



# BHP Billiton Petroleum Onshore US shale briefing

**J. Michael Yeager**  
**Group Executive and Chief Executive, Petroleum**  
**14 November 2011**



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# Petroleum briefing agenda

§ Introduction

§ Part 1: Technical overview of the shale industry

§ Part 2: Business update

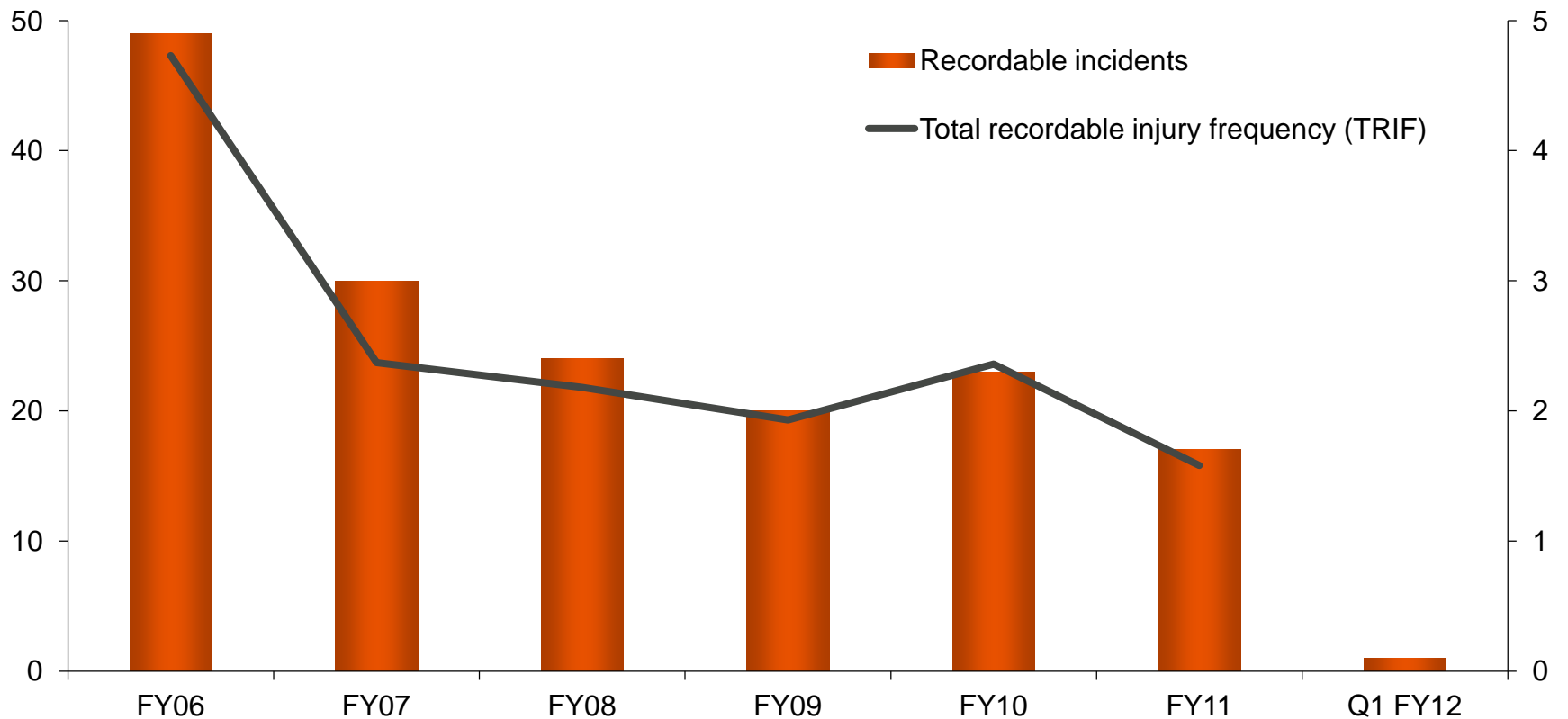


# 7<sup>th</sup> largest independent upstream oil and gas company by total resource



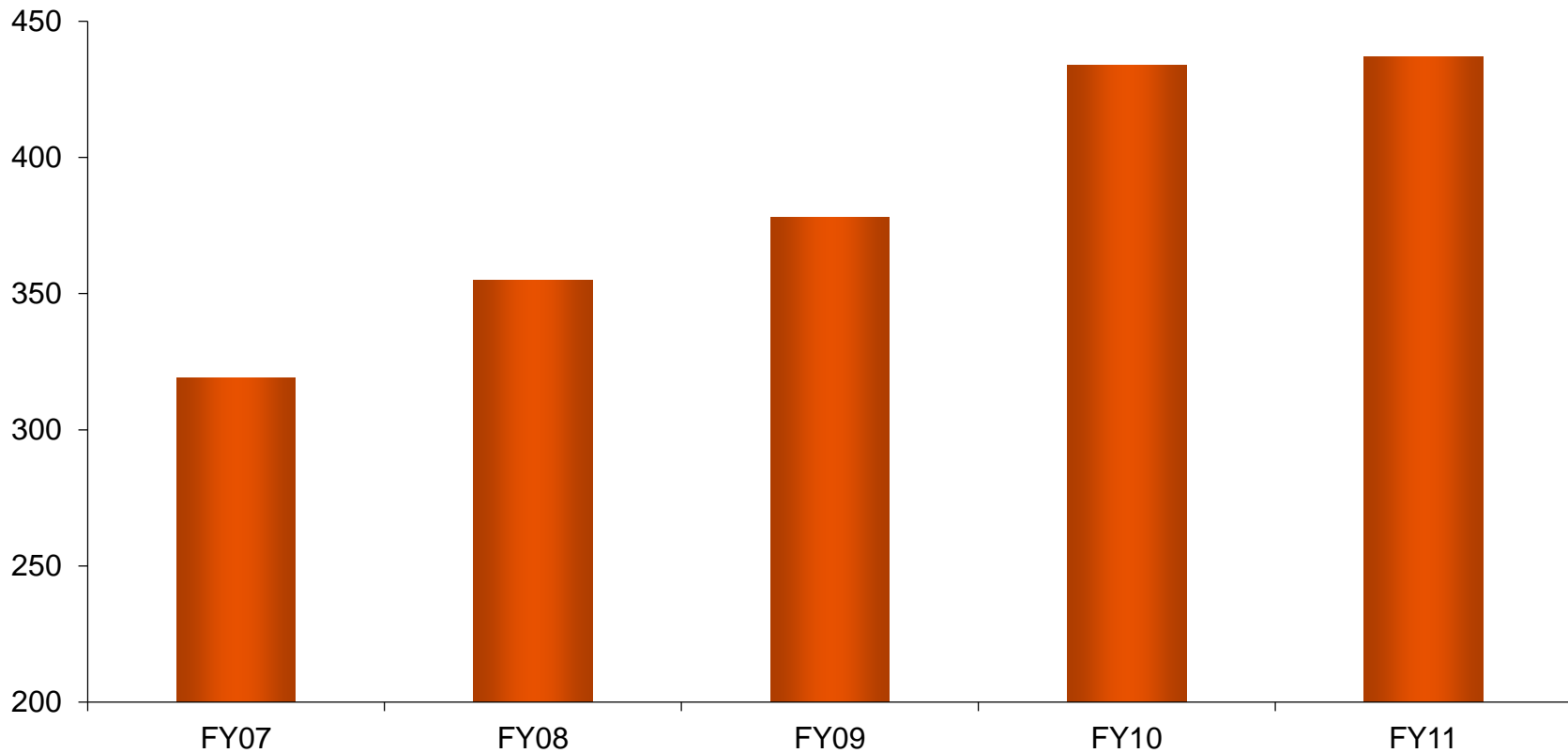
# Outstanding safety performance

## Petroleum conventional business safety performance (Number of incidents)



# Strong production growth 1<sup>st</sup> back to work in the Gulf of Mexico

## Production volumes (Net, Mboe/d)





# Part 1: Technical overview of the shale industry

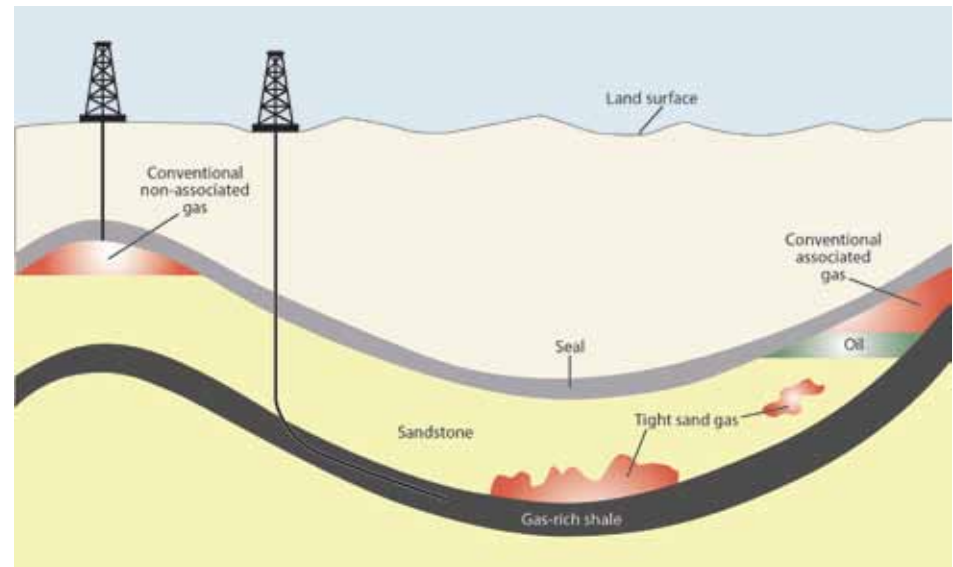
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# Conventional versus unconventional oil and gas reservoirs

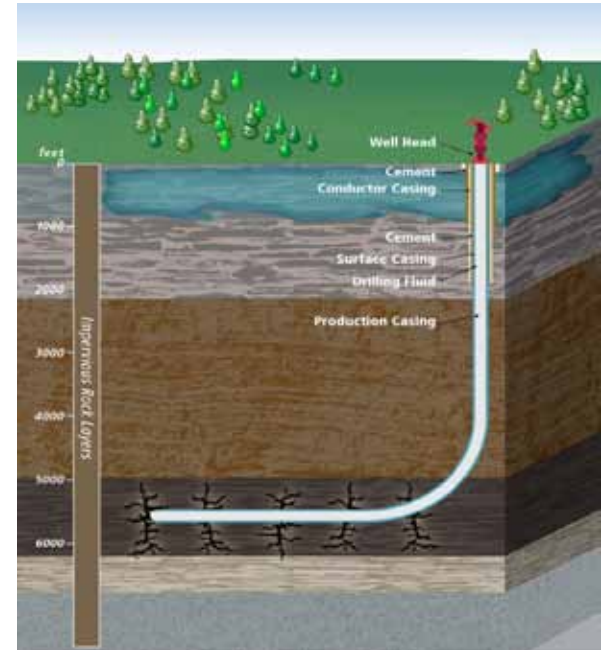
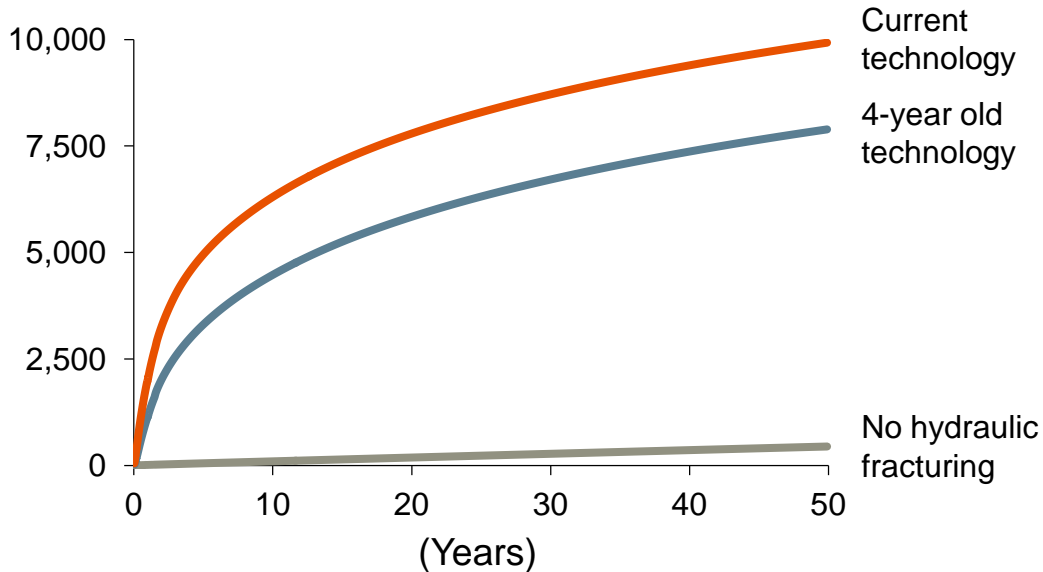
- § Conventional reservoirs have sufficient porosity and permeability to allow oil and gas to flow through the rock matrix
- § The pore spaces in shale reservoirs are significantly smaller and more restrictive
- § Unlike a conventional field, the shale acts as both the **source and the reservoir** for the hydrocarbons
- § Shale reservoirs are deep, with depths of up to 15,000 feet (unlike much shallower coal bed methane reservoirs)

## Schematic geology of natural gas resources



# Extracting shale resources

## Impact of hydraulic fracturing (Cumulative production, MMcf)



- § To produce profitably, most shale reservoirs require both horizontal drilling and hydraulic fracturing
- § Hydraulic fracturing (or 'fracing') is a process used to create fractures within the shale rock matrix to provide a path for the hydrocarbons to move
- § Fracing has been used on over 1 million producing wells and operators now fracture as many as 35,000 wells per year

Source: Company simulation.

# Advancements in technology

First commercial US natural gas well produces gas from shale



1821

Technology developed to lay large diameter pipelines – natural gas industry grows exponentially



1860s-1920s

Development of downhole motors accelerates – key to directional drilling



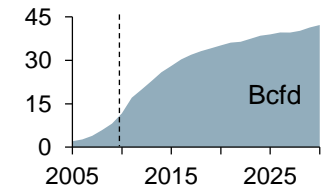
1947

Initial development of the Barnett shale play in Fort Worth, Texas



Early 2000s

US shale gas production rapidly increases as technology continues to improve



2010+

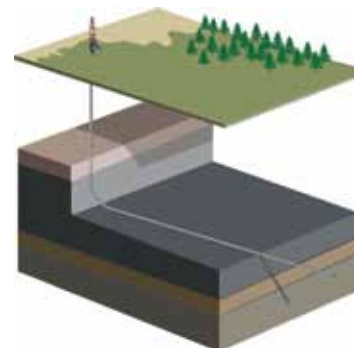
Natural gas is limited to use in cities close to producing fields, including low pressure, fractured shales in the Appalachian and Illinois basins



Hydraulic fracturing first commercially employed in Grant County, Kansas



First commercial horizontal wells



Multi stage fracturing emerges for both vertical and horizontal wells



Source: US Department of Energy, EIA.

# Short development timeline from site preparation to production

Preparation of the site → Drilling → Hydraulic fracturing → Production



2-4 weeks



2-4 weeks



2-4 weeks



Decades

# Preparation of the site

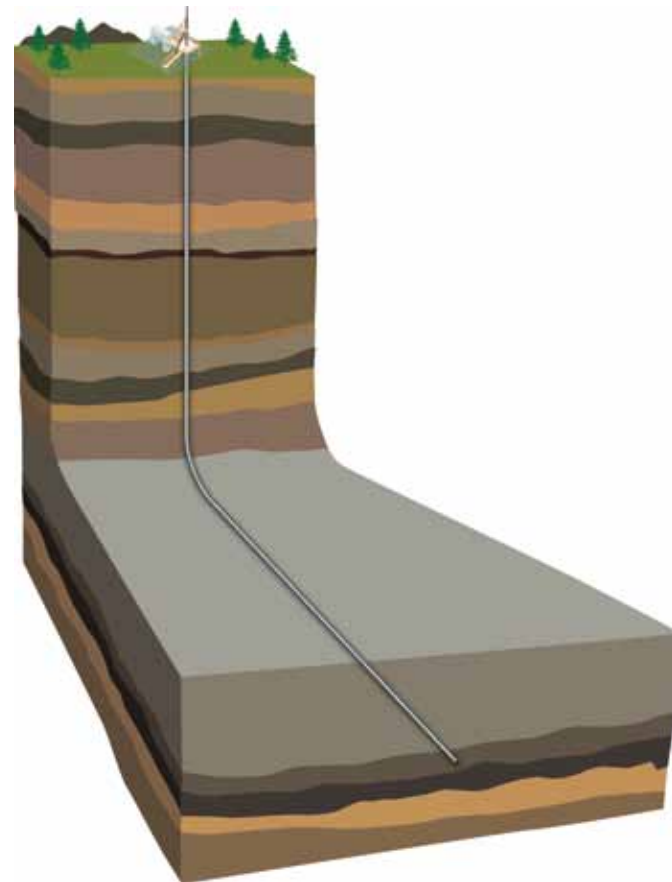
- § Setting up a well site takes 2-4 weeks and includes:
- Construction of roads for the transport of heavy equipment such as the drill rig
  - Levelling of the site
  - Structures for erosion control
  - Construction of lined pits to hold drilling fluids and drill cuttings
  - Placement of racks to hold the drill pipe and casing strings
- § Drilling multiple wells from a single location (a pad) creates efficiencies by reducing the number of site preparations required



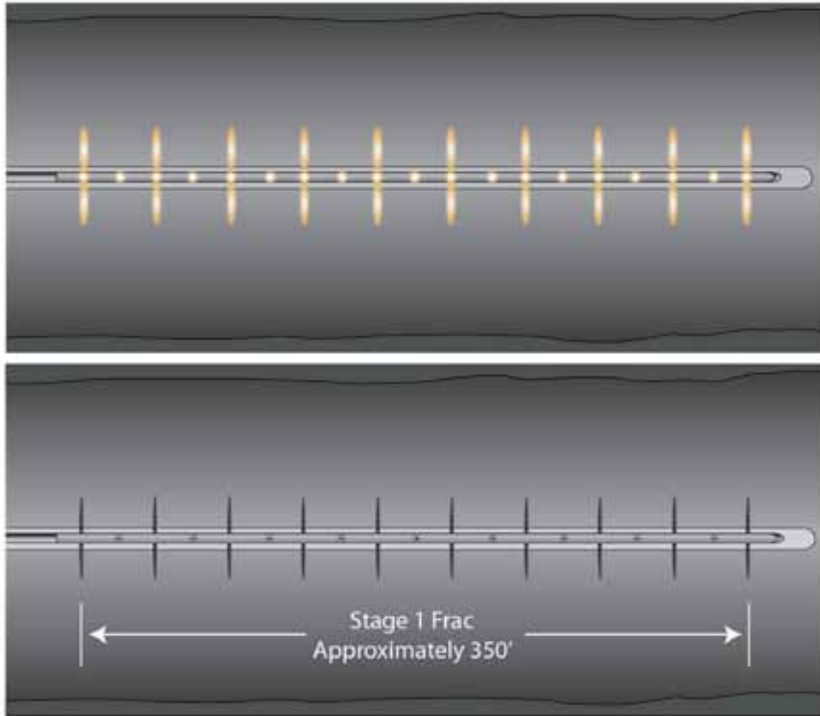
# Routine drilling operations

- § The well construction process is started by drilling a 20 inch+ diameter hole to a depth of ~100 feet and installing conductor pipe which is cemented back to surface
- § Drilling is continued vertically to a depth below known groundwater; a casing string is installed and cemented back to the surface providing isolation to the groundwater zones (**primary barrier**)
- § Directional drilling commences and the well path is steered to penetrate the target zone while simultaneously changing the well inclination from vertical to horizontal
- § Horizontal drilling within the target zone continues until the well reaches the planned total measured depth (lateral length of approximately 5,000 to 6,000 feet)
- § A production casing string is installed and cemented in place (**secondary barrier for groundwater zones**)

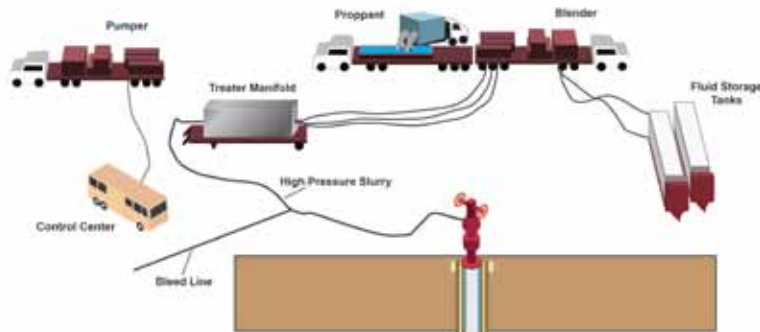
## Schematic of horizontal drilling through a shale formation



# Hydraulic fracturing – the process

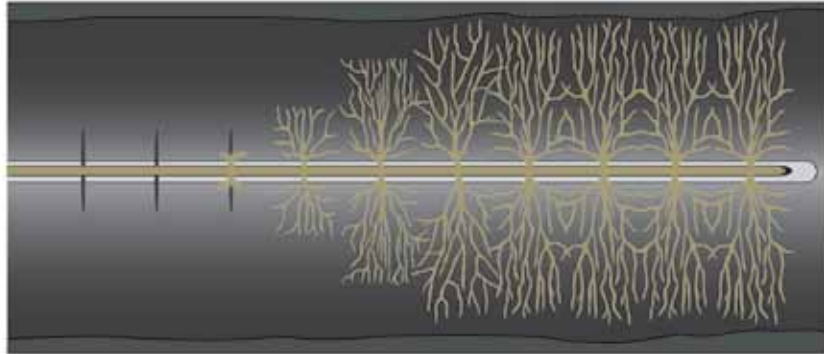


1. The horizontal section of the wellbore is perforated with explosive charges, thousands of feet underground within the target zone of the shale formation
2. The perforation tunnels that are created provide communication from the wellbore to the shale formation

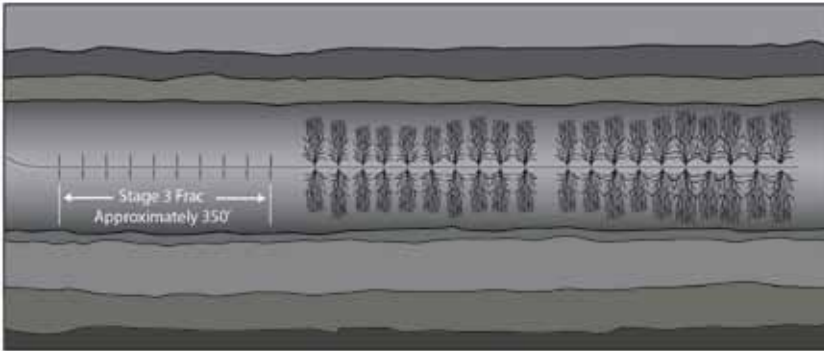


3. Fluid and proppant (sand) are pumped into the well at high pressure

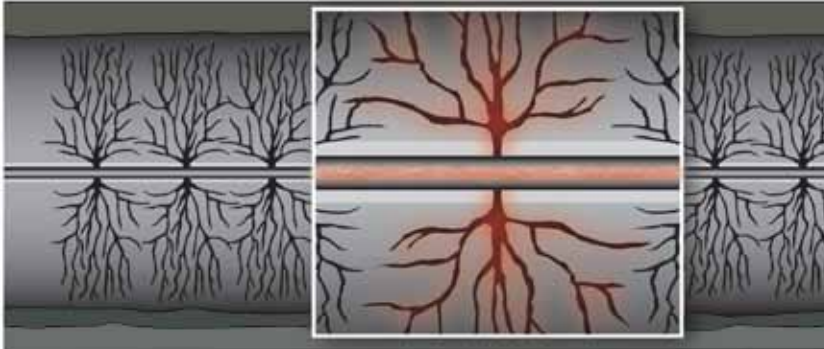
# Hydraulic fracturing – the process



4. Fractures are created and expanded through the pumping process and are kept open by the proppant



5. The fracturing and pumping process is repeated at multiple intervals of the wellbore – after each stage a plug is installed to provide isolation from the previously fractured interval

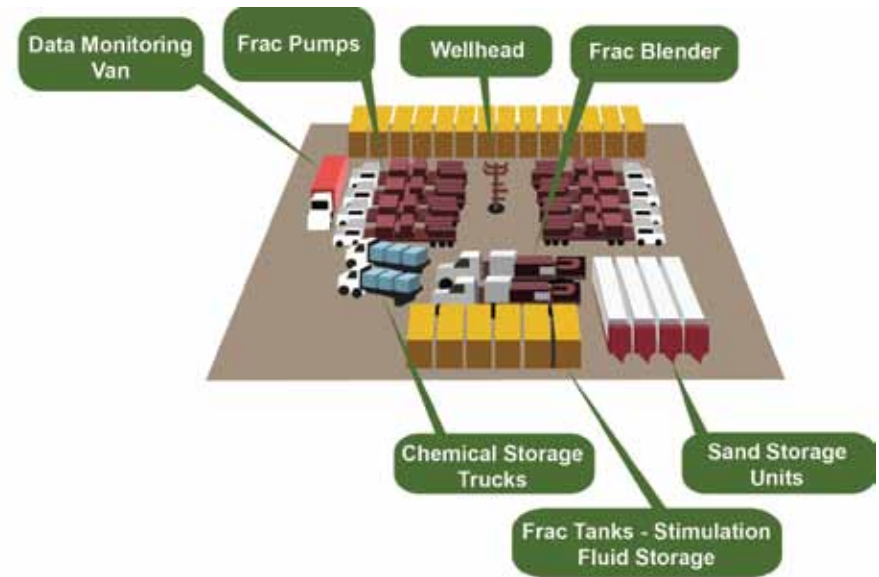


6. After all frac stages are completed, the plugs are drilled out and hydrocarbons safely flow back to the surface

# Hydraulic fracturing – equipment and product intensive

- § Surface fracturing equipment consists of multiple pumping units, blending units, control units, and adequate supplies of fracture fluid and proppant material
- § Supplies are transported to location and stored in tanks or containers, and then mixed and pumped into the well
- § A typical well uses 100,000 barrels of fresh water and in excess of 5,000,000 pounds of sand for fracturing operations
- § Once the fracture operations are completed, a proportion of the fluids are flowed back to the surface where they are treated for reuse or properly disposed

## Example of surface equipment used for hydraulic fracturing operations



# Minimal environmental impact

- § The initial footprint is minimised by drilling as many wells together from one location as possible, referred to as ‘pad drilling’
- § When drilling is completed, the land is restored to its original condition
- § The production phase creates far less disturbance and can last up to 50 years
  - Well sites include the well(s) and sometimes limited production and storage equipment
  - The wells are monitored remotely and accessed only for routine maintenance
- § Landowners are normally royalty owners

## Producing shale gas well



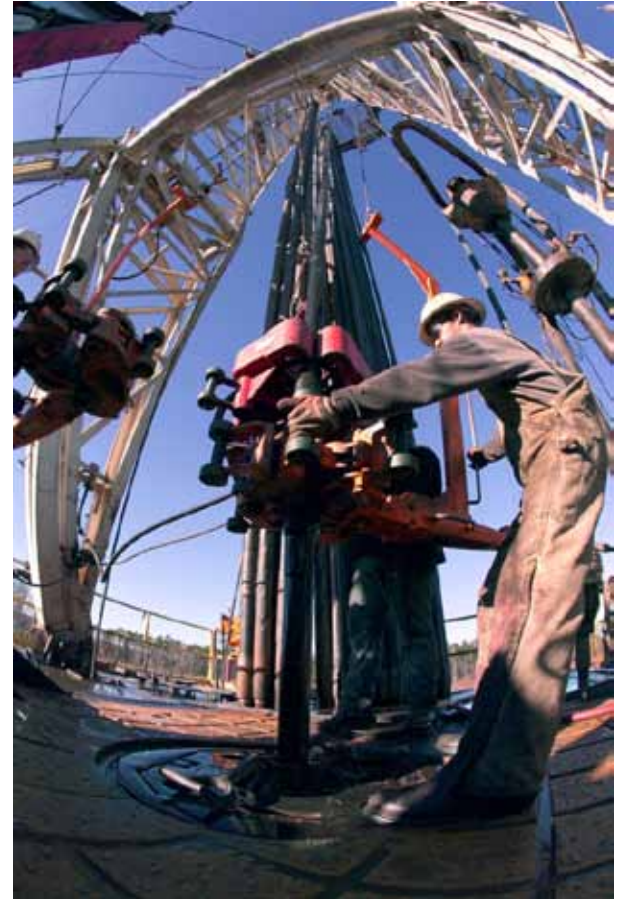
# Sustainable development of shale resources

## Positive impacts

- § Energy security for the US
- § Employment opportunities
- § Lower carbon emissions through coal substitution
- § Attractive landowner mineral rights

## Areas of concern

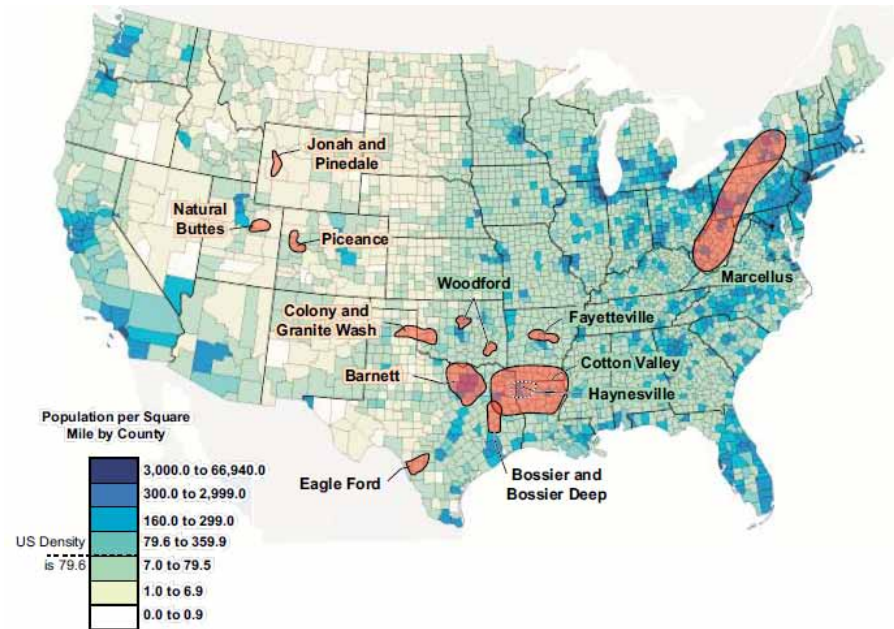
- § Quantity of water used for hydraulic fracturing
- § Chemicals used in hydraulic fracturing
- § Aquifer and groundwater protection
- § Seismic activity
- § Air and noise pollution



# Efficient water usage compared to many alternate forms of energy

- § Water is critical to shale gas development, specifically for hydraulic fracturing
  - Confined to the drilling phase, this does not represent a long term requirement
- § Withdrawals from lakes and streams are subject to regulatory review and approval
- § On a per unit of energy basis, water used for shale gas operations is significantly less than is used in extracting coal or producing corn ethanol
- § BHP Billiton continues to evaluate technologies for increasing the recycling of produced water as well as the feasibility of using salty water for fracturing

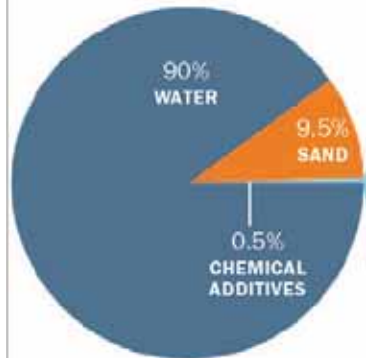
## Shale gas plays and population density in the US



Source: IHS CERA and US Census Bureau.

# Chemicals represent a minor component of the hydraulic fracturing mixture

Typical composition of a shale fracturing mixture



§ Hydraulic fracturing mixtures are typically 99.5% water and sand

- Chemical additives are required to enable proppant transport and to prevent damage to the producing zone

§ BHP Billiton has joined more than 20 other companies to voluntarily disclose the chemical additives used in the process

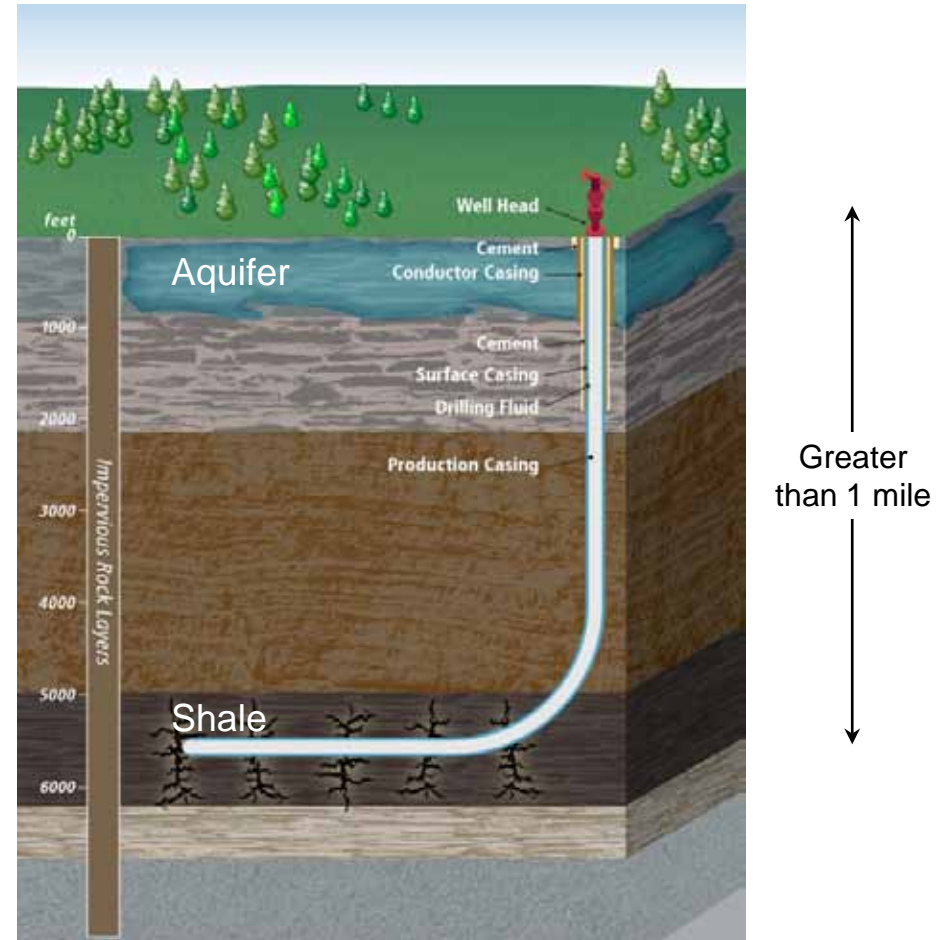
Compound	Purpose	Common application
Acids	Helps dissolve minerals and initiate fissure in rock (pre-fracture)	Swimming pool cleaner
Sodium Chloride	Allows a delayed breakdown of the gel polymer chains	Table salt
Polyacrylamide	Minimizes the friction between fluid and pipe	Water treatment, soil conditioner
Ethylene Glycol	Prevents scale deposits in the pipe	Automotive anti-freeze, deicing agent, household cleaners
Borate Salts	Maintains fluid viscosity as temperature increases	Laundry detergent, hand soap, cosmetics
Sodium/Potassium Carbonate	Maintains effectiveness of other components, such as crosslinkers	Washing soda, detergent, soap, water softener, glass, ceramics
Glutaraldehyde	Eliminates bacteria in the water	Disinfectant, sterilization of medical and dental equipment
Guar Gum	Thickens the water to suspend the sand	Thickener in cosmetics, baked goods, ice cream, toothpaste, sauces
Citric Acid	Prevents precipitation of metal oxides	Food additive; food and beverages; lemon juice
Isopropanol	Used to increase the viscosity of the fracture fluid	Glass cleaner, antiperspirant, hair coloring

Source: US Department of Energy, Groundwater Protection Council.

# Multiple barriers protect aquifers

- § The horizontal section where the fractures are created is generally over a mile deeper than any aquifer
- § As with all oil and gas operations, the well bore is isolated from the surrounding rock and aquifers using concentric steel pipes and cement
- § Fracture height is both measureable and traceable
- § The small percentage of chemicals used are relatively benign in the concentration of the deployed fluids and industry continues to work towards making them completely benign

**Schematic of hydraulic fracturing operations relative to aquifers and groundwater**



# Shale versus Coal Bed Methane (CBM)

- § CBM developments are typically much shallower than shale, creating a greater potential for interaction with groundwater resources
- § Significant amounts of water are produced when coal seam is depressurised to release the gas
- § Landowners in US shale developments may receive direct royalties and share in the economic benefits of the development



# Safe operations ensure protection of groundwater

- § All oil and gas operations involve the disposal of liquids that must be properly managed
- § Shale gas production involves the disposal of moderate volumes of water brought up with natural gas during the production process
- § Water disposal options include underground injection, treatment and discharge or reuse
- § Although other options are viable, underground injection is BHP Billiton's preferred water disposal option after the maximum amount is utilised through recycling
- § Combined with sound operating practices, the underground injection of water substantially reduces any possibility of groundwater contamination



# Taking a prudent approach to address concerns relating to seismic activity

- § Water disposal via deep underground injection has been cited as a potential cause of seismic activity, particularly when injection occurs near to faults
- § Reviews by scientists at regulatory agencies have been inconclusive as earthquake swarms were recorded decades prior to shale industry activity
- § Nonetheless, two BHP Billiton water injection wells in Arkansas were voluntarily plugged and abandoned as a precautionary measure
- § BHP Billiton will continue to dispose of water only in approved wells and facilities and this is not expected to impact our business plans or production growth



# Other impacts on local populations

- § Local impacts (such as land disruption, air quality changes, wildlife issues and noise disturbance) occur during the drilling phase, which lasts only a few weeks
- § BHP Billiton complies with all environmental regulations, maintains rigid internal processes and actively consults with local communities
- § The trade off between local impacts and the economic benefits of shale development are ultimately judged at the state and local levels
  - BHP Billiton's operating areas are primarily low population density and overwhelmingly favour shale development



# Natural gas is a clean and efficient energy source

- § When reasonable assumptions about industry practices are made, studies agree that in the long term there is a net benefit in moving from coal to gas
- § As a corporation, our goal is to reduce our greenhouse gas emissions by using clean fuels and by increasing the energy efficiencies in our operations
- § BHP Billiton sets corporate emissions reduction targets and engages in programs to manage greenhouse gas emissions



# Key messages

- § Hydraulic fracturing is essential for shale development and is a routine process that has been used for more than 60 years
- § We will develop our shale assets in line with our values that we will protect people, the environment and the communities in which we operate
- § We engage regularly, openly and honestly with our host governments and the people affected by our operations, taking their concerns into account in our decision making
- § Rigorous assessments of all our operations are undertaken as a matter of routine, and we will not undertake any activity that is not in line with our Charter guidelines
- § We do not expect any material change to our investment plans from sensible regulatory change



# Part 2: Business update

**J. Michael Yeager**  
**Group Executive and Chief Executive, Petroleum**  
**14 November 2011**



# Agenda

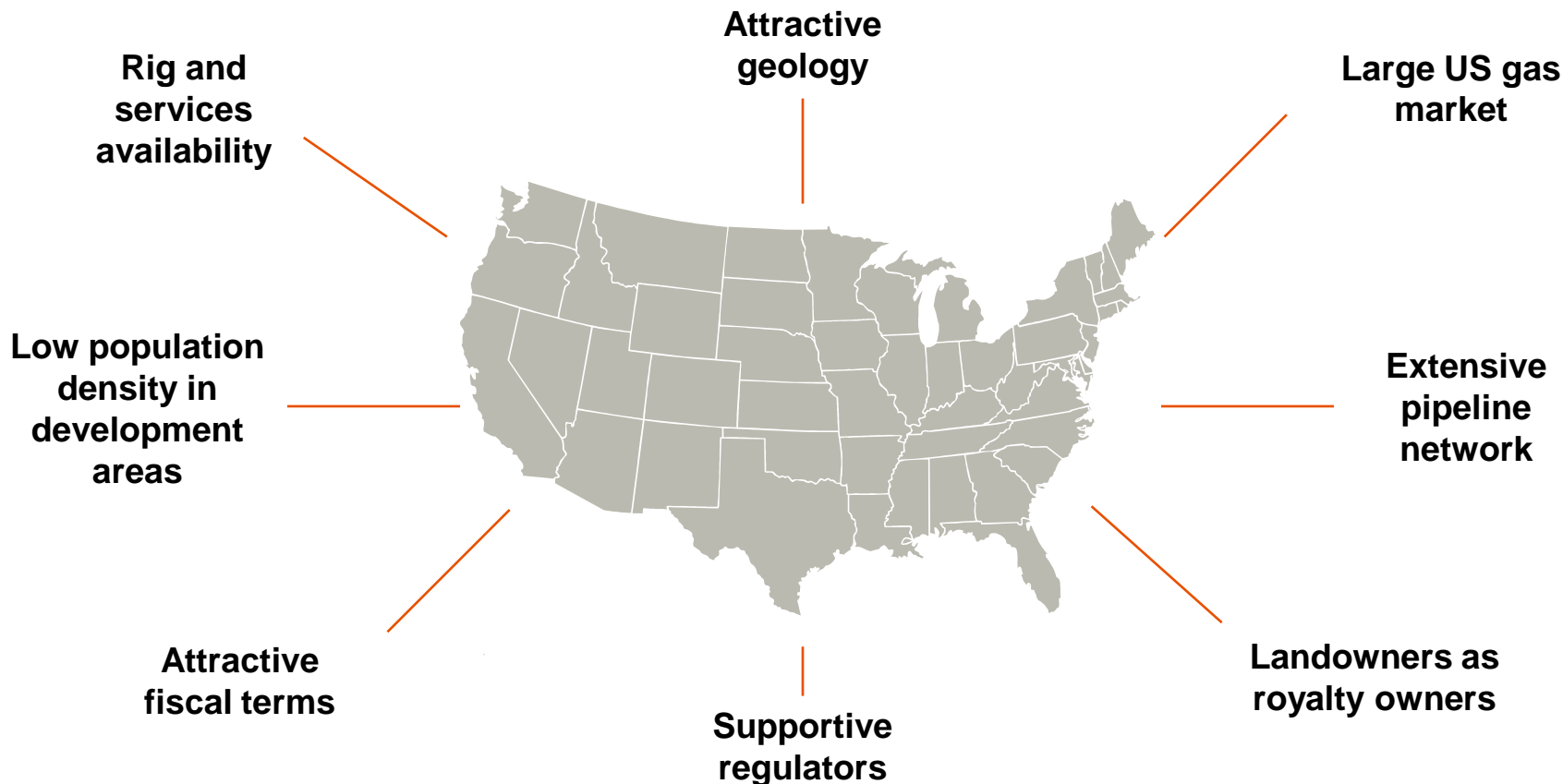
§ US shale overview

§ BHP Billiton's shale assets

§ Business outlook



# What makes US shale work?



**Not all shales have this combination of favourable characteristics working together**

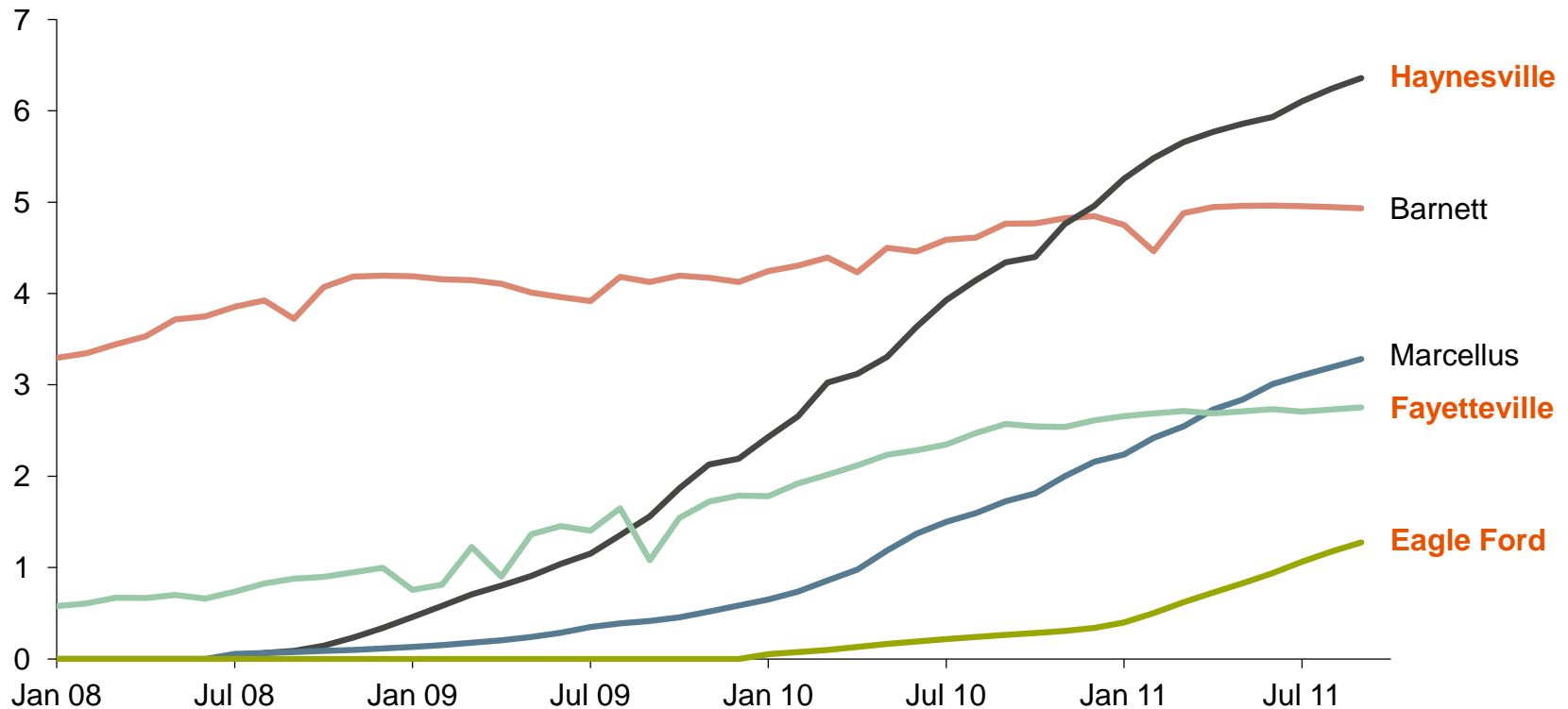
# Increasing transparency and knowledge is leading to greater acceptance of shale

- § Continued positive movement of support for development
- § Strong state support due to jobs, taxes and carbon reduction
- § Supply dependability key to new long term demand
- § Increases US energy self sufficiency for the long term
- § Industry's transparency and technology improvements can have further positive impacts on public sentiment
- § Possible boost to the US economy for decades



# Significant ramp up in onshore US shale

Production  
(Bcfd)

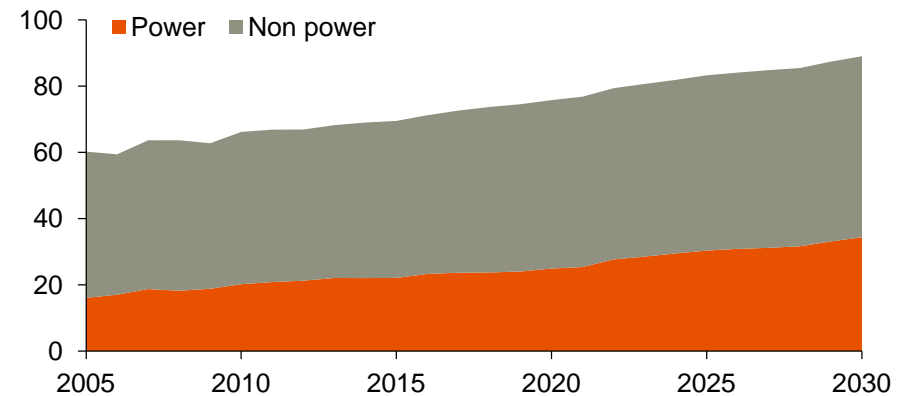


Source: Wood Mackenzie.

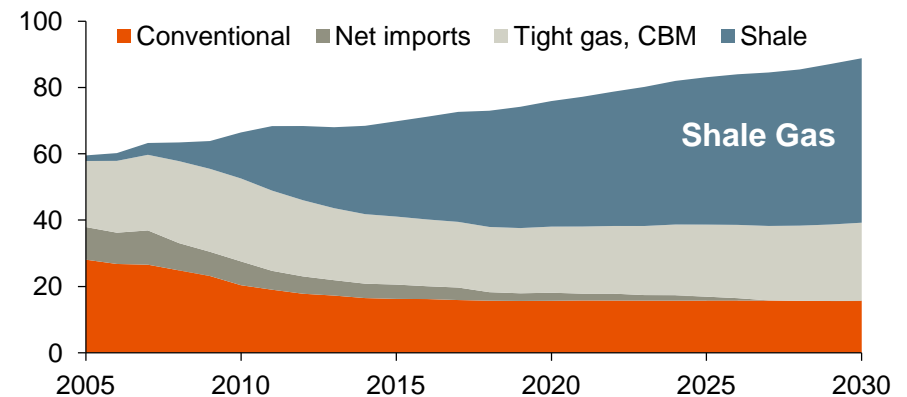
# Shale gas forecast to contribute half of US supply by 2020

- § Shale gas has fundamentally altered the supply mix
- § Increased dependability attracts customers and regulatory support
- § Natural gas is a preferred fuel in a low carbon world
- § Shale forecast to be almost 50% of total US gas production by 2020
- § As long term shale gas supply is substantiated, current oversupply will be absorbed
- § LNG export potential and purchases announced

US natural gas demand  
(Bcfd)



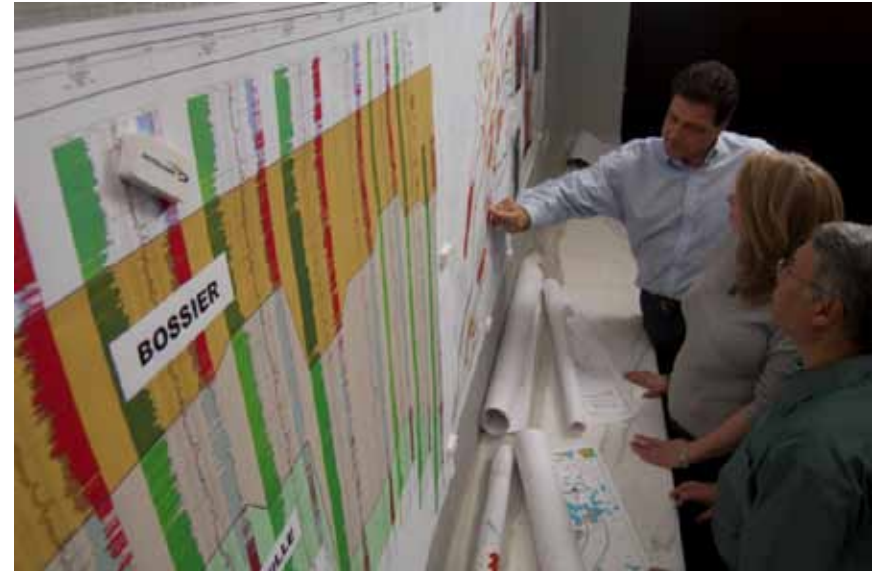
US natural gas supply  
(Bcfd)



Source: Wood Mackenzie.

# What BHP Billiton brings to the table

- § Functional excellence approach:
  - Systematic improvement to drilling/hydraulic fracturing
  - Long term technology gains
  - Scale and leverage to service delivery
- § Financial ability to do more now **and** to take a long term approach
- § Managerial approach to run four simultaneous shale businesses at over US\$1 billion annual investment each
- § ... all to create long term shareholder value



# Agenda

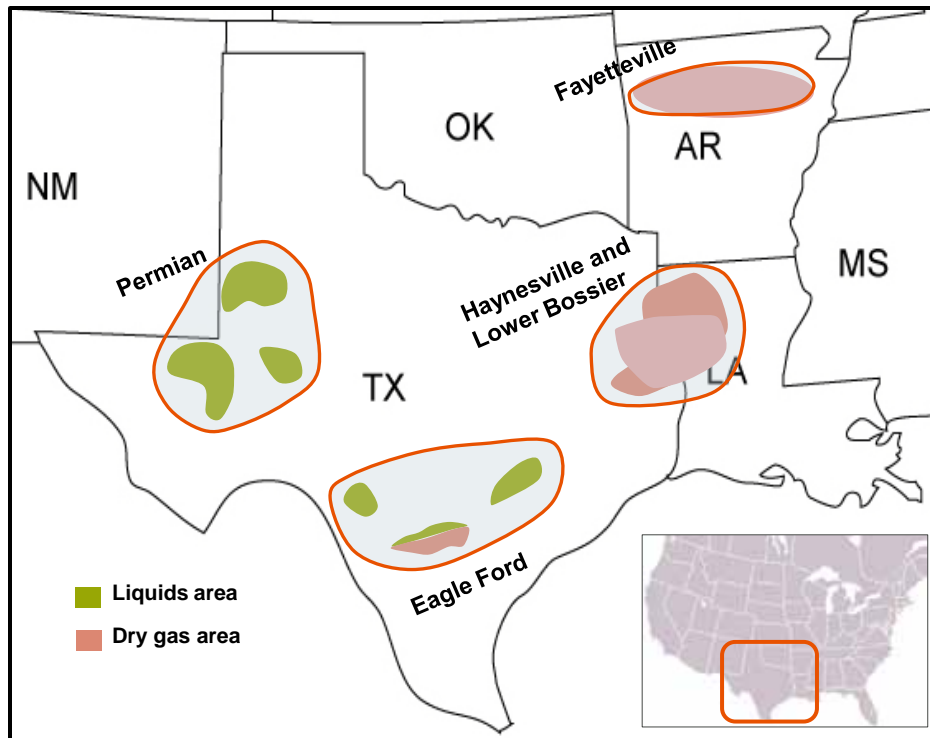
§ US shale overview

§ BHP Billiton's shale assets

§ Business outlook

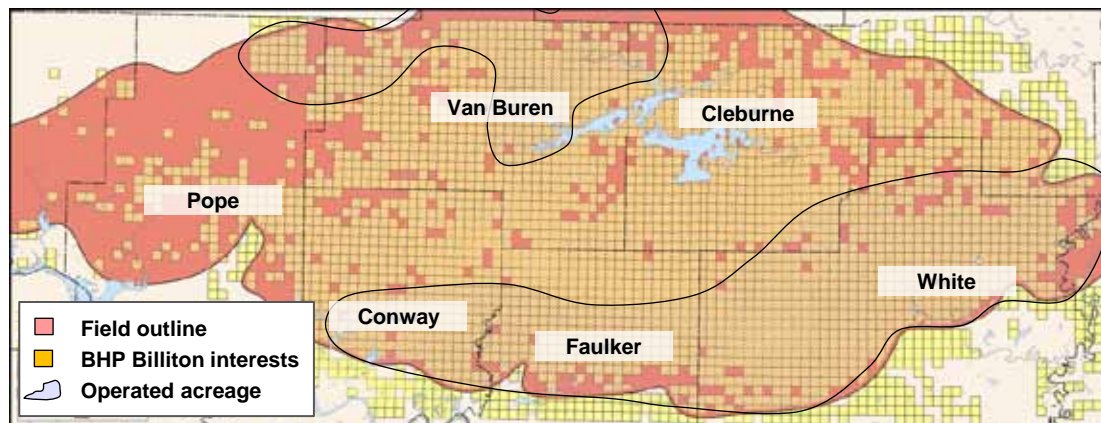


# Capturing a significant resource position



- § Four extremely large and concentrated acreage positions
- § Core positions in each field
- § Long-life, expandable production base
- § Attractive position on the cost/returns curve, offering strong economic returns and payback
- § Proximity to the Gulf of Mexico allows price arbitrage opportunities
- § Each field offers key advantages for long term economic growth

# Fayetteville – progressing ramp up



## Individual well economics

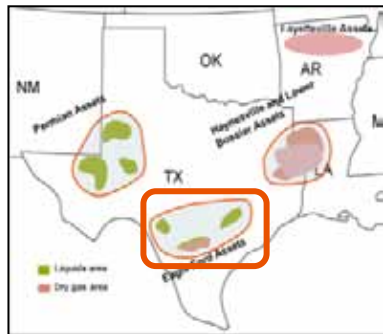
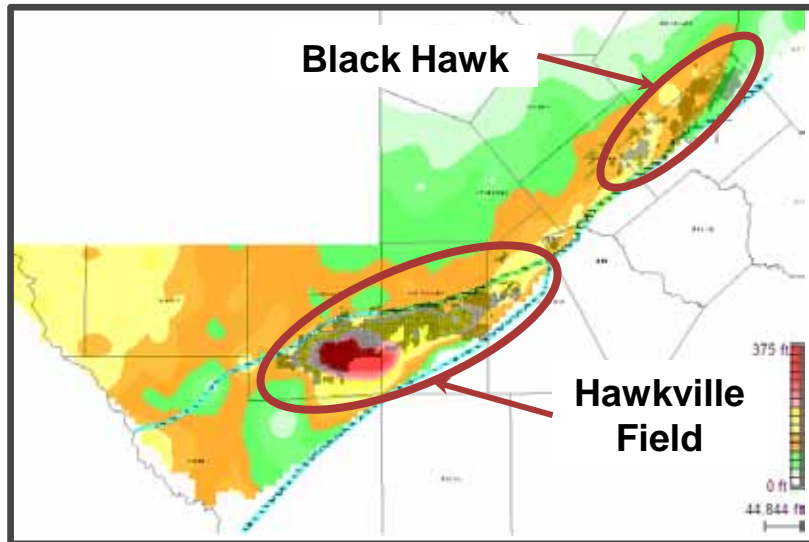
Initial production	3.1 MMcfd
EUR	3.2 Bcf
D&C cost	US\$3.5 million
Rate of return	16%

*Based on November 2011 NYMEX prices.*

- § Second largest producer in the play with 487,000 net acres at 58% average operated working interest
- § Shallow reservoir depths of 2,000-8,500 feet yield low average drilling and completion costs
- § Excellent geology for dependable results and largely derisked through development
- § Current net production 435 MMcfd with pipeline infrastructure in place
- § Total risked net resource potential of 10 Tcf at 70 acre well spacing
- § Total of 6 rigs in the field ramping up to 20 – all rigs to be new build and all now on order
- § Initial service contracts capture significant improvements going forward
- § BHP Billiton team in place – to assume all tasks by April 2012

# Eagle Ford offers the highest economic returns of all US shales

## Isopach map net porosity >9%

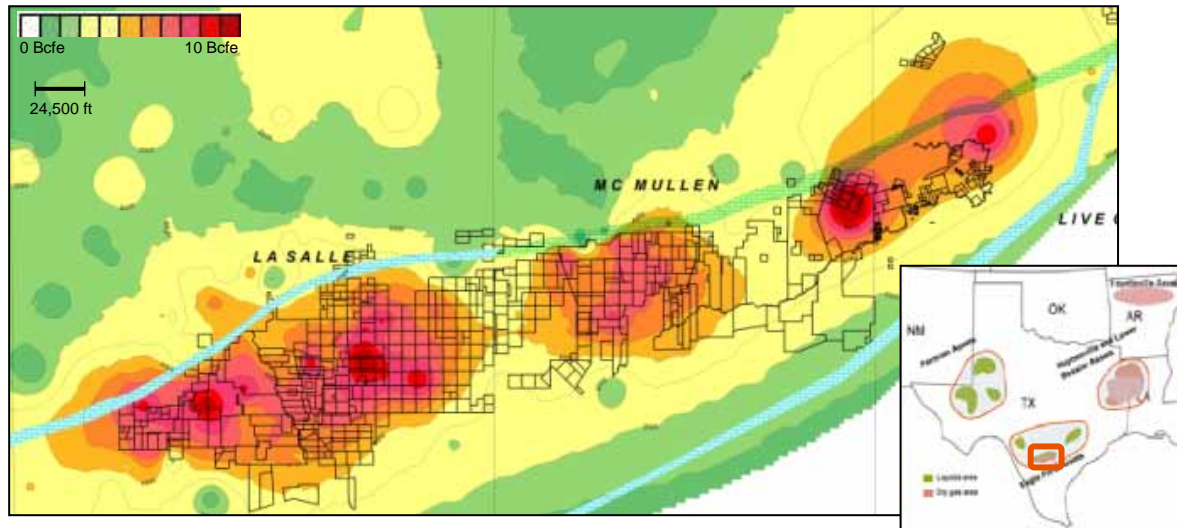


- § Petrohawk drilled the first commercial well in the Eagle Ford play in 2008 – captured key acreage
- § Rated as the lowest cost play among North American shales in the liquids rich regions<sup>1</sup>
- § Attractive product mix of natural gas, condensate and NGL
- § Highest rig count of US unconventional plays<sup>2</sup>
- § Average reservoir depths 10,500-14,000 feet at an approximate D&C cost of US\$9-10 million per well
- § Total net acreage holding ~332,000 acres<sup>3</sup>
- § Current net production 310 MMcfed or 52 Mboe/d (53% liquids)
- § Total risked net resource potential 13.5 Tcfe (42% liquids) at 90-100 acre well spacing
- § Ramping up from 14 to 26 rigs by 2013
- § Potential for reduced well spacing and higher recovery factors

1. Wood Mackenzie.  
2. Pritchard Capital Partners "Industry Update" 4 November 2011.  
3. Net acreage value includes Hawkville, Black Hawk and Red Hawk fields.

# Hawkville has the thickest pay in the Eagle Ford

## Equivalent EUR (Bcfe)



- § 224,000 net acres with average operated working interest of 85%
- § Contributes >50% of BHP Billiton's net Eagle Ford production at 180 MMcfed or 30 Mboe/d (36% liquids)
- § Total risked net resource potential 10.7 Tcfe (34% liquids)
- § Liquids pipeline available end FY12 (via third party)
- § Ramping up from 5 to 13 rigs by 2013

### Individual well economics (rich gas)

Initial production	5 MMcfd gas 613 bbl/d condensate
EUR	2.5 Bcf gas 250 Mbbl NGL 195 Mbbl condensate
D&C cost	US\$8.8 million
Rate of return	43%

Based on November 2011 NYMEX prices.

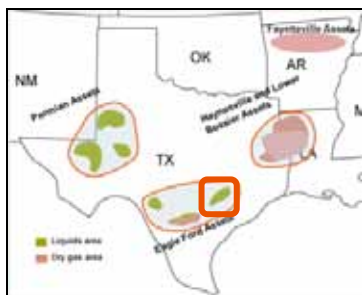
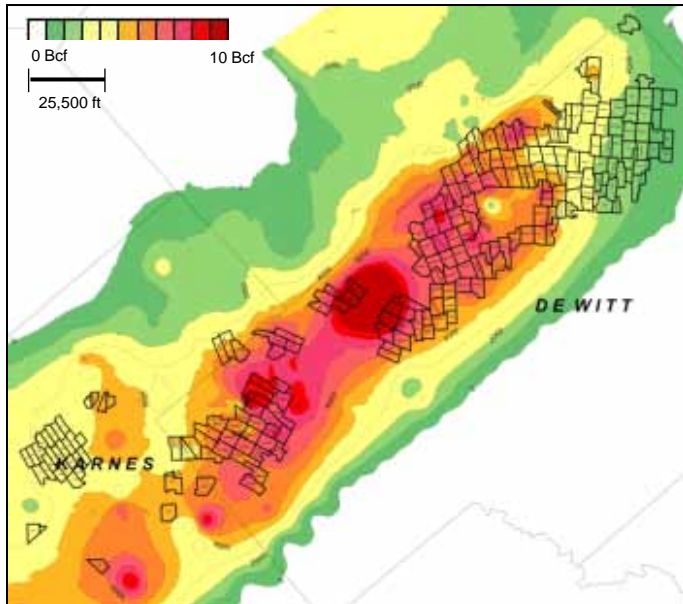
### Individual well economics (lean gas)

Initial production	8.5 MMcfd gas
EUR	5.0 Bcf gas 207 Mbbl NGL
D&C cost	US\$9.6 million
Rate of return	15%

Based on November 2011 NYMEX prices.

# Black Hawk in economic sweet spot of the play

## Equivalent EUR (Bcfe)



- § Black Hawk produces the highest value product mix in our shale portfolio
- § High liquid content substantially improves individual well economics
- § Liquids pipeline available end FY12 (via third party)
- § 58,300 net acres at 48% average operated working interest
- § Current net production of 22 Mboe/d (77% liquids)
- § Total risked net resource potential 2.8 Tcfe (72% liquids)
- § Ramping up from 9 to 13 rigs by 2013

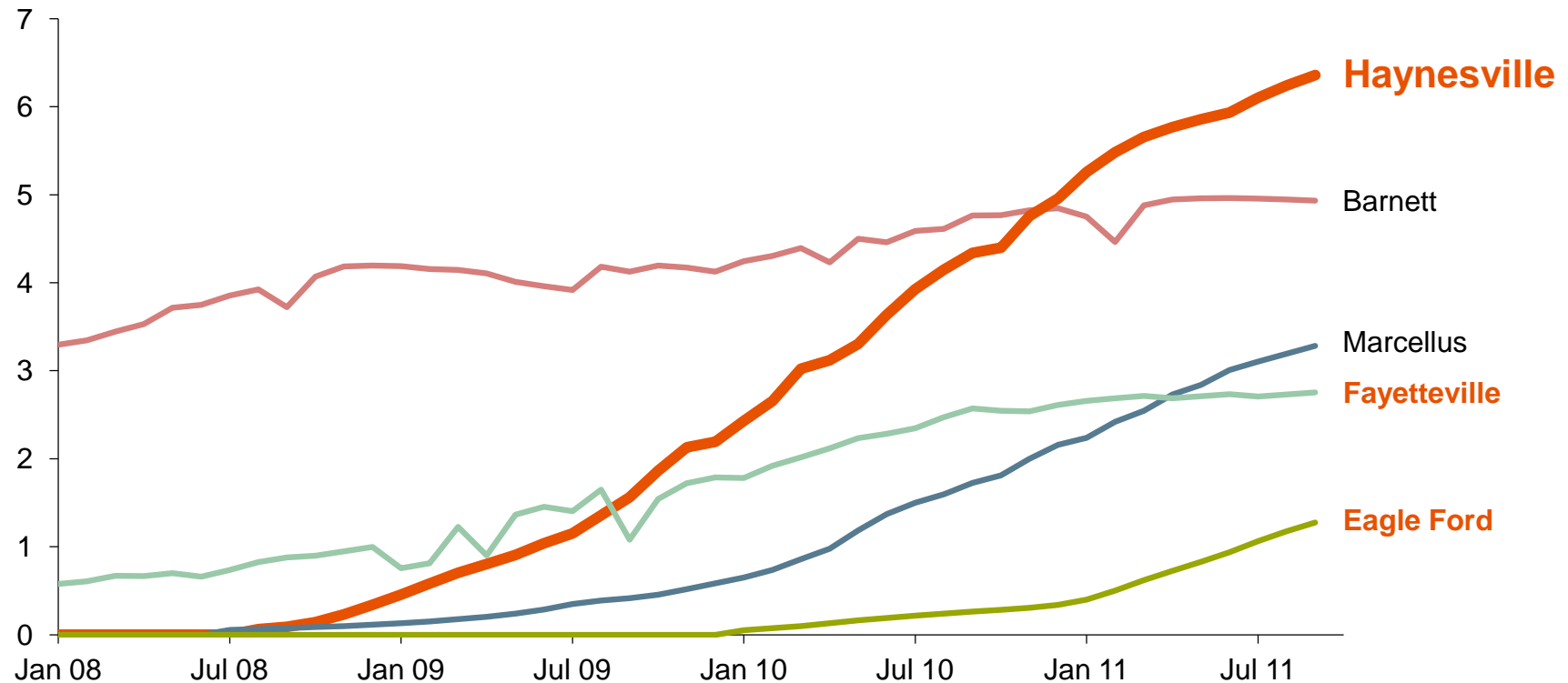
### Individual well economics

Initial production	3.8 MMcfd gas; 1,615 bbl/d condensate
EUR	1.8 Bcf gas; 220 Mbbbl NGL; 550 Mbbbl condensate
D&C cost	US\$9.9 million
Rate of return	>100%

Based on November 2011 NYMEX prices.

# Haynesville is now the highest producing shale play in the US

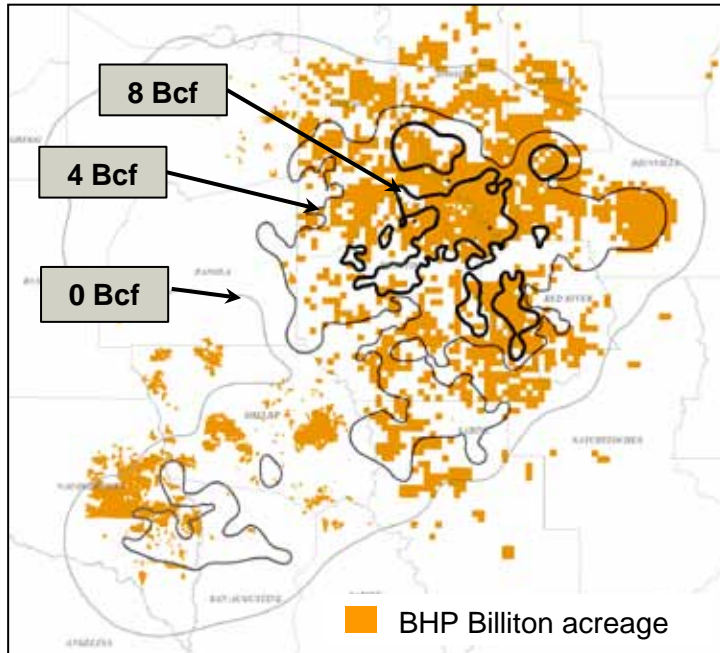
Production  
(Bcfd)



Source: Wood Mackenzie.

# Haynesville is the highest producing gas field in the US

## Haynesville shale EUR contour map



### Individual well economics

Initial production	8.5 MMcfd gas
EUR	8 Bcf gas
D&C cost	US\$10 million
Rate of return	17%

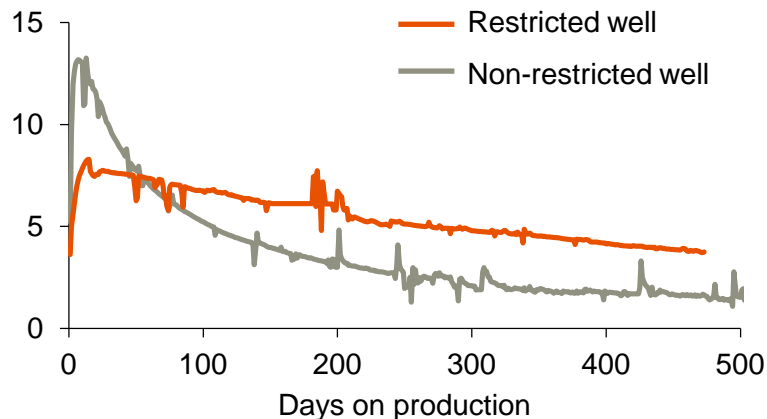
Based on November 2011 NYMEX prices.

1. TOC = Total Organic Content.

- § BHP Billiton has the largest amount of the best acreage in the highest producing gas field in the US
  - Strong acreage position with 345,000 net acres in the Haynesville and Lower Bossier
  - Core of the field yields EURs well above field average
  - Natural fractures, high TOC<sup>1</sup> and over pressured
  - Average operated working interest 75% in Haynesville, and 70% in Lower Bossier
- § Petrohawk has been an industry leader in technical achievements in this field
- § Direct access to an extensive gas pipeline network with ample capacity to support production growth
- § Average reservoir depth of 11,800 feet with an average D&C cost of US\$10 million per well (down from US\$15 million per well with technology improvements)
- § Current net production 780 MMcfd
- § Total risked net resource potential of 22 Tcf at 90 acre well spacing

# Higher EUR with rate management

**Gas production**  
(MMcfd)



§ Petrohawk pioneered the use of rate management in the Haynesville

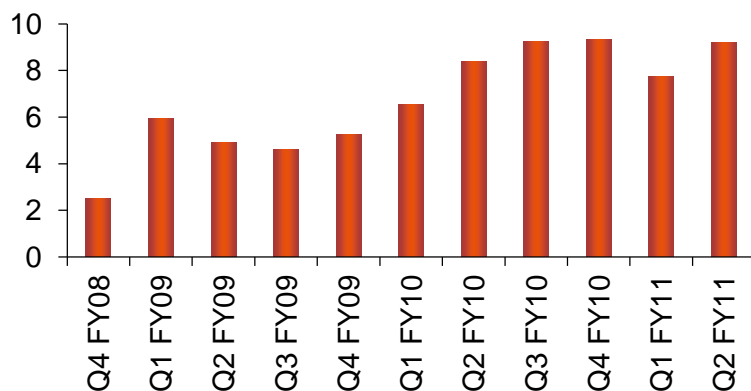
§ Choking back wells during initial production increases ultimate well recovery

§ Holding more back pressure keeps fractures open longer

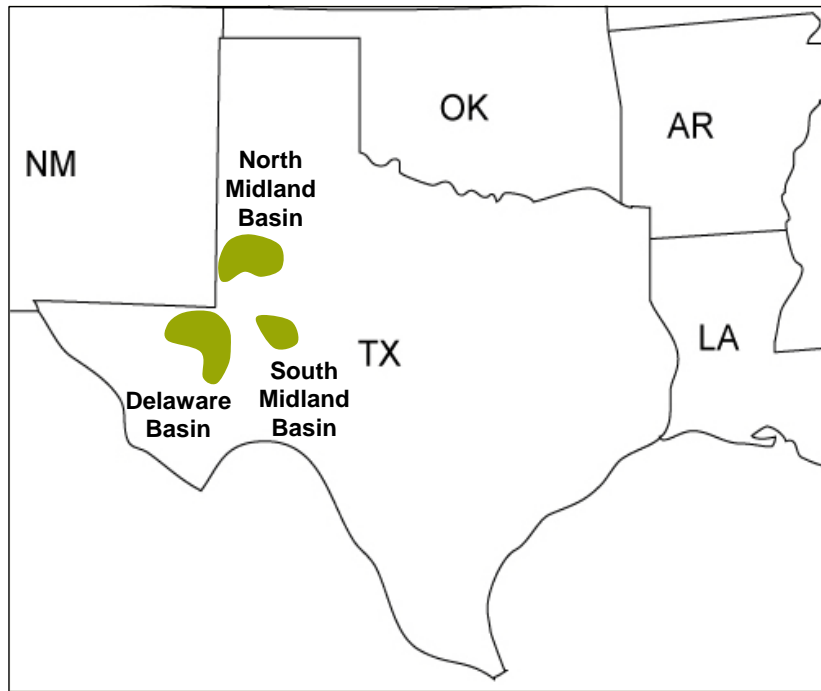
– Average non-restricted EUR: 4-6 Bcf

– Average restricted EUR: 7-9 Bcf

**Average individual well EUR**  
(Bcf)



# Permian Basin provides prospective oil opportunities



- § 481 rigs currently drilling industry wide in the Permian Basin
- § Recent entry into a new liquid rich core shale area with the acquisition of 325,000 net acres at 86% average operated working interest<sup>1</sup>
- § Primarily targeting oil from multiple pay horizons
- § A highly prospective area with seven appraisal wells drilled to date and four rigs currently drilling
- § Very positive early results
- § No volumes projected as plans are not firm

1. Net acreage and average working interest values change with expanding position in the Permian.

# High quality shale portfolio

Field	Advantages	Opportunities
<b>Fayetteville</b>	<ul style="list-style-type: none"> <li>§ Low cost development</li> <li>§ Shallow/brittle</li> </ul>	<ul style="list-style-type: none"> <li>§ Rig ramp up</li> <li>§ Scale/leverage</li> </ul>
<b>Eagle Ford</b>	<ul style="list-style-type: none"> <li>§ Liquids rich</li> <li>§ Industry best field acreage</li> </ul>	<ul style="list-style-type: none"> <li>§ Rig ramp up</li> <li>§ Reduced well spacing</li> </ul>
<b>Haynesville</b>	<ul style="list-style-type: none"> <li>§ Largest core acreage holder</li> <li>§ Highest EUR per well</li> </ul>	<ul style="list-style-type: none"> <li>§ Controlled rig ramp up</li> <li>§ Shallower Bossier shale</li> </ul>
<b>Permian</b>	<ul style="list-style-type: none"> <li>§ Predominantly liquids</li> <li>§ Multiple pay horizons</li> </ul>	<ul style="list-style-type: none"> <li>§ Un-appraised acreage</li> <li>§ Additional land capture</li> </ul>
<b>Overall</b>	<ul style="list-style-type: none"> <li>§ Four world class fields, each with distinct advantages</li> </ul>	<ul style="list-style-type: none"> <li>§ Immediate volume gain</li> <li>§ Multiple, 30-year opportunities for optimisation</li> </ul>

# Agenda

§ US shale overview

§ BHP Billiton's shale assets

§ Business outlook



# Shale offers the ability to rapidly increase volumes and earnings over the long term

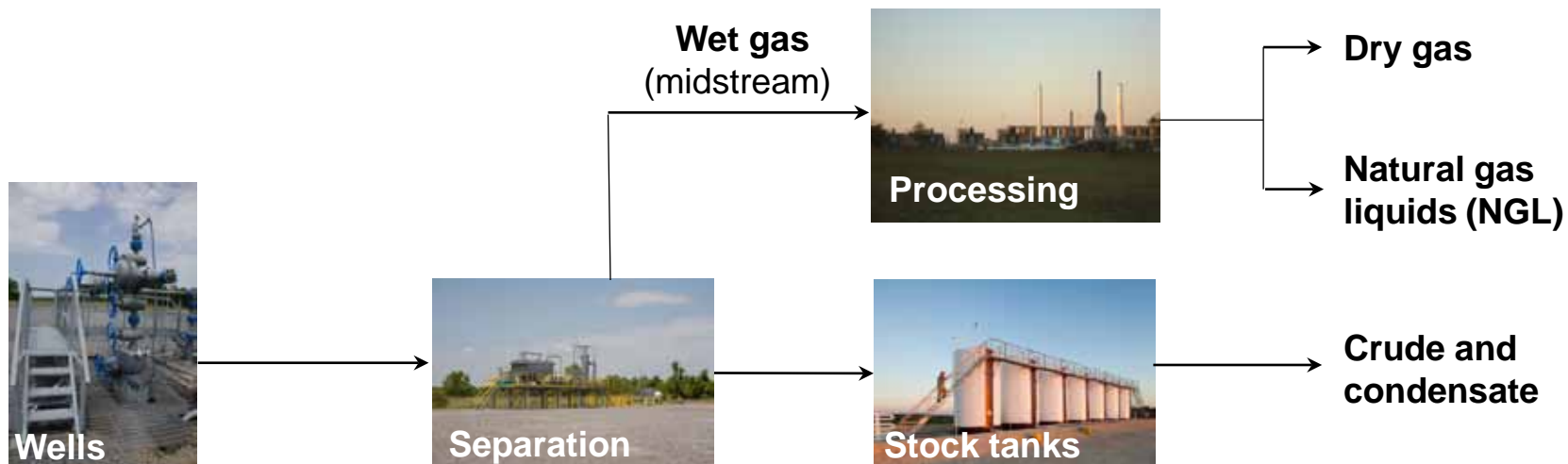


Conventional	Feature	Shale
Yes	Geologic risk	No
5+ years	1 <sup>st</sup> production	Months
Years	Payback	Months
Limited	Flexibility	Significant
Limited	Expandability	<b>Substantial</b>



- § Conventional 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
- § Shale complements our existing conventional portfolio
- § Shale is ripe for a long term technology approach which few companies can do – cost per well, EUR per well, frac design, lateral length, drilling design, etc

# Shale value chain



- § Production is gathered in flow lines and mineral owners take a percentage of production as a royalty
- § Crude and condensate are separated from wet gas – gas is then processed to separate Natural Gas Liquids (NGL)
- § Gas price NYMEX benchmarks are translated to regional sales hubs by market differentials
- § Reporting of the ‘upstream’ and the ‘midstream’ is not uniform across the industry

# Components of Onshore US shale profitability

## Revenue

- § Gas revenue
- § Liquids revenue
- § Third party gathering

## Cash costs

- § Transportation
- § Gathering and processing
- § Midstream operating costs
- § Upstream operating costs
- § Secondary taxes

## Non-cash costs

- § Acquisition amortisation
- § Capital depreciation



# Onshore US shale cash and performance analysis



- § **FY12 production target** of 545 Bcfe (or 90 MMboe) including partial year Petrohawk
- § **Liquids component** approximately 10% and rising with rig ramp up in the Eagle Ford
- § **Liquids and midstream uplift** growing from US\$1.20-1.70/Mcfe over the next two years, driven by growth in liquids
- § **Cash costs** averaging US\$1.90/Mcfe over the next two years, fully burdened with non-recurring retention and transition costs
- § **Non-cash costs** averaging US\$2.60/Mcfe over the next two years, including amortisation of acquisition costs

Note: FY12 guidance reflects ownership of Petrohawk assets from 20 August 2011.

# Long term plans yield significant improvements

## FY12 impacted by short term items

- § Early stage of liquids development
- § Retention programs for Petrohawk staff
- § Major systems costs for land, revenue accounting, etc
- § Excess transport capacity fees to secure future production

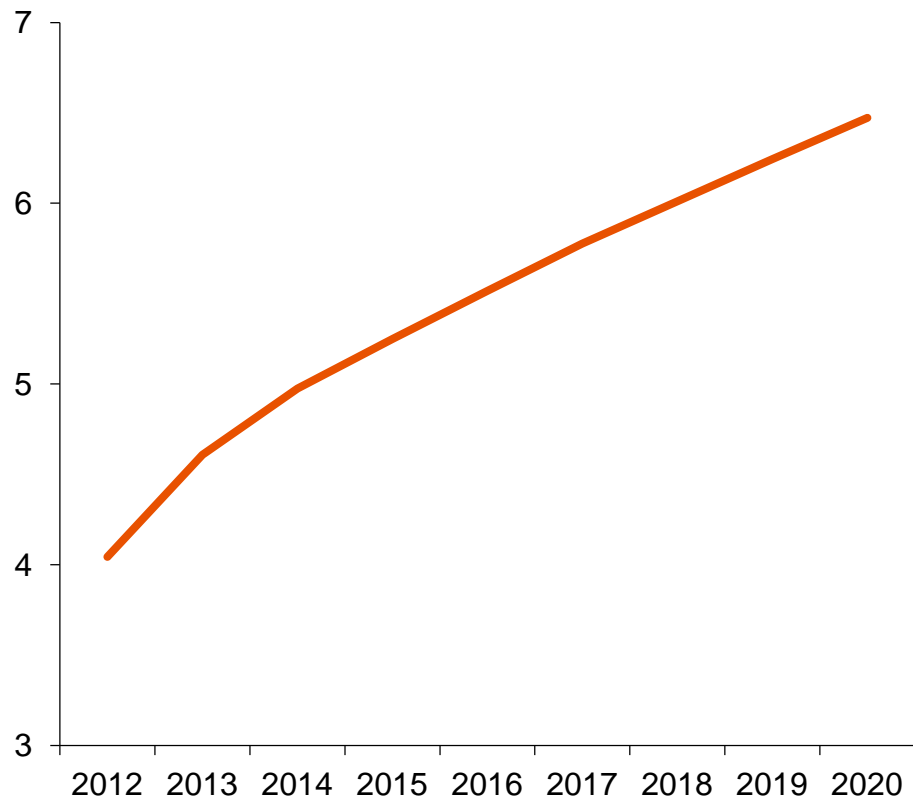
## Sources of improvement

- § Liquids percentage to double by FY15, without Permian
- § Scale of service contracts continue to be captured in operating and capital costs
- § Optimisation of well spacing, especially in liquids
- § Advances in fracing and other long term technologies are being pursued now

# Market indicates that prices will rise

## **NYMEX natural gas futures**

(1 November 2011, US\$/MMbtu nominal)



§ Gas demand growth with dependability of supply

§ Higher cost of new developments, even in the same field

§ Lower gas drilling activity

- Held by production (HBP) declining, lowering the US rig count

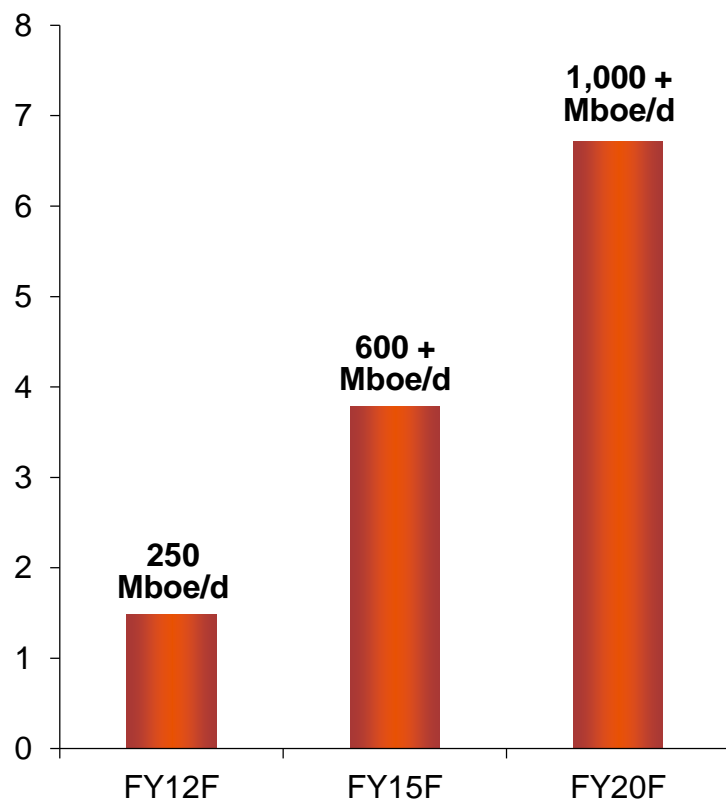
- Drilling focus shift to shale with liquids

- Financial circumstances of smaller players slows investments

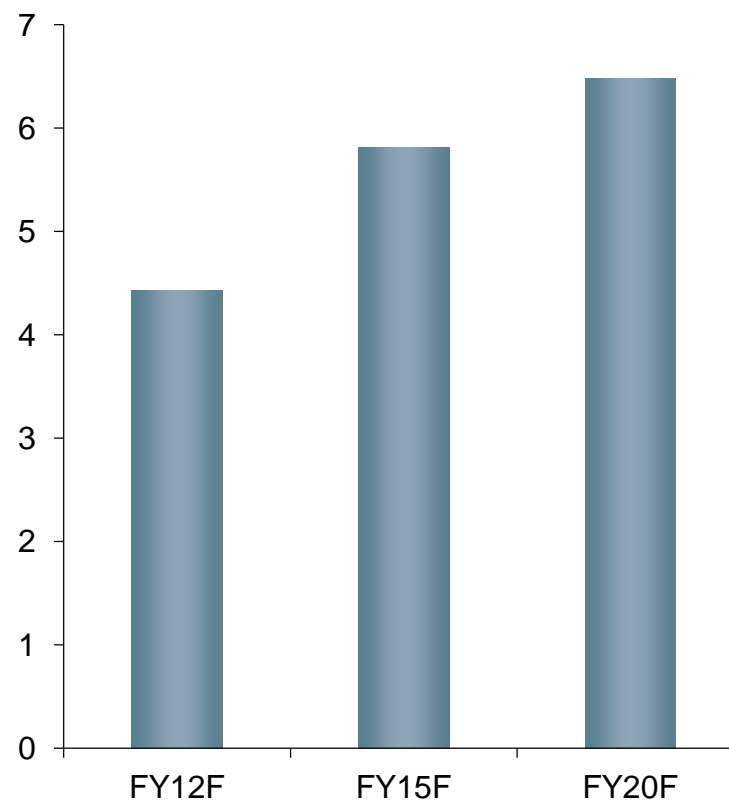
§ Potential for LNG export

# Onshore US shale outlook

**Forecast production rates (excluding Permian)**  
(Net, Bcfe/d)



**Forecast capital spend**  
(Net, real, US\$ billion)



Note: FY12 guidance reflects ownership of Petrohawk assets from 20 August 2011.

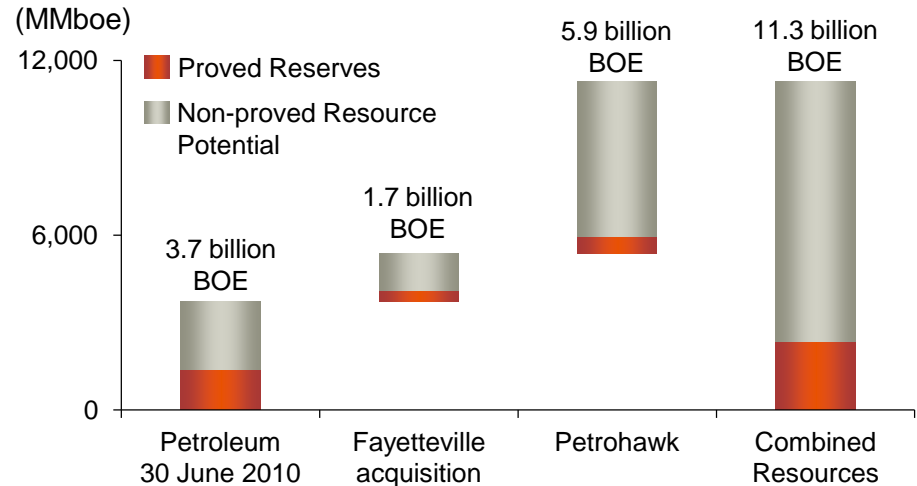
# Onshore US shale is an excellent strategic fit for BHP Billiton

- § World class accessible resource, material to BHP Billiton
  - Large, long-life, low cost, with significant future development
- § Access to the world's largest gas market
- § Low risk due to adequate production history and extensive delineation drilling
- § Long term investment matches our financial strength
- § Large operated positions, leveraging our organisation and expertise
- § Stable operating environment and attractive US fiscal terms

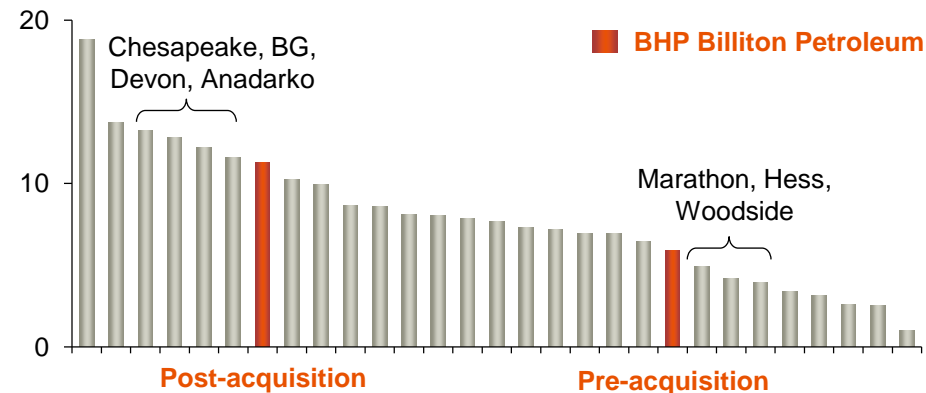
# A significant resource position

- § In a single year BHP Billiton Petroleum's resource base has grown by more than 300% to 11 billion barrels of oil equivalent
- § BHP Billiton Petroleum is now one of the 10 largest independent upstream oil and gas companies in the world based on total resources
- § Onshore US provides years of high return investments at current prices and exposure to numerous technology driven upsides

**Combined net risked resources**



**Independent upstream oil and gas companies by resources<sup>1</sup>**  
(Billions of barrels oil equivalent)

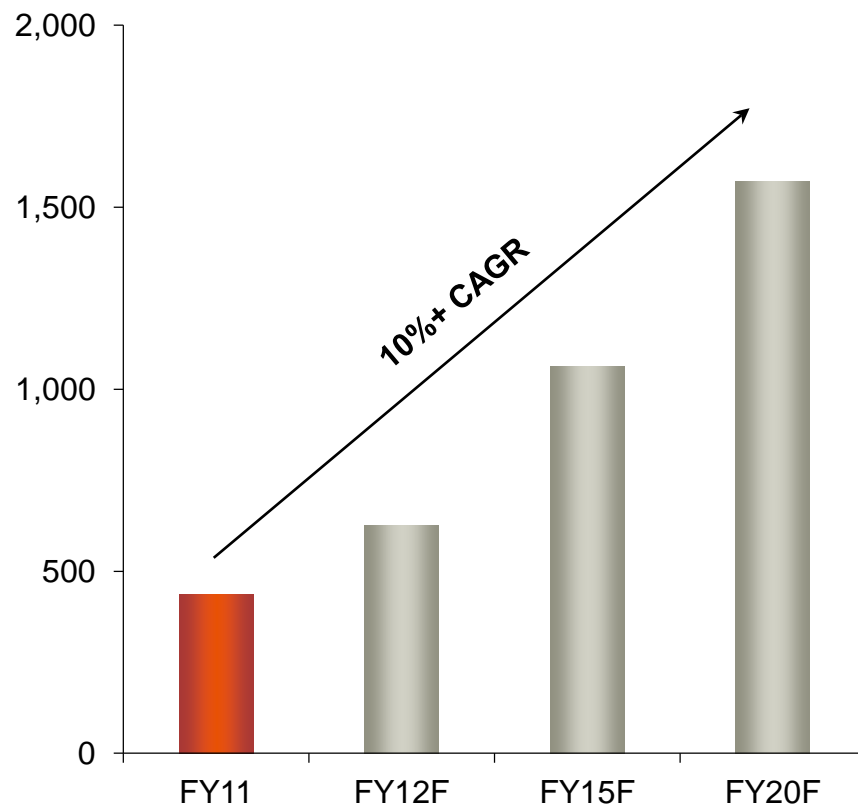


1. Source: Wood Mackenzie.

# Full Petroleum outlook

## Production rates

(Net, Mboe/d)



§ FY12 volume target of 225 MMboe

§ Onshore US shale combines with major growth projects in Western Australia and the Gulf of Mexico

§ Potential to become a 1 MMboe/d business in less than 5 years

§ Sustained growth through the rest of the decade with 10%+ CAGR

### Notes:

FY11 actual reflects ownership of Fayetteville asset from 31 March 2011.

FY12 guidance reflects ownership of Petrohawk assets from 20 August 2011.

# Key messages

- § BHP Billiton has captured key positions in four of the largest, highest value US shale gas/oil fields, each with unique advantages
- § Shale economics strengthened by premium geology and liquids content
- § Rig ramp up in quality reservoirs underpins large anticipated volume growth – can adjust with market conditions
- § Developments are in industry-friendly locations and will be managed as per all BHP Billiton developments
- § Significant shareholder value with huge resources and long term approach





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resourcing the future