The background of the entire page is a photograph of an oil pumpjack (jackal) in silhouette against a dramatic sunset sky. The sky is filled with clouds in shades of orange, red, and purple. The pumpjack is a large, complex mechanical structure with a long walking beam and a counterweight. In the foreground, there are several vertical poles or fence posts, also in silhouette.

US oil and gas reserves and production study 2019



Building a better
working world

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Study overview

The *US oil and gas reserves and production study* is a compilation and analysis of 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 2014 through 2018 for the 50 largest companies based on 2018 end-of-year US oil and gas reserve estimates. The study companies cover approximately 42% of the US combined oil and gas production for 2018 (44% for 2017). Activities related to acquisitions have also been reflected as described in the appendix.

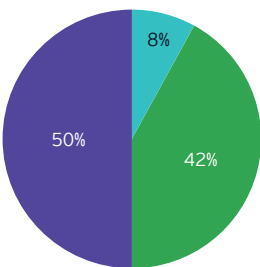
Study companies

Due to the significance of the oil and gas reserves attributable to the study companies, the results of these companies are generally representative of the US E&P industry as a whole. Total US production is fast approaching a leading global position, giving this study's findings an impact beyond the US borders, but 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.

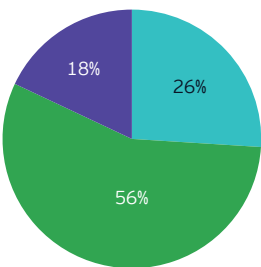
The study companies have been classified into three peer groups: integrated companies (integrateds), large independents and independents. Integrateds are those companies that have oil-refining and marketing activities in addition to E&P activities. Independents do not have oil-refining and marketing activities, but may have midstream operations in addition to their E&P activities. The independents were classified as "large" if their 2018 worldwide ending reserves exceeded 1 billion barrels of oil equivalent (BOE).

Peer group analysis

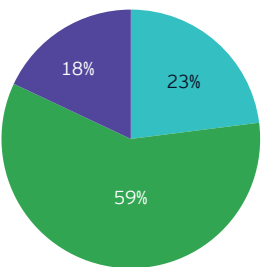
Number of companies



End-of-year US oil and gas reserves, 2018



US combined oil and gas production, 2018



■ Integrateds ■ Large independents ■ Independents



Study highlights

Continued growth in production and improved prices highlighted the results of 2018. Positive improvements in bottom line increased further following the turning point observed in 2017. The role of tight oil production in the US production growth and associated challenges remained one of the major themes.

Overall, total US crude oil production averaged 11.0 million barrels per day (b/d) in 2018, up 1.6 million b/d from 2017, achieving a record high for total production and year-over-year growth. The Energy Information Administration (EIA) projects that US crude oil production will average 12.3 million b/d in 2019 and 13.3 million b/d in 2020. The EIA estimates that most of the growth will come from the Permian region of Texas and New Mexico.

US dry natural gas production averaged 83.4 billion cubic feet per day (bcf/d), a new record high, in 2018. The EIA forecasts dry natural gas production will average 91.0 bcf/d in 2019, up 7.6 bcf/d from the previous record of 2018. The EIA expects natural gas production will rise by 1.5 bcf/d in 2020.

Price outlook

Oil

The study period starts with 2014, which began with strong West Texas Intermediate (WTI) oil prices and saw a drastic drop in the latter half of the year. This was followed by continual monthly price declines reaching as low as US\$30 per barrel in February 2016. Oil prices started improving in 2016, and WTI averaged US\$60 per barrel in 2018. Overall, oil prices reached the highest levels in 2018 since 2014. Oil prices during the first seven months of 2019 averaged US\$57 per barrel.

Starting from late 2018, oil prices declined from US\$71 per barrel in October 2018 to US\$55 per barrel in June 2019. This recent price decline largely reflects increasing uncertainty about global oil demand growth as a result of increasingly weak global economic signals.

The EIA August 2019 Short-Term Energy Outlook projects average annual WTI prices of US\$58 per barrel for 2019 and US\$60 per barrel for 2020.

Gas

Throughout the study period, natural gas prices were generally weak, with 2015 and 2016 being extremely low. Monthly average US Benchmark Henry Hub prices languished below US\$2.00 per million British thermal units (mmBtu) during the early part of 2016, but recovered in the latter part of 2016 and averaged approximately US\$3.06 mmBtu for the rest of the study period.

Projections for average annual Henry Hub prices are US\$2.5 per mmBtu for 2019 and US\$2.7 per mmBtu for 2020.

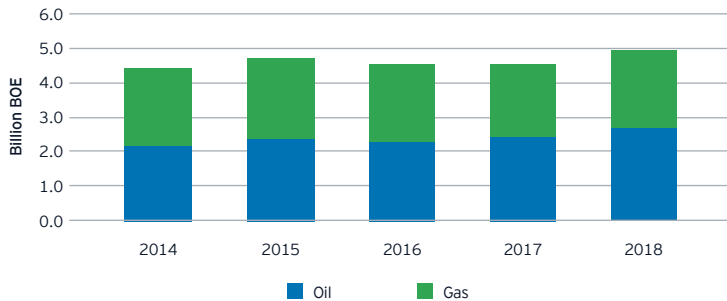
Reserves replacement cost and production overview

While average realized price increased from 2017, the study companies were able to keep their production cost at a relatively consistent level. This is not true for the reserves replacement cost. Capital dollars required to add a barrel of reserves increased by 47% from the prior year due to increased proved acquisition costs and lower reserves revisions reported in 2018.

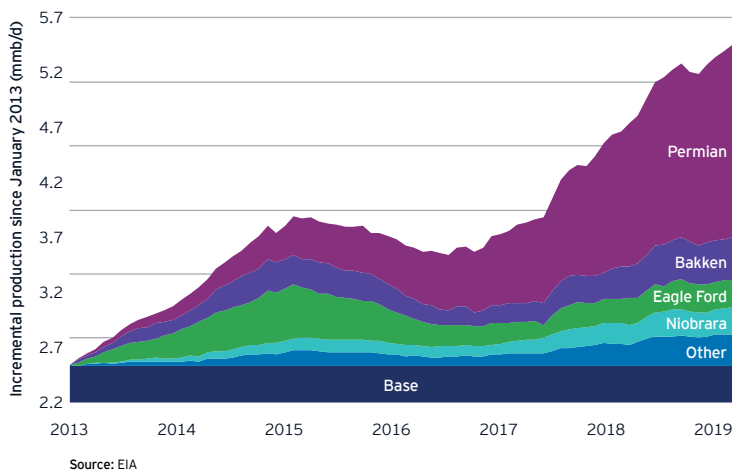
Existing drilled but uncompleted (DUC) wells inventory will contribute significantly to completions and new production in the coming months, as well as insulate short-term production from some cost pressure as activity ramps up further. According to EIA data for seven key US regions, DUC inventory reached 8,248 wells in June 2019. DUC inventory has grown steadily with the changes in the price outlook and drilling activity: DUCs stood at 5,300 at year-end 2016, rising to 7,998 (up 51%) at the conclusion of December 2018. Permian and Eagle Ford DUC inventory continued to account for the largest portion of DUC inventory – 67% as of June 2019 – reflecting the overall emphasis on these two plays.

Permian continues to be the growth engine of the US production. The EIA expects the Permian region to produce 5.4 million b/d by the end of 2020 (41% of total projected 2020 US production). Incremental production from three Permian plays (Spraberry, Wolfcamp and Bone Spring) increased 486% from the beginning of 2015 to June 2019 and continued to dominate the tight oil production as demonstrated in the incremental tight oil production chart on the following page for 2013 through 2019. The pipeline capacity constraints observed in 2018 have been partially reduced by the construction of crude oil transportation pipelines during the earlier half of 2019. As a result, WTI-Cushing and WTI-Midland spread, which averaged more than US\$7 per barrel in 2018, has come down substantially. The EIA assumes it will average US\$1 per barrel in the second half of 2019 and through 2020. Producers should receive a better netback price on every barrel as a result of this improvement. Associated natural gas production remains a risk factor to Permian crude oil production. Tighter limitations on natural gas flaring and continued gas pipeline constraints may reduce drilling in gas-rich areas. Certain producers saw negative prices for natural gas sales during the first half of 2019 due to gas pipeline and infrastructure constraints.

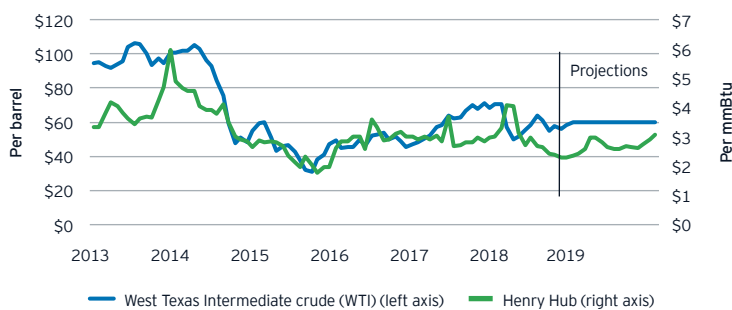
Combined oil and gas production for study companies



Incremental tight oil production 2013-19*



Crude and natural gas spot prices (US\$)



Study highlights

The study companies were able to keep their cost of production at consistent levels while realizing increased revenue per BOE, which significantly improved the bottom line.

Capital expenditures

- Expenditures totaled US\$136.4 billion, 16% higher than 2017 and 55% higher than 2016.
- While investment on unproved properties acquisition decreased by 52% from the prior year, growth was observed in all other categories, resulting in a net increase year over year in capital expenditures.
- The companies drilled 12% and 6% more development and exploration wells, respectively, compared with 2017.

Revenues and results of operations

- Revenues were US\$181.0 billion, up 32% from 2017 and the highest since 2014 as a result of continued improvement of commodity prices.
- Production costs stayed consistent with 2017 and 2016 levels on a per BOE basis.
- After-tax earnings were US\$34.1 billion, the highest for the study period.

Oil reserves

- Production was 2.7 billion barrels, an 11% increase from 2017, the highest for the study period.
- The companies reported a strong extensions and discoveries result of 5.5 billion barrels, the highest for the study period.
- Increases in mergers and acquisitions resulted in purchases and sales of 1.9 billion barrels and 2.1 billion barrels, respectively, the highest results for the study period.
- The companies reported combined oil reserves of 32.6 billion barrels, the highest of the study period.

Gas reserves

- Production was 13.5 trillion cubic feet (tcf), a 6% increase from 2017.
- The companies reported a strong extensions and discoveries result of 31.8 tcf, consistent with 2017.
- The companies reported sales of reserves of 16.3 tcf, the highest for the study period.

Capital expenditures

US – capital expenditures (US\$ millions) (a)

	2014	2015	2016	2017	2018
Proved properties acquired	\$ 25,611	\$ 5,505	\$ 12,416	\$ 13,360	\$ 26,638
Unproved properties acquired	27,084	10,919	23,977	29,360	14,125
Exploration	22,683	16,571	10,669	13,798	14,382
Development	124,016	84,609	40,675	61,143	80,574
Other	379	302	68	196	639
Total	\$ 199,773	\$ 117,906	\$ 87,805	\$ 117,857	\$ 136,358

(a) This includes the 50 largest companies based on 2018 end-of-year oil and gas reserve estimates. Activity related to acquired companies has also been reflected as described in the appendix.

The study companies continued to increase capital expenditures in 2018 and achieved the highest level of spend since 2014. Total capital expenditures were US\$136.4 billion in 2018, representing a 16% increase from 2017 vs. the 34% increase from 2016 to 2017 and the 26% cut from 2015 to 2016.

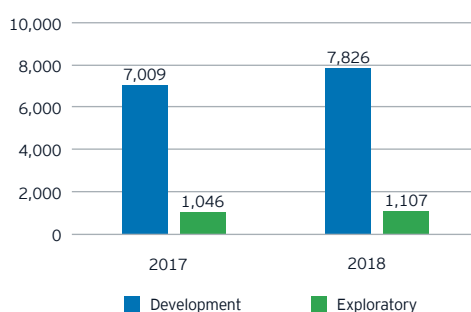
BP p.l.c. was the leading purchaser in 2018 with total property acquisition costs of US\$10.7 billion, primarily due to the acquisition of unconventional onshore oil and gas assets from BHP in the Permian and Eagle Ford basins in Texas and in the Haynesville basin in Texas and Louisiana.

Diamondback Energy followed with total property acquisition costs of US\$11.4 billion, primarily related to the acquisition of its shale competitor, Energen Corporation. This investment expanded Diamondback Energy's presence in the country's largest and fastest growing area – the Permian basin.

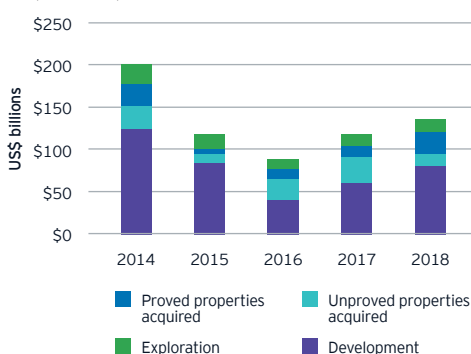
Exploration spending was US\$14.4 billion in 2018 compared with US\$13.8 billion in 2017. The large independents almost doubled their exploration expenditures, while the independents spent 71% less on exploration. The integrateds increased their exploration expenditures by 32%. Pioneer Natural Resources kept its leading position in exploration spend from the prior year and incurred US\$2.7 billion.

Development spending increased from US\$61.1 billion in 2017 to US\$80.6 billion in 2018. While the independents' investment in development expenditures stayed stable from the prior year, the integrateds and the large independents increased their investment in this category by 43% and 49%, respectively.

Net wells drilled



Capital expenditures



Highest capital expenditures for 2018 (US\$ millions)

Proved properties acquired	
BP p.l.c.	\$ 10,650
Diamondback Energy, Inc.	5,551
Concho Resources Inc.	4,136
ConocoPhillips	2,243
Murphy Oil Corporation	794
Unproved properties acquired	
Diamondback Energy, Inc.	\$ 5,818
Concho Resources Inc.	3,617
Oasis Petroleum Inc.	696
EOG Resources, Inc.	486
Continental Resources, Inc.	330
Exploration	
Pioneer Natural Resources Company	\$ 2,654
Royal Dutch Shell plc	1,912
Concho Resources Inc.	1,588
Diamondback Energy, Inc.	1,090
Marathon Oil Corporation	929
Development	
Exxon Mobil Corporation ¹	\$ 7,882
Chevron Corporation	6,245
EOG Resources, Inc.	5,515
Royal Dutch Shell plc	4,052
Anadarko Petroleum Corporation	3,624

¹ See company endnotes on page 29.

Revenues and results of operations

US – revenues and results of operations (US\$ millions) (a)

	2014	2015	2016	2017	2018
Revenues	\$ 218,790	\$ 130,324	\$ 103,545	\$ 137,025	\$ 180,907
Production costs (b)	63,354	56,105	48,870	49,327	54,913
Exploration expense	11,456	14,951	5,771	6,344	4,665
DD&A	72,486	80,984	76,683	61,891	62,684
Impairments	20,006	119,833	19,531	10,282	10,034
Other expenses (c)	6,311	7,490	3,518	5,017	5,434
Pretax results of operations	45,177	(149,039)	(50,828)	4,164	43,177
Income tax expense (benefit) (d)	15,025	(48,795)	(16,842)	(13,358)	9,051
Results of operations	\$ 30,152	\$ (100,244)	\$ (33,986)	\$ 17,522	\$ 34,126

US – revenues and results of operations (US\$ per BOE) (a)

	2014	2015	2016	2017	2018
Revenues	\$ 50.22	\$ 27.91	\$ 22.85	\$ 30.26	\$ 36.70
Production costs (b)	14.54	12.02	10.78	10.89	11.14
Exploration expense	2.63	3.20	1.27	1.40	0.95
DD&A	16.64	17.35	16.92	13.67	12.72
Impairments	4.59	25.67	4.31	2.27	2.04
Other expenses (c)	1.45	1.60	0.78	1.11	1.10
Pretax results of operations	10.37	(31.93)	(11.21)	0.92	8.75
Income tax expense (benefit) (d)	3.45	(10.45)	(3.72)	(2.95)	1.84
Results of operations	\$ 6.92	\$ (21.48)	\$ (7.49)	\$ 3.87	\$ 6.91

(a) This includes the 50 largest companies based on 2018 end-of-year oil and gas reserves. Activity related to acquired companies has also been reflected as described in the appendix.

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

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

(d) Income taxes are presented for informational purposes only. The study is focused on pretax results of operations as a more meaningful comparative metric. Facts and circumstances underlying an individual company's tax results might not be representative of the study group as a whole and as such are not discussed in further detail.

The study companies reported the highest combined pretax and after-tax earnings since 2014. Net income for 2018 was US\$34.1 billion in comparison to net income of US\$17.5 billion in 2017, mainly due to improved revenues. The revenue increase of 32% from the prior year was attributable to improved prices and combined oil and gas production. Average realized revenue per BOE increased by 21.3% in comparison to the prior year, and combined oil and gas production increased by 8.9%.

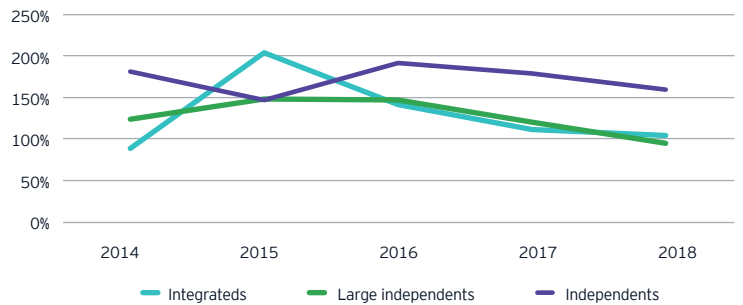
While 2018 average realized revenue per BOE was US\$13.52 less than the reported realization for 2014, we note that pretax earnings per BOE were only short by US\$1.62. This reflects improvement in the study companies' cost structures through decreased production costs; fewer exploration activities; and less depreciation, depletion and amortization (DD&A) from significant impairments taken during the study period. The lower effective tax rate in 2018 compared with 2014 likely reflects the lower US federal income tax rate.

The study companies were successful in keeping production costs flat on a US\$ per BOE basis consistent with the prior year. DD&A and oil and gas property impairment charges also stayed largely consistent with the prior year. Oil and gas property impairments totaled US\$10.0 billion in 2018. EQT Corporation; QEP Resources, Inc.; and EP Energy Corporation accounted for 56%, or US\$5.7 billion, of total impairment charges for the study group in 2018.

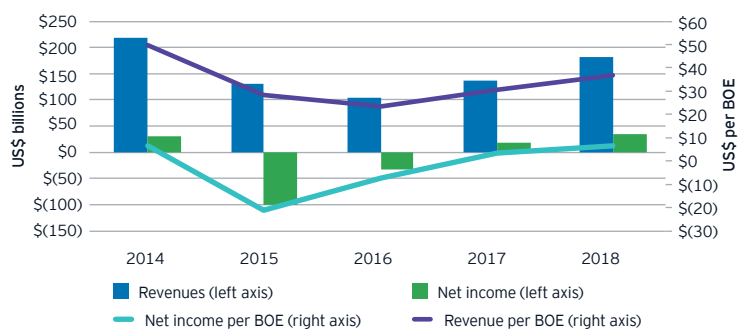
The study companies posted a 108% plowback percentage in 2018, while the five-year average was 138%. The plowback percentage represents total capital expenditures as a percentage of netback (revenues less production costs). Independents posted the highest plowback percentage with a 2018 rate of 158%. Integrations had a rate of 103%, while the large independents followed with a 94% rate.

US crude oil production reached a record level of 11 million barrels per day in 2018.

Plowback percentage



Revenues and results of operations



Oil reserves

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

	2014	2015	2016	2017	2018
Beginning of year	24,657	27,604	24,340	24,004	29,287
Additions:					
Extensions and discoveries	4,118	3,230	2,847	5,149	5,545
Improved recovery	432	153	187	202	262
Revisions	(66)	(4,223)	(927)	1,767	301
Production	(2,180)	(2,411)	(2,293)	(2,416)	(2,686)
Purchases	1,387	577	933	1,316	1,948
Sales	(750)	(590)	(968)	(718)	(2,117)
Other	6	–	(115)	(17)	22
End of year	27,604	24,340	24,004	29,287	32,562

(a) This includes the 50 largest companies based on 2018 end-of-year oil and gas reserve estimates. Activity related to acquired companies has also been reflected as described in the appendix.

(b) This includes condensate and natural gas liquids.

Oil reserves for the study companies increased 11% in 2018 mainly due to significant extensions and discoveries and purchases, partially offset by production and sales. As a result, the study companies reported the highest oil reserves for the five-year study period.

Extensions and discoveries continued to increase following the large improvement in 2017 and improved 8% in 2018. At 5.5 billion barrels, the study companies reported the highest extensions and discoveries for the study period. The largest extensions and discoveries were recorded by Exxon Mobil Corporation (596 million barrels); Chevron Corporation (532 million barrels); and EOG Resources, Inc. (510 million barrels).

Upward revisions for 2018 were 1.0 billion barrels, and downward revisions were 0.7 billion barrels, resulting in 0.3 billion barrels net positive revisions.

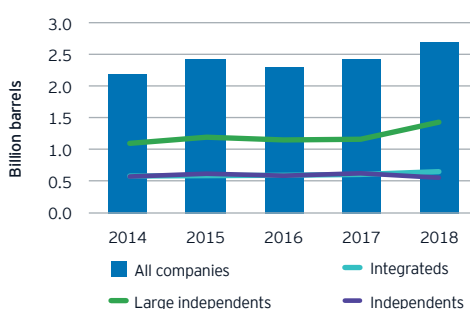
The largest upward revisions were reported by Chevron Corporation (155 million barrels), BP (136 million barrels), Anadarko Petroleum Corporation (99 million barrels) and Range Resources Corporation (92 million barrels). Revisions by these four companies accounted for 48% of all upward revisions in 2018. Individual contributions to the downward revisions were not significant.

Oil production increased 11% from 2.4 billion barrels in 2017 to 2.7 billion barrels in 2018. The largest increases were posted by Chevron Corporation (34 million barrels); EOG Resources, Inc. (32 million barrels); Royal Dutch Shell (31 million barrels); and Occidental Petroleum (23 million barrels). The study companies did not report significant decreases in oil production in comparison to the prior year.

Overall, oil production increased 23% from 2014 to 2018, with the large independents' production growing 38%, compared with 26% growth for the integrateds and an 8% decrease for the independents.

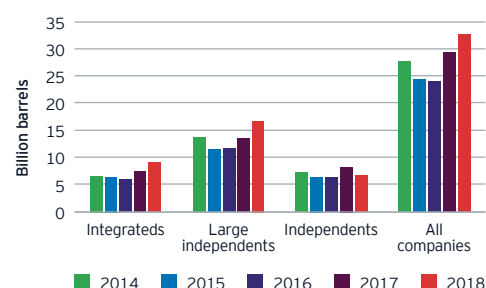
Purchases of oil reserves for 2018 were 1,948 million barrels, while sales were 2,117 million barrels. BP recorded 665 million barrels in purchases (34% of total purchases), largely due to its acquisition of oil and gas assets from BHP.

Oil production



Newfield Exploration Company, Energen Corporation, RSP Permian and Eclipse Resources accounted for combined sales of 1,130 million barrels (53% of total sales), given acquisition of these companies by other companies included in the study group.

End-of-year oil reserves



Highest oil reserves for 2018 (million barrels)

Ending reserves	
Exxon Mobil Corporation ¹	3,458
Chevron Corporation	2,402
BP p.l.c.	2,274
ConocoPhillips	2,264
EOG Resources, Inc.	2,146
Production	
Chevron Corporation	224
EOG Resources, Inc.	187
ConocoPhillips	171
Exxon Mobil Corporation ¹	164
BP p.l.c.	162

¹ See company endnotes on page 29.

In 2018, the study companies reported the highest combined oil and gas reserves for the study period.



Gas reserves

US – proved gas reserves (bcf) (a)

	2014	2015	2016	2017	2018
Beginning of year	174,021	188,528	149,954	149,474	179,178
Additions:					
Extensions and discoveries	29,843	19,578	19,730	32,298	31,765
Improved recovery	982	558	609	1,246	1,646
Revisions	(791)	(41,106)	(5,429)	10,385	(2,628)
Production	(13,334)	(13,840)	(13,491)	(12,662)	(13,473)
Purchases	7,069	1,927	8,135	12,875	5,586
Sales	(9,267)	(5,699)	(9,645)	(14,419)	(16,300)
Other	5	8	(389)	(19)	51
End of year	188,528	149,954	149,474	179,178	185,825

(a) This includes the 50 largest companies based on 2018 end-of-year oil and gas reserve estimates. Activity related to acquired companies has also been reflected as described in the appendix.

End-of-year gas reserves for the study companies increased 4% in 2018 to 186 tcf marking the highest level of gas reserves since 2014. The increase is mainly due to extensions and discoveries and purchases, partially offset by sales, production and net downward revisions.

EQT Corporation (4.7 tcf), Exxon Mobil Corporation (3.7 tcf), Range Resources Corporation (2.3 tcf), Cabot Oil & Gas Corporation (2.2 tcf) and Antero Resources Corporation (2.1 tcf) posted the largest extensions and discoveries, accounting for 47% of the total extensions and discoveries for the study group.

Upward revisions for 2018 were 3.8 tcf, and downward revisions were 6.4 tcf, resulting in 2.6 tcf net negative revisions.

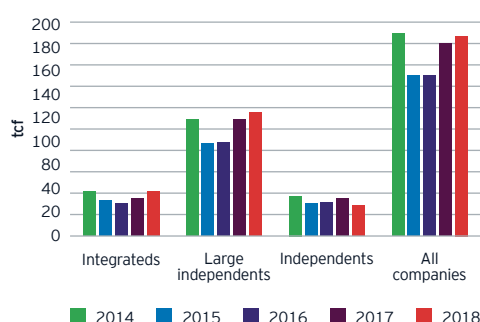
Gas production increased 6%, from 12.7 tcf in 2017 to 13.5 tcf in 2018. EQT Corporation accounted for 74% of the net production increase (598 tcf) following its acquisition of Rice Energy Inc. at the end of 2017.

While gas production from 2014 to 2018 did not change significantly, the level of change varied among the peer groups. The large independents increased their gas production 13.7% from 2014, and production of the integrateds and the independents decreased 9.6% and 21.9%, respectively. The large independents accounted for 64% of total gas production.

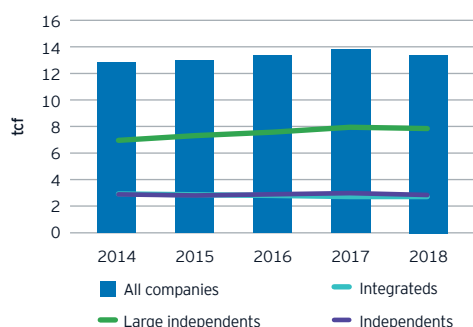
Purchases of gas reserves were 5.6 tcf in 2018. BP accounted for 48% of the gas reserves purchases (2.7 tcf, including the BHP acquisition).

Sales of gas reserves were 16.3 tcf in 2018. Southwestern Energy Company (3.4 tcf), Chesapeake Energy Corporation (2.4 tcf), Newfield Exploration Company (1.7 tcf) and EQT Corporation (1.3 tcf) posted the largest sales in 2018.

End-of-year gas reserves



Gas production



Highest gas reserves for 2018 (bcf)

Ending reserves	
Exxon Mobil Corporation ¹	21,628
EQT Corporation	20,806
Range Resources Corporation	12,028
Cabot Oil & Gas Corporation	11,604
Antero Resources Corporation	11,425

Production	
EQT Corporation	1,393
Exxon Mobil Corporation ¹	1,042
Chesapeake Energy Corporation	832
Southwestern Energy Company	807
BP p.l.c.	751

¹ See company endnotes on page 29.

Performance measures

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

US – proved reserve acquisition costs (PRACs), finding and development costs (FDCs) and reserve replacement costs (RRCs) (a) US\$ per BOE

	2014	2015	2016	2017	2018	Three-year	Five-year
PRACs	\$ 10.04	\$ 6.47	\$ 5.33	\$ 3.78	\$ 9.26	\$ 6.05	\$ 6.89
FDCs including revisions	18.40	(23.98)	17.07	7.24	9.71	9.58	16.39
FDCs excluding revisions	17.97	17.15	11.86	9.41	9.59	10.00	12.73
RRCs	16.74	(30.82)	13.19	6.55	9.62	8.80	13.98

(a) This includes the 50 largest companies based on 2018 end-of-year oil and gas reserve estimates. Activity related to acquired companies has also been reflected as described in the appendix.

PRACs were US\$9.26 per BOE in 2018, the highest since 2014 and more than doubled from the prior year. BP, Concho Resources, ConocoPhillips, Diamondback Energy and Murphy Oil Corporation accounted for 88% of proved properties acquisition costs. The larger acquisitions relating to these companies were discussed above, and the PRAC range for these acquisitions was US\$7.73 per BOE to US\$13.44 per BOE.

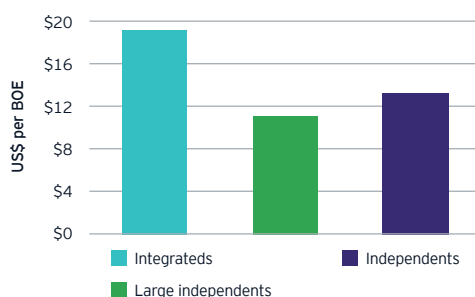
We note that this measure is a combination of oil and gas property acquisitions, and the US\$ per BOE measure is influenced by the mix of the commodities in acquired reserves.

FDCs, including reserve revisions (the traditional measure), for 2018 were US\$9.71 per BOE, 34% higher than in 2017. FDCs including reserve revisions were not meaningful for 2015 due to significant downward reserve revisions for both oil and gas. Five-year averages for FDCs including reserve revisions are not meaningful due to the significant negative reserve revisions from 2015, which resulted in inflated FDC calculations. For the 2016-18 study period, the integrateds' average FDCs including revisions were US\$10.81 per BOE, compared with US\$8.10 per BOE for the large independents and US\$13.06 per BOE for the independents.

Excluding reserve revisions in order to adjust for the significant 2015 downward revisions, FDCs were US\$9.59 per BOE in 2018, a small increase from the prior year. The three- and five-year averages were US\$10.00 per BOE and US\$12.73 per BOE, respectively. Over the five-year study period, the integrateds' average FDCs excluding revisions were US\$19.03 per BOE, compared with US\$11.01 per BOE for the large independents and US\$13.16 per BOE for the independents.

RRCs were US\$9.62 per BOE in 2018, an increase from the prior year. Similar to FDCs, RRC amounts for 2015 are not meaningful due to the significant downward reserve revisions. Related five-year averages are also not meaningful due to the effects of the significant downward revisions in 2015. For the 2016-18 study period, the integrateds experienced RRCs of US\$9.58 per BOE, while large independents and independents had RRCs of US\$7.64 per BOE and US\$11.25 per BOE, respectively.

FDCs excluding revisions – five-year (2014-18) averages



Lowest three-year (2016-18) PRACs, FDCs and RRCs (US\$ per BOE) (d)

PRACs (b)	
Exxon Mobil Corporation ¹	\$ 0.16
CNX Resources Corporation ¹	0.19
Comstock Resources, Inc.	1.43
PDC Energy, Inc.	1.69
Antero Resources Corporation	1.86
FDCs including reserve revisions (c)	
Southwest Energy Company	\$ 1.54
Comstock Resources, Inc.	1.69
Range Resources Corporation	1.80
Cabot Oil & Gas Corporation	1.97
CNX Resources Corporation	2.92
FDCs excluding reserve revisions	
Comstock Resources, Inc.	\$ 1.92
Southwestern Energy Company	1.95
Range Resources Corporation	2.14
CNX Resources Corporation	2.92
Cabot Oil & Gas Corporation	2.96
RRCs (c)	
Southwestern Energy Company	\$ 1.54
Comstock Resources, Inc.	1.66
Cabot Oil & Gas Corporation	1.97
CNX Resources Corporation ¹	2.01
Montage Resources Corporation	2.93

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

(c) Excludes entities with a negative FDC.

(d) Amounts presented represent a combination of oil and gas property and development costs. As such, a company with a large concentration of expenditures related to natural gas will likely have a lower US\$ per BOE in these measures.

¹ See company endnotes on page 29.

Production replacement rates

Oil

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

	2014	2015	2016	2017	2018	Three-year	Five-year
All sources	230%	(34%)	97%	311%	263%	228%	176%
F&D including revisions	206%	(39%)	89%	287%	228%	204%	157%
F&D excluding revisions	208%	137%	129%	219%	216%	190%	183%

(a) This includes the 50 largest companies based on 2018 end-of-year oil and gas reserve estimates. Activity related to acquired companies has also been reflected as described in the appendix.

Continued increases in oil reserves, mainly due to extensions and discoveries and purchases, kept 2018 oil production replacement rates at high levels following the significant improvement observed in 2017. The study companies posted an above 100% replacement rate for the three-year and five-year periods in all three categories of the replacement rates analysis.

While the high level of replacement was kept following the significant improvement in the prior year, the peer groups generally experienced decreases in replacement rates. The exception to this was the integrated. The integrated reported increases in two out of the three rate categories.

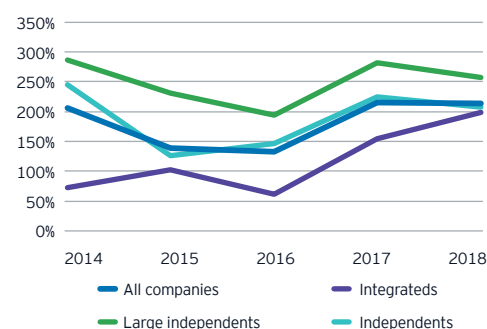
On average, in 2018, 38 study companies reported more than 100% replacement in all 3 replacement categories, in comparison to 41 companies in 2017.

All sources: in 2018, 37 companies reported more than 100% replacement from all sources.

F&D including revisions: in 2018, 39 companies reported more than 100% replacement from all F&D sources.

F&D excluding revisions: in 2018, 39 companies achieved more than 100% replacement from F&D sources other than revisions.

Oil F&D excluding revisions production replacement rates



Oil production replacement rates by peer group, 2018

	All sources	F&D including revisions	F&D excluding revisions
Integrated	350%	269%	202%
Large independents	212%	214%	208%
Independents	292%	210%	258%



Production replacement rates

Gas

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

	2014	2015	2016	2017	2018	Three-year	Five-year
All sources	201%	(182%)	92%	361%	176%	207%	126%
F&D including revisions	220%	(162%)	99%	341%	228%	221%	143%
F&D excluding revisions	228%	140%	141%	265%	248%	218%	204%

(a) This includes the 50 largest companies based on 2018 end-of-year oil and gas reserve estimates. Activity related to acquired companies has also been reflected as described in the appendix.

Similar to oil replacement rates, continued increases in gas reserves resulted in positive and high levels of replacement rates for gas reserves. The study companies achieved an above 100% replacement rate for the five-year and three-year periods in all three categories of the replacement analysis.

Consistent with oil replacement rates, while a high level of replacement was kept following the significant improvement in the prior year, the peer groups generally experienced decreases in replacement rates. The exception to this was the integrateds. The integrateds reported increases in two out of the three rate categories.

On average, in 2018, 41 study companies reported more than 100% replacement in all 3 replacement categories, which is consistent with 2017.

All sources: in 2018, 40 companies reported more than 100% replacement from all sources.

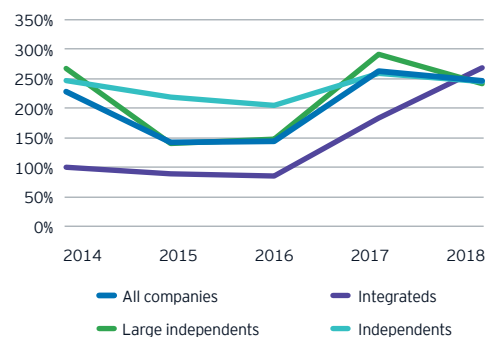
F&D including revisions: in 2018, 44 companies reported more than 100% replacement from all F&D sources.

F&D excluding revisions: in 2018, 40 companies achieved more than 100% replacement from F&D sources other than revisions.

Gas production replacement rates by peer group, 2018

	All sources	F&D including revisions	F&D excluding revisions
Integrateds	354%	266%	271%
Large independents	118%	224%	242%
Independents	198%	201%	245%

Gas F&D excluding revisions production replacement rates



Production costs

US – production costs (US\$ per BOE) (a)

	2014	2015	2016	2017	2018	Three-year	Five-year
Integrations	\$ 19.34	\$ 16.19	\$ 14.41	\$ 13.22	\$ 13.40	\$ 13.67	\$ 15.27
Large independents	12.94	10.82	9.80	10.31	10.72	10.29	10.90
Independents	13.33	11.40	9.80	10.07	9.70	9.85	10.78
All companies	\$ 14.54	\$ 12.12	\$ 10.88	\$ 10.94	\$ 11.14	\$ 10.99	\$ 11.89

(a) This includes the 50 largest companies based on 2018 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 stayed largely the same in comparison to 2016 and 2017 as the companies optimized their cost profiles as a result of adapting to the low and cyclical price environment.

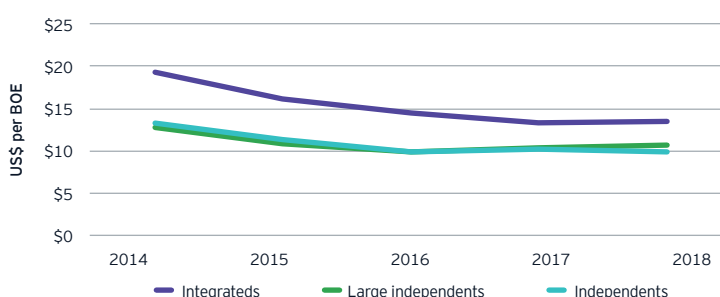
Lowest three-year (2016-18) production costs (US\$ per BOE) (b)

Encana Corporation	\$ 2.98
Roan Resources, Inc. ¹	4.33
Comstock Resources, Inc.	4.96
Cabot Oil & Gas Corporation	5.20
Gulfport Energy Corporation ¹	5.26

(b) Amounts presented represent a combination of oil and gas production costs. As such, a company with a large concentration of expenditures related to natural gas will likely have a lower US\$ per BOE in this measure.

¹ See company endnotes on page 29.

Production costs per BOE



Company statistics

US – capital expenditures for the latest fiscal year

US\$ millions

	Proved properties	Unproved properties	Exploration	Development	Other	Total expenditures
Anadarko Petroleum Corporation	\$ 43	\$ 202	\$ 491	\$ 3,624	\$ –	\$ 4,360
Antero Resources Corporation	–	172	324	1,165	–	1,661
Apache Corporation	–	111	640	1,791	–	2,542
BHP Billiton Group	–	9	418	1,548	–	1,975
BP p.l.c.	10,650	35	216	3,429	–	14,330
Brazos Valley Longhorn, L.L.C. ¹	4	86	12	928	–	1,030
Cabot Oil & Gas Corporation	–	30	94	779	–	903
California Resources Corporation	553	1	38	652	–	1,244
Carrizo Oil & Gas, Inc.	47	182	49	810	–	1,088
Chesapeake Energy Corporation	80	216	132	2,009	–	2,437
Chevron Corporation	160	52	782	6,245	–	7,239
Cimarex Energy Co.	–	103	6	1,487	(2)	1,594
CNX Resources Corporation ¹	39	36	62	844	–	981
Comstock Resources, Inc.	60	–	–	272	–	332
Concho Resources Inc.	4,136	3,617	1,588	1,050	–	10,391
ConocoPhillips	2,243	245	703	3,433	–	6,624
Continental Resources, Inc.	32	330	81	2,478	–	2,921
Denbury Resources Inc.	2	–	1	338	–	341
Devon Energy Corporation	2	71	679	1,537	–	2,289
Diamondback Energy, Inc.	5,551	5,818	1,090	493	114	13,066
Encana Corporation	–	–	2	1,330	–	1,332
EOG Resources, Inc.	124	486	157	5,515	90	6,372
EP Energy Corporation	322	–	7	649	1	979
EQT Corporation	77	199	2	2,444	–	2,722
Extraction Oil & Gas, Inc.	46	80	9	777	–	912
Exxon Mobil Corporation ¹	28	238	236	7,882	–	8,384
Gulfport Energy Corporation ¹	125	–	22	612	1	760
Hess Corporation	43	43	111	1,239	–	1,436

	Proved properties	Unproved properties	Exploration	Development	Other	Total expenditures
Marathon Oil Corporation	\$ 211	\$ 144	\$ 929	\$ 1,332	\$ –	\$ 2,616
Montage Resources Corporation	4	108	21	239	–	372
Murphy Oil Corporation	794	3	88	488	366	1,739
National Fuel Gas Company	2	4	29	332	(10)	357
Noble Energy, Inc.	–	41	58	2,303	–	2,402
Oasis Petroleum Inc.	260	696	54	924	6	1,940
Occidental Petroleum Corporation	428	46	196	3,387	–	4,057
Parsley Energy, Inc.	17	120	–	1,762	–	1,899
PDC Energy, Inc.	205	5	40	971	–	1,221
Pioneer Natural Resources Company	1	64	2,654	949	(17)	3,651
QEP Resources, Inc.	39	26	–	1,133	1	1,199
Range Resources Corporation	2	62	35	845	29	973
Riviera Resources, Inc. ¹	–	–	17	19	–	36
Roan Resources, Inc. ¹	6	43	7	719	–	775
Royal Dutch Shell plc	44	44	1,912	4,052	–	6,052
Sanchez Energy Corporation	–	–	3	593	–	596
SM Energy Company	1	56	185	1,148	–	1,390
Southwestern Energy Company	–	164	5	1,014	–	1,183
SRC Energy Inc.	137	46	–	584	60	827
Ultra Petroleum Corp.	1	1	157	267	–	426
Whiting Petroleum Corporation	106	35	33	803	–	977
WPX Energy, Inc.	13	55	7	1,350	–	1,425
All companies	\$ 26,638	\$ 14,125	\$ 14,382	\$ 80,574	\$ 639	\$ 136,358
Integrations	\$ 10,882	\$ 369	\$ 3,146	\$ 21,608	\$ –	\$ 36,005
Large independents	7,461	6,288	9,361	40,616	102	63,828
Independents	8,295	7,468	1,875	18,350	537	36,525

¹ See company endnotes on page 29.

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

US\$ millions

	Revenues	Production costs (b)	Exploration expense	DD&A	Impairments	Other income (expense) (c)	Income taxes	Results of operations
Anadarko Petroleum Corporation	\$ 9,071	\$ (2,415)	\$ (417)	\$ (3,198)	\$ (373)	\$ (121)	\$ (585)	\$ 1,962
Antero Resources Corporation	3,653	(1,602)	(5)	(832)	(549)	–	(156)	509
Apache Corporation	3,279	(1,155)	(219)	(1,206)	(265)	(32)	(87)	315
BHP Billiton Group	3,747	(1,312)	(270)	(2,842)	–	(46)	(723)	(1,446)
BP p.l.c.	12,962	(3,098)	(509)	(3,921)	–	(2,582)	(454)	2,398
Brazos Valley Longhorn, L.L.C. ¹	832	(124)	(22)	(297)	(214)	3	(40)	138
Cabot Oil & Gas Corporation	1,888	(589)	(114)	(417)	–	(16)	(141)	611
California Resources Corporation	2,378	(1,029)	(34)	(469)	–	(115)	(181)	550
Carrizo Oil & Gas, Inc.	970	(223)	–	(298)	–	(1)	(5)	443
Chesapeake Energy Corporation	5,155	(2,061)	–	(1,073)	–	–	(525)	1,496
Chevron Corporation	13,807	(3,743)	(777)	(4,583)	(516)	150	(886)	3,452
Cimarex Energy Co.	2,298	(637)	–	(539)	–	(7)	(252)	863
CNX Resources Corporation ¹	1,614	(552)	(12)	(461)	–	(65)	(103)	421
Comstock Resources, Inc.	388	(79)	–	(122)	–	(35)	(20)	132
Concho Resources Inc.	3,933	(950)	(65)	(1,478)	–	(10)	(603)	827
ConocoPhillips	11,942	(4,008)	(235)	(2,895)	(65)	(186)	(885)	3,668
Continental Resources, Inc.	4,679	(936)	(8)	(1,839)	(125)	–	(434)	1,337
Denbury Resources Inc.	1,423	(586)	–	(193)	–	(18)	(156)	470
Devon Energy Corporation	4,863	(1,620)	(129)	(1,234)	(109)	227	(460)	1,538
Diamondback Energy, Inc.	2,130	(364)	–	(595)	–	(2)	(241)	928
Encana Corporation	2,189	(445)	–	(860)	–	–	(191)	693
EOG Resources, Inc.	11,578	(2,668)	(127)	(3,182)	(345)	(404)	(1,086)	3,766
EP Energy Corporation	1,240	(342)	(5)	(496)	(1,103)	–	148	(558)
EQT Corporation	4,696	(1,893)	(7)	(1,569)	(2,990)	–	454	(1,309)
Extraction Oil & Gas, Inc.	1,061	(209)	(32)	(432)	(16)	–	(92)	280
Exxon Mobil Corporation ¹	13,071	(5,436)	(238)	(6,023)	–	–	(250)	1,124
Gulfport Energy Corporation ¹	1,355	(415)	–	(477)	–	–	–	463
Hess Corporation	3,141	(862)	(119)	(1,297)	–	(878)	63	48

	Revenues	Production costs (b)	Exploration expense	DD&A	Impairments	Other income (expense) (c)	Income taxes	Results of operations
Marathon Oil Corporation	\$ 4,923	\$ (1,371)	\$ (245)	\$ (2,247)	\$ –	\$ (49)	\$ 19	\$ 1,030
Montage Resources Corporation	472	(177)	(50)	(134)	–	1	–	112
Murphy Oil Corporation	1,290	(281)	(29)	(556)	(20)	(92)	(68)	244
National Fuel Gas Company	559	(177)	–	(120)	–	(6)	(73)	183
Noble Energy, Inc.	3,590	(1,276)	(48)	(1,642)	(169)	(76)	(80)	299
Oasis Petroleum Inc.	1,590	(435)	(27)	(614)	(384)	–	(31)	99
Occidental Petroleum Corporation	5,747	(2,093)	(64)	(2,321)	(32)	(672)	131	696
Parsley Energy, Inc.	1,833	(286)	(163)	(570)	–	(14)	(105)	695
PDC Energy, Inc.	1,535	(258)	(6)	(551)	(458)	(5)	(186)	71
Pioneer Natural Resources Company	4,429	(1,139)	(114)	(1,534)	(77)	(573)	(276)	716
QEP Resources, Inc.	1,920	(507)	–	(836)	(1,561)	–	243	(741)
Range Resources Corporation	2,720	(1,304)	(34)	(635)	(538)	(11)	30	228
Riviera Resources, Inc. ¹	381	(233)	(5)	(58)	(16)	219	55	343
Roan Resources, Inc. ¹	407	(65)	(43)	(123)	–	–	(13)	163
Royal Dutch Shell plc	9,881	(2,656)	(341)	(4,543)	–	(447)	(550)	1,344
Sanchez Energy Corporation	1,031	(362)	–	(262)	(14)	–	–	393
SM Energy Company	1,501	(487)	(55)	(665)	(50)	427	(143)	528
Southwestern Energy Company	2,525	(974)	–	(514)	–	–	–	1,037
SRC Energy Inc.	626	(112)	–	(180)	–	–	(38)	296
Ultra Petroleum Corp.	892	(299)	–	(204)	–	–	–	389
Whiting Petroleum Corporation	1,924	(532)	(22)	(770)	(45)	(2)	(1)	552
WPX Energy, Inc.	1,788	(536)	(75)	(777)	–	4	(74)	330
All companies	\$ 180,907	\$ (54,913)	\$ (4,665)	\$ (62,684)	\$ (10,034)	\$ (5,434)	\$ (9,051)	\$ 34,126
Integrateds	\$ 49,721	\$ (14,933)	\$ (1,865)	\$ (19,070)	\$ (516)	\$ (2,879)	\$ (2,140)	\$ 8,318
Large independents	99,362	(31,225)	(2,232)	(33,276)	(5,637)	(2,912)	(5,638)	18,442
Independents	31,824	(8,755)	(568)	(10,338)	(3,881)	357	(1,273)	7,366

(a) Amounts are determined from the results of the operations table if it 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 or losses.

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

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

¹ See company endnotes on page 29.

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

Million barrels

	Beginning	Extensions and discoveries	Improved recovery	Revisions	Production	Purchases	Sales	Other	Ending
Anadarko Petroleum Corporation	733	132	–	99	(143)	–	(34)	–	787
Antero Resources Corporation	1,027	110	–	7	(46)	–	–	–	1,098
Apache Corporation	537	123	–	(24)	(59)	–	–	–	577
BHP Billiton Group	400	41	–	54	(58)	–	(2)	–	435
BP p.l.c.	1,669	18	67	136	(162)	665	(118)	(1)	2,274
Brazos Valley Longhorn, L.L.C. ¹	340	98	–	(79)	(15)	1	(2)	–	343
Cabot Oil & Gas Corporation	62	–	–	1	(1)	–	(62)	–	–
California Resources Corporation	500	26	4	47	(36)	49	–	–	590
Carrizo Oil & Gas, Inc.	210	96	–	(29)	(18)	3	(13)	–	249
Chesapeake Energy Corporation	479	76	–	(25)	(52)	–	(159)	–	319
Chevron Corporation	1,916	532	5	155	(224)	50	(32)	–	2,402
Cimarex Energy Co.	291	101	–	(1)	(47)	–	(19)	–	325
CNX Resources Corporation ¹	77	20	–	1	(6)	1	(18)	–	75
Comstock Resources, Inc.	8	6	–	–	(2)	–	(11)	23	24
Concho Resources Inc.	500	151	–	(65)	(61)	233	(8)	–	750
ConocoPhillips	1,974	296	2	(38)	(171)	234	(33)	–	2,264
Continental Resources, Inc.	641	253	–	(77)	(61)	4	(2)	–	758
Denbury Resources Inc.	253	–	2	22	(21)	–	–	–	256
Devon Energy Corporation	730	157	–	(9)	(86)	–	(68)	–	724
Diamondback Energy, Inc.	288	176	–	15	(42)	380	–	–	817
Eclipse Resources Corporation ^(b)	62	–	–	–	–	–	(62)	–	–
Encana Corporation	260	211	–	34	(43)	29	(17)	–	474
Energen Corporation ^(b)	348	–	–	–	–	–	(348)	–	–
EOG Resources, Inc.	1,808	510	–	11	(187)	5	(1)	–	2,146
EP Energy Corporation	283	–	–	(43)	(22)	20	(10)	–	228
EQT Corporation	269	13	–	(27)	(17)	–	(70)	–	168
Extraction Oil & Gas, Inc.	188	55	–	5	(20)	10	(8)	–	230
Exxon Mobil Corporation ¹	2,940	596	–	89	(164)	8	(11)	–	3,458
Gulfport Energy Corporation ¹	95	15	–	1	(9)	–	–	–	102
Hess Corporation	604	153	–	(17)	(57)	4	(11)	–	676

	Beginning	Extensions and discoveries	Improved recovery	Revisions	Production	Purchases	Sales	Other	Ending
Marathon Oil Corporation	799	67	-	40	(83)	-	(4)	-	819
Montage Resources Corporation	61	7	-	(8)	(6)	1	-	-	55
Murphy Oil Corporation	268	53	-	(20)	(21)	95	-	-	375
National Fuel Gas Company	30	2	-	2	(3)	-	(5)	-	26
Newfield Exploration Company ^(b)	394	-	-	-	-	-	(394)	-	-
Noble Energy, Inc.	637	146	-	(10)	(65)	-	(31)	-	677
Oasis Petroleum Inc.	225	31	-	(17)	(23)	26	(12)	-	230
Occidental Petroleum Corporation	1,354	-	182	22	(116)	43	(15)	-	1,470
Parsley Energy, Inc.	341	138	-	(6)	(34)	5	(18)	-	426
PDC Energy, Inc.	261	18	-	39	(25)	36	(5)	-	324
Pioneer Natural Resources Company	693	226	-	5	(93)	-	(27)	-	804
QEP Resources, Inc.	386	67	-	9	(29)	10	(32)	-	411
Range Resources Corporation	833	146	-	92	(43)	-	(21)	-	1,007
Riviera Resources, Inc. ¹	99	-	-	(3)	(5)	-	(31)	-	60
Roan Resources, Inc. ¹	117	84	-	(37)	(9)	-	-	-	155
Royal Dutch Shell plc	899	179	-	81	(140)	-	(2)	-	1,017
RSP Permian, Inc. ^(b)	326	-	-	-	-	-	(326)	-	-
Sanchez Energy Corporation	234	83	-	(44)	(20)	-	-	-	253
SM Energy Company	255	119	-	(32)	(27)	-	(32)	-	283
Southwestern Energy Company	608	43	-	19	(23)	-	(1)	-	646
SRC Energy Inc.	133	37	-	7	(12)	12	-	-	177
Ultra Petroleum Corp.	27	1	-	1	(2)	-	(4)	-	23
Whiting Petroleum Corporation	477	26	-	(87)	(39)	22	-	-	399
WPX Energy, Inc.	338	107	-	5	(38)	2	(38)	-	376
All companies	29,287	5,545	262	301	(2,686)	1,948	(2,117)	22	32,562
Integrated	7,424	1,325	72	461	(690)	723	(163)	(1)	9,151
Large independents	15,025	2,874	184	93	(1,471)	553	(584)	-	16,674
Independents	6,838	1,346	6	(253)	(525)	672	(1,370)	23	6,737

(a) Includes condensate and natural gas liquids.

(b) See the appendix for activity related to acquired companies.

¹ See company endnotes on page 29.

US – gas reserves for the latest fiscal year

bcf

	Beginning	Extensions and discoveries	Improved recovery	Revisions	Production	Purchases	Sales	Other	Ending
Anadarko Petroleum Corporation	3,193	190	–	220	(390)	–	(15)	–	3,198
Antero Resources Corporation	11,098	2,125	–	(1,087)	(711)	–	–	–	11,425
Apache Corporation	1,644	704	–	(239)	(217)	1	–	–	1,893
BHP Billiton Group	2,546	204	–	(302)	(271)	–	(18)	–	2,159
BP p.l.c.	8,323	11	1,315	10	(751)	2,655	(237)	–	11,326
Brazos Valley Longhorn, L.L.C. ¹	684	130	–	(22)	(22)	1	(393)	–	378
Cabot Oil & Gas Corporation	9,353	2,243	–	776	(730)	–	(38)	–	11,604
California Resources Corporation	706	27	–	(15)	(73)	89	–	–	734
Carrizo Oil & Gas, Inc.	310	213	–	(6)	(25)	8	(17)	–	483
Chesapeake Energy Corporation	8,600	1,162	–	242	(832)	–	(2,395)	–	6,777
Chevron Corporation	5,180	1,627	2	258	(377)	144	(125)	–	6,709
Cimarex Energy Co.	1,608	343	–	(133)	(206)	–	(21)	–	1,591
CNX Resources Corporation ¹	7,122	839	–	341	(468)	317	(715)	–	7,436
Comstock Resources, Inc.	1,117	980	–	42	(100)	254	(61)	51	2,283
Concho Resources Inc.	2,043	452	–	(58)	(208)	449	(54)	–	2,624
ConocoPhillips	4,853	529	–	(133)	(308)	336	(223)	–	5,054
Continental Resources, Inc.	4,140	1,872	–	(1,154)	(285)	53	(35)	–	4,591
Denbury Resources Inc.	43	–	–	6	(4)	–	(2)	–	43
Devon Energy Corporation	5,974	446	–	(69)	(397)	–	(1,195)	–	4,759
Diamondback Energy, Inc.	285	154	–	4	(35)	641	(1)	–	1,048
Eclipse Resources Corporation ^(b)	1,090	–	–	–	–	–	(1,090)	–	–
Encana Corporation	384	233	–	37	(55)	39	(40)	–	598
Energen Corporation ^(b)	576	–	–	–	–	–	(576)	–	–
EOG Resources, Inc.	3,899	951	–	(127)	(351)	41	(22)	–	4,391
EP Energy Corporation	652	–	–	(44)	(45)	31	(20)	–	574
EQT Corporation	19,830	4,660	–	(960)	(1,393)	–	(1,331)	–	20,806
Extraction Oil & Gas, Inc.	626	164	–	(49)	(47)	25	(16)	–	703
Exxon Mobil Corporation ¹	19,256	3,660	–	(86)	(1,042)	104	(264)	–	21,628
Gulfport Energy Corporation ¹	4,825	622	–	(827)	(444)	–	(43)	–	4,133
Hess Corporation	880	177	–	(24)	(75)	–	(145)	–	813

	Beginning	Extensions and discoveries	Improved recovery	Revisions	Production	Purchases	Sales	Other	Ending
Marathon Oil Corporation	1,324	198	–	188	(156)	–	(1)	–	1,553
Montage Resources Corporation	1,090	516	–	6	(90)	10	–	–	1,532
Murphy Oil Corporation	223	45	–	38	(17)	20	–	–	309
National Fuel Gas Company	1,973	522	–	93	(163)	–	(68)	–	2,357
Newfield Exploration Company ^(b)	1,704	–	–	–	–	–	(1,704)	–	–
Noble Energy, Inc.	1,821	373	–	1	(172)	–	(79)	–	1,944
Oasis Petroleum Inc.	523	46	–	3	(42)	43	(21)	–	552
Occidental Petroleum Corporation	1,205	–	329	(25)	(119)	69	(14)	–	1,445
Parsley Energy, Inc.	452	131	–	49	(37)	6	(28)	–	573
PDC Energy, Inc.	1,154	62	–	95	(88)	149	(36)	–	1,336
Pioneer Natural Resources Company	1,752	230	–	258	(157)	–	(624)	–	1,459
QEP Resources, Inc.	1,794	57	–	314	(140)	8	(545)	–	1,488
Range Resources Corporation	10,264	2,269	–	179	(548)	–	(136)	–	12,028
Riviera Resources, Inc. ¹	1,377	1	–	24	(90)	–	(52)	–	1,260
Roan Resources, Inc. ¹	686	452	–	(185)	(42)	–	–	–	911
Royal Dutch Shell plc	2,569	283	–	(296)	(377)	–	(32)	–	2,147
RSP Permian, Inc. ^(b)	296	–	–	–	–	–	(296)	–	–
Sanchez Energy Corporation	772	242	–	(196)	(55)	–	–	–	763
SM Energy Company	1,280	412	–	(220)	(103)	1	(48)	–	1,322
Southwestern Energy Company	11,126	753	–	412	(807)	–	(3,440)	–	8,044
SRC Energy Inc.	560	144	–	41	(37)	63	–	–	771
Ultra Petroleum Corp.	2,956	85	–	145	(260)	–	(4)	–	2,922
Whiting Petroleum Corporation	846	49	–	(142)	(47)	24	–	–	730
WPX Energy, Inc.	591	177	–	(11)	(64)	5	(80)	–	618
All companies	179,178	31,765	1,646	(2,628)	(13,473)	5,586	(16,300)	51	185,825
Integrateds	35,328	5,581	1,317	(114)	(2,547)	2,903	(658)	–	41,810
Large independents	113,051	20,610	329	(1,524)	(8,650)	1,305	(10,520)	–	114,601
Independents	30,799	5,574	–	(990)	(2,276)	1,378	(5,122)	51	29,414

(a) Includes condensate and natural gas liquids.

(b) See the appendix for activity related to acquired companies.

¹ See company endnotes on page 29.

US – performance measures (three-year averages)

Costs in US\$ per BOE; production replacement rates in %

	Production replacement rates										
				RRC	Oil			Gas			Production costs
	PRAC	FDC including revisions	FDC excluding revisions		All sources	F&D including revisions	F&D excluding revisions	All sources	F&D including revisions	F&D excluding revisions	
Anadarko Petroleum Corporation	\$ 2.03	\$ 16.91	\$ 40.94	\$ 15.16	84%	123%	62%	(73%)	95%	23%	\$ 10.01
Antero Resources Corporation	1.86	4.85	4.28	4.44	529%	495%	252%	205%	163%	300%	9.37
Apache Corporation	2.23	17.15	11.78	17.08	96%	97%	134%	163%	167%	258%	10.88
BHP Billiton Group	0.00	42.30	20.02	42.30	72%	73%	88%	(21%)	(19%)	49%	12.50
BP p.l.c.	9.72	11.72	15.70	10.55	202%	82%	28%	242%	122%	134%	10.00
Brazos Valley Longhorn, L.L.C. ¹	4.94	8.57	8.41	7.65	1297%	920%	945%	156%	742%	739%	6.48
Cabot Oil & Gas Corporation	0.00	1.97	2.96	1.97	(443%)	181%	214%	289%	309%	203%	5.20
California Resources Corporation	8.66	7.48	13.12	7.81	159%	123%	68%	109%	68%	46%	20.09
Carrizo Oil & Gas, Inc.	7.78	13.48	10.18	12.24	370%	314%	473%	403%	501%	472%	9.20
Chesapeake Energy Corporation	8.72	4.75	4.17	4.91	(10%)	113%	285%	127%	260%	241%	10.95
Chevron Corporation	3.04	7.07	9.97	6.94	270%	281%	190%	316%	377%	296%	14.29
Cimarex Energy Co.	9.47	10.68	9.83	10.66	181%	198%	200%	113%	118%	148%	8.35
CNX Resources Corporation ¹	0.19	2.92	2.92	2.01	(18%)	146%	270%	299%	286%	273%	7.13
Comstock Resources, Inc.	1.43	1.69	1.92	1.66	(113%)	163%	143%	831%	775%	685%	4.96
Concho Resources Inc.	13.52	27.01	21.23	20.36	377%	174%	254%	319%	208%	211%	9.10
ConocoPhillips	7.87	9.52	10.05	9.15	166%	154%	156%	(92%)	129%	99%	17.30
Continental Resources, Inc.	3.19	10.17	5.72	10.01	136%	142%	303%	303%	311%	486%	6.86
Denbury Resources Inc.	7.74	25.37	210.74	21.28	58%	48%	7%	134%	181%	(1%)	23.68
Devon Energy Corporation	11.76	8.76	11.63	8.84	121%	172%	153%	22%	148%	84%	8.76
Diamondback Energy, Inc.	11.59	29.97	28.86	19.61	943%	440%	451%	1467%	436%	499%	7.65
Encana Corporation	3.99	7.20	7.63	6.90	322%	340%	343%	(68%)	215%	153%	8.36
EOG Resources, Inc.	16.79	9.96	12.66	10.21	243%	247%	203%	195%	267%	186%	10.72
EP Energy Corporation	12.92	(19.25)	19.43	(32.11)	(141%)	(133%)	89%	(144%)	(1%)	116%	11.31
EQT Corporation	2.92	10.83	5.78	5.27	150%	85%	98%	505%	164%	314%	8.09
Extraction Oil & Gas, Inc.	7.31	14.42	13.83	12.51	395%	291%	309%	513%	414%	418%	7.90
Exxon Mobil Corporation ¹	0.16	13.80	11.69	9.56	278%	175%	200%	159%	137%	167%	14.46
Gulfport Energy Corporation ¹	8.85	4.58	3.60	6.12	441%	139%	129%	352%	249%	323%	5.26
Hess Corporation	10.75	6.69	9.22	6.72	247%	267%	199%	218%	280%	180%	12.32

	Production replacement rates										
	Oil						Gas				Production costs
	PRAC	FDC including revisions	FDC excluding revisions	RRC	All sources	F&D including revisions	F&D excluding revisions	All sources	F&D including revisions	F&D excluding revisions	
Marathon Oil Corporation	\$ 10.73	\$ 17.49	\$ 15.39	\$ 16.65	132%	150%	180%	201%	194%	192%	\$ 11.97
Montage Resources Corporation	1.10	2.95	4.64	2.93	408%	405%	231%	628%	624%	405%	8.51
Murphy Oil Corporation	7.67	16.74	12.40	11.69	262%	106%	159%	246%	200%	158%	11.04
National Fuel Gas Company	0.00	4.80	4.61	4.59	26%	86%	43%	146%	222%	236%	6.16
Noble Energy, Inc.	13.61	10.77	13.24	11.00	234%	251%	207%	(7%)	205%	163%	11.47
Oasis Petroleum Inc.	10.98	24.26	23.12	17.72	176%	77%	136%	476%	356%	171%	13.45
Occidental Petroleum Corporation	7.23	14.53	15.46	12.10	224%	153%	149%	219%	219%	177%	15.18
Parsley Energy, Inc.	9.03	17.70	18.03	16.25	595%	532%	536%	659%	592%	508%	6.79
PDC Energy, Inc.	1.69	40.27	113.85	11.85	371%	117%	38%	419%	89%	37%	5.86
Pioneer Natural Resources Company	15.26	10.61	13.13	10.66	256%	268%	240%	123%	264%	140%	8.61
QEP Resources, Inc.	4.35	11.11	17.74	8.80	298%	190%	191%	(28%)	217%	65%	11.19
Range Resources Corporation	14.74	1.80	2.14	3.32	454%	430%	247%	507%	464%	447%	8.37
Riviera Resources, Inc. ¹	0.00	5.25	4.30	5.39	(188%)	79%	85%	(126%)	63%	84%	11.20
Roan Resources, Inc. ¹	4.09	8.81	7.09	8.04	1,204%	1,011%	1,301%	1,339%	1,114%	1,333%	4.33
Royal Dutch Shell plc	1.59	13.71	21.34	13.44	230%	231%	137%	240%	229%	172%	16.84
Sanchez Energy Corporation	2.12	12.23	7.40	7.55	440%	235%	401%	445%	258%	401%	11.06
SM Energy Company	11.98	17.35	11.89	17.08	127%	264%	363%	115%	173%	282%	11.09
Southwestern Energy Company	0.00	1.54	1.95	1.54	1,199%	1,200%	1,004%	189%	333%	255%	5.97
SRC Energy Inc.	3.47	13.67	14.36	9.22	759%	510%	400%	820%	349%	492%	5.63
Ultra Petroleum Corp.	2.63	5.11	17.56	5.07	(5%)	38%	77%	175%	184%	49%	6.18
Whiting Petroleum Corporation	4.26	(95.26)	13.63	1,417.58	(169%)	(50%)	114%	151%	156%	173%	11.11
WPX Energy, Inc.	4.62	9.49	9.26	8.97	285%	344%	342%	(509%)	200%	227%	9.72
All companies	\$ 6.05	\$ 9.58	\$ 10.00	\$ 8.80	228%	204%	190%	207%	221%	218%	\$ 10.99
Integrates	\$ 5.82	\$ 10.81	\$ 13.08	\$ 9.58	248%	196%	143%	215%	180%	178%	\$ 13.67
Large independents	5.63	8.10	8.37	7.64	204%	207%	194%	199%	227%	225%	10.29
Independents	6.99	13.06	12.17	11.25	272%	209%	247%	226%	249%	237%	9.85

¹ See company endnotes on page 29.

US – rankings and accounting method

	Rankings for the latest fiscal year					Accounting method
	All sources	Oil reserves		Gas reserves		
	Total capital expenditures	Beginning	Ending	Beginning	Ending	
Anadarko Petroleum Corporation	9	11	13	16	16	Successful efforts
Antero Resources Corporation	23	7	7	4	5	Successful efforts
Apache Corporation	15	18	21	25	24	Successful efforts
BHP Billiton Group	19	23	23	19	21	Successful efforts
BP p.l.c.	1	5	3	8	6	Successful efforts
Brazos Valley Longhorn, L.L.C. ¹	34	26	29	39	48	Successful efforts
Cabot Oil & Gas Corporation	40	46	50	6	4	Successful efforts
California Resources Corporation	29	19	20	37	39	Successful efforts
Carrizo Oil & Gas, Inc.	33	39	36	47	47	Full cost
Chesapeake Energy Corporation	16	21	32	7	9	Full cost
Chevron Corporation	5	3	2	11	10	Successful efforts
Cimarex Energy Co.	24	28	30	26	25	Full cost
CNX Resources Corporation ¹	35	45	44	9	8	Successful efforts
Comstock Resources, Inc.	49	50	48	32	20	Successful efforts
Concho Resources Inc.	3	20	15	20	18	Successful efforts
ConocoPhillips	6	2	4	12	11	Successful efforts
Continental Resources, Inc.	12	14	14	14	13	Successful efforts
Denbury Resources Inc.	48	36	34	50	50	Full cost
Devon Energy Corporation	18	12	16	10	12	Successful efforts
Diamondback Energy, Inc.	2	29	11	48	34	Full cost
Encana Corporation	28	34	22	46	43	Full cost
EOG Resources, Inc.	7	4	5	15	14	Successful efforts
EP Energy Corporation	36	30	39	40	44	Successful efforts
EQT Corporation	13	31	41	1	2	Successful efforts
Extraction Oil & Gas, Inc.	39	40	37	41	41	Successful efforts
Exxon Mobil Corporation ¹	4	1	1	2	1	Successful efforts

Rankings for the latest fiscal year

	All sources	Oil reserves		Gas reserves		Accounting method
	Total capital expenditures	Beginning	Ending	Beginning	Ending	
Gulfport Energy Corporation ¹	43	44	43	13	15	Full cost
Hess Corporation	25	17	18	34	36	Successful efforts
Marathon Oil Corporation	14	10	10	28	26	Successful efforts
Montage Resources Corporation	46	47	46	33	27	Successful efforts
Murphy Oil Corporation	22	32	28	49	49	Successful efforts
National Fuel Gas Company	47	48	47	21	19	Full cost
Noble Energy, Inc.	17	15	17	22	23	Successful efforts
Oasis Petroleum Inc.	20	38	38	44	46	Successful efforts
Occidental Petroleum Corporation	10	6	6	30	30	Successful efforts
Parsley Energy, Inc.	21	25	24	45	45	Successful efforts
PDC Energy, Inc.	30	33	31	31	31	Successful efforts
Pioneer Natural Resources Company	11	13	12	24	29	Successful efforts
QEP Resources, Inc.	31	24	25	23	28	Successful efforts
Range Resources Corporation	38	9	9	5	3	Successful efforts
Riviera Resources, Inc. ¹	50	43	45	27	33	Successful efforts
Roan Resources, Inc. ¹	42	42	42	38	35	Successful efforts
Royal Dutch Shell plc	8	8	8	18	22	Successful efforts
Sanchez Energy Corporation	44	37	35	36	38	Successful efforts
SM Energy Company	27	35	33	29	32	Successful efforts
Southwestern Energy Company	32	16	19	3	7	Full cost
SRC Energy Inc.	41	41	40	43	37	Full cost
Ultra Petroleum Corp.	45	49	49	17	17	Full cost
Whiting Petroleum Corporation	37	22	26	35	40	Successful efforts
WPX Energy, Inc.	26	27	27	42	42	Successful efforts

¹ See company endnotes on page 29.



Peer groups

Integrateds

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
CNX Resources Corporation
Concho Resources Inc.
ConocoPhillips
Continental Resources, Inc.
Devon Energy Corporation
Encana Corporation
EOG Resources, Inc.
EQT Corporation
Hess Corporation
Marathon Oil Corporation
Noble Energy, Inc.
Occidental Petroleum Corporation
Pioneer Natural Resources Company
Range Resources Corporation
Southwestern Energy Company

Independents

Brazos Valley Longhorn, L.L.C.
California Resources Corporation
Carrizo Oil & Gas, Inc.
Cimarex Energy Co.
Comstock Resources, Inc.
Denbury Resources Inc.
Diamondback Energy, Inc.
EP Energy Corporation
Extraction Oil & Gas, Inc.
Gulfport Energy Corporation
Montage Resources Corporation
Murphy Oil Corporation
National Fuel Gas Company
Oasis Petroleum Inc.
Parsley Energy, Inc.
PDC Energy, Inc.
QEP Resources, Inc.
Riviera Resources, Inc.
Roan Resources, Inc.
Sanchez Energy Corporation
SM Energy Company
SRC Energy Inc.
Ultra Petroleum Corp.
Whiting Petroleum Corporation
WPX Energy, Inc.

Appendix

Acquired companies

Due to the significance of the operations of companies that were acquired during the study period, the capital expenditures, revenues and results of operations, oil reserves and gas reserves schedules for the 2014-17 period were updated to include activities prior to acquisition. This provides a more meaningful comparison throughout the study period.

In January 2018, Eclipse Resources Corporation was acquired by Montage Resources Corporation. Eclipse Resources Corporation's 2014 through 2017 results have been included in the above-mentioned schedules as applicable. The capital expenditures, revenues and results of operations, oil reserves and gas reserves reported by Montage Resources Corporation for 2018 include activity related to the operations acquired from Eclipse Resources Corporation. Eclipse Resources Corporation's end-of-year 2017 oil reserves (62 million barrels) and gas reserves (1,090 bcf) have been included in 2018 beginning-of-year reserves with an equal volume included as sales in 2018 to reflect the Montage Resources Corporation transaction.

In July 2018, RSP Permian, Inc. was acquired by Concho Resources Inc. RSP Permian, Inc.'s 2014 through 2017 results have been included in the above-mentioned schedules as applicable. The capital expenditures, revenues and results of operations, oil reserves and gas reserves reported by Concho Resources Inc. for 2018 include activity related to the operations acquired from RSP Permian, Inc. RSP Permian, Inc.'s end-of-year 2017 oil reserves (326 million barrels) and gas reserves (296 bcf) have been included in 2018 beginning-of-year reserves with an equal volume included as sales in 2018 to reflect the Concho Resources Inc. transaction.

In November 2018, Energen Corporation was acquired by Diamondback Energy, Inc. Energen Corporation's 2014 through 2017 results have been included in the above-mentioned schedules as applicable. The capital expenditures, revenues and results of operations, oil reserves and gas reserves reported by Diamondback Energy, Inc. for 2018 include activity related to the operations acquired from Energen Corporation. Energen Corporation's end-of-year 2017 oil reserves (348 million barrels) and gas reserves (576 bcf) have been included in 2018 beginning-of-year reserves with an equal volume included as sales in 2018 to reflect the Diamondback Energy, Inc. transaction.

In 2018, Encana Corporation announced its acquisition of Newfield Exploration Company. The transaction closed in February 2019, and Newfield Exploration Company did not file an annual report for 2018. Newfield Exploration Company's 2014 through 2017 results have been included in the above-mentioned schedules as applicable.

The capital expenditures, revenues and results of operations, oil reserves and gas reserves reported by Encana Corporation for 2018 include activity related to the operations acquired from Newfield Exploration Company. Newfield Exploration Company's end-of-year 2017 oil reserves (394 million barrels) and gas reserves (1,704 bcf) have been included in 2018 beginning-of-year reserves with an equal volume included as sales in 2018 to reflect the Encana Corporation transaction.

In November 2017, Rice Energy Inc. was acquired by EQT Corporation. Rice Energy Inc.'s 2014 through 2016 results have been included in the above-mentioned schedules as applicable. The capital expenditures, revenues and results of operations, oil reserves and gas reserves reported by EQT Corporation for 2017 include activity related to the operations acquired from Rice Energy Inc. Rice Energy Inc.'s end-of-year gas reserves (4,005.3 bcf) have been included in 2017 beginning-of-year reserves with an equal volume included as sales in 2017 to reflect the acquisition.

In September 2016, Memorial Resource Development Corp. was acquired by Range Resources Corporation. Memorial Resource Development Corp.'s 2014 and 2015 results have been included in the above-mentioned schedules as applicable. The capital expenditures, revenues and results of operations, oil reserves and gas reserves reported by Range Resources Corporation for 2016 and 2017 include activity related to the operations acquired from Memorial Resource Development Corp. Memorial Resource Development Corp.'s end-of-year 2015 oil reserves (201.7 million barrels) and gas reserves (1,435.3 bcf) have been included in 2016 beginning-of-year reserves with an equal volume included as sales in 2016 to reflect the Range Resources Corporation transaction.

In July 2015, Rosetta Resources was acquired by Noble Energy, Inc. Rosetta Resources' 2014 results have been included in the above-mentioned schedules as applicable. The capital expenditures, revenues and results of operations, oil reserves and gas reserves reported by Noble Energy, Inc. 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, Inc. transaction.

For purposes of the peer group analysis, Memorial Resource Development Corp.; Rosetta Resources; Rice Energy Inc.; Newfield Exploration Company; Energen Corporation; RSP Permian, Inc.; and Eclipse Resources Corporation are independents.

Performance measures

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

- ▶ **Plowback percentage** represents total capital expenditures as a percentage of netback (revenues less production costs).
- ▶ **PRACs** are calculated as proved property acquisition costs divided by proved reserves purchased.
- ▶ **FDCs 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.
- ▶ **FDCs 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.
- ▶ **RRCs** 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 in 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 (IFRS) 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 generally were determined based on data available from Evaluate Energy as of March 15, 2019. 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 generally have not been incorporated herein. Unless otherwise indicated, 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. However, prior period information for Apache Corporation for 2014 to 2015 and Sanchez Energy Corporation for 2015 to 2016, including the effects on calculated performance measures, has been revised to reflect its conversion to the successful efforts method from the full cost method in 2016 and 2017, respectively.

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

Natural gas prices are quoted on an mmBtu basis, while gas reserves in this study are presented in bcf and tcf.

Certain amounts in this study are presented on a per BOE basis. Natural gas volumes are converted to barrels at a ratio of 6,000 cubic feet (mcf) 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 endnotes

Gulfport Energy Corporation filings include only acquisition costs without further breakdown between proved and unproved properties. For our study purposes, Gulfport Energy Corporation acquisitions were included in the proved properties acquired category.

Amounts presented for Exxon Mobil Corporation include investments accounted for by the equity method. Oil rollforwards and computations based on oil volumes exclude NGLs, which are only reported on a worldwide basis.

In 2017, CNX Resources Corporation completed the spin-off of its coal business resulting in two independent, publicly traded companies: CONSOL Energy, a coal company, and CNX Resources Corporation, a natural gas E&P company. The 2014-2015 data for CNX Resources Corporation were obtained from CONSOL Energy filings.

Riviera Resources, Inc. and Roan Resources, Inc. are successors of Linn Energy, Inc.'s operations. Linn Energy, Inc. was the successor entity to Linn Energy, LLC, which declared bankruptcy in 2016. For consistency, results for prior periods include results of Linn Energy, Inc. and Linn Energy, LLC.

Brazos Valley Longhorn, L.L.C. is the successor company to WildHorse Resource Development Company, which was acquired by Chesapeake Energy Corporation in 2019. Brazos Valley Longhorn, L.L.C. filed an annual report for 2018. For consistency, results for prior periods include results of WildHorse Resource Development Company.

Why EY?

Through our oil and gas industry knowledge, our closely linked Assurance, Transactions, Tax and Advisory service teams, as well as more than 10,000 industry professionals globally, Ernst & Young LLP is equipped to provide independent, whole-life support and advice to our oil and gas clients during this time of fundamental change. We help clients solve complex issues and capitalize on opportunities to grow, optimize and protect their businesses now and in the future. Our team has proven skills covering the entire breadth and depth of our oil and gas clients' businesses, ranging from strategy to portfolio review, improvement and management to execution.

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