

CREDIT OPINION

29 July 2019

Update

✓ Rate this Research

RATINGS

Ecopetrol S.A.

Domicile	Bogota, Distrito Capital, Colombia
Long Term Rating	Baa3
Type	LT Issuer Rating - Dom Curr
Outlook	Stable

Please see the [ratings section](#) at the end of this report for more information. The ratings and outlook shown reflect information as of the publication date.

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Ecopetrol S.A.

Annual update to credit analysis

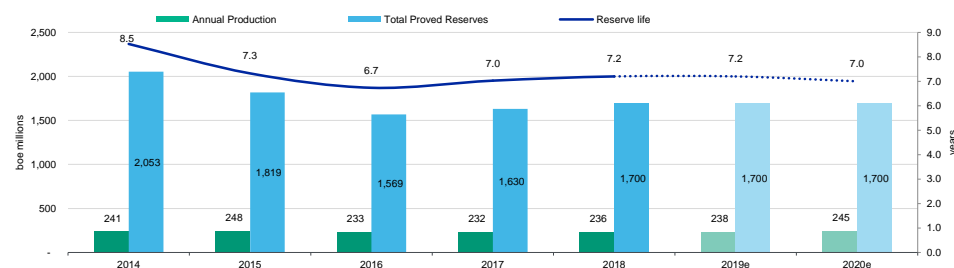
Summary

[Ecopetrol S.A.](#)'s (Ecopetrol) Baa3 ratings and ba1 Baseline Credit Assessment (BCA) reflect the company's status as Colombia's leading oil and gas producer, accounting for about two-thirds of the country's production and 100% of the supply of oil products. The ratings and the BCA also take into consideration Ecopetrol's solid and relatively stable cash flow from its midstream subsidiary Cenit S.A.S., which includes [Oleoducto Central S.A.](#) (Ocensa, Baa3 stable). Furthermore, we assume high probability of support from the [Government of Colombia](#) (Baa2 stable) and a moderate default dependence between the two entities. This assessment results in a one-notch uplift to Ecopetrol's senior unsecured rating to Baa3 from its ba1 BCA, which reflects the company's intrinsic credit risk, without support considerations.

Exhibit 1

Ecopetrol will be able to maintain current reserve life at around seven years through a solid reserve replacement strategy

Production and reserve life evolution



Conversion rate of 6,000 cubic feet = 1 barrel of oil equivalent.

Sources: Ecopetrol, Moody's Investors Service (estimates)

Credit strengths

- » Leading oil and gas producer, accounting for about two-thirds of Colombia's production; only provider for refined products in the country
- » Improving operating and capital efficiency
- » Portfolio of valuable assets that can be relatively easily monetized, including Ocesa
- » Assumption of high support from the Colombian government

Credit challenges

- » Still-high exploration and production (E&P) operating costs, although in line with regional peers
- » Solid reserve replacement strategy but with execution risk
- » Stagnant production

Rating outlook

The stable rating outlook is based on our view that Ecopetrol will be successful in reducing operating costs, increasing reserve replacement rate, and, at least, sustaining reserve life at current levels.

Factors that could lead to an upgrade

- » If Ecopetrol demonstrates ability to grow production and replace reserves without affecting its credit metrics
- » If its leveraged full-cycle ratio is above 1.5x, which would indicate low finding and development costs
- » If its Retained Cash Flow (RCF)/net debt is sustained at current levels

Factors that could lead to a downgrade

- » If Ecopetrol faces liquidity constraints
- » If its reserve life takes a downward trend
- » If RCF/net debt is below 20%
- » Any material adverse consequence for the company's operating or financial risk profile from the Reficar investigations
- » If there is a negative action on the Colombian government's rating or outlook, or a change in our assumptions about government support

Key indicators

Exhibit 2

Ecopetrol S.A.

US Millions	Dec-14	Dec-15	Dec-16	Dec-17	Dec-18	LTM (Mar-19)	2019-proj.	2020-proj.
Average Daily Production (MBOE / Day)	659.6	680.4	636.6	635.6	646.6	652.2	651.1	669.9
Total Proved Reserves (MMBOE)	2,053.4	1,818.8	1,569.3	1,630.3	1,700.3	1,700.3	1,700.3	1,700.3
Crude Distillation Capacity (mbbls/day)	335.0	420.0	405.0	405.0	404.8	404.8	404.8	404.8
Downstream EBIT/Total Throughput Barrels	\$1.38	\$3.26	\$0.48	\$0.79	\$0.56	(\$0.56)	\$3.25	\$3.25
EBIT / Interest Expense	10.1x	4.0x	3.3x	5.6x	8.7x	9.1x	8.3x	8.6x
RCF / Net Debt	15.2%	15.8%	23.5%	41.0%	53.7%	62.2%	47.3%	45.6%
Debt / Book Capitalization	40.5%	52.4%	54.1%	47.9%	40.8%	42.5%	36.7%	33.0%
EBIT / Avg. Book Capitalization		10.8%	10.3%	15.1%	24.2%	25.4%	19.8%	18.1%

All figures and ratios are calculated using Moody's estimates and standard adjustments. Moody's Forecasts (f) or Projections (proj.) are Moody's opinion and do not represent the views of the issuer. Periods are Financial Year-End unless indicated. LTM = Last 12 months.

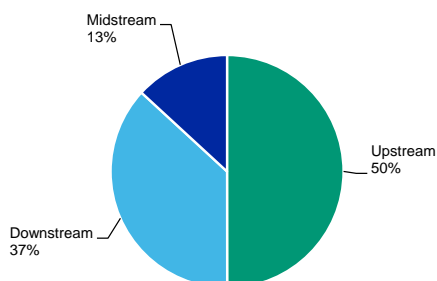
Source: Moody's Financial Metrics™

Profile

Ecopetrol S.A. (Ecopetrol) is the largest integrated oil and gas company in Colombia. The company has three business segments, namely exploration and production, refining activities, and transportation & logistics. Its production averaged 652 thousand barrels of oil equivalent per day (mboe/d), net of royalties, in the 12 months ended March 2019, when total assets amounted to \$40.2 billion. The Colombian government owns 88.5% of the company through shares held by the Ministry of Finance, and the balance is trading on the Colombian Securities Exchange since November 2007. Ecopetrol's ADRs are listed on the New York Stock Exchange since 2008; its market capitalization as of mid-July 2019 was \$38.7 billion.

Exhibit 3

Revenue breakdown by business segment

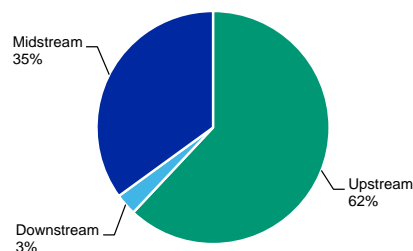


Data as of March 2019.

Source: Ecopetrol

Exhibit 4

EBITDA breakdown by business segment



Data as of March 2019.

Source: Ecopetrol

Detailed credit considerations

Leading upstream and downstream position in Colombia

Ecopetrol is the leading oil and gas producer in Colombia, accounting for over 60% of the country's oil and gas reserves and 63% and 66% of its respective current crude oil and natural gas production in December 2018. With 1.7 billion boe of proved reserves in 2018 and gross production averaging 725-730 mboe/d as per the company's expectation for 2019, Ecopetrol is a medium-sized integrated oil company relative to its larger government-owned peers in Latin America. In addition to selling its own production, Ecopetrol purchases and trades the government's royalty crude, its own natural gas royalties that are paid in cash, as well as a portion of third-party production in Colombia.

In downstream, Ecopetrol owns all of the country's 405,000 barrels per day (bpd) of crude refining capacity through four refineries. About 98% of Ecopetrol's production comes from two refineries: the inland refinery at Barrancabermeja, responsible for 250,000 bpd, and Reficar at Cartagena, which has a 150,000 bpd capacity. Ecopetrol is the largest wholesale marketer in Colombia, with virtually 100% market share, but does not engage in retail product marketing. In 2016, Ecopetrol completed the upgrade of its Reficar refinery and expanded its capacity by 65,000 bpd to a total distillation capacity of 150,000 bpd, which brought Ecopetrol's total distillation capacity to 405,000 bpd. The upgrade moved Reficar's Nelson complexity index to 10.5 from 5.1, allowing for lower feedstock cost and better product slate, which improved its overall efficiency. Ecopetrol is also Colombia's largest petrochemical producer, with 470,000 tons per annum of polypropylene capacity.

The company indirectly owns and operates directly or in joint ventures around 9,000 kilometers of crude oil and refined product pipelines, equivalent to 82% of Colombian pipeline capacity, including 100% or majority stakes in four of the largest crude pipelines, which connect field production to the refineries and to wholesale product and export terminals. These assets are a stable source of cash flow for Ecopetrol and provide a liquidity buffer as tariffs are set in US dollars.

Stagnant production and stabilizing level of reserves

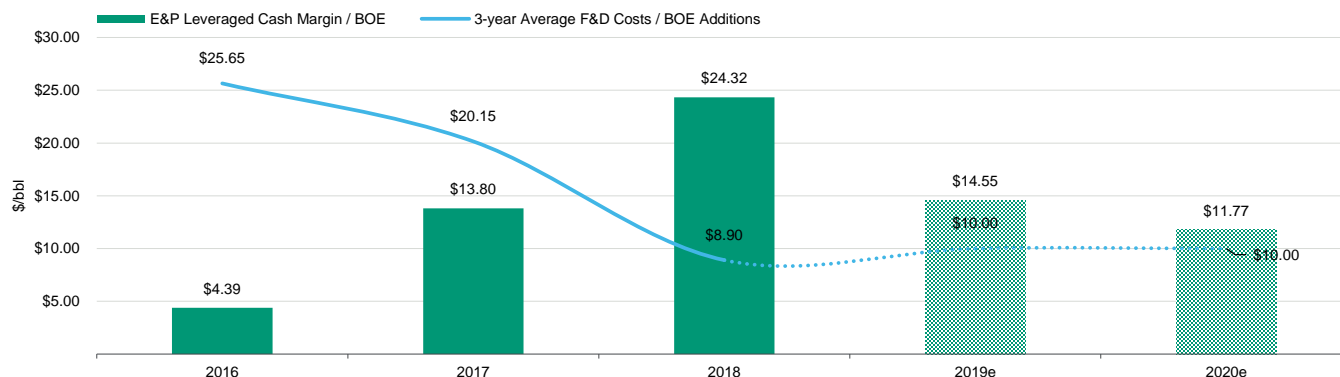
Ecopetrol's production growth rate has been low and stable in the last couple of years and we expect that trend to continue in 2019-20. To protect its liquidity, Ecopetrol cut capital spending by 17% in 2015 and by 67% in 2016 to around \$2 billion in 2017, down from \$5.4 billion spent in 2015. In 2018, Ecopetrol spent \$2.8 billion. The company's guidance for capital spending is to invest between \$3.5-4.0 billion in 2019; in 2019-21, the company expects to invest between \$12-\$15 billion, with the goal to reach over 100% reserve replacement ratio. About 82% of its total capital spending will be allocated to E&P, 8% to the midstream segment and 7% to the downstream segment.

Capital investment cuts negatively affected production growth. Production declined by 6% in 2016 to 637 mboe/d (net of royalties), despite the incorporation of the Rubiales field's 50 mboe in mid-year 2016; in 2017, production remained stable at 636 mboe/d, but slightly increased to 647 mboe/d in 2018 as a result of an increase in upstream investments during the year and select associations with international oil companies. We expect 1% and 3% production increase for 2019-20, respectively. Ecopetrol's production is spread among various regions within Colombia, which somewhat helps protect the business against guerrilla attacks because the company could adjust production in its portfolio of assets in the event of disruptions.

Since late 2016, higher oil prices, combined with better operating and capital efficiency, have helped Ecopetrol improve its credit metrics and cash flow. We believe that the company will be able to maintain its current reserve life at around seven years through a solid reserve replacement strategy and that its credit metrics will remain strong in the foreseeable future. The company plans to (1) continue entering into associations with large technically capable companies, which will help optimize its enhanced recovery processes and reduce costs; (2) invest in small to medium-sized onshore assets that can add reserves at competitive costs; (3) develop unconventional fields, especially in the Magdalena basin, in association with third parties; (4) grow inorganically outside Colombia, primarily in projects in the US, Mexico and Brazil, in joint ventures with experienced partners.

Exhibit 5

Stable oil prices, production growth and cost savings will help maintain Ecopetrol's profitability
Leveraged cash margin and F&D cost evolution



Sources: Ecopetrol, Moody's Investors Service (estimates)

Lower oil prices from 2018 will negatively affect free cash flow (FCF) generation but credit metrics will remain solid

Lower capital investments in 2016 aimed at protecting liquidity resulted in positive adjusted FCF of \$1.6 billion in the year, which favorable compared with minus \$3.9 billion in 2015. Better market fundamentals and disciplined capital investment helped Ecopetrol improve FCF generation further in 2017-18, when its reached \$2.5 billion per year.

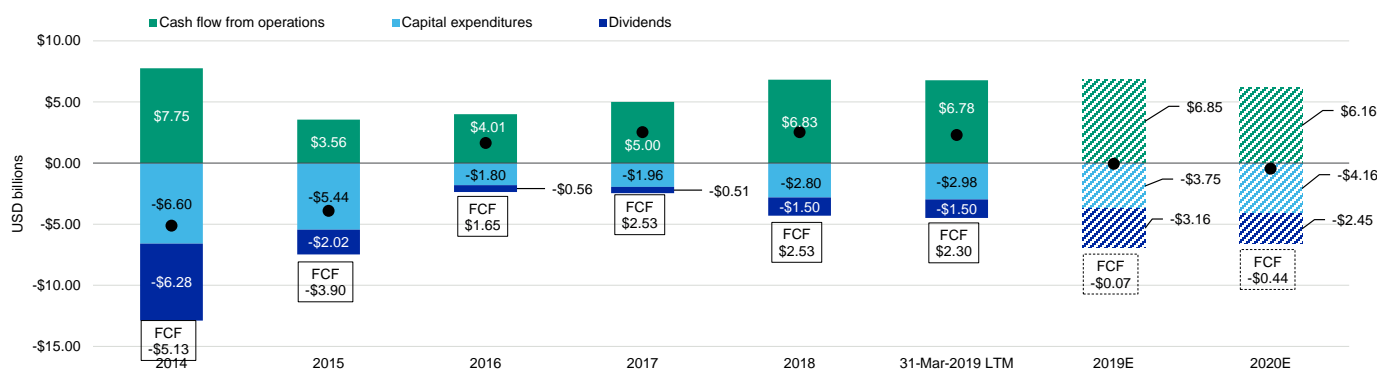
Going forward, we believe that oil and gas production will not grow by more than 1%-3% through 2020. Guerrilla attacks will still hurt Ecopetrol's production in 2019, despite tapering off in recent years, posing a persistent threat that deters new investment, and holds back profitability and production. Lower investments in downstream as the upgrade of the Reficar refinery is now completed, as well as the 25% higher refining capacity and efficiency improvements since mid-2016, will help fund investments in E&P. Favorable results from the midstream business, which benefits from high capacity utilization and adequate tariffs, will also support profitability. However, we believe that Ecopetrol will post slightly negative FCF in the next couple of years as a result of lower crude prices from 2018 levels.

During the oil prices debacle, in 2014-16, the government of Colombia released pressure from Ecopetrol to pay dividends. Now that prices have somewhat improved and liquidity is no longer a risk, dividend payout ratio will be close to 60% of net profit before impairments, as per the company's guidance, reducing the amount of cash available for capital investment in oil and gas production.

Despite negative FCF in 2019-20, we do not expect a significant deterioration in Ecopetrol's credit metrics given the strength of its balance sheet.

Exhibit 6

Cash flow evolution



All figures and ratios are calculated using Moody's estimates and standard adjustments. Moody's forecasts are Moody's opinion and do not represent the views of the issuer.

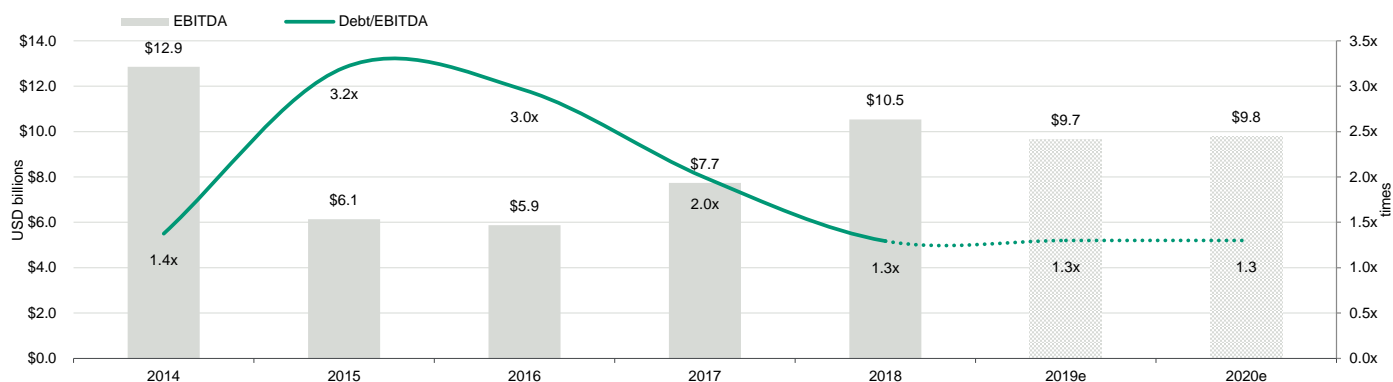
Sources: Moody's Financial Metrics™, Moody's Investors Service (estimates)

Stable debt leverage over the medium term

We believe that Ecopetrol's adjusted gross debt leverage will be at 1.3x as of year-end 2019, which compares positively with its internal maximum limit of 2.5x-3x and with those of all of its National Oil Company peers in Latin America. Our view about Ecopetrol's leverage is based on relatively stable oil prices in the \$65/barrel range in the medium term. We understand that, in its efforts to increase reserves, Ecopetrol will not increase leverage (debt/EBITDA) beyond 3.0x and should keep it close to its maximum target of 2.5x. We assume that the company will finance negative FCF with cash on hands, not with debt.

Exhibit 7

Leverage evolution



All figures and ratios are calculated using Moody's estimates and standard adjustments. Moody's forecasts are Moody's opinion and do not represent the views of the issuer.

Sources: Moody's Financial Metrics™, Moody's Investors Service (estimates)

Ongoing investigations at Reficar

Certain former executives of Ecopetrol and Reficar, as well as other individuals, are under investigations by the Colombian Office of the Comptroller General, the Attorney General's Office and the Prosecutor's Office on possible overpayments and wrongdoings regarding the upgrade and expansion of Ecopetrol's Cartagena refinery, Reficar.

In connection with the ongoing investigations, Ecopetrol has retained a US-based law firm to perform a third-party investigation into the matters set forth by the Prosecutor's Office. We will watch closely any developments arising from the investigations around cost overruns in Reficar's expansion and potential consequences on the company's liquidity and operations. However, we believe that it is unlikely that the company's access to capital markets or operations would be materially affected as a result. Since 2014, Ecopetrol has impaired about \$1.8 billion in assets. In addition, the company has been under investigation for a few years, with no material adverse findings regarding its internal controls or corporate governance practices so far.

Liquidity analysis

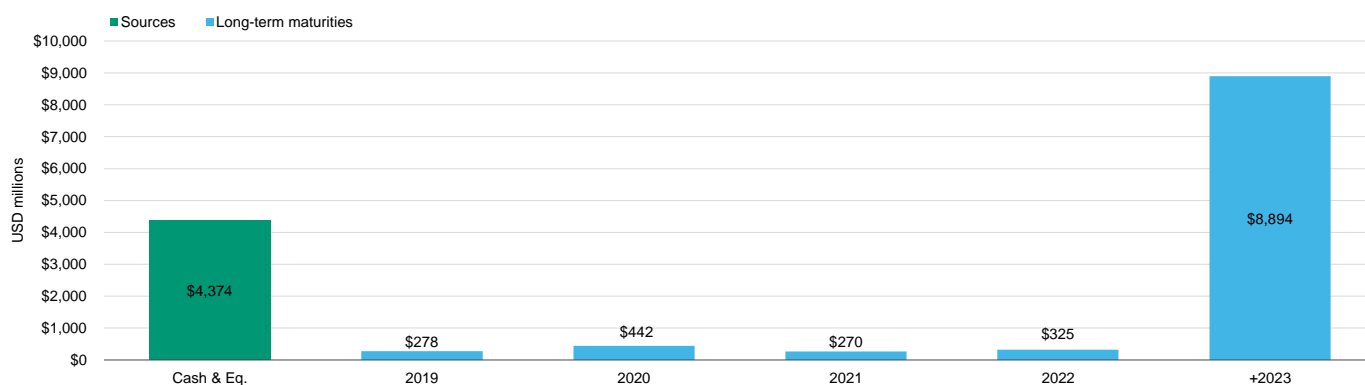
Ecopetrol's liquidity is good and refinancing risk is low. Cash & equivalents of \$4.4 billion in March 2019 and cash flow from operations of \$8.5 billion, as per our estimates for the next 18 months, compared favorably with \$278 million in debt maturing in the remainder of 2019 and \$442 million in 2020. We estimate working cash at \$1 billion, interest expense payments close to \$1.2 billion and capital investments of about \$6 billion until December 2020.

In addition, Ecopetrol's operating results for the first quarter of 2019 were positive and, based on an assumption of \$65/barrel of Brent, the company should not need external funding for the next 12-18 months. In August 2018, the company prepaid \$476 million of a syndicated loan, originally maturing in 2025, and \$155 million in US Export-Import Bank loans, originally maturing in 2023. In addition, in December 2018, the company prepaid \$1.5 billion for a 10-year international bond issued in 2009.

Ecopetrol has a 5-year \$665 million committed long-term credit facility with Scotiabank and Mizuho Bank, with a two-year grace period and semiannual interest payments at LIBOR + 125 bps. As of March 31, 2019 the facility was fully available.

Exhibit 8

Debt maturity profile



Data as of March 2019.

Source: Ecopetrol

Rating methodology and scorecard factors

The forward-looking scorecard-indicated outcome from factors 1-5 is Baa1, compared with Ecopetrol' ba1 BCA and Baa3 global scale rating. Factor 6 — Constraints related to government's policy goals, which is an indicator of the financial risk associated with government taxation and financial dependence on the company — adds two notches to the indicated rating and changes the grid outcome for the 12-18-month forward view to Baa3.

Exhibit 9

Rating factors

Methodology: Energy, Oil & Gas - Integrated	Current LTM (Mar-19)		Moody's Forward View Next 12-18 months (as of Jul-19)	
	Measure	Score	Measure	Score
Factor 1: SCALE (25%)				
a) Average Daily Production (Mboe/d)	652.2	A	669.9	A
b) Proved Reserves (Million boe)	1,700.3	Baa	1,700.3	Baa
c) Total Crude Distillation Capacity (mmbbl/day)	404.8	Ba	404.8	Ba
Factor 2: BUSINESS POSITION (20%)				
a) Business Position	Baa	Baa	Baa	Baa
Factor 3: PROFITABILITY AND RETURNS (10%)				
a) EBIT/Average Book Capitalisation	25.4%	Aaa	18.1%	A
b) Downstream EBIT/Total Throughput Barrels (\$/bbl)	(\$0.6)	Ca	\$3.3	Baa
Factor 4: FINANCIAL POLICY (20%)				
a) Financial Policy	Ba	Ba	Ba	Ba
Factor 5: LEVERAGE AND COVERAGE (25%)				
a) EBIT / Interest Expense	9.1x	A	8.6x	A
b) Retained Cash Flow/Net Debt	62.2%	Aaa	45.6%	Aa
c) Total Debt/Capital	42.5%	A	33.0%	Aa
Grid Indicated Outcome before Notch Adjustment		Baa1		Baa1
Factor 6: CONSTRAINTS RELATED TO GOVERNMENT'S POLICY GOALS (0%)				
a) Constraints Related to Government's Policy Goals		2		2
Rating Outcome:				
a) Scorecard-Indicated Outcome		Baa3		Baa3
b) Actual Rating Assigned				Baa3
Government-Related Issuer				
a) Baseline Credit Assessment				ba1
b) Government Local Currency Rating				Baa2
c) Default Dependence				Moderate
d) Support				High
e) Final Rating Outcome				Baa3

All ratios are based on 'Adjusted' financial data and incorporate Moody's Global Standard Adjustments for Non-Financial Corporations. Moody's forward view does not the view of the issuer; and unless noted in the text, does not incorporate significant acquisitions and divestitures.

Source: Moody's Financial Metrics™

Appendix I: Peer snapshot

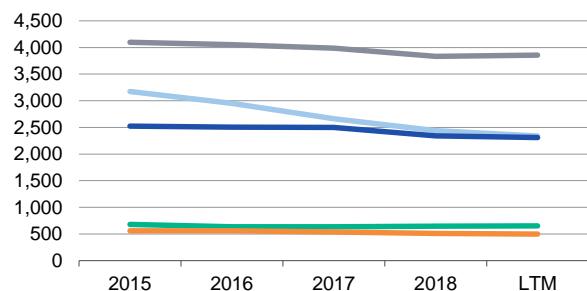
Exhibit 10

(in US millions)	Ecopetrol S.A. Baa3 stable			Petroleos Mexicanos Baa3 Negative			Petroleo Brasileiro S.A. - P Ba2 Stable			YPF Sociedad Anonima B2 Negative			Exxon Mobil Corporation Aaa Stable		
	FYE Dec-17	FYE Dec-18	LTM Mar-19	FYE Dec-17	FYE Dec-18	LTM Mar-19	FYE Dec-17	FYE Dec-18	LTM Mar-19	FYE Dec-17	FYE Dec-18	LTM Mar-19	FYE Dec-17	FYE Dec-18	LTM Mar-19
Revenue	\$18,964	\$23,255	\$23,164	\$74,069	\$87,527	\$84,854	\$88,827	\$95,584	\$93,855	\$15,318	\$16,647	\$15,715	\$237,162	\$279,332	\$275,542
Avg. Prod. (MBOE/day)	636	647	652	2,662	2,441	2,339	2,497	2,340	2,310	538	513	499	3,985	3,834	3,856
Proved Reserves (MMBOE)	1,630	1,700	1,700	7,526	6,849	6,849	9,686	9,510	9,510	900	1,052	1,052	21,221	24,293	24,293
Distil. Capacity (MB/day)	405	405	405	1,627	1,640	1,640	2,276	2,286	2,286	320	320	320	4,918	4,724	4,724
EBIT/Avg Book Capital	15.1%	24.2%	25.4%	19.3%	27.6%	23.7%	8.8%	13.3%	12.2%	3.2%	9.6%	7.8%	7.1%	9.7%	8.8%
DS EBIT/Throughput Bbls	\$ 0.79	\$ 0.56	\$ (0.56)	\$ (13.30)	\$ (14.20)	\$ (20.83)	\$ 10.59	\$ 6.44	\$ 5.44	\$ 8.62	\$ 2.76	\$ 5.57	\$ 7.68	\$ 7.79	\$ 7.81
EBIT / Int. Exp.	5.6x	8.7x	9.1x	2.1x	2.7x	2.3x	2.2x	3.3x	3.4x	0.6x	1.9x	1.6x	12.0x	15.0x	14.0x
RCF / Net Debt	41.0%	53.7%	62.2%	4.5%	2.3%	-0.4%	25.6%	30.8%	28.3%	33.7%	37.8%	38.8%	32.3%	44.2%	40.3%
Total Debt/Capital	47.9%	40.8%	42.5%	185.7%	187.6%	185.2%	64.4%	62.8%	62.1%	52.5%	44.6%	44.6%	19.3%	18.1%	18.3%

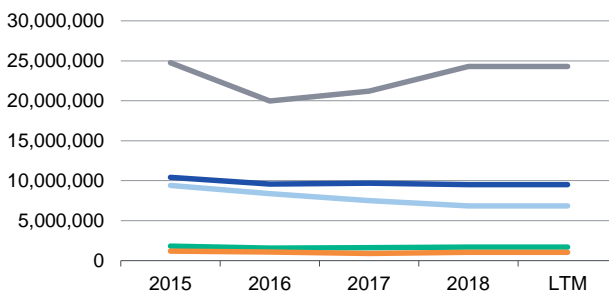
Source: Moody's Financial Metrics™. All figures & ratios calculated using Moody's estimates & standard adjustments. FYE = Financial Year-End. LTM = Last Twelve Months. RUR* = Ratings under Review, where UPG = for upgrade and DNG = for downgrade.

— Ecopetrol S.A. (Baa3) — Petroleos Mexicanos (Baa3) — Petroleo Brasileiro S.A. - PETROBRAS (Ba2) — YPF Sociedad Anonima (B2) — Exxon Mobil Corporation (Aaa)

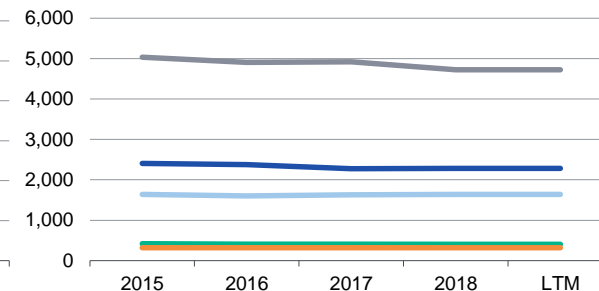
Avg. Prod. (MBOE/day)



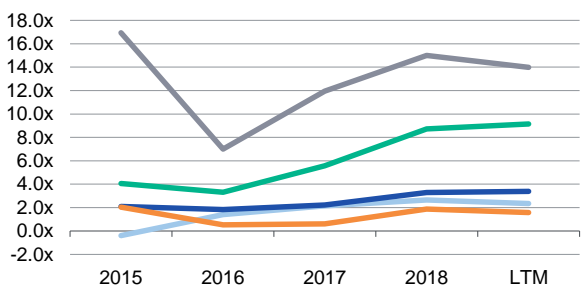
Proved Reserves (MBOE)



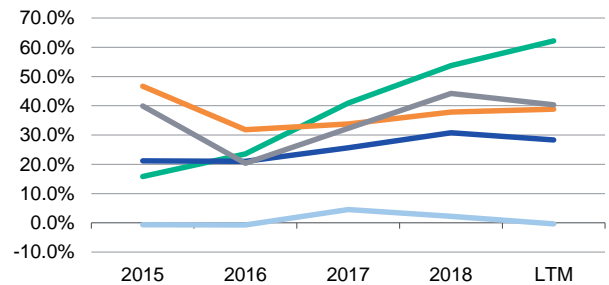
Distil. Capacity (MB/day)



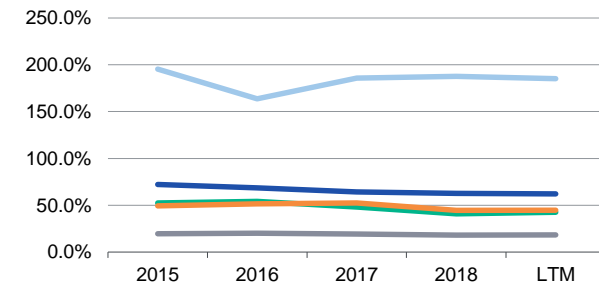
EBIT / Int. Exp.



RCF / Net Debt



Total Debt/Capital



Appendix II: Historical and projected data

Exhibit 11

Summary financial information	2014	2015	2016	2017	2018	2019-proj.	2020-proj.
EBIT	\$8.5	\$3.7	\$3.4	\$4.9	\$7.9	\$6.8	\$6.8
EBITDA	\$12.9	\$6.1	\$5.9	\$7.7	\$10.5	\$9.7	\$9.8
Funds from Operations	\$8.4	\$4.7	\$4.0	\$5.7	\$7.6	\$7.6	\$6.9
Dividends	\$6.3	\$2.0	\$0.6	\$0.5	\$1.5	\$3.2	\$2.5
Retained Cash Flow	\$2.1	\$2.7	\$3.4	\$5.2	\$6.1	\$4.5	\$4.5
Cash Flow from Operations	\$7.8	\$3.6	\$4.0	\$5.0	\$6.8	\$5.8	\$6.2
Cash payments to acquire PP&E and Intangibles	\$6.6	\$5.4	\$1.8	\$2.0	\$2.8	\$3.8	\$4.2
Free Cash Flow	(\$5.1)	(\$3.9)	\$1.6	\$2.5	\$2.5	(\$0.1)	(\$0.4)
Cash + Marketable Securities	\$3.5	\$2.2	\$4.6	\$3.7	\$3.6	\$2.4	\$1.5
Total Debt	\$14.8	\$16.8	\$17.6	\$15.2	\$12.3	\$12.3	\$12.3
Total Book Capitalization	\$36.6	\$32.0	\$32.6	\$31.7	\$30.3	\$33.6	\$37.4
E&P Operating Metrics							
Average Daily Production (MBOE / Day)	659.6	680.4	636.6	635.6	646.6	651.1	669.9
Total Proved Reserves (MMBOE)	2,053	1,819	1,569	1,630	1,700	1,700	1,700
Reserve Life (Total Proved)	8.5	7.3	6.7	7.0	7.2	7.2	7.0
E&P Revenues / BOE	\$94.08	\$47.08	\$40.95	\$54.55	\$73.87	\$61.17	\$58.19
Less: E&P Production Costs / BOE	\$47.64	\$30.36	\$25.59	\$30.10	\$39.15	\$37.00	\$37.00
Less: E&P G&A Costs / BOE	\$15.15	\$8.51	\$6.59	\$6.85	\$6.50	\$6.55	\$6.55
E&P Unleveraged Cash Margin / BOE	\$31.30	\$8.21	\$8.77	\$17.60	\$28.17	\$17.62	\$14.64
Less: E&P Cash Interest Expense / BOE	\$3.51	\$3.73	\$4.38	\$3.80	\$3.85	\$3.07	\$2.87
E&P Leveraged Cash Margin / BOE	\$27.79	\$4.48	\$4.39	\$13.80	\$24.32	\$14.55	\$11.77
Leveraged Full-Cycle Ratio	N/A	N/A	0.22x	0.71x	2.72x	1.45x	1.18x

In \$ billions. All figures and ratios are calculated using Moody's estimates and standard adjustments. Moody's forecasts are Moody's opinion and do not represent the views of the issuer.

Sources: Moody's Financial MetricsTM, Moody's Investors Service (estimates)

Ratings

Exhibit 12

Category	Moody's Rating
ECOPETROL S.A.	
Outlook	Stable
Issuer Rating -Dom Curr	Baa3
Senior Unsecured	Baa3
OLEODUCTO CENTRAL S.A.	
Outlook	Stable
Senior Unsecured	Baa3

Source: Moody's Investors Service

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