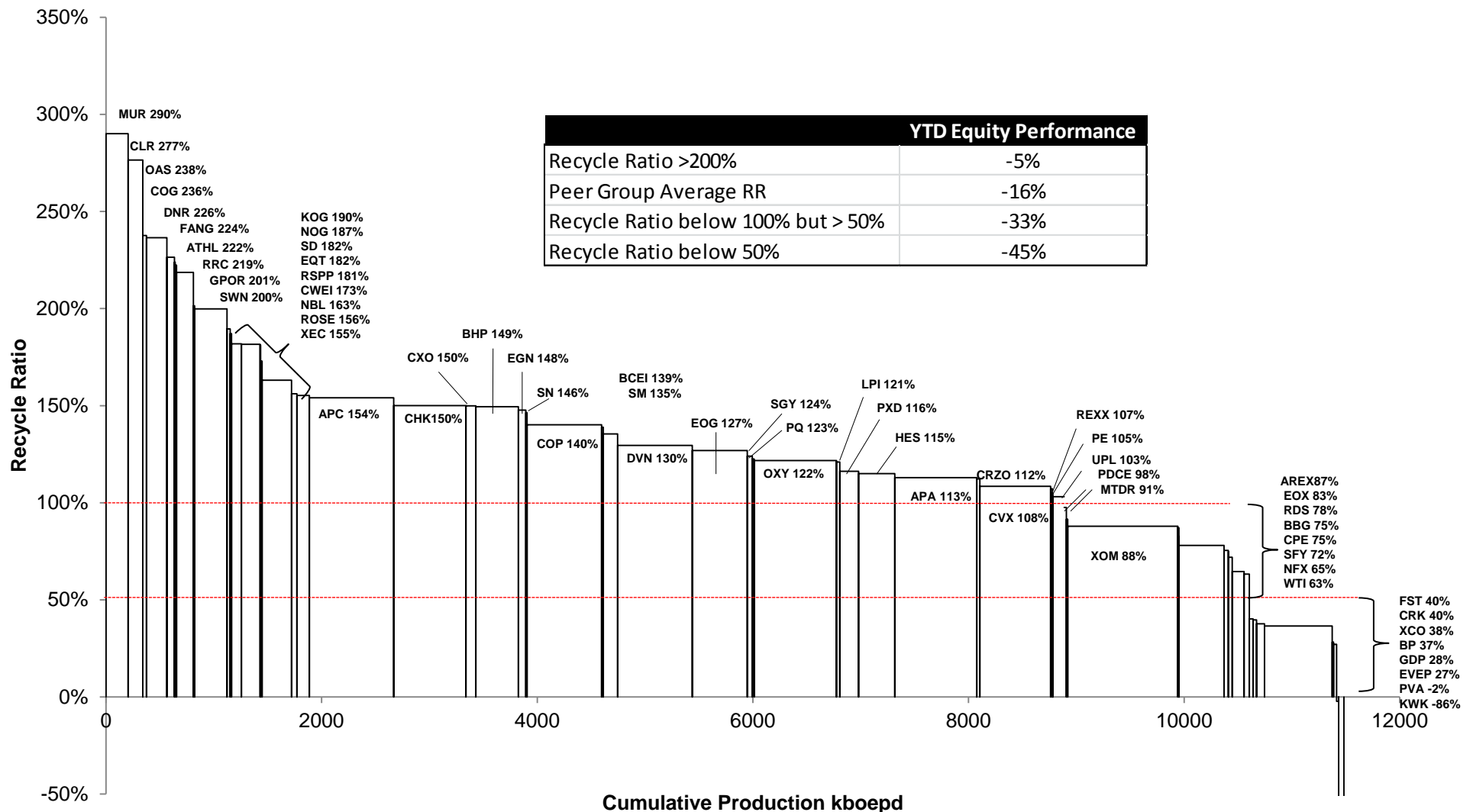


# What Drives the Recycle Ratio II

- In addition, between capital costs of the well and reserves per well, it is the latter that displays the greatest variation in almost every play.



# Recycle Ratios of the Public Peer Group



Source: Based on SEC filings of 61 publicly-listed E&P companies, for the 12-month period ended September 20, 2014