Latin American Oil & Gas Netback — Peer Comparison

September 2017

Fitch Ratings

Sector Highlights

Half-Cycle Costs Decline: Half-cycle costs for Latin American oil and gas companies, as calculated by Fitch Ratings, declined by an average of 28% between 2014 and 2016, allowing companies in the region to adapt to new lower global oil price dynamics. Cost reductions were mainly due to lifting costs reductions of approximately 34% on average during the same period, primarily as a result of currency depreciation in most countries in the region and efficiency improvements, including lower equipment and labor charges.

Half-cycle, or periodic costs, remained below market prices for both integrated and independent oil and gas producers. The gap between average liquid realization prices and half-cycle costs continued to decline in 2016, yet at a much more moderate pace than between 2014 and 2015. Average liquids realization prices during 2016 stood at approximately $44/per barrel (bbl), down from $53/bbl in 2015. Half-cycle costs declined to approximately $19/barrels of oil equivalent (boe) in 2016 from $21/boe in 2015. Fitch views these production costs as average when compared with global peers.

Vertical Integration/Downturn Protection: The vertically integrated oil and gas companies in Latin America, which are all national oil and gas companies (NOCs), benefited from this integration under the new lower hydrocarbon price environment. The higher downstream prices compared to crude oil realization prices allowed these companies to report weighted average realization prices above Fitch's estimated pretax implied full-cycle breakeven prices. This protection was best exemplified by Petrobras' ability to command robust domestic product prices. To some extent, YPF benefited from vertical integration and domestically contained crude and crude-products price dynamics. Ecopetrol and PDVSA's average liquids realization prices were close to after-tax full-cycle economics, while prices for Pemex were below after-tax prices due to the higher than average government take.

Prices Continue Pressuring Independents: Independent oil and gas companies in the region such as Frontera Energy (formerly Pacific Exploration) and GeoPark continue to report significantly lower liquids realization prices than the integrated NOCs. Independents somewhat mitigated this situation by meaningfully reducing lifting costs over the past two years. From 2014 to 2016, Frontera Energy and GeoPark reported some of the highest reductions in lifting costs; 39% and 52% respectively. The lower realization price for independents is primarily the result of different sales mix and contractual programs. The difference between the average liquids realization price for independent oil and gas players and integrated NOCs widened during 2016 to approximately 25% from approximately 18% in 2014.

After-Tax Full-Cycle at Breakeven: Fitch-calculated implied after-tax breakeven oil prices are, on average, at the same level of realization prices for most Latin American oil and gas companies and in line with current global oil prices. The exceptions are Pemex, given Mexico's onerous tax system, and Petroamazonas given its cost compensation system instead of commercial sales to third parties. The average after-tax implied breakeven price for companies in the region dropped to approximately $45/bbl in 2016 from $50/bbl in 2015 and approximately $59/bbl in 2014. This compares evenly with the current global oil price range of $45/bbl–$50/bbl over the past few months,which implies the industry can still earn a 15% return on investment .

Weak Capital Structures: Latin American oil and gas companies have a weaker capital structure than pure exploration and production (E&P) companies. Total debt/proved reserves (1P) in Latin America were in aggregate $10.30/boe, excluding PDVSA, more than double U.S. peers. The weak capital structures are the result of aggressive capex programs, large transfers to sovereign owners and to a lesser extent, downward adjustments of price-driven reserves. The weak capital structures result in standalone ratings below the assigned ratings for most NOCs. Fitch expects Latin American oil and gas companies to continue reporting, on aggregate, weak capital structures due to low investment expectations and continued debt trajectories.

Factor Comparison

The tables below summarize the midpoint of each factor range assessed in the respective Ratings Navigator for each company.

The first table, *Ratings Navigator Factor Range by Company*, highlights the relative importance each factor was accorded in the peer analysis: Lower, Moderate or Higher. The second table, *Difference Between Issuer Default Ratings and Factor Range Midpoint*, highlights in green the factors for which each company is relatively in a better or worse position than the Issuer Default Ratings (IDR). For an interactive version of the Navigator comparison tool click here.

For a factor-by-factor detail on our key observations, and why they are relevant for our ratings in this sector, see our sector-specific Navigator Companion.

Ratings Navigator Factor Range by Company

Issuer		Business profile					Financial profile		
Name	IDR/Outlook	Management and Corporate Governance	Diversification	SEC Proved Reserves	Cost of Production	Production Size	Profitability	Financial Structure	Financial Flexibility
Petroleos Mexicanos (Pemex)	BBB+/Stable	bbb	a	a+	a	aa	bb+	b-	bb+
Ecopetrol S.A.	BBB/Stable	bbb	bbb	bbb+	a	bbb	bbb-	bbb-	bbb+
Petroleo Brasileiro S.A. (Petrobras)	BB/Negative	bbb-	aa	a+	bbb	aa	bb+	b	bb
YPF S.A.	B/Stable	bb	bb	bbb-	bbb	bbb	bb+	a	bb+
Petroleos de Venezuela S.A. (PDVSA)	CC	ccc	a	a	bbb	aa	bb+	bbb	b-
Frontera Energy Corporation	B/Stable	bbb	b	bb	bb	b	b+	aa	bbb-
GeoPark Latin America Limited Agencia en Chile	B/Stable	bbb	b	bb	a	b	bb+	bbb-	bb+
Compania General de Combustibles S.A.	B/Stable	bb+	b	bb	bb	b	bb-	b	b+
Pan American Energy LLC	B+/Stable	bbb	bb-	bbb-	bbb	b	bb+	aa-	bbb

Source: Fitch.

Importance: Higher, Moderate, Lower

Difference Between Issuer Default Ratings and Factor Range Midpoint

Issuers		Business profile					Financial profile		
Name	IDR/Outlook	Management and Corporate Governance	Diversification	SEC Proved Reserves	Cost of Production	Production Size	Profitability	Financial Structure	Financial Flexibility
Petroleos Mexicanos (Pemex)	BBB+/Stable	-1	+2	+3	+2	+5	-3	-8	-3
Ecopetrol S.A.	BBB/Stable	0	0	+1	+3	0	-1	-1	+1
Petroleo Brasileiro S.A. (Petrobras)	BB/Negative	+2	+9	+7	+3	+9	+1	-3	0
YPF S.A.	B/Stable	+3	+3	+5	+6	+6	+4	+9	+4
Petroleos de Venezuela S.A. (PDVSA)	CC	0	+11	+11	+8	+14	+6	+8	+1
Frontera Energy Corporation	B/Stable	0	0	0	0	0	0	0	0
GeoPark Latin America Limited Agencia en Chile	B/Stable	+6	0	+3	+9	0	+4	+5	+4
Compania General de Combustibles S.A.	B/Stable	+4	0	+3	+3	0	+2	0	+1
Pan American Energy LLC	B+/Stable	+5	+1	+4	+5	-1	+3	+10	+5

Source: Fitch.

Worse positioned than IDR | In line with IDR | Better positioned than IDR

Peer Comparison — Business Profile

Please find in the Oil and Gas Production Companies: Ratings Navigator Companion how each subfactor is assessed and why it is important.

Issuer	Management and Corporate Governance	Diversification	SEC Proved Reserves	Cost of Production	Production Size
Petroleos Mexicanos (Pemex)	bbb	a	a+	a	aa
Ecopetrol S.A.	bbb	bbb	bbb+	a	bbb
Petroleo Brasileiro S.A. (Petrobras)	bbb-	aa	a+	bbb	aa
YPF S.A.	bb	bb	bbb-	bbb	bbb
Petroleos de Venezuela S.A. (PDVSA)	ccc	a	a	bbb	aa
Frontera Energy Corporation	bbb	b	bb	bb	b
GeoPark Latin America Limited Agencia en Chile	bbb	b	bb	a	b
Compania General de Combustibles S.A.	bb+	b	bb	bb	b
Pan American Energy LLC	bbb	bb-	bbb-	bbb	b

Source: Fitch

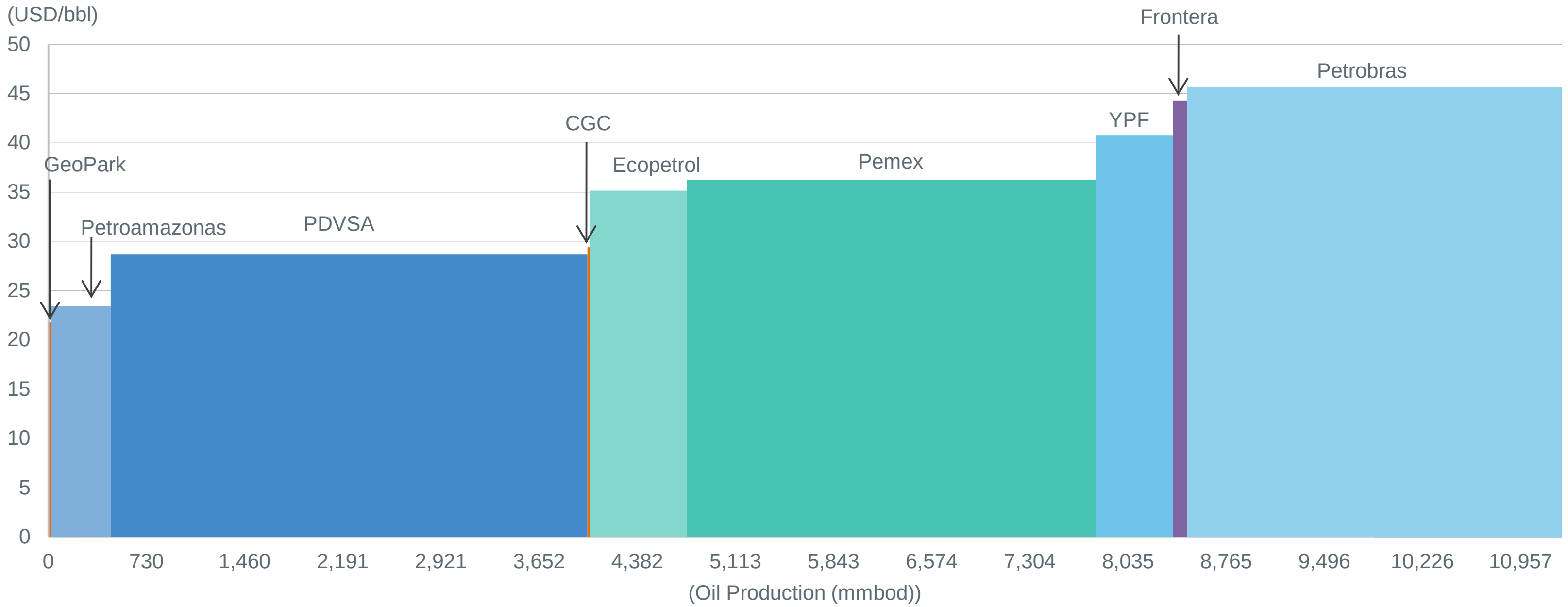
Cost of Production

The cost of production for all Latin American oil and gas companies compares favorably with the assigned ratings and Fitch views the region's cost structure as average in aggregate when compared to global peers. The cost of production factor range midpoint is, on average, five notches above the assigned rating and is not considered a constraining factor for any issuer in the region.

GeoPark ranks first in the region's full-cycle cost curve, primarily as a result of a wellhead sales policy resulting in the off-taker bearing the transportation costs and GeoPark commanding the lowest average realization price in the region. Although PDVSA reports a relatively low full-cycle cost the issuer commands a lower realization price compared to peers as a result of the discounted price of extra heavy crude and the low domestic product's sales realization price.

Pemex and Ecopetrol rank the highest in the region, in terms of cost of production, as a result of competitive lifting costs, which as of 2016, average $5.70/boe and $6.50/boe, respectively. Both companies reported pretax full-cycle costs are very competitive on a global basis. Both companies reported a pretax full-cycle production cost of approximately $35.00/bbl. Ecopetrol was able to significantly lower costs between 2014 and 2016, primarily as a result of Colombian peso depreciation and cost reduction initiatives.

Full Cycle Cost Curve — Latin American Oil and Gas Issuers



bbl – Barrel of oil. mmbod – Milions of barrels of oil per day. GeoPark – GeoPark Latin America Limited Agencia en Chile. Petroamazonas – Empresa Publica de Exploracion y Explotacion de Hidrocarburos Petroamazonas EP. PDVSA – Petroleos de Venezuela S.A. (PDVSA). GCG – Compania General de Combustibles S.A. Ecopetrol – Ecopetrol S.A. Pemex – Petroleos Mexicanos (Pemex). YPF – YPF S.A. Frontera – Frontera Energy Corporation. Petrobras – Petroleo Brasileiro S.A. (Petrobras). Note: Petroleos de Venezuela S.A. (PDVSA) reflects 2015 figures.
Source: Fitch.

Full-Cycle Cost and Required Revenue for Latin American Companies

	Petroleos Mexicanos (Pemex)			Ecopetrol S.A.			Petroleo Brasileiro S.A. (Petrobras)		
($/boe, As of Dec. 31)	2014	2015	2016	2014	2015	2016	2014	2015	2016
Standalone Rating	—	—	B–	—	—	BBB–	—	—	BB–
LT FC IDR	BBB+	BBB+	BBB+	BBB	BBB	BBB	BBB	BB	BB
Outlook	Stable	Stable	Negative	Stable	Negative	Negative	Stable	Negative	Negative
Total Production (000 boe/day)	3,538.1	3,268.9	3,041.4	755.4	760.7	717.9	2,669.0	2,787.0	2,790.0
Lifting Costs	8.2	6.7	5.7	11.3	7.9	6.5	14.6	12.0	10.6
Transportation and Others	0.2	0.1	0.1	5.1	5.1	3.3	0.0	0.0	0.0
Selling, General and Administrative	6.5	5.9	5.4	8.4	6.7	5.8	11.9	9.7	7.2
Interest Costs	2.8	3.3	4.3	2.7	3.2	4.6	7.7	6.3	7.2
Total Periodic Cost (Half-Cycle)	17.7	16.0	15.5	27.5	22.9	20.2	34.2	28.0	25.0
Average Three-Year FD&A	18.0	18.0	18.0	13.0	13.0	13.0	20.0[a]	18.0[a]	18.0[a]
15% Return on Invested Capital	2.7	2.7	2.7	2.0	2.0	2.0	3.0	2.7	2.7
Full-Cycle Costs	38.4	36.7	36.2	42.4	37.9	35.2	57.2	48.7	45.7
Gas Price	28.0	17.0	18.1	23.7	22.1	23.5	43.1	37.5	31.3
Gas Production (% of Total)	30.1	29.4	28.0	18.0	17.6	17.5	19.9	20.1	20.3
Implied Oil Price ($/bbl)	42.8	45.0	43.3	46.5	41.3	37.6	60.7	51.5	49.3
Taxes, Royalties and Other Duties	41.0	23.4	16.8	4.7	1.5	5.8	16.0	6.6	5.6
Implied After Tax Oil Price ($/bbl)	83.8	68.4	60.1	51.2	42.7	43.5	76.7	58.1	54.9
Refining Cost ($/bbl)	2.2	2.2	2.2	7.2	4.4	4.1	2.9	2.5	2.6
Average Liquids Realization Price ($/bbl)	98.3	58.1	45.3	95.1	55.5	42.8	93.4	65.9	61.5

[a]Estimated. [b]Bond issuance in 2017. Boe – Barrel of oil equivalent. LT FC IDR – Long-term Foreign Currency Issuer Default Rating. FD&A – Finding, development and acquisition costs. bbl – Barrel of oil. NR – Not rated. *Continued on the next page.*
Source: Company reports, Fitch.

Full-Cycle Cost and Required Revenue for Latin American Companies (Continued)

	YPF S.A.			Petroleos de Venezuela S.A. (PDVSA)			Frontera Energy Corporation		
($/boe, As of Dec. 31)	2014	2015	2016	2014	2015	2016	2014	2015	2016
Standalone Rating	—	—	BB	—	—	—	—	—	—
LT FC IDR	CCC	CCC	B	CCC	CCC	CC	BB+	D	B
Outlook	—	—	Stable	—	—	—	Stable	—	Stable
Total Production (000 boe/day)	560.1	576.7	577.4	3,730.0	3,776.0	3,548.0	147.0	154.5	104.0
Lifting Costs	13.8	14.1	13.2	18.1	10.7	6.2	15.4	8.5	9.0
Transportation and Others	4.2	4.4	3.8	0.0	0.0	0.0	15.1	13.9	13.8
Selling, General and Administrative	4.2	4.9	3.5	2.1	1.5a	1.5	6.3	3.7	3.9
Interest Costs	3.1	3.4	5.2	2.3	1.5	2.3	4.5	7.9	5.1
Total Periodic Cost (Half-Cycle)	25.2	26.8	25.8	22.4	13.7	10.0	41.3	34.0	31.8
Average Three-Year FD&A	13.0[a]	13.0[a]	13.0[a]	13.0[a]	13.0[a]	13.0[a]	13.0[a]	13.0[a]	13.0[a]
15% Return on Invested Capital	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Full-Cycle Costs	40.2	41.8	40.7	37.4	28.7	24.9	56.2	49.0	46.7
Gas Price	25.4	26.7	28.3	18.0	18.0	18.0	31.0	32.3	25.6
Gas Production (% of Total)	47.7	48.2	48.3	22.3	24.2	27.5	6.8	6.1	8.7
Implied Oil Price ($/bbl)	53.7	55.8	52.4	43.0	32.1	27.6	58.1	50.0	48.7
Taxes, Royalties and Other Duties	1.2	1.1	1.0	20.9	13.5	4.9	3.8	0.9	0.6
Implied After Tax Oil Price ($/bbl)	54.9	56.9	53.3	63.9	45.6	32.5	61.9	50.9	49.3
Refining Cost ($/bbl)	5.8	5.7	5.2	7.1	1.2	2.5	—	—	—
Average Liquids Realization Price ($/bbl)	87.6	83.1	70.8	70.5	37.5	32.4	89.5	49.6	41.8

[a]Estimated. [b]Bond issuance in 2017. Boe – Barrel of oil equivalent. LT FC IDR – Long-term Foreign Currency Issuer Default Rating. FD&A – Finding, development and acquisition costs. bbl – Barrel of oil. NR – Not rated. *Continued on the next page.*
Source: Company reports, Fitch.

Full-Cycle Cost and Required Revenue for Latin American Companies (Continued)

	GeoPark Latin America Limited Agencia en Chile			Compania General de Combustibles S.A.			Empresa Publica de Exploracion y Explotacion de Hidrocarburos Petroamazonas EP		
($/boe, As of Dec. 31)	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**
Standalone Rating	—	—	—	—	—	—	—	—	—
LT FC IDR	B	B	B	NR	NR	B	NR	B[b]	—
Outlook	Stable	Negative	Negative	—	—	Stable	—	—	—
Total Production (000 boe/day)	19.7	20.4	22.4	9.0	19.5	22.5	443.0	431.3	441.0
Lifting Costs	15.0	8.1	7.2	16.2	18.0	15.4	8.8	7.8	6.8
Transportation and Others	7.7	0.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0
Selling, General and Administrative	10.9	5.1	5.4	4.3	3.9	2.5	0.5	0.5	0.4
Interest Costs	4.5	4.1	3.7	0.6	4.5	4.3	0.0	0.0	0.0
Total Periodic Cost (Half-Cycle)	38.1	17.8	16.9	21.0	26.4	22.3	9.4	8.4	7.2
Average Three-Year FD&A	10.0a	5.5	4.2	4.8	6.1	6.2	18.0[a]	18.0[a]	14.0[a]
15% Return on Invested Capital	1.5	0.8	0.6	0.7	0.9	0.9	2.7	2.7	2.1
Full-Cycle Costs	49.6	24.1	21.8	26.6	33.4	29.4	30.1	29.1	23.4
Gas Price	33.0	21.7	27.0	17.1	13.5	15.0	0.0	0.0	0.0
Gas Production (% of Total)	26.0	26.6	25.1	61.2	65.5	70.0	2.2	2.0	2.1
Implied Oil Price ($/bbl)	55.4	25.0	20.0	41.5	71.1	63.0	30.8	29.7	23.9
Taxes, Royalties and Other Duties	3.1	1.8	1.4	7.7	7.0	4.9	0.0	0.0	0.0
Implied After Tax Oil Price ($/bbl)	58.5	26.8	21.4	49.2	78.1	67.9	30.8	29.7	23.9
Refining Cost ($/bbl)	—	—	—	—	—	—	—	—	—
Average Liquids Realization Price ($/bbl)	77.5	26.0	26.0	59.9	79.6	53.9	8.6	7.7	6.7

[a]Estimated. [b]Bond issuance in 2017. Boe – Barrel of oil equivalent. LT FC IDR – Long-term Foreign Currency Issuer Default Rating. FD&A – Finding, development and acquisition costs. bbl – Barrel of oil. NR – Not rated.
Source: Company reports, Fitch.

Management and Corporate Governance — Linked with Government

For all Latin American NOCs, management and corporate governance is given high importance, resulting from the importance linkage with the respective governments holds for ratings. The ratings of Pemex, Ecopetrol, Petrobras, YPF and PDVSA are at the same level as the respective sovereign given the strategic importance these issuers hold for the countries where they operate and the legal ties resulting from government ownership and control. In most cases, Latin American oil and gas companies supply almost all of the liquid fuels consumed in the country, as is the case in Mexico, Venezuela and Colombia. Petrobras has a significant market share in the supply of liquids and was, until recently, the sole supplier to Brazil given the previous pricing strategy.

The importance of company linkage with the government outweighs a weaker financial profile with respect to the assigned ratings. Fitch assesses the standalone credit quality of Pemex at 'B–', Petrobras at 'BB–' and Ecopetrol at 'BBB–' to be lower than the assigned rating. YPF's standalone credit quality is commensurate with a 'BB' rating and the assigned IDR is constrained by Argentina's Sovereign Rating.

Financial Profile — Weak Capital Structures

Almost all oil and gas companies in Latin American have relatively weak capital structures when compared with pure E&P companies elsewhere. This report compares total debt/1P as a measure of capital structure. This is done in order to partially offset the effects oil price volatility has on Fitch's typical cash flow measures for capital structure, such as total debt/EBITDA and total debt/FFO. While this partially mitigates the effects of oil price fluctuations, it does not fully isolate it given reserves can be revised from time to time due to movements in hydrocarbon prices.

While the average total debt/1P for Latin American rated oil and gas companies was on aggregate $10.30/boe as of 2016, U.S. peers was less than half. Weak capital structures are the result of aggressive capex programs during the years prior to the recent cutback in capex due to the decline in international oil prices. Relatively weaker capital structures are a more relevant issue for the ratings of independent oil and gas exploration companies than for integrated NOCs. The ratings most severely affected by the decline in oil prices are Frontera and to a lesser extent GeoPark.

Reserves and Leverage

	Petroleos Mexicanos (Pemex)			Ecopetrol S.A.			Petroleo Brasileiro S.A. (Petrobras)		
(USD Mil., As of Dec. 31)	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**
Standalone Rating	—	—	B–	—	—	BBB–	—	—	BB–
LT FC IDR	BBB+	BBB+	BBB+	BBB	BBB	BBB	BBB	BB	BB
Outlook	Stable	Stable	Negative	Stable	Negative	Negative	Stable	Negative	Negative
1P (mmboe)	12,380.2	9,412.0	8,563.0	2,084.0	1,849.0	1,598.0	13,140.0	10,516.0	10,553.0
PD (mmboe)	8,437.5	6,727.0	4,886.0	1,618.0	1,470.0	1,329.0	8,367.0	5,161.7	9,672.0
PD as % of 1P	68.2	71.5	57.1	77.6	79.5	83.2	63.7	49.1	91.7
Estimated Reserves Life (Years)	9.6	7.9	7.7	8.4	7.4	6.8	13.5	10.3	10.4
Refining Capacity (mmboe)	1,690.0	1,690.0	1,602.0	335.0	420.0	405.0	2,000.0	2,176.0	2,176.0
Total Debt	77,676.9	86,791.7	95,972.0	14,900.6	16,899.1	17,244.0	132,158.0	126,216.0	118,370.0
Total Debt/1P (USD/boe)	6.3	9.2	11.2	7.1	9.1	10.8	10.1	12.0	11.2
Total Debt/PD (USD/boe)	9.2	12.9	19.6	9.2	11.5	13.0	15.8	24.5	12.2
LTM EBITDA	57,198.0	25,856.0	19,236.0	12,862.5	6,016.7	5,296.9	22,883.0	22,760.0	24,173.0
Total Debt to EBITDA (x)	1.4	3.4	5.0	1.2	2.8	3.3	5.8	5.5	4.9

[a]Estimated. [b]Bond issuance in 2017. LT FC IDR – Long-term Foreign Currency Issuer Default Rating. 1P – Proven reserves. PD – Proved, developed reserves. mmboe – Millions of barrels of oil equivalent. Boe – Barrel of oil equivalent. NR – Not rated. N.A. – Not applicable. Note: Frontera Energy Corporation's estimated reserves life excludes the Pirir Rubiales Field production.
Continued on the next page.
Source: Company Reports, Fitch.

Reserves and Leverage (Continued)

	YPF S.A.			Petroleos de Venezuela S.A. (PDVSA)			Frontera Energy Corporation		
(USD Mil., As of Dec. 31)	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**
Standalone Rating	—	—	BB	—	—	—	—	—	—
LT FC IDR	CCC	CCC	B	CCC	CCC	CC	BB+	D	B
Outlook	—	—	Stable	—	—	—	Stable	—	Stable
1P (mmboe)	1,212.0	1,226.0	1,113.0	334,154.0	335,593.0	337,114.1	315.0	198.0	117.0
PD (mmboe)	909.0	895.0	815.0	19,431.0	19,715.0	19,710.8	176.8	117.0	53.0
PD as % of 1P	75.0	73.0	73.2	5.8	5.8	5.8	56.1	59.1	45.3
Estimated Reserves Life (Years)	5.9	5.8	5.3	245.4	243.5	260.3	9.7	5.5	6.6
Refining Capacity (mmboe)	319.5	320.0	320.0	2,822.0	2,730.0	2,482.0	N.A.	N.A.	N.A.
Total Debt	5,793.8	8,072.6	9,707.2	45,736.0	43,716.0	41,076.0	4,704.7	5,414.0	272.9
Total Debt/1P (USD/boe)	4.8	6.6	8.7	0.1	0.1	0.1	14.9	27.3	2.3
Total Debt/PD (USD/boe)	6.4	9.0	11.9	2.4	2.2	2.1	26.6	46.3	5.1
LTM EBITDA	19,236.2	5,152.7	4,820.2	14,989.0	13.0	9,314.0	2,484.0	1,244.0	339.5
Total Debt to EBITDA (x)	0.3	1.6	2.0	3.1	3,362.8	4.4	1.9	4.4	0.8

[a]Estimated. [b]Issuance in 2017. LT FC IDR – Long-term Foreign Currency Issuer Default Rating. 1P – Proven reserves. PD – Proved, developed reserves. mmboe – Millions of barrels of oil equivalent. Boe – Barrel of oil equivalent. NR – Not rated. N.A. – Not applicable. Note: Frontera Energy Corporation's estimated reserves life excludes the Pirir Rubiales Field production.
Continued on the next page.
Source: Company Reports, Fitch.

Reserves and Leverage (Continued)

	GeoPark Latin America Limited Agencia en Chile			Compania General de Combustibles S.A.			Empresa Publica de Exploracion y Explotacion de Hidrocarburos Petroamazonas EP		
(USD Mil., As of Dec. 31)	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**	**2014**	**2015**	**2016**
Standalone Rating	—	—	—	—	—	—	—	—	—
LT FC IDR	B	B	B	NR	NR	B	NR	B[b]	B[b]
Outlook	Stable	Negative	Negative	—	—	Stable	—	—	—
1P (mmboe)	43.7	71.1	78.3	26.2	54.9	52.2	2,040.0	1,894.0	2,429.0
PD (mmboe)	14.0	17.3	19.5	12.6[a]	26.3	25.1[a]	1,435.0	1,432.0	1,534.0
PD as % of 1P	32.0	24.3	24.9	48.0	48.0	48.0	70.3	75.6	63.2
Estimated Reserves Life (Years)	6.1	9.6	9.6	8.0	7.7	6.3	12.6	12.0	15.1
Refining Capacity (mmboe)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Total Debt	369.6	378.7	358.7	5.0	204.7	384.3	76.6	57.5	38.3
Total Debt/1P (USD/boe)	8.5	5.3	4.6	0.2	3.7	7.4	0.0	0.0	0.0
Total Debt/PD (USD/boe)	26.4	21.9	18.4	0.4	7.8	15.3	0.1	0.0	0.0
LTM EBITDA	213.3	65.6	74.4	40.2	76.6	82.3	(1,376.8)	(1,185.7)	(4,045.9)
Total Debt to EBITDA (x)	1.7	5.8	4.8	0.1	2.7	4.7	(0.1)	(0.0)	(0.0)

[a]Estimated. [b]Bond issuance in 2017. LT FC IDR – Long-term Foreign Currency Issuer Default Rating. 1P – Proven reserves. PD – Proved, developed reserves. mmboe – Millions of barrels of oil equivalent. Boe – Barrel of oil equivalent. NR – Not rated. N.A. – Not applicable. Note: Frontera Energy Corporation's estimated reserves life excludes the Pirir Rubiales Field production.
Source: Company Reports, Fitch.

Description of Methodology

Half-Cycle Cost/bbl

Lifting costs/bbl + transportation and other costs/bbl + selling, general and administrative (SG&A) costs/bbl + interest costs/bbl.

Full-Cycle Cost/bbl

Half-cycle cost/bbl + finding, development and acquisition (FD&A) costs/bbl + 15% return on invested capital/bbl (defined as 15% times FD&A costs/bbl).

Implied Pretax Oil Price to Breakeven/bbl

Subtracting out natural gas production/revenue, breakeven price of oil for each issuer based on respective cost structures.

Implied After Tax Oil Price Needed to Breakeven/bbl

Implied pretax oil price to breakeven/bbl + taxes, royalties and other duties/bbl.

Realized Price/bbl

Weighted average of reported realized price per bbl of crude oil/liquids for each respective issuer. If reported realization prices are not available, then oil and gas revenue divided by volumes sold.

Half-Cycle and Full-Cycle Costs

The two key metrics required to analyze the short and long-term viability of E&P companies are half-cycle costs and full-cycle costs, respectively. Full-cycle costs are the costs E&P companies must incur to find, develop and produce hydrocarbons in order to sustain and/or grow production. If hydrocarbon prices are generally sustained above full-cycle costs, the industry is perceived to have an incentive to maintain and/or grow investment in the sector. If the margins for full-cycle costs, or the implied return, are substandard for extended periods, then investment is perceived to be unsustainable, thereby potentially leading to decreased capital spending, production and reserve replacement.

Half-cycle costs are used to measure the marginal cost of production plus interest for E&P companies. This excludes the capex and return on investment captured by full-cycle costs. During periods of low hydrocarbon prices, such as those witnessed during the last 18 months, E&P companies tend to retrench in order to save cash flow via operating expenditure and capex cutbacks. The half-cycle cost measures the ability of E&P companies to cover marginal costs, in this case defined as direct production costs and interest expenses, in periods of low hydrocarbon prices.

Fitch gathered the information regarding production costs from different sources and data include some estimation by Fitch, especially when calculating three-year average FD&A costs for companies that do not report. Also, SG&A costs on a bbl basis may include expenses not related to E&P activities for integrated companies. The difference in total SG&A expenses compared with those expenses related only to E&P for integrated companies is not believed to be meaningful. As a result, the numbers presented with respect to production costs may depict a marginally more conservative picture.

Rating Guidelines Comparator

Issuer	IDR/Outlook	Positive and Negative Sensitivities	Headroom
Petroleos Mexicanos (Pemex)	BBB+/Stable	[+] Although not expected in the short term, an upgrade of ratings could result from an upgrade of the sovereign coupled with strong operating and financial performance and/or a material reduction in Pemex's tax burden.	
		[−] A negative rating action could be triggered by a downgrade of the sovereign's rating, the perception of a lower degree of linkage between the company and the sovereign, and/or a substantial deterioration in credit metrics.	Low
Ecopetrol S.A.	BBB/Stable	[+] An upgrade could result from an upgrade of Colombia's ratings.	
		[−] A downgrade could occur following a downgrade of Colombia's sovereign ratings and/or Fitch's perception of weakening linkage with the sovereign.	
Petroleo Brasileiro S.A. (Petrobras)	BB/Negative	[+] Although not expected in the short to medium term, a positive rating action for Brazil could lead to a positive rating action for Petrobras.	
		[−] A negative rating action for Petrobras could result from a downgrade of the sovereign and/or the perception of a lower linkage between Petrobras and the government.	Low
YPF S.A.	B/Stable	[+] A positive rating action could occur as the result of an upgrade of the sovereign rating.	
		[−] YPF's ratings could be negatively affected by a combination of the following: a downgrade of the Republic of Argentina's ratings; a significant deterioration of credit metrics; and/or the adoption of adverse public policies affecting the company's business performance in any of its business segments.	High
Petroleos de Venezuela S.A. (PDVSA)	CC	[+] Although not expected in the short to medium term, catalysts for an upgrade include a stabilization in the company's liquidity position and improvement in the short-term debt maturity profile, or an upgrade to Venezuela's sovereign rating.	
		[−] Catalysts for a downgrade include nonpayment of financial obligations or a downgrade to Venezuela's ratings.	Low
Frontera Energy Corporation	B/Stable	[+] A sustained conservative capital structure and investment discipline; an increase in production size; and an increase in reserve size and diversification would be viewed positively.	
		[−] A deterioration of the company's capital structure and liquidity as a result of either a steeper than anticipated decrease in production or a marked increase in debt; and/or a significant reduction in the reserve replacement ratio could affect Frontera's credit quality given the current proved reserve life of approximately nine years.	Average
GeoPark Latin America Limited Agencia en Chile	B/Stable	[+] Net production rising consistently to 35,000 to 40,000 boe/d on a sustained basis; reserve life is unaffected as a result of production increase at approximately 10 years; the company's ability to maintain a conservative financial profile with gross leverage of 2.0x or below; and diversification of operations and improvements in realized oil and gas differentials would be viewed positively.	
		[−] An inability to maintain current operating costs and increase production levels; a persistently weak oil and gas pricing environment impairing the longer-term value of the reserve base; and/or a reduction in reserves due to a change in the Peruvian concession would be viewed negatively.	Average
Compania General de Combustibles S.A.	B/Stable	[+] A positive rating action in the short term is considered unlikely. Drivers for a positive rating action or outlook in the medium term include an upgrade of Argentina's Issuer Default Ratings, increased diversification of the company's production profile, and consistent growth in both production and reserves while maintaining adequate financial metrics.	
		[−] Argentina's economic deterioration and the company's inability to maintain an adequate liquidity position or access to foreign currency; a significant deterioration of credit metrics; sustained declines in hydrocarbon reserves/production levels or failure to further develop new fields would be viewed negatively.	Low
Pan American Energy LLC	B+/Stable	[+] An upgrade of Argentina's ratings and country ceilings may result in a positive rating action.	
		[−] Argentina's credit quality deterioration; a material increase in the government's interference in the sector; total debt/EBITDA greater than 3.5x and EBITDA/interest coverage below 4.5x could be viewed negatively.	High

boe/d – Barrels of oil equivalent per day.
Source: Fitch.

Peer Comparison Tables

(x, As of Dec. 31)		FFO-Adjusted Leverage			Total Debt with Equity Credit/ Operating EBITDA		
Company Name	**LT FC IDR**	**2016**	**2015**	**2014**	**2016**	**2015**	**2014**
Ecopetrol S.A.	BBB	3.1	3.8	5.7	3.2	3.1	1.4
Petroleos Mexicanos (Pemex)	BBB+	64.4	(504.4)	10.6	5.5	5.1	1.3
Petroleo Brasileiro S.A. (Petrobras)	BB	4.4	4.7	4.9	4.8	5.5	5.7
Compania General de Combustibles S.A.	B	9.3	3.3	0.2	5.0	3.7	0.1
Empresa Publica de Exploracion y Explotacion de Hidrocarburos Petroamazonas EP	B[a]	0.0	0.1	0.0	(0.0)	0.1	0.0
Frontera Energy Corporation	B	1.0	6.0	2.3	0.8	5.3	1.9
Geopark Latin America Limited Agencia en Chile	B	4.6	11.6	1.8	5.3	5.8	1.7
YPF S.A.	B	2.4	2.5	1.2	2.6	2.3	1.2
Petroleos de Venezuela S.A. (PDVSA)	CC	1.9	2.0	7.8	4.3	98.2	3.1

(x, As of Dec. 31)		Total Net Debt/(CFFO – Capex)			Total Net Debt with Equity Credit/ Operating EBITDA		
Company Name	**LT FC IDR**	**2016**	**2015**	**2014**	**2016**	**2015**	**2014**
Ecopetrol S.A.	BBB	5.7	(14.1)	14.1	2.3	2.8	1.0
Petroleos Mexicanos (Pemex)	BBB+	(6.4)	(6.3)	(7.4)	5.1	4.7	1.2
Petroleo Brasileiro S.A. (Petrobras)	BB	18.7	(56.2)	(7.7)	3.9	4.4	4.6
Compania General de Combustibles S.A.	B	(4.0)	(2.3)	1.6	3.2	3.3	(0.2)
Empresa Publica de Exploracion y Explotacion de Hidrocarburos Petroamazonas EP	B[a]	(0.1)	(0.0)	0.1	0.0	0.0	0.0
Frontera Energy Corporation	B	0.4	(11.8)	(11.9)	(0.3)	4.9	1.8
Geopark Latin America Limited Agencia en Chile	B	24.4	(6.1)	(7.6)	4.2	4.5	1.1
YPF S.A.	B	(4.4)	(3.1)	(4.1)	2.3	2.0	1.0
Petroleos de Venezuela S.A. (PDVSA)	CC	3.2	(15.2)	(3.7)	3.5	85.2	2.5

[a]Bond issuance in 2017. LT FC IDR – Long-term Foreign Currency Issuer Default Rating. NR – Not Rated. CFFO – Cash flow from operations. *Continued on the next page.*
Source: Company reports, Fitch.

Peer Comparison Tables (Continued)

(x, As of Dec. 31)		Operating EBITDA/Interest Paid			FFO Fixed-Charge Coverage		
Company Name	**LT FC IDR**	**2016**	**2015**	**2014**	**2016**	**2015**	**2014**
Ecopetrol S.A.	BBB	6.6	9.6	34.1	6.7	7.9	8.2
Petroleos Mexicanos (Pemex)	BBB+	4.0	4.7	18.8	0.3	(0.0)	2.3
Petroleo Brasileiro S.A. (Petrobras)	BB	3.4	3.7	3.4	2.2	2.3	2.4
Compania General de Combustibles S.A.	B	2.3	2.4	21.8	1.2	2.7	16.1
Empresa Publica de Exploracion y Explotacion de Hidrocarburos Petroamazonas EP	B[a]	(1,144.0)	190.9	486.2	402.3	203.3	483.4
Frontera Energy Corporation	B	2.7	3.6	9.2	2.2	3.2	7.7
Geopark Latin America Limited Agencia en Chile	B	2.7	2.5	8.7	3.1	1.3	8.3
YPF S.A.	B	3.6	6.7	19.6	4.0	6.1	19.1
Petroleos de Venezuela S.A. (PDVSA)	CC	8.9	0.2	3.7	18.3	8.8	1.4

		Operating EBITDA Margin (%)			FFO Margin (%)		
Company Name	**LT FC IDR**	**2016**	**2015**	**2014**	**2016**	**2015**	**2014**
Ecopetrol S.A.	BBB	33.9	31.7	37.3	30.6	23.9	21.9
Petroleos Mexicanos (Pemex)	BBB+	33.3	25.3	56.0	(4.1)	(4.3)	4.0
Petroleo Brasileiro S.A. (Petrobras)	BB	29.7	23.4	15.9	25.6	21.8	16.8
Compania General de Combustibles S.A.	B	35.1	28.3	34.3	4.1	20.9	24.6
Empresa Publica de Exploracion y Explotacion de Hidrocarburos Petroamazonas EP	B[a]	(209.5)	35.1	71.4	73.6	37.2	70.9
Frontera Energy Corporation	B	24.0	36.3	50.2	11.0	22.8	36.5
Geopark Latin America Limited Agencia en Chile	B	38.6	31.3	49.8	28.5	3.8	42.4
YPF S.A.	B	27.7	28.8	29.2	23.4	23.4	27.9
Petroleos de Venezuela S.A. (PDVSA)	CC	22.2	0.0	14.2	51.0	37.6	23.7

[a]Bond issuance in 2017. LT FC IDR – Long-term Foreign Currency Issuer Default Rating. NR – Not Rated. CFFO – Cash flow from operations.
Source: Company reports, Fitch.

Related Research

Corporate Rating Criteria (August 2017)
Full-Cycle Costs Drop for North American E&Ps (Improvement Slows but Efficiency Gains Expected to Continue) (May 2017)
Latin American Oil & Gas Netback Profile (Cash Costs at or Below Market Prices) (January 2016)
Oil and Gas Production Companies: Ratings Navigator Companion

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