



# BHP Billiton Petroleum

## Onshore US Shale Media Tour

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Chief Executive, BHP Billiton Petroleum  
8 November 2012



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Please note, *the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2006* requires Operators to perform consultation relating to environment plans and oil spill contingency plans. The latest revision of the Regulations includes a requirement for correspondence from stakeholders relating to these plans to be passed on to NOPSEMA and therefore should not be considered to be confidential between the author and BHP Billiton. It is recommended that confidential matters not relating to the environment should be in separate communications.

# Agenda

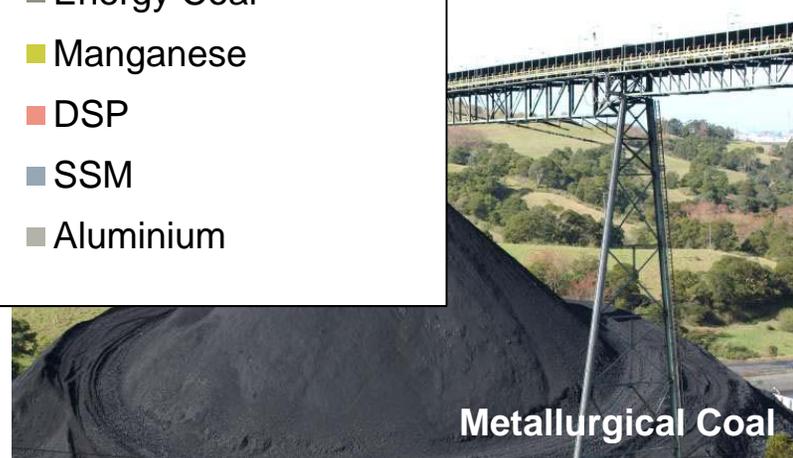
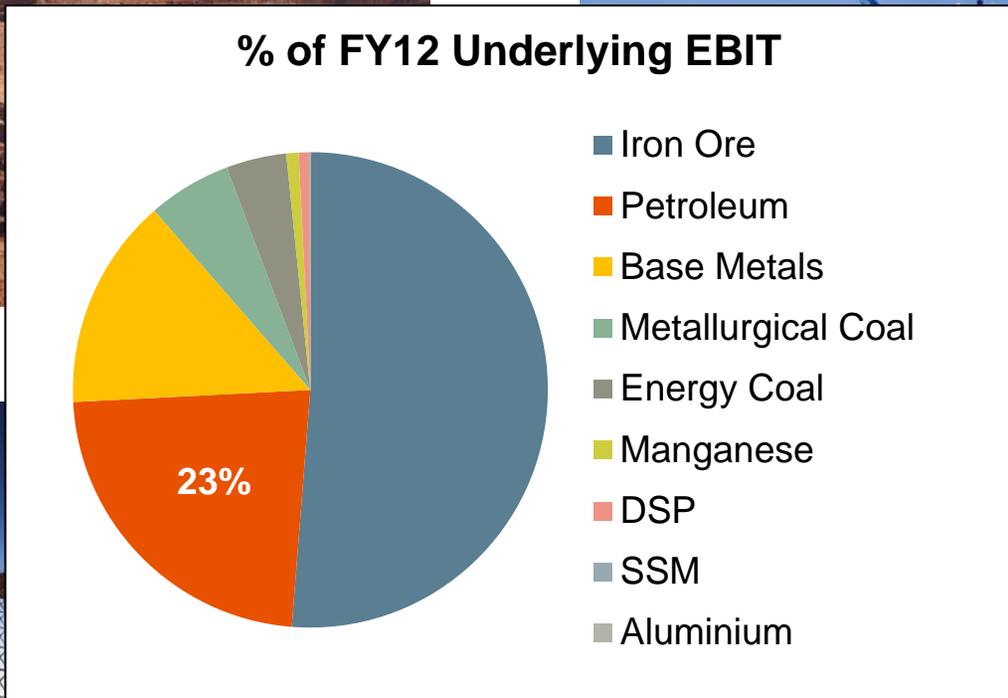
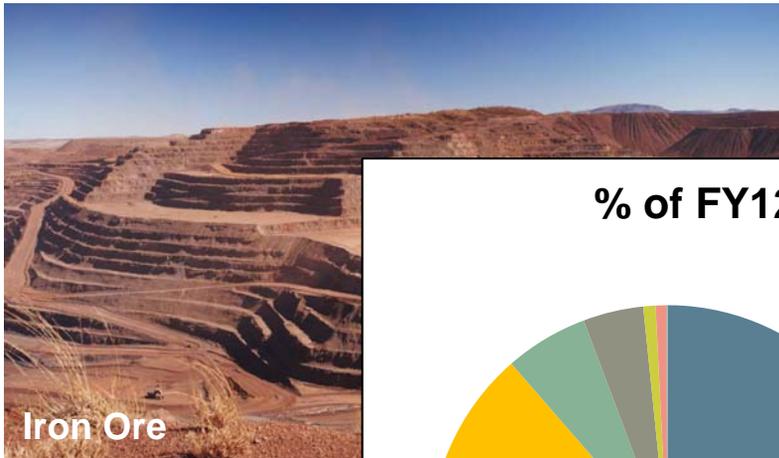
## **BHP Billiton Petroleum overview**

The US shale revolution

BHP Billiton's shale position

Business plan highlights

# One of BHP Billiton's four largest businesses



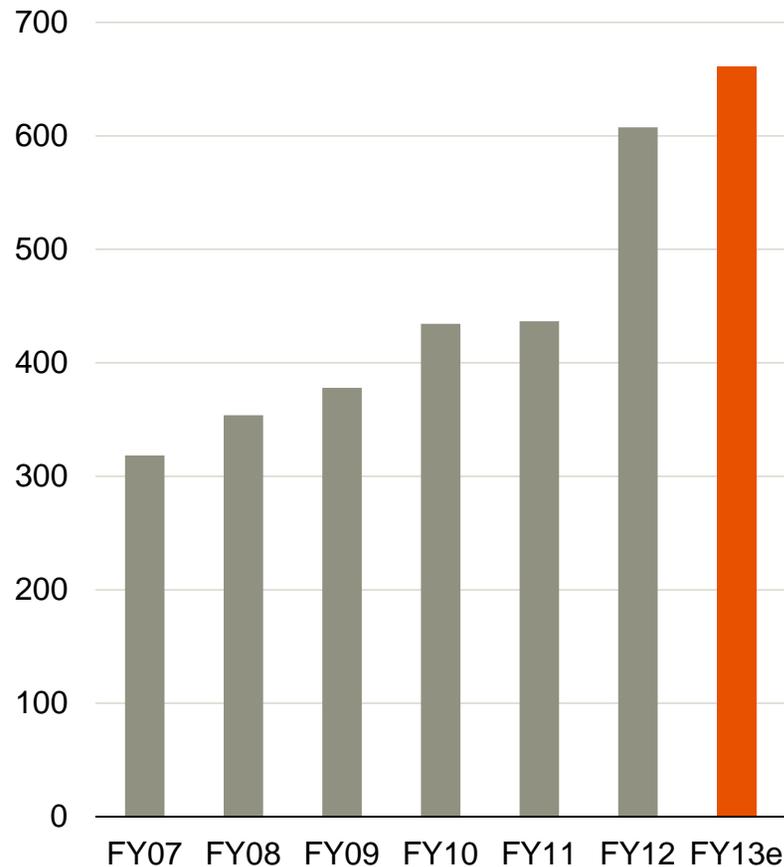
# A world class, global Petroleum portfolio



Production based on approximate FY13 expected net production rates.

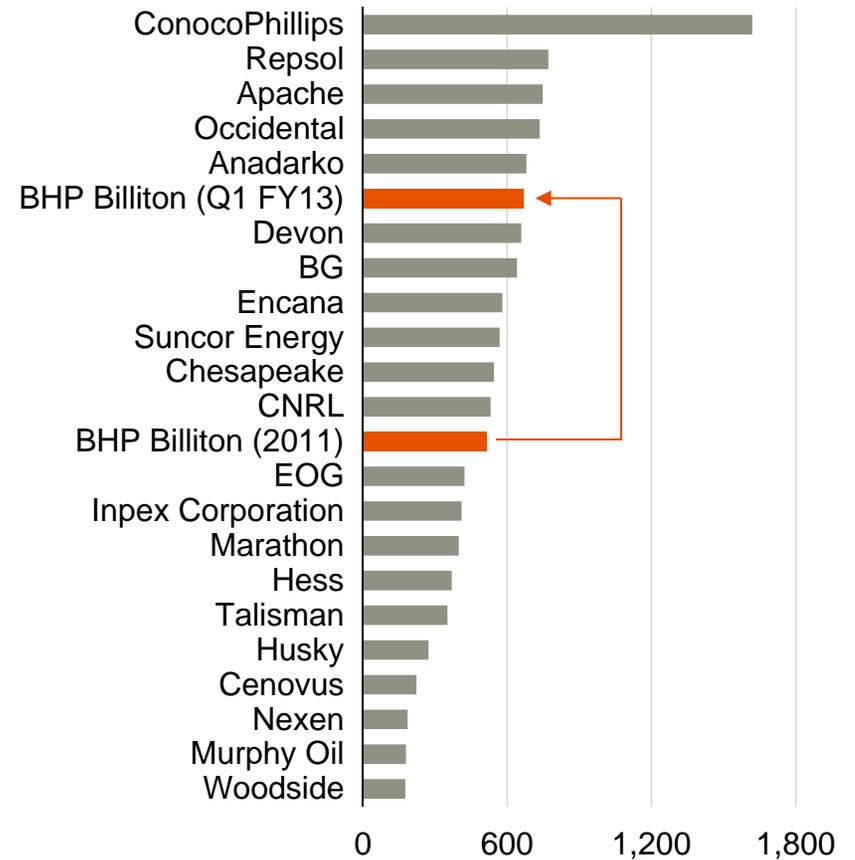
# A continuously growing business

**BHP Billiton Petroleum net volumes**  
(thousands of barrels of oil equivalent per day)



Source: BHP Billiton analysis as at 30 June 2012.

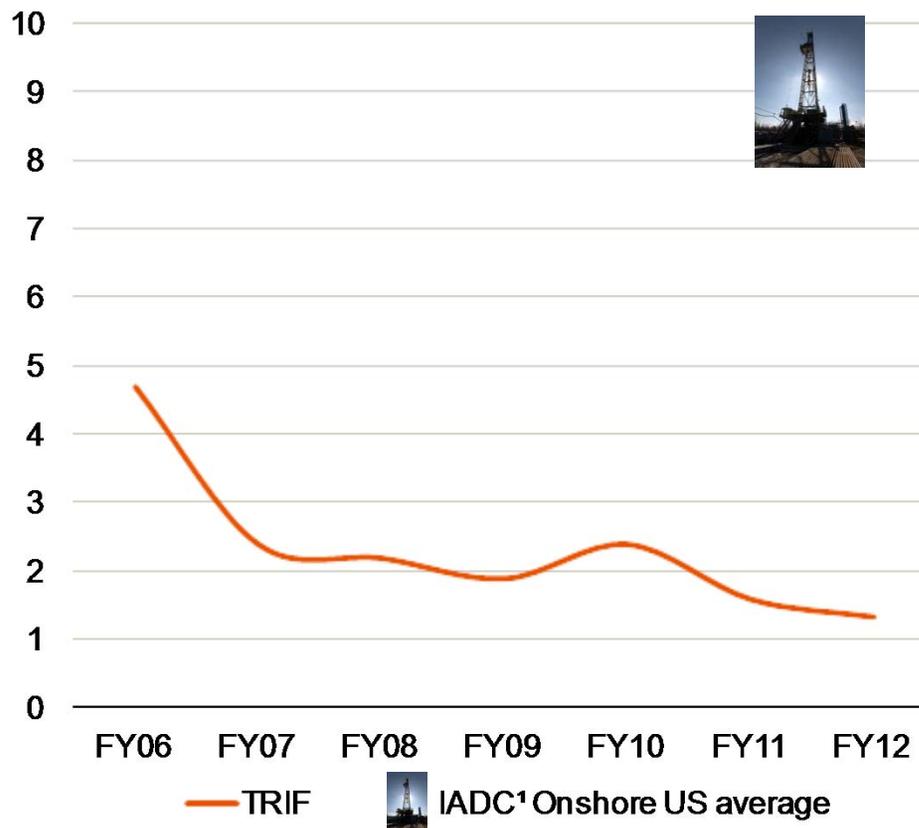
**2011 production rates – large caps**  
(thousands of barrels of oil equivalent per day)



Source: Wood Mackenzie.

# A leader in safety performance

## Conventional business safety performance (Total Recordable Incident Frequency)

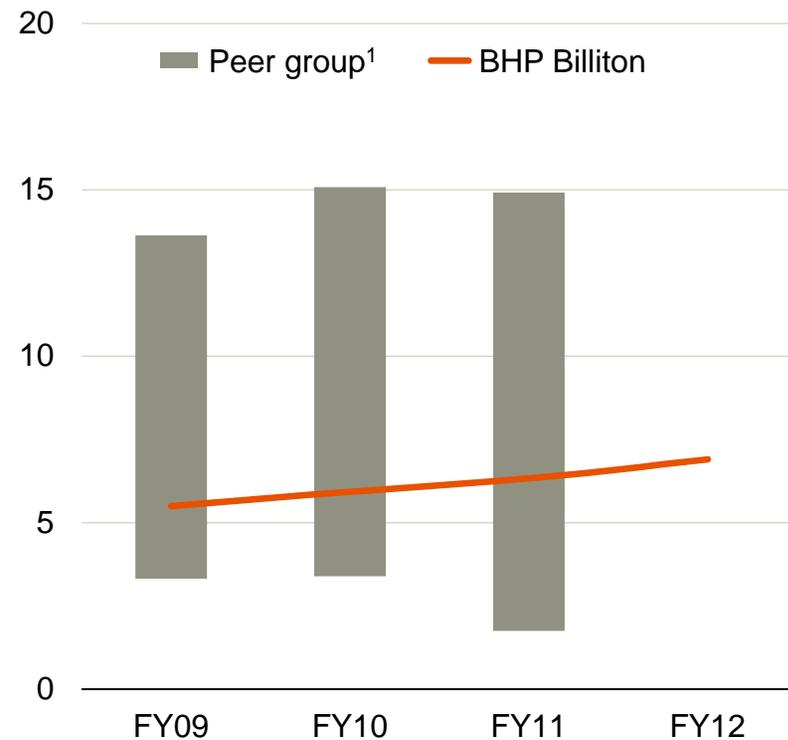


- Best ever TRIF in the conventional business during FY12
- New Onshore US business significantly lagging in performance
- Goal is to become safest in industry, offshore and onshore

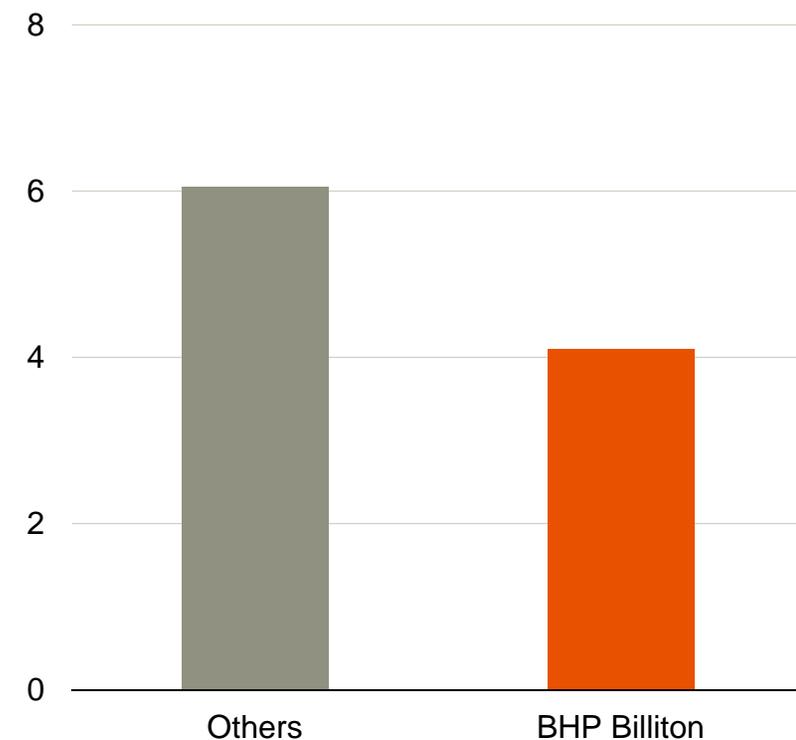
1. International Association of Drilling Contractors.  
Source: BHP Billiton analysis.

# A proven track record of outstanding operational performance

**Unit cash operating costs**  
(BHP Billiton net share, US\$/boe)



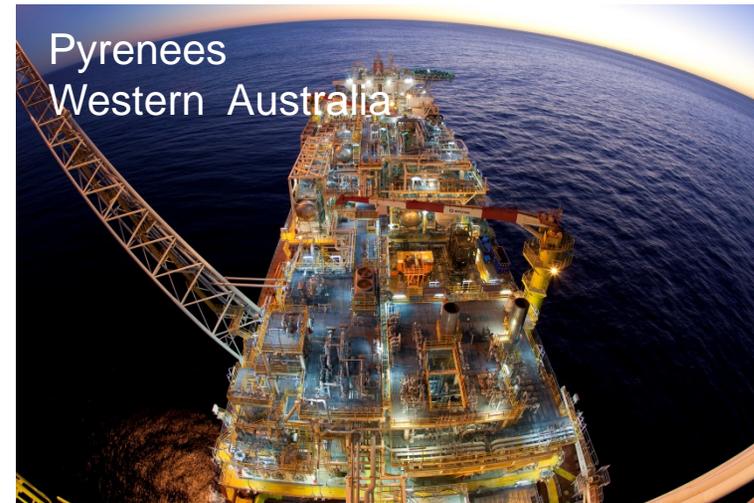
**Average drill time per 1,000 ft**  
(Deepwater Gulf of Mexico, subsalt, days)



1. Unit operating costs peer group consists of Apache, Marathon, Hess, BG, Anadarko, Noble and Talisman. Source: BHP Billiton analysis.

Source: Rushmore Associates' The Rushmore Reviews, Scout Tickets and BHP Billiton analysis as of 16 April 2012.

# Outstanding project execution



# Agenda

BHP Billiton Petroleum overview

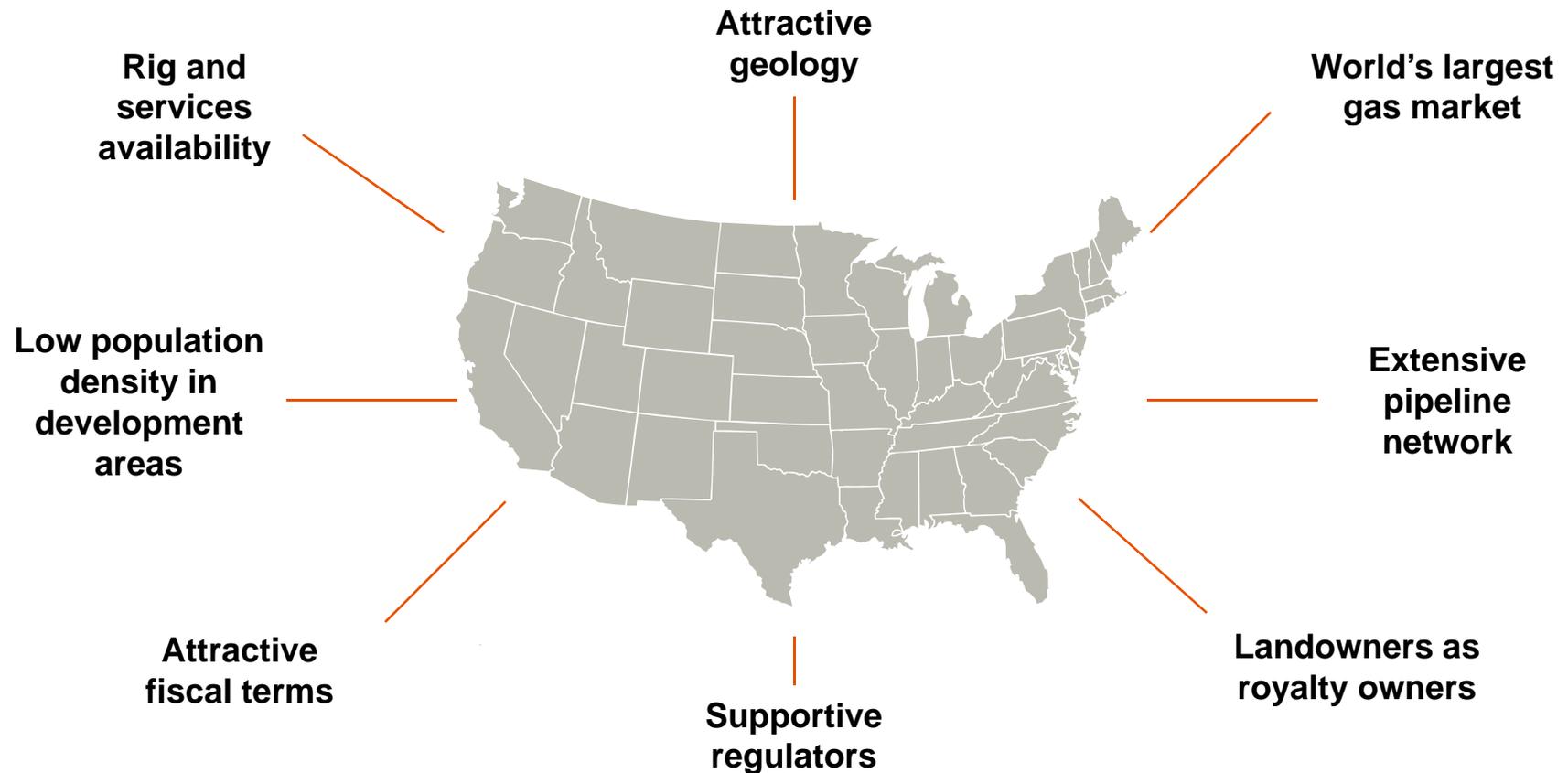
**The US shale revolution**

BHP Billiton's shale position

Business plan highlights



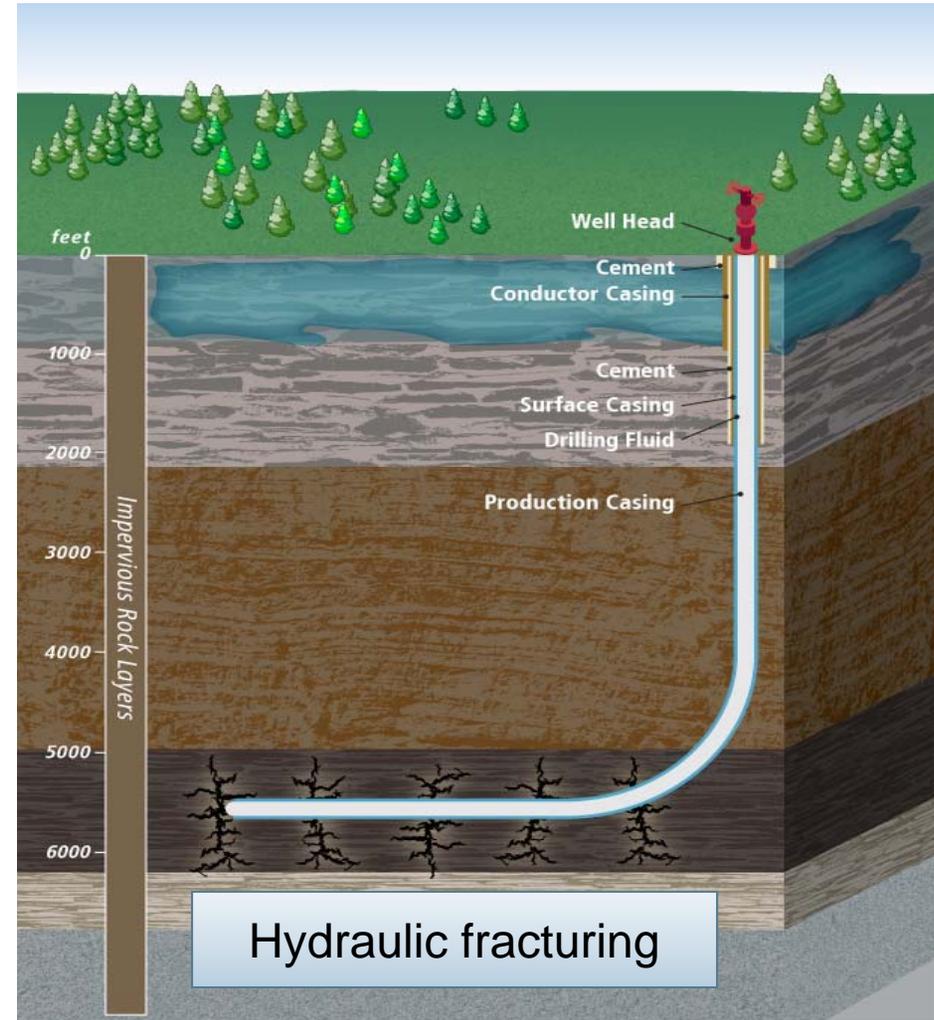
# A unique combination of favourable characteristics working together



# Two technologies in combination



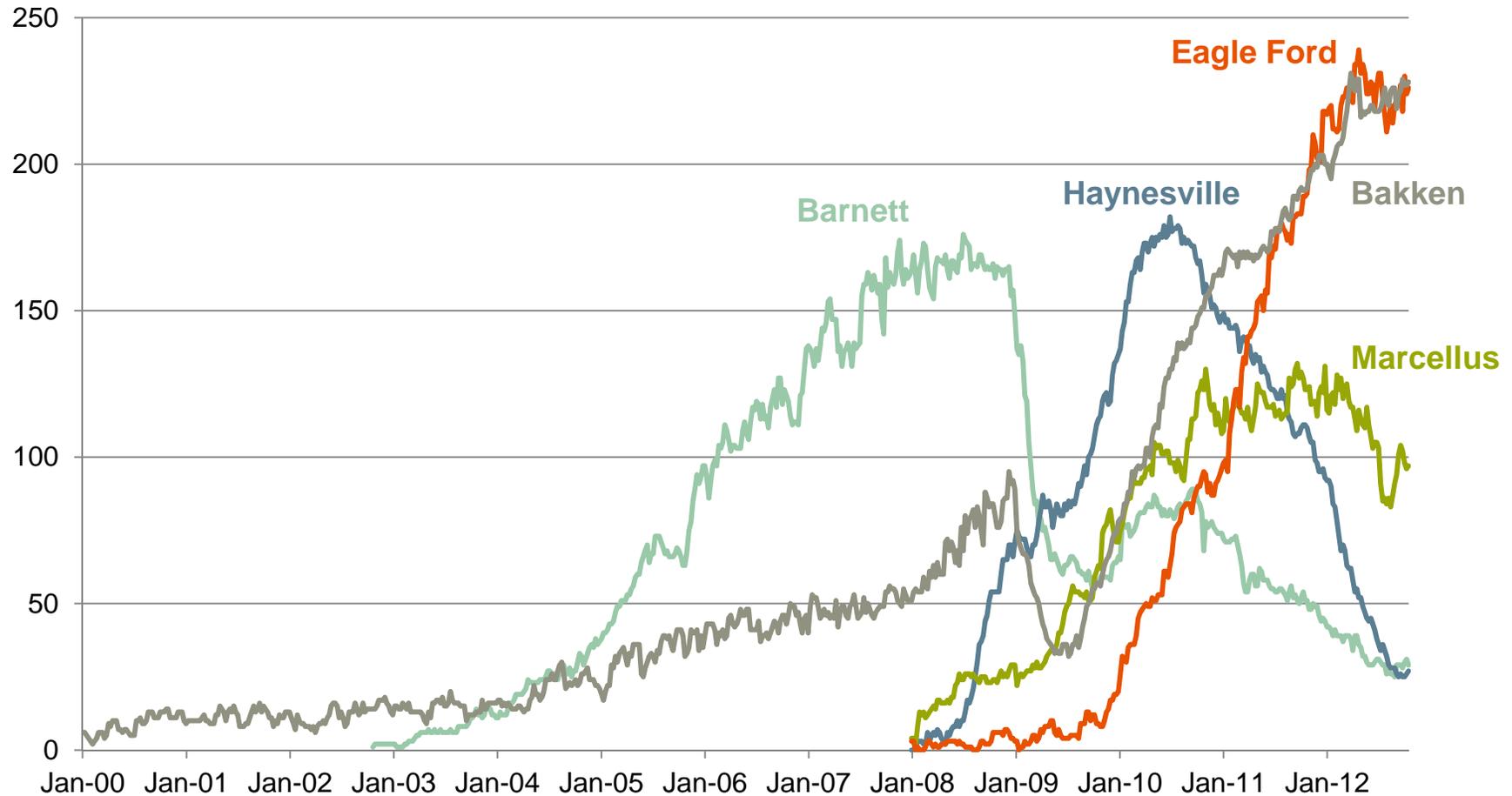
Horizontal drilling



Hydraulic fracturing

# Rig count 2000-2012

## US shale rig counts in selected plays

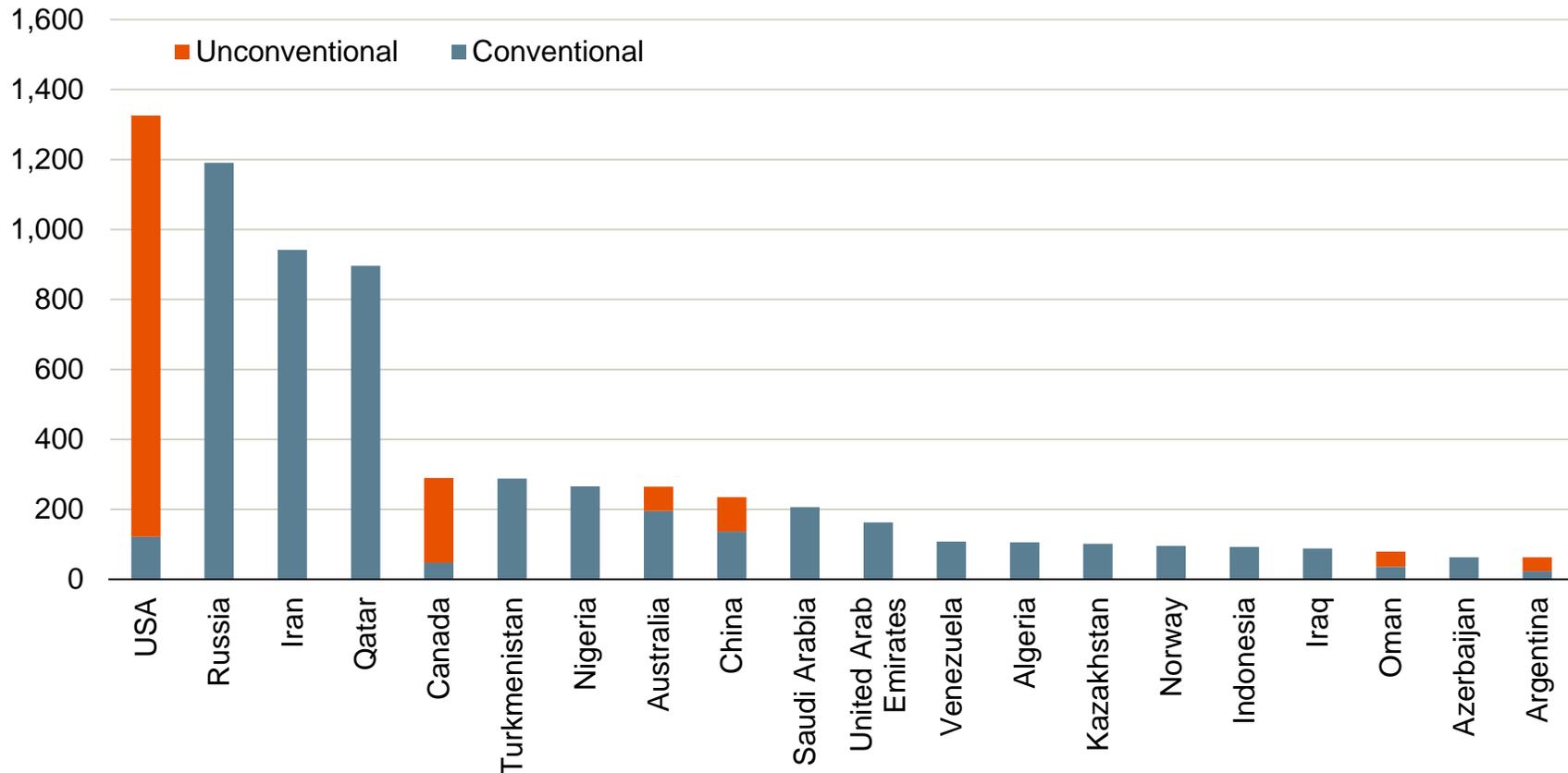


Source: Wood Mackenzie, Smith Bits.

# Natural gas resources in the US are the largest in the world, driven by shale

## Natural gas resource estimate

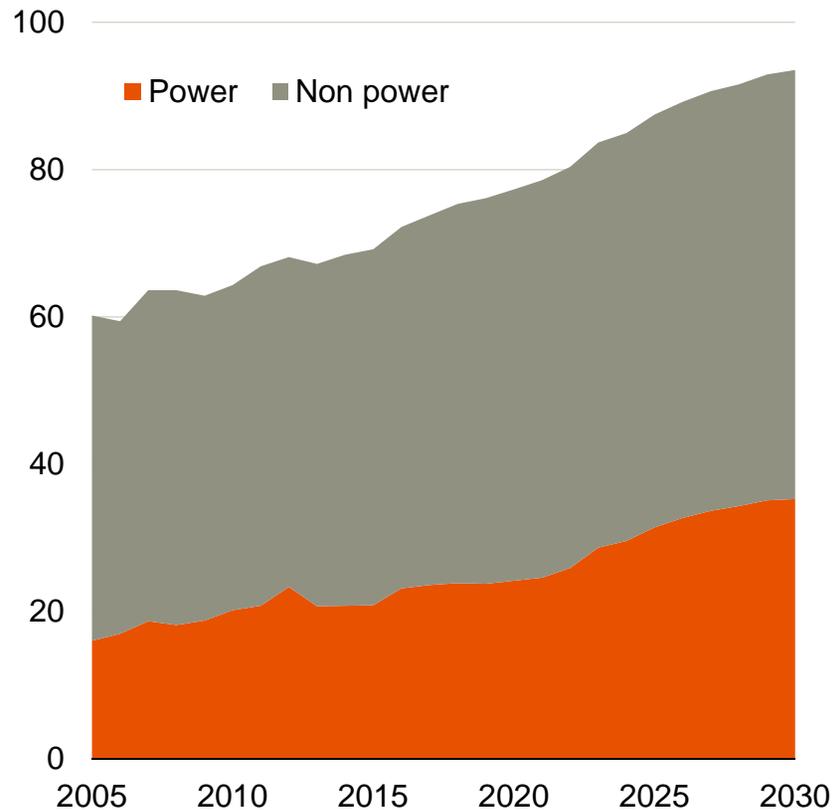
(Tcf)



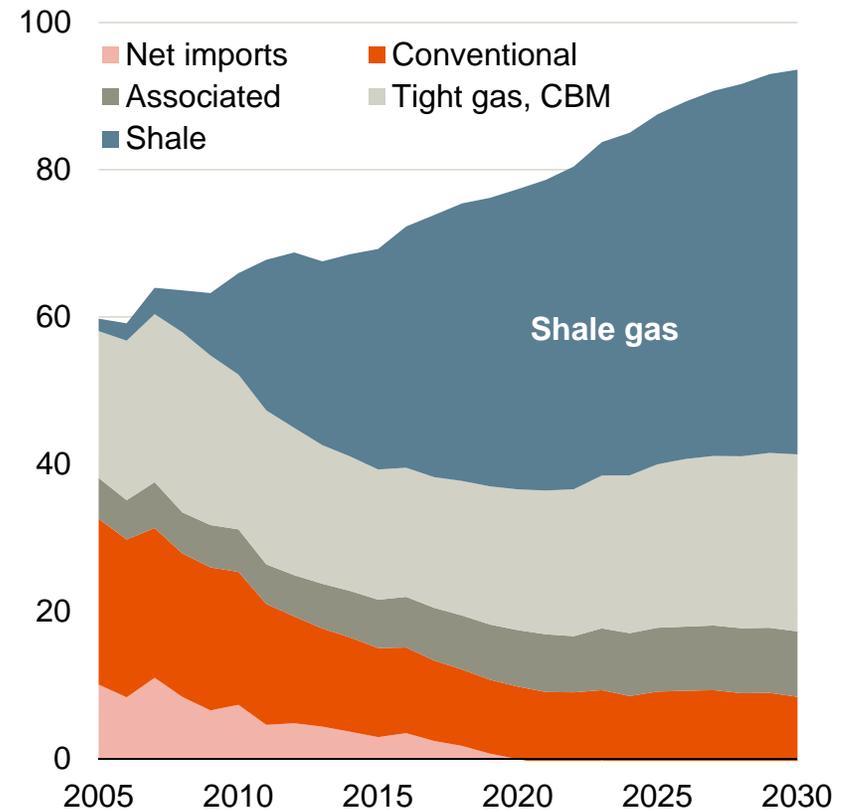
Source: Wood Mackenzie, October 2012.

# Shale gas is a critical source of supply to meet growing US demand for natural gas

## US natural gas demand (Bcfd)



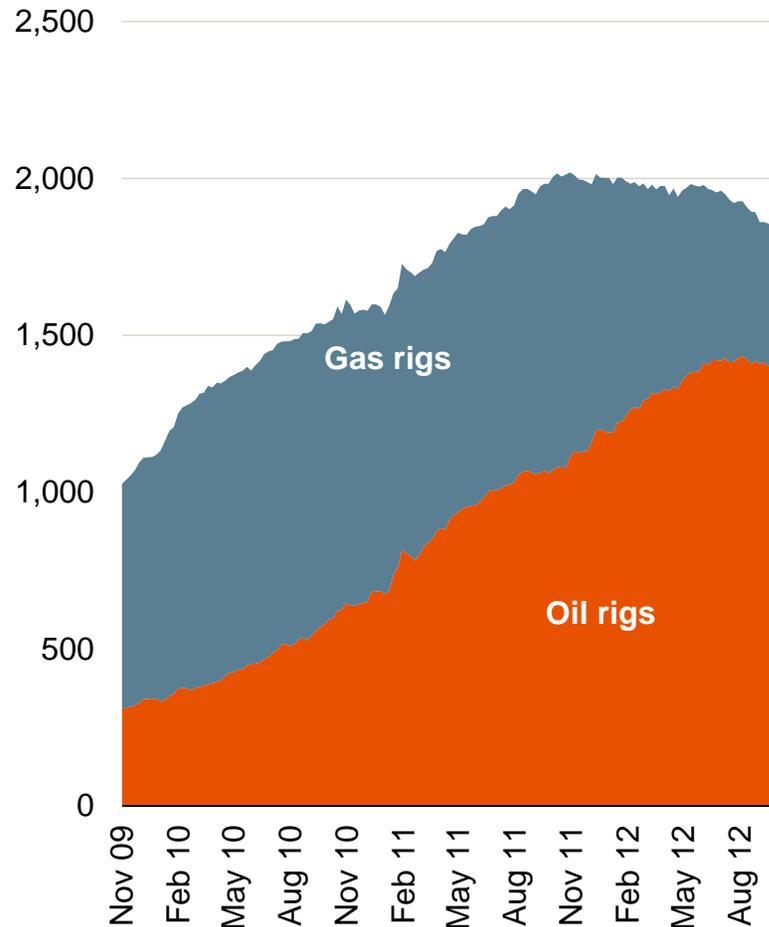
## US natural gas supply (Bcfd)



Source: Wood Mackenzie.

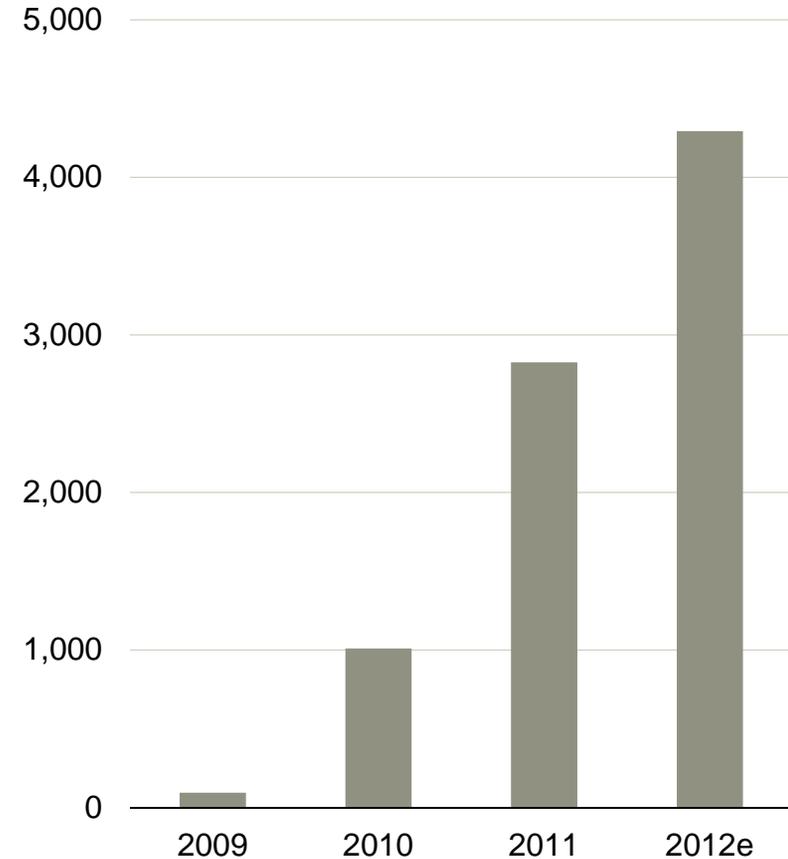
# A major ramp-up in industry activity over the last three years, now focused on liquids

### Total US onshore rig counts



Source: Baker Hughes.

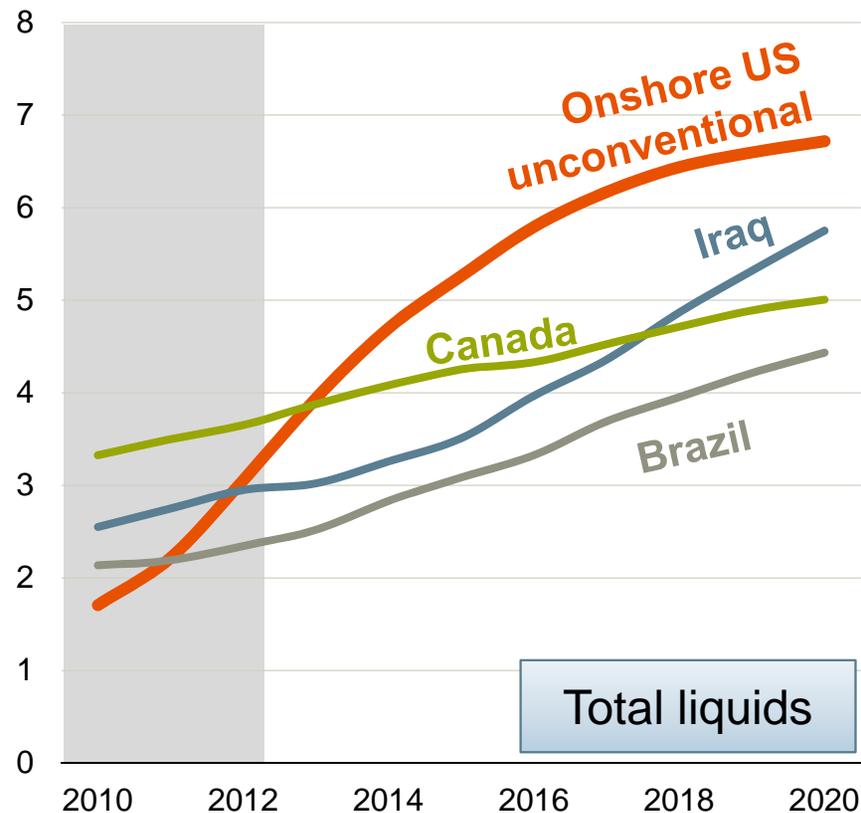
### Drilling permits issued in the Eagle Ford shale



Source: Railroad Commission of Texas.

# US unconventional liquids production now forecast to surpass Brazil, Canada, and Iraq

**Liquids production forecast**  
(millions of barrels per day)



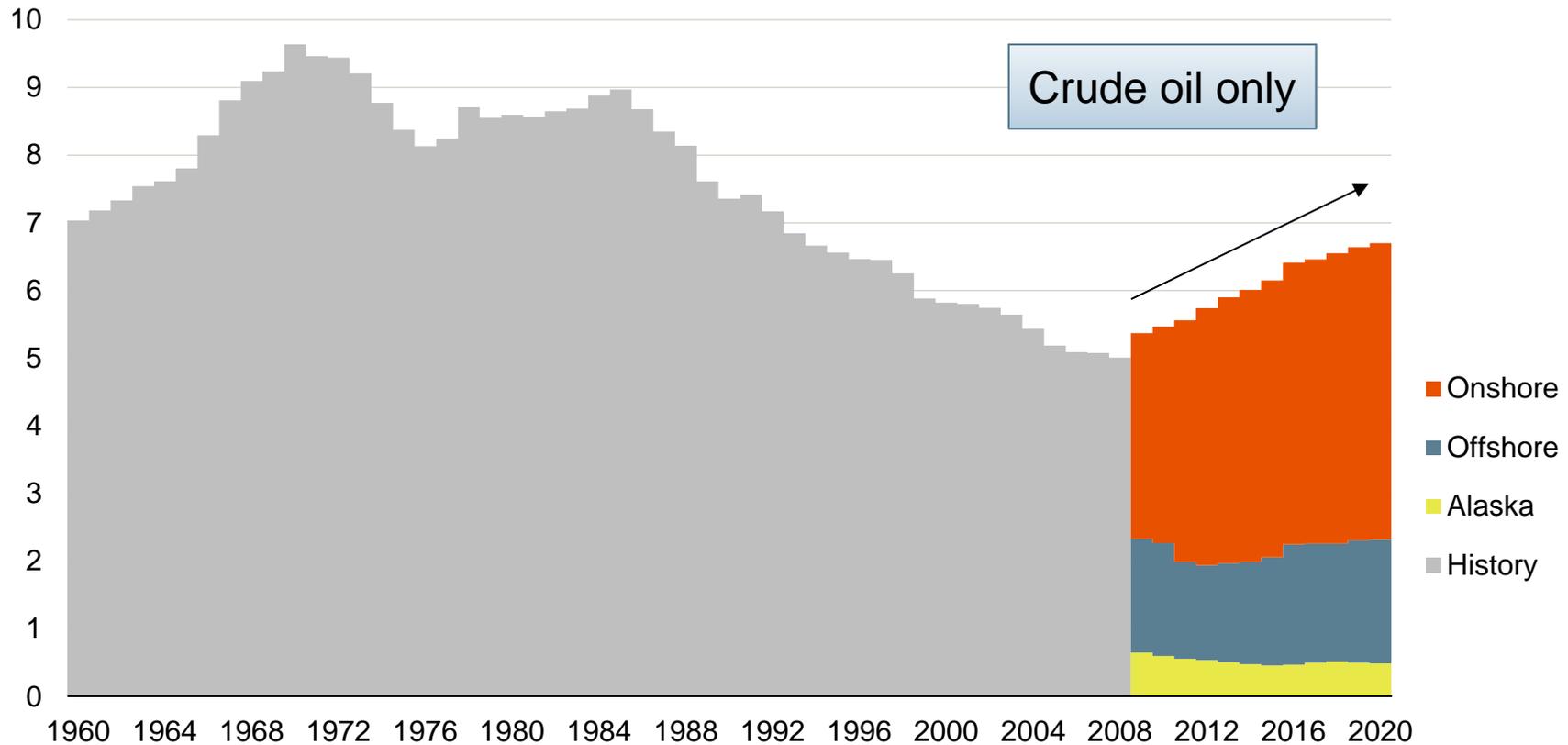
Source: Wood Mackenzie.

- Onshore US unconventional production is expected to grow rapidly and contribute significantly to total US liquids production
- In 2013 total US liquid production forecast to average 11.4 million barrels per day<sup>1</sup>
- Saudi Arabia averages approximately 11.6 million barrels per day<sup>1</sup>

1. Petroleum Marketers Association of America.

# Decades of declining US oil production reversed with growth in shale liquids

**US crude oil production**  
(millions of barrels per day)



Source: US Energy Information Administration.

# Shale energy development brings major benefits to the US economy

## Employment

- 1.75 million jobs created in the past few years and expected to account for 3 million jobs in 2020
- Wages 50% higher than the national average

## Investment and Tax Revenue

- US\$5.1 trillion investment and US\$2.5 trillion in government revenues between now and 2035
- Nearly 2% of US GDP over the next 3 years

## Energy Security

- 25% increase in domestic oil production in the last 4 years, driven primarily by shale oil
- Net oil imports expected to decrease 60% by 2020



Source: US Chamber of Commerce.

# Agenda

BHP Billiton Petroleum overview

The US shale revolution

**BHP Billiton's shale position**

Business plan highlights

# Shale business model

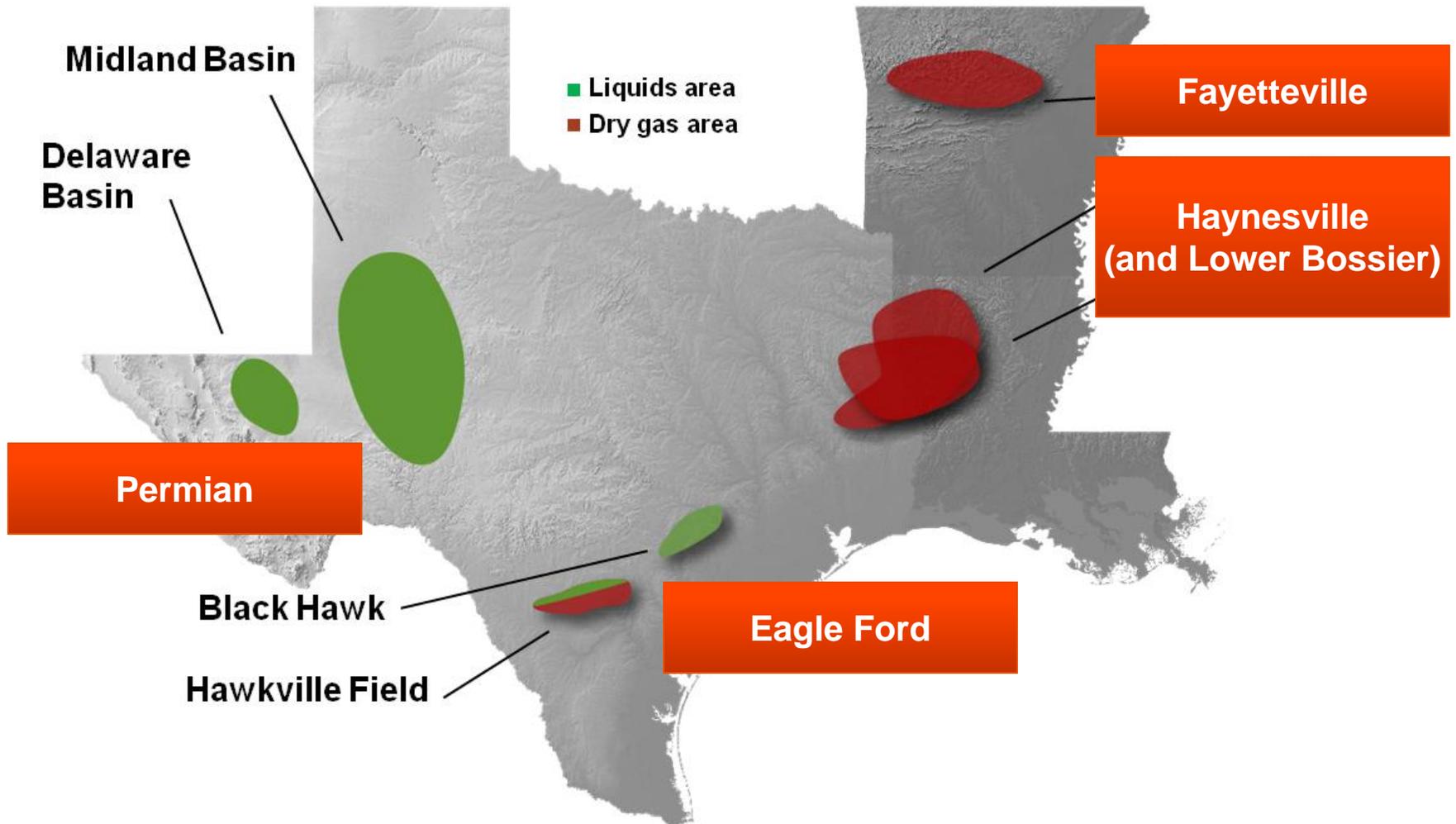


Offshore	Feature	Shale
Yes	Geologic risk	No
5+ years	1 <sup>st</sup> production	Months
Years	Payback	Months
Limited	Flexibility	Significant
Limited	Expandability	<b>Substantial</b>



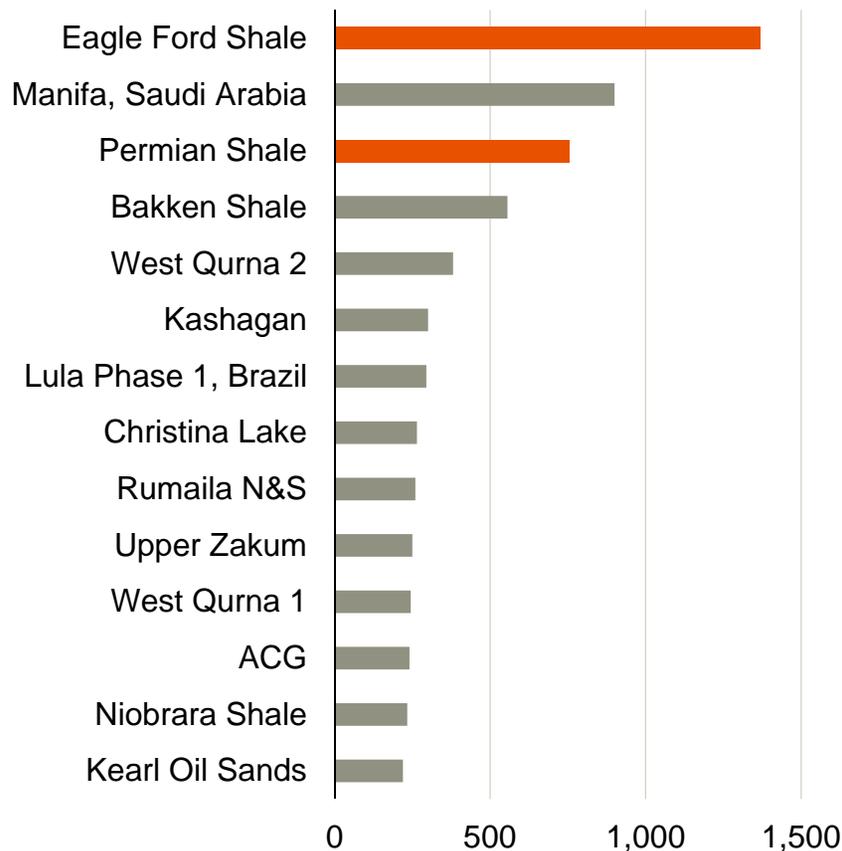
- Offshore oil and gas offers strong returns on a full development basis but expansion capability is limited post investment
- Shale developments offer strong returns on an individual well basis and are highly expandable in both the short and long term
- Current shale drilling and completion technologies recover very low amounts of the hydrocarbons in place
- Shale is ripe for a long term technology approach which few companies can execute

# Strong positions in four large shale plays



# We have significant positions in two of the largest oil field developments in the world

## Major field production growth 2012-2017 (thousands of barrels of oil per day)

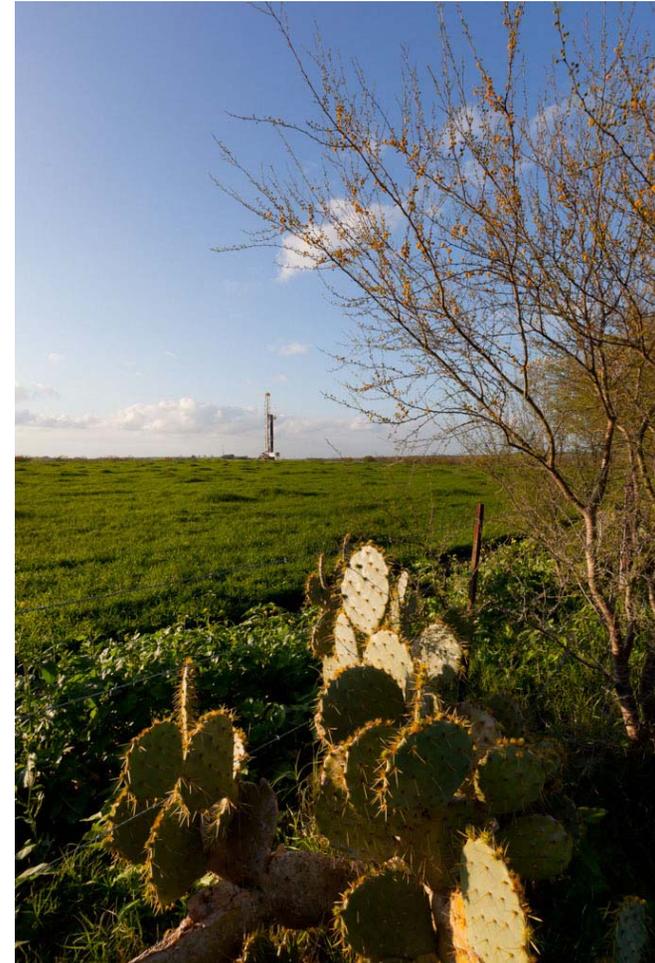
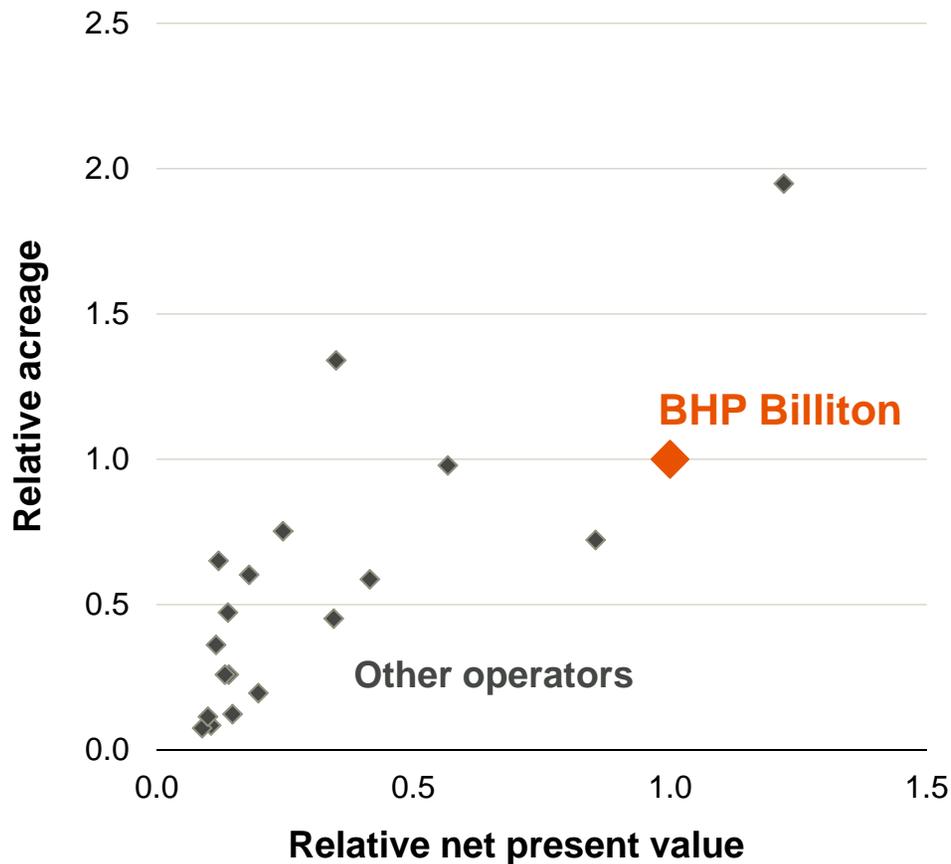


- Eagle Ford and Permian are forecast to be the two largest drivers of US oil production growth through 2017
- BHP Billiton's position in these two fields is large
- Fields with very long lives such as these will have several tranches of technologies applied over decades
- There are very few in the world

Source: Morgan Stanley.

# Our position in the Eagle Ford is among the largest and most valuable of all operators

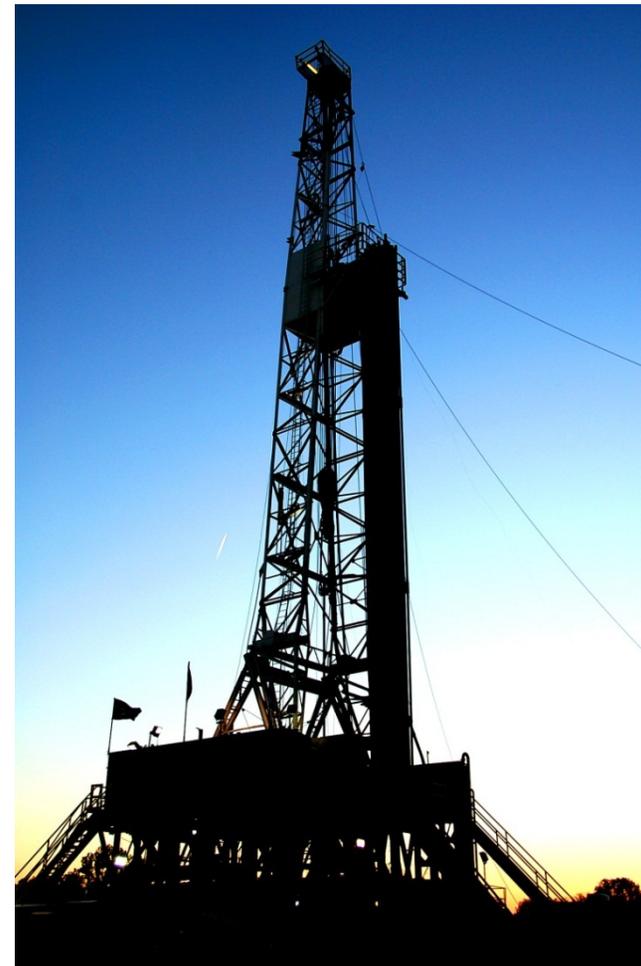
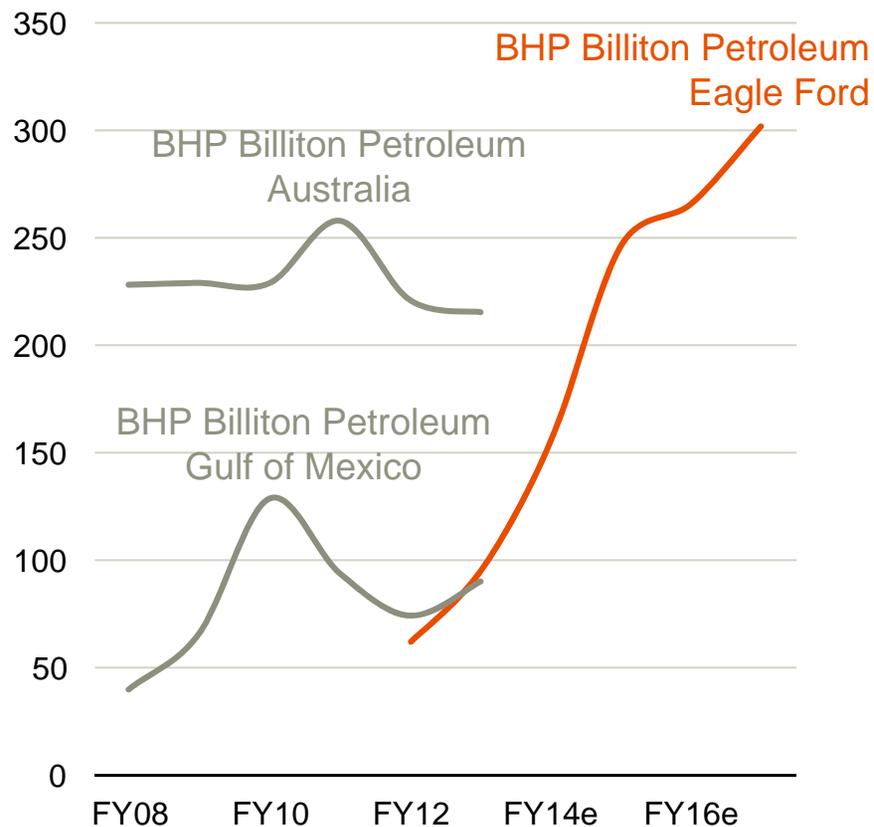
**NPV and acreage of Eagle Ford operators**  
(relative terms, BHP Billiton indexed to 1.0)



Source: WoodMackenzie, BHP Billiton indexed to 1.0 (October 2012).

# The scale of our Eagle Ford opportunity is unprecedented for BHP Billiton Petroleum

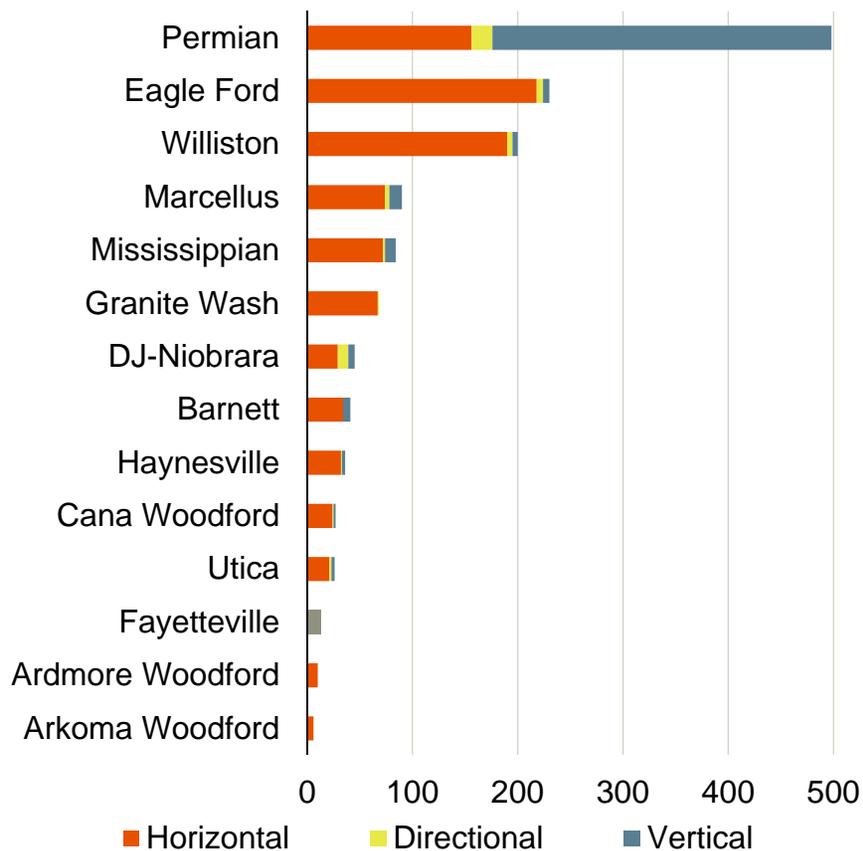
**Actual and estimated production**  
(BHP Billiton net share, Mboe/d)



Source: BHP Billiton analysis.

# Permian offers a second shale liquids opportunity

**US rig count by field and type**  
(week ending October 12, 2012)

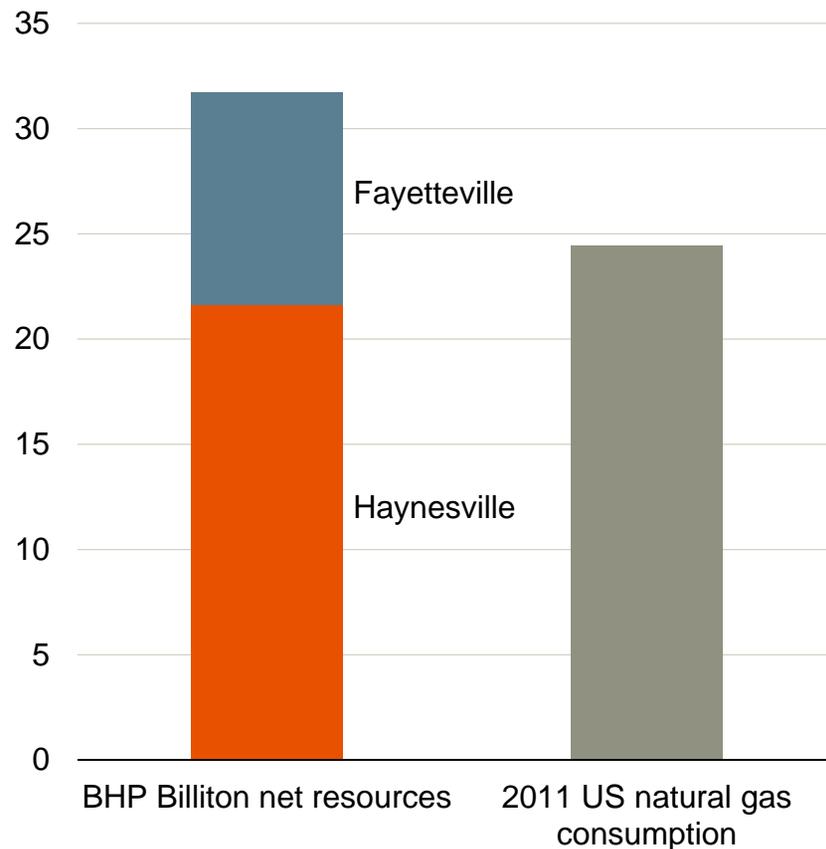


Source: Baker Hughes.

- Industry operating almost 500 rigs in the Permian
- Decades of conventional drilling and production history
- Shale oil development in early stages – years behind Eagle Ford
- BHP Billiton holds over 400,000 acres in the Permian and is actively appraising for potential development

# Our total dry gas resources exceed current annual US consumption

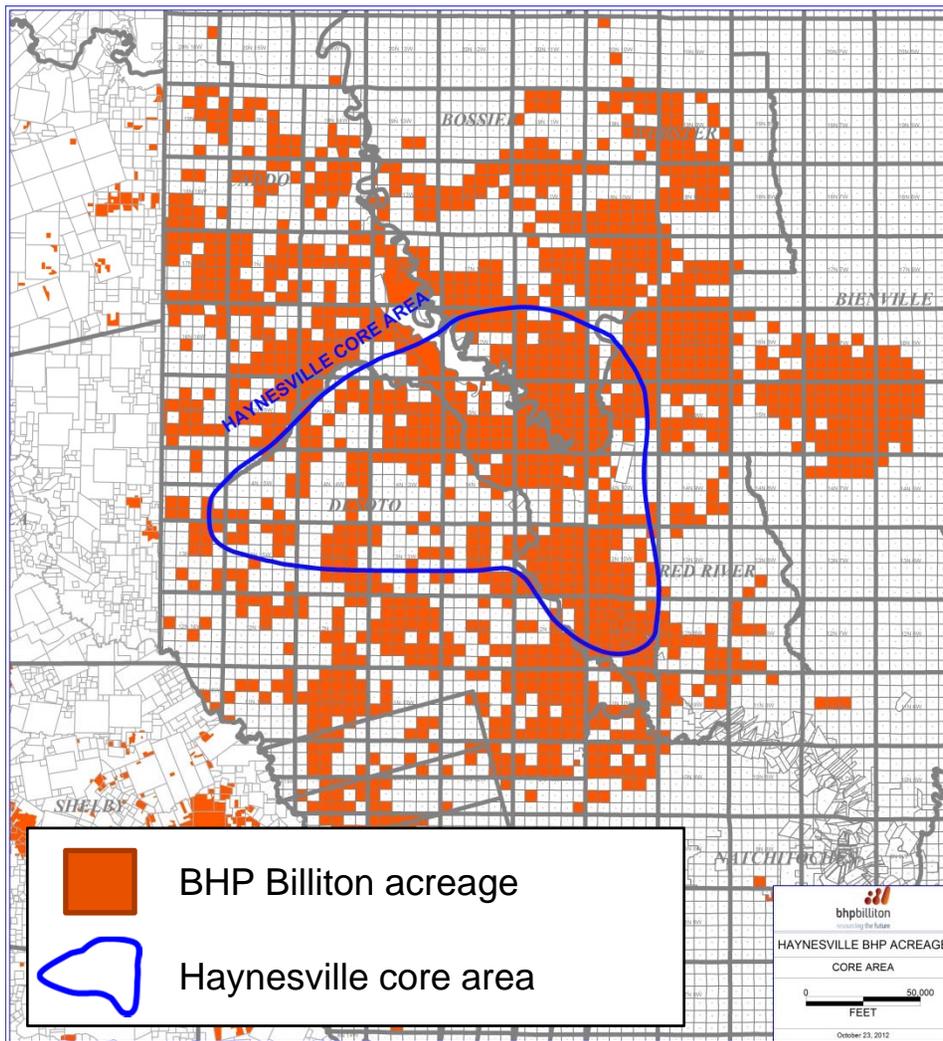
## BHP Billiton resources by field (trillions of cubic feet)



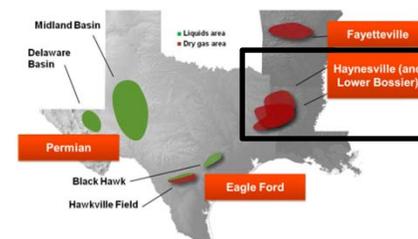
- Total dry gas resources in excess of 30 tcf
- Sufficient to supply US demand for natural gas for more than a year
- Drilling will continue for decades in both fields

Source: Wood Mackenzie, BHP Billiton analysis.

# The quality of our acreage in the Haynesville is among the best in industry

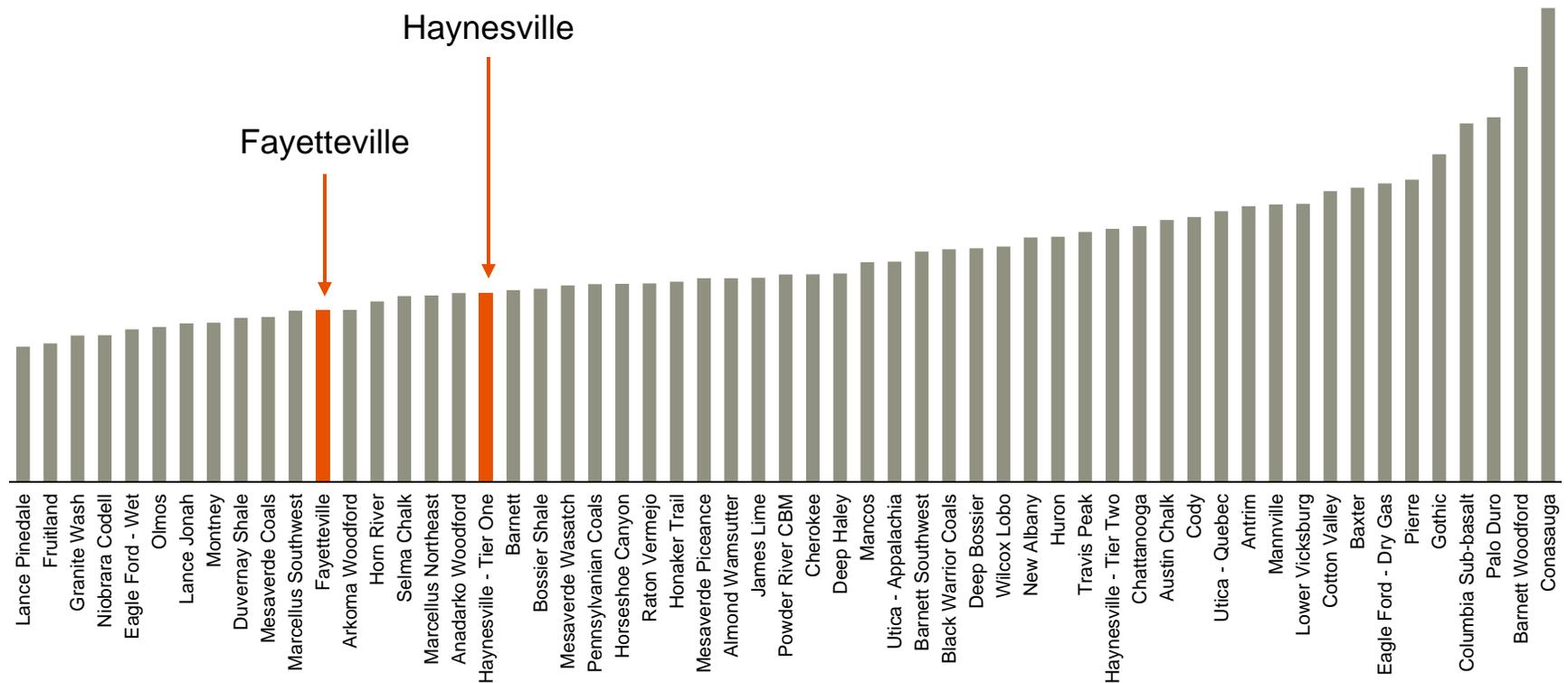


- Largest acreage position in the core of field, where single well recoveries exceed 8 Bcf
- Many wells within our core acreage deliver recoveries in excess of 10 Bcf and some significantly higher
- Strong rates of return for single well investments, even at current prices



# Haynesville and Fayetteville are among the lowest cost dry gas properties in the US

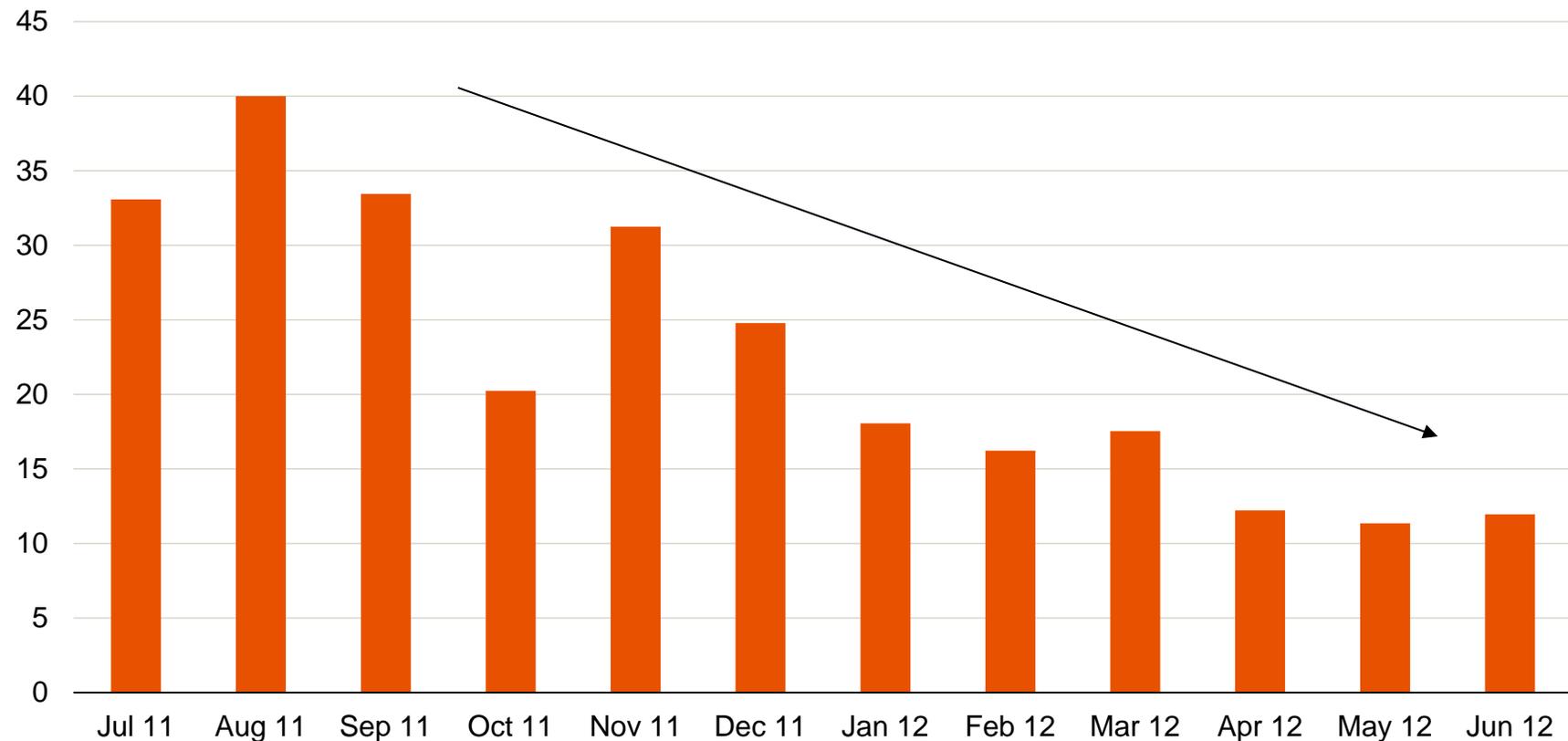
Comparative ranking of break even wellhead cost for US unconventional gas plays, 2012  
(gas focused unconventional plays only)



Source: Wood Mackenzie, 2012.

# We are making significant progress towards further reducing development cost

**Average Fayetteville rig release time**  
(days)



Source: BHP Billiton analysis.

# Agenda

BHP Billiton Petroleum overview

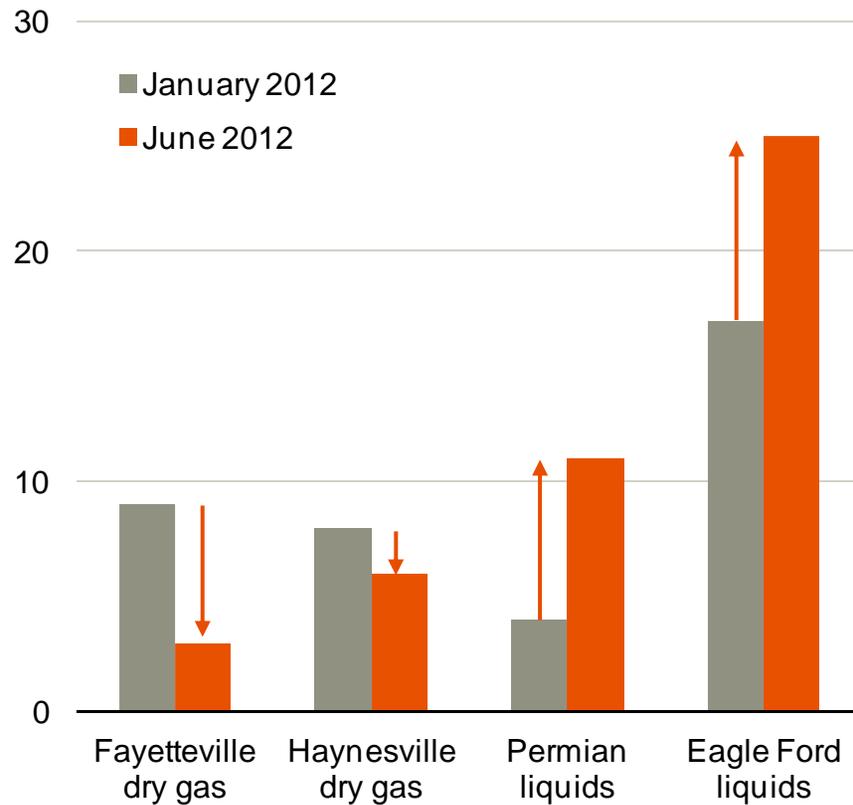
The US shale revolution

BHP Billiton's shale position

**Business plan highlights**

# Near-term activity focused on liquids

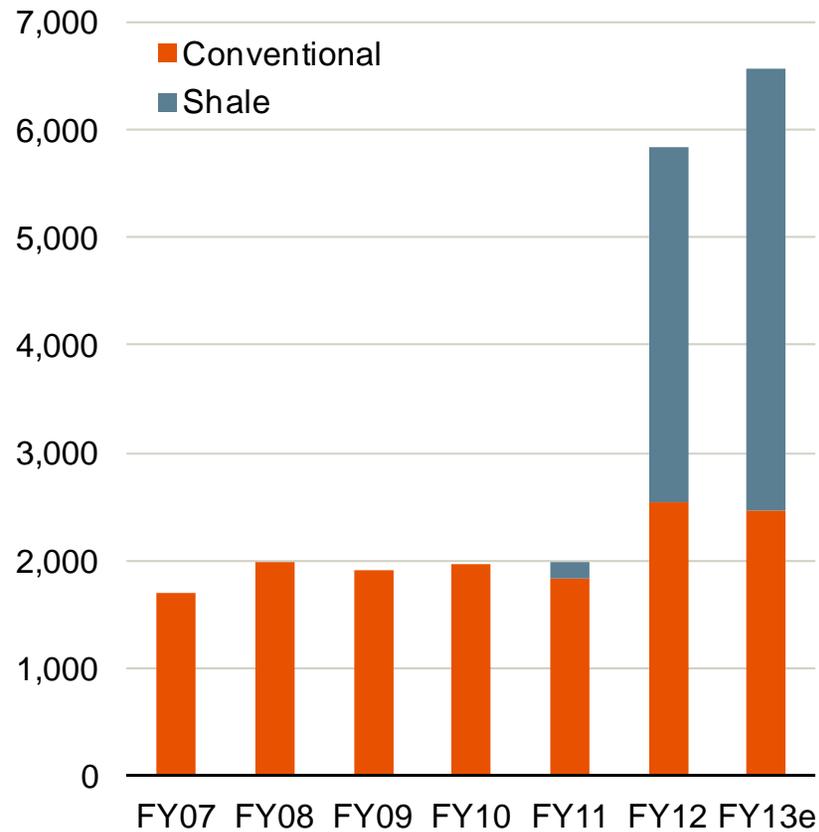
## Gross operated rigs (average rig count)



Source: BHP Billiton analysis.

# US\$6.5 billion capital program this fiscal year, focused on shale liquids

**Development capital**  
(BHP Billiton net share, US\$ millions)



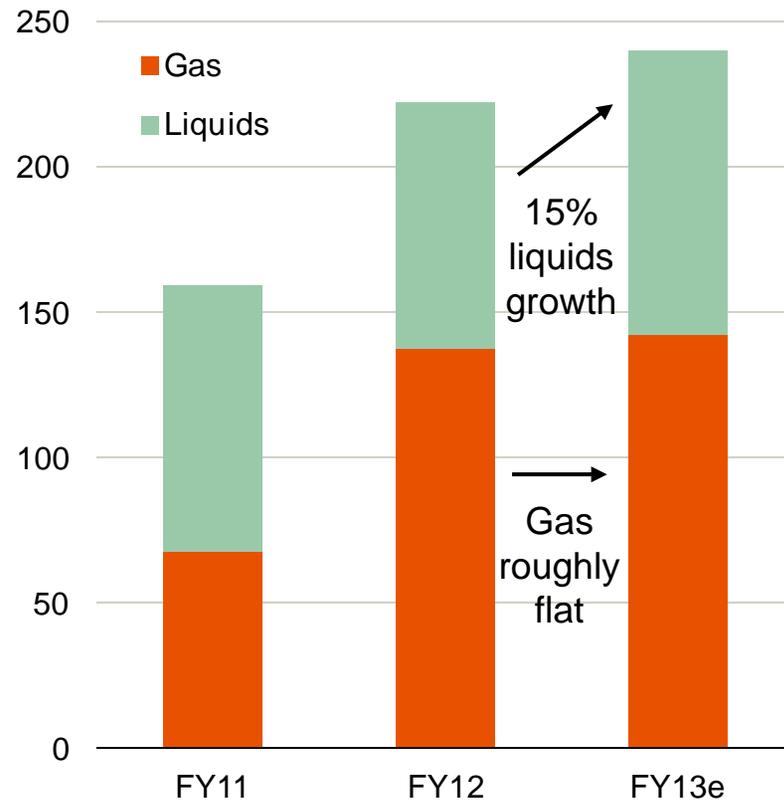
Source: BHP Billiton analysis.



# Targeting combined 15% liquids growth in FY13, both shale and conventional

## Volumes

(BHP Billiton net share, MMboe)



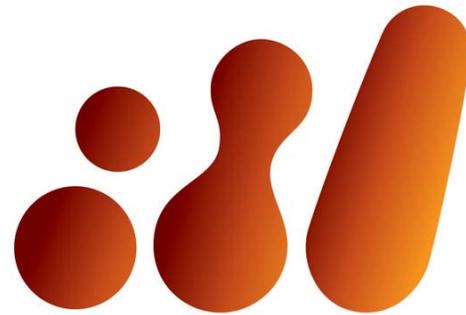
Source: BHP Billiton analysis.



# Onshore US shale in summary

- An industry phenomenon that is transforming the US energy outlook
- BHP Billiton's position is both large and valuable
- Leverages our strengths in project management, technical capability and operational excellence
- Matches BHP Billiton's strategy and strong financial capability
- Major development program and production growth ahead





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resourcing the future



# Looking forward

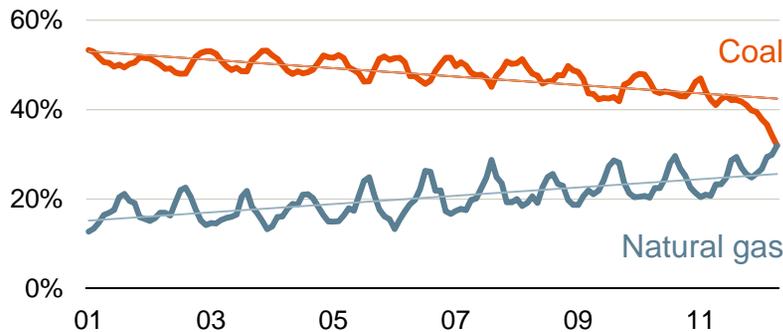
**J. Michael Yeager**  
Chief Executive, BHP Billiton Petroleum  
8 November 2012



# Many examples of shale beginning to transform the US economy

## Electric power: gas displacing coal at an unprecedented rate

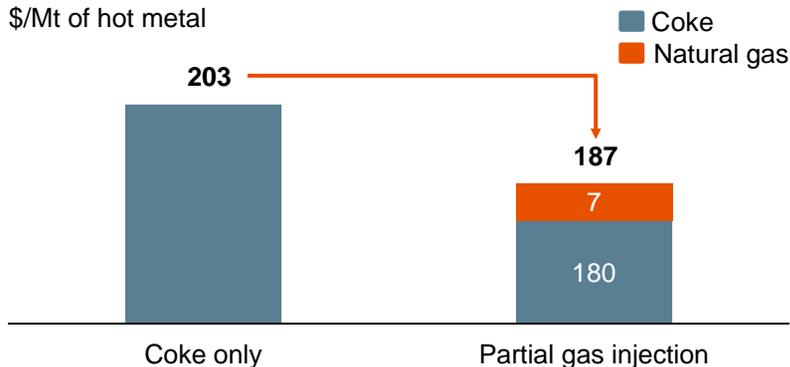
Share of total US electric generation  
Percentage of monthly MWh



Source: EIA.

## Steelmaking: energy costs dropping rapidly

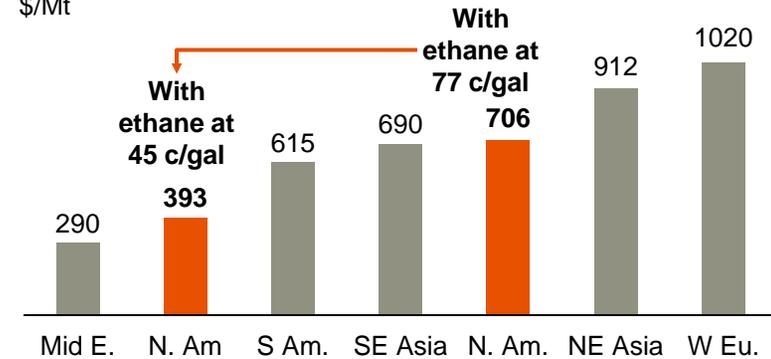
Blast furnace fuel costs<sup>1</sup>  
\$/Mt of hot metal



1. For a non-integrated steel mill using merchant coke  
Source: US Steel.

## Petrochemicals: US becoming a global low-cost powerhouse

Global ethylene cash cost, 2011  
\$/Mt



Source: CMAI, BHP Billiton analysis.

- In April, gas surpassed coal in power generation
- During 2006-2011, the US had the largest reduction in GHG emissions of any country<sup>1</sup>
- US ethylene production is now among the lowest cost in the world
- Low gas prices are reviving other industries such as steelmaking
- Lower gas prices brought on by shale amounts to a ~\$100 billion annual savings to the US economy<sup>2</sup>

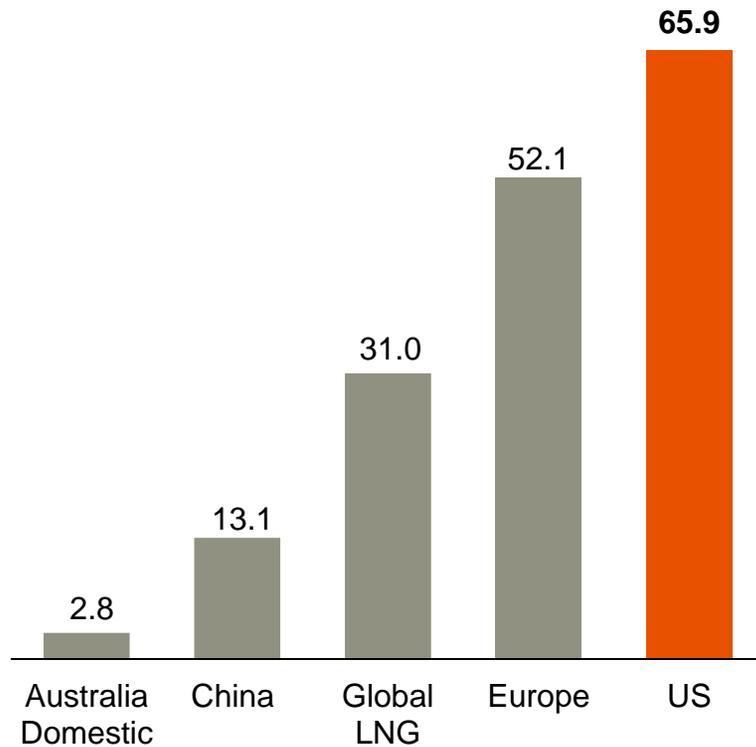
1. Source: IEA.

2. Based on 65 bcf/d average gas use and \$4/MMBTU difference in gas prices relative to Western European levels.

# Significant domestic gas demand upside

## The US gas market is the largest in the world...

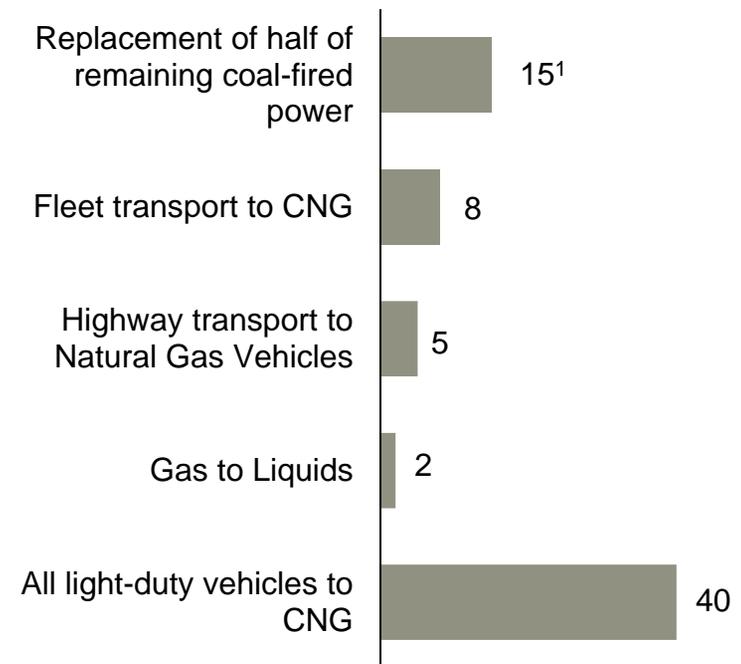
Gas demand, 2011  
(Bcf/d)



Source: AEMO, Wood Mackenzie, BHP Billiton analysis.

## ...but substantial untapped incremental domestic demand remains

Examples of potential incremental US gas usage  
(Bcf/d)



1. Part of this replacement to be driven by projected environmental regulations.

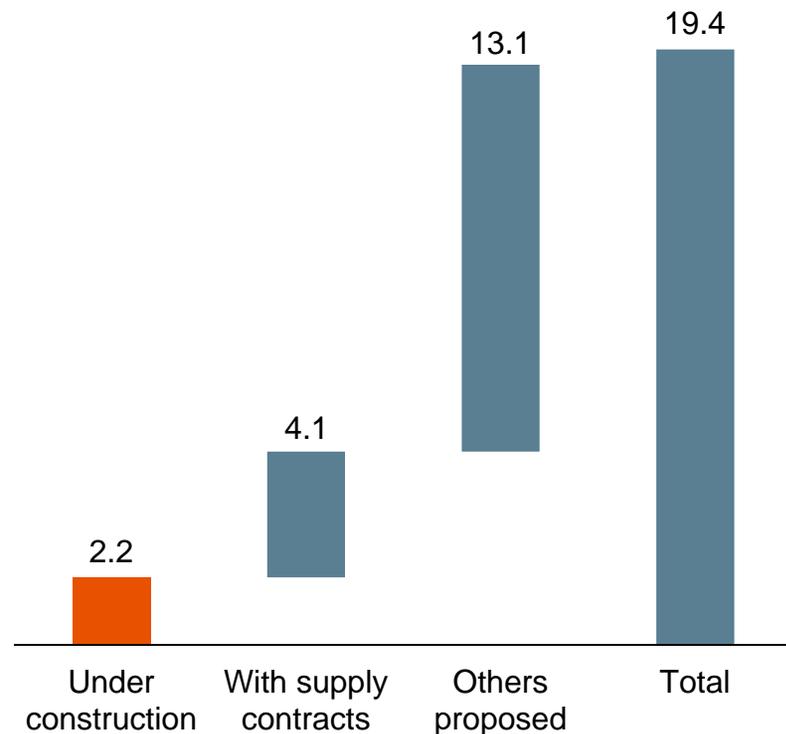
Source: McKinsey, BHP Billiton analysis.

Notes: CNG stands for Compressed Natural Gas vehicles.

# LNG exports are opening new markets to US shale production

## Multiple LNG export terminals proposed in the US Lower 48...

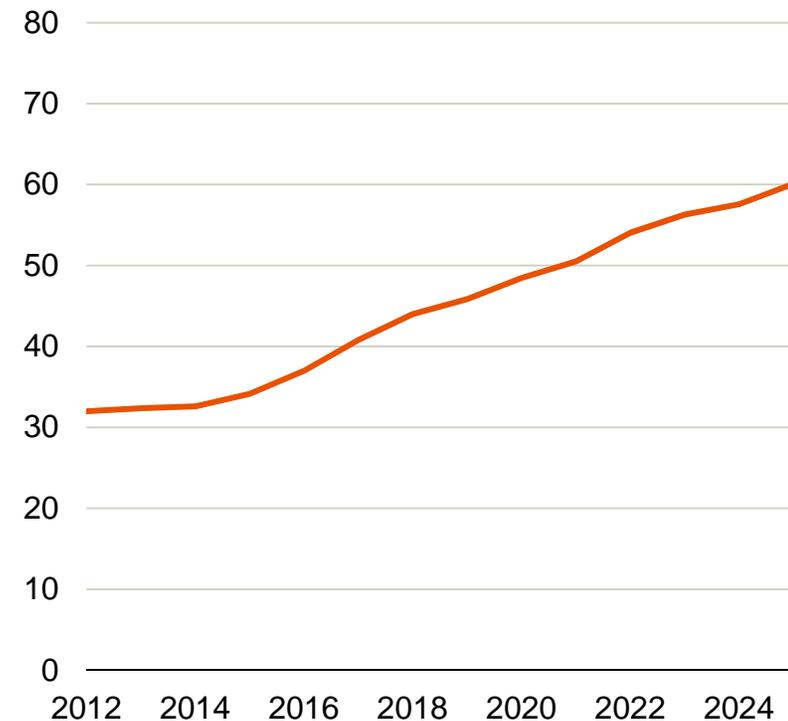
US lower 48 LNG proposed export capacity (Bcf/d)



Source: EIA; BHP Billiton analysis.

## ...which would give US gas access to a growing global market

Global LNG demand (Bcf/d)

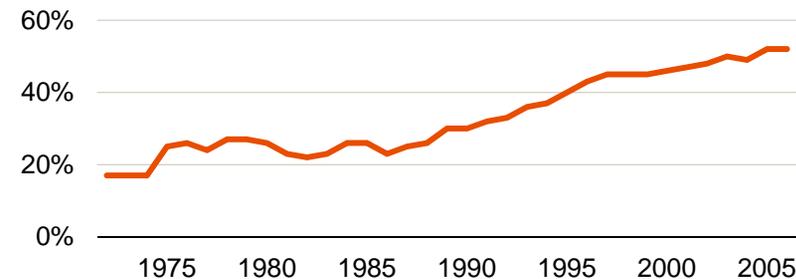


Source: Wood Mackenzie.

# As technology improves, recoveries from shale fields will likely grow, extending their lives

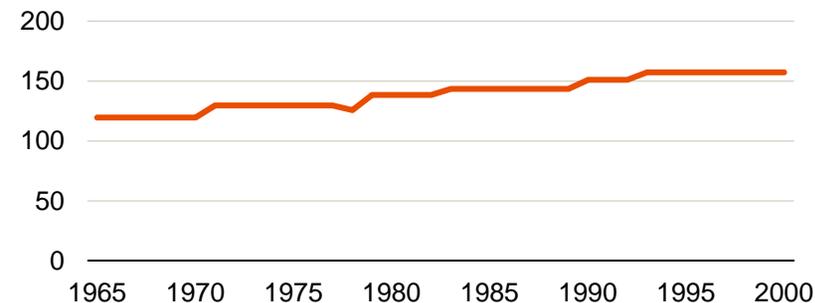
In conventional, technology has helped secure large increases in recoveries over time...

**Norway: Ekofisk recovery factor predictions**  
(percent of OOIP (100%=6,900 MMBO))



Source: Hermansen, H, ConocoPhillips Norway, in "The Ekofisk Field: Achieving three times the original value". Paper presented at the 19<sup>th</sup> World petroleum congress, 2008.

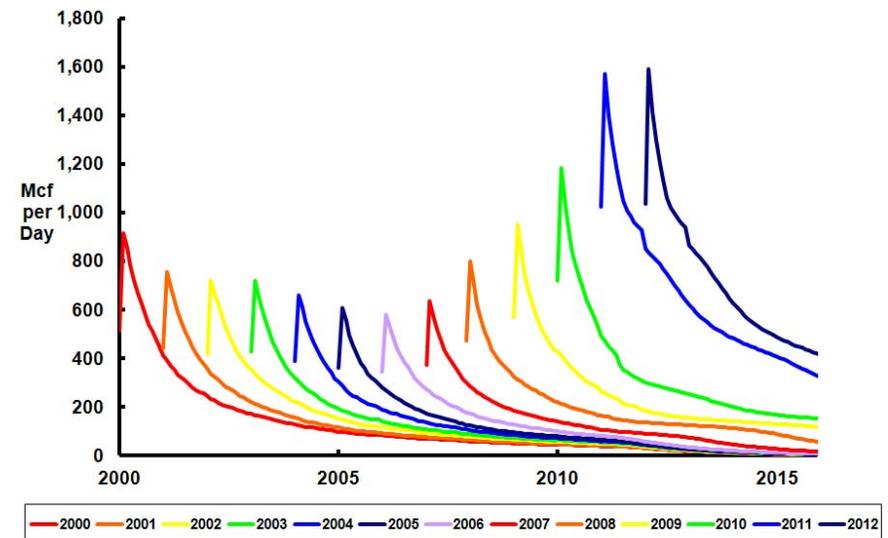
**Canada: Turner Valley Rundle recoverable reserves**  
(MMBO)



Source: Beliveau, D. et al. in "Reserves growth: enigma, expectation or fact?", SPE paper 84144, 2003.

...and early indications are that a similar dynamic is likely to be present in shale

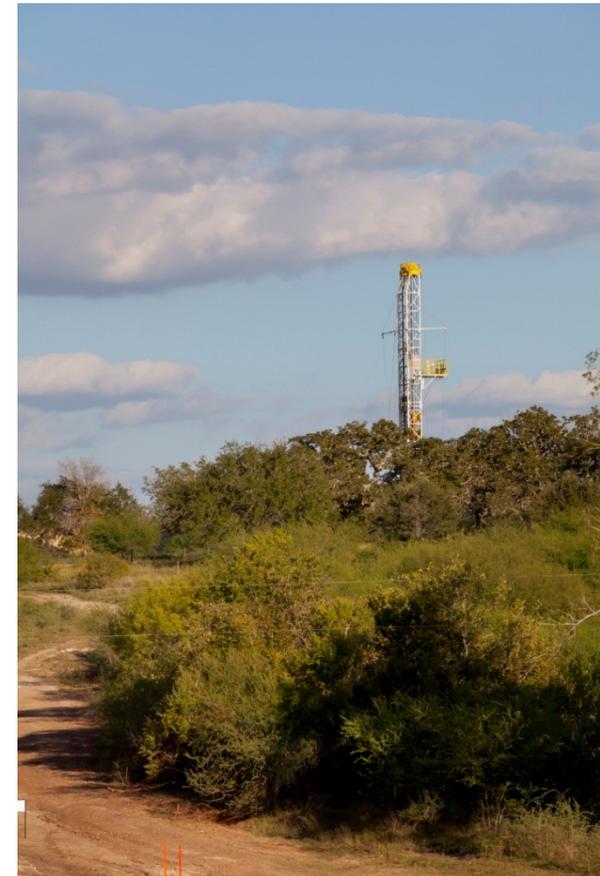
**US lower 48 initial shale gas production rates, by vintage year**  
(Mcf/day)

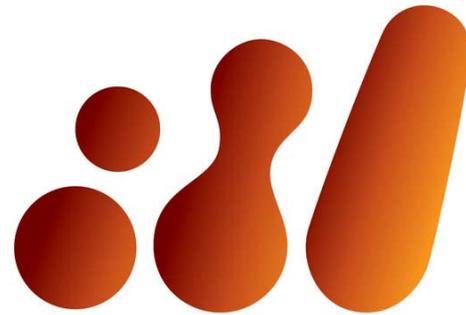


Source: IHS CERA.

# BHP Billiton is well positioned in this transformative opportunity

- Enormous, potentially transformative opportunity for the oil and gas industry
- Requires large capital resources, deep technical skills, and operational discipline
- Fits squarely within our strategic focus
- Positioned for success with a proven track record of operational excellence, strong financial footing, and our long term approach





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