SOUTHWESTERN ENERGY CO
Form 10-K
February 28, 2019

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

Form 10-K

[X] Annual Report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934
For the fiscal year ended December 31, 2018
Commission file number 001-08246

Southwestern Energy Company
(Exact name of registrant as specified in its charter)

Delaware	71-0205415
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

10000 Energy Drive,

Spring, Texas	77389
(Address of principal executive offices)	(Zip Code)

(832) 796-1000
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Name of each exchange on which registered
Common Stock, Par Value $0.01	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	Accelerated filer	Non-accelerated filer	Smaller reporting company	Emerging Growth Company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes No

The aggregate market value of the voting stock held by non-affiliates of the registrant was $3,096,452,639 based on the New York Stock Exchange – Composite Transactions closing price on June 30, 2018 of $5.30. For purposes of this calculation, the registrant has assumed that its directors and executive officers are affiliates.

As of February 26, 2019, the number of outstanding shares of the registrant's Common Stock, par value $0.01, was 541,319,293.

Document Incorporated by Reference

Portions of the registrant's definitive proxy statement to be filed with respect to the annual meeting of stockholders to be held on or about May 21, 2019 are incorporated by reference into Part III of this Form 10-K.

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SOUTHWESTERN ENERGY COMPANY
ANNUAL REPORT ON FORM 10-K
For Fiscal Year Ended December 31, 2018

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This Annual Report on Form 10-K ("Annual Report") includes certain statements that may be deemed to be "forward-looking" within the meaning of Section 27A of the Securities Act of 1933, or the Securities Act, and Section 21E of the Securities Exchange Act of 1934, or the Exchange Act. We refer you to "Risk Factors" in Item 1A of Part I and to "Management's Discussion and Analysis of Financial Condition and Results of Operations – Cautionary Statement about Forward-Looking Statements" in Item 7 of Part II of this Annual Report for a discussion of factors that could cause actual results to differ materially from any such forward-looking statements. The electronic version of this Annual Report, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to those forms filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act are available free of charge as soon as reasonably practicable after they are filed with the Securities and Exchange Commission, or SEC, on our website at www.swn.com. Our corporate governance guidelines and the charters of the Audit, the Compensation, the Health, Safety, Environment and Corporate Responsibility and the Nominating and Governance Committees of our Board of Directors are available on our website, and, upon request, in print free of charge to any stockholder. Information on our website is not incorporated into this report.

We file periodic reports, current reports and proxy statements with the SEC electronically. The SEC maintains an internet website that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC. The address of the SEC's website is www.sec.gov. The public may also read and copy any materials we file with the SEC at the SEC's Public Reference Room at 100 F Street N.E., Washington, D.C. 20549. The public may obtain information about the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330.

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ITEM 1. BUSINESS

Southwestern Energy Company (including its subsidiaries, collectively, “we”, “our”, “us”, “the Company” or “Southwestern”) an independent energy company engaged in exploration, development and production activities, including the related marketing of natural gas, oil and natural gas liquids (“NGLs”) produced in our operations. Southwestern is a holding company whose assets consist of direct and indirect ownership interests in, and whose business is conducted substantially through, its subsidiaries. Currently we operate exclusively in the United States. Our common stock is listed and traded on the NYSE under the ticker symbol “SWN.”

Southwestern, which is currently incorporated in Delaware, has its executive offices located at 10000 Energy Drive, Spring, Texas 77389, and can be reached by phone at 832-796-1000. The Company also maintains offices in Tunkhannock, Pennsylvania and Morgantown, West Virginia.

Our Business Strategy

We aim to deliver sustainable and assured industry-leading returns through excellence in exploration and production and marketing performance from our extensive resource base and targeted expansion of our activities and assets along the hydrocarbon value chain. Our Company’s formula embodies our corporate philosophy and guides how we operate our business:

Our formula, “The Right People doing the Right Things, wisely investing the cash flow from our underlying Assets will create Value+,” also guides our business strategy. We always strive to attract and retain strong talent, to work safely and act ethically with unwavering vigilance for the environment and the communities in which we operate, and to creatively apply technical skills, which we believe will grow long-term value for our shareholders. The arrow in our formula is not a straight line: we acknowledge that factors may adversely affect quarter-by-quarter results, but the path over time points to value creation.

In applying these core principles, we concentrate on:

- Financial Strength. We are committed to rigorously managing our balance sheet and financial risks. We budget to invest from our net cash flow from operations, supplemented over the next two years by a portion of the proceeds from our recent asset sales. Additionally, we protect our projected cash flows through hedging and continue to maintain a strong balance sheet with ample liquidity.

- Increasing Margins. We apply strong technical, operational, commercial and marketing skills to reduce costs, improve the productivity of our wells and pursue commercial arrangements to extract greater value. We believe our demonstrated ability to improve margins, especially by leveraging the scale of our large assets, gives us a competitive advantage as we move into the future.
- Exercising Capital Allocation Discipline. We continually assess market conditions in order to adjust our capital allocation decisions to maximize shareholder returns. This allocation process includes consideration of multiple alternatives including but not limited to the development of our natural gas and oil assets, strategic acquisitions, reducing debt and returning capital to our shareholders.
- Operational Value Creation. We prepare an economic analysis for our drilling programs and other investments based upon the expected net present value added for each dollar to be invested, which we refer to as Present Value Index, or PVI. We target projects that generate the highest returns in excess of our cost of capital. This disciplined investment approach governs our investment decisions at all times, including the current lower-price commodity market.
- Dynamic Management of Assets Throughout Life Cycle. We own large-scale, long-life assets in various phases of development. In early stages, we ramp up development through technical, operational and commercial skills, and as they grow we look for ways to maximize their value through efficient operating practices along with applying our commercial and marketing expertise.
- Deepening Our Inventory. We continue to expand the inventory of properties that we can develop profitably by converting our extensive resources into proved reserves, targeting additions whose productivity largely has been demonstrated and improving efficiencies in production.

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- The Hydrocarbon Value Chain. We believe that our vertical integration enhances our margins and provides us competitive advantages. For example, we own and operate drilling rigs and well stimulation equipment and are investing in a water transportation project in West Virginia, a portion of which is already in service and providing approximately $0.5 million in savings per well. These activities provide operational flexibility, help protect our margin, lower our well costs, minimize the risk of unavailability of these resources from third parties and capture additional value.
- Technological Innovation. Our people constantly search for the next revolutionary technology and other operational advancements to capture greater value in unconventional hydrocarbon resource development. These developments – whether single, step-changing technologies or a combination of several incremental ones – can reduce finding and development costs and thus increase our margins.
- Environmental Solutions and Policy Formation. We are a leader in identifying and implementing innovative solutions to unconventional hydrocarbon development to minimize the environmental and community impacts of our activities. We work extensively with governmental, non-governmental and industry stakeholders to develop responsible and cost-effective programs. We demonstrate that a company can operate responsibly and profitably, putting us in a better position to comply with new regulations as they evolve.

In recent years, we have faced a challenging commodity price environment that has impacted our revenues and margins. As a result, we implemented a series of strategic initiatives, which were designed to reposition our portfolio to increase operational and financial flexibility, stabilize the Company financially and improve operational performance.

Repositioning of Our Portfolio

During 2018, we completed the next phase of strategic steps, designed to reposition our portfolio, which allowed us to sharpen our focus on our assets with the highest return. We believe that, in doing so, we will further strengthen our balance sheet and enhance our financial performance. These initiatives included:

- Completing the sale of 100% of the equity in certain of our subsidiaries that conducted our operations in Arkansas, which were primarily focused on the Fayetteville Shale (the “Fayetteville Shale sale”);
- Responding to commodity price changes by shifting focus to our liquids-rich portfolio in Southwest Appalachia; and
- Utilizing a portion of funds realized from the Fayetteville Shale sale to reduce debt and return capital to shareholders. We intend to use the remaining funds to further develop our Appalachian Basin assets in order to accelerate the path to self-funding and for general corporate purposes.

Financial Stability

During 2018, we focused on enhancing our financial stability by:

- Continuing to invest only in those projects that meet our rigorous economic hurdles at strip pricing, adjusting for basis differentials;
- Demonstrating financial discipline by investing within our announced plan of cash flow;
- Identifying and implementing structural, process and organizational changes to further reduce general and administrative costs; and
- Simplifying our capital structure by consolidating the components of our previous credit arrangements into a single senior secured revolving credit facility while increasing liquidity, extending our maturity profile and reducing interest expense.

Operational Improvement

We improved the performance of our large asset portfolio with a primary focus on enhancing margins and investment returns. During 2018, we executed on this part of our business strategy by:

- Lowering our costs through drilling, completions and operational efficiencies and optimizing gathering and transportation costs;
- Focusing on delivering operational excellence with improved well productivity and economics from enhanced completion techniques, initiation of water infrastructure projects, optimization of surface equipment and managing reservoir drawdown; and

· Expanding our proved reserve quantities in the Appalachian Basin through our successful drilling program, improved operational performance and improved commodity prices.

The bulk of our operations, which we refer to as Exploration and Production ("E&P"), are focused on the finding and development of natural gas, oil and NGL reserves. We are also focused on creating and capturing additional value through our marketing business and, until the Fayetteville Shale sale, natural gas gathering, all of which we historically have referred to as Midstream.

Exploration and Production

Overview

Our primary business is the exploration for, and production of, natural gas, oil and NGLs, with our current operations solely within the United States. We are currently focused on the development of unconventional natural gas reservoirs located in Pennsylvania and West Virginia. Our operations in northeast Pennsylvania (herein referred to as "Northeast Appalachia") are primarily focused on the unconventional natural gas reservoir known as the Marcellus Shale, and our operations in West Virginia and southwest Pennsylvania (herein referred to as "Southwest Appalachia") are focused on the Marcellus Shale, the Utica and the Upper Devonian unconventional natural gas, oil and NGL reservoirs. Collectively, our properties located in Pennsylvania and West Virginia are herein referred to as the "Appalachian Basin."

· Our E&P segment recorded operating income of $794 million in 2018, compared to $549 million in 2017. Our E&P segment operating income increased $245 million in 2018 from 2017 primarily due to a $439 million increase in revenues, partially offset by a $194 million increase in operating expenses due primarily to increased gathering and processing fees resulting from a shift in our production growth to the Appalachian Basin.
· Cash flow from operations from our E&P segment was $1.4 billion in 2018, compared to $985 million in 2017. Our cash flow from operations increased in 2018 as the effects of higher realized prices and increased production volumes more than offset increased operating expenses associated with higher liquids activity.

On August 30, 2018, we announced our entry into an agreement to effect the Fayetteville Shale sale. The Fayetteville Shale sale closed on December 3, 2018 resulting in net proceeds of approximately $1,650 million, following adjustments of $215 million primarily related to the net cash flows from the economic effective date to the closing date and certain other working capital adjustments.

Oilfield Services Vertical Integration

We provide certain oilfield services that are strategic and economically beneficial for our E&P operations when our E&P activity levels and market pricing support these activities. This vertical integration lowers our net well costs, allows us to operate efficiently and helps us to mitigate certain operational and environmental risks. These services have included drilling, hydraulic fracturing and water management and movement.

As of December 31, 2018, we had seven drilling rigs and two leased pressure pumping spreads with a total capacity of approximately 72,000 horsepower. These assets provide us greater flexibility to align our operational activities with commodity prices. In 2018, we provided drilling rigs for all of our 106 drilled wells. In addition, we provided hydraulic fracturing services utilizing one pressure pumping spread in Southwest Appalachia.

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Our Proved Reserves

	For the years ended December 31,		
	2018	2017	2016
Proved reserves: (Bcfe)			
Appalachian Basin	11,920	11,088	2,251
Fayetteville Shale	–	3,679	2,997
Other	1	8	5
Total proved reserves	11,921	14,775	5,253
Prices used:			
Natural gas (per Mcf)	$ 3.10	$ 2.98	$ 2.48
Oil (per Bbl)	65.56	47.79	39.25
NGL (per Bbl)	17.64	14.41	6.74
PV-10: (in millions)			
Pre-tax	$ 6,524	$ 5,784	$ 1,665
PV of taxes	(525)	(222)	–
After-tax	$ 5,999	$ 5,562	$ 1,665
Percent of estimated proved reserves that are:			
Natural gas	67%	75%	93%
Proved developed	47%	54%	99%
Percent of operating revenues generated by natural gas sales	78%	85%	89%

Our reserve estimates and the after-tax PV-10 measure, or standardized measure of discounted future net cash flows relating to proved natural gas, oil and NGL reserve quantities, are highly dependent upon the respective commodity price used in our reserve and after-tax PV-10 calculations.

· Our reserves decreased in 2018, compared to 2017, primarily due to the sale of our Fayetteville Shale E&P assets. Excluding the impact of the Fayetteville Shale sale, our reserves increased 7% in 2018, compared to 2017, primarily through extensions, discoveries and other additions, along with increases in both price and performance revisions in the Appalachian Basin.
· The increase in our reserves in 2017 compared to 2016 was primarily due to extensions, discoveries and other additions in the Appalachian Basin along with increases in both price and performance revisions across our portfolio.
· The increase in our after-tax PV-10 value in 2018 compared to 2017 was primarily due to increases in both price and performance revisions in our Appalachian Basin. Excluding the impact of the Fayetteville Shale sale, the increases in our after-tax PV-10 value in both 2018 and 2017, compared to the respective prior years, was primarily due to higher prices and higher reserve levels, including an increasingly larger percentage of oil and NGL reserves.
· We are the designated operator of approximately 99% of our reserves, based on the pre-tax PV-10 value of our proved developed producing reserves, and our reserve life index was approximately 17.0 years at year-end 2018,

excluding the production from the Fayetteville Shale.

The difference in after-tax PV-10 and pre-tax PV-10 (a non-GAAP measure which is reconciled in the 2018 Proved Reserves by Category and Summary Operating Data table below) is the discounted value of future income taxes on the estimated cash flows. Our year-end 2016 after-tax PV-10 computation did not have future income taxes because our tax basis in the associated natural gas and oil properties exceeded expected pre-tax cash inflows, and thus did not differ from the pre-tax values.

We believe that the pre-tax PV-10 value of the estimated cash flows related to our estimated proved reserves is a useful supplemental disclosure to the after-tax PV-10 value. Pre-tax PV-10 is based on prices, costs and discount factors that are comparable from company to company, while the after-tax PV-10 is dependent on the unique tax situation of each individual company. We understand that securities analysts use pre-tax PV-10 as one measure of the value of a company's current proved reserves and to compare relative values among peer companies without regard to income taxes. We refer you to "Supplemental Oil and Gas Disclosures" in Item 8 of Part II of this Annual Report for a discussion of our standardized measure of discounted future cash flows related to our proved natural gas, oil and NGL reserves, to the risk factor "Our proved natural gas, oil and NGL reserves are estimates that include uncertainties. Any material change to these uncertainties or underlying assumptions could cause the quantities and net present value of our reserves to be overstated or understated" in Item 1A of Part I of this Annual Report, and to "Management's Discussion and Analysis of Financial Condition and Results of Operations – Cautionary Statement about Forward-Looking Statements" in Item 7 of Part II of this Annual Report for a discussion of the risks inherent in utilization of standardized measures and estimated reserve data.

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The following table provides an overall and categorical summary of our natural gas, oil and NGL reserves, as of fiscal year-end 2018 based on average fiscal year prices, and our well count, net acreage and PV-10 as of December 31, 2018, and sets forth 2018 annual information related to production and capital investments for each of our operating areas:

2018 PROVED RESERVES BY CATEGORY AND SUMMARY OPERATING DATA (1)

	Appalachia Northeast	Southwest	Other (2)		Total
Estimated proved reserves:					
Natural gas (Bcf):					
Developed	3,327	1,068	–		4,395
Undeveloped	1,039	2,610	–		3,649
	4,366	3,678	–		8,044
Crude oil (MMBbls):					
Developed	–	17.9	0.1		18.0
Undeveloped	–	51.0	–		51.0
	–	68.9	0.1		69.0
Natural gas liquids (MMBbls):					
Developed	–	175.5	–		175.5
Undeveloped	–	401.6	–		401.6
	–	577.1	–		577.1
Total proved reserves (Bcfe) (3):					
Developed	3,327	2,229	1		5,557
Undeveloped	1,039	5,325	–		6,364
	4,366	7,554	1		11,921
Percent of total	37%	63%	0%		100%
Percent proved developed	76%	30%	100%		47%
Percent proved undeveloped	24%	70%	0%		53%
Production (Bcfe)	459	243	244	(4)	946
Capital investments (in millions)	$ 422	$ 691	$ 118	(5)	$ 1,231
Total gross producing wells (6)	666	466	17		1,149
Total net producing wells (6)	592	333	14		939
Total net acreage	184,024	297,445	166,120	(7)	647,589
Net undeveloped acreage	73,174	220,331	153,159	(7)	446,664
PV-10:					
Pre-tax (in millions) (8)	$ 3,054	$ 3,470	$ –		$ 6,524

PV of taxes (in millions) (8)	(245)	(280)	–	(525)
After-tax (in millions) (8)	$ 2,809	$ 3,190	$ –	$ 5,999
Percent of total	47%	53%	0%	100%
Percent operated (9)	99%	100%	100%	99%

(1) The Fayetteville Shale E&P assets and associated reserves were divested on December 3, 2018.

(2) Other reserves and acreage consists primarily of properties in Colorado. Production and capital investing includes Fayetteville Shale.

(3) We have no reserves from synthetic gas, synthetic oil or nonrenewable natural resources intended to be upgraded into synthetic gas or oil. We used standard engineering and geoscience methods, or a combination of methodologies in determining estimates of material properties, including performance and test date analysis offset statistical analogy of performance data, volumetric evaluation, including analysis of petrophysical parameters (including porosity, net pay, fluid saturations (i.e., water, oil and gas) and permeability) in combination with estimated reservoir parameters (including reservoir temperature and pressure, formation depth and formation volume factors), geological analysis, including structure and isopach maps and seismic analysis, including review of 2-D and 3-D data to ascertain faults, closure and other factors.

(4) Includes 243 Bcf of natural gas production related to our Fayetteville Shale operations which were sold on December 3, 2018.

(5) Other capital investments includes $33 million related to our Fayetteville Shale operations which were sold on December 3, 2018, $60 million related to our water infrastructure project, $16 million related to our E&P service companies and $9 million related to our exploration activities.

(6) Represents producing wells, including 394 wells in which we only have an overriding royalty interest in Northeast Appalachia, used in the December 31, 2018 reserves calculation.

(7) Excludes exploration licenses for 2,518,519 net acres in New Brunswick, Canada, which have been subject to a moratorium since 2015.

(8) Pre-tax PV-10 (a non-GAAP measure) is one measure of the value of a company's proved reserves that we believe is used by securities analysts to compare relative values among peer companies without regard to income taxes. The reconciling difference in pre-tax PV-10 and the after-tax PV-10, or standardized measure, is the discounted value of future income taxes on the estimated cash flows from our proved natural gas, oil and NGL reserves.

(9) Based upon pre-tax PV-10 of proved developed producing activities.

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Lease Expirations

The following table summarizes the leasehold acreage expiring over the next three years, assuming successful wells are not drilled to develop the acreage and leases are not extended:

	For the years ended December 31,			
Net acreage expiring:	2019		2020	2021
Northeast Appalachia	7,429	(3)	3,857	1,837
Southwest Appalachia (1)	21,761	(3)	14,630	6,701
Other				
US – Other Exploration	87,498		30,686	9,032
US – Sand Wash Basin	5,761		989	7
Canada – New Brunswick (2)	–		–	2,518,519

(1) Of this acreage, 9,410 net acres in 2019, 5,300 net acres in 2020 and 2,647 net acres in 2021 can be extended for an average of 4.8 years.

(2) Exploration licenses were extended through 2021 but have been subject to a moratorium since 2015.

(3) We have no reported proved undeveloped locations expiring in 2019.

We refer you to "Supplemental Oil and Gas Disclosures" in Item 8 of Part II of this Annual Report for a more detailed discussion of our proved natural gas, oil and NGL reserves as well as our standardized measure of discounted future net cash flows related to our proved natural gas, oil and NGL reserves. We also refer you to the risk factor "Our proved natural gas, oil and NGL reserves are estimates that include uncertainties. Any material changes to these uncertainties or underlying assumptions could cause the quantities and net present value of our reserves to be overstated or understated" in Item 1A of Part I of this Annual Report and to "Management's Discussion and Analysis of Financial Condition and Results of Operations – Cautionary Statement about Forward-Looking Statements" in Item 7 of Part II of this Annual Report for a discussion of the risks inherent in utilization of standardized measures and estimated reserve data.

Proved Undeveloped Reserves

Presented below is a summary of changes in our proved undeveloped reserves for 2016, 2017 and 2018:

CHANGES IN PROVED UNDEVELOPED RESERVES

	Appalachia		Fayetteville		
(Bcfe)	Northeast	Southwest	Shale (1)	Other (2)	Total
December 31, 2015	314	4	125	–	443
Extensions, discoveries and other additions	–	–	25	–	25
Performance and production revisions (3)	204	–	(1)	–	203
Price revisions	(303)	(4)	(67)	–	(374)
Developed	(181)	–	(39)	–	(220)
Disposition of reserves in place	–	–	–	–	–
Acquisition of reserves in place	–	–	–	–	–
December 31, 2016	34	–	43	–	77
Extensions, discoveries and other additions (4)	1,100	5,186	543	–	6,829
Performance and production revisions (3)	–	6	(14)	–	(8)
Price revisions	2	–	1	–	3
Developed	(17)	–	(29)	–	(46)
Disposition of reserves in place	–	–	–	–	–
Acquisition of reserves in place	–	–	–	–	–
December 31, 2017	1,119	5,192	544	–	6,855
Extensions, discoveries and other additions	397	435	–	–	832
Performance and production revisions (3)	39	217	–	–	256
Price revisions	8	53	–	–	61
Developed	(524)	(572)	–	–	(1,096)
Disposition of reserves in place	–	–	(544)	–	(544)
Acquisition of reserves in place	–	–	–	–	–
December 31, 2018	1,039	5,325	–	–	6,364

(1) The Fayetteville Shale E&P assets and associated reserves were sold on December 3, 2018.

(2) Other includes properties principally in Colorado.

(3) Primarily due to changes associated with the analysis of updated data collected in the year and decreases related to current year production.

(4) The 2017 proved undeveloped, or PUD, additions of 6,829 Bcfe were comprised of 3,910 Bcfe attributable to adding new undeveloped locations throughout the year through our successful drilling program and 2,919 Bcfe attributable to adding undeveloped locations associated with increased commodity pricing across our portfolio.

Performance, production and price revisions consist of revisions to reserves associated with wells having proved reserves in existence as of the beginning of the year. Extensions, discoveries and other additions include new reserves locations added in the current year.

· As of December 31, 2018, we had 6,364 Bcfe of proved undeveloped reserves, all of which we expect will be developed within five years of the initial disclosure as the starting reference date. During 2018, we invested $491 million in connection with converting 1,096 Bcfe, or 16%, of our proved undeveloped reserves as of December 31, 2017 into proved developed reserves and added 832 Bcfe of proved undeveloped reserve additions in the Appalachian Basin. Proved undeveloped reserves also decreased in 2018 primarily due to the sale of the Fayetteville Shale E&P assets.
· As of December 31, 2017, we had 6,855 Bcfe of proved undeveloped reserves. During 2017, we invested $23 million in connection with converting 46 Bcfe, or 60%, of our proved undeveloped reserves as of December 31, 2016 into proved developed reserves and added 6,829 Bcfe of proved undeveloped reserve additions in the Appalachian Basin. The significant increase in our proved undeveloped reserve additions in 2017 was the result of adding new undeveloped locations throughout the year through our successful drilling program, improved operational performance and increased commodity pricing across our portfolio.
· As of December 31, 2016, we had 77 Bcfe of proved undeveloped reserves. During 2016, we invested $103 million in connection with converting 220 Bcfe, or 50%, of our proved undeveloped reserves as of December 31, 2015 into proved developed reserves and added 25 Bcfe of proved undeveloped reserve additions in the Fayetteville Shale. As a result of the commodity price environment in 2016, we had downward price revisions of 374 Bcfe which were slightly offset by a 203 Bcfe increase due to performance revisions.

Our December 31, 2018 proved reserves included 190 Bcfe of proved undeveloped reserves from 30 locations that have a positive present value on an undiscounted basis in compliance with proved reserve requirements but do not have a positive present value when discounted at 10%. These properties have a negative present value of $24 million when discounted at 10%. We have made a final investment decision and are committed to developing these reserves within five years from the date of initial booking.

We expect that the development costs for our proved undeveloped reserves of 6,364 Bcfe as of December 31, 2018 will require us to invest an additional $3.8 billion for those reserves to be brought to production. Our ability to make the necessary investments to generate these cash inflows is subject to factors that may be beyond our control. The current commodity price environment has resulted, and could continue to result, in certain reserves no longer being economic to produce, leading to both lower proved reserves and cash flows. We refer you to the risk factors "Natural gas, oil and NGL prices greatly affect our business, including our revenues, profits, liquidity, growth, ability to repay our debt and the value of our assets" and "Significant capital expenditures are required to replace our reserves and conduct our business" in Item 1A of Part I of this Annual Report and to "Management's Discussion and Analysis of Financial Condition and Results of Operations – Cautionary Statement about Forward-Looking Statements" in Item 7 of Part II of this Annual Report for a more detailed discussion of these factors and other risks.

Our Reserve Replacement

The reserve replacement ratio measures the ability of an E&P company to add new reserves to replace the reserves that are being depleted by its current production volumes. The reserve replacement ratio, which we discuss below, is an important analytical measure used by investors and peers in the E&P industry to evaluate performance results and long-term prospects. There are limitations as to the usefulness of this measure, as it does not reflect the type of reserves or the cost of adding the reserves or indicate the potential value of the reserve additions.

In 2018, we replaced 162% of our production volumes with 1,009 Bcfe of proved reserve additions and net upward revisions of 526 Bcfe, essentially all of which were from the Appalachian Basin. Excluding the production from our Fayetteville Shale assets which were divested on December 3, 2018, we replaced 218% of our production in 2018. The following table summarizes the changes in our proved natural gas, oil and NGL reserves for the year ended December 31, 2018:

(in Bcfe)	Appalachia Northeast	Southwest	Fayetteville Shale (1)	Other (2)	Total
December 31, 2017	4,126	6,962	3,679	8	14,775
Net revisions					
Price revisions	41	106	6	1	154
Performance and production revisions	107	272	(6)	(1)	372
Total net revisions	148	378	–	–	526
Extensions, discoveries and other additions					
Proved developed	154	22	1	–	177
Proved undeveloped	397	435	–	–	832
Total reserve additions	551	457	1	–	1,009
Production	(459)	(243)	(243)	(1)	(946)
Acquisition of reserves in place	–	–	–	–	–
Disposition of reserves in place	–	–	(3,437)	(6)	(3,443)
December 31, 2018	4,366	7,554	–	1	11,921

(1) The Fayetteville Shale E&P assets and associated reserves were divested December 3, 2018.

(2) Other includes properties outside of the Appalachian Basin and Fayetteville Shale.

Our ability to add reserves depends upon many factors that are beyond our control. We refer you to the risk factors “Significant capital expenditures are required to replace our reserves and conduct our business” and “If we are not able to replace reserves, we may not be able to grow or sustain production.” in Item 1A of Part I of this Annual Report and to “Management’s Discussion and Analysis of Financial Condition and Results of Operations – Cautionary Statement about Forward-Looking Statements” in Item 7 of Part II of this Annual Report for a more detailed discussion of these factors and other risks.

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Our Operations

Northeast Appalachia

Northeast Appalachia represented 49% of our total 2018 net production and 37% of our total reserves as of December 31, 2018. In 2018, our reserves in Northeast Appalachia increased by 240 Bcf, which included net additions of 551 Bcf, net upward price revisions of 41 Bcf and net upward performance revisions of 107 Bcf, partially offset by production of 459 Bcf. As of December 31, 2018, we had approximately 184,024 net acres in Northeast Appalachia and had spud or acquired 680 operated wells, 597 of which were on production. Below is a summary of Northeast Appalachia's operating results for the latest three years:

	For the years ended December 31,				
	2018		2017		2016
Acreage					
Net undeveloped acres	73,174	(1)	87,927	(2)	146,096
Net developed acres	110,850		103,299		99,709
Total net acres	184,024		191,226		245,805
Net Production (Bcf)	459		395		350
Reserves					
Reserves (Bcf)	4,366		4,126		1,574
Locations:					
Proved developed producing	1,042		983		820
Proved developed non-producing	21		25		39
Proved undeveloped	82		100	(3)	2
Total locations (4)	1,145		1,108		861
Gross Operated Well Count Summary					
Spud or acquired	35		58		32
Completed	54		77		33
Wells to sales	60		83		24
Capital Investments (in millions)					
Exploratory and development drilling, including workovers	$ 370		$ 420		$ 160
Acquisition and leasehold	14		14		3
Seismic and other	3		13		2
Capitalized interest and expense	35		42		39

Total capital investments	$ 422	$ 489	$ 204
Average completed well cost (in millions)	$ 7.5	$ 5.9	$ 5.3
Average lateral length (feet)	7,584	6,185	6,142

(1) Our undeveloped acreage position as of December 31, 2018 had an average royalty interest of 15%.
(2) The decrease in our net undeveloped acres in 2017 as compared to 2016 is due to leasehold expirations in areas we did not plan on developing.
(3) Our proved undeveloped reserve locations increased significantly in 2017, as compared to 2016, primarily through our successful drilling program in less developed areas and improved realized commodity pricing.
(4) Includes 394 proved developed producing and 10 proved developed non-producing wells in which we only have an overriding royalty interest.

For 2018 as compared to 2017:

· Our average completed well cost increased primarily due to the drilling of longer lateral wells, new infrastructure due to increased activity in delineation areas and more complex hydraulic fracturing designs.

Our ability to bring our Northeast Appalachia production to market depends on a number of factors including the construction of and/or the availability of capacity on gathering systems and pipelines that we do not own. We refer you to "Midstream" in Item 1 of Part I of this Annual Report for a discussion of our gathering and transportation arrangements for Northeast Appalachia production.

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Southwest Appalachia

Southwest Appalachia represented 26% of our total 2018 net production and 63% of our total reserves as of December 31, 2018. In 2018, our reserves in Southwest Appalachia increased by 592 Bcfe, which included net additions of 457 Bcfe, net upward price revisions of 106 Bcfe and 272 Bcfe of net upward performance revisions, partially offset by production of 243 Bcfe. As of December 31, 2018, we had approximately 297,445 net acres in Southwest Appalachia and had a total of 436 wells on production that we operated. Below is a summary of Southwest Appalachia's operating results for the latest three years:

	For the years ended December 31,					
	2018		2017		2016	
Acreage						
Net undeveloped acres	220,331	(1)	219,709		252,470	
Net developed acres	77,114		70,582		69,093	
Total net acres	297,445		290,291		321,563	
Net Production						
Natural gas (Bcf)	105		85		62	
Oil (MBbls)	3,355		2,228		2,041	
NGL (MBbls)	19,679		14,193		12,317	
Total production (Bcfe) (2)	243		183		148	
Reserves						
Reserves (Bcfe)	7,554		6,962		677	
Locations:						
Proved developed	423		364		306	
Proved developed non-producing	45		37		44	
Proved undeveloped	488		559	(3)	–	
Total locations	956		960		350	
Gross Operated Well Count Summary						
Spud or acquired	62		55		17	
Completed	63		50		17	
Wells to sales	76		57		18	
Capital Investments (in millions)						
Exploratory and development drilling, including workovers	$ 502		$ 353		$ 111	
Acquisition and leasehold	37		59		18	
Seismic and other	4		4		1	
Capitalized interest and expense	148		131		158	

Total capital investments (4)	$ 691	$ 547	$ 288
Average completed well cost (in millions) (5) (6)	$ 9.2	$ 7.4	$ 5.4
Average lateral length (feet) (5) (6)	7,267	7,451	5,275

(1) Our undeveloped acreage position as of December 31, 2018 had an average royalty interest of 14%.

(2) Approximately 240 Bcfe, 179 Bcfe and 148 Bcfe for the years ended December 31, 2018, 2017 and 2016, respectively, were produced from the Marcellus Shale formation.

(3) Our proved undeveloped reserve locations increased significantly in 2017, as compared to 2016, primarily through our successful drilling program in less developed areas and improved realized commodity pricing.

(4) Excludes $60 million and $37 million for the years ended December 31, 2018 and 2017, respectively, related to our water infrastructure project.

(5) Includes only wells drilled by the Company.

(6) Average completed well cost and average lateral length for the years ended December 31, 2018, 2017 and 2016 include Marcellus wells only and exclude three Upper Devonian wells in 2018 and one Utica well in 2017 and 2016.

For 2018 as compared to 2017:

· Our average completed well cost increased primarily due to increased completion intensity and larger facilities associated with our liquid-rich wells. The higher well costs are offset by higher liquid production and revenues. In 2018, our NGL and oil production increased by 38% and 46%, respectively, as compared to prior year.

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Our ability to bring our Southwest Appalachia production to market will depend on a number of factors including the construction of and/or the availability of capacity on gathering systems and pipelines that we do not own. We refer you to "Midstream" within Item 1 of Part I of this Annual Report for a discussion of our gathering and transportation arrangements for Southwest Appalachia production.

Fayetteville Shale

On August 30, 2018, we entered into an agreement to effect the Fayetteville Shale sale for $1,865 million, subject to customary adjustments. In early December 2018, we completed the Fayetteville Shale sale, resulting in net proceeds of $1,650 million, following adjustments due primarily to the net cash flows from the economic effective date of July 1, 2018, to the closing date.

Production in the Fayetteville Shale totaled 243 Bcf for the year ended December 31, 2018, which represented 26% of our total 2018 net production. In 2018, we invested $33 million in the Fayetteville Shale.

Other

Excluding 2,518,519 acres in New Brunswick, Canada, which have been subject to a government-imposed drilling moratorium since 2015, we held 153,159 net undeveloped acres for the potential development of new resources as of December 31, 2018. This compares to 369,236 net undeveloped acres held at year-end 2017 and 492,389 net undeveloped acres held at year-end 2016, excluding the New Brunswick acreage.

We limited our activities in areas beyond our assets in the Appalachian Basin and the Fayetteville Shale during 2018, 2017 and 2016 as a result of the commodity price environment as we focused our capital allocation on these more economically competitive plays. There can be no assurance that any prospects outside of our development plays will result in viable projects or that we will not abandon our initial investments.

New Brunswick, Canada. We currently hold exclusive licenses to search and conduct an exploration program covering 2,518,519 net acres in New Brunswick. In 2015, the provincial government in New Brunswick imposed a moratorium on hydraulic fracturing until it is satisfied with a list of conditions. In response to this moratorium, the Company requested and was granted an extension of its licenses to March 2021. In May 2016, the provincial government announced that the moratorium would continue indefinitely. Unless and until the moratorium is lifted, we will not be able to develop these assets. Given this development, we recognized an impairment of $39 million, net of tax, associated with our investment in New Brunswick in 2016.

Acquisitions and Divestitures

On August 30, 2018, we entered into an agreement to effect the Fayetteville Shale sale for $1,865 million, subject to customary adjustments. In early December 2018, we completed the Fayetteville Shale sale, receiving $1,650 million in net proceeds after adjustments to the purchase price of $215 million primarily due to the net cash flows from the economic effective date of July 1, 2018 to the closing date.

In September 2016, we sold approximately 55,000 net acres in West Virginia for approximately $401 million. As of December 2015, these assets included approximately 11 Bcfe of proved reserves.

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Capital Investments

	For the years ended December 31,		
(in millions)	2018	2017	2016
E&P Capital Investments by Type			
Exploratory and development drilling, including workovers	$ 895	$ 878	$ 358
Acquisition and leasehold	51	86	23
Seismic expenditures	4	7	1
Water infrastructure project	60	37	–
Drilling rigs, sand facility, and other	15	28	2
Capitalized interest and other expenses	206	212	239