

A photograph of an oil pumpjack in the foreground, with several other pumpjacks visible in the background. The scene is set during sunset or sunrise, with a warm orange and yellow glow on the horizon and a blue sky with scattered white clouds above. The pumpjacks are silhouetted against the bright sky.

# US oil and gas reserves study

2016

The EY logo, consisting of the letters 'EY' in a bold, white, sans-serif font. A yellow diagonal bar is positioned above the 'Y'.

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# Study overview

The *US oil and gas reserves study* is a compilation and analysis of certain oil and gas reserve disclosure information as reported by publicly traded companies in their annual reports filed with the United States Securities and Exchange Commission (SEC). This report presents the US exploration and production (E&P) results for the five-year period from 2011 through 2015 for the largest 50 companies based on 2015 US end-of-year oil and gas reserve estimates. Activity related to acquired companies has also been reflected as described in the appendix.\*

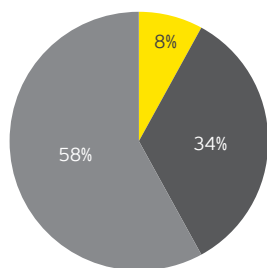
## Study companies

Due to the significant portion of total US oil and gas reserves held by the study companies, the results of these companies generally represent the US E&P industry as a whole. However, it should be noted that results for these companies and for the E&P industry as a whole may be significantly different in other regions of the world.

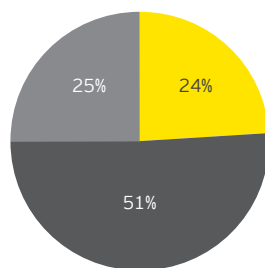
The study companies have been classified into three peer groups: integrated companies (integrateds), large independents and independents. Integrated companies are those that have oil refining and marketing activities in addition to exploration and production. Independents do not have oil refining and marketing activities but may have midstream operations in addition to their exploration and production activities. The independents were classified as “large” if their 2015 worldwide ending reserves exceeded one billion barrels of oil equivalent.

### Peer group analysis

Number of companies



2015 end-of-year oil and gas reserves



■ Integrated ■ Large independents ■ Independents

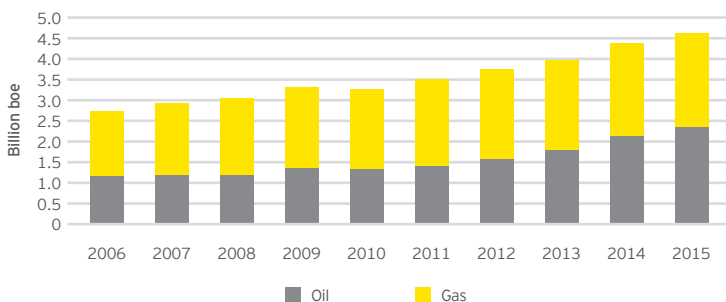
\* The appendix also includes definitions for the performance measure calculations and a discussion of data limitations.



# Industry backdrop and study highlights

Fueled by the shale revolution, combined oil and gas production on a boe basis for the study companies grew by an average of 6% over the 10-year period from 2006 to 2015. This growth in US production has combined with actions taken by OPEC members and other key oil-producing countries to push the sector into an “era of abundance.”

## Combined oil and gas production



## Abundant supply translates to low prices

The shift to abundant supply that exceeds demand has created a low-price environment for both oil and natural gas.

The study period began with relatively strong and stable West Texas Intermediate (WTI) oil prices from 2011 through the middle of 2014, as average monthly prices were in the \$85 to \$105 per barrel range. But the industry saw a significant shift in the latter half of 2014 with continual monthly price declines, and despite some slight rebounds, monthly averages for WTI remained below \$60 per barrel throughout 2015. The study period ended on a low note with an average WTI price of \$37 per barrel in December 2015.

Natural gas prices were generally weak throughout the study period, with 2012 and 2015 being extremely low. As with oil, December 2015 was the low point of the study period, with an average Henry Hub price of \$1.93 per MMBtu.

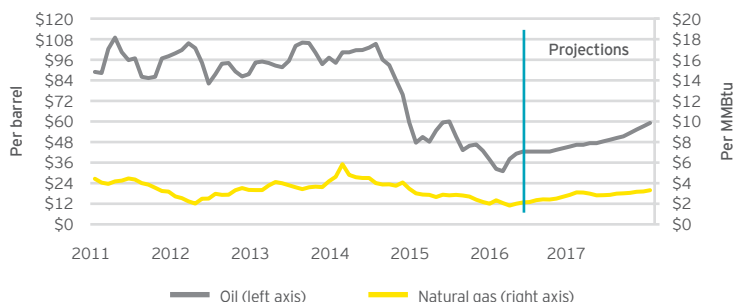
## Low-price environment drives industry transformation

The low-price environment has continued into 2016, and the May 2016 *Short-Term Energy Outlook* from the U.S. Energy Information Administration (EIA) projects average annual WTI prices of \$40 per barrel and \$51 per barrel for 2016 and 2017, respectively. Projections for average annual Henry Hub prices are \$2.32 per MMBtu in 2016 and \$3.11 per MMBtu in 2017.

As the decline in oil prices and weak natural gas prices have lowered revenues and led to downward reserve revisions, many oil and gas companies have experienced rating downgrades and had reserve-based borrowing limits lowered. Decreased cash flows and liquidity have caused some companies, the independents in particular, to defer dividend and/or interest payments while others have begun to restructure through filing for bankruptcy.

While the US oil and gas industry has seen tremendous success in identifying and developing new reserves in the past decade, it now finds itself in a very challenging environment that will once again require companies to transform to survive and prosper in the “era of abundance.”

## WTI and Henry Hub spot prices



Source: EY analysis of EIA data

## Study highlights

The low-price environment made its mark on the study companies' results in 2015

### Capital expenditures

- ▶ Capital expenditures totaled \$117.5 billion, 41% lower compared with 2014.

### Oil reserves

- ▶ Downward reserve revisions of 4.1 billion barrels were reported.
- ▶ Production was 2.4 billion barrels, 10% higher than in 2014.
- ▶ End-of-year reserves were 24.1 billion barrels, 12% lower compared with 2014.
- ▶ The all sources production replacement rate was (45)%.

### Revenues and results of operations

- ▶ Revenues were \$129.8 billion, 41% lower compared with 2014.
- ▶ Property impairments (including ceiling test charges) of \$141.8 billion were recorded.
- ▶ Net losses of \$112.0 billion were recognized.

### Gas reserves

- ▶ Downward reserve revisions of 40.0 tcf were reported.
- ▶ Production was 13.6 tcf, 2% higher than in 2014.
- ▶ End-of-year reserves were 147.0 tcf, 21% lower compared with 2014.
- ▶ The all sources production replacement rate was (192)%.

# Capital expenditures

## US – capital expenditures (millions) (a)

	2011	2012	2013	2014	2015
Proved properties acquired	\$ 13,693.9	\$ 19,169.4	\$ 17,287.5	\$ 25,639.4	\$ 5,393.2
Unproved properties acquired	32,464.5	33,297.1	21,710.7	27,312.9	10,041.0
Exploration	22,723.2	26,873.9	22,260.5	23,608.4	17,058.5
Development	80,671.9	100,285.8	105,006.9	122,793.4	84,674.6
Other	280.7	425.9	450.4	453.4	300.4
<b>Total</b>	<b>\$ 149,834.2</b>	<b>\$ 180,052.0</b>	<b>\$ 166,716.0</b>	<b>\$ 199,807.4</b>	<b>\$ 117,467.7</b>

(a) Includes the 50 largest companies based on 2015 US end-of-year oil and gas reserve estimates. Activity related to acquired companies has also been reflected as described in the appendix.

As a result of the low-price environment, the study companies aggressively cut their capital spending in 2015. Total capital expenditures were \$117.5 billion in 2015, representing a 41% decrease from 2014. A decline in spending of this magnitude last occurred in 2009 and was primarily driven by the global financial crisis.

The study companies saw less merger and acquisition activity than may have been expected as proved property acquisition costs were \$5.4 billion in 2015 while unproved property acquisition costs totaled \$10.0 billion.

WPX Energy was the leading purchaser in 2015, with total property acquisition costs (including proved and unproved) of \$3.2 billion as the company acquired RKI Exploration & Production, LLC (a privately held company). This transaction provided WPX Energy an opportunity to add the Permian Basin to its list of core operating areas.

Noble Energy followed with total property acquisition costs (including proved and unproved) of \$3.1 billion, primarily related to its acquisition of Rosetta Resources which added shale positions in the Eagle Ford shale and Permian Basin to its portfolio.

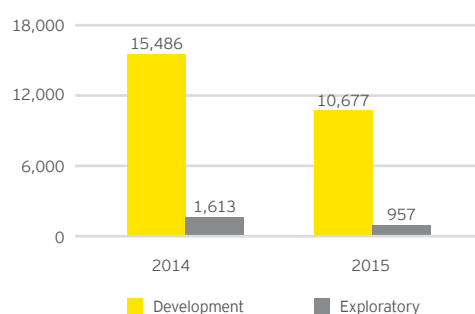
Exploration spending and development spending decreased 28% and 31%, respectively, in 2015. This reduced spending was evident in the study companies' drilling activity as the number of net wells drilled declined 41% (exploratory wells) and 31% (development wells) in 2015 compared with 2014.

Exploration spending was \$17.1 billion in 2015, compared with \$23.6 billion in 2014. The independents saw the largest cut in exploration spending, with a 39% decline, while the large independents' spending decreased 36%.

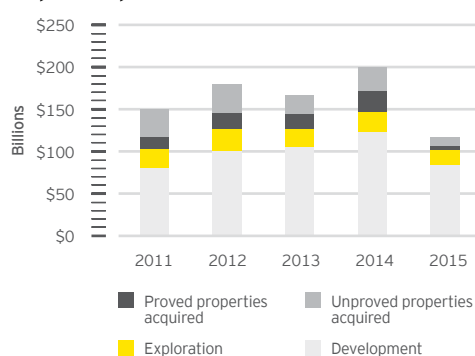
The integrators' exploration spending increased 9%, driven by Royal Dutch Shell, whose activity was focused on the Gulf of Mexico and offshore Alaska. However, the drilling results in the Chukchi Sea, along with the economic and regulatory challenges in that area, has prompted the company to cease its exploration activities in Alaska for the foreseeable future.

Development spending declined from \$122.8 billion in 2014 to \$84.7 billion in 2015. All of the study companies decreased their development spending, with the peer groups seeing declines of 17% (integrators), 35% (large independents) and 34% (independents).

### Net wells drilled



### Capital expenditures



## 2015 capital expenditures – top-ranked companies (millions)

Proved properties acquired	
Noble Energy, Inc.	\$ 1,613.0
WPX Energy, Inc. <sup>(3)</sup>	1,038.0
Gulfport Energy Corporation	810.8
EOG Resources, Inc.	480.6
EV Energy Partners, L.P.	236.4
Unproved properties acquired	
WPX Energy, Inc. <sup>(3)</sup>	\$ 2,170.0
Noble Energy, Inc.	1,478.0
Southwestern Energy Company	692.0
Devon Energy Corporation	634.0
Chevron Corporation	554.0
Exploration	
Royal Dutch Shell plc	\$ 3,433.0
ConocoPhillips	1,456.0
Freeport-McMoRan Inc.	1,250.0
Pioneer Natural Resources Company	1,243.0
Chevron Corporation	1,144.0
Development	
Exxon Mobil Corporation <sup>(1)</sup>	\$ 7,185.0
Chevron Corporation	6,275.0
Royal Dutch Shell plc	5,720.0
ConocoPhillips	4,092.0
BHP Billiton Group	4,036.0

<sup>(1)-(3)</sup> See company footnotes on page 28.

# Revenues and results of operations

## US – revenues and results of operations (millions) (a)

	2011	2012	2013	2014	2015
Revenues	\$ 179,886.4	\$ 174,103.1	\$ 197,475.4	\$ 220,449.6	\$ 129,794.1
Production costs (b)	49,297.6	54,044.1	59,368.0	64,070.9	56,582.9
Exploration expense	5,515.0	6,662.8	7,485.5	9,173.1	12,450.8
DD&A	45,422.1	56,595.5	64,904.7	74,543.9	81,586.5
Impairments	4,485.1	19,689.1	7,096.6	23,373.4	141,811.9
Other expenses (c)	10,484.7	3,207.4	7,376.6	6,658.7	7,541.0
Pre-tax results of operations	\$ 64,682.1	\$ 33,904.2	\$ 51,244.1	\$ 42,629.7	\$ (170,178.9)
Income taxes	22,048.6	11,463.3	17,298.0	14,299.3	(58,183.5)
<b>Results of operations</b>	<b>\$ 42,633.5</b>	<b>\$ 22,440.9</b>	<b>\$ 33,946.0</b>	<b>\$ 28,330.4</b>	<b>\$ (111,995.4)</b>

(a) Includes the 50 largest companies based on 2015 US end-of-year oil and gas reserves. Activity related to acquired companies has also been reflected as described in the appendix.

(b) Includes production taxes and transportation costs for companies that separately disclose these expenses.

(c) Includes asset retirement obligation accretion and production-related general and administrative costs for companies that separately disclose these expenses.

## US – revenues and results of operations (per boe)

	2011	2012	2013	2014	2015
Revenues	\$ 51.58	\$ 46.37	\$ 49.90	\$ 50.42	\$ 28.12
Production costs	14.14	14.40	15.00	14.65	12.26
Exploration expense	1.58	1.77	1.89	2.10	2.70
DD&A	13.02	15.07	16.40	17.05	17.68
Impairments	1.29	5.24	1.79	5.35	30.72
Other expenses	3.01	0.85	1.86	1.52	1.63
Pre-tax results of operations	\$ 18.55	\$ 9.03	\$ 12.95	\$ 9.75	\$ (36.87)
Income taxes	6.32	3.05	4.37	3.27	(12.61)
<b>Results of operations</b>	<b>\$ 12.22</b>	<b>\$ 5.98</b>	<b>\$ 8.58</b>	<b>\$ 6.48</b>	<b>\$ (24.26)</b>

The study companies reported net losses of \$112.0 billion as low prices resulted in significantly decreased revenues and substantial property impairments.

Combined oil and gas production increased 6% in 2015, but prices caused revenues to decline 41% from \$220.4 billion in 2014 to \$129.8 billion in 2015. As with capital expenditures, revenues last declined at this rate during the global financial crisis in 2009.

Production costs fell 12% in 2015 to \$56.6 billion, driven by a 45% drop in production taxes and smaller declines in lease operating expenses and transportation costs.

Recurring depreciation, depletion and amortization (DD&A) increased 9% in 2015 to \$81.6 billion and 44 of the 50 study companies recorded oil and gas property impairments (including ceiling test charges) in 2015, totaling \$141.8 billion.

The largest impairments in 2015 were reported by Apache (\$19.6 billion), Chesapeake Energy (\$18.2 billion) and Devon Energy (\$18.0 billion). Each of these companies follows full cost accounting, which requires a “ceiling test” be conducted each quarter to review properties for impairment. The SEC requires that the 12-month average of the first-day-of-month reference prices be used to determine the ceiling test limitation. Based on EIA posted spot prices, the 12-month average price for oil decreased 47% from 2014 to 2015 while natural gas prices declined 40% (see details in chart below).

Full cost companies accounted for 74% of the total impairments reported in 2015 even though only 28% of the study companies follow full cost accounting.

### EIA posted spot prices (12-month average price required by the SEC)

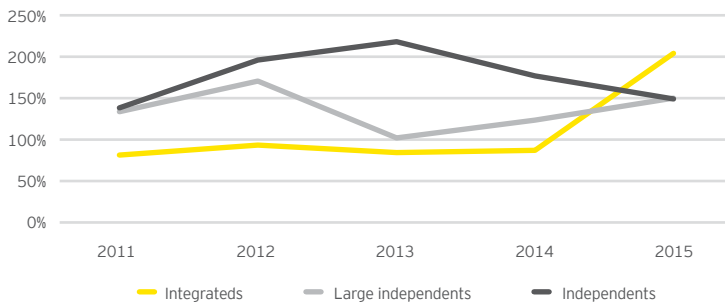
	Oil (per barrel)	Natural gas (per MMBtu)
2014	\$95.28	\$4.36
2015	50.16	2.63

In contrast to full cost, successful efforts accounting requires companies to review proved properties for impairment whenever management determines events or circumstances indicate the recorded carrying value of the properties may not be recoverable. If the unamortized capitalized property costs exceed expected undiscounted future cash flows, the capitalized cost is reduced to fair value. EOG Resources (\$6.4 billion) and California Resources (\$4.9 billion) reported the largest impairments under successful efforts accounting in 2015.

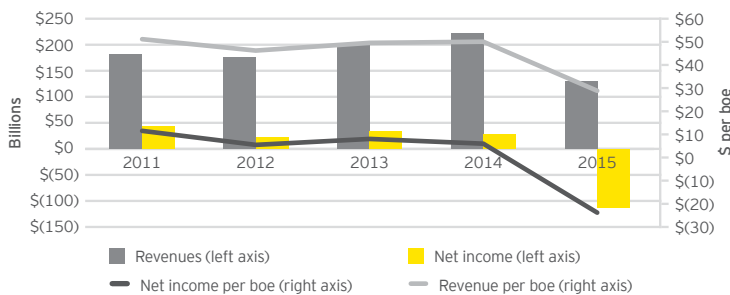
Revenues on a per-boe-of-production basis were \$28.12 in 2015, 45% lower than 2014. After-tax losses for the study companies were (\$24.26) per boe in 2015, but if adjusted for noncash DD&A and impairment charges, after-tax profits (calculated using the study companies' effective tax rate for each year) were \$7.59 per boe in 2015, compared with \$21.60 in 2014.

The study companies posted a 160% plowback percentage in 2015 while the five-year average was 132%. The plowback percentage represents total capital expenditures as a percentage of netback (revenues less production costs). The integrations posted the highest plowback percentage for the first time in the study period with a 2015 rate of 205% as these companies had the smallest percentage decline in capital expenditures along with the largest decline in revenues. The large independents had a rate of 150% while the independents followed closely at 148%.

### Plowback percentage



### Revenues and results of operations



# Oil reserves

## US – proved oil reserves (a) (million barrels) (b)

	2011	2012	2013	2014	2015
Beginning of year	18,240.0	20,179.0	22,660.0	24,717.5	27,551.5
Additions:					
Extensions and discoveries	2,439.7	3,685.0	4,020.8	4,002.6	3,050.7
Improved recovery	324.0	488.1	373.6	418.5	147.1
Revisions	597.5	(56.0)	(405.7)	(40.6)	(4,141.8)
Production	(1,408.5)	(1,586.1)	(1,785.5)	(2,143.7)	(2,350.4)
Purchases	307.6	799.5	645.3	1,303.9	517.0
Sales	(183.5)	(849.6)	(791.3)	(704.3)	(627.0)
Other (c)	(137.6)	0.0	0.3	(2.4)	0.7
<b>End of year</b>	<b>20,179.0</b>	<b>22,660.0</b>	<b>24,717.5</b>	<b>27,551.5</b>	<b>24,147.7</b>

(a) Includes the 50 largest companies based on 2015 US end-of-year oil and gas reserve estimates. Activity related to acquired companies has also been reflected as described in the appendix.

(b) Includes condensate and natural gas liquids.

(c) Includes transfers, reclassifications and other.

Oil reserves for the study companies declined 12% in 2015 as extensions and discoveries decreased and significant downward reserve revisions were recorded. Oil reserves were 27.6 billion barrels in 2014, compared with 24.1 billion barrels in 2015.

Extensions and discoveries decreased 24% in 2015, but at 3.1 billion barrels, the additions remained above the level seen in 2011. The largest extensions and discoveries were recorded by ExxonMobil (387.0 million barrels), EOG Resources (190.5 million barrels) and Marathon Oil (179.0 million barrels).

The low-price environment drove the recording of downward reserve revisions of 4.1 billion barrels in 2015. The independents saw the largest impact, with downward revisions equal to 20% of their beginning-of-year reserves. The large independents' downward revisions were 16% of beginning-of-year reserves, compared with 7% for the integrated.

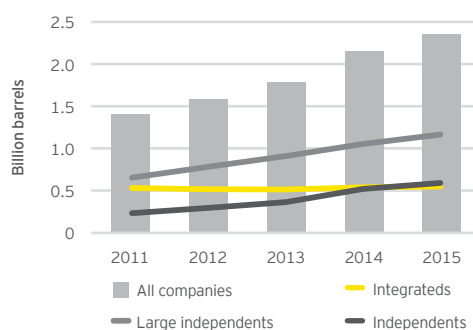
The largest downward revisions on an absolute basis were reported by ConocoPhillips (269.0 million barrels), Occidental Petroleum (248.0 million barrels) and Continental Resources (246.8 million barrels).

Oil production rose 10% from 2.1 billion barrels in 2014 to 2.4 billion barrels in 2015. The largest increases were posted by BHP Billiton (22.7 million barrels), Encana (20.2 million barrels) and Chevron (17.0 million barrels).

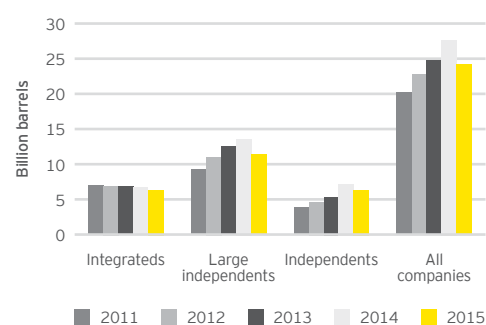
Oil production increased 67% from 2011 to 2015, with the independents' production growing 168%, compared with 82% growth for the large independents and a 6% increase for the integrated.

Purchases of oil reserves were 517.0 million barrels while sales were 627.0 million barrels. Noble Energy's acquisition of Rosetta Resources accounted for the largest transaction activity in 2015.

### Oil production



### End-of-year oil reserves



### 2015 oil reserves – top-ranked companies (million barrels)

Ending reserves	
Exxon Mobil Corporation <sup>(1)</sup>	2,632.0
ConocoPhillips	1,938.0
BP p.l.c.	1,806.0
EOG Resources, Inc.	1,470.7
Chevron Corporation	1,386.0
Production	
Chevron Corporation	183.0
ConocoPhillips	176.0
Exxon Mobil Corporation <sup>(1)</sup>	141.0
BP p.l.c.	138.0
EOG Resources, Inc.	131.5

<sup>(1)</sup> See company footnotes on page 28.



# Gas reserves

## US – proved gas reserves (Bcf) (a)

	2011	2012	2013	2014	2015
Beginning of year	166,066.2	178,267.0	159,639.9	174,051.9	186,722.0
Additions:					
Extensions and discoveries	26,710.8	23,536.8	29,199.2	29,574.3	18,741.2
Improved recovery	833.5	1,257.3	945.4	982.0	557.8
Revisions	(3,795.5)	(26,742.6)	(183.7)	(1,043.3)	(40,004.9)
Production	(12,473.4)	(13,009.1)	(13,031.5)	(13,370.2)	(13,592.7)
Purchases	6,646.3	5,648.1	1,929.6	5,384.9	1,983.3
Sales	(7,542.0)	(9,317.5)	(4,447.0)	(8,856.9)	(7,395.4)
Other (b)	1,821.1	(0.1)	0.0	(0.9)	(1.1)
<b>End of year</b>	<b>178,267.0</b>	<b>159,639.9</b>	<b>174,051.9</b>	<b>186,722.0</b>	<b>147,010.2</b>

(a) Includes the 50 largest companies based on 2015 US end-of-year oil and gas reserve estimates. Activity related to acquired companies has also been reflected as described in the appendix.

(b) Includes transfers, reclassifications and other.

End-of-year gas reserves for the study companies dropped 21% in 2015 to 147.0 tcf as extensions and discoveries decreased and downward revisions equal to 21% of beginning-of-year reserves were recorded.

Extensions and discoveries declined 37% from 29.6 tcf in 2014 to 18.7 tcf in 2015. Antero Resources (2.3 tcf), EQT Resources (2.0 tcf) and ExxonMobil (1.2 tcf) posted the largest extensions and discoveries.

Low natural gas prices over the study period contributed to the study companies recording over 71 tcf of downward reserve revisions from 2011 through 2015, with a staggering 40.0 tcf recorded in 2015. The peer groups were evenly impacted, with each group recording downward revisions equal to about 20% of their beginning-of-year reserves.

ExxonMobil (6.7 tcf), Chesapeake Energy (4.2 tcf) and Southwestern Energy (3.5 tcf) recorded the largest downward revisions in 2015 on an absolute basis.

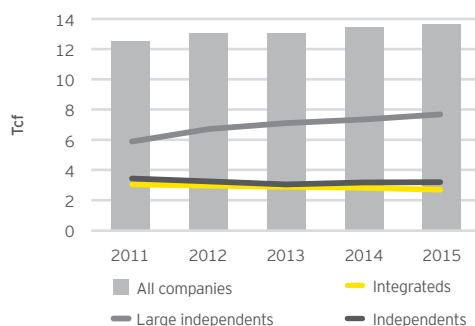
Despite the low prices over the study period, gas production steadily increased each year, rising 2% from 13.4 tcf in 2014 to 13.6 tcf in 2015. The largest production gains in 2015 were seen by large independents – Southwestern Energy, Antero Resources and EQT – with all three companies increasing production by over 100 bcf.

The large independents also led the way over the five-year period as their production increased 33% from 2011 to 2015 while the integrated and independents saw declines in production.

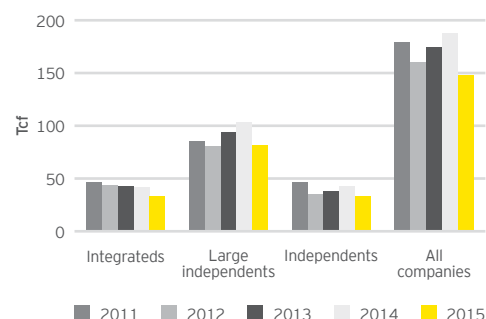
Purchases of gas reserves were 2.0 tcf in 2015, with Noble Energy (629.0 bcf) accounting for the largest activity as a result of its acquisition of Rosetta Resources.

Sales of gas reserves were 7.4 tcf in 2015, with the largest transaction related to Talisman Energy (1.7 tcf), which was acquired by Repsol, S.A. (a company not included in this study). Anadarko Petroleum reported sales of 1.0 tcf as it completed several transactions related to its East Texas and Rocky Mountain properties.

### Gas production



### End-of-year gas reserves



### 2015 gas reserves – top-ranked companies (bcf)

Ending reserves	
Exxon Mobil Corporation <sup>(1)</sup>	19,600.0
Antero Resources Corporation	9,533.0
EQT Corporation	9,110.3
BP p.l.c.	8,363.0
Cabot Oil & Gas Corporation	7,856.0
Production	
Exxon Mobil Corporation <sup>(1)</sup>	1,269.00
Chesapeake Energy Corporation	1,070.00
Southwestern Energy Company	899.00
Anadarko Petroleum Corporation	854.00
ConocoPhillips	671.00

<sup>(1)</sup> See company footnotes on page 28.

**The study companies decreased capital expenditures by 41% in 2015.**

**Overall industry projections are that capital spending will decline 20% in 2016.**

Source: Evercore ISI Research



# Performance measures

## Proved reserve acquisition costs, finding and development costs and reserve replacement costs

### US – proved reserve acquisition costs (PRAC), finding and development costs (FDC) and reserve replacement costs (RRC) (a)

\$ per boe

	2011	2012	2013	2014	2015	3-year	5-year
PRAC	\$ 9.68	\$ 11.01	\$ 17.88	\$ 11.65	\$ 6.36	\$ 12.03	\$ 11.32
FDC including revisions	18.60	42.42	16.64	18.73	(25.50)	31.37	29.31
FDC excluding revisions	18.51	19.37	15.87	18.31	17.47	17.19	17.87
RRC	17.15	32.54	16.76	17.37	(33.11)	27.03	25.30

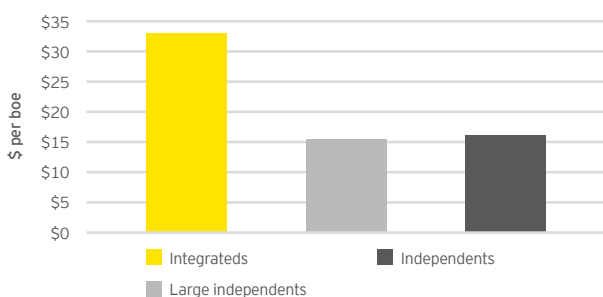
(a) Includes the 50 largest companies based on 2015 US end-of-year oil and gas reserve estimates. Activity related to acquired companies has also been reflected as described in the appendix.

PRAC were \$6.36 per boe in 2015, the lowest of the study period. Top-ranked purchasers WPX Energy and Noble Energy each made purchases that were approximately 60% oil-weighted in 2015. WPX Energy's 2015 PRAC was \$10.95 per boe while Noble Energy posted a 2015 PRAC of \$5.98 per boe.

The downward reserve revisions for both oil and gas in 2015 resulted in negative, not meaningful results for FDC including revisions and RRC. The five-year average for the study period was \$29.31 per boe for FDC including revisions and \$25.30 per boe for RRC.

FDC excluding revisions declined 5% to \$17.47 per boe in 2015 as associated spending decreased 36% and combined oil and gas reserve additions dropped 33%. Over the five-year study period, the integrated's average FDC excluding revisions was \$32.83 per boe, compared with \$15.47 per boe for the large independents and \$16.16 per boe for the independents.

### FDC excluding revisions – 5-year (2011-15) averages



### Three-year (2013-15) PRAC, FDC and RRC\* – leading companies (\$ per boe)

PRAC*	
Exxon Mobil Corporation <sup>(1)</sup>	\$ 0.64
Royal Dutch Shell plc	1.77
Marathon Oil Corporation	3.35
EQT Corporation	3.60
Southwestern Energy Company	3.81
FDC including revisions	
Cabot Oil & Gas Corporation	\$ 3.55
Range Resources Corporation	4.23
Antero Resources Corporation	4.59
EQT Corporation	6.37
National Fuel Gas Company	6.73
FDC excluding revisions	
Antero Resources Corporation	\$ 3.33
EV Energy Partners, L.P.	3.78
PDC Energy, Inc.	4.27
EQT Corporation	4.38
Ultra Petroleum Corp.	4.43
RRC	
Cabot Oil & Gas Corporation	\$ 3.73
Range Resources Corporation	4.45
Antero Resources Corporation	4.63
EQT Corporation	6.09
National Fuel Gas Company	6.69

\* Based on companies with proved acquisition costs of at least \$50 million for the three-year period.

<sup>(1)-(3)</sup> See company footnotes on page 28.

## Production replacement rates

### Oil

#### US – all sources and finding and development (F&D) gas production replacement rates (a)

	2011	2012	2013	2014	2015	3-year	5-year
All sources	247%	256%	215%	232%	(45%)	124%	165%
F&D including revisions	239%	260%	223%	204%	(40%)	118%	161%
F&D excluding revisions	196%	263%	246%	206%	136%	191%	204%

(a) Includes the 50 largest companies based on 2015 US end-of-year oil and gas reserve estimates. Activity related to acquired companies has also been reflected as described in the appendix.

Oil production replacement rates showed the impact of the 4.1 billion barrels of downward revisions recorded in 2015. The downward revisions eclipsed other reserve additions, resulting in an all sources production replacement rate of (45)% for 2015 compared with (40)% for F&D including revisions. The all sources rate was slightly lower due to net sales in 2015.

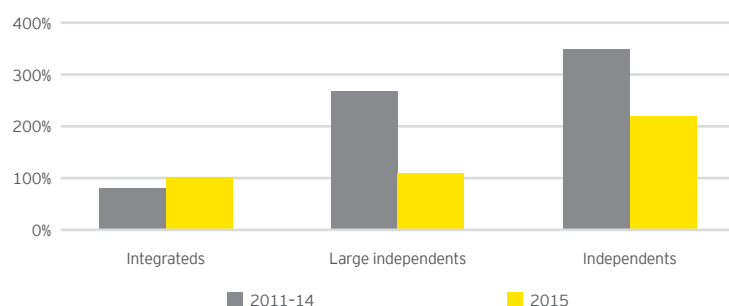
Extensions and discoveries of 3.1 billion barrels in 2015 drove a 136% F&D excluding revisions production replacement rate. While this measure was well above the 100% threshold, it was the lowest rate of the study period as the study companies began to experience the impact of decreased capital spending and drilling activity.

All peer groups replaced at least 100% of their production in 2015 based on the F&D excluding revisions rate. However, the large independents and independents saw a large drop in results for 2015 compared with the 2011-14 average. The integrateds saw a slight increase in 2015 compared with the 2011-14 average, driven by ExxonMobil's activity related to its unconventional resources.

#### 2015 oil production replacement rates by peer group

	All sources	F&D including revisions	F&D excluding revisions
Integrateds	44%	18%	102%
Large independents	(88%)	(80%)	109%
Independents	(43%)	(16%)	220%

#### Oil F&D excluding revisions production replacement rates



#### Three-year (2013-15) oil production replacement rates – top-ranked companies

All sources	
Antero Resources Corporation	1,554%
RSP Permian, Inc.	1,023%
EQT Corporation	934%
CONSOL Energy Inc.	842%
Range Resources Corporation	624%
F&D including revisions	
Antero Resources Corporation	1,554%
EQT Corporation	877%
CONSOL Energy Inc.	842%
RSP Permian, Inc.	706%
Range Resources Corporation	675%
F&D excluding revisions	
Antero Resources Corporation	1,475%
PDC Energy, Inc.	1,132%
RSP Permian, Inc.	856%
Approach Resources Inc.	766%
Range Resources Corporation	588%

## Production replacement rates

### Gas

#### US – gas production replacement rates (a)

	2011	2012	2013	2014	2015	3-year	5-year
All sources	183%	(43%)	211%	195%	(192%)	68%	68%
F&D including revisions	190%	(15%)	230%	221%	(152%)	97%	93%
F&D excluding revisions	221%	191%	231%	229%	142%	200%	202%

(a) Includes the 50 largest companies based on 2015 US end-of-year oil and gas reserve estimates. Activity related to acquired companies has also been reflected as described in the appendix.

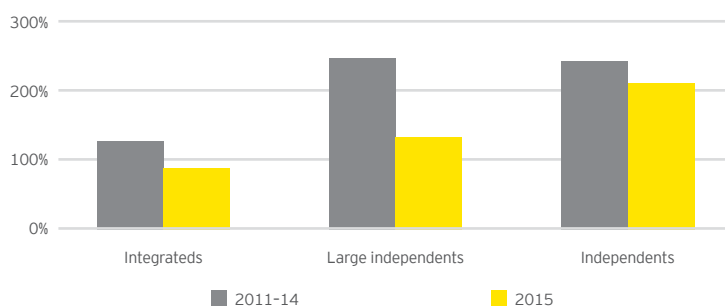
As with oil, gas reserve additions were overshadowed by the 40.0 tcf of downward reserve revisions recorded in 2015. The study companies posted a (152)% F&D including revisions replacement rate and an even lower (192)% all sources rate as there were net sales for the year.

The F&D excluding revisions replacement rate was 142% in 2015, well above the 100% threshold, but as with oil, this was the lowest of the five-year study period. The independents and large independents replaced over 100% of their 2015 production on an F&D excluding revisions basis while the integrations replaced 88%.

#### 2015 gas production replacement rates by peer group

	All sources	F&D including revisions	F&D excluding revisions
Integrations	(226%)	(233%)	88%
Large independents	(181%)	(151%)	132%
Independents	(191%)	(88%)	210%

#### Gas F&D excluding revisions production replacement rates



#### Three-year (2013-15) gas production replacement rates – leading companies

All sources	
RSP Permian, Inc.	1,071%
Gulfport Energy Corporation	780%
Approach Resources Inc.	754%
Antero Resources Corporation	726%
Continental Resources, Inc.	594%
F&D including revisions	
Approach Resources Inc.	753%
Antero Resources Corporation	723%
RSP Permian, Inc.	631%
PDC Energy, Inc.	625%
Gulfport Energy Corporation	611%
F&D excluding revisions	
Antero Resources Corporation	1,118%
RSP Permian, Inc.	928%
Continental Resources, Inc.	814%
Gulfport Energy Corporation	780%
Approach Resources Inc.	643%

## Production costs

### US – production costs (\$ per boe) (a)

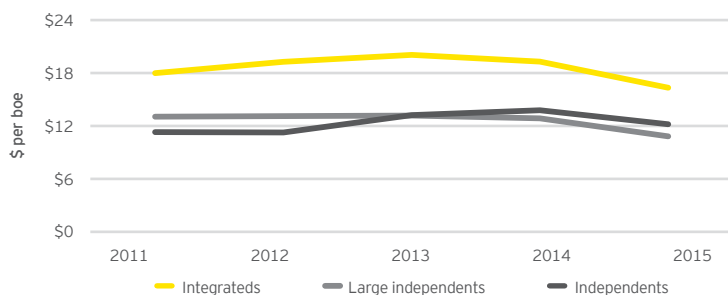
2011	2012	2013	2014	2015	3-year	5-year
\$14.14	\$14.40	\$15.00	\$14.65	\$12.26	\$13.91	\$14.04

(a) Includes the 50 largest companies based on 2015 US end-of-year oil and gas reserve estimates. Activity related to acquired companies has also been reflected as described in the appendix.

Production costs per boe declined 16% from \$14.65 per boe in 2014 to \$12.26 per boe in 2015. Lease operating costs per boe and transportation costs per boe each declined 11% in 2015 despite a 6% increase in combined oil and gas production, while production taxes per boe dropped 48%.

On a peer group basis, the integrateds posted a 16% decline in production costs per boe in 2015, compared with decreases of 17% and 13% for the large independents and independents, respectively.

### Production costs per boe



### Three-year (2013-15, production costs – top-ranked companies (\$ per boe)

EQT Corporation	\$ 4.00
Rice Energy Inc.	5.38
Southwestern Energy Company	5.98
Cabot Oil & Gas Corporation	6.07
National Fuel Gas Company	6.98

**Production for the study companies increased 10% (oil) and 2% (gas) in 2015.**

**The EIA projects a 9% decline in total US oil production in 2016 and relatively low growth for gas.**

Source: May 2016, Short-Term Energy Outlook



# Company statistics

## US – capital expenditures for the latest fiscal year

Millions

	Proved properties	Unproved properties	Exploration	Development	Other	Total capital expenditures
Anadarko Petroleum Corporation	\$ 81.0	\$ 293.0	\$ 503.0	\$ 3,660.0	\$ –	\$ 4,537.0
Antero Resources Corporation	–	198.7	612.0	1,039.3	–	1,850.0
Apache Corporation	1.0	313.0	131.0	1,957.0	–	2,402.0
Approach Resources Inc.	–	0.7	4.4	146.1	0.2	151.3
BHP Billiton Group	–	37.0	281.0	4,036.0	–	4,354.0
BP p.l.c.	131.0	56.0	651.0	3,662.0	–	4,500.0
Breitbart Energy Partners LP	7.9	2.6	–	201.9	2.8	215.2
Cabot Oil & Gas Corporation	16.3	20.1	34.0	723.5	–	793.9
California Resources Corporation	77.0	65.0	43.0	290.0	–	475.0
Carrizo Oil & Gas, Inc.	–	63.4	117.2	389.4	–	570.1
Chesapeake Energy Corporation	–	454.0	112.0	2,941.0	–	3,507.0
Chevron Corporation	23.0	554.0	1,144.0	6,275.0	–	7,996.0
Cimarex Energy Co.	0.0	41.2	6.9	823.8	(4.8)	867.2
Concho Resources Inc.	57.2	206.2	1,120.8	718.2	(7.3)	2,095.1
ConocoPhillips	5.0	168.0	1,456.0	4,092.0	–	5,721.0
CONSOL Energy Inc.	–	76.7	95.4	666.3	–	838.4
Continental Resources, Inc.	0.6	168.5	238.2	2,129.0	22.8	2,559.1
Denbury Resources Inc.	28.2	–	0.7	407.0	–	436.0
Devon Energy Corporation	193.0	634.0	478.0	3,269.0	–	4,574.0
Encana Corporation	12.0	15.0	3.0	1,844.0	–	1,874.0
Energen Corporation	1.9	85.7	649.8	372.2	–	1,109.5
Energy XXI Ltd	–	2.3	38.2	608.6	–	649.1
EOG Resources, Inc.	480.6	133.8	206.8	3,815.8	32.0	4,669.0
EP Energy Corporation	111.0	12.0	26.0	1,168.0	4.0	1,321.0
EQT Corporation	23.9	158.4	53.5	1,633.5	–	1,869.3
EV Energy Partners, L.P.	236.4	1.0	2.2	55.1	–	294.7
Exxon Mobil Corporation <sup>(1)</sup>	6.0	305.0	204.0	7,185.0	–	7,700.0
Freeport-McMoRan Inc.	–	61.0	1,250.0	1,442.0	–	2,753.0
Gulfport Energy Corporation	810.8	–	–	656.7	8.8	1,476.3



	Proved properties	Unproved properties	Exploration	Development	Other	Total capital expenditures
Hess Corporation	\$ -	\$ 22.0	\$ 255.0	\$ 2,414.0	\$ -	\$ 2,691.0
Marathon Oil Corporation	4.0	61.0	959.0	1,477.0	-	2,501.0
Memorial Resource Development Corp.	86.2	362.2	30.1	725.4	-	1,204.0
Murphy Oil Corporation	-	10.1	166.8	1,344.4	30.7	1,552.0
National Fuel Gas Company	1.8	20.0	53.2	454.6	37.6	567.2
Newfield Exploration Company	21.0	283.0	578.0	630.0	-	1,512.0
Noble Energy, Inc.	1,613.0	1,478.0	206.0	2,455.0	-	5,752.0
Oasis Petroleum Inc.	28.7	3.2	2.4	433.7	1.5	469.5
Occidental Petroleum Corporation	37.0	25.0	74.0	2,880.0	-	3,016.0
PDC Energy, Inc.	3.6	0.0	-	552.1	-	555.7
Pioneer Natural Resources Company	9.0	27.0	1,243.0	794.0	102.0	2,175.0
QEP Resources, Inc.	49.6	39.8	8.7	1,010.3	-	1,108.4
Range Resources Corporation	-	73.0	108.9	721.6	22.2	925.7
Rice Energy Inc.	-	100.2	1.3	616.8	-	718.3
Rosetta Resources Inc.	-	-	-	-	-	-
Royal Dutch Shell plc	2.0	135.0	3,433.0	5,720.0	-	9,290.0
RSP Permian, Inc.	104.5	351.8	-	378.9	-	835.2
SM Energy Company	10.0	18.4	132.5	1,234.1	-	1,395.0
Southwestern Energy Company	81.0	692.0	50.0	1,417.0	-	2,240.0
Talisman Energy Inc.	-	-	-	-	-	-
Ultra Petroleum Corp.	-	13.8	18.2	461.5	-	493.5
Whiting Petroleum Corporation	-	29.1	192.4	2,089.8	48.0	2,359.2
WPX Energy, Inc. <sup>(3)</sup>	1,038.0	2,170.0	84.0	657.0	-	3,949.0
<b>All companies</b>	<b>\$ 5,393.2</b>	<b>\$ 10,041.0</b>	<b>\$ 17,058.5</b>	<b>\$ 84,674.6</b>	<b>\$ 300.4</b>	<b>\$ 117,467.7</b>
Integrations	\$ 162.0	\$ 1,050.0	\$ 5,432.0	\$ 22,842.0	\$ -	\$ 29,486.0
Large independents	2,536.4	4,929.5	5,758.4	40,660.7	77.0	53,962.0
Independents	2,694.8	4,061.5	5,868.1	21,171.9	223.4	34,019.7

<sup>(1)-(3)</sup> See company footnotes on page 28.

## US – revenues and results of operations for the latest fiscal year (a)

Millions

	Revenues	Production costs (b)	Exploration expense	DD&A	Impairments	Other (income) expense (c)	Income taxes	Results of operations
Anadarko Petroleum Corporation	\$ 6,593.0	\$ 2,116.0	\$ 1,447.0	\$ 3,785.0	\$ 4,033.0	\$ 1,524.0	\$ (2,332.0)	\$ (3,980.0)
Antero Resources Corporation	\$1,375.1	\$773.7	\$3.8	\$614.7	\$104.3	-	\$(45.5)	\$(75.9)
Apache Corporation	2,637.0	985.0	-	1,419.0	19,537.0	28.0	(6,863.0)	(12,469.0)
Approach Resources Inc.	131.3	40.1	4.4	109.3	220.2	-	(86.1)	(156.6)
BHP Billiton Group	6,334.0	2,220.0	242.0	6,597.0	-	-	(1,080.0)	(1,645.0)
BP p.l.c.	8,078.0	2,992.0	960.0	3,671.0	-	2,800.0	(857.0)	(1,488.0)
Breitburn Energy Partners LP	1,083.9	440.5	-	448.8	2,377.6	-	0.2	(2,183.3)
Cabot Oil & Gas Corporation	1,467.5	611.2	27.5	622.2	114.9	(3.9)	(37.5)	133.1
California Resources Corporation	2,273.0	1,107.0	36.0	976.0	4,852.0	79.0	(1,946.0)	(2,831.0)
Carrizo Oil & Gas, Inc.	623.5	117.0	-	298.9	1,224.4	1.1	(110.3)	(907.6)
Chesapeake Energy Corporation	5,391.0	3,264.0	-	2,099.0	18,238.0	-	(6,683.0)	(11,527.0)
Chevron Corporation	8,670.0	4,723.0	1,614.0	7,640.0	583.0	45.0	(2,133.0)	(3,802.0)
Cimarex Energy Co.	1,417.5	567.3	-	736.6	3,716.9	9.1	(1,311.6)	(2,300.7)
Concho Resources Inc.	2,436.5	541.4	58.8	1,223.3	60.5	7.6	175.7	369.2
ConocoPhillips	8,660.0	4,900.0	2,265.0	4,740.0	6.0	183.0	(1,282.0)	(2,152.0)
CONSOL Energy Inc.	1,181.0	485.7	-	370.4	828.9	102.9	(229.8)	(377.0)
Continental Resources, Inc.	2,552.5	549.5	19.4	1,722.3	402.1	-	(33.7)	(107.2)
Denbury Resources Inc.	1,361.0	610.7	-	492.1	4,939.6	48.3	(1,797.3)	(2,932.4)
Devon Energy Corporation	4,356.0	1,860.0	-	2,107.0	17,992.0	243.0	(5,547.0)	(12,299.0)
Encana Corporation	2,491.0	1,241.0	-	1,088.0	6,473.0	-	(2,285.0)	(4,026.0)
Energen Corporation	878.6	285.8	14.9	1,880.2	-	7.1	(469.4)	(840.0)
Energy XXI Ltd	1,251.1	493.1	-	705.5	2,421.9	50.1	(486.3)	(1,933.2)
EOG Resources, Inc.	6,010.2	2,324.6	140.7	3,017.4	6,402.9	-	(2,128.2)	(3,747.2)
EP Energy Corporation	1,241.0	428.0	20.0	971.0	4,297.0	-	(1,607.0)	(2,868.0)
EQT Corporation	1,155.8	398.0	62.0	723.4	118.3	-	(58.6)	(87.3)
EV Energy Partners, L.P.	315.7	108.4	3.7	106.0	136.7	5.0	(0.3)	(43.7)
Exxon Mobil Corporation <sup>(1)</sup>	8,454.0	5,483.0	194.0	5,325.0	-	-	(976.0)	(1,572.0)
Freeport-McMoRan Inc.	1,994.0	1,215.0	-	1,772.0	13,144.0	-	(5,368.0)	(8,769.0)
Gulfport Energy Corporation	709.0	222.8	-	335.3	1,440.4	-	(220.2)	(1,069.3)

	Revenues	Production costs (b)	Exploration expense	DD&A	Impairments	Other (income) expense (c)	Income taxes	Results of operations
Hess Corporation	\$ 2,706.0	\$ 924.0	\$ 255.0	\$ 2,361.0	\$ 986.0	\$ 711.0	\$ (588.0)	\$ (1,943.0)
Marathon Oil Corporation	3,604.0	1,259.0	750.0	2,758.0	-	47.0	(437.0)	(773.0)
Memorial Resource Development Corp.	1,290.6	366.7	11.3	384.6	616.8	4.5	45.6	(138.9)
Murphy Oil Corporation	1,253.6	367.9	258.2	854.1	329.1	397.0	(337.0)	(615.7)
National Fuel Gas Company	506.7	188.0	-	234.5	1,126.3	9.3	(444.4)	(606.9)
Newfield Exploration Company	1,288.0	488.0	-	754.0	4,786.0	-	(1,659.0)	(3,081.0)
Noble Energy, Inc.	1,961.0	800.0	202.0	1,692.0	158.0	-	(312.0)	(579.0)
Oasis Petroleum Inc.	721.7	245.7	2.4	472.8	46.1	3.9	(18.4)	(30.8)
Occidental Petroleum Corporation	3,809.0	1,878.0	18.0	2,109.0	3,447.0	511.0	(1,606.0)	(2,548.0)
PDC Energy, Inc.	581.9	85.6	1.1	298.8	161.6	5.9	10.4	18.5
Pioneer Natural Resources Company	3,054.0	862.0	99.0	1,385.0	1,056.0	(770.0)	155.4	266.6
QEP Resources, Inc.	1,390.4	654.1	2.7	870.8	55.6	-	(70.6)	(122.2)
Range Resources Corporation	1,621.8	567.0	21.4	581.2	637.8	406.9	(190.6)	(401.8)
Rice Energy Inc.	453.0	202.0	3.1	308.2	18.3	412.6	6.0	(497.2)
Rosetta Resources Inc.	-	-	-	-	-	-	-	-
Royal Dutch Shell plc	5,508.0	3,118.0	3,336.0	6,259.0	-	668.0	(2,907.0)	(4,966.0)
RSP Permian, Inc.	284.0	73.1	2.4	154.0	34.3	0.3	(11.7)	31.5
SM Energy Company	2,012.5	723.6	120.6	921.0	547.3	(43.0)	(97.8)	(159.2)
Southwestern Energy Company	2,074.0	989.0	-	1,028.0	6,950.0	-	(2,619.0)	(4,274.0)
Talisman Energy Inc.	-	-	-	-	-	-	-	-
Ultra Petroleum Corp.	839.1	372.0	-	401.2	3,144.9	-	9.9	(3,088.9)
Whiting Petroleum Corporation	2,092.5	738.4	143.4	1,223.0	1,738.3	64.3	(469.3)	(1,345.6)
WPX Energy, Inc.	1,620.0	577.0	111.0	940.0	2,308.0	(17.0)	(845.0)	(1,454.0)
<b>All companies</b>	<b>\$ 129,794.1</b>	<b>\$ 56,582.9</b>	<b>\$ 12,450.8</b>	<b>\$ 81,586.5</b>	<b>\$ 141,811.9</b>	<b>\$ 7,541.0</b>	<b>\$ (58,183.5)</b>	<b>\$(111,995.4)</b>
Integrateds	\$ 30,710.0	\$ 16,316.0	\$ 6,104.0	\$ 22,895.0	\$ 583.0	\$ 3,513.0	\$ (6,873.0)	\$ (11,828.0)
Large independents	62,308.0	26,419.1	5,453.8	37,976.2	79,127.3	3,650.0	(31,843.1)	(58,475.3)
Independents	36,776.1	13,847.8	893.0	20,715.3	62,101.6	378.0	(19,467.4)	(41,692.1)

(a) Amounts are determined from the results of operations table if this disclosure is provided; otherwise, amounts are determined from the income statement. Revenues determined from the income statement include oil and gas sales and realized derivatives gains/losses.

(b) Includes production taxes and transportation costs.

(c) Includes asset retirement obligations accretion and production-related general and administrative expenses for those companies that separately disclose these expenses.

(1)-(3) See company footnotes on page 28.

## US – oil reserves for the latest fiscal year (a)

### Million barrels

	Beginning	Extensions and discoveries	Improved recovery	Revisions	Production	Purchases	Sales	Other (b)	Ending
Anadarko Petroleum Corporation	1,170.0	19.0	-	(97.0)	(130.0)	-	(112.0)	-	850.0
Antero Resources Corporation	358.0	105.0	-	168.0	(18.0)	-	-	-	613.0
Apache Corporation	868.0	19.7	-	(238.1)	(64.8)	-	(0.2)	-	584.5
Approach Resources Inc.	96.2	21.7	-	(10.4)	(3.6)	-	-	-	104.0
BHP Billiton Group	610.8	85.1	3.7	(116.1)	(90.3)	-	(1.2)	(0.1)	491.9
BP p.l.c.	2,121.0	3.0	27.0	(210.0)	(138.0)	3.0	(1.0)	1.0	1,806.0
Breitbart Energy Partners LP	198.6	10.9	-	(47.9)	(13.1)	0.3	-	-	148.7
Cabot Oil & Gas Corporation	53.1	11.5	-	(3.0)	(6.1)	0.2	-	-	55.7
California Resources Corporation	636.0	27.0	3.0	(103.0)	(43.0)	5.0	-	-	525.0
Carrizo Oil & Gas, Inc.	114.2	31.7	-	(6.3)	(9.8)	-	-	-	129.8
Chesapeake Energy Corporation	687.1	96.4	-	(185.8)	(69.6)	-	(30.9)	-	497.2
Chevron Corporation	1,432.0	137.0	7.0	(1.0)	(183.0)	-	(6.0)	-	1,386.0
Cimarex Energy Co.	244.3	40.9	-	(20.3)	(31.7)	0.0	(1.1)	-	232.1
Concho Resources Inc.	370.3	97.2	-	(71.5)	(34.5)	7.1	(0.9)	-	367.8
ConocoPhillips	2,299.0	87.0	8.0	(269.0)	(176.0)	-	(11.0)	-	1,938.0
CONSOL Energy Inc.	85.0	15.6	-	3.8	(7.3)	-	-	(0.0)	97.1
Continental Resources, Inc.	866.4	134.8	-	(246.8)	(53.5)	-	(0.3)	-	700.5
Denbury Resources Inc.	362.3	-	0.4	(56.6)	(25.2)	1.4	-	-	282.3
Devon Energy Corporation	929.0	75.0	-	(230.0)	(110.0)	6.0	-	-	670.0
Encana Corporation	284.3	93.3	-	(114.7)	(38.3)	-	(4.8)	(0.2)	219.6
Energen Corporation	254.7	108.8	-	(51.5)	(18.1)	0.0	(11.5)	-	282.4
Energy XXI Ltd	185.4	10.6	-	(33.7)	(15.3)	-	(9.9)	-	137.1
EOG Resources, Inc.	1,596.6	190.5	-	(228.2)	(131.5)	44.2	(0.8)	-	1,470.7
EP Energy Corporation	415.0	52.3	-	(59.4)	(27.4)	9.1	-	-	389.6
EQT Corporation	160.5	15.9	-	(22.5)	(9.5)	-	-	-	144.4
EV Energy Partners, L.P.	48.1	6.7	-	(12.3)	(3.4)	19.3	(0.1)	-	58.3
Exxon Mobil Corporation <sup>(1)</sup>	2,436.0	387.0	-	(202.0)	(141.0)	161.0	(9.0)	-	2,632.0
Freeport-McMoRan Inc.	288.0	11.0	-	(54.0)	(38.0)	-	-	-	207.0
Gulfport Energy Corporation	35.8	7.9	-	(12.1)	(7.3)	-	-	-	24.2

	Beginning	Extensions and discoveries	Improved recovery	Revisions	Production	Purchases	Sales	Other (b)	Ending
Hess Corporation	631.0	56.0	-	(199.0)	(68.0)	-	-	-	420.0
Marathon Oil Corporation	795.0	179.0	1.0	(140.0)	(76.0)	-	(7.0)	-	752.0
Memorial Resource Development Corp.	224.2	6.7	-	(27.9)	(11.5)	12.0	(1.9)	-	201.7
Murphy Oil Corporation	234.0	71.4	-	(5.4)	(25.7)	-	-	-	274.3
National Fuel Gas Company	38.5	0.5	-	(2.3)	(3.0)	-	-	-	33.7
Newfield Exploration Company	354.0	69.0	-	(108.0)	(30.0)	1.0	(5.0)	-	281.0
Noble Energy, Inc.	349.0	57.0	-	(93.0)	(43.0)	165.0	(3.0)	-	432.0
Oasis Petroleum Inc.	235.4	39.0	-	(75.5)	(16.1)	2.1	-	-	184.9
Occidental Petroleum Corporation	1,495.0	-	93.0	(248.0)	(93.0)	-	(146.0)	-	1,101.0
PDC Energy, Inc.	160.6	79.5	-	(67.7)	(9.8)	0.0	(0.0)	-	162.7
Pioneer Natural Resources Company	521.3	106.2	-	(137.3)	(52.5)	0.6	(0.0)	-	438.3
QEP Resources, Inc.	269.1	107.4	-	(102.3)	(24.3)	2.6	(0.6)	-	251.9
Range Resources Corporation	564.6	41.2	-	21.5	(24.4)	-	(0.6)	-	602.3
Rice Energy Inc. <sup>(2)</sup>	-	-	-	-	-	-	-	-	-
Rosetta Resources Inc.	172.5	-	-	-	-	-	(172.5)	-	-
Royal Dutch Shell plc	711.0	10.0	4.0	(61.0)	(104.0)	-	-	-	560.0
RSP Permian, Inc.	91.0	57.3	-	(17.1)	(6.9)	12.6	-	-	136.9
SM Energy Company	303.2	80.8	-	(86.8)	(35.3)	1.1	(2.3)	-	260.7
Southwestern Energy Company	156.3	7.6	-	(104.1)	(13.0)	2.9	(0.1)	-	49.7
Talisman Energy Inc.	50.3	-	-	-	-	-	(50.3)	-	-
Ultra Petroleum Corp.	89.8	0.2	-	(54.4)	(3.5)	-	-	-	32.0
Whiting Petroleum Corporation	698.3	157.2	-	(56.2)	(52.7)	-	(37.0)	-	709.6
WPX Energy, Inc.	201.6	22.2	-	(45.9)	(20.4)	60.5	-	-	218.0
<b>All companies</b>	<b>27,551.5</b>	<b>3,050.7</b>	<b>147.1</b>	<b>(4,141.8)</b>	<b>(2,350.4)</b>	<b>517.0</b>	<b>(627.0)</b>	<b>0.7</b>	<b>24,147.7</b>
<b>Integrations</b>	<b>6,700.0</b>	<b>537.0</b>	<b>38.0</b>	<b>(474.0)</b>	<b>(566.0)</b>	<b>164.0</b>	<b>(16.0)</b>	<b>1.0</b>	<b>6,384.0</b>
<b>Large independents</b>	<b>13,589.3</b>	<b>1,180.6</b>	<b>105.7</b>	<b>(2,231.2)</b>	<b>(1,176.7)</b>	<b>218.2</b>	<b>(313.0)</b>	<b>(0.1)</b>	<b>11,373.0</b>
<b>Independents</b>	<b>7,262.1</b>	<b>1,333.1</b>	<b>3.4</b>	<b>(1,436.6)</b>	<b>(607.7)</b>	<b>134.8</b>	<b>(298.0)</b>	<b>(0.2)</b>	<b>6,390.7</b>

(a) Includes condensate and natural gas liquids.

(b) Includes transfers, reclassifications and other.

<sup>(1)-(3)</sup> See company footnotes on page 28.

## US – gas reserves for the latest fiscal year

Bcf

	Beginning	Extensions and discoveries	Improved recovery	Revisions	Production	Purchases	Sales	Other (a)	Ending
Anadarko Petroleum Corporation	8,668.0	60.0	-	(888.0)	(854.0)	8.0	(1,003.0)	-	5,991.0
Antero Resources Corporation	10,535.0	2,253.0	-	(2,816.0)	(439.0)	-	-	-	9,533.0
Apache Corporation	2,196.8	40.9	-	(503.9)	(160.6)	-	(0.4)	-	1,572.8
Approach Resources Inc.	300.0	79.3	-	10.0	(13.3)	-	-	-	376.0
BHP Billiton Group	5,623.5	509.7	0.8	(2,207.6)	(434.6)	-	(195.6)	(0.1)	3,296.1
BP p.l.c.	9,615.0	5.0	432.0	(1,120.0)	(628.0)	65.0	(6.0)	-	8,363.0
Breitbart Energy Partners LP	700.1	24.3	-	(141.6)	(41.9)	2.3	-	-	543.2
Cabot Oil & Gas Corporation	7,082.0	896.0	-	444.0	(566.0)	-	-	-	7,856.0
California Resources Corporation	790.0	34.0	-	(33.0)	(84.0)	8.0	-	-	715.0
Carrizo Oil & Gas, Inc.	221.0	33.9	-	11.8	(21.8)	-	-	-	244.9
Chesapeake Energy Corporation	10,692.0	805.0	-	(4,191.0)	(1,070.0)	-	(195.0)	-	6,041.0
Chevron Corporation	4,174.0	659.0	1.0	(66.0)	(478.0)	-	(48.0)	-	4,242.0
Cimarex Energy Co.	1,666.7	183.1	-	(154.4)	(169.0)	0.0	(9.5)	-	1,517.0
Concho Resources Inc.	1,601.0	359.2	-	(344.2)	(107.0)	27.7	(2.6)	-	1,534.1
ConocoPhillips	9,664.0	107.0	-	(1,177.0)	(671.0)	-	(405.0)	-	7,518.0
CONSOL Energy Inc.	6,317.6	840.8	-	(1,813.1)	(285.0)	-	-	-	5,060.2
Continental Resources, Inc.	2,908.4	710.5	-	(302.1)	(164.5)	-	(0.5)	-	3,151.8
Denbury Resources Inc.	452.4	-	-	(406.1)	(8.1)	0.1	-	-	38.3
Devon Energy Corporation	7,651.0	171.0	-	(1,415.0)	(579.0)	17.0	(37.0)	-	5,808.0
Encana Corporation	2,265.0	159.0	-	(342.0)	(241.0)	-	(728.0)	(1.0)	1,112.0
Energen Corporation	707.9	143.0	-	(44.2)	(35.6)	0.0	(337.3)	-	433.9
Energy XXI Ltd	364.9	40.3	-	(75.6)	(37.5)	-	(13.6)	-	278.5
EOG Resources, Inc.	4,905.5	306.3	-	(1,453.1)	(337.3)	72.3	(3.9)	-	3,489.8
EP Energy Corporation	1,243.0	100.0	-	(338.0)	(76.0)	9.0	-	-	938.0
EQT Corporation	9,776.0	1,955.9	-	(2,059.5)	(562.0)	-	(0.1)	-	9,110.3
EV Energy Partners, L.P.	712.2	60.2	-	(194.4)	(43.6)	214.6	(1.9)	-	747.0
Exxon Mobil Corporation <sup>(1)</sup>	26,259.0	1,167.0	-	(6,731.0)	(1,269.0)	183.0	(9.0)	-	19,600.0
Freeport-McMoRan Inc.	610.0	43.0	-	(287.0)	(90.0)	-	(2.0)	-	274.0
Gulfport Energy Corporation	719.0	997.1	-	(371.4)	(156.2)	371.7	-	-	1,560.1

	Beginning	Extensions and discoveries	Improved recovery	Revisions	Production	Purchases	Sales	Other (a)	Ending
Hess Corporation	620.0	102.0	-	(112.0)	(105.0)	-	-	-	505.0
Marathon Oil Corporation	1,144.0	394.0	-	(191.0)	(128.0)	1.0	(69.0)	-	1,151.0
Memorial Resource Development Corp.	1,740.6	59.0	-	(213.7)	(149.1)	51.6	(53.0)	-	1,435.3
Murphy Oil Corporation	226.3	43.2	-	(5.2)	(31.9)	-	-	-	232.4
National Fuel Gas Company	1,682.9	633.4	-	(34.4)	(139.6)	-	(0.1)	-	2,142.1
Newfield Exploration Company	1,607.0	187.0	-	(352.0)	(124.0)	2.0	(15.0)	-	1,305.0
Noble Energy, Inc.	2,804.0	257.0	-	(705.0)	(258.0)	629.0	(16.0)	-	2,711.0
Oasis Petroleum Inc.	220.1	46.1	-	(55.1)	(14.0)	2.7	-	-	199.8
Occidental Petroleum Corporation	1,714.0	-	123.0	(600.0)	(155.0)	-	(63.0)	-	1,019.0
PDC Energy, Inc.	537.0	311.7	-	(154.8)	(33.3)	0.2	(0.1)	-	660.7
Pioneer Natural Resources Company	1,668.9	144.0	-	(309.9)	(147.2)	0.8	(0.0)	-	1,356.5
QEP Resources, Inc.	2,317.2	467.7	-	(463.8)	(181.1)	3.2	(34.3)	-	2,108.9
Range Resources Corporation	6,922.8	1,018.0	-	(340.3)	(362.7)	-	(960.1)	-	6,277.7
Rice Energy Inc. <sup>(2)</sup>	1,306.6	869.0	-	(274.2)	(201.3)	-	-	-	1,700.0
Rosetta Resources Inc.	655.1	-	-	-	-	-	(655.1)	-	-
Royal Dutch Shell plc	1,561.0	59.0	1.0	(587.0)	(275.0)	-	(5.0)	-	754.0
RSP Permian, Inc.	92.4	55.3	-	(20.2)	(5.0)	11.0	-	-	133.5
SM Energy Company	1,466.5	478.5	-	(369.6)	(173.6)	0.6	(138.4)	-	1,264.0
Southwestern Energy Company	9,809.0	546.0	-	(3,458.0)	(899.0)	97.0	(178.0)	-	5,917.0
Talisman Energy Inc.	1,732.8	-	-	-	-	-	(1,732.8)	-	-
Ultra Petroleum Corp.	4,831.2	17.4	-	(2,243.4)	(269.0)	-	-	-	2,336.3
Whiting Petroleum Corporation	492.0	192.6	-	119.1	(41.1)	-	(96.9)	-	665.7
WPX Energy, Inc.	3,149.6	116.9	-	(624.6)	(277.0)	205.6	(380.3)	-	2,190.2
<b>All companies</b>	<b>186,722.0</b>	<b>18,741.2</b>	<b>557.8</b>	<b>(40,004.9)</b>	<b>(13,592.7)</b>	<b>1,983.3</b>	<b>(7,395.4)</b>	<b>(1.1)</b>	<b>147,010.2</b>
<b>Integrations</b>	<b>41,609.0</b>	<b>1,890.0</b>	<b>434.0</b>	<b>(8,504.0)</b>	<b>(2,650.0)</b>	<b>248.0</b>	<b>(68.0)</b>	<b>-</b>	<b>32,959.0</b>
<b>Large independents</b>	<b>102,716.0</b>	<b>10,132.2</b>	<b>123.8</b>	<b>(21,975.6)</b>	<b>(7,745.6)</b>	<b>824.3</b>	<b>(3,126.5)</b>	<b>(0.1)</b>	<b>80,948.5</b>
<b>Independents</b>	<b>42,397.0</b>	<b>6,718.9</b>	<b>-</b>	<b>(9,525.3)</b>	<b>(3,197.1)</b>	<b>911.0</b>	<b>(4,200.9)</b>	<b>(1.0)</b>	<b>33,102.7</b>

(a) Includes transfers, reclassifications and other.

<sup>(1)-(3)</sup> See company footnotes on page 28.

## US – performance measures (three-year averages)

Costs in \$ per boe; production replacement rates in %

	Production replacement rates										
	PRAC	FDC including revisions	FDC excluding revisions	RRC	Oil			Gas			Production costs
					All sources	F&D including revisions	F&D excluding revisions	All sources	F&D including revisions	F&D excluding revisions	
Anadarko Petroleum Corporation	\$ 11.08	\$ 24.66	\$ 79.40	\$ 24.00	84%	125%	33%	16%	64%	24%	\$ 9.15
Antero Resources Corporation	16.42	4.59	3.33	4.63	1,554	1,554	1,475	726	723	1,118	8.89
Apache Corporation	5.46	128.25	37.23	109.43	(48)	47	157	(144)	22	83	12.76
Approach Resources Inc.	9.19	9.79	7.96	9.79	498	497	766	754	753	643	8.27
BHP Billiton Group	-	(4,672.14)	15.52	(3,007.69)	89	91	227	(97)	(83)	245	13.79
BP p.l.c.	9.41	(70.21)	42.15	(75.43)	(49)	(32)	27	(52)	(33)	90	16.30
Breitburn Energy Partners LP	13.88	(32.48)	74.70	33.93	345	(192)	69	220	(23)	34	23.36
Cabot Oil & Gas Corporation	17.59	3.55	4.59	3.73	336	284	297	383	390	297	6.07
California Resources Corporation	22.66	912.71	16.83	185.35	9	(3)	150	26	20	85	20.29
Carrizo Oil & Gas, Inc.	11.84	17.99	19.39	17.32	482	423	427	(129)	254	176	8.61
Chesapeake Energy Corporation	15.00	67.00	13.25	63.78	(43)	67	216	(50)	18	139	13.11
Chevron Corporation	24.58	29.65	33.71	29.62	105	108	80	137	145	161	20.71
Cimarex Energy Co.	6.23	17.03	13.68	16.19	180	181	226	159	159	197	11.15
Concho Resources Inc.	8.86	23.60	15.16	22.68	215	203	348	283	265	356	12.11
ConocoPhillips	-	43.57	27.53	43.62	64	74	115	4	25	44	20.23
CONSOL Energy Inc.	-	7.39	4.81	7.39	842	842	417	272	272	506	10.00
Continental Resources, Inc.	42.43	17.71	9.91	17.77	205	204	482	594	599	814	9.44
Denbury Resources Inc.	18.95	(29.59)	70.15	(81.60)	38	(20)	48	(1,664)	(1,675)	-	29.06
Devon Energy Corporation	19.70	(339.72)	28.76	86.89	62	11	126	(52)	(23)	50	9.18
Encana Corporation	20.94	33,310.00	29.38	62.18	271	21	232	(188)	(7)	104	14.91
Energen Corporation	23.87	21.69	12.27	21.69	249	273	512	(126)	143	202	13.48
Energy XXI Ltd	24.01	72.31	37.86	40.04	243	121	187	168	1	98	23.38
EOG Resources, Inc.	10.02	20.13	15.57	19.35	232	219	247	47	50	141	14.11
EP Energy Corporation	12.96	20.15	15.87	19.69	233	244	361	(219)	184	162	11.28
EQT Corporation	3.60	6.37	4.38	6.09	934	877	524	328	304	499	4.00
EV Energy Partners, L.P.	4.40	(201.25)	3.78	8.75	192	(5)	261	206	(4)	225	11.07
Exxon Mobil Corporation <sup>(1)</sup>	0.64	153.39	19.19	57.74	197	155	183	(67)	(67)	93	17.01
Freeport-McMoRan Inc.	25.97	(799.18)	341.51	69.60	288	(11)	37	221	(33)	43	21.20
Gulfport Energy Corporation	19.56	9.29	7.15	11.33	209	205	300	780	611	780	8.22



	Production replacement rates										
	PRAC	FDC including revisions	FDC excluding revisions	RRC	Oil			Gas			Production costs
					All sources	F&D including revisions	F&D excluding revisions	All sources	F&D including revisions	F&D excluding revisions	
Hess Corporation	\$ -	\$ 58.82	\$ 21.68	\$ 58.82	68%	69%	242%	147%	158%	188%	\$ 14.87
Marathon Oil Corporation	3.35	19.78	17.07	19.11	239	234	261	130	177	239	15.96
Memorial Resource Development Corp.	9.59	34.78	19.94	17.95	414	17	148	128	111	137	8.99
Murphy Oil Corporation	2.94	26.72	30.42	25.96	293	284	247	127	125	120	14.10
National Fuel Gas Company	4.79	6.73	6.89	6.69	(3)	(3)	51	399	390	374	6.98
Newfield Exploration Company	3.18	37.61	21.24	35.12	154	164	222	(20)	26	130	11.08
Noble Energy, Inc.	5.49	40.42	27.74	23.01	281	141	210	219	147	210	10.43
Oasis Petroleum Inc.	16.33	45.36	19.75	34.24	235	155	381	437	284	462	16.71
Occidental Petroleum Corporation	14.40	39.74	17.43	34.59	74	108	197	(66)	(9)	122	17.82
PDC Energy, Inc.	38.96	9.51	4.27	9.70	455	454	1,132	177	625	1,198	8.03
Pioneer Natural Resources Company	12.25	(150.24)	17.16	(160.34)	(99)	(41)	279	(83)	2	136	11.88
QEP Resources, Inc.	8.35	35.76	12.98	26.69	152	120	297	11	59	184	12.35
Range Resources Corporation	9.23	4.23	4.49	4.45	624	675	588	262	359	357	7.13
Rice Energy Inc. <sup>(2)</sup>	9.33	9.15	7.90	9.18	-	-	-	533	446	516	5.38
Royal Dutch Shell plc	1.77	(415.00)	109.65	(1,632.93)	(19)	(9)	66	(51)	(24)	36	22.18
RSP Permian, Inc.	14.63	20.81	16.78	18.60	1,023	706	856	1,071	631	928	11.01
SM Energy Company	12.86	15.03	11.03	14.89	220	205	307	191	235	288	12.14
Southwestern Energy Company	3.81	25.26	10.68	14.38	463	(703)	60	182	126	238	5.98
Ultra Petroleum Corp.	4.22	(10.07)	4.43	39.02	271	(236)	565	13	(140)	317	7.98
Whiting Petroleum Corporation	11.80	19.77	19.40	17.27	409	321	347	549	497	357	15.80
WPX Energy, Inc. <sup>(3)</sup>	11.80	81.12	23.48	39.61	163	51	232	(21)	28	81	9.91
<b>All companies</b>	<b>\$ 12.03</b>	<b>\$ 31.37</b>	<b>\$ 17.19</b>	<b>\$ 27.03</b>	<b>124%</b>	<b>118%</b>	<b>191%</b>	<b>68%</b>	<b>97%</b>	<b>200%</b>	<b>\$ 13.91</b>
Integrateds	\$ 1.51	\$ 129.22	\$ 34.76	\$ 88.23	66%	62%	89%	(28)%	(19)%	96%	\$ 18.55
Large independents	9.01	22.53	14.00	20.75	130	137	206	105	129	221	12.24
Independents	15.51	33.15	16.90	26.77	174	139	271	67	123	243	13.07

<sup>(1)-(3)</sup> See company footnotes on page 28.

## US – rankings and accounting method

	Rankings for the latest fiscal year					Accounting method
	Total capital expenditures	Oil reserves		Gas reserves		
		Beginning	Ending	Beginning	Ending	
Anadarko Petroleum Corporation	8	7	7	8	9	Successful efforts
Antero Resources Corporation	25	23	12	3	2	Successful efforts
Apache Corporation	18	9	14	22	23	Full cost
Approach Resources Inc.	50	43	42	48	43	Successful efforts
BHP Billiton Group	10	17	18	13	15	Area of interest
BP p.l.c.	9	3	3	7	4	Successful efforts
Breitburn Energy Partners LP	49	36	37	40	40	Successful efforts
Cabot Oil & Gas Corporation	38	47	45	10	5	Successful efforts
California Resources Corporation	45	15	16	36	37	Successful efforts
Carrizo Oil & Gas, Inc.	41	42	41	50	46	Full cost
Chesapeake Energy Corporation	12	14	17	2	8	Full cost
Chevron Corporation	2	6	5	16	13	Successful efforts
Cimarex Energy Co.	35	31	30	28	26	Full cost
Concho Resources Inc.	22	21	23	30	25	Successful efforts
ConocoPhillips	5	2	2	6	6	Successful efforts
CONSOL Energy Inc.	36	46	43	12	12	Successful efforts
Continental Resources, Inc.	16	10	10	18	16	Successful efforts
Denbury Resources Inc.	47	22	25	46	50	Full cost
Devon Energy Corporation	7	8	11	9	11	Full cost
Encana Corporation	23	28	31	21	32	Full cost
Energen Corporation	32	30	24	39	42	Successful efforts
Energy XXI Ltd	40	37	39	47	44	Full cost
EOG Resources, Inc.	6	4	4	14	14	Successful efforts
EP Energy Corporation	30	20	22	34	34	Successful efforts
EQT Corporation	24	40	38	5	3	Successful efforts
EV Energy Partners, L.P.	48	49	44	38	36	Successful efforts

Rankings for the latest fiscal year

	Rankings for the latest fiscal year					Accounting method
	Total capital expenditures	Oil reserves		Gas reserves		
		Beginning	Ending	Beginning	Ending	
Exxon Mobil Corporation <sup>(1)</sup>	3	1	1	1	1	Successful efforts
Freeport-McMoRan Inc.	14	27	33	43	45	Full cost
Gulfport Energy Corporation	28	51	49	37	24	Full cost
Hess Corporation	15	16	21	42	41	Successful efforts
Marathon Oil Corporation	17	11	8	35	31	Successful efforts
Memorial Resource Development Corp.	31	34	34	23	27	Successful efforts
Murphy Oil Corporation	26	33	27	49	47	Successful efforts
National Fuel Gas Company	42	50	47	26	20	Full cost
Newfield Exploration Company	27	24	26	29	29	Full cost
Noble Energy, Inc.	4	25	20	19	17	Successful efforts
Oasis Petroleum Inc.	46	32	35	51	48	Successful efforts
Occidental Petroleum Corporation	13	5	6	25	33	Successful efforts
PDC Energy, Inc.	43	39	36	44	39	Successful efforts
Pioneer Natural Resources Company	21	19	19	27	28	Successful efforts
QEP Resources, Inc.	33	29	29	20	21	Successful efforts
Range Resources Corporation	34	18	13	11	7	Successful efforts
Rice Energy Inc. <sup>(2)</sup>	39	-	-	33	22	Successful efforts
Rosetta Resources Inc.	-	38	-	41	-	-
Royal Dutch Shell plc	1	12	15	31	35	Successful efforts
RSP Permian, Inc.	37	44	40	52	49	Successful efforts
SM Energy Company	29	26	28	32	30	Successful efforts
Southwestern Energy Company	20	41	46	4	10	Full cost
Talisman Energy Inc.	-	48	-	24	-	-
Ultra Petroleum Corp.	44	45	48	15	18	Full cost
Whiting Petroleum Corporation	19	13	9	45	38	Successful efforts
WPX Energy, Inc.	11	35	32	17	19	Successful efforts

<sup>(1)-(3)</sup> See company footnotes on page 28.



## Peer groups

### Integrations

BP p.l.c.  
Chevron Corporation  
Exxon Mobil Corporation  
Royal Dutch Shell plc

### Large independents

Anadarko Petroleum Corporation  
Antero Resources Corporation  
Apache Corporation  
BHP Billiton Group  
Cabot Oil & Gas Corporation  
Chesapeake Energy Corporation  
ConocoPhillips  
Continental Resources, Inc.  
Devon Energy Corporation  
EOG Resources, Inc.  
EQT Corporation  
Hess Corporation  
Marathon Oil Corporation  
Noble Energy, Inc.  
Occidental Petroleum Corporation  
Range Resources Corporation  
Southwestern Energy Company

### Independents

Approach Resources Inc.  
Breitburn Energy Partners LP  
California Resources Corporation  
Carrizo Oil & Gas, Inc.  
Cimarex Energy Co.  
Concho Resources Inc.  
CONSOL Energy Inc.  
Denbury Resources Inc.  
Encana Corporation  
Energen Corporation  
Energy XXI Ltd  
EP Energy Corporation  
EV Energy Partners, L.P.  
Freeport-McMoRan Inc.  
Gulfport Energy Corporation  
Memorial Resource Development Corp.  
Murphy Oil Corporation  
National Fuel Gas Company  
Newfield Exploration Company  
Oasis Petroleum Inc.  
PDC Energy, Inc.  
Pioneer Natural Resources Company  
QEP Resources, Inc.  
Rice Energy Inc.  
RSP Permian, Inc.  
SM Energy Company  
Ultra Petroleum Corp.  
Whiting Petroleum Corporation  
WPX Energy, Inc.

# Appendix

## Acquired companies

Due to the significance of the operations of certain companies that were acquired during the study period, their capital expenditures, revenues and results of operations, oil reserves and gas reserves have been included for the years prior to their acquisition. This provides a more meaningful comparison throughout the study period.

In July 2015, Rosetta Resources was acquired by Noble Energy. Rosetta Resources' 2011 through 2014 capital expenditures, revenues and results of operations, oil reserves and gas reserves have been included in the study. The capital expenditures, revenues and results of operations, oil reserves and gas reserves reported by Noble Energy for 2015 include activity related to the operations acquired from Rosetta Resources. Rosetta Resources' end-of-year 2014 oil reserves (172.5 million barrels) and gas reserves (655.1 bcf) have been included in 2015 beginning-of-year reserves with an equal volume included as sales in 2015 to reflect the Noble Energy transaction.

In May 2015, Talisman Energy Inc. was acquired by Repsol. Talisman Energy's 2011 through 2014 capital expenditures, revenues and results of operations, oil reserves and gas reserves have been included in the study. Talisman Energy's end-of-year 2014 oil reserves (50.3 million barrels) and gas reserves (1,732.8 bcf) have been included in 2015 beginning-of-year reserves with an equal volume included as sales in 2015 to reflect the Repsol transaction. Repsol is not included in this study as its 2015 annual report was not available at the time of preparation.

In June 2013, Plains Exploration & Production Company was acquired by Freeport McMoRan Inc. Plains Exploration & Production's 2009 through 2012 capital expenditures, revenues and results of operations, oil reserves and gas reserves have been included in the study. The capital expenditures, revenues and results of operations, oil reserves and gas reserves reported by Freeport McMoRan for 2012 include activity related to the operations acquired from Plains Exploration & Production. Plains Exploration & Production's end-of-year 2012 oil reserves (336.8 million barrels) and gas reserves (510.8 bcf) have been included in 2013 beginning-of-year reserves with an equal volume included as sales in 2013 to reflect the Freeport McMoRan transaction.

In August 2011, Petrohawk Energy Corporation was acquired by BHP Billiton Group. BHP Billiton has a 30 June fiscal year-end, and its fiscal year includes the period from 1 July through 30 June. Thus, the capital expenditures, revenues and results of operations, oil reserves and gas reserves reported by BHP Billiton for 2012 include activity related to the operations acquired from Petrohawk Energy from the date of acquisition. Petrohawk Energy's capital expenditures, revenues and results of operations, oil reserves and gas reserves have been included in the study for 2009 through 2011. Petrohawk Energy's end-of-year 2011 oil reserves (114.8 million barrels) and gas reserves (3,355.1 bcf) have been included in 2012 beginning-of-year reserves with an equal volume included as sales in 2012 to reflect the BHP Billiton transaction.

For purposes of the peer group analysis, Rosetta Resources, Talisman Energy, Plains Exploration & Production and Petrohawk Energy are independents.

## Performance measures

The performance measures presented herein were calculated based on the companies' oil and gas reserve disclosure information. EY's methodology for calculating the performance measures is defined below.

- ▶ **Proved reserve acquisition costs** are calculated as proved property acquisition costs divided by proved reserves purchased.
- ▶ **Finding and development costs including revisions** are calculated as the sum of unproved property acquisition costs, exploration costs, development costs and identified related asset retirement obligation costs divided by the sum of extensions and discoveries, revisions and improved recovery of proved reserves. The calculation excludes the effect of proved reserves purchased.
- ▶ **Finding and development costs excluding revisions** are calculated as the sum of unproved property acquisition costs, exploration costs, development costs and identified related asset retirement obligation costs divided by the sum of extensions and discoveries and improved recovery of proved reserves. The calculation excludes the effect of proved reserves purchased and revisions.
- ▶ **Reserve replacement costs** are calculated as total capital expenditures divided by the sum of extensions and discoveries, revisions, improved recovery and purchases of proved reserves.
- ▶ **Production replacement rate (all sources)** is calculated as the sum of extensions and discoveries, improved recovery, revisions, purchases and sales of proved reserves divided by production.
- ▶ **Production replacement rate (F&D including revisions)** is calculated as the sum of extensions and discoveries, improved recovery and revisions of proved reserves divided by production.
- ▶ **Production replacement rate (F&D excluding revisions)** is calculated as the sum of extensions and discoveries and improved recovery of proved reserves divided by production.
- ▶ **Production costs** are calculated as production costs, including production taxes, and transportation costs divided by production.

Many individual companies calculate and report their own performance measures, and companies may use different methods that produce results different from those shown this study.

## Data limitations

Users of this study should keep in mind the following limitations on the data presented:

- ▶ This study excludes government and privately owned companies and smaller public companies.
- ▶ Individual companies did not prepare or review the compiled data presented in this report.
- ▶ Oil and gas companies that follow US generally accepted accounting principles (GAAP) are allowed to select either successful efforts accounting or full cost accounting for their oil and gas activities. Some companies included in this study follow US GAAP, while others follow International Financial Reporting Standards as adopted by their applicable country. These variations in standards can result in different results for some companies.
- ▶ Data for all companies may not be comparable because of differing interpretations or applications of reporting requirements.
- ▶ Oil and gas reserve estimates are imprecise and are revised as additional information about reserves becomes known.

## Other

The data included herein is obtained from Evaluate Energy and the individual companies' published annual reports. The study companies were determined based on data available from Evaluate Energy as of 15 March 2016. The data includes each year's original disclosures made by the companies. Restatements or other adjustments made to capital expenditures or revenues and results of operations data in subsequent years have not been incorporated herein. Restatements or other adjustments made to oil and gas reserve data are included in the "Other" component of the reserve tables, but these amounts are not included in the performance measure calculations.

Totals presented may not add due to rounding. All amounts are reported in US dollars.

Natural gas prices are quoted on a MMBtu (million British Thermal Unit) basis while gas reserves in this study are presented in bcf (billion cubic feet) and tcf (trillion cubic feet).

Certain amounts in this study are presented on a per barrel of oil equivalent (boe) basis. Natural gas volumes are converted to barrels at a ratio of six mcf (thousand cubic feet) to one barrel of oil. This ratio is generally viewed as being reflective of an approximate thermal equivalence between the two commodities, though some individual companies may use a different ratio for their internal performance metrics.

## Company footnotes

- (1) Amounts presented for ExxonMobil include investments accounted for by the equity method.
- (2) All of Rice Energy's oil and gas reserves are included as gas reserves as the company discloses its reserves on an mcf equivalent basis.
- (3) WPX Energy discloses one amount for acquisition costs in its cost incurred disclosure. Acquisition costs that were specifically identified as proved in the company's footnotes have been presented as proved while the remainder is presented as unproved.



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