
As filed with the Securities and Exchange Commission on April 19, 2018

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

FORM 20-F
ANNUAL REPORT PURSUANT TO
SECTION 13 OR 15(d) OF
THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 2017

Commission file number: 001-34175

ECOPETROL S.A.
(Exact name of Registrant as specified in its charter)

N/A
(Translation of Registrant's name into English)

REPUBLIC OF COLOMBIA
(Jurisdiction of incorporation or organization)

Carrera 13 No. 36 – 24
BOGOTA – COLOMBIA
(Address of principal executive offices)
Tel. (571) 234 4000

Andrés Felipe Sánchez

Investor Relations Officer
investors@ecopetrol.com.co
Tel. (571) 234 5190
Carrera 13 N.36-24 Piso 5
Bogota, Colombia
(Name, Telephone, E-Mail and/or Facsimile number and Address of Company Contact Person)

Securities registered or to be registered pursuant to Section 12(b) of the Act.

Title of each class

American Depositary Shares (as evidenced by American Depositary Receipts),
each representing 20 common shares par value COP\$609 per share
Ecopetrol common shares par value COP\$609 per share

Name of each exchange on which registered:

New York Stock Exchange

New York Stock Exchange (for listing purposes only)

Title of each class**Name of each exchange on which registered:**

7.625% Notes due 2019
 5.875% Notes due 2023
 4.125% Notes due 2025
 5.375% Notes due 2026
 7.375% Notes due 2043
 5.875% Notes due 2045

New York Stock Exchange
 New York Stock Exchange
 New York Stock Exchange
 New York Stock Exchange
 New York Stock Exchange
 New York Stock Exchange

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

Securities for which there is a reporting obligation pursuant to Section 15(d) of the Act: None

Indicate the number of outstanding shares of each of the issuer's classes of capital or common stock as of the close of the period covered by the annual report.

41,116,694,690 Ecopetrol common shares, par value COP\$609 per share

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Yes No

If this report is an annual or transition report, indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934.

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 and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted 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 and post such files).

N/A

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

Large accelerated filer Accelerated filer Non-accelerated filer Emerging growth company

If an emerging growth company that prepares its financial statements in accordance with U.S. GAAP, 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.

[†] The term "new or revised financial accounting standard" refers to any update issued by the Financial Accounting Standards Board to its Accounting Standards Codification after April 5, 2012.

Indicate by check mark which basis of accounting the registrant has used to prepare the financial statements included in this filing:

U.S. GAAP International Financial Reporting Standards as issued by the International Accounting Standards Board Other

If "Other" has been checked in response to the previous question, indicate by check mark which financial statement item the registrant has elected to follow:

Item 17 Item 18

If this is an annual report, indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

Yes No

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1. Introduction

1.1 About This Report

We file our Annual Report on Form 20-F and other information with the U.S. Securities and Exchange Commission.

We file reports, including annual reports on Form 20-F, and other information with the SEC pursuant to the rules and regulations of the SEC that apply to foreign private issuers. You may read and copy any materials filed with the SEC in the SEC's public reference room at 100 F Street, NE, Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the public reference room. Any filings we make are also available to the public over the Internet at the SEC's website at www.sec.gov and at our website at www.ecopetrol.com.co. (This URL is intended to be an inactive textual reference only. It is not intended to be an active hyperlink to our website. The information on our website, which might be accessible through a hyperlink resulting from this URL, is not and shall not be deemed to be incorporated into this annual report.)

Unless the context otherwise requires, the terms "Ecopetrol", "we", "us", "our" or the "Company" are used in this annual report to refer to Ecopetrol S.A. and its subsidiaries on a consolidated basis.

References to the Nation in this annual report relate to the Republic of Colombia ("Colombia"), our controlling shareholder. References made to the Colombian government or the Government correspond to the executive branch including the President of Colombia, the ministries and other governmental agencies responsible for regulating our business.

1.2 Forward-looking Statements

This annual report on Form 20-F contains forward-looking statements within the meaning of the safe harbor provisions of the U.S. Private Securities Litigation Reform Act of 1995. These statements are not based on historical facts and reflect our expectations for future events and results. Most facts are uncertain because of their nature. Words such as "anticipate", "believe", "could", "estimate", "expect", "should", "plan", "potential", "predicts", "prognosticate", "project", "target", "achieve" and "intend", among other similar expressions, are understood as forward-looking statements. We have made forward-looking statements that address, among other things:

- our exploration and production activities, including drilling;
- import and export activities;
- our liquidity, cash flow, and sources of funding;
- our projected and targeted capital expenditures and other cost commitments and revenues; and
- dates by which certain areas will be developed or will come on-stream.

Our forward-looking statements are not guarantees of future performance and are subject to assumptions that may prove incorrect and to risks and uncertainties that are difficult to predict. Actual results could differ materially from those expressed or forecasted in any forward-looking statements as a result of a variety of factors. These factors may include, but are not limited to, the following:

- general economic and business conditions, including crude oil and other commodity prices, refining margins and prevailing exchange rates;
- competition;
- our ability to obtain financing;

- our ability to find, acquire or gain access to additional reserves and our ability to develop existing reserves;
- uncertainties inherent in making estimates of our reserves;
- significant political, economic and social developments in Colombia and other countries where we do business;
- natural disasters, military operations, terrorist acts, wars or embargoes;
- regulatory developments, including regulations related to climate change;
- receipt of government approvals and licenses;
- technical difficulties; and
- other factors discussed in Section 5.1 of this document as “Risk Factors.”

All forward-looking statements attributed to us are qualified in their entirety by this cautionary statement. We undertake no obligation to publicly update or revise any forward-looking statements, whether as a result of new information or for any other reason. Accordingly, readers should not place undue reliance on the forward-looking statements contained in this annual report.

1.3 *Selected Financial and Operating Data*

The following table sets forth, for the periods and at the dates indicated, our selected historical financial and certain key operating data. The selected financial data has been derived from and should be read in conjunction with, and is qualified in its entirety by reference to, our consolidated audited financial statements, presented in Colombian Pesos.

Table 1 – Selected Operating Data

Operating Information	2017	2016	2015	2014	2013
Oil and gas production (mboed)	715.1	717.9	760.7	755.4	788.2
Proved oil and gas reserves (Mmboe) ⁽¹⁾	1,659	1,598	1,849	2,084	1,972
Exploratory Wells ⁽²⁾	20	6	5	28	22
Refinery Through-put (bpd) ⁽³⁾	347,483	332,751	234,861	240,484	283,362
IP Reserves replacement ratio	126%	(7)%	6%	146%	139%

(1) For 2017, 2016, 2015 and 2014, proved reserves include natural gas royalties. Data for 2013 excludes natural gas royalties. Data for all years excludes crude oil royalties.

(2) Gross exploratory wells.

(3) Refinery through-put includes Barrancabermeja, Reficar, Apiay and Orito. Reficar operations were shut down in March 2014 for the expansion and modernization plan. The new crude unit began start-up process in October 2015. During 2016, Reficar was under stabilization, and commenced full operation in July 2016. The refinery’s global performance testing was successfully completed in the fourth quarter of 2017, resulting in the start of the refinery’s optimization and continuous operation stage.

Financial Information

International Financial Reporting Standards (“IFRS”)

(Expressed in millions of Colombian Pesos, except for the net income per share and net operating income per share, which are expressed in Colombian Pesos)

Table 2 – Selected Financial Data

Financial Information	2017	2016	2015	2014
Revenue	55,954,228	48,485,561	52,347,271	65,971,888
Operating income	16,171,855	8,904,548	2,131,165	14,449,027
Net income (loss) attributable to Ecopetrol’s shareholders	7,178,539	2,447,881	(7,193,859)	5,046,517
Net operating income per share	393	217	51.8	351.4
Weighted average number of shares outstanding	41,116,694,690	41,116,694,690	41,116,694,690	41,116,698,456
Earnings(loss) per share (basic and diluted)	175	59.5	(175.0)	122.7
Total assets	117,847,412	118,958,977	123,588,190	110,923,851
Total equity	48,215,699	43,560,501	43,100,963	48,534,228
Subscribed and paid-in capital	25,040,067	25,040,067	25,040,068	10,279,175
Number of common shares	41,116,694,690	41,116,694,690	41,116,694,690	41,116,698,456
Dividends declared per share	89	23	-	133
Total liabilities	69,631,713	75,398,476	80,487,227	62,389,623

Our consolidated financial statements for the years ended December 31, 2014, 2015, 2016 and 2017 were prepared in accordance with IFRS as issued by IASB. References in this annual report to IFRS mean IFRS as issued by the IASB. Our date of transition to IFRS was January 1, 2014. Our consolidated financial statements for the year ended December 31, 2015 were our first set of consolidated financial statements prepared in accordance with IFRS.

IFRS differs in certain significant aspects from the current reporting standards as in effect in Colombia (“Colombian IFRS”), which is the accounting standard we use for local reporting purposes. As a result, our financial information presented under IFRS is not directly comparable to our financial information presented under Colombian IFRS. For a description of the differences between Colombian IFRS and IFRS see section *Financial Review — Summary of Differences between Internal Reporting Policies and IFRS*.

Our consolidated financial statements were consolidated line by line and all transactions and balances between subsidiaries have been eliminated. These financial statements include the financial results of all subsidiary companies controlled, directly or indirectly, by Ecopetrol S.A. See Exhibit 1 – Consolidated companies, associates and joint ventures, to our consolidated financial statements included in this annual report.

As indicated in paragraphs 9 and 18 of the International Accounting Standard 27 “Consolidated and Separated Financial Statements” we must present our financial information on a consolidated basis as if we were a single entity, combining the financial statements of Ecopetrol S.A. and its subsidiaries line by line, adding assets, liabilities, shareholder’s equity, revenues and expenses of similar nature, removing the reciprocal items among members of the Ecopetrol Group and recognizing non-controlling interest. We present our operating information on a consolidated basis.

The regulations of the SEC do not require foreign private issuers that prepare their financial statements on the basis of IFRS to reconcile such financial statements to U.S. GAAP. Accordingly, while we have in the past reconciled our consolidated financial statements prepared in accordance with Colombian Government Entity GAAP to U.S. GAAP, those reconciliations are no longer presented in our filings before the SEC. We do continue to provide the disclosure required under the U.S. Financial Accounting Standards Board (FASB) Accounting Standards Codification (ASC) Topic 932 “Extractive Activities—Oil and Gas” (which we refer to as ASC Topic 932), as this is required regardless of the basis of accounting on which we prepare our financial statements.

In this annual report, references to “US\$” or “U.S. dollars” are to United States dollars and references to “COP\$” “Colombian Peso” or “Colombian Pesos” are to Colombian Pesos, the Ecopetrol Group’s functional and presentation currency under which we prepare our consolidated financial statements. This annual report translates certain Colombian Peso amounts into U.S. dollars at specified rates solely for the convenience of the reader. Unless otherwise indicated, such Colombian Peso amounts have been translated at the rate of COP\$2,951.15 per US\$1.00, which corresponds to the *Tasa Representativa Promedio del Mercado* (TRM), or Average Representative Market Exchange Rate, for 2017. Such conversion should not be construed as a representation that the Colombian Peso amounts correspond to, or have been or could be converted into, U.S. dollars at that rate or any other rate. On April 16, 2018, the Representative Market Exchange Rate was COP\$2,705.34 per US\$1.00.

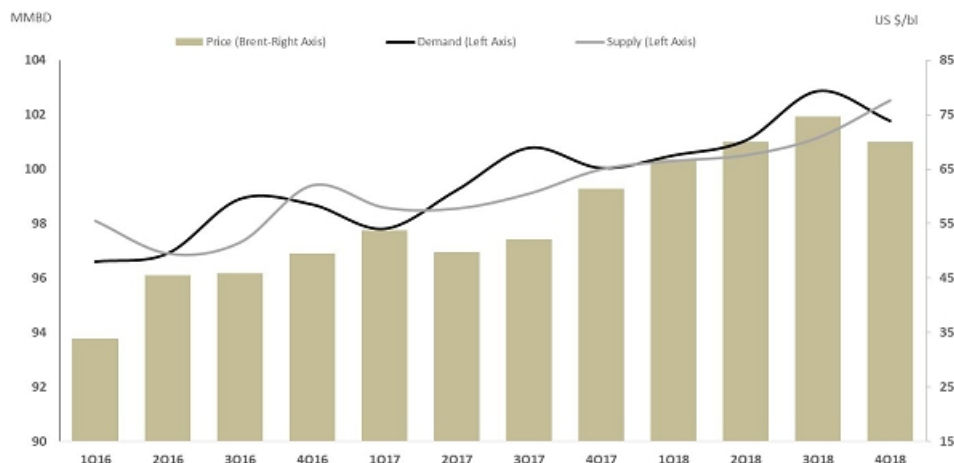
Certain figures shown in this annual report have been subject to rounding adjustments and, accordingly, certain totals may therefore not precisely equal the sum of the numbers presented. In this annual report a billion is equal to one with nine zeros.

2. Strategy and Market Overview

After experiencing the lowest price level in recent years in 2016, the ICE Brent price underwent a gradual recovery during the second half of 2017. The agreement to cut production between OPEC and some Non-OPEC producers in 2017 was the key factor that boosted the crude market towards a path of rebalancing. In addition, price levels were also supported by lower supply in the Middle East and North Africa as a result of unrest and political tensions. On the other hand, the demand for crude oil was favored by improved economic performance in emerging countries, growing import requirements from independent refiners in China and the building of petroleum reserves in Asian countries.

According to estimates of the Energy Information Administration (“EIA”), in 2017 global oil demand grew 0.89 mboepd in excess of total supply. Non-OPEC supply climbed 0.7 mboepd, primarily due to higher US production. On the other hand, OPEC, in compliance with the cut agreement, reduced its crude flow ex NGLs by 0.24 mboepd, mainly in Saudi Arabia (-0.33 mboepd) and Venezuela (-0.26 mboepd). Global demand surprised the market by increasing 1.63 mboepd, mainly due to greater demand in Non-OECD countries.

Graph 1 – Supply/Demand Balance vs ICE Brent Price Evolution



Source: S&P Global Platts, Pira World Oil Market Forecast (February 27, 2018)

Although international oil prices and global demand and supply dynamics are significant factors affecting our business and financial condition, Colombia's local economic factors have also influenced and could continue to influence our performance given that we conduct most of our business in Colombia.

The performance of Colombia's gross domestic product (GDP) is one of the main drivers of fuel consumption in Colombia. According to the National Administrative Department of Statistics (DANE for its acronym in Spanish), during 2017 Colombia's GDP grew 1.8% in real terms, as compared to 2016. The industries with the best performance were financial institutions, insurance, real estate and business services, and agriculture. On the other hand, mining, construction and transportation had the worst performance. Local sales of liquid fuels increased by 3%, boosted by higher sales of gasoline and diesel.

Natural gas demand in Colombia fell 7% in 2017 due to lower natural gas demand from power plants compared to 2016 when the "El Niño phenomenon" occurred. Although sales were affected by this factor, Ecopetrol's short term strategy was focused on promoting demand to mitigate the impact on sales. According to the Energy and Mines Planning Unit (UPME for its acronym in Spanish), under the medium scenario of supply and demand for October 2017, the Colombian natural gas market might experience a deficit after 2024.

2.1 *Our Corporate Strategy*

The 2017-2020 business plan is focused on value generation, profitability and financial sustainability and allows for upsides in case of potential price increases. The plan, released in the third quarter of 2016, has been adjusted to a lower price environment of US\$50 per barrel on average.

The three pillars of the plan are: (i) cash flow focus and cost efficiency, (ii) strict capital discipline and (iii) profitable reserves and production growth.

Cash flow focus and cost efficiency: In 2015, we launched the 2015-2020 Transformation Program (the "Transformation Program") with a goal of increasing our efficiency and decreasing costs. The Transformation Program has allowed us to decrease structural costs by US\$2.4 billion compared to 2014. Such reduction has been accomplished due to the implementation of initiatives through our different business segments and corporate areas.

The business plan entails a second phase of the Transformation Program, with activities aimed to achieve excellence in project planning and execution as well as in our production, transportation, refining and marketing operations.

Capital discipline: We have preserved a rigorous level of capital discipline through the adjustment of project planning processes and the adoption of controls to ensure that projects are delivered efficiently, within the expected time frame and budget, and generate adequate return on investments. For this purpose, Ecopetrol S.A. created the Vicepresidency of Projects and Engineering to provide best-in-class project delivery, through "Ecopetrol Project Development" ("EDP"). EDP is the framework for maturing opportunities and employs best practice guidelines for projects. It is consistently applied with maximum synergy and standardization between Upstream, Midstream and Downstream projects.

The plan calls for investments of approximately US\$13 billion between 2017 and 2020. By 2020, approximately 80-90% of this investment will be allocated to the development of upstream projects, while investments in transportation and refining will seek to improve operational integrity and reliability.

Profitable growth in production and exploration: One of the pillars of the revised business plan is the view that a strong production portfolio and a greater exploratory success will bring about profitable growth. Under a price scenario of US\$50 per barrel, production should average 740-760 thousand barrels of oil equivalent per day by 2020, approximately 6% growth from 2017. Approximately 98% of this production will come from the current producing assets.

In exploration, the plan estimates the incorporation of approximately 1,000 million barrels of contingent resources. In respect of adding reserves, we highlight the results of the exploratory campaigns in the Colombian Caribbean offshore and the U.S. Gulf of Mexico.

During the period 2016 – 2020, Ecopetrol expects to add 600 million barrels of proven reserves from current fields and exploration. Further, the business plan’s financial flexibility will allow Ecopetrol to evaluate inorganic growth opportunities to accelerate reserves addition.

As part of our long-term strategic planning process, we are in the process of developing strategic guidelines for the following years (“Strategy 2020+”). This analysis takes into account financial and sustainability parameters, operational excellence, portfolio diversification and synergies through the entire value chain. Strategy 2020+ will harmonize the requirements of the Upstream, Downstream and Midstream businesses, plus corporate areas, thus consolidating the long-term strategy of Ecopetrol.

In line with the business plan, in November 2017, the Board of Directors approved a US\$3.5-\$4.0 billion investment plan for 2018. The Ecopetrol Group plans to produce 715-725 thousand barrels of oil equivalent per day during 2018. The table below sets forth the details of the investment plan per business segment.

Table 3 – 2018 Investment Plan

Business Segment	Millions of US\$⁽¹⁾	% Percentage⁽²⁾
Exploration	400 - 450	11%
Production	2,580 – 2,950	74%
Transportation and Logistics	270 - 300	8%
Refining, Petrochemicals, and Biofuels	220 - 250	6%
Others	30 - 50	1%
TOTAL	3,500- 4,000	100%

(1) Rounded figures.

(2) Percentage over the upper range

Exploration

In the exploration segment, US\$400-US\$450 million will be allocated mainly to the evaluation and appraisal of discoveries and ongoing exploration efforts of Ecopetrol S.A. (approximately 49%), Hocol S.A. (“Hocol”) (approximately 17%), Ecopetrol America Inc. (approximately 9%), ECP Hidrocarburos Mexico (approximately 4%), Ecopetrol Costa Afuera (approximately 17%) and Ecopetrol Brazil (approximately 4%).

Production

In the production segment, US\$2,580-US\$2,950 million will be allocated mainly to the execution of development and incremental production projects of Ecopetrol S.A. (approximately 94%) primarily at Akacias-CPO09, Castilla, Cupiagua-Cusiana, La Cira-Infantas, Piedemonte, Rubiales, Yarigui-Cantagallo, Provincia and Llanito-Lisama fields. We have also allocated funds for our affiliates and subsidiaries as follows: approximately 2% for the operation and maintenance of fields of Ecopetrol America Inc. in the U.S. Gulf of Mexico, approximately 3% to Hocol, approximately 1% to Equion and Savia.

Transportation and logistics

In the transportation and logistics segment, US\$270-US\$300 million will be allocated to investments focused on risk mitigation and maintenance. The segment is seeking a higher efficiency in operations and maintenance practices.

Refining, petrochemicals and biofuels

In the refining, petrochemicals and biofuels segment, US\$220-US\$250 million will be allocated to programs to improve operations at Reficar and the Barrancabermeja refinery through initiatives aimed to increase revenues, enhancing integrity management, improve efficiency and reduce operational costs. The segment is seeking a higher efficiency in operations and maintenance practices. In accordance with the capital discipline criteria we established to ensure growth and financial sustainability, the Barrancabermeja refinery modernization plan will continue to be suspended. Meanwhile, Ecopetrol continues to analyze and implement alternatives for improving the competitiveness of this refinery including, among others, the use of other sources of crude oil as well as removing operational and logistical restrictions.

3. Business Overview

3.1 Our History

We were formed in 1951 by the Colombian government as *Empresa Colombiana de Petróleos* and began operating the crude oil fields at La Cira-Infantas, the oldest Colombian oil field whose production started in 1918, and the pipeline that connected that field with the Barrancabermeja Refinery and the port of Cartagena. In 1961, we assumed the direct operation of the Barrancabermeja Refinery and continued its transformation into an industrial complex. In 1974, we acquired the Cartagena Refinery, which had been in operation since 1957. Pursuant to Decree 0062 of 1970, we were transformed into a governmental industrial and commercial company.

In 2003 pursuant to Decree Law 1760, the *Agencia Nacional de Hidrocarburos* - National Hydrocarbons Agency (the “ANH”) was created and Ecopetrol’s public role as administrator and regulator of the national hydrocarbons resources was transferred to the ANH. Ecopetrol modified its organic structure and became Ecopetrol S.A., a public stock-holding corporation, one hundred percent state-owned, and continued the development of exploration and production activities in a competitive basis with autonomy over our business decisions. Since 2006, according to Law 1118, we have been evolving from a wholly state-owned entity to a mixed-economy company with private capital. This process has resulted in a substantial change in the legal framework to which we are subject and in the nature of our relationship with the Nation, as our controlling shareholder. As of March 23, 2018, pursuant to our amended bylaws, the duration of the Company is 100 years.

We carried out our initial public offering in November 2007 when our common shares became listed on the Colombian Stock Exchange. Our American Depository Shares (“ADSs”) were listed on the New York Stock Exchange in 2008. Starting in August 2010, our ADSs began trading on the Toronto Stock Exchange (“TSX”) under the symbol “ECP.” On February 17, 2016, we announced our application for voluntary delisting from the TSX. On March 2, 2016, our ADR’s were officially delisted from the TSX. On December 7, 2017, we applied to the Alberta Securities Commission and the Ontario Securities Commission to cease our reporting requirements due to our delisting process and are currently awaiting responses from both. In the meantime, we continue to be subject of the reporting requirements of such Commissions.

3.2 Our Corporate Structure

We operate in the following business segments: i) Exploration and Production; ii) Transportation and Logistics; iii) Refining, Petrochemicals, and Biofuels.

Our subsidiaries Refinería de Cartagena (Reficar), Cenit and Ocesa are significant subsidiaries as such term is defined under SEC Regulation S-X.

We have a number of directly and indirectly held subsidiaries both in Colombia and abroad. Our subsidiaries are either directly owned by us or indirectly owned by us through one or more of our other subsidiaries. As of March 31, 2018, we have 9 directly owned and 29 indirectly owned subsidiaries.

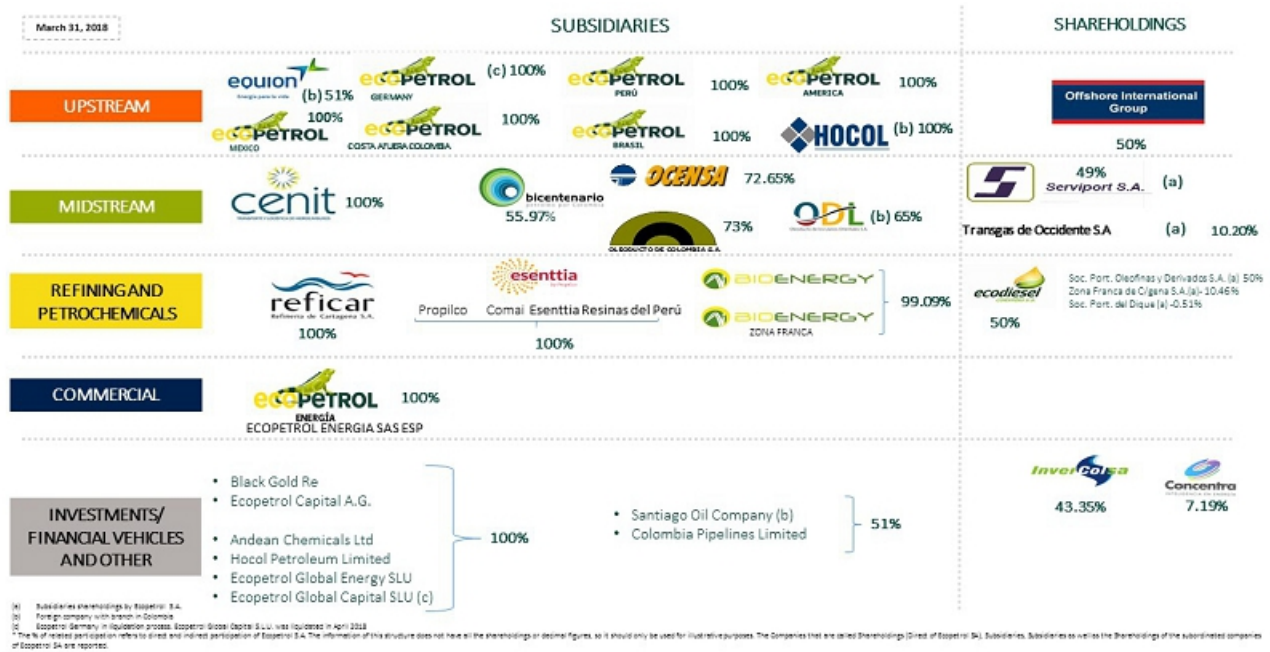
During 2017, the following changes were made to the Ecopetrol Group’s structure:

- (i) In January 2017, the merger by absorption between Sento and Cenit was completed, with the latter being the absorbing company as of January 6, 2017. As a result, Cenit is now the direct holder of a 51.28% equity interest in the outstanding capital stock of ODC. However, this restructuring had no impact on our consolidated financial statements.
- (ii) In August 2017, Ecopetrol S.A. incorporated a subsidiary ECP Hidrocarburos Mexico S.A.de C.V., which will be responsible for exploration and production activities in Mexico.

- (iii) In August 2017, Ecopetrol S.A. wound up certain foreign subsidiaries, namely Ecopetrol Global Capital S.L.U. and ECP Oil and Gas Germany GmbH. Ecopetrol Global Capital S.L.U. was liquidated in April 4, 2018.
- (iv) In March 2018, Ecopetrol S.A. incorporated a new subsidiary, Ecopetrol Energía SAS E.S.P., domiciled in Colombia, which will be responsible for commercialization of electric power for the Business Group.

Exhibit 8.1 to this annual report identifies our principal operating subsidiaries, their respective countries of incorporation, and our percentage ownership in each (both directly and indirectly through other subsidiaries), in each case as of March 31, 2018.

Graph 2 – Ecopetrol Corporate Structure



The stock ownership percentage listed refers to Ecopetrol S.A.'s direct and indirect participation. The data in this structure shows neither the whole ownership nor its decimal figures, so they will be used only for information purposes.

The so-called shareholding (Ecopetrol S.A.'s direct participation), affiliated, subsidiary companies are listed, as well as the stock interest of Ecopetrol S.A.'s subordinate companies.

In 2017, Ecopetrol completed the divestment of its stake in Empresa de Energía de Bogotá S.A. E.S.P. EEB for a total of COP\$1,124 billion. The operation was carried out in accordance with the procedures defined by the Law 226 of 1995, the Decree 2305 of November 13, 2014, and the Decree 2110 of December 22 of 2016.

We currently own 100% of the total outstanding shares of Propilco. In connection with the review of its long-term strategy, the Board of Directors decided to suspend the 2016 plan to sell Ecopetrol's shares in Propilco.

3.3 **Our Business**

We are a vertically integrated oil company with a presence primarily in Colombia and with activities in Peru, Brazil, Mexico and the U.S. Gulf Coast. The Nation currently controls 88.49% of our voting capital stock. We are among the world's biggest state-owned companies, ranking 559 based on Forbes Global 2000 Ranking - 2017. We play a key role in the local Colombian hydrocarbon market.

3.4 Exploration and Production

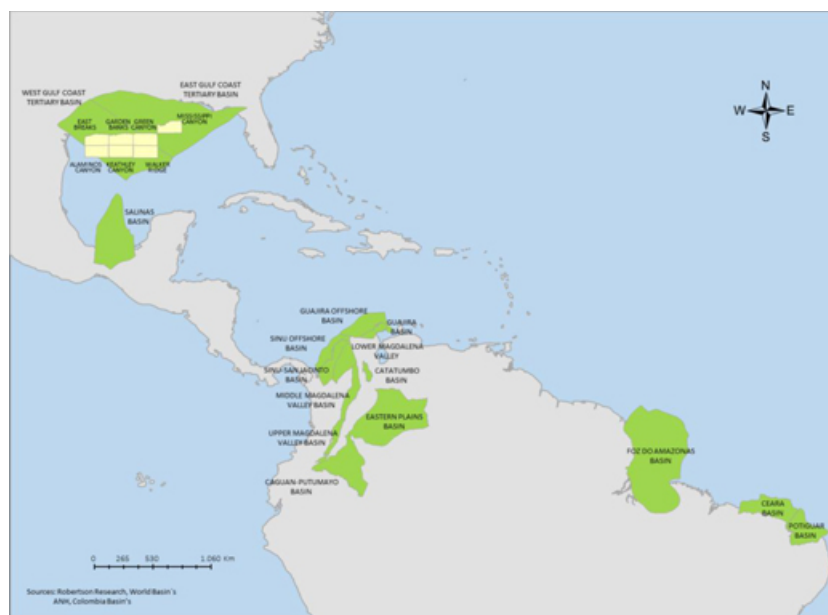
Our exploration and production business segment includes exploration, development and production activities in Colombia and abroad. We began local exploration in 1955 and international exploration in 2006. We conduct exploration and production activities directly in Ecopetrol S.A., through some of our subsidiaries, and through joint ventures with third parties. As of December 31, 2017, we were the largest operator and the largest producer of crude oil and natural gas in Colombia, maintaining the largest acreage exploration position in Colombia.

For purposes of this exploration section, “we” refers to Ecopetrol S.A., its subsidiaries and partnerships in which Ecopetrol has an interest. Unless otherwise stated, all figures are given before deducting royalties.

3.4.1 Exploration Activities

Under the framework of the Exploration Strategy 2017-2020, Ecopetrol is aiming to incorporate at least 1 billion barrels of contingent resources in high reward projects, concentrated in (i) Offshore Colombia, (ii) re-evaluating opportunities onshore Colombia, and (iii) international areas such as the Gulf of Mexico, Brazil and other areas within the Americas.

Graph 3- Sedimentary Basins where Ecopetrol executes exploration activities



During 2017, the exploration strategy was directed at leveraging our goal on three working fronts: onshore Colombia, offshore Caribbean, and strengthening and diversifying our exploration overseas.

3.4.1.1 Exploration Activities in Colombia

During 2017, Ecopetrol and its subsidiaries conducted drilling operations in 16 exploration wells (A3/A2) and in 2 appraisal wells (A1) in Colombia. Of these 16 wells, 3 were successful, 6 were plugged and abandoned, and 7 were under evaluation as of December 31, 2017. This activity was concentrated mainly in the following basins: onshore Sinu, Upper Magdalena Valley, Middle Magdalena Valley, Guajira and offshore Sinu.

In terms of onshore Colombia, we focused our exploration efforts in searching for hydrocarbons in mature basins, near field exploration and close to existing production infrastructure. Additionally, we succeeded in increasing our participation in blocks Fuerte Sur (Sinu offshore basin) and CPO-17 (Llanos basin), from 50% to 100% in both cases.

The following table sets forth for the periods indicated; the number of gross and net productive and dry exploratory wells drilled by us and our joint venture partners and the exploratory wells drilled by third parties pursuant to sole risk contracts with us.

Table 4 – Exploratory Drilling in Colombia

	For the year ended December 31,		
	2017	2016	2015
	(number of wells)		
COLOMBIA			
Ecopetrol S.A.			
Gross Exploratory Wells			
Owned and operated by Ecopetrol			
Productive	–	–	–
Dry ⁽¹⁾	1.0	1.0	1.0
Total	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>
Operated by Partner in Joint Venture ⁽²⁾			
Productive	3.0	–	1.0
Dry	2.0	–	1.0
Total	<u>5.0</u>	<u>–</u>	<u>2.0</u>
Operated by Ecopetrol in Joint Venture ⁽³⁾			
Productive	–	–	–
Dry	1.0	–	–
Total	<u>1.0</u>	<u>–</u>	<u>–</u>
Net Exploratory Wells ⁽⁴⁾			
Productive	1.5	–	0.5
Dry	2.3	1.0	1.5
Total	<u>3.8</u>	<u>1.0</u>	<u>2.0</u>
Sole Risk			
Productive	–	–	–
Dry	–	–	–
Total	<u>–</u>	<u>–</u>	<u>–</u>
ECAS			
Gross Exploratory Wells			
Productive	–	–	–
Dry	1.0	–	–
Total	<u>1.0</u>	<u>–</u>	<u>–</u>
Net Exploratory Wells			
Productive	–	–	–
Dry	0.5	–	–
Total	<u>0.5</u>	<u>–</u>	<u>–</u>
Equion			
Gross Exploratory Wells			
Productive	–	–	–
Dry	–	–	–
Total	<u>–</u>	<u>–</u>	<u>–</u>
Hocol ⁽⁵⁾			
Gross Exploratory Wells			
Productive	–	1.0	1.0
Dry	1.0	–	–
Total	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>
Net Exploratory Wells			
Productive	–	0.5	0.5
Dry	1.0	–	–
Total	<u>1.0</u>	<u>0.5</u>	<u>0.5</u>

(1) A dry well or hole is an exploratory well found to be incapable of producing either crude oil or natural gas in sufficient quantities to justify completion as a crude oil or natural gas well.

(2) The three following wells operated by Oxy are under evaluation, as of December 31, 2017: Infantas Oriente -1 (Oxy 48% working interest and Ecopetrol 52% working interest), Cosecha V (Oxy 70% working interest and Ecopetrol 30% working interest) and Rex NE-1 (Oxy 70% working interest and Ecopetrol 30% working interest).

(3) The following well is under evaluation, as of December 31, 2017: the Lorito-1 well operated by Ecopetrol in partnership with Repsol (Ecopetrol 55% working interest and Repsol 45% working interest).

(4) Net exploratory wells were calculated according to our percentage of ownership in these wells.

(5) Three wells drilled by our subsidiary Hocol are under evaluation as of December 31, 2017: the Bonifacio-1 and Godric Norte-1 wells, both operated solely by Hocol and the Pollera-1 well operated in partnership with Lewis (Lewis 50% working interest and Hocol 50% working).

Ecopetrol drilled three successful wells in Colombia in 2017: (i) Purple Angel-1 well, where Ecopetrol holds a 50% working interest and Anadarko the remaining 50% at Purple Angel block, (ii) Gorgon-1 well, where Ecopetrol holds a 50% working interest and Anadarko the remaining 50% at Purple Angel block, and (iii) Coyote-1, where Ecopetrol holds a 50% working interest, and Parex Resources Inc. as operator the remaining 50% at Playon block.

Six wells were plugged and abandoned. Three of the wells were located in the Colombian Caribbean: (i) Molusco-1 well, where Ecopetrol holds a 50% working interest through its affiliate Ecopetrol Costa Afuera S.A.S (“ECAS”) and ONGC with the remaining 50% at RC-9 block, which was a dry well, (ii) Siluro-1B well, operated by Repsol at RC-11 block, which was a dry well and (iii) Brama-1 well, operated by Petrobras at Tayrona block, which was a dry well. The other three wells were located onshore in Colombia and were determined to be dry: (i) Trogon-1 well, where Ecopetrol holds a 55% working interest as operator and Repsol the remaining 45% at CPO-9 block, (ii) Landero-1 well, where Ecopetrol holds a 100% working interest at Middle Magdalena Valley and (iii) Lunera-1 well, where Hocol holds a 100% working interest as operator at VSM-9 block.

In addition, two appraisal wells were drilled. The first, Capachos 2 ST located at Capachos block operated by Parex Resources Inc., which holds a 50% working interest in partnership with Ecopetrol holding the remaining 50%. This well was under evaluation as of December 31, 2017, but has been declared successful since. The appraisal well Bullerengue Sur-3 located at SSJN1 Block operated by Lewis Energy, which holds a 50% working interest in partnership, with Ecopetrol holding the remaining 50% was plugged and abandoned.

Seismic

In Colombia our subsidiary Hocol S.A. acquired a total of 518 km of 2D in blocks SN 8 and SN 18.

3.4.1.2 *Exploration Activities Outside of Colombia*

Our international exploration strategy is focused on participating in bidding rounds to secure blocks available for exploration and entering into joint ventures with international and regional oil companies. We believe exploring outside Colombia allows us to diversify our risks and improve the possibilities of increasing our crude oil and natural gas reserves.

In partnership with Petronas and Pemex, respectively, we were awarded block 6 and 8 in Mexico during the bidding round 2.1 and our Mexican subsidiary, ECP Hidrocarburos Mexico S.A. de C.V., has entered into petroleum contracts in connection therewith. Additionally, in a 50% partnership with Repsol E&P USA Inc., as operator, we were awarded blocks Garden Banks 77, 78, 121 and 122 in the Gulf of Mexico (US) through our American subsidiary, Ecopetrol America Inc.

With respect to our exploratory drilling outside of Colombia, as set forth in the table below, in 2017 our subsidiary Ecopetrol America Inc. drilled two wells: (i) Warrior-2 and (ii) Warrior-2 ST-1, both located in the Green Canyon area in the Gulf of Mexico (US). These wells contained hydrocarbons, both wells were deemed non-commercial due to thin compartmentalized reservoirs, and were plugged and abandoned. The associated contingent resources of this discovery are currently under evaluation. Ecopetrol America Inc. has a 30% interest in this area, with our partner Anadarko holding the remaining 70% interest and acting as operator.

The following table sets forth information on our exploratory drilling for the periods indicated.

Table 5 – Exploratory Drilling Outside Colombia

	For the year ended December 31,		
	2017	2016	2015
	(number of wells)		
INTERNATIONAL			
Ecopetrol America Inc.			
Gross Exploratory Wells			
Productive	0.0	1.0	–
Dry ⁽¹⁾	2.0	–	1.0
Total	2.0	1.0	1.0
Net Exploratory Wells ⁽²⁾⁽³⁾			
Productive	0.0	0.2	–
Dry	0.6	–	0.5
Total	0.6	0.2	0.5
Ecopetrol Óleo e Gás do Brasil Ltda.			
Gross Exploratory Wells			
Productive	–	–	–
Dry	–	–	–
Total	–	–	–
Net Exploratory Wells			
Productive	–	–	–
Dry	–	–	–
Total	–	–	–
Ecopetrol Germany			
Gross Exploratory Wells			
Productive	–	–	–
Dry	–	–	–
Total	–	–	–
Net Exploratory Wells			
Productive	–	–	–
Dry	–	–	–
Total	–	–	–
Savia Perú			
Gross Exploratory Wells			
Productive	–	–	–
Dry	–	–	–
Total	–	–	–
Net Exploratory Wells			
Productive	–	–	–
Dry	–	–	–
Total	–	–	–

(1) A dry well or hole is an exploratory well found to be incapable of producing either crude oil or natural gas in sufficient quantities to justify completion as a crude oil or natural gas well.

(2) Net exploratory wells are calculated according to our percentage of ownership in these wells.

(3) None of our international wells were dug pursuant to a sole risk contract.

Seismic

Our subsidiary, Ecopetrol Brazil, completed the acquisition of a marine 3D seismic program of 446 km² in block FZA-M-330, in the Foz de Amazonas basin (Brazil). Ecopetrol Brazil holds a 70% equity interest in this block with JX Nippon holding the remaining 30% interest.

Ecopetrol America Inc purchased the 3D seismic program EDGE of 28.000 km² in Green Canyon. The seismic program contributed, to mitigate subsalt uncertainty and to mature leads for lease sales.

3.4.2 Production Activities

Our consolidated average production was 715.1 thousand boepd in 2017, a decrease of approximately 3 thousand boepd as compared to 2016. This decrease is mainly the result of the natural production decline of our fields, partially offset by an increase in upstream investments during 2017.

The following table summarizes the results of our oil and gas production activities for the periods indicated:

Table 6 – Ecopetrol Group’s Oil and Gas Production

	For the year ended December 31,								
	2017			2016			2015		
	Oil	Gas ⁽¹⁾	Total	Oil	Gas ⁽¹⁾	Total	Oil	Gas ⁽¹⁾	Total
	(thousand boepd)								
Total production in Colombia ⁽²⁾	577.3	121.6	698.9	582.5	123.3	705.8	619.2	130.4	749.6
Total International production ⁽³⁾	13.6	2.6	16.2	9.6	2.5	12.1	7.3	3.8	11.1
Total production of Ecopetrol Group	590.9	124.2	715.1	592.1	125.8	717.9	626.5	134.2	760.7

(1) Conversion between mcfpd and boepd is performed at 5,700 mcfpd to 1 boepd.

(2) Total production in Colombia corresponds to Ecopetrol S.A., Hocol and Equion.

(3) Total International production corresponds to Savia Perú and Ecopetrol America Inc.

3.4.2.1 Production Activities in Colombia

3.4.2.1.1 Ecopetrol S.A.’s Production Activities in Colombia

For the year ended December 31, 2017, Ecopetrol S.A. was the largest participant in the Colombian hydrocarbons industry, accounting for approximately 64% of crude oil production (according to calculations made by Ecopetrol based on information from the Ministry of Mines and Energy) and approximately 68% of natural gas production (according to calculations made by Ecopetrol based on information from the Ministry of Mines and Energy). Also during 2017, Ecopetrol S.A. carried out development drilling mainly in the Orinoquia and Middle Magdalena regions, drilling 475 development wells; 199 of those through direct operations and 276 through joint ventures.

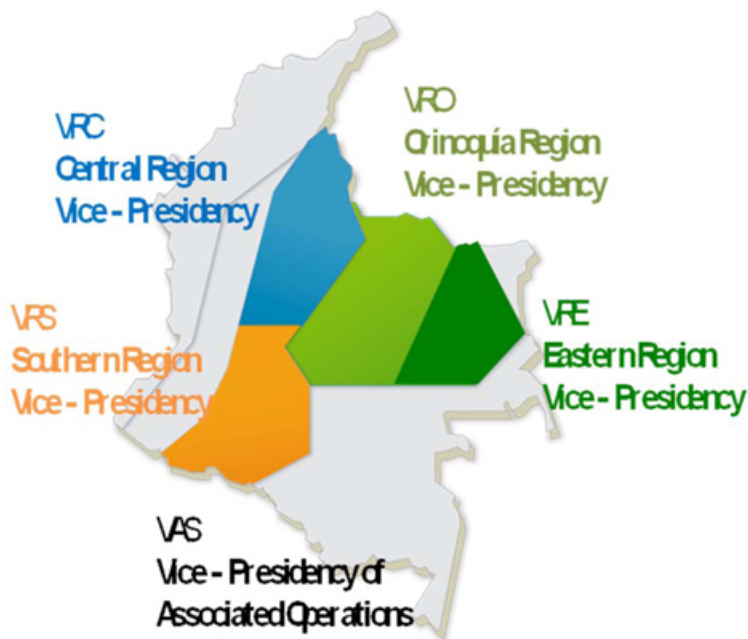
In terms of operational structure, Ecopetrol S.A. manages its production operations through a regional organization. Since July 1, 2014, three regional Vice-Presidencies were created: Central, Orinoquia and Southern. After the company took over the operations of the Rubiales field in July of 2016, a new Vice-Presidency, the Eastern Region, was incorporated to this scheme. Our operating assets are distributed in the following regions:

- Central Region: comprising 30 fields with active production in 2017.
- Orinoquia Region: comprising 23 fields with active production in 2017.
- Southern Region: comprising 36 fields with active production in 2017.
- Eastern Region: comprising 2 fields with active production in 2017.

A fifth Vice-Presidency, the Vice-Presidency of Associated Operations, is responsible for all of the production activities in which a partner is involved, regardless of the location of such activities in Colombia. This Vice- Presidency is comprised of 121 fields with active production in 2017.

The map below indicates the locations of Ecopetrol S.A.'s operations with production information for each of our administrative regions following in the subsequent paragraphs.

Graph 4 – Ecopetrol S.A. Operations in Colombia



Note: VAS is the countrywide Vice-presidency.

Crude Oil Production

The average daily production of crude oil in Colombia by Ecopetrol S.A. (excluding its subsidiaries), was 545 mbod in 2017, 7.1 mbod lower than in 2016, which represents a year-to-year decrease of 1.3%.

However, it is important to highlight that since July of 2016 we took over the operations of the Rubiales and Cusiana fields. A plan was set up more than two years in advance, which allowed us to successfully transition between operators, without any technical, operational or communities' issues in any of the two fields. In July 2017, Ecopetrol completed the first year of operating in the Rubiales field. During 2017, we invested in the asset with the drilling of 127 wells and the implementation of efficiency measures, thereby continuing to mitigate historical production declines.

The following chart summarizes Ecopetrol S.A.'s average daily crude oil production in Colombia by Region, prior to deducting royalties, for the periods indicated.

Table 7 – Ecopetrol S.A.’s Average Daily Crude Oil Production in Colombia by Region Vice-Presidency

	For the year ended December 31,		
	2017	2016 (thousand bpd)	2015
Central Region			
1) La Cira – Infantas	22.6	19.1	22.9
2) Casabe	15.9	17.8	21.9
3) Yarigui	14.5	16.6	17.8
4) Other	18.5	21.3	23.7
Total Central Region	71.5	74.8	86.3
Orinoquía Region			
1) Castilla	114.1	121.3	122.5
2) Chichimene	70.5	74.0	78.0
3) Cupiagua	9.6	11.3	14.0
4) Other	24.3	18.3	21.1
Total Orinoquía Region	218.5	224.9	235.6
Eastern Region			
1) Rubiales ⁽¹⁾	118.7	61.5	0
2) Caño Sur ⁽²⁾	1.4	0.4	0
Total Eastern Region	120.1	61.9	0
Southern Region			
1) San Francisco	6.2	6.5	8.1
2) Huila Area ⁽³⁾	3.1	7.4	7.8
3) Tello	3.9	4.4	4.5
4) Other	12.2	9.4	11.0
Total Southern Region	25.4	27.7	31.4
Associated Operations			
1) Rubiales ⁽¹⁾	0.0	41.4	94.3
2) Quifa	18.8	19.6	24.2
3) Caño Limon	22.2	23.3	25.6
4) Cusiana ⁽⁴⁾	0.0	2.6	5.2
5) Other	68.5	75.9	83.6
Total Associated Operations	109.5	162.8	232.9
Total average daily crude oil production Ecopetrol S.A. (Colombia)	545.0	552.1	586.2

(1) In the first half of 2016, the Rubiales field was part of the Vice-Presidency of Associated Operations. Since July 1, 2016, it has been a part of the Eastern Region.

(2) In the first half of 2016, the Caño Sur field was part of the Orinoquia Region. Since July 1, 2016, it has been a part of the Eastern Region.

(3) Huila Area: some assets were reclassified and are reported under Other in the Southern Region.

(4) In the first half of 2016, the Cusiana field was part of the Vice-Presidency of Associated Operations. Since July 3, 2016, it has been a part of the Orinoquia Region.

Table 8 – Ecopetrol S.A. Production per Type of Crude

	2017 (mbod)	Year-on-Year Δ(%)	2016 (mbod)	Year-on-Year Δ(%)	2015 (mbod)
	Light	42.4	(4.9)%	44.6	(0.0)%
Medium	151.6	(6.1)%	161.5	(13.7)%	187.1
Heavy	351.0	1.4%	346.0	(2.4)%	354.5
Total	545.0	(1.3)%	552.1	(5.8)%	586.2

Ecopetrol S.A.'s crude oil production during 2017 consisted of approximately 36% light and medium crudes and 64% heavy crudes. In 2016, approximately 37% of the crude oil production corresponded to light and medium crudes and 63% to heavy crudes. In 2015, approximately 40% of the crude oil production corresponded to light and medium crudes and 60% to heavy crudes.

Natural Gas Production

In 2017, the average daily production of natural gas by Ecopetrol S.A. reached 111 mboed, including natural gas liquids ("NGLs"), corresponding to a 4.3% decrease in comparison to 2016 production.

We have three main natural gas production fields, Guajira, Cusiana and Cupiagua. In the Guajira field, we have partnered with Chevron who operates the field. The development of Cusiana field had a change in participation, because Tauramena joint venture expired on July 3, 2016. The Tauramena block is part of the Cusiana unified exploitation plan. As a consequence of the termination of the Tauramena joint venture, Ecopetrol's participation increased from 63.4% to 97.8%, and Ecopetrol assumed the operation of the Cusiana unified exploitation plan. Ecopetrol S.A. is the operator of the Cupiagua field and other wells previously under the Recetor contract that were transferred from Equion to Ecopetrol as a result of the full return of the Recetor Field to Ecopetrol on May 30, 2017.

Of our total natural gas production during the year ended December 31, 2017, approximately 24% was supplied from the Guajira field, 29% from the Cusiana field, 23% from the Cupiagua field and the remaining 24% from other fields.

The following table sets forth Ecopetrol S.A.'s average daily natural gas production in Colombia, including NGLs, prior to deducting royalties, for the years ended on December 31, 2017, 2016, and 2015.

Table 9 – Ecopetrol S.A.'s Average Daily Natural Gas Production in Colombia

	For the year ended December 31,		
	2017	2016	2015
	(thousand boepd)		
COLOMBIA			
Central Region			
1) La Cira – Infantas	0.15	0.17	0.12
2) Provincia	2.41	3.09	3.75
3) Yarigui	0.48	0.56	0.56
4) Gibraltar	7.16	6.32	5.52
4) Other	2.02	1.60	1.51
Total Central Region	12.22	11.74	11.46
Orinoquía Region			
1) Cupiagua	25.29	28.72	24.09
2) Cusiana ⁽¹⁾	31.97	15.98	0.00
2) Other	2.44	1.44	1.18
Total Orinoquía Region	59.70	46.14	25.27
Southern Region			
1) Huila Area ⁽²⁾	0.10	0.64	0.85
2) Tello	0.22	0.35	0.35
3) Other	0.40	0.03	0.03
Total Southern Region	0.72	1.02	1.23
Associated Operations			
1) Guajira	27.09	33.34	42.71
2) Cusiana ⁽¹⁾	0.00	12.65	27.03
3) Other	11.29	11.10	13.47
Total Associated Operations	38.38	57.09	83.21
Total Natural Gas Production (Colombia)	111.02	115.99	121.17

Note: Conversion between mcfpd and boepd is performed at 5,700 mcfpd to 1 boepd.

(1) In the first half of 2016, the Cusiana field was part of the Vice-Presidency of Associated Operations. Since July 3, 2016, it has been a part of the Orinoquía Region.

(2) The Huila area: some assets were reclassified and are reported under Other in the Southern Region.

Projects to Increase Recovery Factor:

During 2017 Ecopetrol prioritized opportunities within its recovery factor increase program, keeping the following active pilots in operation: waterflooding (WF) in Chichimene, Castilla, Apiay and Suria; Chemical Enhanced Oil Recovery (CEOR) in Chichimene, Yarigui and Casabe and Vapor Injection Continue (ICV) in Teca; and developing additional ones: WF in Nutria and Tisquirama and CEOR in Cira and Geles.

The Chichimene and Castilla fields have continued reporting increases in their recovery factors between 8% and 12% in their pilot areas. Additionally, in 2017, we evaluated the steam injection pilots in the Teca project, located in the Middle Magdalena Valley, where we also obtained positive production responses.

At the Chichimene field, nitrogen injection pilots were successfully completed. We are currently analyzing the production curve, and air injection is expected to begin in the second half of 2018.

Among the main results of the pilots in 2017, it is important to highlight that 73 mmboe of proven reserves and 174 mmboe of contingent resources were incorporated. In addition, four new recovery projects were conceptualized (WF in Chichimene, Castilla and Llanito-Gala-Galan, being among the most important ones).

35 recovery pilots have started since the beginning of the recovery factor increase program in 2008. Out of these pilots, 28 have shown positive results, of which 11 are now in expansion stage, 11 are operating and six were closed.

Development Wells

The following table sets forth the number of gross and net development wells drilled in Colombia, both solely by Ecopetrol S.A. and with its joint ventures that reached total depth for the years ended December 31, 2017, 2016 and 2015.

Table 10 – Ecopetrol S.A.’s Gross and Net Development Wells in Colombia

	For the year ended December 31,		
	2017	2016	2015
	(number of wells)		
COLOMBIA			
Central Region			
Gross wells owned and operated by Ecopetrol	-	-	79
Orinoquía Region			
Gross wells owned and operated by Ecopetrol	56	47	109
Southern Region			
Gross wells owned and operated by Ecopetrol	-	-	21
Eastern Region			
Gross wells owned and operated by Ecopetrol	143	36	-
Total gross wells owned and operated by Ecopetrol S.A. in Colombia	199	83	209
Associated Operations			
Gross wells in joint ventures	276	50	330
Net wells ⁽¹⁾	97	19	146
Total gross wells in joint ventures Ecopetrol S.A. in Colombia	276	50	330
Total net wells in joint ventures Ecopetrol S.A. in Colombia ⁽¹⁾	97	19	146
Total gross wells Ecopetrol S.A. in Colombia	475	133	539
Total net wells Ecopetrol S.A. in Colombia ⁽¹⁾	296	102	355

(1) Net wells correspond to the sum of wells owned and operated by Ecopetrol (1) plus the net wells in our associated operations. Net wells in the associated operations are the result of our investment percentage of wells owned in joint ventures with our partners, as defined in the contract obligations.

Production Acreage

The following table sets forth Ecopetrol S.A.'s developed and undeveloped gross and net acreage of crude oil and natural gas production in Colombia for the year ended December 31, 2017.

Table 11 – Ecopetrol S.A.'s Developed and Undeveloped Gross and Net Acreage of Crude Oil and Natural Gas Production in Colombia

	Production Acreage as of December 31, 2017 (acres)			
	Developed		Undeveloped	
	Gross	Net	Gross	Net
Ecopetrol S.A.	459,757	354,350	4,960,480	3,627,708

Gross and Net Productive Wells

The following table sets forth Ecopetrol S.A.'s total gross and net productive wells by region as of December 31, 2017.

Table 12 – Ecopetrol S.A.'s Gross and Net Productive Wells by Region

	As of December 31, 2017 (number of wells)			
	Crude Oil ⁽¹⁾		Natural Gas ⁽²⁾	
	Gross	Net	Gross	Net
COLOMBIA				
Ecopetrol S.A.				
Central region	2,301	1,813	6	6
Orinoquía region	978	972	17	17
Southern region	578	513	11	11
Eastern Region	804	804	0	0
Region of Associated Operations	2,987	1,499	25	9
Total (Ecopetrol S.A.)	7,648	5,601	59	43

Note: The above table reflects the productive wells that directly contribute to hydrocarbon production and therefore excludes wells used for injection, disposal, water abstraction, or other similar activities.

- (1) We consider crude oil wells to be those in which the main operation is oil production, although many of these wells produce gas associated with oil production that, in some cases, have a commercial purpose.
- (2) Natural gas wells are those in which operations are directed only toward the production of commercial gas.

3.4.2.1.2 Ecopetrol S.A.'s Affiliates and Subsidiaries' Production Activities in Colombia

Crude Oil Production

The following table sets forth our average daily crude oil production from Hocol and Equion, prior to deducting royalties, for the periods indicated.

Table 13 – Ecopetrol S.A.'s Subsidiaries in Colombia Average Daily Crude Oil Production

	For the year ended December 31,		
	2017	2016	2015
	(thousand bpd)		
Hocol			
Joint venture operation	2.3	2.6	2.1
Direct operation	19.4	15.4	19.3
Total Hocol	21.7	18.0	21.4
Equion			
Joint venture operation	0.1	0.1	–
Direct operation	10.5	12.3	11.6
Total Equion	10.6	12.4	11.6
Production Tests	–	–	–
Total Average Daily Crude Oil Production (Subsidiaries in Colombia)	32.3	30.4	33

The 20.6% increase in Hocol's production in 2017 as compared to 2016 was mainly due to the transfer of Ecopetrol's stake in the Espinal field to Hocol on January 1, 2017.

The 14.5% decrease in Equion's production in 2017 as compared to 2016 was mainly due to the transfer of Tauramena contract share in Cusiana to Ecopetrol.

Natural Gas Production

The following table sets forth our subsidiaries' average daily natural gas production, prior to deducting royalties, for the periods indicated.

Table 14 – Ecopetrol S.A.'s Subsidiaries in Colombia Average Daily Natural Gas Production

	For the year ended December 31,		
	2017	2016	2015
	(thousand boepd) ⁽¹⁾		
Hocol			
Joint venture operation	0.6	0.2	–
Direct operation	5.2	0.6	0.2
Total Hocol	5.8	0.8	0.2
Equion			
Joint venture operation	0.2	0.1	–
Direct operation	4.6	6.4	9
Total Equion	4.8	6.5	9
Production Tests	–	–	–
Total Natural Gas Production (Subsidiaries in Colombia)	10.6	7.3	9.2

(1) Conversion between mcfpd and boepd is performed at 5,700 mcfpd to 1 boepd.

Development Wells

The following table sets forth the number of gross and net development wells drilled exclusively by our subsidiaries and in their joint ventures in Colombia for the periods indicated.

Table 15 – Ecopetrol S.A.’s Subsidiaries in Colombia Gross and Net Development Wells

	For the year ended December 31,		
	2017	2016	2015
	(number of wells)		
Hocol			
Gross wells owned and operated by Hocol	17	9	13
Gross wells in joint ventures	–	–	1
Net wells ⁽¹⁾	17	9	13
Equion			
Gross wells owned and operated by Equion ⁽²⁾	–	–	–
Gross wells in joint ventures	1	1	5
Net wells ⁽¹⁾	–	–	1
Total gross wells owned and operated in Colombia	17	9	13
Total gross wells in joint ventures in Colombia	1	1	6
Total net wells (Subsidiaries in Colombia)	17	9	14

(1) Net wells correspond to the sum of wells owned and operated by our subsidiaries and their ownership percentage of wells owned in joint ventures with their partners.

(2) Even though for the last three years Equion has operated every well, Equion has not owned any well 100%; rather Equion has drilled wells in joint venture with Ecopetrol. Therefore, after a careful review of the categories, all Equion data was moved from gross wells owned and operated by Equion to gross wells in joint ventures. However, the number of wells remains the same.

Production Acreage

The following table sets forth our subsidiaries’ developed and undeveloped gross and net acreage of crude oil and natural gas production in Colombia for the year ended December 31, 2017.

Table 16 – Ecopetrol S.A.’s Subsidiaries in Colombia Developed and Undeveloped Gross and Net Acreage of Crude Oil and Natural Gas Production

	Production acreage as of December 31, 2017			
	Developed		Undeveloped	
	Gross	Net	Gross	Net
	(in acres)			
Hocol	20,892	12,726	627	528
Equion	16,300	4,024	54,666	12,162
Total (Subsidiaries in Colombia)	37,192	16,750	55,293	12,690

Gross and Net Productive Wells

The following table sets forth our subsidiaries’ total gross and net productive wells in Colombia for the year ended December 31, 2017.

Table 17 – Ecopetrol S.A.’s Subsidiaries in Colombia Gross and Net Productive Wells ⁽¹⁾

	For the year ended December 31, 2017			
	Crude Oil		Natural Gas	
	Gross	Net	Gross	Net
	(number of wells)			
Hocol	286	222	7	5.5
Equion	15	8	15	8
Total (Subsidiaries in Colombia)	301	230	22	13.5

(1) Information in the table above reflects productive wells that directly contribute to hydrocarbons production and therefore excludes wells used for injection, disposal, water abstraction, or other similar activities. We consider crude oil wells to be those in which the main operation is oil production, although many of these wells produce gas associated with oil production that, in some cases, have a commercial purpose. Natural gas wells are those in which operations are directed only towards production of commercial gas.

3.4.2.2 Production Activities Outside Colombia

Crude Oil Production

The following table sets forth our average daily crude oil production outside Colombia, prior to deducting royalties, for the periods indicated.

Table 18 – Ecopetrol S.A.’s Subsidiaries Outside Colombia Average Daily Crude Oil Production

	For the year ended December 31,		
	2017	2016 (thousand bpd)	2015
Savia Perú	4.4	4.1	4.8
Ecopetrol America Inc.	9.2	5.5	2.5
Total average daily crude oil production (International)	13.6	9.6	7.3

Natural Gas Production

The following table sets forth our average daily natural gas production outside Colombia, prior to deducting royalties, for the periods indicated.

Table 19 – Ecopetrol S.A.’s Subsidiaries Outside Colombia Average Daily Natural Gas Production

	For the year ended December 31,		
	2017	2016 (thousand boepd)	2015
Savia Perú	0.6	1.3	1.2
Ecopetrol America Inc.	2.0	1.2	2.6
Total average daily natural gas production (International)	2.6	2.5	3.8

Development Wells

The following table sets forth the number of gross and net development wells outside Colombia, drilled exclusively by us and in joint ventures for the periods indicated.

Table 20 – Ecopetrol S.A.’s Subsidiaries Outside Colombia Gross and Net Development Wells ⁽¹⁾

	For the year ended December 31,		
	2017	2016 (number of wells)	2015
Savia Perú			
Gross wells	-	-	-
Net wells ⁽²⁾	-	-	-
Ecopetrol America Inc.			
Gross wells	2	3	2
Net wells ⁽²⁾	0.4	0.7	0.4
Total gross wells (International)	2	3	2
Total net wells (International)	0.4	0.7	0.4

(1) Information in the table above reflects productive wells that directly contribute to hydrocarbons production and therefore excludes wells used for injection, disposal, water abstraction, or other similar activities.

(2) Net wells correspond to the sum of wells entirely owned by us or our subsidiaries and our ownership percentage of wells owned in joint ventures with our partners.

Production Acreage

The following table sets forth our developed and undeveloped gross and net acreage of crude oil and natural gas production outside Colombia for the year ended December 31, 2017.

Table 21 – Ecopetrol S.A.’s Subsidiaries Outside Colombia Developed and Undeveloped Gross and Net Acreage of Crude Oil and Natural Gas Production

	Production acreage as of December 31, 2017			
	Developed		Undeveloped	
	Gross	Net	Gross	Net
	(in acres)			
Savia Perú	79,575	39,788	57,671	28,836
Ecopetrol America Inc. ⁽¹⁾	72,720	20,243	23,040	6,566
Total (International)	152,295	60,031	80,711	35,402

(1) Production and acreage from Ecopetrol America Inc. is related to the K2, Dalmatian and Gunflint field blocks in the Gulf of Mexico. For K2, there are four blocks in the production stage. For Dalmatian, there are 5 blocks in the production stage, of which 3 are producing. For Gunflint, there are four blocks in the production stage, of which 2 are producing.

Gross and Net Productive Wells

The following table sets forth our total gross and net productive wells outside Colombia for the year ended December 31, 2017.

Table 22 – Ecopetrol S.A.’s Subsidiaries Outside Colombia Gross and Net Productive Wells

	As of December 31, 2017	
	Crude Oil	
	Gross	Net
	(number of wells)	
INTERNATIONAL		
Savia Perú	626	313
Ecopetrol America Inc.	14	3.3
Total (International)	640	316.3

3.4.2.3 Marketing of Crude Oil, Natural Gas and Refined Products

In 2017, Ecopetrol sold 917.2 mboepd, out of which 434.5 mbopd represented sales of crude oil (48%), 75.7 mboepd natural gas (8%) and 407 mboepd of fuels and petrochemicals (44%).

Crude Oil Export Sales

Crude oil export sales in 2017 decreased by 19 mbopd as compared to 2016 mainly due to higher consumption of the local refineries. Ecopetrol’s crude oil export sales are traded both in the spot and contract markets, primarily to refiners in the United States, Asia and Europe.

The Castilla blend is the main type of crude oil for export sales, with 315.1 mbopd sold during 2017 (a 76% share of our crude oil basket) followed by the Vasconia Norte with 29.1 mbopd (a 7% share in our crude oil basket), Vasconia with 15.2 mbopd (a 4% share of our crude oil basket), and the South blend with 13.0 mbopd (a 3% share of our crude oil basket).

Ecopetrol placed its exports in markets that represent the best value for its crudes. The United States remained the main destination representing almost a half of our crude exports. In particular, lower supply of other heavy and intermediate grades generated new opportunities for Colombian crudes in the US. In addition, the percentage of exports to Asia increased from 15% in 2016 to 25% in 2017 due to the expansion of refining capacity and higher imports in that market. Ecopetrol's crude basket reached a nine year high, discounted only by US\$ 6.9/bl below the ICE Brent price.

Crude Oil Purchase Contracts

Ecopetrol has signed several crude oil purchase contracts with third parties and business partners. Ecopetrol also purchases crude oil from the ANH as royalties. This oil is processed in Ecopetrol's refineries or exported. The purchase price is referenced to export parity based on international market prices plus a commercial fee.

The contract terms are typically linked to the term of the exploration and production contracts signed with our partners. Other contract clauses such as price and point of delivery vary and may be subject to renegotiation during the term of the contract. Certain purchase contracts are not linked to joint venture agreements and may be extended and renegotiated by the parties.

The table below sets forth the volumes of crude oil purchased from our business partners and third parties and volumes of crude oil purchased from the ANH from royalties for the years ended on December 31, 2017, 2016 and 2015.

Table 23 – Ecopetrol Consolidated Crude Oil Purchases

	For the year ended December 31,		
	2017	2016	2015
	(million barrels)		
Ecopetrol Corporate Group			
Crude oil purchased from the ANH	40.3	42.9	45.6
Crude oil purchased from third parties	16.7	15.5	15.6
Crude oil imported from third parties	24.8	22.0	1.8

Import of Diluents

In 2017, Ecopetrol decreased the imports of diluent by 8% (5 mbpd) compared to 2016. Diluent is used to transport our heavy crudes through the pipeline system and the reduction is due to optimizations in dilution processes within the transformation plan last year.

Natural Gas Sales

Ecopetrol sells natural gas to distribution companies through firm, interruptible and conditional contracts. These distributors supply natural gas to the residential market, as compressed natural gas for vehicles market and to large industrials in Colombia. We also market and sell natural gas directly to the industrial sector and to gas-fired power plants.

Ecopetrol's natural gas sales and self-consumption decreased by 2.8% (2.2 mboepd) compared to 2016 due to lower demand from natural gas fired power plants.

Natural Gas Delivery Commitments

The table below sets forth the commitments we have in Colombia under firm contracts with local natural gas distribution companies, local industries, gas fired power generators, and internal agreements with our refineries and fields.

Table 24 – Ecopetrol Consolidated Natural Gas Delivery Commitments

	For the year ended December 31,			
	2018	2019	2020	2021
			(gbtud)	
Volume for sales third parties	437.3	219.0	171.8	114.1
Volume for self-consumption	137.2	137.7	137.7	136.3
Total Commitments	574.5	356.7	309.5	250.4

Neither Equion nor Savia Peru are included in the table above since they do not consolidate within Ecopetrol Group. Data was updated based on current contracts and the official report made to the Ministry of Mines and Energy in 2017. During 2017 the Energy and Gas Regulatory Commission published a new resolution modifying the existing trading rules in the Colombian natural gas market. One of the major changes provided Ecopetrol the opportunity to negotiate and subscribe one-year term agreements starting on December 2018. See the section Business Overview—Applicable Laws and Regulations—Regulation of the Natural Gas Market.

Refined Products

Domestic sales of refined products increased by 8.6 mboepd, an increase of 2.9% compared to 2016. This increase is primarily the result of: (i) a 2.7%, or 3.8 mboepd, increase in middle distillates sales mainly due to the reactivation of oil service and the mining sector, (ii) a 2.2%, or 2.4 mboepd, increase in gasoline as a result of a decrease in the production of ethanol for gasoline blending, (iii) a 32.8%, or 2.1 mboepd, increase in fuel oil sales mainly as a result of new contracts, (iv) a 3.1%, or 0.5 mboepd, increase in LPG sales primarily as a result of the stabilization of production at Reficar and imports of LPG carried out by Ecopetrol to meet the national demand deficit, and (v) a 1.6%, or a 0.3 mboepd, decrease in petrochemicals sales, due to a decrease in asphalt and aromatic solvents sales by Ecopetrol S.A, as a consequence of non-execution of 4G road construction projects and contraction of the domestic demand and availability problems for aliphatic solvent.

Exports of products decreased by 25.7% compared to 2016 (18.7 mbd from Reficar and 17.7 mbd from Ecopetrol) primarily due to a decrease in our exports of fuel oil and high sulfur diesel. The 40% or 27 mbd, decrease in our fuel oil exports was primarily due to start up activities at our Coker Unit. The 39% or 11 mbd, decrease in our diesel exports was primarily due to our production of ultralow sulfur diesel for our local market.

3.4.3 Reserves

The reserves audit process was conducted in accordance with SEC definitions and rules set forth in Rule 4-10(a) of Regulation S-X and the disclosure guidelines contained in the SEC's Modernization of Oil and Gas Reporting final rule dated December 31, 2008 and effective as of January 1, 2010.

The estimated reserve amounts presented in this report, as of December 31, 2017, are based on the average prices during the 12-month period prior to the ending date of the period covered in this report, determined as the unweighted arithmetic averages of the prices in effect on the first day of the month for each month within such period, unless prices were defined by contractual arrangements, as required by the SEC regulations.

Our crude oil and natural gas net proved reserves include reserves from our subsidiaries located in the United States (Gulf of Mexico) and Peru, and Equion and Hocol's assets in Colombia.

Estimated Net Proved Reserves

The following table sets forth our estimated net proved developed reserves of crude oil and gas by region for the years ended December 31, 2017, 2016 and 2015.

Table 25 – Net Proved Developed Reserves

Net Proved Developed Reserves	Colombia	North America	South America excluding Colombia	Total
Net Proved Developed oil reserves in million barrels oil equivalent				
At December 31, 2015	849	3	6	858
At December 31, 2016	710	6	7	723
At December 31, 2017	747	10	6	763
Net Proved Developed NGL reserves in million barrels oil equivalent				
At December 31, 2015	54	0	1	55
At December 31, 2016	55	0	1	56
At December 31, 2017	54.6	0	0.8	55.4
Net Proved Developed gas reserves in billion standard cubic feet				
At December 31, 2015	3,156	16	5	3,176
At December 31, 2016	3,114	9	8	3,131
At December 31, 2017	3,143	10	5	3,158
Net Proved Developed oil, NGL and gas reserves in million barrels oil equivalent				
At December 31, 2015	1,457	5	7	1,470
At December 31, 2016	1,311	8	10	1,329
At December 31, 2017	1,353	11	8	1,372

The conversion rate used is 5,700 standard cubic feet = 1 barrel of oil equivalent.

We are required, as are all oil companies undertaking exploratory and production activities in Colombia, to pay a percentage of our production to the Government as royalties. However, the ANH's Resolution 877 of 2013, Resolution 351 of 2014 and Resolution 640 of 2014 require natural gas royalties to be paid in cash, which means that the determination of the property rights to the quantities of natural gas we produce is based on the total volume produced without deductions on account of royalties. The main producing gas fields are Cusiana, Cupiagua, Pauto, Chuchupa, Gibraltar, Ballena and Mamey.

Ecopetrol S.A. owns 100% of Cenit, a subsidiary that operates in Colombia and is dedicated to the storage and transportation of hydrocarbons through pipelines. Cenit provides transportation services for the entire Ecopetrol Group and we fully consolidate Cenit into our consolidated results of operations. Therefore, the difference between the tariffs set by the Ministry of Mines and Energy and the real transportation costs (fixed and variable operating expenses) does not affect our consolidated income statement. Thus, in presenting our reserves information in 2016 and 2017 annual report, we have used our real transportation costs, rather than the regular tariffs set by the Ministry of Mines and Energy.

The following table summarizes our proved oil, NGL and natural gas reserves, which includes 304 billion standard cubic feet of fuel gas within our natural gas results and 562 billion cubic feet of royalties, as of December 31, 2017.

Table 26 – Proved Oil, NGL and Natural Gas Reserves

Reserves Category	Oil (million barrels)	NGL (million barrels)	Natural Gas (bcf)	Total Oil and Gas (Mmboe)
PROVED DEVELOPED RESERVES				
Total (Colombia)	747	54.6	3,143	1,353
International:				
North America	10	0	10	11
South America	6	0.8	5	8
TOTAL PROVED DEVELOPED RESERVES	763	55.4	3,158	1,372
PROVED UNDEVELOPED RESERVES				
Total (Colombia)	247	19	93	282
International:				
North America	4	0	3	5
South America	0	0	0	0
TOTAL PROVED UNDEVELOPED RESERVES	251	19	96	287
TOTAL PROVED RESERVES	1,014	74	3,253	1,659

The conversion rate used is 5,700 standard cubic feet = 1 barrel of oil equivalent.

Reserves Replacement

The reserves replacement ratio is defined as the sum of additions and revisions of proved reserves divided by produced volumes in any given period. The following table presents the changes in reserves in each category relating to the reserve replacement ratio for the years 2017, 2016 and 2015.

Changes in Proved Reserves

Table 27 – Changes in Proved Reserves

	As of December 31,		
	2017	2016	2015
<i>Consolidated Company (million barrels oil equivalent)</i>			
Revisions of previous estimates	174	(54)	(25)
Improved Recovery	73	11	16
Extensions and discoveries	44	27	24
Purchases	4	-	-
Total reserves additions	295	(16)	16
Production	(234)	(235)	(251)
Net change in proved reserves	61	(251)	(235)

The reserves replacement ratio for 2017 was 1.26 compared to (0.07) in 2016. The average replacement ratio for the last three years was 0.42.

Table 28 – Reserves Replacement Ratio (including purchase and sales)

	As of December 31,		
	2017	2016	2015
Annual	1.26	(0.07)	0.06
Three year average	0.42	0.48	0.97

Revisions of Previous Estimates

In 2017, revisions increased reserves by 174 million boe, mainly as a result of:

- (i) An increase of 49 million boe due to the continuous development of the Castilla, Chichimene, Rubiales, Caño Sur and Akacias fields of which a 32 million boe increase in reserves is due to the new development projects in the Caño Sur and Akacias fields, and a 17 million boe increase in reserves is due to development activities and improved reservoir performance in the Chichimene, Castilla and Rubiales fields.
- (ii) An increase of 23 million boe due to improved natural gas sales in the Cupiagua and Pauto fields, which in turn was due to better performance and improved output of such fields. Additionally, new gas and NGL projects in the Cupiagua Sur field led to a 27 million boe increase in reserves. Revisions in the Nutria, Llanito, Tibu, Casabe and Cohembi fields as a result of drilling activities and better production performance accounted for a 23 million boe increase in reserves.
- (iii) The remaining 30%, or 52 million boe, increase in reserves was due to varying increases and decreases from other fields.

Improved Recovery

In 2017, improved recovery increased reserves by 73 million boe. The additions were associated with new proved areas under waterflooding in the Chichimene and Castilla fields (47 million boe increase).

The continued development of waterflooding projects at existing wells in the Tibu, La Cira, Infantas, Casabe and Guando SW fields, accounting for a 24 million boe increase. The remaining 3%, or 2 million boe, increase was due primarily to water injection pilots in the Apiay and Palogrande fields.

Extensions and Discoveries

Extensions and discoveries during 2017 amounted to 44 million boe primarily due to extensions of proved acreage mainly from activities in new proved areas in the Rubiales, Castilla, Pauto, Cajua and Arrayan fields, which accounted for 39 million boe of the total of 44 million boe from extensions of proved acreage. The remaining 5 million boe corresponds to smaller changes in several other fields.

Purchases

Ecopetrol S.A.'s purchases of minerals in 2017 included the acquisition of an additional participation of 11.6% in the K2 Field by Ecopetrol America Inc which represented 4 million boe.

Development of reserves

As of December 31, 2017, our total proved undeveloped oil and gas reserves amounted to 287 million boe, 24% of which is related to the drilling activities in the Castilla field, 11% is related to gas sale projects in the Pauto and Cupiagua fields and 42% of which is related to the development activities in the Rubiales, Caño Sur, Chichimene, Yarigui, Tibu, Nutria, Palagua and Quifa fields. The Moriche, Ocelote, Akacias, Dina, Casabe, Llanito, La Cira and Cajua fields collectively accounted for 11% of total proved undeveloped oil and gas reserves with the remaining 12% from several other fields.

Our proved undeveloped reserves represent 17% of our total proved reserves.

The Ecopetrol's year-end development plans are consistent with SEC guidelines for the development of proved undeveloped reserves within five years.

The following table reflects the developed and undeveloped proved reserves estimates through the past three fiscal years.

Table 29 – Developed and Undeveloped Proved Reserves

Proved Reserves as of December 31,	Oil	NGL	Gas	Total
	Mmbbls	Mmbbls	Bcf	Mmboe
2017 proved reserves				
Developed	763	55	3,158	1,372
Undeveloped	251	19	96	287
2016 proved reserves				
Developed	723	56	3,131	1,329
Undeveloped	241	13	87	269
2015 proved reserves				
Developed	858	55	3,176	1,470
Undeveloped	308	18	303	379

Of the total amount of proved undeveloped reserves that Ecopetrol had at the end of 2016 (269.3 million boe), we converted approximately 53 million boe, or 20%, to proven developed reserves during 2017 (286.6 million boe), primarily associated with the development of crude oil and gas projects in the Castilla, Rubiales, Pauto, Quifa, La Cira Infantas and K2 fields. These projects accounted for approximately 89% of the total conversion while the remaining 11% is associated with development execution in other fields such as the Chichimene and Ocelote fields, among others. The amount of investments made during 2017 to convert proved undeveloped reserves to proved developed reserves was US\$494 million.

Changes in Undeveloped Proved Reserves

The following table reflects the main changes in undeveloped proved reserves during 2017.

Table 30 – Changes in Undeveloped Proved Reserves in 2017

<i>Consolidated Companies(million barrels oil equivalent)</i>	
Revisions of previous estimates	9
Improved recovery	36
Extensions and discoveries	25
Proved Undeveloped converted to Proved Developed	(53)
Net change in unproved reserves	17

The conversion rate used is 5,700 standard cubic feet = 1 barrel of oil equivalent.

Reserve Estimation Process

Ecopetrol's reserves process is coordinated by the Corporate Reserves Manager, a highly experienced geologist and engineer, who reports to the Upstream Chief Financial Officer. The reserves audit group is comprised of reserves coordinators who are geologist and petroleum engineers, each with more than 10 years of experience in reservoir characterization, field development, estimation and reporting of reserves and who support the professionals involved in the estimation and reporting process.

Reserves are first estimated internally, supervised and coordinated by the Manager of Reservoirs, a geologist who holds a Master's degree in geology and has more than 20 years of experience in projects associated with reservoir characterization and development, estimation, and reporting of reserves. The employees involved in the reserves process meet the Society of Petroleum Engineers qualifications for reserves estimators. Internally estimated reserves are submitted to an external audit process, which was conducted by the external engineers (Ryder Scott and DeGolyer and MacNaughton). According to our corporate policy, we report the reserves values obtained from the external engineers, even if they are lower than our internal estimated reserves.

The reserves estimation process ends when the Corporate Reserves Manager consolidates the results and together, with the Technical Vice-President, presents the outcome to the Reserves Committee, which comprises the CEO, Vice-President of Development and Production, Chief Financial Officer and the Upstream Chief Financial Officer. Results are later presented to the Audit and Risk Committee of the Board of Directors and finally approved by the Board of Directors.

Petroleum engineering consultants DeGolyer and MacNaughton and Ryder Scott have audited Ecopetrol's proved reserves as of December 31, 2017. These external engineers audited 99% of our estimated net proved reserves. The reserves reports of the external engineers are included as exhibits to this annual report. The external engineers DeGolyer and MacNaughton and Ryder Scott audited 99% of our estimated net proved reserves for the year ended December 31, 2017, 2016 and 2015.

Ecopetrol uses deterministic methods that are commonly used internationally to estimate reserves. These methods have some uncertainty with respect to degradation, and thus, the estimates should not be interpreted as being exact amounts. However, the technology used to estimate reserves is considered reliable. The majority of the producing proved reserves were estimated by applying appropriate decline curves or other performance relationships. In analyzing decline curves, reserves were estimated by calculating economic limits that are based on current economic conditions. In certain cases, where the methods previously employed could not be used, reserves were estimated by analogy with similar reserves for which more complete data was available.

Estimates of reserves were prepared by geological and engineering standard methods commonly used in the oil and gas industry. The method or combination of methods used in the analysis of each reserve was adopted from experience analogy reserves, including information on the stage of development, quality and completeness of basic data and production history.

The following table reflects the estimated proved reserves of oil and gas as of December 31, 2015 through 2017, and the changes therein.

Table 31 – Estimated Proved Reserves of Oil and Gas

Consolidated companies	Colombia	North America	South America excluding Colombia	Total
Net proved oil, NGL and gas reserves in Mmboe				
At December 31, 2015	1,821	14	14	1,849
Revisions	(51)	(0.7)	(2.5)	(54)
Improved Recovery	11	0	0	11
Extensions and discoveries	27	0	0	27
Production	(231)	(2.3)	(1.7)	(235)
At December 31, 2016	1,577	11	10	1,598
Revisions	170	4.6	(0.3)	174
Improved Recovery	73	0	0	73
Extensions and discoveries	44	0	0	44
Purchases	0	4	0	4
Production	(229)	(4)	(1.5)	(234)
At December 31, 2017	1635	16	8	1659

For more information regarding the potential impacts of oil prices on our reserve estimates, see the sections *Financial Review—Trend Analysis and Sensitivity Analysis* and *Risk Review—Risk Factors*.

3.4.4 *Joint Venture and Other Contractual Arrangements*

We conduct our exploration and production business through a variety of types of contractual arrangements with the Colombian government or with third parties. Below is a general description of each type of contractual arrangement to which we were a party as of December 31, 2017:

Association Contract

The purpose of this type of contract, created by the Decree 2310 of 1974, is the exploration of the areas covered by the contract, and the exploitation of hydrocarbons found in that area. This type of contract, together with E&P contracts and Special Contracts (Casabe and La Cira) which are described below, are the most significant in terms of our production and proved reserves.

Under association contracts, the exploratory risk is assumed entirely by Ecopetrol S.A.'s contractual partner, the associate. If there is a discovery and Ecopetrol S.A. agrees that the relevant field is commercially viable, Ecopetrol S.A. will participate in the field's development. A joint account will be created and Ecopetrol S.A. and the partner will participate in the expenses and investments in the proportions established in the corresponding contract. Ecopetrol S.A. will reimburse the direct exploratory expenses incurred by the contractual partner in the proportions established by the contract.

If Ecopetrol S.A. does not believe that the relevant field is commercially viable, the partner has the right to execute on its own all activities considered necessary for the field's exploitation as a "sole risk operation", and to be reimbursed for a defined percentage of all investments for such sole risk operation in accordance with the corresponding contract.

Every association contract provides for an executive committee that makes all technical, financial and operational decisions if Ecopetrol S.A. has agreed that a field is economically viable. All major decisions of this committee must be made unanimously by the parties.

The maximum term of an association contract is 28 years. The first six years of the contract are for the exploratory phase, and are extendible for 1 or 2 more years at the partner's request. The remaining time is for the exploitation phase.

Incremental Production Contract

We enter into incremental production contracts to obtain incremental hydrocarbon production beyond a base production curve that is established based on the proven reserves of a specific field or well. Under this type of arrangement, Ecopetrol S.A. owns 100% of the hydrocarbons defined by the base production curve. The incremental production (i.e. the hydrocarbon volume obtained beyond the basic production as a result of investment activities), will be owned by the parties to such incremental production contract in the proportions established by such contract.

The initial phase of an incremental production contract has a term of up to 3 years, in which the contractual partner executes an initial work program approved by Ecopetrol S.A. in order to gain the right (but not the obligation) to continue with the second phase. If Ecopetrol's partner decides to continue with the project for the second phase (the complementary phase), it must inform Ecopetrol S.A. in writing no later than 90 days prior to the termination date of the initial phase and deliver a proposed development plan for each covered field. The second phase is the production phase and has a maximum term of 22 years minus the length of the initial phase.

Incremental production contracts provide for an executive committee that is responsible for taking all decisions in order to approve, control, and supervise all operations that take place during the duration of the contract. These contracts also provide for a steering committee, which is responsible for the supervision of the execution of the work programs, the annual budget, and other items.

Risk Production Contract for Discovered Undeveloped and Inactive Fields (First Round 2003)

We have entered into risk production contracts for discovered undeveloped fields to promote exploration by private companies of both undeveloped and inactive fields. Under these contracts, the contracting party assumes all costs and expenses for the development and operation of a field in exchange for a percentage interest in the field's production as specified in the contract. This type of contract has a ten-year term calculated as from its date of execution; one year for the evaluation period and a maximum of nine years for the development period. Some of these contracts have subsequently been extended beyond their original term.

Operation for Risk Production Contracts for Discovered Undeveloped and Inactive Fields (Second Round 2005)

The contracts awarded in the second round of undeveloped and inactive discovered fields are service contracts wherein services rendered are payable with a percentage of the production. Ecopetrol S.A. keeps all rights to explore and exploit hydrocarbons found in the area.

These contracts have a 10 year term, including an evaluation period of 8 months, within which the operator has to comply with a minimum commitment to conduct a technical evaluation of the field at its own risk.

Other than facilities associated with drilled wells, the facilities built during the term of the contract will be owned by the operator, who will remain responsible for them, even after contract ends. Only drilled wells become property of Ecopetrol S.A. upon the contract's termination.

Risk Participation Contract

The purpose of this contract is the exploration of the contracted area, and the exploitation of the oil found in the contracted area. Unlike in the association contract, Ecopetrol S.A. shares exploratory risks and costs with the contractual partner, the associate, together with the oil produced, in the proportions established by the contract.

Risk participation contracts provide for an executive committee which is created upon the execution of the contract.

These contracts have a 28 year term, including an exploratory period of six years (which period is extendible under certain contracts for one or two years), after which the exploitation period commences.

Special Contracts

We are party to a Joint Venture Contract for Exploration and Exploitation of "La Cira-Infantas" Area; and a Services and Technical Collaboration Contract for the "Casabe" field.

Joint Venture Contracts for Exploration and Exploitation of "La Cira-Infantas" Area and of "Teca-Cocorná" Area

These contracts between Ecopetrol S.A. and Occidental Andina LLC, executed on September 6, 2005 and June 24, 2014, respectively, have as their purpose, a joint collaboration between the parties with the goal of increasing the economic value of the La Cira-Infantas field and the Teca-Cocorná field by means of hydrocarbon exploration and production activities, including, among others, an incremental production project to improve the recovery factor, process optimization, and exploratory activities.

Ecopetrol S.A. partially assigned its exploratory and production rights in the Contracted Areas to Occidental Andina LLC. Ecopetrol S.A. provides financial resources and the preferential rights of use for the existing infrastructure in that zone and Occidental Andina LLC provides financial resources and the technical and operative experience in mature fields redevelopment projects and enhanced recovery technologies.

Ecopetrol S.A. is the operator under both Joint Venture Contracts, and on behalf of the parties is responsible for the conduction, execution and control, directly or via contractors, of the operational activities.

The La Cira-Infantas contract's term is divided in three phases. The first phase lasts 180 days, the second 730 days and the third up to the economical limit.

The incremental production, after deduction of the royalties, is owned 52% by Ecopetrol S.A. and 48% by Occidental Andina LLC. These same percentages apply to the participation in the operational and direct expenses. Adjustments to the participations for the benefit of Ecopetrol S.A. will occur if there are high production levels or high prices.

The Teca-Cocorná contract's term is divided in two phases. The first phase lasts three years, extendable for up to an additional year, the second 20 years counted as from the initiation for the second phase and will be reduced by the term of any extensions of the first phase.

The incremental production, after deduction of the royalties, is owned 60% by Ecopetrol S.A. and 40% by Occidental Andina LLC. These same percentages apply to the participation in the operational and direct expenses. Adjustments to the participations for the benefit of Ecopetrol S.A. will occur if there are high production levels and high prices.

Services and Technical Collaboration Contract "Casabe"

The purpose of the contract executed between Ecopetrol S.A. and Schlumberger Surencó S.A. on April 26, 2004, is the evaluation, design and execution of work programs specifically with the purpose of increasing the value in the Casabe field by means of hydrocarbon exploration and production activities to obtain incremental production, application of new technologies, application of techniques for deposits management and operational costs reduction. Ecopetrol S.A. is the operator and Schlumberger Surencó S.A. keeps the right of first option regarding the activities to be executed in the area of interest.

Both parties can invest in all the activities seeking to evaluate, obtain and incorporate incremental value in the area of interest. Such activities are developed directly by the parties or via contractors (Ecopetrol) or subcontractors (Schlumberger). Amounts expended pursuant to the contract are reimbursed depending on the incremental value (monthly valuation in US\$ of the results obtained from the execution of the work programs) created through the contract and the activities executed thereunder.

Both Ecopetrol S.A. and Schlumberger Surencó S.A. commit to assume full responsibility for damages and/or losses suffered by their respective personnel and goods in development of the contract, regardless of the cause. The maximum authority is the Management Committee.

The contract had an initial term of 10 years, and was amended several times to include an additional term of six years for which a new business was structured.

The National Hydrocarbons Agency (ANH) and its Contracts

The National Hydrocarbon Agency ("ANH") was created by Decree Law 1760 of 2003 and was given the authority to administer all national hydrocarbon reserves under contracts executed beginning on January 1, 2004. Decree Law 1760 of 2003 states, "The Empresa Colombiana de Petróleos, Ecopetrol, is split, its organic structure is modified, and the Agencia Nacional de Hidrocarburos and the Sociedad Promotora de Energía de Colombia S.A. are created". Prior to January 1, 2004, Ecopetrol S.A. had the authority to contract with third parties for the exploration and production of new areas.

The creation of the ANH did not modify the rights or obligations of Ecopetrol or other parties with respect to contracts in existence before January 1, 2004 when the ANH was created and therefore Ecopetrol retains the authority to execute agreements with respect to all areas that it held prior to that date.

Below, we include a brief description of each type of contract that we have entered into with the ANH:

Technical Evaluation Agreement

This type of contract grants to the contractor the right to develop technical evaluation operations with operational autonomy at its own cost and risk, seeking to appraise the hydrocarbon potential, with the purpose of identifying the zones of prospective interest in the area by means of the execution of an exploratory program. The contractor has the option to request the conversion of a technical evaluation agreement (“Technical Evaluation Agreement” or “TEA”) into one or more E&P Contracts that cover the area of the TEA (or a portion thereof).

The contractor can conduct evaluation activities for terms that vary between 18, 24 and 36 months, depending on the terms of reference of the ANH’s bidding round.

E&P Contract

The ANH enters into concession contracts pursuant to which the Nation grants exploration and production rights, and receives royalties and taxes. In turn, the contractor provides 100% of the investment and expenses resources, and receives 100% of the production after royalties and taxes. The ANH has named this contract an “Exploration and Production Contract” (E&P Contract).

Pursuant to the first stage of this contractual model, the ANH only receives a percentage of oil revenues in two cases:

- (i) When the international oil prices rise beyond a specified price, above which the ANH has a right to participate in a share of the increased revenues generated, or
- (ii) In the case of recognition of production rights in an extended contractual phase.

Under all E&P contracts executed since ANH’s 2008 bidding round, the ANH receives a percentage of the production from the beginning of the contract, upon the commencement of the production phase, and not only in the extension phase of the contract as mentioned in the previous paragraph. In addition, ANH has economic rights when the price of oil exceeds a reference price set in the contract (high price fee) and the superficiary canon.

E&P contracts have two phases: (i) an exploration period, which term is 6 years counted from the effective date, renewable for two additional years, and (ii) a production period, which is, with respect to each production field, 24 years plus any extensions, which are counted from the date of declaration of commerciality of the corresponding field. The above-mentioned terms have been modified during ANH’s 2014 bidding round for unconventional and offshore reservoirs to an exploration period of nine years and a 30 years production period.

ANH and Ecopetrol Agreements (Convenios)

At the time of termination or extension of any association contract executed by Ecopetrol S.A. before December 31, 2003, the rights over the production area and over the movable and immovable assets therein will continue to belong to Ecopetrol S.A.

Pursuant to article 2 of Decree 2288 of 2004, which regulates Decree Law 1760 of 2003, Ecopetrol S.A. must execute an agreement with the ANH to regulate the exploration and exploitation terms and conditions of the relevant area, which was previously subject to an association contract.

Decree 2288 of 2004 also established that Ecopetrol S.A. would have to execute agreements with ANH covering fields directly operated by Ecopetrol S.A. Under these agreements ANH recognizes the exclusive right of Ecopetrol S.A. to explore and exploit the hydrocarbons property of the Nation that are obtained in the areas they cover, until resource depletion or until Ecopetrol S.A. returns the area to the Nation through the ANH.

These agreements also provide the conditions under which Ecopetrol S.A. is able to assign, partially or completely, its rights and duties thereunder to third parties.

3.5 Transportation and Logistics

3.5.1.1 Transportation Activities

The transportation and logistics segment includes the transportation of crude oil, motor fuels, fuel oil and other refined products including diesel, jet and biofuels. We conduct most of these activities through our wholly-owned subsidiary Cenit and its subsidiaries.

The map below shows the locations of the main transportation networks owned by our business partners and us.

Graph 5 – Map of Oil Pipelines



Graph 6 – Map of Multipurpose Pipeline



The table below sets forth the volumes of crude oil and refined products transported through the crude oil pipelines and multipurpose pipelines owned by us.

Table 32 – Volumes of Crude Oil and Refined Products Transported

	For the year ended December 31,		
	2017	2016 (thousand bpd)	2015
Crude oil transport ⁽¹⁾	823.3	867.0	978.0
Refined products transport ⁽²⁾	268.2	263.1	253.8
Total	1,091.5	1,130.1	1,231.8

(1) The crude oil transported volumes correspond to the following systems: Ocaña Segment 3, ODC, Vasconia-Galan, Ayacucho-Galan, Ayacucho-Coveñas and Trasantino Pipeline.

(2) The pipelines transporting refined products include the following: Galan-Sebastopol, Galan-Salgar, Galan-Bucaramanga, Buenaventura-Yumbo and Cartagena-Baranoa.

The volume of crude oil transported by Cenit’s main systems and those of affiliates decreased in 2017 by 5% compared to the previous year. This decrease was mainly the result of attacks on the Caño Limon – Coveñas pipeline causing that pipeline to be out of operation for 193 days. Additionally, we experienced a decrease in the volume of crude oil transported out of the Oleoducto Trasantino (“OTA”) pipeline. Of the total volume of crude transported by oil pipeline, approximately 60% belonged to Ecopetrol’s corporate group.

The volume of refined products transported by Cenit increased by 1.9% in 2017 mainly due to growth of local fuel demand. This increase was partially offset by operating conditions such as, among others, an increase in inventories of certain customers, and the presence of illicit valves in the Oriente pipelines. Of the total volume of refined products transported in multi-purpose pipelines during the year, 23% belonged to Ecopetrol’s corporate group.

Transportation Capacity

During 2017, we increased the capacity of our primary and secondary oil pipelines and loading facilities due to the expansion of Ocesa's capacity, which in turn was due to the commencement of project P135 that contemplated the repowering of the entire system including the entry of three new pumping stations in segments two and three. Our main crude oil pipeline systems' operating capacity increased from 1,369,000 bpd in 2016 to 1,500,000 bpd in 2017.

Our main refined products pipeline transportation capacity increased from 515 thousand bpd in 2016 to 518.6 thousand bpd in 2017. This increase in capacity was primarily the result of a new validation of the capacities of some of our pipelines with drag reducing agents.

References to our crude oil transportation capacity in this annual report refer to the capacity of the pipelines that belong to Cenit and its subsidiaries to transport crude oil volumes either to the Barrancabermeja refinery or to our export facilities. In addition, we have other feeder systems that transport oil volumes from producing facilities or other pumping stations to these main pipelines. References to our refined products transportation capacity refer to the capacity of pipelines that begin in the Galan station (Barranca refinery) and Cartagena station (Cartagena refinery).

3.5.1.2 Pipelines

As of December 31, 2017, we, directly or indirectly with private partners, own, operate and maintain an extensive network of crude oil and refined products pipelines. These pipelines connect our own and third-party production centers, import facilities and terminals to refineries, major distribution points and export facilities in Colombia. Cenit directly owns 45% of the total crude oil pipeline shipping capacity in Colombia. When aggregated with the crude oil pipelines in which Cenit owns an interest, Cenit owns 82% of the oil pipeline shipping capacity in Colombia. By December 31, 2017, our network of crude oil and multipurpose pipelines was approximately 8,939 kilometers in length. The transportation network consists of approximately 5,228 kilometers of main crude terminals and oil pipeline networks connecting various fields to the Barrancabermeja refinery and Reficar, as well as to export facilities. We also own 3,712 kilometers of multipurpose pipelines for transportation of refined products from the Barrancabermeja refinery and from Reficar to major distribution points. Out of the 5,228 kilometers of crude oil pipelines, owned by us, 3,016 kilometers of crude oil pipeline are wholly owned and 2,212 kilometers of crude oil pipeline are owned through non-wholly owned subsidiaries.

The following table sets forth our main pipelines in which we own an indirect interest as of December 31, 2017.

Table 33 – Our Main Pipelines

Pipeline	Kilometers	Capacity (mbd)	Product Transported	Origin	Destination	Indirect Ownership Percentage
Caño Limón-Coveñas	771	250	Crude Oil	Caño Limón	Coveñas	100.00%
Oleoducto de Alto Magdalena (OAM)	391	110	Crude Oil	Tenay	Vasconia	87.29%
Oleoducto de Colombia (ODC)	483	236	Crude Oil	Vasconia	Coveñas	73.00%
Oleoducto Central –Ocesa (*Segment 2)	848	745	Crude Oil	Cupiagua	Coveñas	72.65%
Oleoducto de los Llanos (ODL)	260	314 ⁽¹⁾	Crude Oil	East fields	Monterrey Cusiana	65.00%
Oleoducto Bicentenario de Colombia	230	110 ⁽²⁾	Crude Oil	Araguaney	Banadia	55.97%

(1) Transportation capacity for this pipeline is measured by using crude oil viscosity of 690 cStk (30° C).

(2) Represents the contractual crude oil transportation capacity for the pipeline currently in operation.

As of December 31, 2017 we owned 72 stations, 38 located in crude oil pipelines, 30 in refined products pipelines, 2 in crude oil ports and 2 in refined product ports.

As of December 31, 2017, we had a nominal storage capacity associated with the transportation network of 17.6 million barrels of crude oil and 4.4 million barrels of refined products. We do not own any tankers.

The Transportation and Logistic segment implemented a new maintenance operating model with the aim of clarifying roles as well as unifying criteria for planning and execution among the companies of the segment.

Pipeline Projects SAN FERNANDO – MONTERREY

The San Fernando – the Monterrey project's initial objectives included ensuring the ability to transport 300,000 bpd at 300cSt of diluted crude oil from the Chichimene and Castilla fields to the Monterrey pumping station and the transportation of 45,000 bpd of diluent (naphtha) between the Apiay station and the Castilla and Chichimene fields.

The scope of the project includes the construction of a new 30" 119 km crude oil pipeline, a new pumping station to include reception, storage and dilution facilities, the conversion of the existing pipeline of 10" between the Castilla II plant and the Apiay station, and the construction of a new 10" pipeline between Chichimene and San Fernando fields in order to transport diluent (naphtha) from the Apiay station to the San Fernando plant.

During 2017, the systems and subsystems were tested and started to operate according to the defined operational requirements. Currently, the pipeline is operating above 650 cSt.

OLEODUCTO AL PACIFICO SAS

Given the uncertainties around the future results of the exploration and production activities in Colombia and the current expected return of the investment, in December 2017 the parties engaged in the Oleoducto al Pacifico suspended the project. Based on our current view, this decision has had no impact on the oil industry in Colombia and can be reconsidered in the event the transportation system may be necessary.

TRANSPORTATION OF HIGHER VISCOSITY CRUDES

Ocensa executed an ambitious plan that addressed the crude oil basket quality in Colombia, where oil production is mainly comprised of heavy crude oil. In response, Ocensa offered a solution to its clients by developing the AD600 project that leveraged transportation from 300 cSt to 600 cSt. Since March 2017 the Ocensa pipeline regularly operates with this new viscosity specification with normal operational conditions that satisfy our clients' needs.

Adaptations were also made to one of the single buoy moorings of the Coveñas terminal to permit the import of naphtha for dilution at this terminal. Integral capacity tests were executed in March 2017 for the transport of crude with this viscosity, and transport began in the same month.

The main modifications are on: the ODL pipeline (Oleoducto de los Llanos; Rubiales – Cusiana), on Ocensa Segment 1 (Cusiana – Porvenir), Segments 2 & 3 (El Porvenir – Vasconia – Coveñas) and on the Oleoducto de Colombia Pipeline (ODC – Oleoducto de Colombia). This project, combined with the expansion of capacity on Ocensa (P-135), will make it possible to transport higher viscosity crudes.

3.5.1.3 *Export and Import Facilities*

We currently have concessions granted by the Nation for four export/import docks for crude oil and refined products: Coveñas, Tumaco, Pozos Colorados and Cartagena. Our export capacity reached 1.24 million bpd for crude oil. Our import capacity of refined products reached 0.18 million bpd.

Our crude oil loading facilities can load tankers of up to 350 thousand deadweight tonnage (DWT). Adjacent to these loading facilities we also have crude oil storage facilities that are capable of storing 9 million barrels. Our docks used for import and export of refined products can load tankers of 70 thousand DWT. Additionally, these facilities have storage capacity of up to 1.2 million barrels.

3.5.2 Other Transportation Facilities

We have entered into transportation agreements with tanker-truck and barge companies in order to transport crude oil from locations that do not have pipeline connections to refineries and export facilities. The volume of refined products that cannot be transported in pipelines or in tanker trucks because of capacity limitation is transported by barges. During 2017, 24.8 million barrels of crude oil and refined products were transported by tanker trucks and 8.98 million barrels of crude oil and refined products were transported by barges, particularly using the Rio Magdalena, connecting Barrancabermeja with Barranquilla and Cartagena.

3.5.3 Marketing of Transportation Services

Cenit and its subsidiaries' main line of business is the crude oil pipeline transport (74% of revenues), followed by the refined products pipeline transport (17% of revenues) and ports and related services (7% of revenues).

Transportation contracts of crude oil may take several forms: ship or pay (payment for the availability of a fixed capacity in the system), ship and pay (payment for volumes actually transported) or spot. The main users for the crude oil transportation business are Ecopetrol S.A., Metapetroleum Corp., Petrominerales, Occidental de Colombia, Mansarovar and Gran Tierra, who collectively represented 93% of this business segment's revenues in 2017. Transportation services for crude oil provided to Ecopetrol S.A. represented 54% of this business segment's crude oil transport revenues.

Cenit also transports refined products. Its main client for this service is Ecopetrol S.A., which accounted for 42% of refined products pipeline transport revenues in 2017, principally due to the transport of naphtha, diesel and gasoline. Cenit also has 13 other fuel wholesalers' customers for whom it transports other refined products. The most significant of these customers are Organizacion Terpel, ExxonMobil, Chevron Petroleum Company, Biocombustibles S.A.S. and Petrobras Colombia.

Deregulated businesses such as ports and crude loading facilities represent a smaller portion of Cenit's revenue (7% in 2017). Clients for these businesses include some of the same parties for which Cenit provides crude oil and refined products transportation services.

3.6 Refining and Petrochemicals

3.6.1 Refining

Our main refineries are the Barrancabermeja refinery, which Ecopetrol S.A. directly owns and operates, and a refinery in the Free Trade Zone in Cartagena that is operated by Reficar S.A., a wholly owned subsidiary of Ecopetrol S.A., Ecopetrol S.A. also owns and operates two other minor refineries – Orito and Apiay, but these are considered part of the upstream segment since the majority of production is for self-consumption.

Our refineries produce a full range of refined products, including gasoline, diesel, jet fuel, LPG, and heavy fuel oils, among others.

The following table sets forth our daily average installed and actual refinery capacity for each of the last three years:

Table 34 – Daily Average Installed and Actual Refinery Capacity

	For the year ended December 31,								
	2017			2016			2015		
	Capacity (bpd)	Through -put (bpd)	% Use	Capacity (bpd)	Through -put (bpd)	% Use	Capacity (bpd)	Through -put (bpd)	% Use
Barrancabermeja	250,000	209,838	84%	250,000	213,091	85%	250,000	221,900	89%
Reficar ⁽¹⁾	150,000	135,700	90%	150,000	117,188	78%	165,000 ⁽³⁾	10,428	6%
Apiay ⁽²⁾	2,500	997	40%	2,500	1,382	55%	2,500	1,604	64%
Orito ⁽²⁾	2,500	948	38%	2,500	1,090	44%	2,500	929	37%
Total	405,000	347,483	86%	405,000	332,751	82%	420,000	234,861	56%

(1) Reficar's operations were fully stabilized during the second half of 2017.

(2) Apiay and Orito are considered to be part of the upstream segment, not the refining segment, and the majority of products are for local on-site consumption.

(3) The capacity indicated in 2015 was 165 thousand barrels per day which includes a design safety factor of 10%.

3.6.1.1 *Barrancabermeja Refinery*

The Barrancabermeja refinery supplies 55% of the fuels consumed in Colombia according to internal calculations made by the Barrancabermeja refinery and Colombia's fuels consumption reported by the Ministry of Finance.

The following table sets forth the production of refined products of Barrancabermeja for the periods indicated.

Table 35 – Production of Refined Products from Barrancabermeja Refinery

	For the year ended December 31,		
	2017	2016 (bpd)	2015
LPG, Propylene and Butane	10,712	11,956	13,623
Gasoline Fuels and Naphtha	56,047	59,305	59,487
Diesel	56,090	48,233	46,212
Jet Fuel and Kerosene	20,421	20,435	22,388
Fuel Oil	38,217	55,730	64,306
Lube Base Oils and Waxes	609	668	521
Aromatics and Solvents	2,847	2,879	3,197
Asphalts and Aromatic Tar	26,468	14,092	9,519
Polyethylene, Sulfur and Sulfuric Acid	1,509	1,541	1,318
Total	212,920	214,839	220,571
Difference between Inventory of Intermediate Products	(405)	(661)	142
Total Production	212,515	214,178	220,713

In 2017, total production from the Barrancabermeja refinery decreased by 0.8% from 214,178 bpd in 2016 to 212,515 bpd in 2017 primarily due to lower throughput caused by less feedstock of light and intermediate crudes, which in turn was consequence of insurgent actions on the Caño Limon-Coveñas pipeline.

We own and operate four petrochemical plants and one paraffin and lube plant located within the Barrancabermeja refinery. In 2017, we produced 53,417 tons of low-density polyethylene, a decrease of 4% compared to the production of 55,642 tons in 2016. This decrease was due primarily to a reduction in the operational availability of the turboexpander unit. We produced 857 kboepd of aromatics (benzene, toluene, xylene, orthoxylene, heavy aromatics and cyclohexane), a 57% decrease as compared with the production of 1,994 kboepd of aromatics in 2016. The decrease was mainly the result of lower load and availability of light crude oils (particularly from the Caño Limon pipeline) as explained above.

The gross refining margin decreased from US\$14 per barrel in 2016 to US\$13.5 per barrel in 2017, primarily due to price differentials of refined products as compared to crude oil, in line with international market trends, and the increase in the local crude price by US\$6 per barrel in 2017 as compared to 2016.

The average conversion ratio for Barrancabermeja refinery was 82.7% in 2017 and 74.6% in 2016. This increase in the conversion ratio was primarily due to an increase in the yield of medium distillates and a decrease in the production of fuel oil by redirecting efforts to higher-value currents.

3.6.1.2 Reficar

The following table sets forth the production of refined products from Reficar for the periods indicated.

Table 36 – Production of Refined Products from Reficar

	For the year ended December 31, ⁽¹⁾		
	2017	2016	2015
		(bpd)	
LPG, Propylene and Butane	6,791	6,080	0
Gasoline Fuels and Naphta	43,728	35,012	1,558
Diesel	60,467	40,950	2,282
Jet Fuel and Kerosene	6,700	5,768	1,202
Fuel Oil	10,150	24,602	2,826
Sulfur	446	241	0
Total	128,282	112,653	7,868
Difference between Inventory of Intermediate Products	3,916	911	2,476
Total Production⁽²⁾	132,198	113,564	10,344
Petcoke (Metric tons)	704,073	601,163	0

(1) The table shows the entire production of Reficar.

(2) Does not include petcoke.

During the second half of 2017, the refinery finalized its stabilization period.

The following tables set forth the imports and sales of refined products from Reficar for the periods indicated.

Table 37 – Imports and Sales of Refined Products from Reficar

	For the year ended December 31,		
	2017	2016	2015
		(bpd)	
Imports			
Motor Fuels	212	3,641	15,112
Diesel	-	6,155	21,979
Jet Fuel and Kerosene	847	2,211	4,384
Alkylate	-	83	-
LPG and Butane	618	355	-
Total Imports	1,677	12,445	41,475

During 2017, Reficar imported products to cover the North Coast sales demand.

	For the year ended December 31,		
	2017	2016 (bpd)	2015
Sales			
Motor Fuels	44,051	38,534	16,101
Diesel	60,289	46,060	22,692
Jet Fuel and Kerosene	7,489	7,479	5,012
Fuel Oil	7,528	16,593	2,066
Other Products	27,099	22,990	2,281
Total Sales	146,456	131,656	48,152

During its stabilization period in the second half of 2017, Reficar reached the goal of completing individual unit performance tests (for 100% of units), and the Global Performance Test on December 5, 2017. During the Global Performance Test, Reficar maintained an average throughput of 144 thousand barrels per day for 60 days.

In terms of gross refining margin, the refinery progressed from an average of approximately to US\$5.3 per barrel in 2016 to US\$9.5 per barrel in 2017. Throughput also improved during 2017, increasing from an average of 117 kbpd in 2016 to 136 kbpd in 2017.

Reficar's 2017 financials already reflect the operation of the new units, thus total sales have increased 44% as compared to 2016, from US\$2,142 million in 2016 to US\$3,085 million in 2017. A total of 49.5 million barrels of crude were processed in 2017 compared to 42.9 million barrels processed in 2016. Exports to international markets represented 36% of total sales (US\$ 1,111 million). During 2017, the refinery's production has substituted 1.6 million barrels of gasoline and 8.8 million barrels of diesel, which previously had to be imported in order to supply the domestic demand. As per information provided by the Colombian Government (specifically by the National Statistics Department –DANE-), Reficar and Barrancabermeja contributed 0.9 percentage points to the National Industrial GDP growth for 2017.

Financing

On December 30, 2011, with the approval from the Colombian Ministry of Finance and Public Credit, Reficar executed a US\$3.5 billion project finance to partially fund the expansion and modernization of the refinery in Cartagena, loans with tenors of 14 and 16 years from Commercial Banks and Export Credit Agency Facilities, respectively. The aggregate amount drawn under these finance agreements totaled US\$3,496.6 million. These credit agreements included a mechanism by which Reficar can exit the facility by transferring the debt to the Ecopetrol parent level by either (i) the occurrence of a mandatory debt assumption event or (ii) a voluntary debt assumption. As part of Ecopetrol Group's strategy to optimize its capital structure, on December 13, 2017, with the approval of the senior lenders and the Colombian Ministry of Finance and Public Credit, Ecopetrol S.A. voluntarily assumed Reficar's senior debt. The principal amount repaid by Reficar during 2016 was US\$269 million and during 2017 was US\$130 million. Interest payments during 2016 and 2017 were US\$87 million and US\$42 million, respectively. As of the date of the voluntary assumption, Reficar owed the senior lenders a principal amount of US\$2,666 million (in nominal terms).

As a result, debt service paid by Reficar during 2017 was lower as compared to 2016 because Ecopetrol assumed the debt service payment due on December 20, 2017, as described above.

During 2017, Reficar received capital injections of US\$269 million to cover project capital expenditures, start-up costs, one-off stabilization costs of the new refinery and the debt service payments due on June 20, 2017. The amount requested by Reficar under the Construction Support Agreement was US\$97 million. The amount requested by Reficar under the Debt Service Guarantee Agreement was US\$172 million. There was no need to request additional contributions under the Debt Service Guarantee to cover the debt service payment due on December 2017. Total debt service payments during 2017 totaled US\$172 million.

In order to finalize the implementation of Ecopetrol Group's strategy to optimize its capital structure, the following capital injections were undertaken by Ecopetrol on December 13, 2017, increasing its shareholding participation in Reficar from 46.58% to 75.96%:

- As a result of the voluntary debt assumption, Reficar assumed an account payable in the amount of US\$2,596 million (book value for Reficar's senior debt under IFRS) in favor of Ecopetrol. As a shareholder, Ecopetrol requested that such account be repaid with Reficar shares.
- Ecopetrol requested that the existing subordinated COP-denominated loan it granted in Reficar in the amount of \$1,522,760 million (book value as of December 13, 2017) be repaid with new Reficar shares.

3.6.1.3 Polipropileno del Caribe S.A.

During 2017, Propilco production totaled 441 thousand tons of petrochemical products, a 0.9% decrease compared to the 445 thousand tons produced in 2016, due to feedstock price volatility. The total contribution margin in 2017 (including the contribution of polypropylene, polyethylene and masterbatches) was 32% lower than in 2016, a decrease from US\$318 per ton in 2016 to US\$215 per ton in 2017. The decrease in contribution margin was primarily due to higher volatility in the propylene market, Propilco's main feedstock.

Table 38 – Operating Capacity of Propilco

	For the year ended December 31,		
	2017	2016	2015
		(Metric Tons)	
Average capacity	470,000	470,000	470,000
Throughput	440,632	444,812	434,484
% Use	94%	95%	92%

3.6.1.4 Biofuels

We have investments in two biofuels companies: (i) Bioenergy S.A.S., in which we own 99.08 % of the shares, who finished the construction of an ethanol plant with theoretical capacity of 480,000 liters / day, and (ii) Ecodiesel Colombia S.A., in which we own 50% of the shares, currently in operations with a theoretical capacity of 100,000 tons per year of biodiesel.

3.6.2 Marketing and Supply of Refined Products

We are the main producer and supplier of refined products in Colombia. We market a full range of refined and feedstock products including regular and high-octane gasoline, diesel fuel, jet fuel, natural gas and petrochemical products, among others.

3.7 Research and Development; Intellectual Property

Our innovation and technology center is the Colombian Petroleum Institute, established in 1985 and located in Bucaramanga, Santander. In 2017, research and development expenses were US\$25.7 million, compared to US\$16.9 million in 2016. Technology and innovation are essential to our efforts to add value to our business segments through the development of proprietary technologies and competitive advantages and the adaptation of third-party technologies to our processes.

The focus of technology development is on designing high added-value products and solutions for Ecopetrol and the Colombian oil industry. The scope of the Colombian Petroleum Institute activities covers all of our value chain segments: exploration, production, refining, transportation and commercialization, as well as environmental sustainability and asset integrity.

Each year Ecopetrol presents to the Colombian Institute for the Development of Science and Technology (*Instituto Colombiano para el Desarrollo de la Ciencia y la Tecnología*, or COLCIENCIAS) its research, technology development projects and innovation initiatives, in order to obtain certifications for its science and technology investments. COLCIENCIAS certifies science and technology investments, which are deductible from income tax upon execution; and Ecopetrol applies the tax benefit. In 2017, we obtained US\$12.3 million in science and technology-related tax benefits certified by COLCIENCIAS.

Our intangible assets are preserved through a technological value-generation process and an intellectual property protection process, which include the consolidation of trade secrets, patents, copyrights, trademarks, industrial designs, and publications in specialized journals. Ecopetrol has filed 207 patent applications in the last ten years, 12 of them in 2017. Our most recent patent applications include innovative technologies such as (i) a process to improve the flow capacity and enhance the dilution capacity of diluents in heavy and extra-heavy oil production and transport processes, (ii) equipment for the evaluation of electrochemical impedance at high temperatures, (iii) a clay-based catalyst for hydrocracking processes, (iv) catalysts for hydrotreating naphtha and (v) a process and equipment for the pretreatment and saccharification of biomass.

In 2017, Ecopetrol declared four industrial secrets that strengthen its competitive advantages in exploration, refining and transport of heavy crudes in Colombian basins. The Colombian and international authorities granted us five new patents, including one in Brazil that protects our proprietary process to obtain bioparaffins through hydrotreatment of oils. We currently hold 84 patents in Colombia, the United States, Mexico, Russia, Peru, Venezuela, Ecuador, Brazil, Nigeria, Indonesia, and Malaysia.

In 2017, Ecopetrol S.A. licensed 10 of its technologies to private companies for manufacturing, marketing commercialization, and after-sales support. To date, we have licensed 42 technologies to Colombian and multi-national companies. One of the licensed technologies is a system of chemical additives to reduce the consumption of diluent in heavy crude oil gathering and dehydration. Another licensed technology reduces haze in biodiesel. Some of our technologies have potential uses in other industries, and may in the future represent an important source of income.

3.8 Applicable Laws and Regulations

3.8.1 Regulation of Exploration and Production Activities

3.8.1.1 Business Regulation

Pursuant to the Colombian Constitution, the Nation is the exclusive owner of all hydrocarbon resources located in Colombia and has full authority to determine the rights to be held and royalties or compensation to be paid by investors for the exploration or production of any hydrocarbon reserves. The Ministry of Mines and Energy and the ANH are the authorities responsible for regulating all activities related to the exploration and production of hydrocarbons in Colombia.

Decree Law 1056 of 1953 (the Petroleum Code, or *Código de Petróleos*) declares that the hydrocarbon industry and its activities of exploration, exploitation, refinement, transportation and distribution are of public interest, which means that, in the interest of the hydrocarbon industry, the Colombian government may order necessary expropriations in order to develop such industry. The hydrocarbon industry is under governmental supervision and control, regulated mainly by the Ministry of Mines and Energy and the ANH.

Ministry of Mines and Energy Resolution 181495 of 2009, as amended by Resolution 40048 of 2015, establishes a series of regulations regarding hydrocarbon exploration and production.

Ministry of Mines and Energy Resolution 180742 of 2012, partially repealed by Resolution 90341 of 2014, included a series of technical regulations for unconventional hydrocarbon resources, including the procedures for advancing the exploration and exploitation of unconventional reserves. It also establishes the types of wells and their classification as well as the fulfillment of those minimum (drilling and abandoning) conditions, necessary to initiate or perform E&P activities. Furthermore, it contemplates the applicable procedure to resolve disputes between mining sector and the oil and gas sector, regarding the coexistence of their rights in some specific projects.

On May 26, 2015, Decree 1073 compiled the majority of Colombian decrees in force regarding the administrative sector of mines and energy.

Agreement (*Acuerdo*, a type of regulation) 004 of 2012, as issued by the ANH, amends Agreement 008 of 2004 and sets forth the rules governing the award of exploration and production areas and the execution of contracts. As set forth below, Agreement 002 of 2017 replaces this *Acuerdo*.

Agreement 003 of 2014, as issued by the ANH, complements Agreement 004 of 2012 by setting forth the contractual framework for the carrying out of activities in unconventional reservoirs, the procurement regulations for the exploration and exploitation of unconventional fields and the procurement process for the awarding of hydrocarbon exploration and exploitation areas.

Agreement 002 of 2015, as issued by the ANH, partially amends Agreement 004 of 2012 and sets forth the initial rules and measures the Government can take to mitigate the adverse effects of the decline of international oil prices. The main measures established by this agreement are the following:

- (i) The extension of terms and deadlines for the execution of activities related to investments in exploration and evaluation phases and for the declaration of commercial discoveries;
- (ii) The establishment of procedures to transfer investments in exploration programs between allocated areas; and
- (iii) The levelling of the contractual terms of offshore contracts entered before 2014 to the ones included in the contracts executed as a result of the 2014 Colombian Round.

Agreement 003 of 2015, as issued by the ANH, modifies and also partially amends Agreement 004 of 2012, and provides certain rules and measures the Government can take to mitigate the adverse effects of the decline of international oil prices. This agreement permits performance guarantees required under E&P contracts to be reduced in the same amount as the works actually performed during the term of the respective phase.

Agreement 004 of 2015, as issued by the ANH, also partially amends Agreement 004 of 2012, and provides certain rules and measures for the Government to mitigate the adverse effects of the decline of international oil prices. This agreement allows contractors to attribute additional activities carried out under a TEA to commitments under the first phase of an E&P contract.

Agreement 002 of 2017, as issued by the ANH on May 18, 2017, replaces Agreement 004 of 2012, Agreement 003 of 2014, and Agreements 002, 003, 004 and 005 of 2015. It establishes the general structure of the New Regulation for Administration and Assignment of Areas and the general guidelines regarding future hydrocarbon contracts in Colombia. Seeking the interests of the Nation, the market conditions, the national hydrocarbon sector strategy, the competitive context of producer countries and the Nation's social and environmental evolution.

Agreement 002 of 2017 adapted the existing regulations for the selection of contractors, and the applicable rules for the award, execution, termination, liquidation, monitoring, control and surveillance of the contracts signed with the ANH.

3.8.1.1.1 Environmental Licensing and Prior Consultation

Law 99 of 1993 and other environmental regulations, such as particularly Decree 1076 of 2015 (compilation decree regarding the administrative sector of environment and sustainable development), impose on companies, including oil and gas companies, the obligation to obtain an environmental license prior to undertaking any activity that may result in the serious deterioration of renewable natural resources, or that may have the capacity of materially modifying the physical environment.

The National Authority on Environmental Licensing (ANLA), created by means of Decree 3573 of 2011, is the entity responsible for evaluating the applications and issuing the environmental licenses for oil & gas-related activities, as well as surveilling and overseeing all hydrocarbons projects and monitoring the environmental compliance of such activities.

If the projects or activities could have a direct impact over the territories or the interests of indigenous, Afro-Colombian or Raizal communities, the Colombian Constitution provides that the companies developing such projects or activities must undertake a public consultation process with those communities before initiating such projects or activities. This consultation process is a pre-requisite for obtaining the required environmental licenses.

In addition, the Colombian Constitution and laws establish that, as part of the public participation mechanisms, Colombian individuals may request information regarding the activities of the project and their potential impacts. They may also request to undertake an environmental hearing so as to obtain information of the project subject to environmental licensing.

On May 26, 2015, the Ministry of Environment and Sustainable Development (“MESD”) issued Decree 1076, which compiles the majority of Colombian regulations in force regarding environment and sustainable development.

The environmental license encompasses all of the necessary permits, authorizations, concessions and other control instruments necessary under Colombian environmental law to undertake a project or activity that may result in the serious deterioration of renewable natural resources, or that have the capacity of materially modifying the physical environment. The license shall define specific conditions under which the beneficiary of the license may undertake such project or activity. The procedure to obtain an environmental license begins when the company files an Environmental Impact Study (EIA) related to the project before the ANLA. The licensing process includes an application for the use of natural renewable resources (water, soil and air), the filing of an EIA and a plan to prevent, mitigate, correct and compensate for any activity that may harm the environment, known as the Environmental Management Plan (PMA).

The environmental licensing procedure in Colombia is set forth in Decree 1076 of 2015. According to the regulation currently in effect, the procedure to obtain an environmental license shall not take more than 90 business days. But, depending on the complexity of the information requested by the ANLA and administrative delays, including an oral hearing to determine the viability of the project, the procedure may take between 165 and 265 business days, depending on whether the applicant is required to file additional information. The new procedure incorporates an oral hearing between the ANLA and the applicant in order to evaluate the information provided in the license application and whether it is necessary or not to request additional information about the proposed project. The ANLA will have no other opportunities to request additional information after this hearing.

MESD is also responsible for establishing guidelines regarding climate change policies for the hydrocarbon sector in Colombia. We comply with those guidelines. At present, MESD has not proposed any specific steps for the implementation of the Kyoto Protocol or the Paris Agreement, as they relate to our operations. We are continuously monitoring climate change requirements that could be applicable to us. A company that does not comply with the applicable environmental laws and regulations, does not execute the Environmental Management Plan (PMA) approved by the environmental authority or ignores the requirements imposed by an environmental license may be subject to an administrative proceeding initiated by the ANLA or the regional environmental authorities established by Law 1333 of 2009. The proceeding may result in oral or written warnings, monetary penalties, fines, license revocation or the temporary or permanent suspension of the activity being undertaken. Apart from administrative sanctions, the Colombian judiciary or other law enforcement authorities may also impose civil and even criminal sanctions if environmental damages are verified as a consequence of having breached the environmental laws and regulations applicable to the project.

3.8.1.1.2 Royalties

In Colombia, the Nation is the owner of minerals and non-renewable resources located in the subsoil, including hydrocarbons. Thus, companies engaged in exploration and production of hydrocarbons, such as Ecopetrol, must pay to the National Hydrocarbons Agency (ANH), as representative of the National Government of Colombia, a royalty on the production volume of each production field, as determined by the ANH.

Royalties may be paid in kind or in cash. Each production contract has its applicable royalty arrangement in accordance with applicable law. In 1999, a modification to the royalty regime established a sliding scale for royalty payments for crude oil and natural gas production fields discovered after July 29, 1999 and depending on the quality of the crude oil produced. Since 2002, as a result of the enactment of Law 756 of 2002, the royalty rate was fixed as a sliding scale depending on the produced volume from 8% for fields producing up to 5 kbpd to 25% for fields producing in excess of 600 kbpd. Notwithstanding the royalties for Incremental Production Contracts, Contracts for Undeveloped and Inactive Fields, and Incremental Production Projects defined in paragraph 3 article 16 Law 756 of 2002, and article 29 of the law 1753 of 2015, the changes in the royalty regime only apply to new discoveries and do not apply to fields already in the production stage as of July 29, 1999. Producing fields pay royalties in accordance with the royalty law in force at the time of the discovery.

Regarding natural gas, in accordance with Resolution 877 of 2013, as amended by Resolution 640 of 2014, starting on January 1, 2014, the ANH has received royalties in cash rather than in kind. Thus, the producer may dispose of its gas production volumes corresponding to royalties paid in cash.

3.8.2 Regulation of Transportation Activities

Hydrocarbon transportation activity is a public interest activity in Colombia and a public service. As such, it is under governmental supervision and control, regulated mainly by the Ministry of Mines and Energy and CREG.

Transportation and distribution of crude oil, liquefied petroleum gas and refined products must comply with the Petroleum Code, the Code of Commerce and all governmental decrees and resolutions. However, liquefied petroleum gas related-activities are regulated by CREG. According to Law 681 of 2001, multipurpose pipelines owned by Cenit (a company wholly owned by Ecopetrol) must be open to third-party use on the basis of equal access to all.

Notwithstanding the general rules for hydrocarbon transportation in Colombia, Law 142 of 1994 defines the regulatory framework for the provision of public utility services, including the provision of natural gas. Moreover, natural gas transportation is subject to regulations specific to the natural gas industry as issued by CREG, due to the categorization of natural gas distribution as a public interest activity under Colombian laws.

Transportation systems, classified as crude oil pipelines and refined product pipelines, may be owned by private parties. Pipeline construction, operation and maintenance must comply with environmental, social, technical and economic requirements under national guidelines and international standards for the oil and gas industry.

Construction of transportation systems requires licenses and local permits awarded by the Ministry of Mines and Energy, the Ministry of Environment and Sustainable Development and regional environmental authorities, respectively.

Crude oil transport

The regulatory framework relating to crude oil transportation accounts for both private use and public use pipelines. Private use pipelines are those built by the operating or refining entity for its own exclusive right and that of its affiliates. Public access pipelines are defined as pipelines built and operated by a public or private legal entity, for the purpose of publicly providing crude oil transportation services. The Colombian government, through the ANH, has a preferential right to use up to 20% of the total capacity of any public or private access pipeline to transport its share of production. However, for both private and public access pipelines, the ANH must pay the tariff for the pipeline use to transport its percentage of production.

The Ministry of Mines and Energy is responsible for reviewing and approving the design of and tracks for crude oil pipelines, by establishing transport rates based on information provided by the service providers. It also oversees the calculation and payment of hydrocarbon transport-related taxes and manages the information system for the oil product distribution chain.

In 2014, the Ministry updated the transport regulation and the rate calculation method for this line of business. It introduced a framework for the secondary market and incentives for new pipeline construction and current pipeline capacity expansions. According to the Petroleum Code, rates must be revised every four years.

During the scheduled revision of 2015 and due to the dramatic changes in international crude oil prices, the Ministry of Mines and Energy allowed, by means of Resolution 31325 of 2015, transportation companies and oil production companies to engage in direct negotiations in order to agree on a tariff suitable for both parties. The negotiation period was extended until June 2016. Notwithstanding the fact that tariff agreements were reached with certain companies, the results of the negotiations were not positive. Thus, tariffs were set by the Ministry of Mines and Energy in accordance with the criteria previously established by Resolution 72146 of 2014, as further amended by Resolution 31325 of 2015 and Resolution 31285 of 2016.

The Port Superintendence is the authority that oversees the port business for crude oil and refined products. Although this business is not highly regulated, market participants are required to report certain information to the Port Superintendence.

As a result of the enactment of Decree 119 of 2015, operators of private use hydrocarbon ports are currently able to provide hydrocarbon transport services to third parties pursuant to a mechanism established under that decree.

Decree 119 of 2015 was incorporated into Decree 1079 of 2015 issued by the Ministry of Transport, which compiles the majority of Colombian decrees and regulations in force regarding the administrative sector of transportation.

Refined products and liquefied petroleum gas transport

In 2014 CREG assumed responsibility for regulating product pipeline transportation from the Ministry of Mines and Energy, in addition to its pre-existing regulatory responsibility for liquefied petroleum gas, natural gas and electric energy transportation.

In August 2017 CREG issued a draft resolution 113 of 2017, which introduced a new framework for the transportation regulation of liquefied petroleum gas and refined products. The draft resolution is currently open for observations from the general public and the oil and gas industry. CREG is also in the process of defining the transportation regulation and the rate calculation method for refined products. The primary goals and components of the proposed regulation are: a) to ensure access to the transport systems for liquid fuels and the LPG pipeline systems without discrimination; b) to promote the timely expansion of the transport system in line with the needs of the market; c) to promote competition and prevent restrictive practices; d) to separate the operations of refining and transport; and e) to ensure the efficient and continuous operation of transport systems.

3.8.3 Regulation of Refining and Petrochemical Activities

Article 58 of the Petroleum Code establishes that oil refining activities can be developed throughout the Colombian territory and are not reserved to the State. However, Article 4 establishes that such activities are considered of public interest subject to governmental regulation, and the development of those activities must comply with technical requirements established by regulation.

In 2008, Law 1205, further developed by Resolution 180689 of 2010, issued by the Ministry of Mines and Energy, was issued with the main purpose of contributing to a cleaner environment. It established the minimum quality specifications for fuels in Colombia. Since August 2010, Ecopetrol has been producing and selling diesel and gasoline that complies with the requirements of the aforementioned law and, for some cities, we sell with better standards.

Since 1995, under Resolution number 898 of August 23, 1995 the Ministries of Environment and Sustainable Development and of Mines and Energy, have regulated the environmental criteria for liquid and solid fuels used in commercial and industrial furnaces and boilers as well as automobile internal combustion engines. Resolution 898 has been subject to numerous modifications through the years, the most recent by Resolution 40619 of June 30, 2017. Ecopetrol has been complying with this regulation and working with governmental entities in order to improve air quality in the most critical areas in Colombia.

3.8.3.1 Regulation of Liquefied Petroleum Gas (LPG) and Liquid Fuels

Wholesale marketing, transport, distribution and retail marketing of LPG are mainly regulated by CREG Resolution 74 of 1996, and subsequent resolutions. LPG in Colombia is primarily obtained through Ecopetrol's refineries, field production and imports. The LPG must meet minimum quality standards to be marketed. Our marketing activities are regulated by CREG Resolution 53 of 2011 (as amended by CREG Resolutions 108 of 2011, 154 of 2014, 019 of 2015, and 034, 063 and 064 of 2016). The LPG price is regulated by CREG Resolutions 66 of 2007 (as amended by CREG Resolutions 59 of 2008, 002 of 2009, 123 of 2010, 095 of 2011, 65 and 129 of 2016).

According to Article 4 and 212 of the Petroleum Code and Law 39 of 1987 (added by Law 26 of 1989), the distribution of crude oil and its derivatives has a public purpose (*utilidad pública*), and the distribution of fuel oil and crude oil by-products is considered a public utility activity. Consequently, individuals or entities engaged in these activities are subject to regulations issued by the Colombian government. The Government has the power to determine quality standards, measurement and control of liquid fuels, and establish penalties that may apply to dealers who do not operate in compliance therewith.

The Ministry of Mines and Energy is the entity that controls and exercises technical supervision over the distribution of liquid fuels derived from petroleum, including the refining, import, storage, transportation and distribution in the country. Law 812 of 2003 identified the agents of the supply chain of petroleum-based liquid fuels. In this context, The Ministry of Mines and Energy through Resolution 40344 of 2017, published the required actions to ensure the LPG supply for the priority sectors in the country.

The distribution of liquid fuels, except LPG, is governed by Decree 1073 of 2015, which establishes the requirements, obligations and penalties applicable to supply agents in the distribution, refining, import, storage, wholesale, transportation, retail sale and consumption of liquid fuels.

Decree 1073 of 2015 establishes the minimum technical requirements for the construction of storage plants and service stations. This Decree also regulates the distribution of liquid fuels, except LPG establishing the minimum requirements for distributors and the activities and types of agreements permitted for these agents. The Ministry of Mines and Energy also regulates the types of liquid fuels that can be sold and purchased and the penalties for noncompliance with governmental regulations.

Pursuant to Law 1430 of 2010, the distribution of fuels in areas near Colombian borders is the responsibility of the Ministry of Mines and Energy and is subject to specific regulations that impose strong control procedures and requirements. The Ministry of Mines and Energy establishes the safety standards for LPG, storage equipment, maintenance and distribution of LPG.

The Superintendence of Public Domestic Utilities also oversees the liquefied petroleum gas transportation business. Cenit reports key operational and financial indicators to the Superintendence of Public Domestic Utilities on a monthly basis.

3.8.3.2 Regulation Concerning Production and Prices

According to the Decree - Law 4130 of 2011 and Decree 1260 of 2013, CREG is in charge of setting the prices of petroleum by-products throughout the entire chain of production and distribution except for current gasoline engine, diesel and biofuels. On the other hand, by Decree 381 of 2012, as amended by Decree 1617 of 2013, the Ministry of Mines and Energy is in charge of setting the methodology to determine the reference price of gasoline, diesel (ACPM), biofuels and mixtures thereof.

Then, since May 2012, CREG fixes the prices for most crude oil by-products, but for gasoline, diesel, ACPM and biofuels. CREG determines the methodology to calculate their price while the Ministry of Mines and Energy fixes the relevant prices in accordance with said methodology. The ANH does not intervene in the definition of prices of gasoline and diesel fuel. In addition, under Resolution 007 of 2017, CREG determined the basis for the methodology of compensation of terrestrial transportation of liquid fuel-oil, including current gasoline, diesel and biofuels between the storage plant and the fuel service station.

The methodology for calculating jet fuel prices is set out in Law 1450 of 2011, and jet fuel prices themselves are set by the Ministry of Mines and Energy.

The ANH determines the formula that is used to calculate royalty payments corresponding to the production of crude oil and the crude oil price reference for local refining.

Decree 381 of 2012 and 1617 of 2013, as amended by Decree 2881 of 2013, as compiled in Decree 1073 of 2015, restructured the Ministry of Mines and Energy and gave it the responsibility to study industry problems and implement short- and long-term refining planning policies. The Ministry is also responsible for establishing the governmental policies and goals to ensure the reliability, stability and continuity for the production of liquid fuels, biofuels and others.

Pursuant to Article 58 of the Petroleum Code, any refining company operating in Colombia must provide a portion or, if needed, the total of its production to supply local demand prior to exporting any production. If local demand increases, and imported crudes are needed, the refining company may charge the State additional transportation costs in proportion to the imported crudes delivered to the refinery.

Fuel Price Stabilization Fund (FEPC)

The Fuel Price Stabilization Fund was created by Law 1151 of 2007. It is a fund assigned and administered by the Ministry of Finance and Public Credit. Its function is to attenuate, in the domestic market, the impact of fluctuations in fuel prices in international markets.

According to article 2.3.4.1.3 of Decree 1068 of 2015, the resources for the functioning of the FEPC come from the following sources: (a) financial returns of resources of the Fund; (b) extraordinary credit resources received from the National Treasury, and (c) funds allocated to the FEPC in the national general budget.

The operation of the FEPC is governed by Decree 1068 of 2015 on Chapter 1, and Title 6 (compilation decree regarding treasury public sector). First, refiners and/or importers of regular gasoline and diesel must report to the Ministry of Mines and Energy, the volume of regular gasoline and diesel sold in the previous month, such report to be made within the first 25 days of each month. The report must also contain information corresponding to each fuel disaggregated daily; the discrimination of the volumes sold, and the origin national or imported of the gasoline and diesel sold. If the regular gasoline or the diesel is of national origin, the refiner/importer must inform the refinery from which they come. Secondly, the Ministry of Mines and Energy calculates and liquidates by resolution, the Net Position of each refiner/importer and each fuel to be stabilized by the FEPC.

Decree 1068 of 2015 provides that the FEPC will pay in Colombian pesos the value corresponding to the calculation and settlement of the Net Position of each refiner and/or importer within the term defined by the Ministry of Mines and Energy and based on availability of FEPC resources.

Law 1819 of 2016 created a tax, related contribution to finance the FEPC. This contribution is caused when the sum of the Differentials of Participation (difference between the Producer Income and the International Parity Price, when the first is greater than the second on the date of issuance of the sales invoice, multiplied by the volume of fuel sold) is greater than the sum of the Differentials of Compensation (the difference presented between the Producer Income and the International Parity Price, when the second is greater than the first on the date of issuance of the sales invoice, multiplied by the volume of fuel sold).

The event that generates the contribution is the sale in Colombia of gasoline or ACPM (diesel) by the refiners and/or importers to the wholesale distributor of fuels, according to the price set by the Ministry of Mines and Energy, however, if the importer is at the same time a wholesale distributor, the triggering event shall be the withdraw of the product to be sold. The taxpayer responsible for the contribution is the refiner and/or importer and the active subject is the Nation. The tax base corresponds to the positive difference between the sum of the Differentials of Participation and the sum of the Differentials of Compensation.

The Ministry of Mines and Energy calculates the contribution through the liquidation of the Net Position of each refiner or importer with respect to the FEPC based on the report that the refiners and/or importers submit. If the sum of the Differentials of Participation is greater than the sum of the Differentials of Compensation and the contribution is caused, the Ministry of Mines and Energy will order the refiner or the importer to pay the contribution to the National Treasury within the 30 days following the execution of the liquidation resolution.

Subsequently, Law 1837 of 2017 (article 16) provided that the remaining resources that were in the Ecopetrol's accounts as of December 2014, as a result of the collection of the Differential Contribution from the FEPC, would be transferred to the General Direction of Public Credit and Treasury of the Ministry of Finance and Public Credit (DGCPTN).

Based on the aforementioned law and Decree 1068 of 2015, the Ministry of Mines and Energy settled, through Resolution 31762 of 2017, the value of the remaining resources resulting from the collection of the Differential Contribution of Participation, corresponding to the third quarter of 2013 and the second half of 2014 (from July 1 to December 22, 2014), valued at COP \$6,849,420,921 and COP \$202,004,538,015 respectively. In this Resolution, it ordered Ecopetrol to transfer the sum of COP \$208,853,958,936 to DGCPTN, which has already been transferred by Ecopetrol.

In 2017 the Ministry of Mines and Energy issued Resolution 31885 that contains the liquidated net positions corresponding to the period between July 1 and December 28, 2016, and as a result, the FEPC must pay Ecopetrol COP \$558,564,915,500.00, which it already paid to Ecopetrol.

As of the date of this report, the Ministry of Mines and Energy has not calculated the Net Positions corresponding to the year 2017.

3.8.3.3 Regulation of Biofuel and Related Activities

The sale and distribution of biofuels is regulated by the Ministry of Mines and Energy. Regulations establish the quality and pricing standards for biofuels and impose minimum requirements for mixing ethanol with gasoline and biodiesel with diesel.

The sale and distribution of biofuels is provided under CREG Resolution 240 of 2016, which particularly regulates: a) sorts of market that will be served with biogas and biomethane; b) quality and safety conditions; and c) tariff regime. Pursuant to article 4 of the foregoing Resolution, biogas supply through isolated networks to serve non-regulated users and natural gas vehicles ("GNV" as per its Spanish acronym), shall be incorporated as a public utility company. Furthermore, article 5 provides that biomethane supply through isolated networks or interconnected networks to the National Transportation System shall also be incorporated as a public utility company. Finally, article 12 states that biogas suppliers may develop the production, transportation, distribution and commercialization activities through integrated structures, provided that they keep separate accounts for each activity and grant free access to the networks to both regulated and non-regulated users. To the same extent, production, distribution and commercialization of biomethane through interconnected networks to the National Transportation System may be developed through integrated structures as long as the supplier keeps separate accounts for each activity and grants free access to the networks to both regulated and non-regulated users.

3.8.4 Regulation of the Natural Gas Market

Decree 1073 of 2015, Part 2, Title 2, Chapter 2, established that all producers have to issue a production statement that includes the volumes of natural gas available for sale for a period of ten years. This decree established the regime for the selling and marketing of natural gas in Colombia, including specific procedures that regulate the Colombian market in order to manage the remaining natural gas reserves owned by the Nation, and to protect domestic consumers, especially residential consumers, by prioritizing delivery of gas to residential consumers, regulating the export of natural gas and setting forth the export restrictions applicable during an internal shortage of natural gas.

Currently in Colombia, other than with respect to the Opón field, the price of natural gas is determined by the market.

CREG issued Resolution 114 of 2017 which adjusted commercial aspects of the wholesale natural gas market in Colombia and compiled CREG Resolution 089 of 2013 and its modifications. However, pursuant to Decree 1073 of 2015, such procedures do not apply to the following activities: a) natural gas exports; b) natural gas as raw material in petrochemical production; c) natural gas commercialization from minor fields (production capacity under 30 million SCFD); d) natural gas commercialization from hydrocarbon fields under testing phase or which have not yet been declared commercially viable; e) natural gas commercialization from unconventional reservoirs; and f) internal consumption from natural gas producers.

CREG determines which agents can participate in the primary and secondary markets. Ecopetrol is authorized to participate as a seller in the primary market as a natural gas producer and as a buyer in the secondary market when Ecopetrol requires natural gas from other producers for its own needs. CREG regulations provide that a natural gas producer cannot participate as a merchant of natural gas in the secondary market except that it may purchase gas to meet its existing contractual obligations. Ecopetrol is also able to re-sell available natural gas transportation capacity into the secondary market.

Priority for the Supply of Natural Gas

The export of natural gas, in contrast, is not considered a public utility activity under Colombian law and therefore is not subject to Law 142 of 1994. Nevertheless, the internal supply of natural gas is a priority for the Colombian government and is considered to be a public utility complementary activity, and therefore public utility regulations apply to the internal supply of natural gas.

Decree 1073 of 2015 (amended by Decree 2345 of 2015) provides that in the event the supply of natural gas is reduced or halted as a result of a shortage, the Colombian government has the right to suspend the supply of natural gas for export. If such export contracts are suspended by the Colombian government, the export agents are entitled to receive compensation in accordance to article 2.2.2.2.15 and 2.2.2.2.38 of Decree 1073, 2015. Notwithstanding the foregoing, Decree 1073 of 2015 establishes freedom to export natural gas under normal gas-reserve conditions. Producers of natural gas may enter into natural gas export contracts if the ratio of proved reserves to consumption exceeds seven years, as determined by the Colombian Energy Planning Authority (or UPME for its Colombian acronym).

Decree 1073 of 2015 (amended by Decree 2345 of 2015) establishes an order of supply when restrictions are placed on the supply of natural gas or serious emergency situations arise that preclude the continued provision of certain services, as follows: (i) essential demand, as established in Decree 1073 of 2015, (ii) non-essential demand under an existing agreement with a warranty of uninterrupted provision, and (iii) fair exports delivery.

The order of priority for the supply of natural gas is as follows: (i) the operation of the compressor stations of the National Transportation System, (ii) residential users and small business users engaged in the distribution network, (iii) vehicular compressed natural gas and (iv) gas refineries, excluding those destined for self-generation of electricity that can be replaced with energy from National Transportation System, which has first priority. The Ministry of Mines and Energy also establishes distribution priorities in the event of a natural gas shortfall derived from supply or infrastructure issues. This order of priority is based on the type of contract, with firm supply contracts having priority over interruptible supply contracts.

Decree 1073 of 2015 and CREG Resolution 114 of 2017: i) provide specific procedures and forms of supply agreements determined by CREG pursuant to which an agent may sell and buy natural gas in the Colombian primary and secondary market produced from large fields (capacity of more than 30 million CFPD) and; ii) permit the sale of natural gas from small fields (capacity under 30 million CFPD) pursuant to contracts that fulfill certain regulatory requirements but whose form is not prescribed by law.

3.9 Sustainability Initiatives

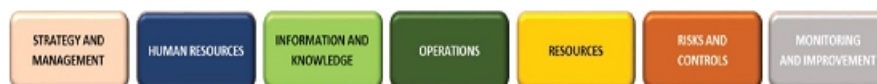
3.9.1 HSE

This section describes the health, safety and environmental (HSE) practices of Ecopetrol S.A. Currently, subsidiaries of Ecopetrol S.A. establish their own HSE models, provided that these models must be consistent with guidelines established by Ecopetrol S.A.

3.9.1.1 Ecopetrol S.A.

One of the principles that guides Ecopetrol is our commitment to our employees and the development of those communities in which we operate. For that reason, Ecopetrol S.A. is devoted to improving our health, safety and environmental (HSE) practices.

We have several programs in place aimed at increasing the safety of our industrial processes and minimizing the number of occupational accidents and other major incidents. Our HSE management model is based on key focus areas that are aligned with our integrated management system.



The results of the HSE strategies in 2017, compared with the prior year, were:

- (i) A 20% decrease in road accidents, due to improvements in real-time monitoring of drivers' safety habits, an increase in control check points for tracking tankers and awareness campaigns for drivers.
- (ii) A 40% decrease in the number of incidents involving employee or contractor injuries that require medical treatment, restricted work or disability.
- (iii) A reduction in the severity of occupational incidents.
- (iv) A reduction in oil spills.
- (v) Improvement in reporting of minor oil spills and identification of their causes.

Contingency Plans and Environmental Remediation

All of our operational areas have preparedness and emergency response plans, each in accordance with Colombian legal requirements and our new internal guidelines for emergency management.

Our preparedness and emergency response plans have been developed based on our analysis of risk scenarios, the estimated consequences of these events and the implementation of strategies to be followed in response to each scenario. These contingency plans have the approval of the ANLA.

The objectives of our contingency plans are to:

- (i) Protect the health and safety of our workers, contractors and the communities in which we operate.
- (ii) Prevent oil spills and leaks of harmful substances in offshore and onshore areas, fires and explosions and mitigating environmental impacts.

Our contingency plan includes, among others:

- (i) Procedures for the containment of oil and other harmful substances, as well as procedures to safeguard the safety of affected communities, the environment and the personnel involved in such containment actions.
- (ii) Strategies for responding to emergencies located outside of our facilities and mutual aid emergency plans, including actions developed with local environmental authorities, the local community and other organizations for containment and recovery of spilled product, and cleaning and recovery of affected areas, monitoring of the environmental effects and, if the spill or leak has an operational source, compensation for local communities and other affected persons.

Further, we are upgrading the skills of our fire brigade, ensuring the reliability of firefighting and emergency equipment and working on improving our performance during drills.

In offshore operations, our operator has the responsibility of designing and implementing plans and strategies aligned with international best practices that cover various emergency response scenarios.

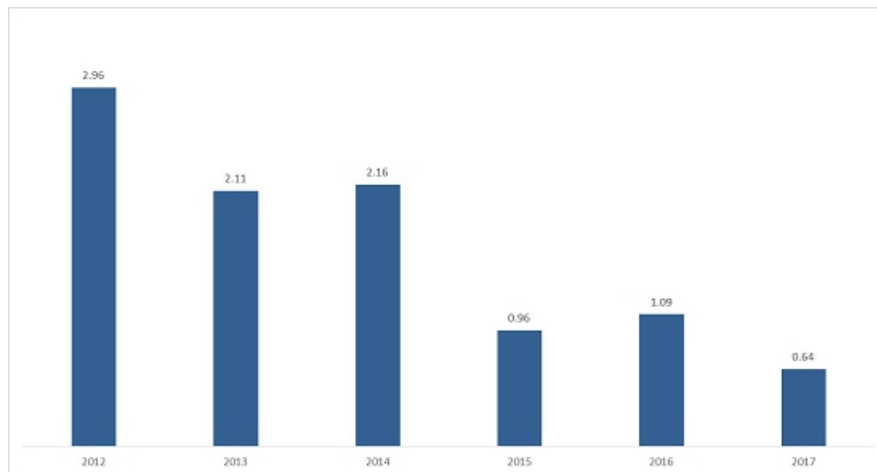
Total Recordable Incident Rate – Employees and Contractors

Ecopetrol S.A. places an important emphasis on understanding, monitoring and controlling our impacts on workers and contractors.

Ecopetrol S.A. monitors a standard measure of occupational safety known as the Total Recordable Incidents Frequency Index (TRIF), which represents the number of employee or contractor injuries that require medical treatment or time off for every million hours worked.

TRIF has improved from 2.96 incidents per million hours worked in 2012 to 0.64 in 2017. In 2017, 60 recordable cases occurred, where 37% led to restricted work, 18% required medical treatment, and 45% led to disability. Additionally, we had a 40% reduction in occupational incidents compared to 2016 as a result of the sustained implementation of the HSE management system.

Graph 7 – Total Recordable Incident Rate – Employees and Contractors (*) ()**



* Number of employee or contractor injuries requiring medical treatment or time off for every million hours worked.

** Includes data for Ecopetrol S.A. and the Vice-Presidency of Transport and Logistics, but does not include data for subsidiaries of Ecopetrol S.A.

Frequency of process safety incidents

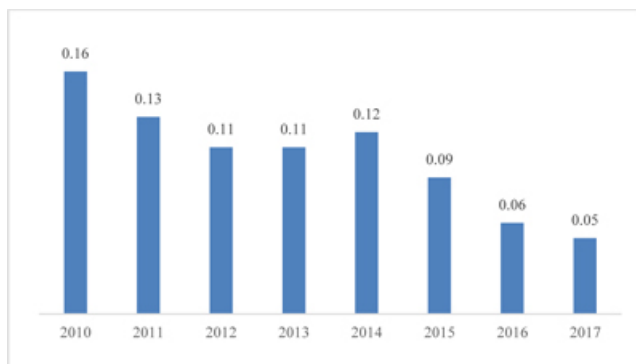
Our “Process Safety Management” (PSM) strategy is to: first, define high-risk processes; second, prioritize intervention in high-risk processes; and third, apply all PSM elements in the prioritized high-risk processes.

Loss of primary containment is the number of unplanned or uncontrolled releases of oil, gas or other hazardous materials.

We report Tier 1 process safety events per million hours worked, which are the losses of primary containment of greatest consequence causing harm to a member of the workforce, costly damage to equipment or exceeding defined quantities according to API-754. We reduced our Tier 1 process safety indicator by 17% compared to 2016 (2017: 0.05 and 2016: 0.06). The reporting thresholds for API-754 Tier 1 is an unplanned or uncontrolled release of any material, including non-toxic and non-flammable materials, from a process that results in one or more health, safety or environmental consequences set forth under those guidelines. In 2017, there were 0.05 Tier 1 process safety incidents per million hours worked.

Frequency of Tier 1 process safety incidents per hours worked (per million hours worked):

Graph 8 – Tier 1 Process Safety Incidents (*) ()**



* Tier 1 process safety incidents per million hours worked (API-754).

** Includes data for Ecopetrol S.A. and the Vice-Presidency of Transport and Logistics classified according to the criteria in API-754 Tier 1, but does not include figures for Ecopetrol S.A.'s subsidiaries.

Environmental Incidents

In 2017, Ecopetrol S.A. recorded 14 environmental incidents compared with 8 in 2016 and 11 in 2015. The volume of oil spills was 50.7 barrels in 2017, a decrease from 202 barrels in 2016 and 207 barrels in 2015. The increase in the numbers of environmental incidents and decrease in oil spills was the result of improvement in the identification of critical equipment operating in high or very high risk conditions, and the implementation of asset integrity plans designed to mitigate those risk conditions.

Lisama 158/La Fortuna Incident

On March 2, 2018, a seepage of water and traces of crude oil occurred near the Lisama 158 well, located in the village of La Fortuna, in the Middle Magdalena Valley of Colombia. Ecopetrol activated its contingency plan to contain the spill. It is estimated that between March 12 and 15, 550 barrels of crude, mixed with mud and rainwater, seeped into the streams of La Lizama and Caño Muerto. As of March 30, 2018, the Lisama 158 well was sealed and stopped flowing. Ecopetrol has ordered an investigation to determine the cause of the incident. As of the date of this annual report, the National Environmental Licenses Agency (ANLA) has opened an investigation into the incident and the Prosecutor's Office and other control entities may also open investigations. As of the date of this annual report, Ecopetrol has received third party claims in the form of seven constitutional actions for the protection of fundamental rights. Ecopetrol is not aware of any other third party claims in connection with this incident, and it cannot offer any assurance as to whether or not there will be third party actions in the future.

3.9.1.2 Cenit

While Cenit had previously followed Ecopetrol's HSE guidelines, Cenit established its own HSE practice and set and defined its own HSE Key Performance Indicators (KPIs) and targets in respect of its non-operative facilities and offices. This resulted in significant cost reductions with no change in risk levels in 2015, 2016 and 2017. Local and field operations, however, are still conducted under Ecopetrol's HSE model and guidelines.

Cenit established its own HSE Management System based on Decree 1072 of 2015 in 2017 and this will be implemented during 2018. Cenit is also leading the definition of HSE KPIs with all of the midstream subsidiaries to be able to measure the transportation business as a whole and share the lessons learned and best practices within the industry. Cenit consolidated the 2017 KPIs and agreed upon the goals for 2018 for the transportation business to obtain the results for each subsidiary and for the entire group.

3.9.1.3 Refinería de Cartagena

In 2017, around 7,495,531 man-hours were employed conducting Reficar's business activities. Our HSE performance indicators for Total Recordable Cases (TRIF), Process Safety Incident (ISP) and Environmental Incident (EI) were well-within our established guidelines.

The following table covers Reficar's Total Recordable Cases (TRIF) for 2015, 2016 and 2017, which includes Ecopetrol Operation and Maintenance (O&M), Reficar and subcontractors. The table presents statistics related to construction, pre-commissioning, start-up and operating activities. Reficar has not reported fatalities (accidents that caused deaths) during the period 2010-2017.

Table 39 – Performance Indicators

METRIC	2017	2016	2015 ⁽¹⁾
Man-hours	7,495,531	10,351,896	32,944,698
Recordable accidents	9	29	57
Total recordable cases (TRIF)*	1.2	2.80	1.73
Environmental Incidents (EI)	0	0	0
Process Safety Incidents (ISP)*	0.13	0.19	0.03

⁽¹⁾ In our annual report on Form 20-F for 2015, man hours and accidents corresponding to Reficar's construction stage were reported. This report registers man hours and accidents of 2015 corresponding to the entire operation of the Refinery.

* In the second half of 2016, these risks were associated with the new stage of operation of the units while in 2015 they were associated with the construction, commissioning, precommissioning and start-up of the new refinery. For 2017, these risks were associated with normal operations.

The results of other related performance indicators during 2017 were:

- (i) Lost Time Injury Incidents: 4 incidents, which include for 3 Ecopetrol O&M and 1 incident for Reficar and subcontractors.
- (ii) Medical Treatment Injury: 3 incidents, which include 1 for Ecopetrol O&M, and 2 incidents for Reficar and subcontractors.

- (iii) Restricted Work Incidents: 2 incidents, which include 2 for Ecopetrol O&M, and 0 incidents for Reficar and subcontractors.
- (iv) Environmental Incidents: 0.
- (v) Process Safety Incident: 1.

3.9.2 Human Rights

Ecopetrol's Secretary General, through its Corporate Responsibility unit, carries out an annual survey that evaluates stakeholder perception taking into account general and specific criteria relevant to corporate responsibility. For 2017, Ecopetrol decided to include a new section within the survey to measure stakeholder perception in human rights. This section includes criteria such as: (i) freedom of association, (ii) equality and non-discrimination, (iii) communicating how actual and potential human rights impacts are addressed, (iv) supply chain and human rights, (v) grievance mechanism or accountability mechanism, and (vi) human rights education and training. The information gathered through this process will be used by Ecopetrol to design an updated annual Human Rights Plan.

3.9.3 Environmental Sustainability

3.9.3.1 Environmental Practices

Ecopetrol S.A.

During 2017, the environmental management strategy of Ecopetrol included the following components:

- (i) **Environmental Viability:** this strategy concentrates on obtaining environmental licenses and permits as well as adequate land management that ensures the sustainability of operations through timely prevention efforts and management of environmental impacts, constant and systematic relationships with stakeholders and participation in the sustainable development of the territories in which we operate.
- (ii) **Climate Change:** this strategy aims to decrease our carbon emissions and reduce the vulnerability of our operations and our facilities to the effects of climate change through the implementation of four strategic action lines:
 - a. **Mitigation:** reducing our carbon dioxide emissions and creating carbon offset alternatives;
 - b. **Vulnerability and Adaptation:** reducing the risks and impacts to our operations posed by climate variability and change;
 - c. **Research and Technology:** reducing our greenhouse gas emissions through action on research and development, process optimization, implementation of energy efficient strategies, carbon capture and sequestration and diversification into low carbon energy sources; and
 - d. **Involvement in Policymaking:** informing and influencing government policies on climate change.
- (iii) **Sustainable productive projects and biodiversity:** this strategy has as its main objective the adequate management of biodiversity and ecosystem services, aiming to work for the welfare of communities. It has four major areas of work: (i) multifunctional landscape management, (ii) biodiversity conservation, (iii) non-oil income generation and (iv) transfer of technical capabilities for developing sustainable projects.
- (iv) **Eco-efficiency:** this strategy aims to maximize our efficient use of resources and mitigate our environmental impacts. Through this strategy, which extends to our supply chain, we seek to utilize energy, materials, and in general all natural resources as efficiently as we can, thereby reducing the environmental impacts from our operations and projects and minimizing emissions, effluents and waste disposal from our operations and projects while taking into account our production benchmarks.

- (v) **Integrated Management of Water Resources:** this strategy aims to ensure compliance with water resources laws and reduce conflicts over water use in the areas near our projects and operations. Our core focus areas under this strategy are aligned with the objectives defined by the 2010 National Water Policy for the Management of Water Resources in Colombia which focuses on water supply, demand, quality, risk governance and institutional strengthening.

In 2017, Ecopetrol reported its performance related to environmental management in its Sustainability Management Report to relevant institutions focused in promoting sustainable issues, such as the environmental benchmarking of ARPEL.

3.9.4 Energy Initiatives

Refining

Ecopetrol's refining companies have been undertaking significant efforts to make efficient and rational use of energy resources in its production processes and reduce energy consumption and costs and carbon dioxide emissions. We focus on efficiency, reliability and optimization, and energy diversification. During 2017, the Barrancabermeja Refinery's average monthly energy consumption was 61,782 MWhm (megawatts per hour per month) equivalents, provided through self-generation. Reficar's average monthly energy consumption was 67,451 MWhm (megawatts per hour per month) equivalents, 99.94% was provided through self-generation and the remaining 0.06% with non-regulated energy purchased from the National Transmission System.

Production

Further, during 2017, Ecopetrol S.A.'s production sector had an average monthly energy consumption of 381 GWhm (gigawatts per hour per month) for its direct operation, from which 70.8% was provided through self-generation and the remaining 29.2% with non-regulated energy purchased from the National Transmission System.

3.10 Related Party and Intercompany Transactions

Set forth below is a description of material related party transactions. For additional information about transactions with related parties, see Note 31 to our consolidated financial statements.

Ocensa

Ecopetrol S.A. has entered into a number of agreements with its 72.65%-owned subsidiary Ocensa, of which the following are the most significant:

- In March 1995, Ecopetrol S.A. entered into an agreement for the transportation of crude oil through the Ocensa pipeline. Pursuant to the terms of this agreement, Ecopetrol S.A. was required to make monthly payments that varied depending on both the volume of crude oil transported through the pipeline and a tariff imposed by Ocensa on the basis of Ocensa's financial projections and their expected volumes of crude oil. On January 17, 2013, this agreement was amended as a result of Ocensa's new business model. Among other changes, this amendment to the transportation agreement establishes the payment of the tariff calculated according to Resolutions issued in 2010 by the Ministry of Mines and Energy. In 2013, another amendment was executed that modified the terms by which the payments of invoices should be made. In 2015 Ecopetrol received a temporary release of capacity from Vitol of 24,000 barrels per day for segment I and II and 14,000 barrels per day for segment III. In 2017, payments made by Ecopetrol S.A. under this agreement amounted to US\$968.2 million.

- On July 10, 2012, Ecopetrol entered into a ship or pay agreement for the unloading of up to 8 thousand barrels per day of crude oil barrels at Ocesa's unloading facilities. This agreement was later amended on March 12, 2013 and on July 19, 2013. The fees correspond to a cost of US\$1.50 per barrel of crude oil that is unloaded. The agreement has a term of five years. On April 11, 2014 Ecopetrol entered into an additional ship or pay agreement for the operation of Ocesa's unloading facilities by means of which Ecopetrol has the right to unload an additional volume of up to 2,000 barrels per day. The additional agreement has a five year term. On 2015, as a result of certain modifications made by Ocesa to the unloading facilities that make it possible to receive crude with lower API gravity, the parties signed an addendum to the agreement whereby crude of 18 API can be unloaded by Ecopetrol at Ocesa's facilities. On March 2016 Ocesa temporarily modified the fee for unloading operations based on the stretch market conditions to US\$0.50. By virtue of these agreements, Ecopetrol S.A. paid fees of US\$2.39 million to Ocesa in 2017.
- On October 28, 2013, Ecopetrol entered into a natural gas supply contract in force until November 30, 2018, pursuant to which Ecopetrol S.A. supplies gas to Ocesa and receives a fixed price per MBTU (million British Thermal Units). This agreement replaced the contract for natural gas supply in Cusiana entered into on December of 2004, under which Ocesa paid a variable rate to Ecopetrol. In 2017, Ecopetrol S.A. received an aggregate sum of US\$5.12 million under the contract.

Ocesa has entered into the following agreements, among others, with some of our other subsidiaries:

- In March 1995, Equion and Santiago Oil Company entered into agreements for the transportation of crude oil through the Oleoducto Central S.A. (Ocesa) pipeline. In November 2012, Equion and Santiago Oil Company transferred, by means of various transactions, its shares (24.8%) and transportation rights (19.8%) holdings in the Ocesa pipeline to wholly owned subsidiaries of Ecopetrol S.A. (51%) and Talisman (49%). Equion and Santiago Oil Company kept 5% of transportation rights in Ocesa. In 2014, the transportation fees billed by Ocesa were: Equion (US\$44.4 million), Santiago Oil Company (US\$3.8 million) and Hocol (US\$30.8 million). On January 17, 2013, this agreement was amended as a result of Ocesa's new business model. Among other changes, the amendment to the transportation agreement establishes that tariff payments are to be calculated according to resolutions issued by the Ministry of Mines and Energy. On May 23, 2013, another amendment was executed that modified the terms by which the payments of invoices should be made. In 2017, Equion paid Ocesa US\$5.2 million and Santiago Oil Company US\$0.774 million, in each case for transportation fees. Hocol paid Ocesa, as assignee of transportation rights from original shippers, US\$0.012 million in 2017.
- On July 9, 2012, Ocesa and ODL entered into a strategic alliance for the dilution of crude oil in the Cusiana station. The term of this contract is of five years. Once the initial term of the agreement ends, Ocesa has a purchase option over the assets that perform the dilution process. In 2015, the parties signed two addenda to the agreement in order to include additional construction work to be conducted by ODL and supervised by Ocesa for an agreed fee. ODL paid Ocesa US\$2.3 million under this contract in 2017.

Oleoducto de Colombia S.A. (ODC)

Ecopetrol S.A. entered into the following agreements with its 73%-owned subsidiary ODC:

- In July 1992, a take-and-pay agreement was signed for the transportation of hydrocarbons. Pursuant to this agreement, Ecopetrol S.A. must pay a previously agreed tariff for the volume of hydrocarbons transported. The duration of this agreement is indefinite; however the contract will remain in force as long as Ecopetrol S.A. holds shares in Oleoducto de Colombia S.A., whether directly, or through an affiliate. As of January 2013, the parties agreed that the applicable tariff would be the one set by the Ministry of Mines and Energy (the "MME Tariff"). The MME Tariff had been set in 2011 for a four-year term, with a yearly adjustment based on the consumer price index. In 2017, payments made by Ecopetrol S.A. under this agreement amounted to US\$83.7 million.

- In August 1992, an operation and maintenance agreement was signed for the Vasconia and Coveñas terminals both property of ODC. The duration of this agreement is indefinite, but can be terminated by any party upon six months' notice. The initial contract included services rendered by Ecopetrol directly or by third-party contractors hired by Ecopetrol through mandate; with a variable surcharge over expenses and third-party contracts between 5% and 12% plus any applicable taxes. In 2014, an amendment to the agreement was signed, adjusting the monthly fixed rate to include expenses of services rendered directly by Ecopetrol, plus an additional 10% fee, and to eliminate the administrative surcharge. The contract also includes a variable sum related to contracts and purchases made by Ecopetrol through mandate. In March 2015, the monthly rate was adjusted for both Vasconia and Coveñas Stations. In March 2016, an amendment to the agreement was signed, adjusting the agreement's scope to include the pipeline's maintenance and, adjusting the monthly fixed rate. In December 2017, an amendment to the agreement was signed, adjusting the agreement's scope according to the change of the maintenance model of the midstream segment. Pursuant to the terms of this agreement, ODC paid approximately US\$25.9 million in 2017.
- In March 1998, a joint operation agreement was signed for the TLU-1 Coveñas buoy. The duration of this agreement is indefinite and can be terminated by mutual agreement. In December 2013, Ecopetrol S.A. assigned its rights under this agreement to Cenit, though Ecopetrol S.A. kept its role as operator under the agreement. Pursuant to the terms of this agreement, ODC paid Ecopetrol S.A. approximately US\$12.6 million in 2017.
- In September 1999, a joint operation agreement was signed for the TLU-3 Coveñas buoy between Ocesa, ODC and Ecopetrol. Pursuant to the terms of this agreement, ODC paid approximately US\$3.7 million in 2017. The duration of this agreement is indefinite. In December 2013, Ecopetrol S.A. assigned its rights under this agreement to Cenit, though Ecopetrol S.A. kept its role as operator under the agreement.
- In July 2006, an operation and maintenance agreement was signed for the Caucasia station and the Vasconia-Coveñas pipeline system. The duration of this agreement is indefinite. Since 2010, this agreement only covers the operation of the Caucasia station and the Vasconia-Coveñas pipeline system, both property of ODC. The initial contract included services rendered by Ecopetrol directly or by third party contractors hired by Ecopetrol through mandate; with a variable surcharge over expenses and third party contracts between 5% and 12% plus any applicable taxes. In 2014, an amendment to the agreement was signed, adjusting the monthly fixed rate to include expenses of services rendered directly by Ecopetrol, plus an additional 10% fee, and to eliminate the administrative surcharge. The contract also includes a variable sum related to contracts and purchases hired by Ecopetrol through mandate. In 2015, an addendum was signed which adjusted the fixed rate. In March 2016, an amendment to the agreement was signed, adjusting the agreement's scope to include the station's maintenance and, adjusting the monthly fixed rate. In December 2017, an amendment to the agreement was signed, adjusting the agreement's scope according to the change of the maintenance model of the midstream segment. In 2017, ODC paid Ecopetrol US\$10.7 million under this agreement.

ODC has entered into the following agreements with some of our other subsidiaries:

- Between March 1992 and January 1993, Hocol, Equion and Santiago Oil Company each entered into agreements with ODC for the transportation of crude oil through the Vasconia-Coveñas pipeline. The term of each of these agreements is indefinite. As of January 2013, the applicable tariff is the one set by the Ministry of Mines and Energy. In 2017, the transportation fees billed by ODC were: Equion (US\$7.4 million), Santiago Oil Company (US\$0.4 million) and Hocol (US\$0.58 million).

Oleoducto de los Llanos Orientales (ODL)

Ecopetrol S.A. has entered into the following agreements, among others, with its 65%-owned subsidiary ODL:

- In March 2009, Ecopetrol S.A. entered into a ship-or-pay agreement with ODL that establishes a financing tariff used to pay ODL's indebtedness to Grupo Aval for five years. This agreement was superseded by a new contract executed in May 2010, with a seven-year term, to reflect new conditions agreed with Grupo Aval. In August 2013, this contract was amended, providing a new term of seven years, including a two-year grace periods, and an interest rate of DTF + 2.5%. This financing tariff is collected through a trust fund, which in turn is responsible for making the debt service payments to Grupo Aval. Under this agreement, ODL has committed to transport 75,000 bpd during the initial two-year grace period of the facility and 90,000 bpd during the remaining years including the new term. Ecopetrol S.A. is responsible for 65% of this capacity. Payments by Ecopetrol S.A. under this contract were COP\$107 billion in 2017.
- In September 2009, Ecopetrol S.A. entered into a second ship-or-pay agreement with ODL that establishes a financing tariff collected through a trust fund that in turn is responsible for making debt service payments to security holders. Under this agreement, ODL committed to transport 19,500 bpd during the first phase of the ODL project (which began in September 2009 and ended in the first quarter of 2010) and 39,000 bpd upon commencement of the second phase of the ODL project which occurred in the first quarter of 2010 and was completed in the third quarter of 2016, the termination date of the agreement.
- In December 2009, Ecopetrol S.A. entered into a service agreement with ODL to transport crude oil. This agreement was replaced in January 2014 by a new agreement that expires in December 2020. This is a "ship or pay" agreement covering 167,000 bpd for 2014, 149,000 bpd for 2015 and 139,000 bpd until 2020. In January 2017, this agreement was amended, in order to maintain the economic and commercial balance for the parties, based on changes to the standard condition of the system (to transport crude oil with a 690 cStk viscosity), reducing the "ship or pay" capacity from 139,000 bpd to 129,139 bpd until 2020. Payments by Ecopetrol S.A. under this contract were COP\$575.5 billion in 2017.
- In March 2010, Ecopetrol S.A. entered into a pipeline operating and maintenance agreement with ODL. This agreement had an original five-year term and was amended in 2015 to extend the term another 10 years, adjusting certain conditions. In January 2017, this agreement was partially assigned by Ecopetrol to Cenit due to matters related to the management of plants and pipeline assets. In August 2017, the maintenance obligations were partially assigned by Ecopetrol to a third party. In October 2017, an amendment, of some technical definitions, in the name of and the annexes of the contract were updated and certain Ecopetrol's obligations were removed, in line with the partial assignment. Pursuant to the terms of this agreement, ODL paid to Ecopetrol S.A. COP\$6.9 billion and to Cenit COP\$1.1 billion in 2017.
- In June 2013, Ecopetrol S.A. entered into a five-year service agreement with ODL to dilute, in the facilities of the Cusiana field, crude oil transported in the Rubiales – Monterrey/Cusiana pipeline, with a committed capacity of 182,000 bpd. In January 2014, this agreement was amended to include an oil transfer service that has a "take or pay" volume of 15,000 bpd and the term was renewed for a new five-year period. In November 2017, this agreement was amended to reflect new commercial conditions related to fees. Pursuant to the terms of this agreement, Ecopetrol paid to ODL COP\$33.2 billion in 2017.
- In August 1, 2015, ODL entered into an indefinite management agreement with Oleoducto Bicentenario by means of which ODL receives legal representation and provides management services to Oleoducto Bicentenario. In August 1, 2017, the agreement was amended in order to change the way ODL is remunerated by this service, improving the structure of the agreement. Pursuant to the terms of this agreement, Bicentenario paid to ODL COP\$9 billion plus applicable taxes in 2017.

Oleoducto Bicentenario de Colombia S.A.S.

Ecopetrol S.A. has entered into the following agreements, among others, with its 55.97% owned subsidiary Oleoducto Bicentenario:

- In June 2012, Ecopetrol S.A. entered into ship-or-pay and ship-and-pay agreements with Oleoducto Bicentenario for the transportation of crude oil from Araguaney to Banadía that establish a price, which requires the payment of Oleoducto Bicentenario's indebtedness to local banks for 12 years. This tariff is collected through a trust; the trust is also responsible for making the debt service payments to the banks. The duration of the ship-or-pay agreement is the earlier of 12 years or when the credit has been entirely paid, and the duration of the ship-and-pay agreement is 20 years after the ship-or-pay terminates. Under these agreements, Oleoducto Bicentenario has committed to transport at least 110,000 bpd, of which the 55% of the agreement volume is provided directly by Ecopetrol S.A. and 0.97% indirectly by Hocol. In March 2014, the parties signed an amendment to these agreements under which Oleoducto Bicentenario acknowledges having received an advance tariff payment which can be amortized through volumes of crude transported in excess of 110,000 bpd. In April 2015, these agreements were amended to modify certain definitions to reflect new terms from the negotiation of the debt, which included a modification of participant banks and a reduction of the interest rate. In March 2017, the parties signed an amendment to these agreements in order to include the terms and conditions of the "contingent service" that involves the transportation of crude oil from Banadía to Araguaney when this service is required, and includes a "ship or pay" commitment of 270,000 bpd when the contingent service is needed. In addition, this amendment includes an equivalent credit note of one and a half day of service into the original ship-or-pay agreement for the transportation of crude oil from Araguaney to Banadía. Hocol has signed an amendment to the transportation agreement from Araguaney to Banadía, in order to receive the related credit note in case that the availability of the service in that direction is suspended in order to enable the contingent service (Banadía-Araguaney). In September 2017 the agreement was amended to specify that the "contingent capacity" could be over 180,000 barrels per any "contingent service" operation and to extend the term until July 30 of 2018 Pursuant to the terms of these agreements, in 2017 Ecopetrol and Hocol paid to Bicentenario S.A. COP\$613.1 million.
- In June 2012, Ecopetrol S.A. and Hocol entered into storage or pay and storage and pay agreements with Oleoducto Bicentenario. Under these agreements, Oleoducto Bicentenario is committed to receive, store, preserve and deliver our crude oil. The storage or pay agreement will terminate when Oleoducto Bicentenario's indebtedness to local banks has been entirely paid, and the duration of the storage and pay agreement is 20 years after the storage or pay agreement terminates. In April 2015, this contract was amended to modify certain definitions to reflect new terms from the negotiation of the debt, which included a modification of participant banks and a reduction of the interest rate. Pursuant to the terms of this agreement, in 2017 Ecopetrol and Hocol paid to Bicentenario COP\$24.8 billion plus applicable taxes.
- In August 2012, Ecopetrol S.A. entered into an Operation and Maintenance agreement for the Araguaney – Banadía pipeline system. The duration of this agreement is 15 years. This agreement was partially assigned in January 2017 by Ecopetrol to Cenit due to matters related to the management of plants and pipeline assets. In November 2017, the maintenance obligations of the transportation system were partially assigned to Cenit S.A.S. Finally, in December 2017 the agreement was modified to exclude from its scope the Araguaney and Banadía Stations maintenance. Pursuant to the terms of this agreement, Ecopetrol S.A. received COP\$11.7 billion in 2017.

Ecodiesel

- Ecopetrol S.A. entered into a supply agreement with Ecodiesel Colombia S.A. ("Ecodiesel"), a company in which Ecopetrol S.A. has a 50% equity interest. This agreement has been operative since August 1, 2010. Pursuant to the terms of this agreement, Ecodiesel must deliver to Ecopetrol S.A. and Ecopetrol S.A. must in turn purchase 48,100 barrels of Ecodiesel's biodiesel production each month. Payments vary depending on the purchased volumes and the prices of biodiesel. This agreement expires on January 31, 2021. In 2021, a total of COP\$258 billion was paid under this contract.

Savia Peru S.A.

- On February 19, 2016, Ecopetrol S.A., as lender and shareholder of 50%, and Savia Perú, as borrower, entered into a five-year loan agreement for an aggregate principal amount not to exceed US\$70 million. The proceeds of the facility will be used to (i) repay short term loans and (ii) pay shortfalls related to final judgments (in case they materialize). The loan agreement accrues interest at an annual rate of 4.99%, which can be adjusted on an annual basis, with semi-annual interest payments and principal payments beginning on the 21st month following the disbursement date. Total disbursement was US\$56.5 million through the disbursement period ended on December 31, 2017. As of April 2018, the outstanding balance of the obligation with Ecopetrol is US\$49.4 million under the loan agreement. Korea National Oil Corporation (KNOC), as shareholder of the other 50% of Savia Perú, signed a facility under the same terms and conditions as described above.

Transactions with Other State-Controlled Entities

Other than the agreements that we have entered into with the ANH, in the ordinary course of business we enter into transactions with other state-owned entities that include but are not limited to the following:

- Selling and purchasing goods, including crude oil purchases of ANH royalties (see below);
- Properties and other assets;
- Rendering and receiving services;
- Leasing assets;
- Depositing and borrowing money; and
- Using public utilities.

For the years ended December 31, 2017, 2016 and 2015, we purchased the following volumes of crude oil from the ANH (National Hydrocarbon Agency) corresponding to royalties paid in kind by oil producers in Colombia: 40.3 million barrels, 42.9 million barrels and 45.6 million barrels, respectively. See the section *Business Overview—Applicable Laws and Regulations—Regulation of Exploration and Production Activities—Business Regulation—Royalties* for a description of the current royalty scheme.

3.11 Insurance

We have a clear and defined corporate policy based on risk financing guidelines that summarizes the Company's risk transfer and retention alternatives and provides support and guidance for all the insurance-related issues of all of our affiliated and subsidiary companies.

There are three corporate insurance programs covering Ecopetrol S.A. and its subsidiaries. In the text and tables below, we set forth our insurance programs and the companies covered, along with limits and coverage details.

Group 1- Downstream Program: This insurance program provides coverage for downstream (assets and operations) of Ecopetrol S.A. and all of its subsidiaries in excess of their local insurance programs, when applicable. Coverage includes all physical damage and sabotage and terrorism, which were designed to cover downstream operations.

Table 40 – Group 1 Downstream Program

Policies	Limit (eel/agg*)		Deductible		Ecopetrol Downstream	Reficar	Propilco	Bioenergy
	Onshore	Off shore	On shore	Off shore				
	(figures in USD in millions)							
Property all risk	2,744	0	5	N/A	X	X	X	X
Sabotage and terrorism	600	0	0.5	N/A	X	X	X	X

(*) Eel: each and every loss. Agg: Aggregate

Group 2 – Upstream Program: This program provides coverage for upstream (assets and operations) of Ecopetrol’s interests and all of its upstream subsidiaries. Coverage includes all physical damage, sabotage and terrorism and control of wells.

Table 41 – Group 2 Upstream Program

Policies	Limit (eel/agg*)		Deductible		Ecopetrol Upstream	Equion	Hocol	América	Brazil	ODL	Cenit	ECA
	Onshore	Offshore	Onshore	Offshore								
	(figures in USD in millions)											
Property all risk	400**	400**	0.25	0.5	X	X	X	NA	NA	NA	NA	X
Sabotage and terrorism	55	0	0.5	N/A	X	X	X	NA	NA	NA	X	X
Control of Wells	250/50***	400	0.25 - 0.5****	6	X	X	X	X	X	NA	NA	X

(*) Eel: each and every loss. Agg: Aggregate

(**) USD250M but USD400M Maximum Loss limit and in the aggregate in respect of earthquakes.

(***) Drilling USD250M / Production USD50M

(****) 0.25, except for Drilling/Workover wells for which the deductible is 0.5.

Group 3 – Transversal Program: This program provides coverage for downstream, upstream and midstream operations of Ecopetrol and its subsidiaries and all of its subsidiaries in excess of their local insurance programs. Coverage includes general liability, directors and officers, cargo, crime and charterers’ liability.

Table 42 – Group 3 Transversal Program

Policies	Limit (eel/agg*)		Deductible Offshore	Ecopetrol Downstream	Reficar	Propilco	Ecopetrol Upstream	Equion	Hocol	América	Brazil	ODL	Cenit
	Onshore	Offshore											
	(figures in USD in millions)												
Third Party Liability	500	500	1	X	X	X	X	X	X	X	X	X	X
Crime	75/150	Various	Various	X	X	X	X	X	NA	NA	NA	X	X
Directors & Officers	250	Various	Various	X	X	X	X	X	X	X	NA	X	X
Cargo	120	3% dispatch	NA	X	NA	X	NA	X	NA	NA	NA	NA	NA
Charterers	750	0.02	NA	NA	NA	X	NA	NA	NA	NA	NA	NA	NA

(*) Eel: each and every loss. Agg: Aggregate

Our third-party liability insurance policies cover Ecopetrol S.A., our subsidiaries and affiliates in excess of local underlying policy limits for claims made against them by third parties. Our commercial general liability coverage will pay on behalf of or indemnify amounts for which an insured becomes legally obligated to pay, including damages in respect of bodily injury, property, pollution and product liability. Coverage of bodily injury and property damage is subject to coverage territory during the policy period.

Until last year, this Group included coverages for midstream (assets and operations). However, since second semester 2017 Ecopetrol's midstream subsidiaries (Cenit, Ocesa, ODL, Bicentenario and ODC) started an independent program looking for the optimization of coverages for the Oil Transportation.

Table 43 –Midstream Program

	Limit (eel/agg*)		Deductible		Cenit	Ocesa	ODL	OBC	ODC
	Onshore	Offshore	Onshore	Offshore					
	(figures in USD in millions)								
Policies									
Property all risk *	200	200	0.2	0.5	X	X	X	X	X
Sabotage and terrorism	50	50	0.1	0.1	X	X	X	X	X
Third Party Liability	100	100	0.25	0.25	X	X	X	X	X

*Each company has its own limit of 200M and an aggregated excess shared limit of 500m

With respect to offshore operations in the U.S. Gulf Coast, Ecopetrol America Inc. is party to Operating Agreements, or OAS, that include customary conditions and which contain similar terms and provisions to those in the Model Form of Offshore Deepwater Operating Agreement of the American Association of Professional Landmen. In general, pursuant to these OAs, the obligations, duties, and liabilities of the contract parties are several, and not joint or collective, for all operations covered by the OAs.

Ecopetrol S.A. has a contract with two local insurance companies for domestic operations. The local policies relate to transit, accidents, mandatory policies, liability mandatory policies, and personal accidents policies, among others. Additional policies are requested from the insurers as they are needed.

3.12 Human Resources/Labor Relations

3.12.1 Employees

As of December 31, 2017, the Ecopetrol Corporate Group had 11,682 employees, an increase of 7.0% from 2016. Most of our employees are located in Colombia. The table below presents the breakdown of Ecopetrol employees according to the business segments where they work, and the personnel of our subsidiaries for the years ended December 31, 2017, 2016 and 2015.

Table 44 – Corporate Group's Employees

	As of December 31,		
	2017	2016	2015 ⁽¹⁾
	(number of employees)		
Ecopetrol S.A.			
Exploration and Production			
Exploration	197	225	218
Production	2,141	2,095	1,880
Others	639	452	457
Total Exploration and Production	2,977	2,772	2,555
Downstream			
Refining	2,669	2,685	2,700
Marketing	132	133	136
Others	67	72	6
Total Downstream	2,868	2,890	2,842
Transport	817	949	1,158
Others	330	244	61
Total Operations	6,992	6,855	6,616
Corporate	2,290	1,993	2,115
TOTAL ECOPETROL S.A.	9,282	8,848	8,731
Ecopetrol America Inc.	70	71	75
Bioenergy S.A.S.	358	145	122
Bioenergy Zona Franca S.A.S.	316	258	126
Hocol S.A.	205	179	172
Equion Energía Limited	298	321	458
Oleoducto Central S.A.	290	290	271
Oleoducto de Colombia S.A.	1	2	2
Oleoducto de los Llanos S.A.	68	55	56
Oleoducto Bicentenario de Colombia S.A.S.	0	0	0
Ecopetrol del Perú S.A.	0	0	0
Ecopetrol Costa Afuera de Colombia S.A.S.	6	0	
Refinería de Cartagena S.A.	185	170	270
Ecopetrol Óleo e Gás do Brasil Ltda.	16	16	17
Polipropileno del Caribe S.A. (Esenttia S.A.)	370	409	388
Cenit Transporte y Logística de Hidrocarburos S.A.S.	217	156	73
TOTAL	11,682	10,920	10,761

(1) 31 persons employed by us during 2015 were not included in our 2015 employee statistics as they were independent contractors involved in non-regular activities and cannot be classified as temporary employees.

Loans and investment on training and development for our employees

To improve the quality of life of our employees, Ecopetrol S.A. extends various types of loans to its employees, including housing loans and general-purpose loans. The principal amount of the loan depends on the applicant's tenure. Ecopetrol S.A. does not guarantee any loans made by third parties. In 2017, Ecopetrol S.A. extended 1,201 housing loans for a total of COP\$219.44 billion and 1,794 general-purpose loans for a total of COP\$14.86 billion. Ecopetrol S.A. also provided on-site and external training and development, which total to COP\$21.1 billion, and it extended a total of COP\$182.6 billion in subsidies for education.

We have not provided loans (including housing loans), extended or maintained credit lines, arranged for the extension of credit by third parties, materially modified or renewed an extension of credit lines, in the form of a personal loan to or for any of our executive officers since our ADSs were registered under the Exchange Act.

There are no executive officers with housing loans from Ecopetrol.

Labor Regulation

In accordance with article 123 of the Colombian Constitution and the article 7th of the Law 1118 of 2006, our employees are considered "public servants"; even though they are subject to the common labor law. As such, their behavior is subject to the rules to those who handle public interests and goods and could be held liable for their illegal actions and omissions pursuant to the following regimes: (i) disciplinary (Law 734 of 2002), (ii) criminal or (iii) civil.

3.12.2 Collective Bargaining Arrangements

Ecopetrol S.A.

A collective bargaining agreement between us and our main labor unions governs labor relations with our unionized employees, which amounted to 4,609 employees as of January 1, 2018. The agreement also governs our labor relations with the 2,593 non-unionized employees who, according to current labor legislation, have been beneficiaries of the collective bargaining agreement.

We currently have seven industry-wide labor unions and seven company labor unions:

- Unión Sindical Obrera de la Industria del Petróleo — USO (industry labor union);
- Asociación de Trabajadores Directivos Profesionales y, Técnicos de las Empresas de la Rama de Actividad Económica del Recurso Natural del Petróleo, los combustibles y sus Derivados— ADECO (industry labor union);
- Sindicato Nacional de Trabajadores de Empresas Operadoras, Contratistas, Subcontratistas de Servicios y Actividades de la Industria Petrolera, Petroquímica y Similares — SINDISPETROL (industry labor union);
- Unión de Trabajadores de la Industria Energética Nacional y de Servicios Públicos – UTEN (industry labor union);
- Asociación Sindical de Trabajadores de la Industria del Petróleo – ASTIP (industry labor union);
- Sindicato Nacional de Trabajadores de la Industria de los Hidrocarburos – SINATRINHI (industry labor union);
- Sindicato Nacional de Trabajadores de Mantenimiento de la Industria del Petróleo, Gas y Carbón – SINTRAMANPETROL (industry labor union); Asociación de Profesionales de Ecopetrol — ASPEC (company labor union);
- Asociación Sindical de Empleados de Ecopetrol – ASOPETROL (company labor union);
- Asociación Sindical de Trabajadores de Ecopetrol – TRASINE (company labor union);
- Asociación Sindical de Trabajadores de Ecopetrol – ASTECO (company labor union);
- Sindicato de Trabajadores Petroleros de Ecopetrol – SINPECO (company labor union);
- Sindicato de Profesionales de Ecopetrol S.A. – SINPROECOP (company labor union); and
- Asociación de Profesionales y Tecnólogos Empleados de ECOPETROL S.A. – APROTECO (company labor union).

Any employee working for any company in the oil and gas industry may join the USO, ADECO SINDISPETROL, UTEN, ASTIP, SINATRINHI or SINTRAMANPETROL. Only our employees may join the company labor unions.

Ecopetrol S.A. relations with unions are based on a permanent dialogue and communication sessions where different matters are discussed in order to solve and prevent any labor conflict.

Our current collective bargaining agreement has been in effect since 2014 and has a term of four years, expiring on June 30, 2018. In 2016, the agreement was reviewed on application matters, except for monetary expenses (including wages and benefits). This review ended with a mutual arrangement document, signed on December 10, 2016.

There will be no changes to these terms until June 2018 or till the end of the eventual negotiation process. This agreement currently covers all workers benefiting from the Collective Labor Convention, regardless of whether they are part of any labor union.

4. Financial Review

Our consolidated financial statements for the years ended December 31, 2015, 2016 and 2017 were prepared in accordance with IFRS.

IFRS differs in certain significant aspects from the current Colombian IFRS (which is the accounting standard we use for local statutory reporting purposes). As a result, our financial information presented under IFRS is not directly comparable to certain of our financial information presented under Colombian IFRS. A description of the differences between Colombian IFRS and IFRS is presented under *Summary of Differences between Internal Reporting (Colombian IFRS and IFRS)* below.

Our consolidated financial statements were consolidated line by line and all transactions and significant balances between affiliates have been eliminated. These financial statements include the financial results of all subsidiaries companies controlled, directly or indirectly, by Ecopetrol S.A. See Exhibit 1—Consolidated companies, associates and joint ventures, to our consolidated financial statements included in this annual report.

4.1 *Factors Affecting Our Operating Results*

Our operating results were affected mainly by international prices of crude oil and, to a somewhat lesser extent, international prices for refined products and local prices for natural gas, as well as sales volumes, product mix, exchange rate and our operational performance. Crude oil prices and volumes are particularly important to the results of our exploration and production segment. This is because as export volumes or export prices of crude oil and products decrease or increase, our revenues do also. Results from our refining activities are also affected by the price of crude oil used as raw material, changes in product prices in the international market, change in environmental regulations, conversion ratios and utilization rates and refining capacity, all of which affect our refining margins. Changes in the value of foreign currencies, particularly the U.S. dollar against the Colombian Peso, can also have a significant effect on our financial statements. Finally, terrorist attacks by guerillas against our pipelines and other facilities or social unrest can lead to loss of revenues by restricting the availability of transport systems for exports or sales of crude oil and products and/or production activities, in addition to the direct costs of repairing and cleaning.

Sales volumes and prices

Our results from the exploration and production segment depend mainly on our sales volumes and average local and international prices for crude oil, petrochemicals and natural gas. Additionally, sales volumes also reflect the purchase of crude oil and natural gas that we make from third parties and the ANH.

We sell crude oil and natural gas in the local and the international market. We also process crude oil at the Barrancabermeja and Cartagena refineries and sell refined and other petrochemical products in the local and international markets.

Local sales and prices

We have a number of crude oil short-term commercial agreements with local customers, and natural gas short and long-term supply contracts with gas-fired power plants and local natural gas distribution companies. Local sale prices are determined in accordance with existing regulations, contractual arrangements and the spot market linked to international benchmarks. Local sales represent 50.4% of our total revenues, on average, for the past three years.

International Sales and Prices

Our foreign sales represented 49.6% of our total revenues, on average, for the past three years.

International sale prices are determined in accordance with contractual arrangements and the spot market linked to international benchmarks primarily ICE Brent benchmark.

A market diversification strategy has allowed us to capture markets where we have been able to obtain higher prices for our crudes and refined products. We sell our crudes and refined products in various regions, such as the U.S., Central America and the Caribbean, Asia and Europe. In our negotiations with potential customers, we seek to use the most liquid benchmark reference prices in each region.

Exploration costs

We account for exploratory drilling costs using the successful efforts method, whereby all costs associated with the exploration and drilling of productive wells are initially capitalized. Costs incurred in exploring and drilling dry or unsuccessful wells are expensed in the period in which the well is determined to be a dry or unsuccessful well and are accounted for under "Exploration and Project expenses." Consequently, an increase in the number of exploratory wells we declare as dry or unsuccessful will negatively affect our results and may cause volatility in our operating expenses.

Royalties

Each of our production contracts has its own royalty arrangement in accordance with applicable law. Law 141 of 1994 established a royalty fixed rate equivalent to 20% of total production. In 1999, a modification to the royalty system established a sliding scale for royalty percentage linked to the production level of crude oil and natural gas to fields discovered after July 29, 1999, depending on whether the production is crude oil or natural gas, and on the quality of the crude oil produced. Since 2002, as a result of the enactment of Law 756 of 2002, the royalty percentage has ranged from 8% for fields producing up to five thousand bpd to 25% for fields producing an excess of 600 thousand bpd. Producing fields pay royalties in accordance with the applicable royalty rate at the time of the discovery. Also, Law 756 of 2002 establishes that in the fields of the association contracts that finalize or revert back, an additional royalty rate of 12% of the basic production applies.

Since January 2014, the ANH has collected natural gas production royalties from producers settled in cash based on a formula, regardless of whether a producer has sold the gas. As a result, we no longer commercialize this gas on behalf of the ANH. In addition, because the royalties are now payable to the ANH in cash, all the gas we produce is considered part of our reserves and production, without any deduction for royalties. The cost of natural gas royalties totaled COP\$449,959 million in 2017.

Purchases of hydrocarbons

We purchase all crude oil delivered to the ANH as royalties by us and by third parties. The purchase price is calculated according to a formula set forth in a contract between Ecopetrol and the ANH that reflects our export sales prices (crudes and products), a quality adjustment for API gravity and sulfur content, transportation rates from the wellhead to the Coveñas or Tumaco ports and a marketing fee. We sell the physical product purchased from the ANH as part of our ordinary business. In June 2016, the contract between the ANH and us was extended until June 30, 2018.

Since 2016, we have imported crude oil for Reficar feedstock when such imports result in better operational or economic performance of the Ecopetrol Group.

4.2 Effect of Taxes, Exchange Rate Variation, Inflation and the Price of Oil on our Results

4.2.1 Taxes

In December 2016, the Colombian Congress adopted Law 1819, which introduced changes to the Colombian tax system as follows:

- The CREE and CREE surtax were eliminated. Instead, a unified income tax rate was set, which will be 33% for 2018 and onwards.
- An income tax surtax for profits above COP\$800 million of 4% in 2018.
- Taxpayers must calculate their taxable income taking as initial base the year and result under Colombian IFRS. Accounting profit is reconciled to obtain the net income tax which is the basis to calculate the income tax.

- From fiscal year 2017 onwards, a withholding tax on dividends paid is as follows:
 - (i) For non-resident shareholders: (i) a 5% dividend tax on dividends distributed from profits taxed at the corporate level; and (ii) a 35% withholding tax rate on dividends distributed from profits not taxed at the corporate level, plus an additional 5% dividend tax after applying the initial 35% withholding tax rate.
 - (ii) For Colombian individuals: dividends paid are taxed at 5% if they are between 600 and 1,000 Tax Value Unit (UVT – Unidad de Valor Tributario for its acronym in Spanish) and 10% if they are greater than 1,000 UVT.
- Dividends paid to local corporations are not subject to any tax, provided that such dividends were taxed at the corporate level.
- 2017 and future loss carryforwards are subject to a time-limit of 12 years.
- Depreciation and amortization methods and annual percentages are limited to those established in the fiscal framework and depend on the type of asset. For example, machinery and equipment depreciate at an annual rate of 10%, infrastructure (including pipelines) at 2.22% and vehicles and computers at 20%, among others.
- The income tax for tax free zone users is 20% for fiscal year 2018. The tax rate of companies located in a free trade zone with legal stability is 15%, which typically applies during the contract’s duration.
- The presumptive income rate increased to 3.5% in 2017 from 3% in 2016.
- Tax rate for VAT increased to 19% in 2017 from 16% in 2016.
- The charge on financial transactions is 0.004%, with half of the tax liability being deductible.
- Carbon tax accrues on the carbon content of fossil fuels used for combustion. The rate will be COP\$15,000 per ton of CO₂.

The 2016 Tax Reform included two tax benefits that are expected to improve the operations of the oil and gas industry:

“CERT: Certificado de Reembolso Tributario” incentive:

- For exploration activities, the “CERT” (for its acronym in Spanish) incentive was approved, consisting of the reimbursement of part of the investment made in the exploration phase.
- The CERT will be granted when the income tax return is filed.
- The CERT can only be redeemed to pay taxes at the national level and its effective maturity date is two years after it is issued. Nevertheless, Decree 2253 of 2017 establishes that a CERT redemption can be made from year two to year five, as from the date of the granting of the incentive. The CERT can also be sold and traded in fixed income market.
- For production activities, the CERT reimbursement will be granted exclusively to investments that increase the recovery factor, i.e. investments that increase the reserves that are currently proved in certain wells.
- On December 29, 2017, the Colombian Government issued Decree 2253, which establishes that companies who (i) qualify as operators of association agreements entered into with Ecopetrol, (ii) have exploration and production of hydrocarbons agreements and (iii) are currently involved in the exploration and production of hydrocarbons, among others, can also qualify for the CERT. Additionally, the CERT will not qualify as taxable income or capital gain for the taxpayer receiving or acquiring such incentive.

- On March 23, 2018, the following Resolutions were issued in order to regulate the procedures and requirements that companies must comply to claim the CERT: 0860 of Ministry of Finance and Public Credit, 108 of ANH and 40284 and 40285 of Ministry of Mines and Energy.

Refundable VAT on O&G exploration:

- Taxpayers in the oil and gas industry are entitled to refund VAT paid in the exploration phase for offshore projects. Taxpayers can request for this VAT as of the next fiscal year in which the investment was made. VAT that is reimbursed cannot be used as a higher cost or expense for income tax purposes.

4.2.2 Exchange Rate Variation

The functional currency of each of the companies of Ecopetrol Group is determined in relation to the main economic environment where each company operates; however our consolidated financial results are reported in Colombian Pesos, which is the Ecopetrol Group's functional and presentation currency. A substantial part of our consolidated revenues coming from Ecopetrol Group companies whose functional currency is the Colombian Peso, the U.S. dollar-Colombian Peso is derived from local sales and exports of crude oil, natural gas and refined products sold at prices referenced to benchmarks quoted in U.S. dollars. Therefore, they are exposed to foreign currency exchange risk on revenues, capital expenditures and financial instruments that are denominated in a currency other than its functional currency.

Fluctuations in the U.S. dollar-Colombian Peso exchange rate have effects on our consolidated financial statements. As crude oil is priced in U.S. dollars, fluctuations in the exchange rate of the Colombian Peso against the U.S. dollar may have a significant impact on revenues, cost, assets and liabilities held in foreign currency.

An appreciation of the Colombian Peso has a negative impact on our results of operations because our revenues from exports of crude oil, natural gas and refined products are primarily expressed in U.S. Dollars. Costs of imported goods and contracted services expressed in U.S. dollars will also be lower when expressed in Colombian Pesos, but on balance, our operating income in Colombian Pesos tends to decline when the Colombian Peso appreciates, other factors being equal. The appreciation of the Colombian peso against the U.S. dollar also decreases the debt service requirements of our Companies with the Colombian peso as their functional currency, as the amount of the Colombian pesos necessary to pay principal and interest on foreign currency debt decreases with the appreciation of the Colombian peso.

Conversely, when the Colombian Peso depreciates against the U.S. dollar, our reported revenues, costs related to imported goods and services, interest costs, and operating income, all tend to increase.

During 2017, the Colombian peso appreciated on average 3.35% against the U.S. dollar. In 2016 and 2015, the Colombian Peso depreciated on average 11.18%, and 37.28%, respectively, against the U.S. dollar. Additionally, as of December 31, 2017 and December 31, 2016 the Colombian Peso/U.S. dollar exchange rate appreciated 0.56% and 4.72%, respectively from the rate a year earlier. As of December 31, 2015, in contrast, the Colombian Peso depreciated 31.64%, from the rate a year earlier.

In 2017, our consolidated debt in foreign currency decreased by a total of US\$2,582 million mainly as a result of prepayments of foreign currency denominated loans of US\$2,400 million and amortization of foreign currency capital expenditures. In 2016, our consolidated debt in foreign currency increased by a total of US\$975 million as Ecopetrol S.A. raised US\$475 million through international loans and US\$500 million through an international bond issuance. In 2015, our consolidated debt in foreign currency increased by a total of US\$3,425 million as Ecopetrol S.A. raised US\$1,925 million through an international loan and US\$1,500 million through an international bond issuance.

As of December 31, 2017 our U.S. dollar denominated total debt was US\$12,590 million, which we recognize in our financial statements at its amortized cost, which corresponds to the present value of cash flows, discounted at the effective interest rate. Out of this total, US\$11,985 million relates to Ecopetrol S.A., whose functional currency is the Colombian Peso. Therefore, when the Colombian Peso depreciates against the U.S. dollar, Ecopetrol S.A. is exposed to an exchange rate loss. In contrast, when the Colombian Peso appreciates against the U.S. dollar, Ecopetrol S.A. has an exchange rate gain. Some of the Ecopetrol Group companies have the U.S. dollar as their functional currency and are not exposed to a material exchange rate risk resulting from fluctuations in the Colombian Peso against the U.S. dollar. On the asset side, when the financial statements of the Group are consolidated, the exchange rate differential of the subsidiaries' assets and liabilities whose functional currency is the U.S. dollar is recognized directly in equity, as part of Other comprehensive income.

In 2015, Ecopetrol S.A. adopted hedge accounting, using two types of natural hedges with its U.S. dollar debt as a financial instrument: i) a cash flow hedge for exports of crude oil and ii) a hedge of the net investment in foreign operations. As a result of the implementation of both hedges 71.2% (\$8,532 million) of Ecopetrol S.A.'s debt in U.S. dollars, as of December 31, 2017, was designated as a hedge. With the adoption of hedge accounting, the effect of the volatility of the foreign exchange rate on the hedged portion of the debt is recognized directly in equity, as part of Other comprehensive income.

The remaining portion of Ecopetrol S.A.'s U.S. dollar-denominated debt, as well as the financial assets and liabilities denominated in foreign currency, continues to be exposed to the fluctuation in the exchange rate, which means that an appreciation of the Colombian peso against the U.S. dollar could generate a loss for companies whose functional currency is the Colombian peso that have a net position in U.S. dollars or a gain if they have a net liability position in U.S. dollars. Conversely, a depreciation of the Colombian peso against the U.S. dollar could generate a gain for companies whose functional currency is the Colombian peso that have a net position in U.S. dollars or a loss if they have a net liability position in U.S. dollars.

As of December 31, 2017, Ecopetrol Group companies with the Colombian peso as their functional currency have a net U.S. dollar position close to zero after the implementation of the natural hedging previously mentioned above, neutralizing the effect of exchange rate fluctuations in their results for the year. The companies with the U.S. dollar as their functional currency have a net U.S. dollar position of US\$1,699 million and are not exposed to a material exchange rate risk resulting from fluctuations in the Colombian peso against the U.S. dollar, as discussed above.

4.2.3 *Effects of Inflation*

The average annual rate of inflation in Colombia for the past ten years is 4.3%. It decreased in 2017 as compared to 2016. As measured by the general consumer price index, average annual inflation in Colombia for the years ended December 31, 2017, 2016 and 2015 was 4.09%, 5.75%, and 6.77%, respectively. The decrease in inflation in 2017 is mainly explained by the recovery of the agricultural sector given the end of the "El Niño" weather phenomenon and the nonoccurrence of agricultural and freight transport stoppages that occurred in 2016. The decrease in inflation is also related to the weakness of consumer demand and the monetary policy applied by the central bank. Cost inflation in the prices of goods, raw materials, interest cost of debt in local currency indexed to inflation and services for operation of oil and gas producing assets can vary over time and between each market segment.

4.2.4 *Effects of the Price of Oil*

The average price of ICE Brent crude was US\$54.7 per barrel in 2017 as compared to US\$45.10 per barrel in 2016 and US\$53.60 per barrel in 2015. (*See section Strategy and Market Overview*). In addition, Ecopetrol's average crude oil basket price relative to ICE Brent reported a discount of US\$6.90 in 2017, a lower discount than the US\$9.40 and US\$9.70 observed in 2016 and 2015, respectively, due to an active commercial strategy, including seeking more valuable markets for our crude oil, and strengthening the demand for our heavy crude oil in the international market. Therefore, our average price crude oil basket was US\$47.80 per barrel in 2017 as compared to US\$35.70 per barrel in 2016 and US\$43.90 per barrel in 2015, which represents an increase of US\$12.10 per barrel in 2017 compared to 2016.

In the *Operating Results* section below, we present the impact of the price increase in our revenue and cost of sales.

Additionally, fluctuations in the price of oil had an impact on the value of our oil and gas reserves. Reserves valuation is made in accordance with SEC price regulations. Volatility in hydrocarbon prices, refining margins and reserves, as well as changes in environmental regulations may lead to the recognition of impairment or recovery of assets.

In 2015, the adverse economic context faced by the hydrocarbons sector resulted in a reduction in forecasted oil prices and an increase in market and country risk reflected in the discount rate, as well as a reduction in the recoverable reserves amount and refining margin, among other factors, Ecopetrol recognized an impairment of non-current assets of COP\$7,864,875 million before taxes.

In 2016, in connection with our evaluation of the recoverable amount of the assets value, which includes the variation in estimations of future prices under the current scenarios of OPEC's oil quota agreements and the impact resulting from changes on specifications issued by the International Marine Organization agreement regarding marine pollution -Marpol- on crude and fuels with high sulfur content, Ecopetrol recognized an impairment of non-current assets of COP\$928,747 million before taxes.

In 2017, Ecopetrol had a COP\$1,311,138 million net reversal of prior year impairments primarily as a result an improved hydrocarbon prices outlook, incorporation of new reserves. Ecopetrol's crude an improved oil basket price discount as compared to the ICE Brent crude oil price, favorable refining margins outlook and technical operational capacity, among other factors.

For additional information about impairment charges and reversals, see section *Operating Results—Consolidated Results of Operations—Impairment of non-current assets* and Note 18 to our consolidated financial statements.

4.3 *Accounting Policies*

Our consolidated financial statements for the years ended December 31, 2015, 2016 and 2017 were prepared in accordance with IFRS. The detail of the accounting policies is described in Note 4 to our consolidated financial statements.

4.4 *Critical Accounting Judgments and Estimates*

Critical accounting policies are those policies that require us to exercise judgment or involve a higher degree of complexity in the application of the accounting policies that currently affect our financial condition and results of operations. The accounting judgments and estimates we make in these contexts require us to calculate variables and make assumptions about matters that are highly uncertain. In each case, if we had made other estimates, or if changes in the estimates occur from period to period, our financial condition and results of operations could be materially affected.

See Note 3 to our consolidated financial statements for a summary of the critical accounting judgments and estimates applicable to us. There are many other areas in which we use estimates about uncertain matters, but we believe the reasonably likely effect of changed or different estimates would not be material to our financial presentation.

4.5 Operating Results

The following discussion is based on information contained in our audited consolidated financial statements and should be read in conjunction therewith.

4.5.1 Consolidated Results of Operations

The following table sets forth components of our income statement for the years ended December 31, 2017, 2016 and 2015.

Table 45 – Consolidated Income Statement

<i>Income Statement (Colombian Pesos in millions)</i>	For the Years ended December 31,			% Change	
	2017	2016	2015	2017/2016	2016/2015
Revenue	55,954,228	48,485,561	52,347,271	15.4	(7.4)
Cost of sales	36,908,325	34,251,423	36,994,516	7.8	(7.4)
Gross Profit	19,045,903	14,234,138	15,352,755	33.8	(7.3)
Operating expenses	4,185,186	4,400,843	5,356,715	(4.9)	(17.8)
Impairment of non-current assets	(1,311,138)	928,747	7,864,875	(241.2)	(88.2)
Operating Income	16,171,855	8,904,548	2,131,165	81.6	317.8
Finance results, net	(2,495,731)	(1,175,367)	(7,663,104)	112.3	(84.7)
Share of profit of companies	93,538	61,345	(46,687)	52.5	(231.4)
Income before income tax	13,769,662	7,790,526	(5,578,626)	76.7	(239.6)
Income tax	(5,800,268)	(4,543,046)	(710,353)	27.7	539.5
Net Income (loss)	7,969,394	3,247,480	(6,288,979)	145.4	(151.6)
Net income (loss) attributable to:					
Company's shareholders	7,178,539	2,447,881	(7,193,859)	193.3	(134.0)
Non-controlling interest	790,855	799,599	904,880	(1.1)	(11.6)
Net Income (loss)	7,969,394	3,247,480	(6,288,979)	145.4	(151.6)

4.5.1.1 Total Revenues

Table 46 – Third-Party Revenues by Business Segment

The following table sets forth our principal sources of third-party revenues by business segment for the years ended December 31, 2017, 2016 and 2015. An explanation of how we classify our operations into business segments is included in Section 4.5.2 below.

Revenue by segment	2017			2016			2015			Change Sales Revenues	
	Volume (barrels equivalent)	Average price U.S. dollars/barrels	Sales revenues (Colombian Pesos in millions)	Volume (barrels equivalent)	Average price U.S. dollars/barrels	Sales revenues (Colombian Pesos in millions)	Volume (barrels equivalent)	Average price U.S. dollars/barrels	Sales revenues (Colombian Pesos in millions)	2017/2016	2016/2015
Local crude oil	6,629,362	46.5	909,871	5,288,631	35.0	553,666	4,904,765	38.5	491,279	64.3	12.7
Foreign crude oil	151,619,346	47.8	21,426,666	159,311,257	35.7	17,278,579	178,581,520	44.0	21,181,265	24.0	(18.4)
Trading of crude oil	-	-	-	-	-	-	17,526,239	-	1,309,196	-	(100.0)
Natural gas local	26,998,537	22.8	1,815,754	27,543,046	23.6	1,988,336	30,831,442	21.8	1,845,345	(8.7)	7.7
Foreign natural gas	618,022	17.7	32,303	931,754	20.9	58,809	2,906,034	23.6	182,950	(45.1)	(67.9)
Other income ⁽¹⁾	3,412,568	-	819,726	1,288,736	-	647,942	3,558,621	-	659,178	26.5	(1.7)
Exploration and production sales	189,277,835	-	25,004,320	194,363,424	-	20,527,332	238,308,621	-	25,669,213	21.8	(20.0)
Local refined products	106,891,163	67.2	21,187,091	106,047,637	54.9	17,771,166	102,475,029	67.1	18,806,063	19.2	(5.5)
Foreign refined products	38,268,394	53.2	6,005,556	51,843,743	40.4	6,330,648	26,357,160	48.8	3,535,666	(5.1)	79.1
Foreign crude oil	341,366	53.0	52,397	-	-	-	-	-	-	-	-
Other income ⁽¹⁾	-	-	98,315	-	-	92,210	-	-	115,137	6.6	(19.9)
Refining and petrochemicals	145,500,923	-	27,343,359	157,891,380	-	24,194,024	128,832,189	-	22,456,866	13.0	7.7
Transportation services	-	-	3,606,549	-	-	3,764,205	-	-	4,221,192	(4.2)	(10.8)
Transportation and logistics	-	-	3,606,549	-	-	3,764,205	-	-	4,221,192	(4.2)	(10.8)
Total sales	334,778,758	-	55,954,228	352,254,804	-	48,485,561	367,140,810	-	52,347,271	15.4	(7.4)
Crude oil	158,590,074	47.8	22,388,934	164,599,888	35.7	17,832,245	201,012,524	43.9	22,981,740	25.6	(22.4)
Natural gas	27,616,559	22.7	1,848,057	28,474,800	23.5	2,047,145	33,737,476	22.0	2,028,295	(9.7)	0.9
Refined products	148,572,125	62.7	28,012,373	159,180,116	50.1	24,101,814	132,390,810	63.4	22,341,729	13.2	7.9
Transportations services and others	-	-	3,704,864	-	-	4,504,357	-	-	4,995,507	(3.9)	(9.8)
Total sales	334,778,758	-	55,954,228	352,254,804	-	48,485,561	367,140,810	-	52,347,271	15.4	(7.4)

(1) In the case of the exploration and production segment, corresponds to services and sales of refined products (mainly LPG and asphalt) allocated to our exploration and production segment. In the case of the refining and petrochemicals segment, corresponds to industrial services.

In 2017, total revenues increased by 15.4% as compared to 2016, primarily as a result of a COP\$10,971,709 million increase in revenues mainly due to the 33.9%, or US\$12.1 per barrel increase of our average crude oil basket price and a smaller discount of Ecopetrol's average crude oil basket price from international prices. This increase was partially offset by: (i) a COP\$1,894,819 million decrease in revenues attributable to the decrease in our sales volume and a COP\$261,200 decrease in services provided by our transportations and logistics segment and (ii) the 3.35% appreciation of the Colombian Peso against the U.S. dollar, from an average exchange rate of COP\$3,053.42/US\$1.00 in 2016 to an average exchange rate of COP\$2,951.15 /US\$1.00 in 2017, resulting in a decrease in sales revenue from exports, which represented a decrease of COP\$1,347,023 million.

The decrease of our sales volume in 2017 as compared to 2016 was the result of (i) the 3.7%, or 6 mbe, decrease in our crude sales volume caused mainly by lower crude exports due to a greater allocation of domestic crudes to supply Reficar in order to replace imports, (ii) the 6.7%, or 10.7 mbe, decrease in refined products volumes due to lower exports of diesel, primarily due to: (a) our commercial strategy of focusing on allocating higher volumes to the domestic market to supply local demand and replace imports which resulted in lower cost of sales and better gross margin, (b) lower exports of fuel oil, and (c) a decrease in production at the Barrancabermeja refinery as a result of reliance on more efficient alternative sources, and (iii) the 3%, or 0.86 mbe, decrease in natural gas sales volume due to continued lower thermal demand as a result of no effect of the "El Niño" weather phenomenon that ended in the middle of 2016.

In 2016, total revenues decreased by 7.4% as compared to 2015, primarily as a result of: (i) a COP\$6,456,917 million decrease in revenues mainly due to the 18.6%, or US\$8.2 per barrel reduction of our average crude oil basket price, (ii) a COP\$1,572,854 million decrease in revenues attributable to the decrease in our sales volume and lower services provided by our transportations and logistics segment. This decrease was partially offset by the 11.2% devaluation of the Colombian Peso against the U.S. dollar, from an average exchange rate of COP\$2,746.47/US\$1.00 in 2015 to an average exchange rate of COP\$3,053.42/US\$1.00 in 2016, resulting in an increase in sales revenue from exports, which represented an increase of COP\$4,168,061 million.

The decrease of our sales volume in 2016 as compared to 2015 was the result of (i) the 18.1%, or 36.4 mbe, decrease in our crude sales volume caused mainly by lower crude exports due to production decline, reduced purchases by third parties and lower availability of crude due to its use for feedstock at Reficar, and (ii) the 15.6%, or 5.3 mbe, decrease in natural gas sales volume due to lower thermal demand as a result of the end of the "El Niño" weather phenomenon and the termination of our sales contract to Venezuela on June 30, 2015. This decrease in sales volume was partially offset by the 20.2%, or 26.8 mbe, increase in sales of refined products given the increase of operations at Reficar and higher demand due to the growth in the number of motor vehicles in Colombia.

4.5.1.2 Cost of Sales

Our cost of sales was principally affected by the factors described below. See Note 26 to our consolidated financial statements for more detail.

Cost of sales in 2017 was COP\$36,908,325 million, representing a COP\$2,656,902 million or 7.8% increase as compared to 2016, primarily as a result of the following factors:

- A COP\$1,439,366 million increase in the purchase costs of crude oil, natural gas and refined products, which were purchased for sales and, in the case of crude oil, for refining, which was primarily the result of (i) higher average purchase prices due to the COP\$4,322,867 million increase in international benchmark prices for crude oil, natural gas and refined products, and (ii) increased crude oil imports required at Reficar for its operations. This increase was partially offset by (i) a COP\$2,399,596 decrease in volumes purchased due to lower imports of fuels, especially diesel and gasoline, due to our strategy described above of replacing imports with products produced by Reficar, and lower diluent consumption, due to the strategy of marketing high-viscosity crudes and co-dilution with LPG, and (ii) COP\$543,905 million decrease in costs in Colombian Peso terms due to the appreciation of the average exchange rate of the Colombian Peso against the U.S. dollar.

- A COP\$ 748,051 million increase in depreciation, amortization and depletion charges due to (i) higher depreciation as a result of the beginning of operations of the Gunflint field by Ecopetrol America Inc. in August 2016, (ii) a decrease in hydrocarbon proved developed reserves in 2016 as compared to 2015, which in turn led to an increase in depreciation expenses, and (iii) the capitalization of project costs and maintenance in our transportation system.
- A COP\$415,534 million increase in the cost of processing materials and operating supplies due to an increase in our operational activities.
- A COP\$243,702 million increase in labor costs, which is primarily the result of: (i) no performance variable bonus payment in 2016, (ii) a 5.2% salary increase in 2017 and (iii) the payment of salaries and health services for employees of the Rubiales field for the entire year of 2017, after Ecopetrol assumed operations in July 2016.
- A COP\$41,471 million decrease in other minor items.

The factors mentioned above were partially offset by a COP\$231,222 million increase in inventories and an increase in unit costs associated with the increase of the Brent price of crude oils and products.

Cost of sales in 2016 was COP\$34,251,423 million, representing a COP\$2,743,093 million or 7.4% decrease as compared to 2015, primarily as a result of the following factors:

- A COP\$2,043,600 million decrease in the purchase costs of crude oil, natural gas and refined products, which were purchased for sales and in the case of raw materials for refining, which was primarily the result of (i) a lower average purchase prices due to the COP\$3,571,691 million decrease in international benchmark prices for crude oil, natural gas and refined products, and (ii) a COP\$142,758 decrease in volumes purchased due to the positive effect of a decrease in imports by Reficar and lower products imports by the Refinery of Cartagena given its beginning of operation partially offset by greater purchases of crude oil in the international market for its supply. This decrease was partially offset by a COP\$1,670,849 million increase in the average exchange rate of the Colombian Peso against the U.S. dollar (which led to increased costs in Colombian Peso terms).
- A COP\$966,578 million decrease in maintenance and contracted services cost, which was primarily the result of (i) a COP\$630,576 million decrease in contracted services, mainly due to cost savings achieved through the implementation of our business transformation plan and the transfer of the direct operation of the Rubiales field to Ecopetrol in July 2016; and (ii) a COP\$336,002 million decrease in maintenance costs, mainly due to savings achieved from our 2016 maintenance plan which included the renegotiation of fees and the optimization of time without affecting operations.
- A COP\$587,696 million decrease in transportation costs, which was the result of an optimization of the use of tanker trucks. This optimization included improvements in the pipeline transportation system for the transportation of heavy crude oil and consequently less use of tanker trucks, use of shorter transportation routes and renegotiation of fees for contracts.

The factors mentioned above were partially offset by a (i) COP\$784,266 million increase in the amortization, depletion and depreciation of property, plant and equipment in connection with the start-up of the Reficar units and capitalization of major maintenance costs at the Barrancabermeja refinery and (ii) a COP\$70,515 million decrease in other minor items.

4.5.1.3 Operating Expenses before impairment of non-current assets effects

Operating expenses and selling, general and administrative expenses before taking into account the impairment of non-current assets, amounted to COP\$4,185,186 million in 2017, a COP\$215,657 million or 4.9% decrease as compared to 2016, mainly as a result of the following factors (see Notes 27 and 28 to our consolidated financial statements for more detail).

- A COP\$451,095 million increase in other income due to the acquisition of an additional 11.6% interest at the K2 field in the Gulf of Mexico, which generated a gain due to the increase in the book value of the asset above the price paid for the additional interest. This non-cash gain is the result of the fair value valuation of the interest acquired, reflecting a price increase between the date of the deal and the price outlook by the end of 2017, among other factors.
- A COP\$263,034 million decrease in taxes mainly due to the reduction of the wealth tax rate from 1% in 2016 to 0.4% in 2017, which was partially offset by an increase in Hocol's tax expenses as a result of a regulatory trial on deductible expenses.
- A COP\$122,427 million increase in other income due to the sale of the following fields in 2017: Sogamoso, Río Zulia, Río de Oro and Puerto Barco, Santana, Nancy Maxine Burdine and Valdivia Almagro.

This decrease was partially offset by:

- A COP\$613,350 million increase in exploratory expenses as a result of a higher seismic activity and the recognition of spending on exploratory activity mainly at the Kronos-1, Parmer-1, Warrior 2, Lunera-1, Brama-1, Molusco-1, Godric, Dumbo and Pollera wells,
- A COP\$7,549 million increase in other minor items.

Operating expenses and selling, general and administrative expenses before taking into account the impairment of non-current assets, amounted to COP\$4,400,843 million in 2016, a COP\$ 955,872 million (17.8%) decrease as compared to 2015, mainly as a result of the following factors (see Notes 27 and 28 to our consolidated financial statements for more detail).

- A COP\$855,659 million decrease in exploratory expenses as a result of decreased seismic activity and fewer dry wells reported in the period;
- A COP\$309,746 million decrease in commissions, fees, freights and services due to optimization achieved through the implementation of the transformation program.

This decrease was partially offset by:

- A COP\$134,665 million increase in labor expenses mainly due to the implementation of a voluntary retirement plan. This plan includes benefits such as monthly income, education and health until the date on which the employees are granted their legal retirement pension.
- A COP\$74,868 million increase in other minor items.

Each of our operating segments bears the costs and expenses incurred for product use and marketing and each segment assumes administrative expenses and all non-operational transactions related to its activity. Discussion of operating expenses by business segment is included in the section *Financial Review—Operating Results—Consolidated Results of Operations—Segment Performance and Analysis*.

4.5.1.4 Impairment of non-current assets

The impairment of our non-current assets includes expenses (or recovery) of impairment of property, plant and equipment and natural resources, investments in companies, goodwill and other non-current assets. The Company is exposed to future risks derived mainly from variations in: (i) oil prices outlook, (ii) refining margins and profitability, (iii) cost profile, (iv) investment and maintenance expenses, (v) amount of recoverable reserves, (vi) market and country risk assessments reflected in the discount rate, and (vii) changes in domestic and international regulations, among others.

Any change in the foregoing variables used to calculate the recoverable amount of a non-current asset can have a material effect on the recognition of either losses or recovery of impairment charges in the profit or loss statement. In our business segments highly sensitive variables can include among others: (i) in the exploration and production segment, variations of the hydrocarbon prices outlook; (ii) in the refining segment, changes in product and crude oil prices, discount rate, refining margins, changes in environmental regulations, cost structure and the level of capital expenditures; (iii) in the transportation and logistics segment, changes in tariffs regulation and volumes transported. (See Notes 3.2, 4.12 and 18 to our consolidated financial statements for more detail).

In 2017, we had a COP\$1,311,138 million net reversal of impairment of non-current assets, as compared to impairment losses of COP\$928,747 million in 2016 and COP\$7,864,875 million in 2015. These impairments are a non-cash accounting effect and consequently they do not involve any disbursement or income. Further, any cumulative impairment amount of non-current assets is susceptible to reversion when the fair value of the asset exceeds its book value. On the contrary, in the event that the book value exceeds the fair value of the asset, an additional impairment expense could be recognized.

The partial reversal of the impairment recorded in previous years is primarily the result of an improved hydrocarbon prices outlook, incorporation of new reserves, Ecopetrol's crude oil basket price discounts as compared to the ICE Brent crude price, favorable refining margins outlook, market conditions affecting the discount rate and technical operational capacity, among other factors.

The impairment losses recognized in 2016 and 2015 were mainly due to lower estimates of the outlook for oil prices given the oil price environment during those years, operational variables in the exploration and production and refining segments, market and country risk assessments reflected in the discount rate, and a reduction in the amount of recoverable reserves, among others.

For more information regarding impairment by segment, see the section *Financial Review—Operating Results—Consolidated Results of Operations—Segment Performance and Analysis*.

4.5.1.5 Finance Results, Net

Finance results, net, mainly includes exchange rate gains or losses, interest expense, yields and interest from our investments and non-current liabilities financial costs (asset retirement obligation and post-benefits plan).

Finance results, net, amounted to a loss of COP\$2,495,731 million in 2017 as compared to a loss of COP\$1,175,367 million in 2016. This increase in loss was mainly due to:

- The negative impact (COP\$970,916 million) resulting from the 0.56% appreciation of the Colombian Peso against the U.S. dollar on our U.S. dollar net asset position. In 2017 our exchange rate gain was COP\$5,514 million, as compared to a gain of COP\$976,430 million in 2016.
- A COP\$688,664 million decrease in financial income corresponding to the reversal of a provision we had set aside in 2016 relating to a litigation concerning Santiago de las Atalayas (the "Comuneros"). See below and Note 23.3 to our consolidated financial statement for more detail.
- A COP\$39,814 million increase in losses related to other minor financial items.

This increase in our financial loss was partially offset by: (i) the use of cash flow and net investment hedge accounting, which has allowed us to neutralize, overall, the effect of the exchange rate fluctuation on 71.2% of the U.S. dollar debt of Ecopetrol S.A., since exchange rate changes are recognized under other comprehensive income within equity, (ii) the efficient allocation of debt within the companies that make up the Ecopetrol Group, thereby achieving an approximately zero net position in U.S. dollars as of December 31, 2017, and (iii) a COP\$379,030 million decrease in interest expenses as a result of: (i) the use of cash surpluses to pre-pay foreign currency-denominated loans totaling US\$1,925 million in June 2017 and US\$475 million in December 2017 and (ii) a decrease in interest on local currency-denominated loans with a lower interest rate indexed to the Consumer Price Index (CPI) and a decrease in interest on capital payments.

Finance results, net, amounted to a loss of COP\$1,175,367 million in 2016 as compared to a loss of COP\$7,663,104 million in 2015. This decrease in loss was mainly due to:

- The positive impact (COP\$6,543,044 million) resulting from the depreciation of the Colombian Peso against the U.S. dollar on our U.S. dollar net asset position. Our 2016 exchange rate gain was COP\$976,430 million, as compared to a loss of COP\$5,566,614 million in 2015.
- The adoption of cash flow hedge accounting in October 2015 and the hedging of our net investment in June 2016 has allowed us to neutralize, overall, the effect of the exchange rate fluctuation over 88% of the U.S. dollar debt of Ecopetrol S.A., since exchange rate changes are recognized under other comprehensive income within equity.
- A COP\$688,664 million increase in financial income corresponding to the reversal of a provision we had set aside relating to a litigation concerning the “Comuneros” (litigation concerning Santiago de las Atalayas). In November 2016, the Ministry of Mines and Energy concluded that the amounts being held were not royalties and therefore not due to the Comuneros. The amounts belonged to Ecopetrol and therefore Ecopetrol recovered the provision it had been recognizing in its financial statements relating to this dispute. See Note 23.3 to our consolidated financial statement for more detail.
- A COP\$107,244 million increase in the valuation of our forward hedging operations used to mitigate the volatility of the exchange rate in the cash flow required for the operations of our subsidiary Ocesa, whose functional currency is the U.S. dollar.
- A COP\$145,191 million increase in other minor financial items.

This decrease in our financial loss was partially offset by a COP\$996,406 million increase in interest expenses as a result of (i) the recognition of Reficar’s interest expenses which, up to 2015, had been capitalized (ii) the aggregate US\$475 million international loans we entered into in February and May 2016 and the US\$500 million international bond we issued in June 2016, and (iii) the negative effect the Colombian Peso had on our exchange rate on interest due on our foreign debt.

For more details on our financial income and expenses see Note 29 to our consolidated financial statements for more details.

4.5.1.6 Income Tax

Income taxes amounted to COP\$5,800,268 million in 2017, COP\$4,543,046 million in 2016 and COP\$710,353 million in 2015. The above is equivalent to an effective tax rate of 42.1%, 58.3% and -12.7% in 2017, 2016 and 2015, respectively.

The decrease in the effective tax rate from 2016 to 2017 was mainly due to: (i) the better financial performance of the exploration and production segment, (ii) the reduction of losses at Reficar and Ecopetrol America Inc, which also resulted in lower tax rates and (iii) the reduction of the wealth tax rate from 1% in 2016 to 0.4% in 2017.

The increase in the effective tax rate from 2015 to 2016 was mainly due to: (i) lower recovery of deferred tax asset, (ii) the effect of the adjustment in deferred tax resulting from the application of the Colombian tax reform described above, and (iii) the recognition of the presumptive tax on subsidiaries reporting tax losses.

See Note 10 to our consolidated financial statements for more details.

4.5.1.7 Net Income (Loss) Attributable to Owners of Ecopetrol

As a result of the foregoing, in 2017, net income attributable to owners of Ecopetrol was COP\$7,178,539 million whereas, in 2016, net income attributable to owners of Ecopetrol was COP\$2,447,881 million and, in 2015, net loss attributable to owners of Ecopetrol was COP\$7,193,859 million.

4.5.1.8 Segment Performance and Analysis

In this section, including the tables below, we present our financial information by segment: Exploration and Production, Refining and Petrochemicals and Transportation and Logistics. See the section Business Overview for a description of each segment.

The following tables present our revenues and net income by business segment for the years ended December 31, 2017, 2016 and 2015:

Table 47 – Revenues by Business Segment

	Year ended December 31,			% Change	
	2017	2016	2015	2017/2016	2016/2015
	(Colombian Pesos in millions)				
Exploration and Production	36,494,934	28,221,210	31,732,611	29.3	(11.1)
Third parties	25,004,320	20,527,332	25,669,213	21.8	(20.0)
Local crude oil	909,871	553,666	491,279	64.3	12.7
Foreign crude oil	21,426,666	17,278,579	21,181,265	24.0	(18.4)
Trading of crude oil	-	-	1,309,196	-	(100.0)
Natural gas local	1,815,754	1,988,336	1,845,345	(8.7)	7.7
Foreign natural gas	32,303	58,809	182,950	(45.1)	(67.9)
Other income	819,726	647,942	659,178	26.5	(1.7)
Inter-segment net operating revenues	11,490,614	7,693,878	6,063,398	49.3	26.9
Refining and Petrochemicals	28,644,016	24,823,714	23,245,676	15.4	6.8
Third parties	27,343,359	24,194,024	22,456,866	13.0	7.7
Local refined products	21,187,091	17,771,166	18,806,063	19.2	(5.5)
Foreign refined products	6,005,556	6,330,648	3,535,666	(5.1)	79.1
Foreign crude oil	52,397	-	-	-	-
Other income	98,315	92,210	115,137	6.6	(19.9)
Inter-segment net operating revenues	1,300,657	629,690	788,810	106.6	(20.2)
Transportation and Logistics	10,598,064	10,648,776	10,844,550	(0.5)	(1.8)
Third parties	3,606,549	3,764,205	4,221,192	(4.2)	(10.8)
Inter-segment net operating revenues	6,991,515	6,884,571	6,623,358	1.6	3.9
Eliminations of consolidations	(19,782,786)	(15,208,139)	(13,475,566)	30.1	12.9
Total revenues	55,954,228	48,485,561	52,347,271	15.4	(7.4)

Total revenues by segment include exports and local sales to third-parties and inter-segment sales. See the section Financial Review—Operating Results—Consolidated Results of Operations—Total Revenues for prices and volumes to third parties.

Table 48 – Operating and Net Income by Business Segment

	Year ended December 31,			% change	
	2017	2016	2015	2017/2016	2016/2015
	(Colombian Pesos in millions)				
Exploration and Production					
Operating Income	8,061,484	2,912,307	(1,782,153)	177	(263)
Net income attributable to owners	3,820,501	1,322,370	(5,851,620)	189	(123)
Refining and Petrochemicals					
Operating Income	1,362,934	(595,712)	(2,521,271)	(329)	(76)
Net income attributable to owners	358,859	(1,823,020)	(4,016,050)	(120)	(55)
Transportation and Logistics					
Operating Income	6,748,047	6,589,251	6,444,217	2	2
Net income attributable to owners	2,999,978	2,960,449	2,819,759	1	5
Eliminations in consolidation					
Operating Income	(610)	(1,298)	(9,628)	(53)	(87)
Net income attributable to owners	(799)	(11,918)	(145,948)	(93)	(92)
Ecopetrol consolidado					
Operating Income	16,171,855	8,904,548	2,131,165	82	318
Net income attributable to owners	7,178,539	2,447,881	(7,193,859)	193	(134)

4.5.1.9 Exploration and Production Segment Results

In 2017, exploration and production segment sales were COP\$36,494,934 million, compared to COP\$28,221,210 million in 2016. In 2017, our segment sales increased by 29.3% as compared with 2016 mainly as a result of:

- Increased sales of crude oil to third parties, which increased by 21.8% in 2017 as compared to 2016 primarily due to: (i) an increase in the price of our crude oil basket of US\$12.1 per barrel, (ii) an increase in local sales of crude oil (1.3 mmbbls) due mainly to sales of crude oil as a result of the Bicentenario alternative transport system which mitigated the effect of the attacks on the Caño Limon-Coveñas Oil pipeline. This increase was partially offset by: (i) a decrease of 7.7 mmbbls in crude oil exports due to an increase in the use of local crude oil by Reficar for its operations, (ii) the appreciation of the Colombian Peso against the U.S. dollar resulting in a decrease in sales revenue recorded in U.S. dollars and (iii) a decrease of 0.9 mmboe in sales of natural gas mainly due to the end of the El Niño phenomenon in 2017, which reduced thermal generation by gas.
- Increased inter-segment revenues, which increased by 49.3% in 2017 as compared to 2016 mainly due to sales of crude oil in order to supply Reficar.

In 2016, exploration and production segment sales were COP\$28,221,210 million, compared to COP\$31,732,611 million in 2015. In 2016, our segment sales decreased by 11.1% as compared with 2015 mainly as a result of:

- Lower sales of crude oil to third parties, which decreased by 20% in 2016 as compared to 2015 primarily due to: (i) a decline of 36.8 mmbbls in crude oil exports and volumes available for commercialization mainly due to the decrease in the production output and delivery of crude oil destined for exports to Reficar as feedstock (ii) a decrease in the price of our crude oil basket of US\$8.2 per barrel, (iii) a decrease of 2.0 mmboe in sales of foreign natural gas mainly due to the termination of our Venezuela sales contract on June 30, 2015. Notwithstanding, the decrease in sales to third parties was partially offset by an increase in the devaluation of the Colombian Peso against the U.S. dollar and higher sales of crude oil and local natural gas, the latter resulting from an increase in the prices of the natural gas basket of US \$2/barrel, which was indexed to 2015 prices and impacted by the “El Niño” weather phenomenon; and
- Higher inter-segment revenues, which increased by 26.9% in 2016 as compared to 2015 mainly due to sales of crude oil in order to supply Reficar.

Cost of sales affecting our exploration and production segment is mainly related to: (i) the amortization and depletion of our production assets, (ii) contracted services and (iii) costs related to maintenance, operational services, electric power, projects and labor in the exploration and production segment. In addition, this segment’s costs are impacted by the purchases of crude oil from ANH and third parties, naphtha for dilution and transportation services.

In 2017, the cost of sales for this segment increased by 14.5% as compared with 2016, due to the net effect of:

- Fixed costs increasing by 16.1%, or COP\$1,115,851 million, in 2017 as compared to 2016, mainly due to (i) an increase in contracted services, maintenance and operating materials, which included preventative surface maintenance activities at our production facilities and well services as a strategy to mitigate natural decline rates and (ii) an increase in the costs of hydrocarbon transportation services as a result of paying for alternative routes to bypass the attacks on the Caño Limon-Coveñas oil pipeline. This increase was partially offset by a decrease in contracted services as a result of the full return of the Recetor field to Ecopetrol on May 30, 2017 and our full operation of the Rubiales field for the entire year.

- Variable costs increasing by 13.9%, or COP\$2,221,585 million, in 2017 as compared to 2016, as a result of (i) an increase of purchases of crude oil due to the increase in international benchmark prices, (ii) higher depreciation, mainly as a result of the beginning of operations of the Gunflint field by Ecopetrol America Inc. in August 2016, (iii) a decrease in hydrocarbon proved developed reserves in 2016 as compared to 2015 which led to an increase in depreciation expenses, and (iv) higher transportation costs due to the use of alternate pipelines in order to transport the crude oil despite the attacks on the Caño Limon-Coveñas oil pipeline. This increase was partially offset by: (i) lower imports of fuels, especially diesel and gasoline, due to the replacement of imports with products produced by Reficar, lower diluent consumption, due to the strategy of marketing high-viscosity crudes and co-dilution with LPG use of products by Reficar rather than the use of imported products, and (ii) the positive effect of the appreciation of the Colombian peso against the U.S. dollar on our purchases in U.S. dollar.

In 2016, the cost of sales for this segment decreased by 10.6% as compared with 2015, due to the net effect of:

- Fixed costs decreasing by 3.7%, or COP\$268,558 million, in 2016 as compared to 2015, mainly due to (i) a decrease in contracted services, maintenance and operating materials as a result of the cost efficiencies achieved by the transformation plan, which involved reduction of contract fees and optimization of maintenance timing without affecting operations, and (ii) a decrease in services contracted in association with partners as a result of the return of the Rubiales and Cusiana contracts to Ecopetrol in July 2016, showing the operational capacity and efficiency of the segment. This decrease was partially offset by an increase in the costs of hydrocarbon transportation services as a result of a ship or pay contract, indexed to the U.S. dollar, between the exploration, production, transportation and logistics segments.
- Variable costs decreasing by 13.3%, or COP\$2,467,666 million, in 2016 as compared to 2015, as a result of (i) reduction in purchases of diluent as part of our cost efficiencies, strategy and lower production of heavy crude oil, (ii) lower volumes of crude oil purchases from the ANH, third parties and other products due to lower availability of crude oil due to lower production, (iii) lower transportation costs due to the optimization of the use of tanker trucks and savings due to the increase in viscosity for the transportation of heavy crude oil through pipelines, (iv) a decrease in services contracted in association with partners as a result of the return of the Rubiales and Cusiana contracts to Ecopetrol in July 2016, and (v) capitalization of inventories as a result of higher prices on purchases of crude oil, diluent in December 2016 compared to December 2015. This decrease was partially offset by an increase of electric power costs and process materials as chemicals and catalysts used in our direct operation of the Rubiales field and the increase in the average exchange rate of the Colombian Peso against the U.S. dollar (which led to increased costs in Colombian Peso terms).

In 2017, operating expenses before impairment of non-current assets increased by 7.8% in 2017 as compared to 2016, primarily as a result of (i) higher expenses related to our exploratory activity as we engaged in more seismic activity and recorded expenses related to exploratory activity at the Kronos-1, Parmer-1, Warrior 2, Lunera-1, Brama-1, Molusco-1, Godric, Dumbo and Pollera wells, (ii) the termination in 2016 of the deferred income amortization we had been recognizing since 2007 for the advance payment by the Ministry of Finance and Public Credit of the obligations under Ecogas, in relation to the Built, Operate and Transfer contracts (BOMT's) for the construction, operation, maintenance and transfer of gas pipelines. This increase was partially offset by (i) increased income due to the acquisition of an additional 11.6% interest at the K2 field in the Gulf of Mexico which generated a gain due to the increase in the book value of the asset above the value paid for the additional interest and (ii) the reduction of the wealth tax rate from 1% in 2016 to 0.4% in 2017.

In 2016, operating expenses before impairment of non-current assets decreased by 70.1% in 2016 as compared to 2015, primarily as a result of (i) lower expenses related to our exploratory activity as we engaged in less seismic activity and exploratory drilling, (ii) minor commissions, fees, freight and services as a result of the savings obtained in the implementation of our transformation plan, and (iii) a lower wealth tax. This decrease was partially offset by an increase in labor expenses due to the implementation of the voluntary retirement plan.

The net reversal of impairment of non-current assets recognized in the exploration and production segment in 2017 totaled COP\$183,718 million as compared to an impairment loss of COP\$196,448 million in 2016. The net reversal of the impairment was primarily due to the increased value of offshore oil fields, partially offset by an impairment of onshore fields, both as a result of calculating their valuation taking into account market variables, reserves, price spreads as compared to the ICE Brent price, and available technical and operational information.

The impairment losses of non-current assets recognized in the exploration and production segment in 2016, which totaled COP\$196,448 million compared to COP\$4,504,495 million in 2015, decreased by 95.6% as compared to 2015 mainly due to variation in estimations of future prices which include the current scenarios of oil quota agreements of OPEC and the impact of changes on specifications issued by the IMO (International Maritime Organization) agreement on crude and fuels with high sulfur content (See Note 18.1 to our consolidated financial statements for more details).

The segment recorded net income attributable to owners of Ecopetrol of COP\$3,820,501 million in 2017 as compared to net income attributable to owners of Ecopetrol of COP\$1,322,370 million in 2016 and net loss attributable to owners of Ecopetrol of COP\$5,851,619 million in 2015.

Lifting and Production Costs

The aggregate average production cost, on a Colombian Peso basis, has increased to COP\$23,684 per boe during 2017 from COP\$20,993 per boe during 2016. On a dollar basis, our aggregate average production cost increased to US\$8.02 per boe in 2017 from US\$6.88 per boe in 2016, due partially to a 3.27% appreciation of the average exchange rate of the Colombian Peso against the U.S. dollar in 2017.

The aggregate average lifting cost, on a Colombian Peso basis, increased to COP\$22,585 per boe during 2017 from COP\$19,799 per boe during 2016. On a dollar basis, it increased to US\$7.65 per boe in 2017 from US\$6.49 per boe in 2016 also due partially to the 3.27% appreciation of the average exchange rate of the Colombian Peso against the U.S. dollar in 2017.

The abovementioned increases were primarily due to:

- Higher costs at both the Rubiales and Cusiana fields due to their full return to Ecopetrol at the beginning of the third quarter of 2016;
- Higher costs at the Recetor field due to its full return to Ecopetrol on May 30, 2017;
- An increase in costs related to subsoil maintenance, which in turn was due to an increase in the number and complexity of well interventions and services, which have managed to maintain and improve the basic production curve;
- An increase in costs related to surface maintenance, which in turn was due to an increase in the number of intervened surface equipment, which has managed to maintain the operational reliability and integrity of the surface equipment in production operations;
- An increase in energy costs, which in turn was due to an increase in water production in fields, mainly in the Meta region and incorporation of assets in the Rubiales field with a higher water cut (+ 98% BSW);
- An increase in costs related to chemical treatment of fluids, which in turn was due to an increase in the volume of water production in fields under our direct and indirect operation; and
- An increase in water treatment, that increases energy consumption and fluid treatment given the utilization of injection technique for water disposal and recovery projects.

The difference between the aggregate average lifting cost and aggregate average production cost is that lifting cost does not include the costs related to hydrocarbon self-consumption required in the production process or the deliveries we make to our refineries and natural gas liquid plants.

The following table sets forth crude oil and natural gas average sales prices, the aggregate average lifting costs and aggregate average unit production cost for the years ended December 31, 2017, 2016 and 2015.

Table 49 – Crude Oil and Natural Gas Average Prices and Costs

	2017	2016	2015
Crude Oil Average Sales Price (U.S. dollars per barrel) ⁽¹⁾	47.8	35.7	43.9
Crude Oil Average Sales Price (COP\$ per barrel) ⁽¹⁾	141,175	108,337	118,115
Natural Gas Average Sales Price (U.S. dollars per barrel equivalent)	22.7	23.5	22.0
Natural Gas Average Sales Price (COP\$ per barrel equivalent)	66,919	71,893	60,120
Aggregate Average Unit Production Costs (U.S. dollars per boe) ⁽²⁾	8.02	6.88	7.92
Aggregate Average Unit Production Cost (COP\$ per boe) ⁽²⁾	23,684	20,993	21,732
Aggregate Average Lifting Costs (U.S. dollars per boe) ⁽³⁾⁽⁴⁾⁽⁵⁾	7.65	6.49	7.40
Aggregate Average Lifting Costs (COP\$ per boe) ⁽³⁾⁽⁴⁾⁽⁵⁾	22,585	19,799	20,308

(1) Corresponds to our average sales price on a consolidated basis.

(2) Unit production costs correspond to consolidated average costs on total production volumes net of royalties. Production costs do not include costs related to transport, commercialization and administrative expenses.

(3) Lifting costs per barrel are calculated based on total production (excluding production tests and discovered undeveloped fields), which are net of royalties, and correspond to our lifting costs on a consolidated basis.

(4) The cost indicator is calculated by using the cost of production (does not include costs related to hydrocarbons consumption by Ecopetrol in the production process, such as by our refineries and natural gas liquid plants) and dividing by the net produced volume (excluding royalties) as the denominator.

(5) As a result of the evaluation of control over companies under IFRS, Ecopetrol does not consolidate Savia Perú and Equion.

4.5.1.10 Transportation and Logistics Segment Results

In 2017, our transportation and logistics segment sales were COP\$10,598,064 million compared to COP\$10,648,776 million in 2016. The 0.5% decrease in 2017 as compared with 2016 was mainly due to (i) a 5% decrease in the volume of crude oil transported by our pipelines, which was primarily due to the production decrease at the national level and (ii) the negative effect on our U.S. dollar-indexed transportation fees resulting from the appreciation of the Colombian Peso against the U.S. dollar. This decrease was almost offset by a 1.9% increase in the volume of refined products transported primarily due to the increase in demand for refined products in Colombia and the elimination of restrictions in the Pozos Colorados - Galán system. Sales to third parties decreased in 2017 as compared to 2016 primarily due to the fact that the segment received income from the transportation services to Frontera Energy for its participation in the Rubiales field, and once the field returned to us in July 2016, these services were recognized as inter-segment sales.

In 2016, our transportation and logistics segment sales were COP\$10,648,776 million compared to COP\$10,844,550 million in 2015. The 1.8% decrease in 2016 as compared with 2015 was mainly due to an 11.3% decrease in the volume of crude oil transported by our pipelines, which was primarily due to the production decrease at the national level, in spite of (i) the positive effect on our U.S. dollar-indexed transportation fees resulting from the devaluation of the Colombian Peso against the U.S. dollar and (ii) a 3.7% increase in the volume of refined products transported in the Galán-Sebastopol system to meet the demand for fuel in Colombia and the start-up of Reficar. Sales to third parties decreased in 2016 as compared to 2015 primarily due to the fact that the segment received income from the transportation services to Pacific Rubiales for its participation in the Rubiales field, and once the field returned to us in July 2016, these services were recognized as inter-segment sales.

The cost of sales for our transportation and logistics segment is mainly related to: (i) project costs associated with the maintenance of transportation networks and (ii) operating costs related to these systems, including the costs of labor, energy, fuels and lubricants and others.

The cost of sales amounted to COP\$3,271,835 million in 2017 as compared to COP\$3,349,791 million in 2016. The cost of sales for this segment decreased by 2.3% in 2017 as compared with 2016 mainly due to a decrease in costs associated with maintenance, operating supplies and materials due to the continuity of our efficiency program to optimize our operating costs. This decrease was partially offset by (i) an increase in material processing costs needed for power generation in three new pumping stations to operate Ocesa's P135 project and (ii) an increase in depreciation resulting from the start of P135.

The cost of sales amounted to COP\$3,349,791 million in 2016 as compared to COP\$3,744,422 million in 2015. The cost of sales for this segment decreased by 10.5% in 2016 as compared with 2015 mainly due to a decrease in costs associated with maintenance, operating supplies and materials due to the continuity of our efficiency program to optimize our operating costs. This decrease was partially offset by an increase in material processing costs needed for power generation in pumping stations and an increase in depreciation due to a higher level of investments in the segment.

In 2017, operating expenses before the impairment of non-current assets decreased by 15.1% as compared to 2016 due to lower administrative expenses mainly as a result of the consolidation of administration areas within the segment and a decrease in taxes because of the reduction of the wealth tax rate discussed previously.

In 2016, operating expenses before the impairment of non-current assets increased by 30.7% as compared to 2015 due to a recovery of environmental provisions in 2015, no similar recoveries in 2016 and an increase in labor costs as a result of the implementation of the voluntary retirement plan. This increase was partially offset by lower wealth and industry taxes.

The net reversal of impairment of non-current assets recognized in the segment in 2017, totaled COP\$59,455 million in 2017 as compared to an impairment recovery of COP\$41,062 million in 2016. The net reversal of the impairment was due to the inclusion, in the assessment of the recovery amount of this segment's assets, of flows associated with the Port of Tumaco that positively affects the recoverable amount of the southern transportation unit (See Note 18.3 to our consolidated financial statements for more detail).

The impairment recovery of non-current assets recognized in the segment in 2016 totaled COP\$41,062 million in 2016 as compared to COP\$81,388 million loss in 2015, a decrease of 150.5% as compared to 2015 mainly due to the incorporation, in the assessment of the recovery amount of this segment's assets, of flows associated to the San Fernando - Apiay system project that affects the recoverable amount of the Llanos transportation line, partially offset by an increase in impairment of assets related to the southern transportation line.

The segment recorded net income attributable to owners of Ecopetrol of COP\$2,999,978 million in 2017 as compared to net income of COP\$2,960,449 million in 2016 and COP\$2,819,759 million in 2015.

4.5.1.11 Refining and Petrochemicals Segment Results

In 2017, the refining and petrochemical segment sales were COP\$28,644,016 million compared to COP\$24,823,714 million in 2016. In 2017, sales of refined products and petrochemicals increased by 15.4% as compared with 2016, mainly due to an increase of our average products basket price due to the increase in the international prices. This increase was partially offset by (i) a decrease in exports of fuel oil primarily due to reduced production at the Barrancabermeja refinery as a result of reliance on more efficient alternative sources and stabilization of the coker unit at Reficar and (ii) a decrease in exports of diesel due to our commercial strategy of focusing on selling to the domestic market due to better commercial conditions, replacing local imports of such products.

In 2016, the refining and petrochemical segment sales were COP\$24,823,714 million compared to COP\$23,245,676 million in 2015. In 2016, sales of refined products and petrochemicals increased by 6.8% as compared with 2015, mainly due to an increase in the volume of domestic and export sales mainly in mid-distillates due to the startup of operations at Reficar. This increase was partially offset by a decrease of our average products basket price due to the decrease in the international price of crude oil.

The cost of sales for our refined products and petrochemicals segment is mainly related to the purchase of crude oil and natural gas for our refineries, imported products to supply local demand, feedstock transportation services, services contracted for maintenance of the refineries and the amortization and depreciation of refining assets. Cost of sales amounted COP\$26,855,395 million in 2017, compared to COP\$22,843,987 million in 2016 and COP\$20,758,808 million in 2015.

In 2017, the cost of sales for this segment increased 18% as compared with 2016, principally due to (i) an increase in purchases of crude oil at increased international benchmark prices and (ii) higher volumes of imports of crude oil and inter-segment purchases of crude oil for Reficar. This increase was partially offset by lower imports of other fuels, especially diesel and gasoline, due to the use of products produced by Reficar rather than imported products.

In 2016, the cost of sales for this segment increased 10% as compared with 2015, principally due to the operation of Reficar's units in 2016 which led to (i) an increase in crude oil purchases through import and inter-segment transactions as Reficar required a special feedstock during the stabilization and performance testing period which increased production cost, (ii) an increase in the depreciation of Reficar's units (iii) inventory consumption that had been in stock in December 2015, and (iv) higher costs for services contracted, materials of process, maintenance and electrical power. This increase was partially offset by lower imports of products and the excellent operational performance of the Barrancabermeja refinery.

In 2017, operating expenses before the impairment of non-current assets decreased by 17.2% as compared to 2016, due a decrease of stabilization expenses of Reficar and a decrease in taxes because of the reduction of the wealth tax rate.

In 2016, operating expenses before the impairment of non-current assets increased by 27.3% as compared to 2015, due to an increase in labor expenses related to our voluntary retirement plan in 2016 and other expenses related to the start-up of operations at Reficar.

The net reversal of impairment of non-current assets recognized in the segment in 2017, which totaled COP\$1,067,965 million in 2017 as compared to an impairment loss of COP\$773,361 million in 2016, decreased as compared to 2016 as a result of (i) a net reversal of the impairment of Reficar as a result of an improved outlook in refining margins due to the anticipated effects of the ratification of the International Convention for the Prevention of Pollution from Ships (Marpol), which goes into effect in 2020, (ii) a lower discount rate resulting from the application of WACC methodology and (iii) operational and financial optimization due to the stabilization of the refinery. This reversal was partially offset by Bioenergy's impairment related to the change of the project start date, the process of stabilization of the industrial plant, the updating of operational variables and the financial expenses of the Barracabermeja refinery's modernization project, which is currently postponed.

The impairment losses of non-current assets recognized in the segment in 2016, which totaled COP\$773,361 million as compared to COP\$3,278,993 million in 2015, decreased by 76.4% as compared to 2015. The 2016 scenario incorporated refining margins including the effect of Marpol in 2016 compared to 2015, partially offset by the effect of adjustment of operational variables based on that observed during Reficar's stabilization period and new ethanol prices on Bioenergy's impairment (See Note 18.2 to our consolidated financial statements for more details).

As mentioned earlier, the refining segment is highly sensitive to changes in product prices and feedstock in the international market, the discount rate, the refining margins, changes in environmental regulations and cost structure and the level of capital expenditures.

The refining and petrochemicals segment recorded net income attributable to owners of Ecopetrol of COP\$358,859 million in 2017, as compared to a net loss attributable to owners of Ecopetrol of COP\$1,823,020 million in 2016 and COP\$4,016,050 million in 2015.

4.6 Liquidity and Capital Resources

Our principal source of liquidity in 2017 was cash flows from our operations amounting to COP\$16,973,626 million.

Our principal uses of cash in 2017 were (i) COP\$11,259,492 million in debt payments through the pre-payment of foreign currency-denominated loans totaling US\$1,925 million in June 2017 and US\$475 million in December 2017, (ii) COP\$5,965,556 million in capital expenditures, which included investments in property, plant and equipment and natural and environmental resources, (iii) dividend payments for the fiscal year 2016 amounting to COP\$1,504,647 million, which includes dividends relating to fiscal year 2016 for COP\$945,661 million and the payment of dividends to non-controlling interest in 2017 for COP\$558,986 million.

For more information regarding our debt, see the section *Financial Review—Financial Indebtedness and Other Contractual Obligations*.

4.6.1 *Review of Cash Flows*

Cash from operating activities

Net cash provided by operating activities increased by 19.3% in 2017 as compared to 2016, mainly as a result of (i) a 32.7% increase in our operational income before depreciation, depletion and amortization (DD&A) and impairment of non-current assets and efficiency gains and cost-savings generated by our corporate strategy. This increase was partially offset by (i) higher working capital needs mainly due to increase in accounts receivable from the FEPC and commercial receivables accounts and (ii) an increase in our costs due to the effect of recovery in international crude oil prices on our purchases and an increase in maintenance activities, contracted services and operating supply needs associated with an increase in our operational activities.

Net cash provided by operating activities increased by 21.9% in 2016 as compared to 2015, mainly as a result of (i) lower working capital needs mainly due to the higher oil prices observed at the end of 2016 versus the end of 2015, (ii) a 4% increase in our operational income before depreciation, depletion and amortization (DD&A) and impairment of non-current assets resulting from a decrease in our costs and operational expenses (before DD&A and impairment) due to our savings generated by the transformation plan. This increase was partially offset by (i) the decrease in international prices of crude oil during 2016, and (ii) an increase in income tax paid by the transportation and logistics segment due to the better results in 2015.

Cash used in investing activities

In 2017, net cash used in investing activities decreased by 53.3% as compared to 2016, mainly as a result of a 110.4% decrease in our investment portfolios as a result of pre-payments of foreign currency-denominated loans totaling US\$2,400 million in 2017. This decrease was partially offset by (i) cash proceeds from the sale of our shares in Empresa de Energía de Bogotá, which totaled COP\$56,930 million in the aggregate and (ii) a 4.6% increase in investments in capital expenditures, which was driven mainly by the reactivation of activity in our Castilla and Rubiales fields, the development of improved recovery projects in fields such as La Cira and Chichimene, and an increase in exploration activities.

In 2016, net cash used in investing activities decreased by 26.8% as compared to 2015, mainly as a result of: (i) a 62.4% decreased investment in capital expenditures due to the effect of decreasing oil prices and the conclusion of the Reficar modernization project, and (ii) additional cash proceeds from the sale of our investments in Empresa de Energía de Bogotá and Interconexión Eléctrica S.A., which totaled COP\$966,715 million in the aggregate. This decrease was partially offset by increased investments of our excess liquidity in our investment portfolios, which in turn resulted from the savings we achieved and the recovery of the price of oil during the second half of 2016.

Cash used in financing activities

Net cash used in financing activities increased by 362% in 2017, as compared to 2016, due to (i) prepayments of foreign currency-denominated loans totaling US\$2,400 million and (ii) an increase in dividends payments to the shareholders of Ecopetrol of COP\$255,484 million in 2017 as compared to 2016, which was partially offset by a COP\$463,135 million decrease in dividend payments made by certain of our subsidiaries to their non-controlling shareholders.

Net cash used in financing activities increased by 98.5% in 2016, as compared to 2015, due to a decrease in cash from borrowings of COP\$5,151,937 million which was partially offset by a decrease in dividends payments of COP\$3,781,099 million in 2016 as compared to 2015.

4.6.2 Capital Expenditures

Our consolidated capital expenditures in 2017, 2016 and 2015 were COP\$6,107,506 million, COP\$5,837,477 million and COP\$15,517,949 million, respectively. These investments were distributed by business segment on average, for the past three years as follows: 64.9% for the exploration and production segment, 17.4% for refining and petrochemicals and 17.7% for the transportation and logistics segment. See Note 33.3 to our consolidated financial statements for more detail about capital expenditures by segment.

Our investment plan approved for 2018 is a range of between US\$3,500 million and US\$4,000 million. The investments will be distributed approximately as follows: 85% for exploration and production, 14% for refining, petrochemicals, and transportation and logistics, and 1% for other investments.

The resources required for the investment plan will be funded through internal cash generation with no need to raise additional net financing.

4.6.3 Dividends

In 2017, we paid dividends of COP\$945,661 million to Ecopetrol's shareholders, including the Nation, and dividends paid to non-controlling shareholders of our subsidiaries totaling COP\$558,986 million.

In 2016, we paid the last installment of dividends relating to 2014 net income to the Nation for COP\$690,177 million and our transportation and logistics subsidiaries paid dividends to their non-controlling shareholders for COP\$1,022,121 million. Given the net loss we reported in 2015, our shareholders at the ordinary general shareholder's meeting did not approve distribution of dividends for 2015.

On March 23, 2018, our shareholders at the ordinary General Shareholders Assembly approved a distribution of dividends for the fiscal year ended December 31, 2017 amounting to COP\$3,659,386 million, or COP\$89 per share, based on the number of outstanding shares as of December 31, 2017. The dividend payment was approved to be made in one installment for the minority shareholders of Ecopetrol on April 19, 2018 and two installments for the Nation, the first paid on April, 19 2018 and the second installment to be paid on September, 17 2018.

4.7 Summary of Differences between Internal Reporting (Colombian IFRS and IFRS)

We prepare our interim and annual statutory financial information in accordance with our internal reporting policies, which follow Colombian IFRS and differ in certain significant aspects from IFRS. The following table sets forth our consolidated net income and equity for years ended December 31, 2017, 2016 and 2015, in accordance with Colombian IFRS and IFRS:

Table 50 – Consolidated Net Income and Equity

	For the year ended December 31, (Colombian Pesos in millions)			% Change	
	2017	2016	2015	2017/2016	2016/2015
Net income attributable to owners of Ecopetrol (IFRS)	7,178,539	2,447,881	(7,193,859)	193.3	(134.0)
Cash flow hedge for future company exports	(366,048)	(494,604)	2,140,553	(26.0)	(123.1)
Exchange rate effects on tax bases – Deferred tax	(192,079)	(388,568)	1,065,580	(50.6)	(136.5)
Net income Attributable to owners of Ecopetrol (Colombian IFRS)	6,620,412	1,564,709	(3,987,726)	323.1	(139.2)
Net Equity (IFRS)	48,215,698	43,560,501	43,100,963	10.7	1.1
Cash flow hedge for future company exports	(29,258)	(39,803)	(74,259)	(26.5)	(46.4)
Exchange rate effects on tax bases – Deferred tax	1,594,865	1,799,020	2,205,064	(11.3)	(18.4)
Net Equity (Colombian IFRS)	49,781,305	45,319,718	45,231,768	9.8	0.2

As noted above, certain differences exist between our net income and equity as determined in accordance with our internal reporting policies, which follow Colombian IFRS, which are used for management reporting purposes, as presented in the business segment information, and our net income and equity as determined under IFRS, as presented in our consolidated financial statements.

The primary differences between Colombian IFRS and IFRS as they apply to our results of operations are summarized below:

Cash flow hedge for future company exports. In September 2015, in order to hedge the effect of exchange rate volatility on Ecopetrol's foreign currency debt, Ecopetrol's Board of Directors approved a cash flow hedge for future crude oil exports. According to IAS 39 – Financial Instruments, Ecopetrol implemented this hedge beginning on October 1, 2015, the date on which it formally completed the related hedging documentation.

Under Colombian IFRS, the General Accounting Office of the Nation (CGN for its acronym in Spanish) issued Resolution 509, which allows companies to apply hedge accounting for non-derivative financial instruments from any date within the transition period or the first period of application of International Accounting Standards in Colombia, even if such company has not yet formally documented the hedging relationship, the objective or the risk management strategy. Under these rules, Ecopetrol applied cash flow hedge accounting from January 1, 2015 in its financial statements under Colombian IFRS.

As a result of this accounting policy difference, for the year ended December 31, 2017, our net income as reported under IFRS was COP\$366,048 million higher than our net income as reported under Colombian IFRS.

Exchange rate effects on tax bases – Deferred tax. According to IAS 12.41, companies with a U.S. dollar functional currency and profit or tax loss in Colombian Pesos are required to recognize deferred taxes attributable to the difference between the carrying amounts of non-monetary assets in their financial statements and their respective tax bases converted from Colombian Pesos to U.S. dollars using the exchange rate on the closing date. The effect of the temporary difference is charged to profit and losses without a cash outflow expected in the future. Under local accounting principles (The General Accounting Office opinion No. 20162000000781 dated January 18, 2016), the result attributable to the aforementioned difference in accounting policies does not generate deferred taxes at December 31, 2017.

Ecopetrol's functional currency is the Colombian Peso and it consolidates some subsidiaries whose functional currency is the U.S. dollar but who settled their taxes in Colombian Pesos. As a result of the application of paragraph 41 – IAS 12, such subsidiaries are required to calculate deferred taxes under IFRS.

As a result of this accounting policy difference, for the year ended December 31, 2017, our net income attributable to owners of Ecopetrol as reported under IFRS was COP\$192,079 million higher than our net income attributable to owners of Ecopetrol as reported under Colombian IFRS.

The application of IAS12.41 also generated adjustments to our goodwill and investments in companies impairments of COP\$61,893 million in 2017, COP\$86,781 million in 2016 and COP\$418,872 million in 2015 in connection with our purchase of subsidiaries whose functional currency is the U.S. dollar as well as adjustments to our revenue from the equity method of COP\$60,748 million in 2017, COP\$71,056 million in 2016 and COP\$81,808 million in 2015 in connection with our associates and joint ventures whose functional currency is the U.S. dollar.

As a result of these accounting policy differences described above, for the year ended December 31, 2017, we reported net income attributable to the owners of Ecopetrol under IFRS of COP\$7,148,539 million as opposed to a net income attributable to the owners of Ecopetrol of COP\$6,620,412 million reported under Colombian IFRS for the same period. For the year ended December 31, 2016, these same accounting differences led us to report net income attributable to the owners of Ecopetrol under IFRS of COP\$2,447,881 million as opposed to a net income attributable to the owners of Ecopetrol of COP\$1,564,709 million reported under Colombian IFRS for the same period. For the year ended December 31, 2015, these same accounting differences led us to report a net loss under IFRS of COP\$7,193,859 million as opposed to a net loss of a COP\$3,987,726 million reported under Colombian IFRS for the same period.

4.8 Financial Indebtedness and Other Contractual Obligations

As of December 31, 2017, we had outstanding consolidated indebtedness of COP\$43.5 trillion, which corresponded primarily to the following long-term transactions:

Table 51 – Consolidated Financial Indebtedness

Company	Type	Initial Date	Original Amount	Maturity	Interest Rate	Amortization	
Ecopetrol S.A.	Bonds	July 23, 2009	US\$1,500 million	July 23, 2019	7.625%	Bullet	
		September 18, 2013	US\$350 million	September 18, 2018	4.250%	Bullet	
		September 18, 2013	US\$1,300 million	September 18, 2023	5.875%	Bullet	
		September 18, 2013	US\$850 million	September 18, 2043	7.375%	Bullet	
		May 28, 2014	US\$2,000 million	May 28, 2045	5.875%	Bullet	
		September 16, 2014	US\$1,200 million	January 16, 2025	4.125%	Bullet	
		June 26, 2015	US\$1,500 million	June 26, 2026	5.375%	Bullet	
		June 15, 2016	US\$500 million*	September 18, 2023	5.875%	Bullet	
		December 1, 2010	COP\$479,900 million	December 1, 2020	Floating	Bullet	
		December 1, 2010	COP\$284,300 million	December 1, 2040	Floating	Bullet	
		August 27, 2013	COP\$120,950 million	August 27, 2018	Floating	Bullet	
		August 27, 2013	COP\$168,600 million	August 27, 2023	Floating	Bullet	
		August 27, 2013	COP\$347,500 million	August 27, 2028	Floating	Bullet	
		August 27, 2013	COP\$262,950 million	August 27, 2043	Floating	Bullet	
		Bank Loans*	May 27, 2013	COP\$1,839 billion**	May 24, 2025	Floating	Semi-annual
			December 30, 2011***	US\$440 million	December 20, 2025	Floating	Semi-annual
			ECAs	March 22, 2013	US\$245 million	July 25, 2023	Floating
March 22, 2013	US\$151 million			July 6, 2019	Floating	Semi-annual	
December 30, 2011***	US\$2,650 million			December 20, 2027	Fixed	Semi-annual	
December 30, 2011***	US\$100 million			December 20, 2027	Floating	Semi-annual	
December 30, 2011***	US\$97 million			December 20, 2027	Fixed	Semi-annual	
December 30, 2011***	US\$210 million			December 20, 2027	Floating	Semi-annual	
Ocensa	Bond	May 7, 2014	US\$500 million	May 7, 2021	4.000%	Bullet	
Oleoducto Bicentenario	Bank Loan	July 5, 2012	COP\$2,100 billion**	July 5, 2024	Floating	Quarterly	
ODL	Bank Loan*	August 1, 2013	COP\$800,000 million**	August 1, 2020	Floating	Quarterly	

* Reopening of bond due to 2023.

** Bank loans refinanced from their original conditions.

*** Debt obtained by Reficar for the Refinery modernization voluntarily assumed by Ecopetrol.

The long term debt balance for the end of 2017 is explained as follows:

- On June 30, 2017, Ecopetrol repaid in advance its entire syndicated bank loan contracted with international banks in 2015. The loan had a nominal value of US\$ 1,925 million which was originally due on February 2020.
- On August 14, 2017, Ecopetrol signed a committed line with a local bank for COP\$ 990 billion as a contingent financing mechanism. This facility has 2 year availability period, a maturity of 10 years from the date of the first disbursement, 2 years grace period on capital, an interest rate of IBR + 300 basis points and a commitment fee of 7.2 basis points annually on the undisbursed amount during the availability period.
- On December 13, 2017, Ecopetrol voluntarily assumed Reficar's debt obtained for the refinery modernization (approximately US\$2,666 million in nominal terms plus accrued interest). The debt assumption was under the same financial conditions that Reficar originally had. This transaction had no effect on Ecopetrol's consolidated debt level.
- On December 15, 2017, Ecopetrol repaid in advance its loans with The Bank of Tokyo-Mitsubishi UFJ, Ltd. and Export Development Canada, with nominal values of US\$175 million and US\$300 million, respectively. The original due date for those facilities was 2021.
- Ecopetrol did not disburse any long-term debt in 2017.

On April 13, 2018, Ecopetrol redeemed all of its outstanding 4.250% notes due September 18, 2018 in an aggregate principal amount of US\$350 million. The notes were issued in September 2013.

Contractual Obligations

We enter into various commitments and contractual obligations that may require future cash payments. The following table summarizes our contractual obligations as of December 31, 2017.

Table 52 – Our Contractual Obligations

COPS in millions	Payments due by period				
	Total	Less than 1 year	1 to 3 years	3 to 5 years	More than 5 years
Contractual obligations					
Employee Benefit Plan	28,005,753	1,254,613	2,489,826	2,598,517	21,662,797
Contract Service Obligations	5,306,166	2,374,015	1,586,881	427,820	917,450
Operating Lease Obligations	252,178	198,456	53,722	0	0
Natural Gas Supply Agreements	2,413,949	255,394	558,876	359,997	1,239,681
Purchase Obligations	2,949,525	607,012	2,302,193	-	40,320
Energy Supply Agreements	694,965	146,648	185,221	57,502	305,594
Capital Expenditures	885,000	679,966	198,099	6,935	-
Build, Operate, Maintain and Transfer Contracts (BOMT)	687,721	80,105	119,422	124,594	363,601
Capital (Finance) Lease Obligations	581,810	25,762	84,375	92,768	378,905
Financial Sector Debt	10,553,695	1,357,133	2,808,557	2,479,877	3,908,127
Bonds	27,433,741	1,105,598	4,747,385	1,367,000	20,213,757
Total	79,764,503	8,084,702	15,134,557	7,515,010	49,030,232

The table does not include the contractual obligations of Equion, Savia and Ecodiesel, which do not consolidate within the Ecopetrol's Group.

4.9 Off Balance Sheet Arrangements

As of December 31, 2017, we did not have off-balance sheet arrangements of the type that is required to be disclosed under Item 5.E of Form 20-F.

4.10 Trend Analysis and Sensitivity Analysis

Trend Analysis

Ongoing Trends

Ecopetrol updated its 2020 Business Plan on September 29, 2016. This Plan is based on three fundamental pillars: i) protection of cash and cost efficiency; ii) strict capital discipline; and iii) growth in reserves and production; these pillars will strengthen the Company's financial sustainability and afford it opportunities for both organic and inorganic growth, generating value and profitability for its shareholders.

According to this business plan, during 2018 the Company will continue to pursue its transformation to ensure operational and financial sustainability. It will focus on multi-year fields development plans; improved return on assets; committing ourselves to integrity, safe operations, environment consciousness and joint prosperity with communities in which we operate and execute projects.

We believe that our strategy of diversifying our export destinations and sales under term contracts with fixed discounts to reference prices will help to mitigate the impact of crude oversupply over the spread of our export basket.

Furthermore, with the full operation of all of the units of Reficar since 2016 and shifting from stabilization to optimization, Ecopetrol's trade balance is expected to continue improving due to the reduction of gasoline imports and incremental exports of fuels. Reficar's fuels production is expected to continue being allocated primarily in the domestic market, with a surplus to be exported.

Adding profitable reserves and maintaining the pace of production are the Company's priorities. The exploration campaign will be focused in regions with strong prospects. Investment in exploration will be approximately US\$400-US\$450 million, allocated mainly to the evaluation and appraisal of discoveries and ongoing exploration efforts of Ecopetrol S.A., Hocol, Ecopetrol America Inc., Ecopetrol Mexico, Ecopetrol Costa Afuera and Ecopetrol Brazil.

We stress that a strong cash position allows us to assess opportunities for inorganic growth of Ecopetrol's reserves.

Sensitivity Analysis

Sensitivity Analysis of Reserves

The following table provides information about the sensitivity analysis conducted on our oil and gas reserves as of December 31, 2017, taking into account ICE Brent crude oil prices that reasonably reflect management's view of crude oil prices given prevailing market conditions.

Table 53 – Sensitivity Analysis of Reserves

	Oil and NGL (million barrels)	Natural Gas (bcf)	Total Oil and Gas (Mmboe)
Reserves as of December 31, 2017	1,088	3,253	1,659
Sensitivity Scenario	1,143	3,267	1,716
Difference (million barrels)	55	14	57
Difference (%)	5.1%	0.4%	3.4%

The conversion rate used is 5,700 cf = 1 boe.

Assumptions for the Sensitivity Analysis of Reserves

- The sensitivity of the ICE Brent price index is forecasted to average US\$55 per barrel in 2018, US\$60 per barrel in 2019, US\$65 per barrel in 2020, US\$70 per barrel in 2021 and US\$75 per barrel onwards.
- The base scenario on which our sensitivity analysis is made corresponds to our oil, NGL and natural gas reserves, as of December 31, 2017, as presented elsewhere in this annual report.
- Other variables such as the operating costs, capital costs and portfolio price were not varied for purposes of the analysis.

Sensitivity Analysis of our Results

The following table provides information about the sensitivity of our results as of December 31, 2017, due to variations of US\$1 in the price of ICE Brent crude and of 1% in the COPS/US\$ exchange rate.

Table 54 – Results of Sensitivity Analysis

	Income Statement 2017	Income Statement Case ICE Brent ⁽¹⁾ + US\$1	Difference Between Real 2017 and Case ICE Brent (COPS in billions)	Income Statement Case TRM ⁽²⁾ - 1%	Difference Between Real 2017 and Case TRM
Revenue	55,954.23	56,929.63	975.40	56,519.30	565.07
Cost of sales	(36,908.33)	(37,279.43)	(371.11)	(37,175.09)	(266.76)
Gross Income	19,045.90	19,650.20	604.29	19,344.21	298.31
Operating expenses	(4,185.19)	(4,185.19)	-	(4,185.19)	-
Impairment of non-current assets	1,311.14	1,311.14	-	1,311.14	-
Operating income	16,171.86	16,776.15	604.29	16,470.16	298.31
Finance results, net	(2,495.73)	(2,495.73)	-	(2,495.73)	-
Share of profit of associates and joint ventures	93.54	93.54	-	93.54	-
Income before income tax	13,769.66	14,373.96	604.29	14,067.97	298.31
Income Tax	(5,800.27)	(6,054.82)	(254.55)	(5,925.92)	(125.65)
Net Income	7,969.39	8,319.14	349.74	8,142.05	172.66

(1) ICE Brent = US\$55 per barrel

(2) Exchange rate (TRM) = COP\$2,951/US\$1.00

Assumptions for the Sensitivity Analysis of our Results

- Our sensitivity analysis is based on the Consolidated Statement of Profit or Loss for 2017, as presented elsewhere in this annual report.
- The sensitivity of the ICE Brent price index is in reference to an increase of US\$1 per barrel of crude oil in the average ICE Brent reference price based on a 365-day year for 2017. Prices assumed correspond to realized prices for crude oil, natural gas and refined products for 2017, adjusted to account for the differences between such realized prices and the ICE Brent reference price.
- The sensitivity of our results to changes in the exchange rate is in reference to a 1% average depreciation of the Colombian Peso against the U.S. dollar during 2017. Prices are the realized prices of crude oil, natural gas and refined products in 2017 and are expressed for the sensitivity using the adjusted exchange rate (i.e. a 1% average depreciation of the Colombian Peso against the U.S. dollar during 2017).
- The income tax for each of our sensitivity analyses (price of ICE Brent and COPS/US\$ exchange rate) is estimated using the effective corporate tax rate of 42% for 2017.

The table below sets forth the line items that are being affected by the variation on the reference prices or the average exchange rate.

Table 55

VARIATION ON ICE BRENT REFERENCE PRICE	VARIATION ON AVERAGE EXCHANGE RATE REVENUE
Sales of crude oil	Sales of crude oil
Sales of refined products	Sales of refined products
Sales of natural gas	Sales of natural gas
	COST OF SALES
Local purchases from business partners	Local purchases from business partners
Local purchases of hydrocarbons from the ANH	Local purchases of hydrocarbons from the ANH
Local purchases of natural gas	Local purchases of natural gas
Imports of products	Imports of products

5. Risk Review

5.1 Risk Factors

The risks discussed below could have a material adverse effect, separately or in combination, on our business's operating results, cash flows, liquidity and financial condition. Investors should carefully consider these risks.

5.1.1 Risks Related to Our Business

This section describes the most significant potential risks to our business.

Our crude oil and natural gas reserve estimates involve some degree of uncertainty and may prove to be incorrect over time, which could adversely affect our ability to generate revenue.

Reserves estimates are prepared using generally accepted geological and engineering evaluation methods and procedures. Estimates are based on geological, topographical and engineering facts. Actual reserves and production may vary materially from estimates shown in this annual report, and downward revisions in our reserve estimates could lead to lower future production which could affect our results of operations and financial condition.

Hydrocarbon reserves presented in this annual report were calculated in accordance with SEC regulations. As required by those regulations, reserves were valued based on the unweighted average of closing prices for the first day of each month in the 12-month periods ended December 31, 2017, 2016 and 2015, as well as other conditions in existence at those dates. The average of closing prices of ICE Brent crude oil for the first day of each month in the 12-month period was US\$55.57 per barrel in 2015, US\$44.49 per barrel in 2016 and US\$54.93 per barrel in 2017. In 2016, the Company recognized a reduction in oil and gas proven reserves of 14% in 2016 as compared to 2015, to 1,598 mmbob in 2016 from 1,849 mmbob in 2015. In 2017, the Company recognized an increase in oil and gas proven reserves of 4% as compared to 2016, to 1,659 mmbob in 2017 from 1,598 mmbob in 2016. For more information, see the section *Business Overview—Exploration and Production—Reserves*.

Furthermore, at least once a year, or more frequently if the circumstances require, the Company ascertains whether there are signs of impairment to its assets or cash-generating units (CGUs) due to the difference between the carrying amount of such assets or CGUs as opposed to their recoverable amounts, using reasonable assumptions, based on internal and external factors, which reflect market conditions. The recoverable amount is considered to be the higher of the fair value minus costs of disposal and value in use, based on the free cash flow method, discounted at the weighted average capital cost (WACC). Whenever the recoverable amount of an asset or CGU is lower than its net carrying amount, such amount is reduced to its recovery amount, recognizing a loss for impairment as an expense in the consolidated statement of profit or loss. External and internal sources of information may indicate that an impairment loss recognized for an asset, other than goodwill, may no longer exist or may have decreased, in this case, the reversal is recognized a gain for impairment in the consolidated statement of profit or loss.

In 2017, Ecopetrol had a COP\$1,311,138 million net reversal of impairments recorded in previous years primarily as a result of improved hydrocarbon prices outlook, incorporation of new reserves, Ecopetrol's crude oil basket price discount as compared to the ICE Brent crude oil price, improved refining margins outlook and technical operational capacity, among other factors. For additional information about this impairment charges, see Note 18 to our consolidated financial statements.

Any significant change in estimates and judgments could have a material effect on the quantity and present value of our proved reserves and subsequently on the recognition or recovery of impairment charges. Changes to estimations of reserves are applied prospectively to the amounts of depreciation, depletion and amortization charged and, consequently, the carrying amounts of exploration and production assets.

In order to assess the possible impact of current expected oil price scenarios and market conditions, as well as of further developments driven by the economic environment for the oil and gas industry, the Company has performed a sensitivity analysis over its proved reserve balance as of December 31, 2017. Based on these calculations, assuming an average price per barrel of ICE Brent crude oil of US\$55 per barrel in 2018, US\$60 per barrel in 2019, US\$65 in 2020, US\$70 in 2021 and US\$75 per barrel for later years, Ecopetrol could recognize an increase in oil and gas proved reserves of approximately 3.3%. This analysis takes into account Ecopetrol's estimates and expectations regarding the main assumptions used in its proven reserve calculation, which final actual result may fluctuate and differ substantially from those provided herein due to several factors outside of the control of the Company. For additional information see the section *Financial Review—Trend Analysis and Sensitivity Analysis*.

On the contrary, any downward revision in our estimated quantities of proved reserves would indicate lower future production volumes, which could result in higher expenses for depreciation, depletion and amortization for properties to which we apply the units of production method for calculating these expenses. These higher expenses, and any lower revenues as a result of actual production volumes and realized prices, could adversely impact our results of operations and financial condition.

Achieving our long-term growth depends on our ability to execute our strategic plan — specifically, the discovery and successful development of additional reserves.

Our long-term growth objectives depend largely on our ability to discover and/or acquire new reserves, and in turn developing them successfully and improving the recovery factor in our mature oil fields. Our exploration activities expose us to the inherent geological and drilling risks including the risk of not discovering commercially viable crude oil or natural gas reserves; and the risk that some exploratory wells initially budgeted for may be drilled at a later stage or not be drilled at all. Despite the effort we make to control costs associated with drilling, these are often uncertain, and numerous factors beyond our control may cause drilling operations to be curtailed, delayed or cancelled.

Our ability to add and develop reserves also depends on our capacity to structurally reduce costs to maintain the profitability of oil fields already being exploited.

If we are unable to successfully discover and develop additional reserves, or if we do not acquire properties having proved reserves, our reserves portfolio will decline. Failure to secure additional reserves may impede us from achieving or maintaining production targets, and may have a negative impact on our results of operations and financial condition.

See the section *Strategy and Market Overview—Our Corporate Strategy* for a discussion of our strategic plan.

Our business depends substantially on international prices for crude oil and refined products. The prices for these products are volatile; a sharp decrease could adversely affect our business prospects and results of operations.

In 2017, in Ecopetrol, approximately 92.4% of the revenues came from sales of crude oil, natural gas and refined products and 87% of the total volume sold of these products is indexed to international reference prices or benchmarks such as ICE Brent. Consequently, fluctuations in those international indexes have a direct effect on our financial condition and results of operations.

Prices of crude oil, natural gas and refined products have traditionally fluctuated as a result of a variety of factors including, among others, competition within the international oil and natural gas industry; long-term changes in the demand for crude oil (as further explained below), natural gas and refined products; the economic policies in the United States, China and the European Union; regulatory changes; changes in global supply, such as the current market conditions shifting from oversupply to a balanced crude oil market; inventory levels; changes in the cost of capital; adverse or favorable economic conditions; global financial crises; development of substitute sources of energy, development of new technologies; global and regional economic and political developments in the Organization of the Petroleum Exporting Countries, (OPEC); the willingness and ability of the OPEC and its members to set production levels; local and global demand and supply for crude oil, refined products and natural gas; trading activity in oil and natural gas, which thereby affects their respective margins; derivative financial instruments related to oil and gas; development or availability of alternative fuels; weather conditions; natural events or disasters; and terrorism and global conflict. In 2017, demand grew faster than supply, reducing crude oil inventories to almost a five year average, leveraged in stronger than expected economic growth in OECD countries and the extension of OPEC and Russia's production cut agreement.

When crude oil, refined products and natural gas prices are low, we earn less revenue and we generate lower cash flow and less income. Conversely, when crude oil, refined product and natural gas prices are high, we earn more and generate a larger amount of cash and net income. During 2017, our crude oil basket price was US\$47.8 per barrel versus US\$35.7 in 2016; the refined product basket price was US\$62.7 per barrel versus US\$50.1 per barrel in 2016; and the natural gas price was US\$22.7 per barrel equivalent in 2017 versus US\$23.5 per barrel equivalent in 2016. However, it is important to consider that the margin on refined products can result either in higher or lower margins due to a change in price of crude the same way gas prices can be impacted by local conditions, such as local demand and weather conditions.

In 2017, we had a COP\$1,311,138 net reversal of the impairment of non-current assets, as compared to the impairment of non-current assets of COP\$928,747 million in 2016 and COP\$7,864,875 in 2015. These impairments are an accounting effect that does not involve any disbursement of resources and they are susceptible to reversion when the fair value of the asset exceeds its book value. For additional information about this impairment charges, see the section *Financial Review—Operating Results—Consolidated Results of Operations—Impairment of non-current assets* and Note 18 to our consolidated financial statements.

A reduction of international crude oil prices could also result in a delay or a change in our capital expenditure plan, in particular delaying exploration and development activities, thereby delaying the development of reserves and affecting future cash flows. In order to maintain a profitable operation and preserve the cash flow of the Company at certain oil price levels, some of our producing fields may have to be closed or their operations temporarily suspended which would affect our production levels and expected revenues.

Changes in the Colombian Peso/U.S. dollar exchange rate could have an adverse effect on our financial condition and results of operations given the amount of U.S. dollar denominated debt held by the company and the fact that most of our revenues are derived from sales of products quoted in or with reference to U.S. dollars.

Most of our revenues are derived from sales of products quoted in or with reference to U.S. dollars. Therefore when the Colombian Peso depreciates against the U.S. dollar, our revenues converted into Colombian Pesos, increase. Conversely, when the Colombian Peso appreciates against the U.S. dollar, our revenues decrease.

On the other hand, imported goods, oil services and the debt, which is mainly denominated in U.S. dollars, become less expensive when the Colombian Peso appreciates against the U.S. dollar and more expensive when the Colombian Peso depreciates against the U.S. dollar.

As of December 31, 2017 our U.S. dollar-denominated total debt was US\$12.6 billion, which we recognize in our consolidated financial statements at its amortized cost, which corresponds to the present value of cash flows, discounted at the effective interest rate. Out of this total, US\$12.0 billion relate to Ecopetrol S.A., whose functional currency is the Colombian Peso. Therefore, when the Colombian Peso depreciates against the U.S. dollar, Ecopetrol S.A. is exposed to an exchange rate loss. In contrast, when the Colombian Peso appreciates against the U.S. dollar, Ecopetrol S.A. is exposed to an exchange rate gain. Some of the Group's affiliates have the U.S. dollar as functional currency and are not exposed to a material exchange rate risk resulting from fluctuations in the Colombian Peso against the U.S. dollar. On the asset side, when the financial statements of the Group are consolidated, the exchange rate differential of the affiliates' assets and liabilities whose functional currency is the U.S. dollar is recognized directly in the equity, as part of the other comprehensive income.

The Company adopted hedge accounting as part of its risk management strategy, using two types of natural hedges with its U.S. dollar debt as a financial instrument: i) cash flow hedge for exports of crude oil and ii) hedge of a net investment in a foreign operation. As a result of the implementation of both hedges, \$8,532 million of Ecopetrol S.A.'s debt in U.S. dollars as of December 31, 2017, was designated as a hedge. With the adoption of hedge accounting, the effect of the volatility of the foreign exchange rate on the hedged portion of the debt is recognized directly in equity, as part of other comprehensive income. The remaining portion of Ecopetrol S.A.'s U.S. dollar-denominated debt as well as the financial assets and liabilities denominated in foreign currency continues to be exposed to the fluctuation in the exchange rate.

The U.S. dollar/Colombian Peso exchange rate has fluctuated during the last several years. On average, the Colombian Peso depreciated 37.28% against the U.S. dollar in 2015, 11.18% in 2016 and appreciated 3.35% in 2017. Additionally, as of December 31, 2017, the Colombian Peso appreciated 0.56%, as of December 31, 2016, the Colombian Peso appreciated 4.72%, and as of December 31, 2015 it depreciated 31.64%, in each case from year-end exchange in the previous year. In addition, given the performance of interest rates in the U.S., crude oil prices in the next few years and political uncertainty in Colombia, there is no clear view of how the U.S. dollar and the Colombian peso will behave in the medium to long-term. Given that markets are dealing with a great deal of uncertainty, it is expected that U.S. dollar movements will remain difficult to forecast.

A future depreciation in the exchange rate of the Colombian Peso against the U.S. dollar may affect our financial results when converted into Colombian Pesos, given the portion of our U.S. dollar debt that is not designated as hedge instrument and the future debt we may acquire. Please see our sensitivity analysis on our results of operation to exchange rate fluctuations in the section *Financial Review—Effect of Taxes, Exchange Rate Variation, Inflation and the Price of Oil on our Results—Exchange Rate Variation* and in Note 30.2 to our consolidated financial statements.

Increased competition from local and foreign oil companies may have a negative impact on our ability to gain access to additional crude oil and natural gas reserves in Colombia and abroad.

We must bid for exploration blocks offered by the ANH in Colombia and similar authorities in other countries, which means we compete under the same conditions as other domestic and foreign oil and gas companies, and receive no special treatment. Our ability to obtain access to potential fields also depends on our ability for evaluating and selecting potential opportunities and to adequately bid for such opportunities.

We are also exposed to international competition as a result of our international exploratory activities. Currently, we are exploring in Brazil, Mexico and the US Gulf of Mexico, where we both partner and compete with other oil and gas companies operating in those locations.

If we are unable to adequately compete with local and foreign oil companies, or if we cannot enter into joint ventures with market players having high potential exploration projects, our exploration activities may be limited. This could reduce our market share and, in turn, adversely affect our financial condition.

If operational risks to which we are exposed in Colombia or overseas materialize, the health and safety of our workforce, the local community and the environment may be affected. In addition, we may suffer a disruption or shutdown of our operational activities.

Our exploration, production, refining and transportation activities in Colombia and in the foreign countries in which we operate are subject to industry-specific operating risks, some of which, despite our internal procedures and adherence to industry best practices, are beyond our control. Our operations may be curtailed, delayed or cancelled due to adverse or abnormal weather conditions, natural disasters, blockages in the communities in which we operate, equipment failures or accidents, oil or natural gas spills or leaks, shortages or delays in the availability or in the delivery of equipment, delays or cancellation of environmental licenses or other government authorizations or judicial decisions, fires, explosions, blow-outs, surface cratering, pipeline failures, theft and damage to our transportation infrastructure, sabotage, terrorist attacks and criminal activities.

Some of our operations in Colombia and abroad could be conducted in remote and uninhabited locations which involve health and safety risks that could affect our workforce. By our own Company policy and practices, as well as under Colombian law and international industrial safety regulations, we are required to have health and safety practices that minimize risks and health issues faced by our workforce. Failure to comply with health and safety regulations in the jurisdictions where we operate may lead to investigations by health officials that could result in lawsuits or fines.

We may be required to incur in additional costs and expenses to allocate funds to industrial safety and health compliance under Colombian law and international industrial safety regulations. Additionally, if any operational incident occurs that affects local communities and ethnic communities in nearby areas, we will need to incur in additional costs and expenses in order to return affected areas to normality and to compensate for any damages we may cause. These additional costs may have a negative impact on the profitability of the projects we may decide to undertake.

The occurrence of any of these operating risks could result in substantial losses or slowdowns to our operations, including injury to our employees, malfunction or destruction of property, equipment and infrastructure, clean-up responsibilities, third-party liability claims, government investigations and imposition of fines, withdrawal of environmental licenses and other government permits, suspension or shutdown of our activities and loss of revenue. The occurrence of any of these events may have a material adverse effect on our financial condition and results of operations.

Our involvement in deep-water drilling either as direct operator or in conjunction with our business partners involves risks and costs, which may be out of our control.

Our deep-water drilling activities present severe risks, such as the risk of spills, explosions on platforms and drilling operations, and natural disasters. The occurrence of any of these events or other incidents could result in personal injuries, loss of life, severe environmental damage with the resulting containment, clean-up and repair expenses, equipment damage and liability in civil and administrative proceedings. Heightened risks and costs associated with deep-water drilling may have a negative effect on our results of operations and financial condition and in our reputation.

See the section [Business Overview—Exploration and Production—Exploration Activities—Exploration Activities Outside of Colombia](#) for a summary of our current deep-water drilling activities.

As a result of the oil spill in the Macondo field operated by British Petroleum in the U.S. Gulf Coast in April 2010, significant concerns regarding the safety of deep-water drilling have been raised and, as a result, applicable regulations in various countries have changed. More stringent government regulation may result in increased costs and longer exploration and development timeframes for our deep-water drilling operations and consequently could adversely affect our results of operations and financial condition.

We are exposed to the credit, political and regulatory risks of our customers and any material nonpayment or nonperformance by our key customers could adversely affect our cash flow and results of operations.

Some of our customers may experience financial problems that could have a significant negative effect on their creditworthiness. Severe financial problems encountered by our customers could limit our ability to collect amounts owed to us, or to enforce the performance of obligations owed to us under contractual arrangements. In addition, many of our customers finance their activities through their cash flows from operations, short and long term debt or equity.

The combination of decreasing cash flows as a result of declines in commodity prices, a reduction in borrowing bases under reserve-based credit facilities and the lack of availability of debt or equity may result in a significant reduction of our customers' liquidity and limit their ability to make payments or perform their obligations to us according to their contractual terms.

Furthermore, some of our customers may be highly leveraged and subject to their own operating expenses. Therefore, the risk we face in doing business with these customers may increase. Other customers may also be subject to regulatory changes, which could increase the risk of defaulting on their obligations to us. Financial problems experienced by our customers could result in the impairment of our assets, a decrease in our operating cash flows and may also reduce or restrict our customers' future use of our products and services, which may have an adverse effect on our revenues.

Our ability to access the credit and capital markets on favorable terms to obtain funding to refinance our debt maturities may be limited due to the deterioration of these markets, any change to our credit ratings and the authorizations we need before incurring any financial indebtedness.

A new financial crisis, volatility in prices in the oil and gas sector, the spread in protectionist policies in the United States and Europe, the lack of consensus among OPEC members, the discovery of corruption by governments and private companies in emerging markets and further geopolitical disruptions in the Middle East, which could involve developed countries, which in turn could worsen risk perception with respect to the emerging markets, or the occurrence of any of the risks described in the section *Risk Review—Risk Factors—Risks Related to Colombia's Political and Regional Environment* could make it more difficult for us and our subsidiaries to access international and local capital markets and finance our operations and potentially refinance our debt maturities on terms acceptable to us. These conditions, along with significant write-offs in the financial services sector and the re-pricing of credit risk, can make it difficult for us to obtain funding for our capital needs on favorable terms. Access to credit and capital markets is also dependent on our credit ratings, which are mainly determined by our financial and operational strength, oil and gas market conditions and the support that could be provided by the Colombian government. We cannot assure that our credit ratings will continue for any given period of time or that the ratings will not be further lowered or withdrawn. An assigned rating may be raised or lowered depending, among other things, on the respective rating agency's assessment of our financial strength. In addition, a downgrade in the rating of the Republic of Colombia could also trigger a downgrade on our ratings as our rating is capped by the rating of the Republic of Colombia and the implicit support that can potentially be provided to the Company. On March 14, 2017, Fitch Ratings maintained our long term international credit rating at BBB but upgraded our outlook from negative to stable following the upgrade from the Republic of Colombia from negative to stable also in March 2017. On June 27, 2017, S&P increased our stand-alone credit rating from BB to BB+ and maintained our long-term international credit rating at BBB and our outlook as negative, in line with those of the Republic of Colombia. On December 11, 2017, in line with a downgrade of the Republic of Colombia, S&P lowered our long-term international credit rating from BBB to BBB- and changed our outlook from negative to stable. S&P maintained, however, our stand-alone credit rating at BB+. On September 21, 2017, Moody's maintained our long term international credit rating at Baa3 and revised our outlook from negative to stable. On February 22, 2018, despite the downgrade of Republic of Colombia, Moody's maintained our long term international credit rating and outlook. We cannot offer any assurance that our credit rating will continue.

As a result of these factors, we may be forced to revise the timing and scope of our capital projects as necessary to adapt to existing market and economic conditions, downgrades to our credit ratings or to access the financial markets on terms less favorable, therefore negatively affecting our results of operations and financial condition.

In addition, under applicable regulation, the Government, through the Ministry of Finance and Public Credit and the favorable opinion of the National Planning Department, must authorize all indebtedness of state-owned entities and government-controlled companies through a majority equity stake. Consequently, excluding our foreign subsidiaries or those subsidiaries in which we hold minority interest, most of our indebtedness must be previously authorized by the Colombian Ministry of Finance and Public Credit and the National Planning Department. As such, our indebtedness is subject to the Government's time frames and policies, and we cannot guarantee that such authorizations would be granted in a timely fashion or granted at all.

We may be exposed to increases in interest rates, thereby increasing our financial costs.

We may incur debt locally and in the international capital markets and, consequently, may be affected by changes in prevailing interest rates. If market interest rates increase, our financing expenses may increase, which could have an adverse effect on our results of operations and financial condition.

As of December 31, 2017, approximately 19%, or US\$2.8 billion (COP\$8.3 trillion), of our total indebtedness consisted of floating rate debt. If market interest rates rise, our financing expenses will increase, which could have an adverse effect on our results of operations and financial condition. In addition, as we refinance our existing debt in the coming years, the mix of our indebtedness may change, specifically as it relates to the ratio of fixed to floating interest rates, the ratio of short-term to long-term debt, and the currencies in which our debt is denominated in or indexed to. We cannot assure you that such changes will not result in increased financing expenses borne by us. Finally, as we incur new debt in the future to fund our capital projects or inorganic acquisitions, the prevailing interest rates and spreads at any specific time could be less favorable in terms of cost when compared to our previous financing transactions, which could adversely affect our financial condition and results of operations.

Our current and planned investments and exploration activities outside Colombia are exposed to political and economic risks.

As part of our strategic plan, we operate through business partners, subsidiaries or affiliates outside of Colombia. We currently have investments, joint ventures and subsidiaries incorporated in Peru, Brazil, Mexico, Bermuda, Panama, the Cayman Islands, Switzerland, Germany, Spain, the United Kingdom and the United States, and we are analyzing investments in other countries. In connection with making investments, we are and will be subject to risks related to economic and political conditions and governmental economic actions. We cannot predict the positions of foreign governments relating to the oil and gas industry, land tenure, protection of private property, environmental standards, regulation or taxation; nor can we assure you that future governments will maintain policies favorable to foreign investment or repatriation of capital.

We began exploration activities outside Colombia in 2006 through our Brazilian subsidiary, Ecopetrol Óleo e Gás do Brasil Ltda. Our foreign subsidiaries have subsequently entered into a number of joint venture exploration agreements with regional and international oil companies to explore acreage in Brazil and the U.S. Gulf Coast. We have limited experience exploring outside Colombia. We may face new and unexpected risks involving environmental and other legal requirements beyond those we currently experience.

The results of operations and financial condition of our subsidiaries in these countries also may be adversely affected not only by risks associated with hydrocarbon exploration and production, but also by fluctuations in their local economies, political instability and government actions, including: the imposition of price controls, the imposition of restrictions on hydrocarbon exports, fluctuation of local currencies against the Colombian Peso, the nationalization of oil and gas reserves, increases in export and income tax rates for crude oil and oil products, and unilateral (governmental) institutional and contractual changes, including controls on investments and limitations on new projects.

Any of these conditions occurring could disrupt or terminate our operations, causing our development activities to be curtailed or terminated in these areas, or our production to decline; limit our ability to pursue new opportunities; affect the recoverability of our assets; or cause us to incur additional costs or delay the timeline of our projects.

Our future performance depends on the successful development and deployment of new technologies and the knowledge to apply and improve them.

Technology, knowledge and innovation are essential to our business, especially for reductions to our operating costs and improvements in processes related to the production and transportation of heavy crude oil and the exploitation of mature fields. If we do not develop the right technology, do not secure access to required third-party technology, fail to deploy the right technology, do not obtain the expertise to operate our deployed technology or to improve our processes, or do not deploy the knowledge necessary to improve such technology effectively, the execution of our corporate goals, our profitability and our earnings may be adversely affected. In the case of our recovery program, we not only depend on the successful selection, adaptation, demonstration and deployment of appropriate technologies but also in the response of the reservoir to the application of these recovery technologies.

Our performance could be negatively affected by a deficiency in leadership capacity and lack of key skilled employees.

As the oil and gas industry faces an increasing number of challenges, the ability to react quickly to these challenges has become a key factor in achieving efficiency, profitability, growth and sustainability. Our ability to achieve these goals can be negatively affected by a deficiency in leadership capacity and a lack of key skilled employees that can execute our business strategy with creativity and determination.

Our operations may not be able to keep pace with the increasing domestic demand for natural gas.

According to the Colombian Energy and Gas Regulatory Commission (CREG) Resolution 114 of 2017, former Resolution 089 of 2013, the natural gas market is a physical market, which means that suppliers must comply with the quantities agreed in their contracts. Hence, Ecopetrol will not be able to keep or increase its market participation unless the Company increases its natural gas reserves as local demand grows.

Additionally, we are currently party to a number of national gas supply contracts that have firm gas commitments. If we are unable to deliver natural gas to these clients as a result of cuts in operations, delays in the completion of projects relating to our production facilities or the acceleration of the decline in our gas production, among other reasons, we may be required to compensate our customers for our failure to supply natural gas.

Delays in the start of new projects could result in penalties imposed on us by our clients. Although we did not pay penalties due to delays in the start of new projects in 2017, we cannot assure you that in the future we will not be subject to additional monetary fines which can in turn affect our financial condition and results of operations.

We depend on others for the construction and availability of natural gas transportation infrastructure for the transport of our gas, which may limit our ability to develop new or existing fields or lead to the deterioration of related assets and may not allow us to recover the cost of capital invested in natural gas discoveries.

Ecopetrol S.A. can only hold up to 25% of the equity of any natural gas transportation company. Therefore, there can be no assurance that the transportation infrastructure necessary to transport natural gas from the fields to distribution points and our customers will be built by third parties or that if built there will be sufficient capacity available to us for the exploitation of new natural gas discoveries or the development of existing fields. The failure to commercially exploit new or existing discoveries may result in impairment of the related assets and our inability to recover the capital expenditures invested to make these natural gas discoveries. As a result, we may be required to enter into agreements with natural gas transportation companies on terms that are not favorable to us.

For example, we have developed natural gas reserves in the Cusiana and Cupiagua fields, but transportation capacity to deliver gas from these fields is currently limited. Although there are projects under development that will eliminate this limitation in 2018, we can offer no assurance that they prove successful.

Our operations could be affected by reactions of labor unions, social organizations and contractors to Colombia's political and social environment, organizational changes and the collective bargaining agreement negotiation process.

Due to Colombia's political and social environment and organizational changes, social organizations in the communities where we have operations, contractors and unions, may have reactions and present their demands through social movements, which could have an adverse effect on our operations and financial condition.

In addition, our current collective bargaining agreement has been in effect since 2014 and has a term of four years, expiring June 30, 2018. There will be no changes to these terms until June 2018 or until the end of the negotiation process. If the unions do not present any request of negotiation, the terms will be maintained for another six months. During this period of time, the collective bargaining agreement negotiation will take place and unions may try to impact our normal operations. Further, we cannot assure you will not experience strikes or labor unrest in the future.

Our activities may be interrupted or affected by external factors, such as abnormal weather conditions and natural disasters.

We are exposed to several risks that may partially interrupt our activities. They include fires or explosions, natural disasters, criminal acts and acts of terror, malfunction of pipelines and emission of toxic substances.

Also, the effects of climate change could create impacts and losses in any part of our business operations, for instance, as the result of increase in the intensity of the “La Niña” and “El Niño” climate phenomena, causing floods and drought periods, increased temperature and rising sea levels.

The “El Niño” climate phenomenon is characterized by (i) a lack of rainfall, which limits the amount of water necessary for the development of various activities of the company, and (ii) increased temperatures, which could have a direct impact on our worker’s health given an increased occurrence of heat waves and the increased occurrence of epidemics and diseases. The “La Niña” climate phenomenon is characterized by increased rainfall, which can generate (i) landslides that threaten pipeline infrastructure and limit road transportation and (ii) flooding, which could limit operations in our production fields and facilities.

As a result, our activities could be significantly affected or even paralyzed. These risks could result in property damage, loss of revenue, loss of life, pollution and harm to the environment, among others. If any of these occur, we may be exposed to economic sanctions, damages, fines or penalties in addition to the costs required to repair or remediate the related damage. These costs, fines and penalties may adversely affect our financial condition and results of operations.

Our operations, including our activities in areas classified as indigenous reserves and Afro-Colombian lands, are subject to opposition from members of various communities.

We currently carry out and plan to continue carrying out activities in areas classified by the Government as indigenous reserves and Afro-Colombian lands. In order to undertake these activities, we must first comply with the previous consultation process, set forth by Colombian law. These consultation processes are part of the administrative procedures for obtaining environmental licenses to start our projects, works or activities in areas belonging to ethnic communities. In addition, consultations can be seen as a potential instrument to involve communities in the decision of developing extracting industry and infrastructure projects in their territories. Generally, these consultation processes last between six months to one year depending on the community expectations, but may be significantly delayed if we cannot reach an agreement with the communities. We strive to be respectful of the Constitution and laws and the autonomy of indigenous and Afro-descendant communities, and we therefore do not enter their territories until we have reached an agreement with them.

Our activities are subject to opposition, including protests by various communities, and even in areas in which the previous consultation process does not apply. Recently, through popular consultation, some communities have voted against the development of extractive industry projects. Any such similar situation may affect our future projects.

In recent years, indigenous communities have been claiming their ancestral territories and requesting recognition on previously closed consultation processes. We may be exposed to operational restrictions as a result of the opposition of these communities.

No certainty can be given that we will be able to reach an agreement with the different communities opposed to our operations or that such communities will participate in consultation processes if available. We may be exposed to similar delays due to opposition from local communities in other countries where we carry out our activities.

We have made significant investments in acquisitions and we may not realize the expected value.

We have acquired interests in several companies in Colombia and abroad. See the section *Business Overview—Our Corporate Structure*. Obtaining the expected benefits of the acquisitions will depend, in part, on our ability to (i) obtain the expected results of operations and financial condition from these acquisitions, (ii) manage disparate operations and integrate distinct corporate cultures, (iii) manage our objectives as a corporate group, and (iv) institute our corporate governance rules as well as other factors beyond our control such as the economic and regulatory environment in countries in which we have made acquisitions and crude oil prices. These efforts may not succeed. Our failure to successfully obtain the expected results from our acquisitions could adversely affect our financial condition and results of operations.

We might be required to provide additional financial support to Bioenergy despite its recent completion.

Bioenergy's ethanol plant, which began operations in April 2017 was financed with COP\$132 billion through bilateral loans for its agricultural component and COP\$382 billion through an infrastructure leasing for its industrial component. Although Ecopetrol is not the sponsor and has not provided financing guarantees to Bioenergy, some additional financial support might be needed to assure the stabilization phase of the plant. Additionally, Bioenergy may also face situations such as social unrest, strikes or other operational difficulties that could negatively impact its operation and financial results.

Any situation that could affect the operations of this subsidiary may have a negative impact on its profitability as well as on its ability to pay its debt, which in turn could adversely affect our financial condition and results of operations.

Ongoing Colombian State control entities investigations regarding our subsidiaries Reficar and Bioenergy could adversely affect us.

Ecopetrol, Bioenergy and Reficar's employees are generally subject to the control and supervision of the Colombian State control entities. See section *Risk Review—Legal Proceedings and Related Matters* for additional information.

The investigations concerning Reficar and Bioenergy that are described in section *Risk Review—Legal Proceedings and Related Matters* remain ongoing. While we are cooperating fully with both cases, adverse developments in connection with these investigations, including any expansion of the scope of the investigations, could negatively impact us and could divert the efforts and attention of our management team from our ordinary business operations.

In connection with this investigation or any other investigation carried out by any other authority, there can be no assurance that we will not incur in additional costs and expenses or expose us or our employees to sanctions and lawsuits, any of which could adversely impact our reputation and, in turn, could have adverse effects on our financial condition and results of operations. See section *Risk Review—Legal and Regulatory Risk—We may incur losses and spend time and money defending pending lawsuits and arbitrations and responding to administrative investigations.*

Our results may be affected by the performance of our business partners or their third-party service providers, as many of our operations are executed under joint venture agreements.

Many of our operations are performed through joint ventures with our business partners. Consequently, we depend on the performance of our business partners. The poor performance of any of them, especially in those projects in which we do not act as operator, could negatively impact oil and natural gas production, which in turn could have a negative impact on our results of operations and financial condition. We are exposed to the risk of not finding business partners with the appropriate skills and performance we require for our projects. We are also indirectly exposed to supply agreements and other third-party services contracted by our business partners acting as operators under joint venture agreements.

Our insurance policies do not cover all liabilities and may not be available for all risks.

Our insurance policies do not cover all liabilities, and insurance may not be available for all risks. There can be no assurance that incidents will not occur in the future, that insurance will adequately cover the entire scope or extent of our losses or that we will not be found liable in connection with claims arising from these and other events, which could adversely affect our financial condition and results of operations.

A failure in our information technology systems or cyber security attacks may adversely affect our financial results.

We depend on the reliability and security of our information technology systems to conduct certain exploration, development and production activities, process financial records and operating data, communication with our employees and business partners, and for many other activities related to our business. Our information technology systems may fail or have other significant shortcomings due to operational system flaws or employee misuse, tampering or manipulation. In addition, we may become the target of cyber-attacks or information security breaches that could result in the unauthorized release, gathering, monitoring, misuse, loss or destruction of proprietary and other information. Any of these occurrences could disrupt our business, result in potential liability or reputational damage or otherwise have an adverse effect on our financial results.

During 2017, our internal cyber security systems identified several cyber security attacks such as brute force login attacks designed to identify valid credentials in IT infrastructure and one ransomware attack with data loss (low level confidentiality) at Ecopetrol S.A. Our platforms also identified and controlled certain malware events and SQL injection attacks.

Although we have not experienced any material losses relating to failure of our information technology systems or cyber incidents, there can be no assurance that we will not suffer such losses in the future.

We are exposed to behaviors incompatible with our ethics and compliance standards.

Given the large number of contracts that we are a party to in Colombia and abroad with local and foreign suppliers, the geographic distribution of our operations and the great variety of actors that we interact within the course of business, we are subject to the risk that our employees, contractors, or any person having relations with us may misappropriate our assets, manipulate our assets or information or engage in money laundering or the financing of terrorism, for such person's personal or business advantage. Our systems for identifying and monitoring these risks may not be effective to fully mitigate them in all situations. Such acts may result in material financial losses or reputational harm to the Company.

The reliability and capacity of national power supply systems may affect or limit the continuity of our operations or limit growth.

Our average energy consumption in 2017 was 6,392 GWh/year, of which 72% was supplied through self-generation, and the remaining 28% through power grid. Our demand is 9% of the total energy demand in Colombia.

Several producing fields are connected to the national transmission system and depend on its expansion and reliability to keep steady production levels and to accommodate future growth. The national electricity market is volatile due to changes in hydrology and availability of fuels (natural gas, diesel etc.), bringing uncertainty to prices. Ecopetrol centralizes the management of power sources and uses, quality and cost in the short, medium and long term with the objective of optimizing energy consumption, but we cannot offer any assurance that the program will prove successful.

Rising water production levels may affect or constrain our crude oil production.

During 2017, Ecopetrol S.A. produced approximately 9.3 million barrels of water per day. Taking into account the nature of our reservoirs, the water production levels to be managed by the Company may increase in the future. In order to achieve our oil and gas production goals and to avoid any production restrictions going forward, we will need to secure the required capacity to manage water levels. Factors that may trigger a possible constraint in our crude oil production due to the rising water production levels are: (i) ineffective project management of the required facilities, (ii) the Company's and its partners' ability to timely obtain the environmental permits related to water management, (iii) social and community interactions that could affect the development and operation of these projects, and (iv) the availability of capital to execute the required projects.

5.1.2 Risks Related to Colombia's Political and Regional Environment

This section discusses potential risks related to our extensive operations in Colombia.

The Colombian government could seize or expropriate Ecopetrol's assets under certain circumstances for fair compensation.

Pursuant to Articles 58 and 59 of the Colombian constitution, the Government can exercise its eminent domain powers in respect of private property assets in the event such action is deemed by the Government to be required in order to protect public interests. According to Law 388 of 1997, eminent domain powers may be exercised through: (i) an ordinary expropriation proceeding, or (ii) an administrative expropriation. In all cases we would be entitled to a fair compensation for the expropriated assets. Also, as a general rule, compensation must be paid before the asset is effectively expropriated. However, the compensation may be lower than the price for which the expropriated asset could be sold in a free-market sale or the value of the asset as part of an ongoing business. The aforementioned Article 59 of the Colombian constitution establishes an expropriation for war reasons, which require that compensation be paid before expropriation but can only be executed on a temporary basis.

Colombia has experienced internal security issues that have had or could have a negative effect on the Colombian economy and on us.

Colombia has experienced internal security issues, primarily due to the activities of guerrillas, paramilitary groups, drug cartels and criminal bands known as *Bacrim*. From time to time, guerrillas target crude oil and multi-purpose pipelines, including the Oleoducto Transandino, Caño Limón-Coveñas and Oleoducto Bicentenario pipelines, and other related infrastructure disrupting our activities and those of our business partners.

During 2017, the attacks against our pipeline infrastructure increased by 28% in relation to 2016 (49 attacks in 2016 compared with 63 attacks in 2017). This situation especially affected the infrastructure located in the following departments: Norte de Santander, Arauca and Nariño and the following pipelines: Caño Limón Coveñas and Transandino. One of the consequences of the 2017 attacks is a deferred production of 1.6 million barrels. On several occasions, guerilla attacks have resulted in unscheduled shutdowns of our transportation systems in order to repair or replace sections of pipelines or production facilities that have been damaged with deferral of production in certain fields, as well as caused us to undertake environmental remediation. For the pipeline infrastructure managed by Ecopetrol S.A, the direct cost of repairs due to terrorist attacks in 2017 was approximately COP\$20,313 million (US\$6.8 million, with a COP\$2,984/1.00 US exchange rate as of December 31, 2017). During the first four months of 2018, there have been 33 attacks against the infrastructure of the Caño Limón Coveñas and Transandino pipelines. So far, however, these attacks have not resulted in deferred production due to the transportation of the crude from the Caño Limón field through the Bicentenario pipeline from Banadia in Arauca to Araguany in Casanare. We cannot offer any assurance that we will continue to ensure such transportation through alternate routes.

Likewise, the theft of refined products and crude oil, resulting from security issues, may impact our operating and financial results in the future. Theft of refined products, increased from approximately 28.5 boed in 2016 to approximately 34.9 boed in 2017. Theft of crude oil increased from approximately 1,796 bod in 2016 to approximately 1,883 bod in 2017.

These activities and their possible escalation and the effects associated with them have had, and may have in the future, a negative impact on the Colombian economy or on us, which may affect our customers, employees, assets or the environment, with resulting containment, clean-up and repair expenses.

Despite the peace agreement between the Colombian government and the FARC and the ongoing peace negotiation process with the National Liberation Army (the ELN), some illegal and terrorist activities of guerrilla groups or their members may continue

On November 30, 2016, the Colombian Congress approved a peace agreement between the Colombian government and the Revolutionary Armed Forces of Colombia, or FARC. Currently, the Colombian government is in the process of gradually integrating FARC members into civilian life.

On the other hand, the National Liberation Army, or ELN, an insurgency guerrilla group, has increased its actions against the Colombian security forces and the critical infrastructure of the Nation in recent months, which we believe is an attempt to show its presence and influence in some regions and put pressure on the ongoing peace negotiations which formally began in February 2016. In February 2017, the public dialogue phase began in Quito, Ecuador. These dialogues were interrupted as a result of the terrorist attacks carried out by the ELN since January 9, 2018, when the bilateral ceasefire ended. The Colombian Government decided to resume the dialogue in April 2018, due to the suspension of ELN terrorist actions during the electoral period in March 2018. It is expected that attacks against critical infrastructure will continue until a new bilateral ceasefire can be agreed upon.

Despite the progress made with the FARC and the now stalled negotiations with the ELN, some guerrilla groups may continue their illegal and terrorist activities, resulting in a deterioration of Colombia's national security and consequently may negatively impact our operating results.

There have been certain events in Colombia and abroad, which have resulted in political tensions between Colombia and some of its neighboring countries.

There have been certain events in Colombia and abroad, which have resulted in political tensions between Colombia and some of its neighboring countries.

Economic differences between Colombia and Venezuela, mainly due to Venezuela's current public order situation and internal political tension, could affect our diplomatic relations, impact border towns and cities and therefore have a negative impact on Colombia's economy and general security situation.

Companies operating in Colombia, including us, are subject to the prevailing economic conditions and the investment climate in Colombia, which may be less stable than the prevailing economic conditions and investment climate in developed countries.

Market prices of securities issued by Colombian companies, including us, are subject to the prevailing economic conditions in Colombia. A large portion of our assets and operations are located in Colombia and most of our sales are currently derived from our crude oil and natural gas production and the production of our refineries located in Colombia. Accordingly, our financial condition and results of operations depend to a significant extent on macroeconomic and political conditions prevailing from time to time in Colombia and on the exchange rates between the Colombian Peso and the U.S. dollar.

If the perception of improved overall security in Colombia deteriorates or if the investment climate worsens, the Colombian economy may face lower growth rates than the ones posted recently, which could negatively affect our financial condition and results of operations. Furthermore, the market price of our shares and American Depositary Shares, or ADSs, may be adversely affected by changes in governmental policies, particularly those affecting economic growth, exchange rates, interest rates, inflation and taxes. The Government has changed monetary, fiscal, taxation, labor and other policies over time and has thus influenced the performance of the Colombian economy. We have no control over the extent and timing of government intervention and policies.

Colombian political and economic conditions have a direct impact on our business and may have a material adverse effect on us.

Colombia's economic policies may have direct impact on our Company as well as market conditions, the prices of securities and our ability to access national and international capital markets. Our financial condition and results of operations may be adversely affected by the following factors, among others, and the Government's response to such factors: exchange rate movements; inflation; exchange control policies; price instability; interest rates; liquidity of domestic capital and lending markets; tax policy; regulatory policy for the oil and gas industry, including pricing policy; and other political, diplomatic, social and economic developments in or affecting Colombia.

Uncertainty over whether the Government will implement changes in policy or regulations that may affect any of the factors mentioned above or other factors in the future may lead to economic uncertainty in Colombia and increase the volatility of the Colombian securities market and securities issued abroad by Colombian companies. The upcoming 2018 Colombian presidential election could also result in changes to policies that may have an adverse effect on the local market and consumer confidence that may impact our business and have a material adverse effect on us.

Developments and the perception of risk in other countries, especially emerging market countries, may adversely affect the market price of Colombian securities, including our ADSs.

Securities issued by Colombian companies may be affected by economic and market conditions in other countries, including other Latin American and emerging market countries. Although economic conditions in Latin American countries and in other emerging market countries may differ significantly from economic conditions in Colombia, investors' reactions to developments in these other countries may have an adverse effect on the market value of securities of Colombian issuers and our ability to access capital markets.

Due to past financial crises in several emerging market countries (such as the Asian financial crisis of 1997, the Russian financial crisis of 1998 and the Argentine financial crisis of 2001), the world financial crisis of 2008 and the recent sovereign debt crises in certain European countries, investors may view investments in emerging markets with heightened caution. In the past, as a result of crises in other countries, flows of investments into Colombia have been reduced. Crises in other countries, especially in emerging market countries, may hamper investor enthusiasm for securities of Colombian issuers. If Latin America experiences a new slow-down or if the price for securities of Latin American issuers falls, the price for our ADSs could follow this trend and could be adversely affected as could our ability to access domestic or international capital markets.

New or higher taxes resulting from changes in tax regulations or the interpretation thereof in Colombia could adversely affect our results of operations and financial condition.

New tax laws and regulations, and uncertainties in the interpretation with respect to existing and future tax policies pose risks to us. In recent years, the Colombian Congress and tax authorities have imposed and subsequently eliminated additional taxes such as the Income Tax for Equality ("CREE") and the wealth tax, and enacted modifications to taxes related to financial transactions, income, value added tax ("VAT"), and taxes on net worth. In addition, in December 2016, pursuant to Law 1819, the Colombian Congress enacted a tax reform, which became effective in 2017. For a description of taxes affecting our results of operations and financial condition in 2017, see section *Financial Review — Effect of Taxes, Exchange Rate Variation, Inflation and the Price of Oil on Our Results — Taxes*. Changes in tax-related laws and regulations, and interpretations thereof, can affect tax burdens by increasing tax rates and fees, creating new taxes, limiting tax deductions, and eliminating tax-based incentives and non-taxed income. In addition, tax authorities and tax courts may interpret tax regulations differently than we do, which could result in tax litigation and associated costs and penalties.

Until recently, for Colombian income tax purposes, dividends that were distributed from profits taxed at the corporate level were not taxed or subject to withholding tax at the shareholder level. However, beginning in 2017, dividends paid to non-resident shareholders are subject to a withholding tax. The withholding tax rates applicable to dividends paid to non-resident shareholders are: (i) a 5% dividend tax on dividends distributed from profits taxed at the corporate level; and (ii) a 35% withholding tax rate on dividends distributed from profits not taxed at the corporate level plus an additional 5% dividend tax after applying the initial 35% withholding tax rate. Tax treaty rules might also apply on dividend distributions when a shareholder is a resident in a country that has executed a tax treaty with Colombia.

5.1.3 Legal and Regulatory Risks

This section discusses potential legal and regulatory risks to Ecopetrol, including the risk of having to comply with new laws and regulations.

Our operations are subject to extensive regulation.

The Colombian hydrocarbons industry is subject to extensive regulation and supervision by the Government and regulatory agencies in matters including the award of exploration and production blocks by the ANH, the imposition of specific drilling and exploration obligations, restrictions on production, price controls, capital expenditures, liquidation of the Net Position of each refiner or importer with respect to the FEPC and required divestments. Existing regulation applies to virtually all aspects of our operations in Colombia and abroad. The commercialization activities of some of our products also face extensive regulation. Such regulation is subject to change by the applicable regulator affecting our ability to commercialize our products. See section *Business Overview—Applicable Laws and Regulations*.

The terms and conditions of the agreements with the ANH under which we explore and produce crude oil and natural gas generally reflect negotiations with the ANH and other governmental authorities and may vary by fields, basins and hydrocarbons discovered.

We are required, as are all oil companies undertaking exploratory and production activities in Colombia, to pay a percentage of our production to the Government as royalties. The Colombian Congress has modified the royalty program for crude oil and natural gas production several times in the last 20 years, as it has modified the regime regulating new contracts entered into with the Government. In the future, the Colombian Congress may once again amend royalty payment levels for new contracts and such changes could have an adverse effect on our future exploration and production in Colombia. See section *Business Overview—Applicable Laws and Regulations—Regulation of Exploration and Production Activities—Business Regulation—Royalties* for a description of the current royalty scheme.

Our operations in Colombia are subject to extensive national, state and local environmental regulations. Environmental rules and regulations are applicable to our exploration, production, refining, transportation, supply and marketing activities, as well as the biofuels we produce. These regulations establish, among other things, quality standards for hydrocarbon products, air emissions and greenhouse gases, water discharges and waste disposal, soil remediation, water pollution and the general storage, handling, transportation and treatment of hydrocarbons in Colombia. Currently, all exploratory projects drilling in areas that do not yet have a license must undergo an environmental impact assessment and must receive an environmental license from the governmental agency responsible for awarding environmental licenses, the Environmental License National Agency or ANLA. Environmental authorities with jurisdiction over our activities routinely inspect our crude oil fields, refineries and other production sites, and they may decide to open investigations or sanction proceedings, which may result in the imposition of fines, restrictions on operations or other sanctions in connection with potential non-compliance with environmental laws.

We are also subject to control and monitoring by the regional autonomous corporations (CAR), which are regional environmental authorities that grant permits for the use and exploitation of natural resources, establish compensation measures for the use of these resources, and perform monitoring, control and sanctions function.

If we fail to comply with any of these national or regional environmental regulations or authorities, we could be subject to administrative and criminal penalties, including warnings, fines or closure orders of our facilities. Any such criminal penalty would be imposed on the legal representatives of the Company, including any legal representative, director or worker who participated or failed to take action related to the activities that lead to environmental damage. See section [Business Overview—Applicable Laws and Regulations—Regulation of Exploration and Production Activities—Business Regulation—Environmental Licensing and Prior Consultation](#).

Environmental regulation has become more stringent in Colombia in recent years. As a result, our operating costs have increased in order to comply with these new technical environmental requirements as well as the need to strengthen our specialized team in charge of environmental compliance in project and operations. If environmental laws continue to impose additional costs on us, we may need to reduce our investments on strategic projects in order to allocate funds to environmental compliance. We are also exposed to delays in obtaining environmental licenses from ANLA, which can lead to cost overruns or to changes in our investment plans. These additional costs may have a negative impact on the profitability of the projects we intend to undertake or may make them economically unattractive, in turn having a negative impact on our results of operations and financial condition.

Some of the companies in the business group perform exploratory activities outside of Colombian territory. As such, such companies are subject to foreign environmental regulations for the exploratory activities conducted by the business group outside of Colombia. Failure to comply with foreign environmental regulations may result in investigations by foreign regulators, which could lead to fines, warnings or temporary suspensions of our operations, which could have a negative impact in the consolidated financial statements and results of operations of the group.

In addition, the companies of the business group conducting upstream activities outside Colombia may be subject to foreign health, safety and environmental regulations. Foreign health and safety regulations may be more severe than those established under Colombian law and, therefore, we may be required to make additional investments to comply with those regulations.

Under certain of our credit agreements, we are under an obligation to comply with international environmental standards established by our lenders or by multilateral institutions. Failure to comply with such environmental standards could result in an event of default under the relevant credit agreements that we, or our subsidiaries, have entered into, which would affect our financial condition.

We may incur losses and spend time and money defending pending lawsuits and arbitrations and responding to administrative investigations.

We are currently a party to several legal proceedings filed against us. We are also subject to labor-related lawsuits filed by current and former employees in connection with pension plans and retirement benefits. For example, as of December 31, 2017, Ecopetrol S.A. was a party to 3,169 legal proceedings relating to civil, administrative, environmental, tax, and labor claims filed against us in courts and arbitration tribunals, of which 396 met the accounting threshold for an accrual provision. Additionally, Ecopetrol S.A.'s subsidiaries were a party to 1,190 legal proceedings relating to civil, administrative, environmental, tax, and labor claims filed against them of which 18 met the accounting threshold for an accrual provision. We allocate substantial amounts of money and time to defend against these claims, in which the claimants often seek substantial sums of money as well as other remedies. See Note 23 to our consolidated financial statements and see section [Risk Review—Legal Proceedings and Related Matters](#). In addition, in accordance with Colombian law, we and our employees are subject to surveillance and investigations by certain administrative control entities in Colombia, which are intended to determine whether public funds have been misused, mismanaged or misappropriated or whether they have been used in compliance with applicable law. Such investigations may divert the attention of management and subject the Company to reputational risk and increase difficulties in retaining talent. See section [Risk Review—Legal Proceedings and Related Matters](#).

5.1.4 Risks Related to Our ADSs

This section discusses potential risks associated with an investment in our American Depositary Shares (as opposed to our common shares) by investors outside Colombia.

Holders of our ADSs may encounter difficulties in protecting their interests.

Holders of our ADSs do not have the same voting rights as holders of our common shares. As set forth in the amended and restated deposit agreement, dated December 29, 2017, among Ecopetrol S.A., JP Morgan Chase Bank, N.A., as depositary (the “Depositary”), and all holders from time to time of our American Depositary Receipts (as amended and restated, the “Deposit Agreement”), holders of our ADSs may instruct the Depositary, to vote on shareholder matters prior to a shareholders’ meeting.

Colombian law is not clear about the need to request proxies from existing shareholders. Thus, holders of our ADSs may not become aware of some matters in time to instruct the Depositary to vote their shares.

The Deposit Agreement provides holders of our ADSs with the right to instruct the Depositary to vote common shares separately. However, holders of our ADRs should be aware that in Colombia, it is uncertain whether a depositary must vote all common shares of a Colombian corporation in an American Depositary Receipt, or ADR, program in the same manner as a single block or may vote them separately. Accordingly, if either the custodian or the Depositary are not able to vote the common shares (including the right to receive common shares in the form of ADRs) deposited under the Deposit Agreement and any other securities, cash or property from time to time held by the Depositary in respect or in lieu of deposited common shares (the “Deposited Securities”) separately, all such Deposited Securities shall be voted based on the majority vote of the voting instructions timely received from holders of ADRs. In the case of such single block voting, all holders of ADRs, including holders of ADRs for which no voting instructions are timely received and holders of ADRs with voting instructions contrary to the voting instructions of a majority of the Deposited Securities timely received, should be aware that the Deposited Securities shall all be voted as a single block and that the voting instructions of such holders of ADRs will be deemed given in the manner stated above.

The Depositary will not itself exercise any voting discretion in respect of any Deposited Securities. The holders of our ADRs will be solely responsible for any exercise of the voting rights of the Deposited Securities represented by the ADRs if such vote is made pursuant to the procedures described in the Deposit Agreement. Holders of ADRs are strongly encouraged to forward their voting instructions as soon as possible as voting instructions will not be deemed received until such time as the ADR department responsible for proxies and voting has received such instructions notwithstanding that such instructions may have been physically received by the Depositary, prior to such time.

In the future, the Colombian regulatory authorities may clarify their interpretation as to how the voting rights should be exercised by holders of our ADSs, and such possible interpretation could adversely affect the value of the common shares and ADSs.

Our ADSs holders may be subject to restrictions on foreign investment in Colombia.

Colombia’s International Investment Statute (the set of rules and regulations which govern the foreign exchange market and the transactions thereto, which include Resolution 8 of 2000 and External Circular No. DCIN 83 issued by the Colombian Central Bank among others) regulates the manner in which non-Colombian residents can invest in Colombia and participate in the Colombian securities market. Among other requirements, Colombian law requires foreign investors to register certain foreign exchange transactions with the Colombian Central Bank and outlines the necessary procedures to authorize certain types of foreign investments. Colombian law requires that certain foreign exchange transactions, including international investment in foreign currency between Colombian residents and non-Colombian residents, must be made through authorized foreign exchange market intermediaries. Any income or expenses under our ADR program must be made through the foreign exchange market.

Investors acquiring our ADRs are not required to register with the Colombian Central Bank directly, as they will benefit from the registration to be obtained by the custodian for our common shares underlying the ADRs in Colombia. If investors in ADRs choose to surrender their ADRs and withdraw common shares, they must register their investment in the common shares as a portfolio investment through their local representative, which may be a brokerage firm, trust company or investment management companies supervised by the Superintendence of Finance. Investors will only be allowed to transfer dividends abroad after their foreign investment registration procedure with the Colombian Central Bank has been completed. Investors withdrawing common shares could incur expenses and/or suffer delays in the application process. The failure of a non-resident investor to report or register foreign exchange transactions with the Colombian Central Bank relating to investments in Colombia on a timely basis may prevent the investor from remitting dividends abroad, or result in the initiation of an investigation and in the imposition of fines. In the future, the Government, the Colombian Congress or the Colombian Central Bank may amend Colombia’s International Investment Statute or the foreign investment rules, which could result in more restrictive rules and could negatively affect trading of our ADSs.

Colombia currently has a free convertibility system. If a more restrictive convertibility system is implemented, the Depositary may experience difficulties when converting Colombian Peso amounts into U.S. dollars to remit dividend payments. Also, currently Colombia has a floating exchange rate system that might be subject to change in the future. See section [Shareholder Information—Exchange Controls and Limitations](#).

Holders of our ADSs may not be able to effect service of process on us, our directors or executive officers within the United States, which may limit your recovery in any foreign judgment you obtain against us.

We are a mixed economy company organized under the laws of Colombia. In addition, most of the members of our Board of Directors (“Directors”) and executive officers reside outside the United States. All or a substantial portion of our assets and the assets of these persons are located outside of the United States. As a result, it may not be possible for you to effect service of process within the United States upon us or these persons or to enforce judgments against us or them in U.S. courts obtained in such courts predicated upon the civil liability provisions of the U.S. federal securities laws. Colombian courts determine whether to enforce a U.S. judgment predicated on the U.S. securities laws through a procedural system known as *exequatur*. For a description of these limitations, see section [Shareholder Information—Enforcement of Civil Liabilities](#).

The protections afforded to minority shareholders in Colombia are different from those in the United States, and may be difficult to enforce.

Under Colombian law, the protections afforded to minority shareholders are different from those in the United States. In particular, the legal framework with respect to shareholder disputes is substantially different under Colombian law than U.S. law and there are different procedural requirements for commencing shareholder lawsuits, such as shareholder derivative suits. As a result, it may be more difficult for our minority shareholders to enforce their rights against us or our Directors or controlling shareholder than it would be for shareholders of a U.S. company.

ADRs do not have the same tax treatment as other equity investments in Colombia.

Although ADRs represent Ecopetrol’s common shares, for Colombian tax purposes, ADRs are securities different from their underlying assets. Therefore, ADR holders are not entitled to the tax treatment granted to holders of the common shares. Such tax treatment includes, among others, those benefits relating to dividends and profits derived from sale of Colombian common shares. For further information see section [Shareholder Information—Taxation—Colombian Tax Considerations](#).

Judgments of Colombian courts with respect to our ADSs will be payable only in Colombian Pesos.

If proceedings are brought in the courts of Colombia seeking to enforce the rights of ADS holders of common shares, we will be required to discharge our obligation amounts in Colombian Pesos. Colombian law provides that an obligation in Colombia to pay amounts denominated in foreign currency may only be satisfied in Colombian currency at the Representative Market Exchange Rate of the date the judgment is obtained, and such amounts are then adjusted to reflect exchange rate variations through the effective payment date.

The relative volatility and illiquidity of the Colombian securities markets may substantially limit our investors’ ability to sell our ADSs at the price and time they desire.

Investing in securities that are traded in emerging markets, such as Colombia, often involves greater risk when compared with other world markets, and these investments are generally considered to be more speculative in nature.

The Colombian securities market is substantially smaller, less liquid, more concentrated and can be more volatile than other securities markets in the United States. As of December 31, 2017, the Colombian Stock Exchange (“BVC”) had a market capitalization of approximately COP\$363,843 billion (US\$121.93 billion using the closing rate for 2017), a 17% increase when compared with the amount at the end of 2016, a daily average trading volume of approximately COP\$138,631 million (US\$46.99 million, using the average exchange rate for 2017), a 29% decrease when compared with the volume in 2016. By comparison, the New York Stock Exchange (the “NYSE”) had a market capitalization of US\$22.1 trillion as of December 31, 2017, and a daily trading volume of approximately US\$32.8 billion in 2017.

As of December 31, 2017, our shares represented the highest market capitalization of the BVC accounting for as of 8.9% of the total COLCAP index, which reflects the price volatility of the 20 most-liquid stocks.

Given the current ownership structure of our shares, it may be difficult for you to purchase large quantities of shares from a single shareholder. We cannot assure you that a liquid trading market for our ADSs will develop or, if developed, that it will be maintained. Without a liquid trading market, the ability of investors in our ADSs to sell them at the desired price and time could be substantially limited.

We are not required to disclose as much information to investors as a U.S. issuer is required to disclose.

We are subject to the reporting requirements of the Superintendence of Finance and the BVC - (Colombian Stock Exchange). The corporate disclosure requirements that apply to us may not be equivalent to the disclosure requirements that apply to a U.S. issuer and, as a result, you may receive less interim information about us than you would receive from a U.S. issuer.

5.1.5 Risks Related to the Controlling Shareholder

Our controlling shareholder’s interests may be different from those of certain minority shareholders.

Law 1118 of 2006 requires the Nation to maintain at least 80% of our outstanding capital stock. The Nation currently holds 88.49 % of our outstanding capital stock, making it our controlling shareholder. The Nation as our controlling shareholder has majority voting rights at the General Shareholders Assembly to elect the members of our Board of Directors. The Nation, as controlling shareholder, may propose and approve decisions that are in its own interest and in furtherance of its own economic and political interests that may not necessarily benefit minority shareholders.

Our controlling shareholder may approve dividends at the ordinary General Shareholders Assembly, notwithstanding the interest of certain minority shareholders, in an amount that results in us having to reduce our capital expenditures or increase our debt levels, thereby negatively affecting our prospects, results of operations and financial condition. See the section Shareholder Information—Dividend Policy.

Additionally, our controlling shareholder may undertake projects, approve decisions or make announcements about its intentions related to its holding of the Company’s stock, which may not be in our best interest or in the best interest of our minority shareholders, including holders of our ADSs, and could affect the price of our shares or ADSs.

5.2 Risk Management

5.2.1 Managing Risk through Our Internal Control System

Under the leadership of the Vice-Presidency of Compliance, Ecopetrol S.A. consolidated its internal control systems into a unified system that integrates the best practices called for by the Committee of Sponsoring Organizations of the Treadway Commission (COSO 2013), Sarbanes–Oxley Act (SOX), governance and management of enterprise IT (COBIT), Enterprise Risk Management (ERM) and our ethics and compliance rules, with the aim of establishing an integrated management system for all control components; thereby allowing us to strengthen all of our control system.

The main purpose of the Ecopetrol S.A.'s Internal Control System is to provide reasonable assurance regarding the achievement of all of the Company's objective relating to operations, strategy, reporting and compliance, through the appropriate risks management and ensuring the effectiveness of its controls. The system performance is systematically monitored by the Board of Directors semiannually and by the Audit and Risk Committee monthly.

Ecopetrol S.A.'s Internal Control System is aligned to the Company's strategy and business processes and gives responsibility to all employees to manage risk, to maintain the effectiveness of controls, to report incidents in order to preventively correct possible deficiencies and to provide reasonable assurance of achieving corporate objectives and goals.

The risk management component of our Internal Control System is in charge of identifying events or situations that may affect our defined objectives, assessing and prioritizing them to implement the most appropriate response. This component has been designed and implemented across the organization, with a two-level focus: Enterprise Risk and Processes Risks.

- (i) **Enterprise Risks:** Are those risks that are directly associated with the business strategy plan of the Company and are systematically monitored by the Management Committee on a monthly basis. The management of those risks is led by a member of the Management Committee; and each risk has a defined treatment plan and monitoring indicators.
- (ii) **Processes Risks:** Are those risks that tend to identify potential failures in the activities related to our core and support business processes that drive us to achieve our objectives. At this level, our processes have identified risks with their respective mitigation methods, including financial and non-financial controls, treatment plans and/or monitoring indicators.

Our risk management approach is based on the risk management cycle, consisting in five main stages: planning, identifying, evaluating, treatment and monitoring risks, as well as communication across all stages. This cycle is supported in three pillars of risk management: culture, organizational structure and normative and management tools.

Three of our most important tools within the risk management component are:

- (i) **Risk Assessment Methodology:** In order to properly prioritize mitigation, treatment and monitoring efforts of risk management at the process level, a standardized methodology was established to assess inherent and residual risk levels. The risk level (Very High, High, Medium, Low or None) is obtained from the combination of the consequences (impacts) and the probability of occurrence of those consequences. According with the level of risk, action plans for management and mitigation are defined.
- (ii) **Mitigation Plans:** Each year, by performing the stages of the risk management cycle, we define and implement mitigation plans in order to reduce the levels of exposure to risk through mitigation or elimination of some of its causes. Metrics and goals must be defined during the development of each plan to ensure its effectiveness and to prioritize our efforts on those with the greatest impacts.
- (iii) **Monitoring Indicators:** As part of the monitoring stage of the risk management cycle, Ecopetrol has implemented Key Risk Indicators (KRIs) which are metrics used to provide early signals of increasing risk exposures. These signals constitute information for preventative decision making in order to avoid risk materialization.

Ecopetrol has also defined guidelines to implement an Internal Control System framework for its subsidiaries. Under those guidelines, each subsidiary must report the performance of its Internal Control System to Ecopetrol S.A. to ensure compliance with the above measures, and the subsidiaries have methodological support from Ecopetrol S.A. when requested. Ecopetrol S.A. also performs preventive monitoring in selected subsidiaries to assure all the components and principles of their Internal Control Systems are present and operating.

5.2.2 Managing Information Security and Cybersecurity

Ecopetrol S.A. has a dedicated management team focused on information security issues such as risk analysis, treatment of information, safe information management practices, classification of critical business information, control systems compliance and effectiveness of available information security technologies, all of which are articulated with the ERM system at the enterprise level.

Ecopetrol S.A. has included cybersecurity risk as one of the key enterprise risks. Based on that, a working group formed in 2014, coordinated by the information security area with the participation of industrial control systems specialists, has been understanding the new challenges of cybersecurity risk; developing activities to identify and protect critical digital assets.

During 2017, Ecopetrol S.A., as a NOC (National Oil Company), provided updates to the Cyber Defense Command Unit (an entity under the control of the Colombian Ministry of Defense) an inventory of its critical cybernetic infrastructure that was included in the classified catalogue of national critical cybernetic infrastructure.

Ecopetrol's cybersecurity team established a plan to continue the incorporation of cybersecurity practices to enhance the awareness about these risks at an operational level and adjust current information security practices considering the new cyberthreat context. Likewise, as a result of this process, we are currently continuing the incorporation of elements relative to management of the cyber security threat, including, policies, specialized monitoring and control mechanisms, vulnerability management, and cybersecurity insurance coverage, among others.

Ecopetrol S.A. incorporated a Security Operations Center service, in order to enhance the ability to foresee and identify trends in attacks in Ecopetrol S.A.'s information technology infrastructure and to monitor Ecopetrol's reputation on the internet.

While there were some cyberattacks during 2017, there were no material effects on processes, equipment, products, services, relationships with customers or suppliers, competitive conditions or critical information. Ecopetrol S.A. does not have any current proceedings that relate to cybersecurity issues.

Furthermore, during 2017, our internal audit department conducted an audit on cybersecurity processes with an emphasis on the production area. As a result of such audit, an action plan was established to be implemented in 2018. The primary goal of the plan is to reinforce our cybersecurity strategy and refine certain technical components of our cybersecurity program.

5.2.3 Managing Financial Risk

We are exposed to certain risks associated with the nature of our operations and the financial instruments we use. Among the risks that affect our financial assets, liabilities and expected future cash flows are changes in commodity prices, currency exchange rates, interest rates and the credit quality of our counterparties.

Commodity price risk is associated with our day-to-day operations as we export and import crude oil, natural gas and refined products. We occasionally use hedges to partially protect our financial results from price fluctuations taking into account that part of our financial exposure under purchase contracts for crude oil and refined products depends on international oil prices. We believe that the risk of such exposure is partially naturally hedged since we are an integrated group (with operations in the upstream, midstream and downstream segments) and either export crude oil at international market prices or sell refined products at prices that are correlated to international market prices. We do not use derivative financial instruments for speculative or profit-generating purposes.

Currency risk arises in our operations given the fact that most of our revenues are derived from sales of products quoted in or with reference to U.S. dollars. Therefore when the Colombian Peso depreciates against the U.S. dollar, our revenues converted into Colombian Pesos, increase. Conversely, when the Colombian Peso appreciates against the U.S. dollar, our revenues decrease. On the other hand, imported goods, oil services and the debt, which is mainly denominated in U.S. dollars, become less expensive when the Colombian Peso appreciates against the U.S. dollar and more expensive when the Colombian Peso depreciates against the U.S. dollar.

As of December 31, 2017 our U.S. dollar-denominated total debt was US\$12.6 billion, which we recognize in our consolidated financial statements at its amortized cost, which corresponds to the present value of cash flows, discounted at the effective interest rate. Out of this total, US\$12.0 billion relate to Ecopetrol S.A., whose functional currency is the Colombian Peso. Therefore, when the Colombian Peso depreciates against the U.S. dollar, Ecopetrol S.A. is exposed to an exchange rate loss. In contrast, when the Colombian Peso appreciates against the U.S. dollar, Ecopetrol S.A. is exposed to an exchange rate gain. Some of the Ecopetrol Group's subsidiaries have the U.S. dollar as functional currency and are not exposed to a material exchange rate risk resulting from fluctuations in the Colombian Peso against the U.S. dollar. On the asset side, when the financial statements of the Group are consolidated, the exchange rate differential of the subsidiaries' assets and liabilities whose functional currency is the U.S. dollar is recognized directly in equity, as part of other comprehensive income.

Taking previous considerations into account, Ecopetrol seeks to identify and manage currency risk in a comprehensive manner, using an integrated analysis of natural hedges in order to benefit from the correlation between income or investments in a foreign operations and debt denominated in foreign currency. In addition, the risk management strategy of the Company may involve the use of financial derivative instruments, and non-derivative financial instruments. As a part of its risk management strategy, using the natural hedge between exports and dollar-denominated debt, on October 1, 2015, US\$5.4 billion of Ecopetrol S.A.'s debt in U.S. dollars was designated as hedge instrument of its future export sales for the period 2015 – 2023. On June 8, 2016, Ecopetrol continued its hedge accounting strategy, using the natural hedge between some of its foreign investments and its dollar-denominated debt in an amount of US\$5.2 billion. As of December 31, 2017, the outstanding value of the natural accounting hedges was US\$8.5 billion. The remaining portion of our dollar-denominated debt, as well as the financial assets and liabilities denominated in foreign currency continue to be exposed to the fluctuation of the exchange rate, which means that an appreciation of the Colombian peso against the U.S. dollar could generate a loss if companies whose functional currency is the Colombian peso have an active net position in U.S. dollars or a gain if they have a net liability position in U.S. dollars. Conversely, a depreciation of the Colombian peso against the U.S. dollar could generate a gain if companies whose functional currency is the Colombian peso have a net active position in U.S. dollars or a loss if they have a net liability position in U.S. dollars. Finally, the Company maintains enough cash in Colombian pesos and U.S. dollars to meet its expenses in each currency (see Note 4.1.5 to our financial statements for further explanation of our accounting policy and Note 30.2 for details of the hedge accounting adopted). With the adoption of hedge accounting, the effect of volatility of foreign exchange rate on the hedged portion of the debt is recognized directly in equity, as part of other comprehensive income. Our hedge management strategy is completely focused on our accounting, reason why the ultimate effect will only be determined when the hedge operations come to an end. Nevertheless, it is important to bear in mind that for Ecopetrol S.A.'s cash flow, the effect of the Colombian peso appreciation against the U.S. dollar is positive given the fact that we habitually convert our income in foreign currency to Colombian pesos.

Interest rate risk arises from our exposure to changes in interest rates mainly as a result of the issuances of floating rate debt linked to LIBOR, DTF and CPI (with a participation of 5.2%, 8.7% and 3.9%, respectively, of the nominal debt balance as of December 31, 2017). Thus, volatility in interest rates may affect the fair value of and cash flows related to our investments and floating rate debt. In 2017, our analysis of credit risk events and global financial markets drove us to decide not to hedge interest rate risk. Nevertheless, our capital markets office continuously monitors the performance of interest rates and the effect of interest rates on our financial statements.

The trust funds linked to Ecopetrol S.A.'s pension obligations (PAP) are also exposed to changes in interest rates, as they include fixed- and floating-rate instruments that are mark to market. This exposure is continuously monitored by our treasury office given the potential impact volatility may have on our financial results. The treasury office's information is gathered from reports provided by the asset managers. These reports refer to regulatory limits as well as market, credit and liquidity risks. The investment guidelines with respect to the PAPs are issued by the Colombian regulation for pension funds, as stipulated in the Decree 941 of 2002 and Decree 1861 of 2012, where it is indicated that they have to follow the same regime as the regular obligatory pension funds in their moderate (i.e., neither conservative nor aggressive) portfolio. For further information regarding the trust funds linked to the pension obligations of the company, see Note 22.2 Plan assets to our consolidated financial statements.

Finally, counterparty risk is the potential probability that a borrower or counterparty defaults on any obligation. In our case, we are exposed to this risk as we invest in different financial instruments and receive letters of credit in order to mitigate our exposure with our commercial counterparties. We manage this risk through an analysis of an issuer's creditworthiness, stock price behavior, spreads on credit default swaps and the probability of default.

Investment Guidelines

Ecopetrol S.A.

Following the promulgation of Decree 1525 of 2008, which provides general rules on investments for public entities, Ecopetrol S.A.'s management established guidelines for our investment portfolios. These guidelines determine that investments in Ecopetrol S.A.'s U.S. dollar portfolio are generally limited to investments of our excess cash in fixed-income securities issued by entities rated A or higher in the long term and A1/P1/F1 or higher in the short term (international scale) by Standard & Poor's Ratings Services, Moody's Investors Service or Fitch Ratings. In addition, Ecopetrol S.A. may also invest in securities issued or guaranteed by the U.S. government or Colombian government, without regard to the ratings assigned to such securities. In Ecopetrol S.A.'s Colombian Peso portfolio, it must invest our excess cash in fixed-income securities of issuers rated AAA in the long term, and F1+/BRC1+ in the short term (local scale) by Fitch Ratings Colombia or BRC Standard & Poor's. In addition, Ecopetrol S.A. may also invest in securities issued or guaranteed by the Colombian government without rating restrictions.

In order to diversify risk in our Colombian Peso portfolio, Ecopetrol S.A. does not invest more than 10% of the excess of cash in one specific issuer. In the case of our U.S. dollar portfolio, it does not invest more than 5% of the excess of cash in one specific issuer in the short term (up to one year), or 1% in the long term.

Ecopetrol S.A.'s investment portfolio in U.S. dollars is segmented into four tranches, each one matching our liquidity needs. The working capital tranche is calculated taking into account our cash flow needs for the next 60 days. The liquidity tranche is calculated as the contingent cash flow needs over the working capital, taking into account the development of capital expenditures related to projects. The asset liability tranche is built to match our long-term debt. The investment tranche includes the remaining amount of the total portfolio after deducting the amounts pertaining to the above mentioned tranches and after subtracting the Colombian Peso portfolio.

Ecopetrol S.A.'s investment portfolio in Colombian Pesos is segmented in two tranches, each one matching our liquidity needs. The first tranche is calculated taking into account our cash flow needs for the next 30 days, and the second tranche is built for investment purposes.

5.3 Legal Proceedings and Related Matters

We are a party to various legal proceedings in the ordinary course of business. Other than the proceedings disclosed in this annual report, we are not involved in any pending (or, to our knowledge, threatened) litigation or arbitration proceeding that we believe will have a material adverse effect on our Company. Other legal proceedings that are pending against or involve us and our subsidiaries are incidental to the conduct of our and their business. We believe that the ultimate disposition of such other proceedings individually or in an aggregate basis will not have a material adverse effect on our consolidated financial condition or results of operations.

As of December 31, 2017, Ecopetrol S.A. was a party to 3,169 legal proceedings relating to civil, administrative, environmental, tax and labor claims filed against us in the Colombian courts and arbitration tribunals, of which 396 had an accrual provision. We allocate sufficient amounts of money and time to defend these claims. Historically, we have been successful in defending lawsuits filed against us. Other than the environmental administrative proceedings described in the last paragraph of this section, based on the advice of our legal advisors, it is reasonable to assume that the litigation procedures brought against us will not materially affect our financial position or solvency regardless of the outcome. See Note 23 to our consolidated financial statements included in this annual report for a discussion of our legal proceedings.

Caño Limón – Coveñas Crude Oil Pipeline Spill

On December 11, 2011, the Caño Limón-Coveñas oil pipeline ruptured and caused the spill of approximately 3,267 barrels of crude oil into the Iscala creek, which connects with the Pamplonita River that provides water to the city of Cúcuta. The incident did not cause any fatalities or injuries.

A class action lawsuit has been filed against Ecopetrol S.A. and against employees of the company, and the First Administrative Court has jurisdiction to conduct the case, which is in the probatory stage.

The Regional Environmental authority of Norte de Santander, or Corporación Autónoma Regional de la Frontera Nororiental (CORPONOR) has filed a lawsuit against Ecopetrol at the Administrative Court of Norte de Santander claiming for (i) the environmental loss caused by the incident and (ii) for compensation costs relating to the environment damage for approximately COP\$33 billion. Ecopetrol's legal counsel filed to dismiss the lawsuit on June 2, 2014, based on three grounds: (i) there is no proof of environmental loss, (ii) CORPONOR does not have the authority to file this lawsuit and (iii) CORPONOR's petition for direct compensation is not the proper legal action according to the applicable procedural rules. Currently this lawsuit is in probatory stage.

Ecopetrol and national and local authorities convened to develop a project consisting of an alternative to the water supply in the intake of the aqueduct in Cúcuta, The Company's Board of Directors in December 2011 approved the participation of Ecopetrol in the project as part of the strengthening of its contingency plans and its relationship with its stakeholders. On November 10, 2017, the relevant parties entered into an agreement with the purpose of building the alternative water supply at a cost of approximately COP\$385 billion. According to the agreement Ecopetrol will be in charge of the construction of the above mentioned infrastructure.

BT Energy Challenger

On October 22, 2014, we were served with a class action suit against us seeking monetary damages of approximately COP\$7.4 trillion related to an incident that occurred on August 21, 2014, during the loading operations of the BT Energy Challenger vessel. The claimants alleged possible damage to the port area of Ecopetrol's terminal in Coveñas, as well as of marine and submarine areas and beaches that form the geographical area of the Morrosquillo Gulf. This allegation is currently under investigation by the Harbor Master of Coveñas. Ecopetrol filed a motion requesting the judge to require the claimants to amend their claim to more precisely set forth the facts and evidence it believes establishes Ecopetrol's liability.

On March 3, 2015, Ecopetrol filed its statement of defense arguing the exclusive fault of a third party. On October 20, 2015, the Court denied a class action of more than 100 informal traders in the region because there is no common identity with the initial class (hotel employees). However, during 2016 the Sucre Administrative Tribunal accepted another 1208 informal traders and fishermen as claimants.

On March 10, 2017, a mandatory conciliatory hearing was held in order to seek an agreement but it failed.

In January 2018, a judicial order was issued to commence the evidence gathering process, a decision which was objected by the parties.

PetroTiger

As highlighted in previous 20-F and 6-K filings, on January 6, 2014, the United States Department of Justice (DOJ) announced the unsealing of charges against two former co-chief executive officers (CEOs) and the former general counsel of PetroTiger Ltd. (PetroTiger), alleging, among other things, violations of the U.S. Foreign Corrupt Practices Act (FCPA) and conspiracy to commit violations of the FCPA and money laundering in connection with payments made to an Ecopetrol employee. By the time of the DOJ announcement, that employee no longer worked at the Company. The DOJ alleged the payments were made to secure Ecopetrol's approval for PetroTiger's entry into an oil services contract with Mansarovar Energy Colombia Ltd. Ecopetrol participated in the Mansarovar project as non-operating partner in a joint operating agreement. Also on January 6, 2014, the DOJ announced that the general counsel of PetroTiger had pled guilty on November 8, 2013, to one count of conspiracy to violate the FCPA and to commit wire fraud. One of the charged former co-CEOs pleaded guilty on February 18, 2014, to the same charge. On May 9, 2014, the DOJ charged the other former co-CEO with conspiracy to violate the anti-bribery provisions of the FCPA, conspiracy to commit wire fraud, conspiracy to launder money, and substantive FCPA anti-bribery and money laundering violations. On June 15, 2015, that co-CEO pleaded guilty to conspiracy to violate the FCPA.

After the DOJ unsealed its charges on January 6, 2014, Ecopetrol filed a complaint the same month, jointly with the Transparency Secretariat of the Presidency of the Republic, to Colombia's Attorney General's office requesting the investigation of individuals who may have been involved in the wrongdoing related to the Mansarovar contract. Colombian authorities initiated a proceeding related to PetroTiger, and on March 11, 2015, arrested four current Ecopetrol employees and two former Ecopetrol employees related to their investigation of the Mansarovar project and five other contracts involving PetroTiger and Ecopetrol. To date, four investigations of the control entities continue in course. During 2017 and 2018 to date, Colombian authorities have resolved an appeal confirming the conviction of a former Ecopetrol employee and another person involved in the case but not linked with Ecopetrol. Likewise, another appeal submitted by Ecopetrol and the Prosecutor's Office is in progress in a case in which a former Ecopetrol employee was acquitted.

Ecopetrol has responded to information requests from the DOJ and Colombian authorities in connection with their investigations of PetroTiger. Ecopetrol has been designated with the formal status of victim in the local Colombian proceedings. It has terminated the employment of the four charged individuals who were Ecopetrol employees at the time of the arrests. Ecopetrol has concluded an internal investigation and has not identified any new issues relating to PetroTiger.

Salgar-Cartago Multipurpose Pipeline Spill

On December 23, 2011 our Salgar-Cartago pipeline ruptured. Internal and external experts believe this incident occurred as a result of creep movement of soil caused by severe weather conditions, causing the soil surrounding the pipeline to exert strong pressure on the pipeline and rupture it. As of the date of this annual report, 10 lawsuits related to this incident are active for an approximately worth of COP\$7.8 billion.

Environmental Administrative Proceedings

As of December 2017, Ecopetrol S.A. was party to 215 environmental administrative proceedings, of which 197 were initiated before 2017, and 18 during 2017. During 2017, 5 proceedings were concluded, in 3 of them we were subject to monetary fines through Resolutions issued in 2017; DTP 1330 October 5, DGL 796, September and DGL 411 May 10. However, these last two proceedings were suspended due to the replenishment of resources. It is not possible for us to determine whether the pending proceedings could have a material effect on Ecopetrol.

Reficar Investigations

Reficar is a wholly owned subsidiary of Ecopetrol. According to Colombian regulations, Ecopetrol's and Reficar's employees are considered public servants, and as such can be held liable for negligent use or management of public resources. In this context, given that Ecopetrol is majority owned by the Colombian Government and Reficar is a wholly owned subsidiary of Ecopetrol, Ecopetrol and Reficar administer public resources.

As a result, Ecopetrol and Reficar employees are generally subject to the control and supervision of the following control entities, among others:

- The Office of the Comptroller General (*Contraloría General de la República*) oversees the adequate use of public resources and has the authority to investigate public employees or private sector employees that use or manage public resources.
- The Attorney General's Office (*Procuraduría General de la Nación*) supervises compliance with applicable law by public employees and private sector employees that carry out public functions. The Attorney General's Office investigates and disciplines individuals for compliance failures.

- The Prosecutor's Office (*Fiscalía General de la Nación*) investigates potential crimes and prosecutes alleged crimes before the court in judicial proceedings.

The following are the most significant investigations and proceedings carried out by the aforementioned state entities:

1. The Office of the Comptroller General's investigations and proceedings:

Because of the modifications of the schedule and budget related to Reficar's expansion and modernization project (the "Project"), the Office of the Comptroller General initiated a special audit investigation of the Project in 2016 and delivered a final report to Reficar on December 5, 2016. The report made 36 findings most of which were related to increased costs compared to budget for services, labor and materials. As required, on January 18, 2017, Reficar submitted an action plan exposing and addressing the 36 findings in the following areas: (i) contract management, (ii) supervision of engineering standards contracted with third parties, and (iii) documentation of the control, reporting and monitoring mechanisms of subcontracts.

As a result of the findings described above the Office of the Comptroller General opened actions for financial responsibility (*proceso de responsabilidad fiscal*) against 36 individuals and the six companies involved in the Project, including current and former members of Ecopetrol's Board of Directors; former members of Reficar's Board of Directors; current and former employees of Ecopetrol; and former employees of Reficar, as well as Chicago Bridge & Iron Company N.V., CBI - Chicago Bridge & Iron company (CB&I) Americas Ltd., Chicago Bridge & Iron Company CB&I UK Limited, CBI Colombiana S.A., Foster Wheeler USA Corporation and Process Consultants Inc.

One current member of Ecopetrol's Board of Directors, Joaquín Moreno Uribe, is being investigated in these proceedings.

These actions were initiated based on the Office of the Comptroller General's theory that lower than expected profitability at Reficar could have been caused by modifications to the schedule, and for the increase of the budget of the Project. As of the date of this annual report, Reficar has no liability under this proceeding.

While the content and status of the investigations remains confidential, we can report that Reficar and several of its employees have cooperated with and provided the information required by the department of the Office of the Comptroller General in charge of leading the investigation.

In January 2017, the Office of the Comptroller General initiated another special audit in Reficar and delivered a final report to Reficar on July 12, 2017. In this report the Office of the Comptroller General concluded that, in their opinion, Reficar's 2016 Financial Statements do not reasonably represent, in all material aspects, the entity's financial position as of December 31, 2016.

On February 2, 2018, the Legal Accounts Commission of the National House of Representatives of the Republic of Colombia informed Reficar that the House of Representatives decided, through Resolution No. 2713, that it would not close the General Budget, Treasury Account or the National Balance Sheet for the 2016 fiscal year, since the 2016 Financial Statements of several state entities, among them Reficar, had received a negative opinion from the Office of the Comptroller General. Pursuant to Resolution No. 2713, Colombian control entities have been ordered to initiate disciplinary, fiscal and/or penal investigations.

Reficar's external auditors issued an unqualified opinion on Reficar's financial position as of December 31, 2016 and 2017. As of the date of this annual report, such auditors have not informed Reficar that there has been any change to their opinion.

2. The Attorney General's Office investigations:

Reficar has been officially informed that the Attorney General's Office currently has one ongoing investigation relating to the Project. The investigation initiated in 2012 against members of Reficar's Board of Directors at the time, as well as certain current and former officers of Reficar.

On September 12, 2017 the Attorney General's Office issued a list of charges related to the failure to fulfill some of their duties as administrators and/or for acting "ultra vires" in the exercise of their functions against: (i) Javier Genaro Gutiérrez (Ecopetrol CEO, 2007-2015); (ii) Felipe Laverde (Reficar General Counsel, 2009-March 2017); (iii) Pedro Rosales (Ecopetrol Downstream Executive Vice President, 2008-2015); (iv) Diana Constanza Calixto (Ecopetrol Head of the Corporate Finance Unit, 2009-2014) and (v) Reyes Reinoso Yañez (Reficar CEO, 2012-2016). The Attorney General's Office closed the case against the rest of the members of Reficar's Board of Directors and the rest of the current and former officers of Reficar.

3. The Prosecutor's Office investigations:

The Prosecutor's Office is conducting an investigation. In connection therewith, between July 25 and August 2, 2017 the Prosecutor's Office indicted the following individuals with charges, the majority of which are related to offenses against the public administration and illegal interest in the execution of agreements:

(i) Orlando José Cabrales Martínez (Reficar CEO, 2009-2012); (ii) Reyes Reinoso Yañez (Reficar CEO, 2012-2016); (iii) Felipe Laverde Concha (Reficar General Counsel, 2009-March 2017); (iv) Pedro Alfonso Rosales Navarro (Ecopetrol Downstream Executive Vice President, 2008-2015); (v) Masoud Deidehban (CBI Executive Project Director); (vi) Phillip Asherman (CBI CEO) and (vii) Carlos Lloreda (Reficar's statutory auditor from 2013-2015.)

The arraignment hearing is scheduled to take place on May 30, 2018.

Prosecutor's Office has not yet made public the factual basis for such charges, and accordingly we are not in a position to predict the outcome of investigation or the disposition of any of the charges.

As of the date of this annual report, to the best of Ecopetrol's knowledge, the financial statements continue to fairly represent the financial and operational condition of the Company in all material aspects and its internal controls remain effective.

Ecopetrol and Reficar have cooperated closely and extensively with the control entities in furthering their investigations and will continue to monitor the status and development of these investigations.

Additionally, on May 9, 2017, Ecopetrol's Audit and Risk Committee retained a U.S.-based outside law firm to commence a third-party investigation into the matters set forth in the Prosecutor's Office announcement. The results were presented in December 2017 to Ecopetrol's Audit and Risk Committee. This investigation concluded that to date there has been no evidence of possible unlawful acts that affect Ecopetrol's internal control over the financial reporting of the Company, on the allegations made by the Prosecutor's Office.

In March 2016, Reficar filed a Request for Arbitration before the International Chamber of Commerce (the "ICC"), against Chicago Bridge & Iron Company N.V., CB&I (UK) Limited, and CBI Colombiana S.A. (jointly, "CB&I") concerning a dispute related to the Engineering, Procurement, and Construction Agreements entered into by and between Reficar and CB&I for the expansion of the Cartagena Refinery in Cartagena, Colombia. Reficar is the Claimant in the ICC arbitration and seeks no less than US\$2 billion in damages plus lost profits. On May 25, 2016, CB&I filed its Answer to the Request for Arbitration and Counterclaim for approximately US\$106 million and COP\$324,052 million. On June 27, 2016, Reficar filed its reply to CB&I's counterclaim denying and disputing the declarations and relief requested by CB&I. On April 28, 2017, CB&I submitted its Statement of Counterclaim increasing its claims to approximately US\$116 million and COP\$387,558 million. On March 16, 2018, CB&I submitted its Exhaustive Statement of Counterclaim further increasing its claims to approximately US\$129 million and COP\$432,303 million (including interests).

The hearing before the tribunal is currently scheduled for 2019. At the conclusion of which the tribunal would render its final decision on Reficar's and CB&I's claims. Until then, the outcome of this arbitration is unknown.

Bioenergy Special Audit

The Office of the Comptroller General, in exercise of its fiscal monitoring duties and authority as set forth in Article 267 of the Political Constitution, has undertaken audits of the performance of the Bioenergy S.A.S. and Bioenergy Zona Franca S.A.S. investments.

On February 6, 2017 the Office of the Comptroller General initiated a Special Intervention (Special Audit) in order to evaluate the use of public funds in the project carried out by Bioenergy Zona Franca S.A.S. and Bioenergy S.A. On July 10, 2017 the Office of the Comptroller General issued its final report with 15 findings related to: (i) acquisition, lease payments and the use of agricultural lands, (ii) loss of profits due to the project's delay; and (iii) execution of contracts related with the building, commissioning and start-up of the industrial plant and the agricultural component of the project. As required, Bioenergy has commenced a remediation plan to address the findings.

6. Shareholder Information

6.1 Shareholders' General Assembly

Our Shareholders' General Assembly was held on March 23, 2018 and the following matters were approved:

- The plan for distribution of the Company's profits, which establishes the distribution of an ordinary dividend per share of eighty nine pesos (COP\$89) to be paid to minority shareholders in one installment on April 19, 2018 and in two installments to the majority shareholder, 50% on April 19, 2018 and 50% on September 17, 2018.
- Amendment of our bylaws. For further information please see the section Corporate Governance—Bylaws.
- Appointed Ernst & Young as external auditor of Ecopetrol for fiscal year 2018.
- The bylaws were amended in the General Shareholders Assembly held on March 23, 2018.
- The new composition of the Board of Directors for the year 2018 as follows:

Non Independent Directors:

- Director General of State Owned Enterprises of the Ministry of Finance and Public Credit.
- Claudia Isabel González Sánchez

Independent Directors:

- Mauricio Cabrera Galvis
- Jorge Londoño Saldarriaga
- Jaime Ardila Gómez
- Carlos Cure Cure
- Joaquín Moreno Uribe

- Hernando Ramírez Plazas (nominated by the hydrocarbon producing provinces)
- Carlos Gustavo Cano Sanz (nominated by the minority shareholders with the greatest share participation)

6.2 Dividend Policy

In 2018, as a result of the solid financial position of the Company, the Board of Directors approved as a dividend policy consisting of the distribution of between 40% and 60% of the adjusted net income of the Company of each fiscal year. For this purpose, the Board of Directors shall assess the macroeconomic environment, the cash projection for achieving strategy goals and growth plans, while maintaining an appropriate financial flexibility. This policy cannot exceed the maximum amount to be distributed and should keep the Company's debt metrics in line with an investment grade rating. The maximum amount to be distributed is the profits available to shareholders (net income after release and appropriation for legal, fiscal and occasional reserves).

Pursuant to Colombian law, dividend distribution to our shareholders must be approved by a 78% majority of the shares represented in the corresponding General Shareholders Assembly. In the absence of this special majority, at least 50% of the net profits must be distributed.

On March 23, 2018, our shareholders at the ordinary General Shareholders Assembly approved an ordinary dividend of 55% of our net income for the fiscal year ended December 31, 2017. On March 31, 2017, our shareholders at the ordinary General Shareholders Assembly approved an ordinary dividend of 40% of our net income before the impairment of non-current assets (net of taxes) for the fiscal year ended December 31, 2016. Given that the fiscal year ended December 31, 2015 resulted in a net loss for Ecopetrol S.A., our shareholders at the General Shareholders Assembly held on March 31, 2016, approved that there was no distribution of profits for the fiscal year ended December 31, 2015. Pursuant to Article 456 of the Code of Commerce the Company absorbed the net loss for the fiscal year ended December 31, 2015 through its legal reserve. In 2015 there was no dividend distribution and in 2016 the shareholders approved the distribution of 40% of our net income before the impairment of non-current assets (net of taxes). See section Financial Review—Liquidity and Capital Resources—Dividends.

Ecopetrol S.A. is required to have legal reserves equal to 50% of its subscribed capital. If the legal reserves are less than 50% of subscribed capital, we will contribute 10% of net income to our legal reserves every year until our legal reserves meet the required level.

6.3 Market and Market Prices

Starting on August 2010, our ADSs began trading on the Toronto Stock Exchange ("TSX") under the symbol "ECP." On February 17, 2016, we announced the application for voluntary delisting from the Toronto Stock Exchange after in an ordinary meeting held on January 27, 2016, during which the Board of Directors made the decision to delist from the TSX. This decision was based on the Board of Director's assessment of, among other factors, the limited trading activity of our ADRs in Canada, a liquid market for our ADRs on the NYSE and for our ordinary shares on the local Colombian Stock Exchange (Bolsa de Valores de Colombia), both of which enable interested investors to acquire a participation in Ecopetrol S.A. The time and administrative efforts associated with maintaining the listing of the ADRs on the TSX were also taken into account. On March 2, 2016, Ecopetrol's ADRs were delisted from the TSX. After delisting from the TSX, the ADRs have continued to trade on the NYSE and the ordinary shares have continued to trade in the Colombian stock market. Therefore, the Company continues to be subject to United States, Canadian as well as Colombian reporting and corporate governance obligations. Ecopetrol has applied to the Alberta Securities Commission and Ontario Securities Commission to cease being a reporting issuer in Canada. As of the date of this annual report, these applications are under review by such entities and we are awaiting for final resolution on the matter, until a decision is reached, Ecopetrol continues to comply with its reporting responsibilities under its reporting issuer status in Canada.

The following table sets forth reported high and low closing prices in Colombian Pesos for our shares and the reported average daily trading volume of our shares on the BVC for the periods indicated. The table also sets forth information on the trading price of our shares in Colombian Pesos and U.S. dollars, as well as the average trading volume.

Table 56 – Shares Traded on the Bolsa de Valores de Colombia

Shares Traded on the BVC

	Colombian Pesos per share		U.S. dollars per share ⁽¹⁾		Average number of shares traded
	High	Low	High	Low	Per day
2013	5,710	3,695	3.2091	1.8992	7,018,859
2014	4,030	1,815	2.0556	0.7546	8,222,596
2015	2,305	1,090	0.8402	0.3973	10,109,301
2016	1,465	881	0.4802	0.2888	13,077,105
2017	1,480	1,290	0.7492	0.4373	11,420,810
Most recent quarters					
First quarter 2016	1,425	881	0.4386	0.2712	17,971,092
Second quarter 2016	1,465	1,220	0.4892	0.4074	14,267,136
Third quarter 2016	1,410	1,170	0.4786	0.3971	10,403,945
Fourth quarter 2016	1,385	1,240	0.4593	0.4112	9,760,236
First quarter 2017	1,415	1,290	0.4842	0.4414	10,004,466
Second quarter 2017	1,480	1,325	0.5067	0.4537	14,076,659
Third quarter 2017	1,405	1,350	0.4727	0.4542	8,247,688
Fourth quarter 2017	2,210	1,395	0.7406	0.4675	13,447,615
First quarter 2018	2,800	2,210	0.9800	0.7735	19,795,943
Most recent six months					
November 2017	1,820	1,700	0.6045	0.5646	14,409,722
December 2017	2,210	1,775	0.7391	0.5936	9,771,858
January 2018	2,800	2,210	0.9777	0.7717	21,066,624
February 2018	2,770	2,335	0.9680	0.8160	21,606,463
March 2018	2,775	2,450	0.9749	0.8607	17,676,641
April 2018 (through April 16, 2018)	2,980	2,615	1.0801	0.9478	14,416,613

(1) U.S. dollars per common share translated at the Representative Market Exchange Rate as of each period.

The following table sets forth reported high and low closing prices in U.S. dollars for our ADSs and the average daily trading volume of our ADSs on the NYSE for the periods indicated. The table also sets forth information on the trading price of our ADSs in U.S. dollars, as well as the average trading volume.

Table 57 – Shares Traded on the New York Stock Exchange

	ADSs Traded on NYSE		
	U.S. dollars per ADS ⁽¹⁾		Average number of ADSs Traded per day
	High	Low	
2013	63.80	37.93	464,193
2014	41.16	14.77	603,083
2015	19.80	6.50	960,193
2016	10.04	5.40	1,160,901
2017	14.63	8.60	1,008,056
Most recent quarters			
First quarter 2016	9.22	5.40	1,559,605
Second quarter 2016	10.04	7.89	1,257,883
Third quarter 2016	9.80	7.83	914,424
Fourth quarter 2016	9.37	7.85	926,722
First quarter 2017	9.67	8.60	986,373
Second quarter 2017	10.24	8.70	1,182,807
Third quarter 2017	9.59	8.78	756,630
Fourth quarter 2017	14.63	9.44	1,139,727
First quarter 2018	20.05	14.63	1,695,397
Most recent six months			
November 2017	12.04	11.22	1,458,409
December 2017	14.63	11.74	893,424
January 2018	20.05	14.63	1,943,724
February 2018	19.78	16.26	1,800,215
March 2018	19.82	17.11	1,352,395
April 2018 (through April 16, 2018)	21.98	19.30	1,599,547

(1) Represents the right to receive 20 of our common shares.

Registration and Transfer of Shares

Under Colombian law, transfers of shares must be registered on the issuer's stock ledger. Only those holders registered on the stock ledger are considered by law as shareholders. Ecopetrol's shares are in electronic form, other than those shares held by the Nation, which are in physical form.

Transfers of shares evidenced in electronic form required to be negotiated through the Colombia Stock Exchange. In Colombia, only the relevant stockbrokers called *sociedades comisionistas de bolsa* are authorized to make the transfers of shares through the Colombia Stock Exchange. The transfers of shares are registered in the Centralized Security Deposit (*Depósito Centralizado de Valores*) or DECEVAL, through the relevant stockbrokers. DECEVAL records the share transfer on its systems, in order to make the corresponding registration in the issuer stock ledger.

Under Colombian legislation, if a transfer of shares for a value equivalent to or higher than 66,000 UVR (the UVR was COP\$252.3767 as of December 31, 2017) must be made through the BVC if the shares are registered with the BVC. Otherwise, shareholders can freely negotiate a transfer of shares.

Nevertheless, pursuant to Decree 2555 of 2010 article 6.15.1.1.2 the following transfers are not required to be executed through the BVC:

- Transfers between shareholders who are considered to be the same beneficial owner;
- Transfers of shares owned by financial institutions, under supervision of Superintendence of Finance, that are in a liquidation process;
- Repurchases of shares by the issuer;
- Property delivered in lieu of payment, or payment of money or other valuable property, different than the amount owed or demanded, in exchange for the extinguishment of the debt;
- Transfers of shares made by the Nation or the Financial Institutions Warranty Fund (*Fondo de Garantías de Instituciones Financieras*) or FOGAFIN;
- Transfers of shares issued abroad by Colombian companies, provided they take place outside Colombia;
- Transfers of shares issued by foreign companies, offered through a public offer in Colombia, provided that they take place outside Colombia; and

- Any other transaction specifically authorized by the Superintendent of Finance to take place outside the BVC.

For the purposes described above, multiple transfer transactions made within one hundred twenty (120) calendar days, between the same parties on shares of the same issuer and under similar conditions, are treated as a single transfer.

6.4 Ecopetrol ADR Program Fees

Fees and Charges That a Holder of Our ADSs May Have to Pay, Either Directly or Indirectly

JPMorgan Chase Bank, N.A., our Depositary, may charge each person to whom ADSs are issued, including, without limitation, issuances against deposits of shares, issuances in respect of share distributions, rights and other distributions, issuances pursuant to a stock dividend or stock split declared by us or issuances pursuant to a merger, exchange of securities or any other transaction or event affecting the ADSs or Deposited Securities, and each person surrendering ADSs for withdrawal of Deposited Securities in any manner permitted by the Deposit Agreement or whose ADSs are cancelled or reduced for any other reason, US\$5.00 for each 100 ADS (or any portion thereof) issued, delivered, reduced, cancelled or surrendered, as the case may be. The Depositary may sell (by public or private sale) sufficient securities and property received in respect of a share distribution, rights and/or other distribution prior to such deposit to pay such charge.

The Depositary collects its fees for issuance and cancellation of ADSs directly from investors depositing common shares or surrendering ADSs for the purpose of withdrawal or from intermediaries acting for them. The Depositary collects fees for making distributions to investors by deducting those fees from the amounts distributed or by selling a portion of distributable property to pay the fees. The Depositary may collect its annual fee for Depositary services by deduction from cash distributions, or by directly billing investors, or by charging the book-entry system accounts of participants acting for them. The Depositary may generally refuse to provide services to any holder until the fees and expenses owing by such holder for those services or otherwise are paid.

The following additional charges may be incurred by holders of ADRs, by any party depositing or withdrawing common shares or by any party surrendering ADSs and/or to whom ADSs are issued (including, without limitation, issuance pursuant to a stock dividend or stock split declared by us or an exchange of stock regarding the ADRs or the Deposited Securities or a distribution of ADSs), whichever is applicable:

- A fee of U.S.\$0.05 or less per ADS for any cash distribution made pursuant to the Deposit Agreement;
- A fee for the distribution of securities (or the sale of securities in connection with a distribution), such fee being in an amount equal to the fee for the execution and delivery of ADSs which would have been charged as a result of the deposit of such securities (treating all such securities as if they were common shares) but which securities or the net cash proceeds from the sale thereof are instead distributed by the Depositary to those holders of ADRs entitled thereto;
- An aggregate fee of up to US\$0.05 per ADS per calendar year (or portion thereof) for services performed by the Depositary in administering the ADRs (which fee may be charged on a periodic basis during each calendar year and shall be assessed against holders of ADRs as of the record date or record dates set by the Depositary during each calendar year and shall be payable in the manner described in the next succeeding provision);
- A fee for the reimbursement of such fees, charges and expenses as are incurred by the Depositary and/or any of the Depositary's agents (including, without limitation, the custodian and expenses incurred on behalf of holders of ADRs in connection with compliance with foreign exchange control regulations or any law or regulation relating to foreign investment) in connection with the servicing of our common shares or other Deposited Securities, the sale of securities (including, without limitation, Deposited Securities) and the delivery of Deposited Securities or otherwise in connection with the Depositary's or its custodian's compliance with applicable law, rule or regulation (which fees and charges shall be assessed on a proportionate basis against registered holders of ADRs as of the record date or dates set by the Depositary and shall be payable at the sole discretion of the Depositary by billing such holders of ADRs or by deducting such charge from one or more cash dividends or other cash distributions);

- Stock transfer or other taxes and other governmental charges;
- SWIFT, cable, telex and facsimile transmission and delivery charges incurred at the request of a holder of ADRs;
- Transfer or registration fees for the registration of transfer of Deposited Securities on any applicable register in connection with the deposit or withdrawal of Deposited Securities; and
- In connection with the conversion of foreign currency into U.S. dollars, the Depositary shall deduct out of such foreign currency the fees, expenses and other charges charged by it or the Depositary's agent (which may be a division, branch or affiliate) so appointed in connection with such conversion. The Depositary and/or the Depositary's agent may act as principal for such conversion of foreign currency. Such charges may at any time and from time to time be changed by agreement between us and the Depositary.

We will pay all other charges and expenses of the Depositary and any agent of the Depositary (except the custodian) pursuant to agreements from time to time between us and the Depositary. The fees described above may be amended from time to time.

Fees and Other Direct and Indirect Payments Made by the Depositary to Us

Our Depositary has agreed to reimburse us for certain expenses we incur that are related to establishment and maintenance of the ADR program, including investor relations expenses and exchange application and listing fees. In 2015, reimbursements were made in the amount of approximately US\$2,069,202 for expenses related to investor relations activities. In 2016, reimbursements were made in the amount of approximately US\$2,366,395 for expenses related to investor relations activities. In 2017, reimbursements were made in the amount of approximately US\$2,220,290 for expenses related to investor relations activities.

6.5 Taxation

6.5.1 Colombian Tax Considerations

The following is a general description of the Colombian tax considerations for investments in common shares in Colombia or for the purchase of ADSs, in a foreign securities market. This description is based on applicable law in effect as of the date of this annual report is issued, which may be subject to changes.

Prospective purchasers of common shares or ADSs should consult their own tax advisors for a detailed analysis of the tax consequences in Colombia, resulting from the acquisition, ownership and disposition of common shares or ADSs.

General Rules

Colombian entities and individuals who are deemed to be residents within the Colombian national territory for Colombian tax purposes are subject to Colombian income tax on their worldwide income. Foreign entities and individuals who are not deemed to be residents in Colombia, as well as their permanent establishment in Colombia for tax purposes are subject to income tax in Colombia only with respect to their national-source income, which is generally defined as income obtained from (i) the rendering of services inside Colombian territory, (ii) the exploitation of tangible and intangible assets in Colombia, and (iii) the sale of tangible or intangible assets that are located inside Colombian territory at the time of the sale. Double taxation treaties signed by Colombia, if applicable, may provide for special regulations regarding income tax.

Dividends paid by Colombian companies, as well as profits distributed by branches/permanent establishments are deemed Colombian income. However, whether they are taxed or not depends on an imputation system set forth in articles 48 and 49 of the Colombian Tax Code (hereinafter "CTC"). According to this system, dividends are taxable when paid out of non-taxed profits, in which case a 35% withholding applies when paid to non-resident shareholders. Conversely, they are non-taxable when paid out of taxed profits, provided that the shareholder qualifies as a Colombian company.

Notwithstanding the above, one of the novelties introduced by Law 1819 of December 29 of 2016 (the "Tax Reform") was the creation of a new dividends tax that applies on all dividend distributions to Colombian individuals or to any type of non-resident shareholder, absent any specific treaty or exception, regardless that dividends are paid from taxed or non-taxed profits. According to the Tax Reform, dividend payments made to foreign shareholders will be subject to a 5% withholding. This new tax will only apply to dividends paid from profits accrued as from fiscal year 2017.

Note that the dividend tax will apply simultaneously with the aforementioned imputation system. Accordingly, dividends paid from non-taxed profits will be subject to a 35% withholding for income tax, and an additional 5% dividend tax on the balance. This means that the overall burden in this scenario is 38.25% (e.g. $\$100 * 35\% = \35 , plus $\$65 * 5\% = \3.25).

Relief or reduced tax rates may apply under an applicable treaty to avoid double taxation, but the application of any such rules must be analyzed on a case-by-case basis.

For Colombian tax purposes, an individual is considered to be a Colombian resident when he/she meets any of the following criteria:

- (i) He/she remains in Colombia continuously or discontinuously for more than 183 calendar days within any given 365-consecutive-day term;
- (ii) He/she is related to the Colombian government's foreign service or to individuals who are in the Colombian government's foreign service and who, by virtue of the Vienna Conventions on diplomatic and consular relations, are exempted from taxes during the time of their service; or
- (iii) He/she is a Colombian national and:
 - Has a spouse or permanent companion, or dependent children, who are tax residents in Colombia, or
 - 50% or more of his or her total income is Colombian source income, or
 - 50% or more of his or her assets are managed in Colombia, or
 - 50% or more of his or her assets are deemed to be located or possessed in Colombia, or
 - Has failed to provide proof of residency in another country (different from Colombia) upon previous official request by the Colombian tax office, or
 - He/she has a tax residency in a country considered by the Colombian government to be a low tax jurisdiction or a tax haven.

Law 1739 of 2014 clarifies that Colombian nationals who meet any of the following requirements, will not be deemed as tax residents:

- (i) If more than 50% of his or her annual income, has its source in the jurisdiction where he or she is domiciled and whose country of domicile is not Colombia.

- (ii) If more than 50% of his/her assets are located in the jurisdiction where he or she is domiciled and whose country of domicile is not Colombia.

For purposes of Colombian taxation, an entity is deemed to be a “national” or a “Colombian entity” and, therefore, subject to taxation in Colombia on its worldwide income, if it meets any of the following criteria:

- (i) It has its place of effective management, in Colombia during the corresponding year or taxable period;
- (ii) It has its main domicile in the Colombian territory; or
- (iii) It has been incorporated in Colombia, in accordance with Colombian laws.

Pursuant to the Colombian Tax Code, a foreign company or non-resident individual has a permanent establishment in Colombia when said company or individual performs activities in Colombia through: (1) a fixed place of business (i.e., branches, factories or offices), or (2) an individual who is not an independent agent empowered to execute agreements on behalf of the foreign company. As noted above, permanent establishments are considered Colombian taxpayers in connection with the Colombian-source income and Colombian-source taxable gains attributed to said permanent establishment. A foreign company or entity will not be deemed to have a permanent establishment by the sole fact that it acts through a broker or any other independent agent. In addition, passive-income generating activities, such as dividends, royalties and interests, typically do not qualify as entrepreneurial and are not deemed to create permanent establishments.

Tax Treatment of a Non-Colombian Entity and a Non-Resident Individual of Colombia Who Purchases an ADS in a Foreign Securities Market

Dividends

As a general rule, dividends paid to foreign companies, foreign entities or non-resident individuals who are investing in ADSs which underlying assets are Colombian shares are treated as Colombian-source income and are thus subject to Colombian income tax.

To avoid double taxation, dividends paid by Colombian entities are not subject to income tax at the shareholder level when they are paid out of corporate profits that have been previously taxed at the corporate level. As of taxable year 2017, a withholding tax on dividends is triggered for dividends paid to non-resident shareholders. Withholding tax rates on dividends varies as follows: (i) a new 5% dividend tax for dividends distributed out of profits already taxed at the company’s level; (ii) 35% withholding tax rate for dividends distributed out of profits not taxed at the company’s level, plus the new 5% dividend tax rate after having applied and deducted the initial 35% withholding. As of fiscal year 2017, for Colombian individuals, the new dividends tax will apply 5% or 10% depending on the dividend amount. Dividends tax will be applicable to profits generated from fiscal year 2017 onwards. Finally, dividends paid to local corporations are not subject to this new dividend tax.

Further to the above, the applicable withholding tax rate for an entity or a non-resident individual investing through a Foreign Funds Administration Account (FFAA) is 25%, since its investment qualifies as portfolio investments and the dividends that are distributed by the Colombian entity are not taxed at the corporate level (assuming that the dividends cannot be attributed to a permanent establishment in Colombia belonging to the shareholder). These foreign shareholders subject to this withholding tax are not required to file an income tax return in Colombia.

In addition to the above, the new dividend tax will apply at a 5% rate.

Taxation of Capital Gains from the Sale of ADSs

Capital gains obtained from the sale of ADSs by non-Colombian entities, Colombian individuals who are non-residents in Colombia and foreign non-resident individuals, are not subject to income tax in Colombia as such sale does not generate Colombian-source income to the extent that the ADSs are not deemed to be sourced in Colombia.

If the holder of the ADSs who is a non-resident entity, a Colombian individual who is not a resident in Colombia or a foreign non-resident individual, decides to surrender the ADSs and withdraw the underlying common shares, it is arguable that such transaction does not generate a capital gain subject to income tax in Colombia. However, different interpretations may be adopted by the Colombian Tax Authorities on this matter.

Tax Treatment in Colombia of a Non-Colombian Entity and a Non-Resident Individual of Colombia Who Purchases Ecopetrol's Shares in Colombia's Securities Market

Dividends

As a general rule, dividends paid to foreign companies, foreign entities, or to non-resident individuals in Colombia, who are investing in Colombian shares directly or through a FFAA, are treated as national-source income; thus, they are subject to Colombian income tax.

To avoid double taxation, dividends are not subject to income tax at the shareholder level when they are paid out of corporate profits that have been previously taxed at the corporate level. However, as of taxable year 2017, a withholding tax on dividends is triggered for dividends paid to non-resident shareholders. Withholding tax rates on dividends varies as follows: (i) 5% dividend tax for dividends distributed out of profits already taxed at the company's level; and (ii) 35% withholding tax for dividends distributed out of profits not taxed at the company's level, plus an additional 5% dividend tax after having applied and deducted the initial 35% withholding. As of fiscal year 2017, for Colombian individuals, dividends will be taxed between 5% and 10% depending on the dividend amount. Dividends tax will be applicable to profits generated from fiscal year 2017 onwards. Finally, dividends paid to local corporations are not subject to the new dividend tax.

For fiscal year 2017 if the shareholder is a non-resident entity or a non-resident individual investing directly, it will be taxed upon distribution, by means of the withholding tax mechanism, provided that its investment does not qualify as portfolio investments and dividends that are distributed are not taxed at the corporate level. In this case, dividends will be subject to a 35% withholding tax.

Non-resident entities or non-resident individuals will be taxed upon distribution by means of the withholding tax mechanism, provided that their investments qualify as portfolio investments (i.e., investing through a FFAA) and dividends that are distributed by the Colombian entity are not taxed at the corporate level. In this case, pursuant to Article 18-1 of the Colombian Tax Code, the applicable withholding tax rate is 25%, assuming that the dividends cannot be attributed to a permanent establishment in Colombia belonging to the shareholder. These foreign shareholders subject to this withholding tax are not required to file an income tax return in Colombia.

In addition to the above, the new dividend tax will apply at a 5% rate.

Taxation of Capital Gains for the Sale of Shares

Pursuant to Article 36-1 of the Colombian Tax Code, capital gains derived from the sale of shares listed on the BVC and owned by the same beneficial owner, are deemed as non-taxable income in Colombia, provided that the shares sold during the same taxable year do not represent more than 10% of the outstanding shares of the listed company. Pursuant to Article 18 of Decree 2634 of 2012, sellers of shares are not required to file an income tax return for the transfer of securities that are listed in the National Registry of Securities and Issuers (*Registro Nacional de Valores y Emisores*) as long as the foreign investment is treated as a portfolio investment according to article 3 of Decree 2080 of 2000.

If the above-mentioned requirements are not met, the capital gain obtained in the sale of shares is subject to income tax or capital gains tax, under the following rules:

- The gain or loss arising therefrom will be the difference between the sale price and the tax basis of the shares. As a general rule, the tax basis of shares is equal to the price paid for such shares (i.e., cost of acquisition).

- The applicable tax rate and the withholding tax rate have to be determined on a case-by-case basis. Generally, if the shares have been owned for at least two years, the profits from the sale will qualify as capital gains taxable at 10%, otherwise, profits will qualify as ordinary income taxable, approximately 37% for fiscal year 2018, and 33% as from fiscal year 2019.

Tax Treatment of Non-Residents Who Purchase Ecopetrol's Shares in the BVC Market and Exchange Them for ADSs

Dividends

Payment of dividends by Colombian entities to foreign companies, foreign entities or to non-resident individuals who are investing in ADSs which underlying assets are Colombian shares or in Colombian shares directly are subject to the tax treatment described above.

Taxation on Capital Gains for the Sale of Shares

If the holder of the Colombian shares is a non-resident entity, a Colombian individual who is not a resident in Colombia or a foreign non-resident individual, and such holder decides to exchange such common shares for ADSs, it is arguable that such transaction should not generate a capital gain subject to income tax in Colombia. However, different interpretations may be adopted by the Colombian tax authorities on this matter. For instance, assuming that the exchange of securities is treated as a sale of Ecopetrol's shares, the seller would be subject to the tax treatment described above in connection with the taxation of capital gains for the sale of shares. Absent any specific rules or regulations addressing this specific situation, a case-by-case analysis would be necessary.

6.5.2 U.S. Federal Income Tax Consequences

This summary describes the principal U.S. federal income tax consequences of the ownership and disposition of common shares or ADSs, but it does not purport to be a comprehensive description of all of the U.S. tax consequences that may be relevant to a decision to hold or dispose of common shares or ADSs. This summary applies only to purchasers of common shares or ADSs who will hold the common shares or ADSs as capital assets for U.S. federal income tax purposes and does not apply to special classes of holders such as dealers in securities or currencies, holders whose functional currency is not the U.S. dollar, holders of ten percent or more of our shares (taking into account shares held directly or through depositary arrangements by vote or by value), tax-exempt organizations, financial institutions, holders liable for the alternative minimum tax, securities traders who elect to account for their investment in common shares or ADSs on a mark-to-market basis, partnerships or other pass-through entities or arrangements and investors therein, insurance companies, U.S. expatriates, persons that purchase or sell common shares or ADSs as part of a wash sale for tax purposes, and persons holding common shares or ADSs in a hedging transaction or as part of a straddle, conversion or other integrated transaction for U.S. federal income tax purposes. The statements regarding U.S. tax law set forth in this summary are based on the Internal Revenue Code of 1986, as amended, which we call the "Code," its legislative history, existing and proposed U.S. Treasury regulations, published rulings and court decisions all as in force on the date of this annual report, and changes to such law subsequent to the date of this annual report may affect the tax consequences described herein (possibly with retroactive effect). This summary is also based in part on the representations of the Depositary and the assumption that each obligation in the Deposit Agreement and any related agreement will be performed in accordance with its terms.

Each holder is encouraged to consult such holder's tax advisor concerning the overall tax consequences to it, including the consequences under laws other than U.S. federal income tax laws, of an investment in common shares or ADSs.

In this discussion, references to a "U.S. Holder" are to a beneficial owner of a common share or an ADS that is for U.S. federal income tax purposes (1) an individual citizen or resident of the United States, (2) a corporation, or any other entity taxable as a corporation, organized under the laws of the United States, any state thereof or the District of Columbia, (3) an estate whose income is subject to U.S. federal income tax regardless of its source, or (4) a trust if (i) a United States court can exercise primary supervision over the trust's administration and one or more United States persons are authorized to control all substantial decisions of the trust or (ii) it has in effect a valid election under applicable U.S. Treasury regulations to be treated as a U.S. person.

For U.S. federal income tax purposes, holders of ADSs generally will be treated as owners of the common shares represented by such ADSs.

This discussion does not address any aspect of U.S. federal taxation other than U.S. federal income taxation (such as the estate and gift tax or the Medicare tax on net investment income). Holders of common shares or ADSs should consult their own tax advisor regarding the U.S. federal, state and local and other tax consequences of owning and disposing of common shares and ADSs in their particular circumstances.

Distributions on Common Shares or ADSs

A distribution to U.S. Holders made by us of cash or property with respect to common shares or ADSs generally will be treated as a dividend for U.S. federal income tax purposes to the extent paid out of our current or accumulated earnings and profits (as determined under U.S. federal income tax principles). Distributions in excess of our current or accumulated earnings and profits, as determined for U.S. federal income tax purposes, will be treated first as a tax-free return of capital reducing such U.S. Holder's adjusted tax basis in the common shares or ADSs. Any distribution in excess of such adjusted tax basis will be treated as capital gain and will be either long-term or short-term capital gain depending upon whether the U.S. Holder held the common shares or ADSs for more than one year. Distributions of additional common shares or ADSs to U.S. Holders that are part of a pro rata distribution to all of our shareholders generally will not be subject to U.S. federal income tax. We do not maintain calculations of our earnings and profits under U.S. federal income tax principles, and, therefore, except as described in the previous sentence, U.S. Holders should expect that any distributions generally will be reported as dividends for U.S. federal income tax purposes. As used below, the term "dividend" means a distribution that constitutes a dividend for U.S. federal income tax purposes.

The amount of any distribution will include the amount of any Colombian tax withheld on the amount distributed, and the amount of a distribution paid in Colombian Pesos will be measured by reference to the exchange rate for converting Colombian Pesos into U.S. dollars in effect on the date the distribution is received by the Depositary (or by a U.S. Holder in the case of a holder of common shares) regardless of whether the payment is in fact converted into U.S. dollars. If the Depositary (or U.S. Holder in the case of a holder of common shares) does not convert such Colombian Pesos into U.S. dollars on the date it receives them, generally, any gain or loss resulting from currency exchange fluctuations during the period from the date the dividend payment is included in income to the date the payment is converted into U.S. dollars will be treated as ordinary income or loss and will not be eligible for the special tax rate applicable to qualified dividend income (as discussed below). The gain or loss generally will be income or loss from sources within the United States for foreign tax credit limitation purposes. Dividends paid by us will not be eligible for the dividends received deduction allowed to corporations under the Code.

If you are a non-corporate U.S. Holder, dividends that constitute qualified dividend income will be taxable to you at the preferential rates applicable to long-term capital gains provided that you meet certain holding requirements. Dividends paid on the ADSs will be treated as qualified dividend income if (1) the ADSs are readily tradable on an established securities market in the United States and (2) we were not, in the year prior to the year in which the dividend was paid, and are not, in the year in which the dividend is paid, a passive foreign investment company (PFIC). The ADSs are listed on the New York Stock Exchange, and will qualify as readily tradable on an established securities market in the United States so long as they are so listed. Based on our audited financial statements and relevant market and shareholder data, we believe that we were not treated as a PFIC for U.S. federal income tax purposes with respect to our 2017 taxable year. In addition, based on our audited financial statements and our current expectations regarding the value and nature of our assets, the sources and nature of our income, and relevant market and shareholder data, we do not anticipate becoming a PFIC for the 2018 taxable year. However, this conclusion is a factual determination that is made annually and thus may be subject to change. Based on existing guidance, it is not clear whether dividends received with respect to the common shares will be treated as qualified dividends. In addition, the U.S. Treasury has announced its intention to promulgate rules pursuant to which holders of ADSs or common shares and intermediaries through whom such securities are held will be permitted to rely on certifications from issuers to treat dividends as qualified for tax reporting purposes. Because such procedures have not yet been issued, it is not clear whether we will be able to comply with them. Holders of ADSs and common shares should consult their own tax advisers regarding the availability of the reduced dividend tax rate in the light of the considerations discussed above and their own particular circumstances.

A U.S. Holder will be entitled, subject to a number of complex limitations and conditions, to claim a U.S. foreign tax credit in respect of any Colombian income taxes withheld on dividends received on common shares or ADSs. U.S. Holders who do not elect to claim a credit for any foreign income taxes paid during the taxable year may instead claim a deduction in respect of such Colombian income taxes provided the U.S. Holder elects to deduct (rather than credit) all foreign income taxes for that year. Dividends received with respect to the common shares or ADSs will be treated as foreign source income, subject to various classifications and other limitations. For the purposes of the U.S. foreign tax credit limitations, the dividends paid with respect to our common shares or ADSs generally will constitute "passive category income" for most U.S. Holders. The rules relating to computing foreign tax credits or deducting foreign income taxes are extremely complex, and U.S. Holders are urged to consult their own independent tax advisers regarding the availability of foreign tax credits with respect to any Colombian income taxes withheld.

Sale, Exchange or Other Taxable Dispositions of Common Shares or ADSs

A U.S. Holder generally will recognize capital gain or loss upon the sale, exchange or other taxable disposition of common shares or ADSs in an amount equal to the difference between the U.S. dollar value of the amount realized on the sale, exchange or other taxable disposition of the common shares or ADSs and the U.S. Holder's adjusted tax basis, determined in U.S. dollars, in the common shares or ADSs. Any gain or loss will be long-term capital gain or loss if the common shares or ADSs have been held for more than one year. Certain non-corporate U.S. Holders (including individuals) may be eligible for preferential rates of U.S. federal income tax in respect of long-term capital gains. The deductibility of capital losses is subject to limitations under the Code.

If you are a U.S. Holder of common shares or ADSs, the initial tax basis of your common shares or ADSs will be the U.S. dollar value of the Colombian Peso-denominated purchase price determined on the date of purchase. If the common shares or ADSs are treated as traded on an "established securities market," a cash basis U.S. Holder, or, if it elects, an accrual basis U.S. Holder, will determine the dollar value of the cost of such common shares or ADSs by translating the amount paid at the spot rate of exchange on the settlement date of the purchase. Such an election by an accrual basis U.S. Holder must be applied consistently from year to year and cannot be revoked without the consent of the Internal Revenue Service ("IRS"). If you convert U.S. dollars to Colombian Pesos and immediately use that currency to purchase common shares or ADSs, such conversion generally will not result in taxable gain or loss to you.

With respect to the sale or exchange of common shares or ADSs, the amount realized generally will be the U.S. dollar value of the payment received determined on (1) the date of receipt of payment in the case of a cash basis U.S. Holder and (2) the date of disposition in the case of an accrual basis U.S. Holder. If the common shares or ADSs are treated as traded on an "established securities market," a cash basis taxpayer, or, if it elects, an accrual basis taxpayer, will determine the U.S. dollar value of the amount realized by translating the amount received at the spot rate of exchange on the settlement date of the sale.

Deposits and withdrawals of common shares in exchange for ADSs, and ADSs for common shares generally will not result in the realization of gain or loss for U.S. federal income tax purposes.

Backup Withholding and Information Reporting

In general, dividends on common shares or ADSs, and payments of the proceeds of a sale, exchange or other taxable disposition of common shares or ADSs, paid within the United States, by a U.S. payor through certain U.S.-related financial intermediaries to a U.S. Holder are subject to information reporting and may be subject to backup withholding at a current rate of 24% unless the holder (1) establishes that it is a corporation or other exempt recipient or (2) with respect to backup withholding, provides an accurate taxpayer identification number and certifies that it is a U.S. person and that no loss of exemption from backup withholding has occurred.

Backup withholding is not an additional tax. The amount of any backup withholding tax from a payment to a U.S. Holder will be allowed as a credit against the U.S. Holder's U.S. federal income tax liability, provided that the required information is timely furnished to the IRS. A U.S. Holder generally may obtain a refund of any amounts withheld under the backup withholding rules that exceed its U.S. federal income tax liability by timely filing a refund claim with the IRS.

U.S. Tax Considerations for Non-U.S. Holders

A holder or beneficial owner of common shares or ADSs that is not a U.S. Holder for U.S. federal income tax purposes (a "non-U.S. Holder") generally will not be subject to U.S. federal income or withholding tax on dividends received on common shares or ADSs, unless the dividends are "effectively connected" with the non-U.S. Holder's conduct of a trade or business within the United States. In such a case a non-U.S. Holder generally will be taxed in the same manner as a U.S. Holder. In the case of "effectively connected" dividends received by a corporate non-U.S. Holder, the corporate non-U.S. Holder may, under certain circumstances, be subject to an additional "branch profits tax" at a 30% rate.

A non-U.S. Holder of common shares or ADSs will not be subject to U.S. federal income or withholding tax on gain realized on the sale of common shares or ADSs, unless (i) the gain is "effectively connected" with the non-U.S. Holder's conduct of a trade or business in the United States, or (ii) in the case of gain realized by an individual non-U.S. Holder, the non-U.S. Holder is present in the United States for 183 days or more in the taxable year of the sale and certain other conditions are met. In the case of "effectively connected" gains realized by a corporate non-U.S. Holder, the corporate non-U.S. Holder may, under certain circumstances, be subject to an additional "branch profits tax" at a 30% rate.

Although non-U.S. Holders generally are exempt from backup withholding and information reporting requirements, a non-U.S. Holder may be required to comply with certification and identification procedures in order to establish its exemption from information reporting and backup withholding.

6.6 Exchange Controls and Limitations

Payments in foreign currency with respect to certain foreign exchange transactions including international investments between Colombian residents and non-Colombian residents must be conducted through the foreign exchange market. Therefore, any foreign currency income or expense under the ADRs must be completed through the appropriate channels of the foreign exchange market. Transactions conducted through the foreign exchange market are made at market rates freely negotiated with authorized foreign exchange intermediaries (local banks, financial corporations, administrators and others). As of September 25, 1999 the Colombian foreign exchange regime is structured under the system of free flotation of the exchange rate whereby market forces determine the level of exchange rate from time to time.

Foreign portfolio investments must be made through authorized foreign exchange investment management companies. Only brokerage firms, trust companies and investment management companies, subject to the inspection and supervision of the Superintendence of Finance, are allowed to make investments in the local Colombian market on behalf of foreign investors. Such brokerage firms, trust companies and investment management companies also act as the foreign investors' local representatives for tax and foreign exchange purposes.

Colombian law provides that the Colombian Central Bank may intervene in the foreign exchange market at its own discretion at any time (i.e. it may limit the remittance of dividends whenever the international reserves fall below an amount equal to three months of imports). Additionally, from time to time, the Colombian government introduces amendments to the International Investment Statute. Hence, we cannot assure you that the Colombian Central Bank will not intervene in the future imposing restrictions to the free convertibility system currently applicable in Colombia. See section *Risk Review—Risk Factors—Risks Related to Colombia's Political and Regional Environment*.

Registration of Foreign Investment Represented in Underlying Shares

Colombia's International Investment Statute and the regulations issued by the Colombian Central Bank, which have been amended from time to time through related decrees and regulations, govern the manner in which non-Colombian resident entities and individuals can invest in Colombia and participate in the Colombian securities markets. Among other requirements, the International Investment Statute and Colombian Central Bank regulations mandate registration of foreign investment transactions with the Colombian Central Bank and specify procedures to authorize and administer such foreign investment transactions. Additionally, pertinent information related to foreign investment transactions must be updated on a regular basis (yearly or monthly, depending on the type of information).

Under the International Investment Statute and Colombian Central Bank regulations, the failure of a foreign investor to report or register with the Colombian Central Bank foreign exchange transactions relating to investments in Colombia on a timely basis may (i) prevent the investor from obtaining remittance rights, (ii) constitute an exchange control infraction, and (iii) result in financial sanctions.

Notwithstanding the regulations described above, foreign investors who acquire ADRs are not required to directly register this investment with Colombian authorities. Holders of ADRs will benefit from the registration to be obtained by the local custodian for our common shares underlying the ADRs in Colombia. Such registration allows the custodian to convert dividends and other distributions with respect to the common shares into foreign currency and remit the proceeds abroad. If investors in ADRs choose to surrender their ADRs and withdraw common shares, they must retain an administrator, who will act as a local representative for the investments, and register their investments in common shares as a portfolio investment through said local representative. The local representative is the brokerage firm, trust company or investment management company that acts on behalf of the holders of the ADRs in Colombia, and the request for registration is made by them.

Colombian residents who acquire ADRs and either receive profits from this investment, surrender their ADRs or liquidate their investment in ADRs must register these operations with the Colombian authorities and comply with applicable regulations through its Colombian brokerage firm.

In obtaining its own foreign investment registration, an investor who surrenders its ADRs and sells common shares may incur expenses and/or suffer delays in the application process. Investors would only be allowed to transfer dividends abroad or transfer funds received as distributions relating to our common shares after their foreign investment registration procedure with the Colombian Central Bank has been completed. In addition, the Depositary's foreign investment registration may also be adversely affected by future legislative changes, but its rights to transfer dividends abroad or profits arising from distributions relating to our common shares must be maintained according to Colombian law and foreign investment treaties entered into by Colombia in force at the time of the registration of the investment, except when Colombia's international reserves fall below an amount equivalent to three months' worth of imports. Prospective purchasers of common shares or ADSs should consult their own foreign exchange advisors.

6.7 Exchange Rates

On April 16, 2018, the Representative Market Exchange Rate was COP\$2,705.34 per US\$1.00. The Federal Reserve Bank of New York does not report a noon-buying rate for Colombian Pesos. The *Superintendencia Financiera*, or Superintendence of Finance, calculates the Representative Market Exchange Rate based on the weighted averages of the buy and sell foreign exchange rates quoted daily by foreign exchange rate market intermediaries including financial institutions for the purchase and sale of U.S. dollars. The Superintendence of Finance also calculates the Representative Market Exchange Rate for each month for purposes of preparing financial statements and converting amounts in foreign currency to Colombian Pesos.

The following table sets forth the high, low, average and period-end exchange rate for Colombian Peso/U.S. dollar Representative Market Exchange Rate for each of the last five years and for the last six months.

Table 58 – Colombian Peso/U.S. dollar Representative Market Exchange Rate

	Exchange Rates			
	High	Low	Average	Period-End
2013	1,952.11	1,758.45	1,868.90	1,926.83
2014	2,446.35	1,846.12	2,000.68	2,392.46
2015	3,356.00	2,360.58	2,746.47	3,149.47
2016	3,434.89	2,833.78	3,053.42	3,000.71
2017	3,092.81	2,839.02	2,951.15	2,984.00
Most recent six months				
November 2017	3,056.70	2,977.18	3,010.87	3,043.11
December 2017	3,028.82	2,957.75	2,990.14	2,938.87
January 2018	2,986.84	2,790.50	2,863.74	2,986.84
February 2018	2,941.77	2,790.77	2,861.60	2,863.78
March 2018	2,879.77	2,781.93	2,846.38	2,795.02
April 2018 (through April 16, 2018)	2,795.02	2,704.78	2,759.10	2,725.20

Source: Superintendence of Finance for historical data. *Banco de la República*, or the Colombian Central Bank, for averages.

6.8 Major Shareholders

Major Shareholders

The following table sets forth the names of our major shareholders, and the number of shares and the percentage of outstanding shares owned by them at March 31, 2018:

Table 59 – Major Shareholders

Shareholders	At March 31, 2018	
	Number of shares	% Ownership
Nation ⁽¹⁾ – Ministry of Finance and Public Credit	36,384,788,417	88.49
Public float	4,731,906,273	11.51
Total	41,116,694,690	100.00

(1) Includes 1,600,000 shares owned by other state entities.

All our common shares have identical voting rights.

As of February 20, 2018, 2.1% of our common shares were held of record in the form of American Depositary Shares. As of February 20, 2018, we had 39 registered holders and as of March 31, 2018 we had 15,907 beneficiaries of common shares, or ADSs representing common shares, in the United States.

Changes in the Capital of the Company

There are no conditions in our bylaws governing changes in our capital stock that are more stringent than those required under Colombian law, with the exception that the Nation must hold a minimum of 80% of our capital stock at all times.

6.9 Enforcement of Civil Liabilities

We are a Colombian company. Most of our Directors and executive officers and some of the experts named in this annual report reside outside the United States. All or a substantial portion of our assets and the assets of these persons are located outside of the United States. As a result, it may not be possible for you to affect service of process within the United States upon us or these persons who are residents in Colombia or to enforce against us or these persons who are residents in Colombia judgments in U.S. courts obtained in such courts predicated upon the civil liability provisions of the U.S. federal securities laws. Colombian courts will enforce a U.S. judgment predicated on the U.S. securities laws through a procedural system known under Colombian Law as “*exequatur*.” The Colombian Supreme Court will enforce a foreign judgment, without reconsideration of the merits only if the judgment satisfies the requirements set forth in Articles 605 through 607 of Law 1564 of 2012 (*Código General del Proceso*) which entered into force on January 1, 2016, pursuant to *Acuerdo* No. PSAA15-10392, of October 1, 2015, issued by the Colombian Superior Council of the Judiciary (*Consejo Superior de la Judicatura*), as follows:

- A treaty exists between Colombia and the country where the judgment was granted relating to the recognition and enforcement of foreign judgments or, in the absence of such treaty, there is reciprocity in the recognition of foreign judgments between the courts of the relevant jurisdiction and the courts of Colombia;
- The foreign judgment does not relate to “in rem rights” vested in assets that were located in Colombia at the time the suit was filed;
- The foreign judgment does not contravene or conflict with Colombian laws relating to public order other than those governing judicial procedures;
- The foreign judgment, in accordance with the laws of the country where it was rendered, is final and is not subject to appeal;
- A duly legalized copy of the judgment (together with an official translation into Spanish if the judgment is issued in a foreign language) has been presented to the Supreme Court of Colombia;
- The foreign judgment does not refer to any matter upon which Colombian courts have exclusive jurisdiction;
- No proceeding is pending in Colombia with respect to the same cause of action, and no final judgment has been awarded in any proceeding in Colombia on the same subject matter and between the same parties;
- In the proceeding commenced in the foreign court that issued the judgment, the defendant is served in accordance with the laws of such jurisdiction and in a manner reasonably designated to give the defendant an opportunity to defend against the action; and
- The legal requirements pertaining to the exequatur proceedings have been observed;

The United States and Colombia do not have a bilateral treaty providing for automatic reciprocal recognition and enforcement of judgments in civil and commercial matters. The Colombian Supreme Court has in the past accepted that reciprocity exists when it has been proven that either a U.S. court has enforced a Colombian judgment or that a U.S. court would enforce a foreign judgment, including a judgment issued by a Colombian court. However, such enforceability decisions are considered by Colombian courts on a case-by-case basis.

Proceedings for enforcement of a money judgment by attachment or execution against any assets or property located in Colombia are within the exclusive jurisdiction of Colombian courts and such proceedings are conducted in Spanish. All parties affected by a foreign judgment in exequatur proceedings must be summoned to the exequatur proceedings in accordance with the rules that apply to the Colombian courts. In the course of such proceedings, both the plaintiff and the defendant are afforded the opportunity to request that evidence be collected in connection with the requirements listed above. In addition, before the judgment is rendered, each party may file final allegations in support of such party’s position regarding the above-mentioned requirements.

Assuming that a foreign judgment complies with the standards set forth in the preceding paragraphs and the absence of any condition referred to above that would render a foreign judgment not subject to recognition under Colombian law, such foreign judgment would be enforceable in Colombia in an enforcement proceeding under the laws of Colombia, provided that the Colombian Supreme Court has previously granted exequatur upon the foreign judgment.

7. Corporate Governance

Since 2004, Ecopetrol S.A. has voluntarily adopted transparency, governance and control practices to facilitate corporate governance in order to generate confidence among stakeholders and ensure the sustainability of its business.

The corporate governance practices at Ecopetrol S.A.:

- Promote and guarantee all stakeholders transparency, objectivity and competitiveness.
- Add value to the company and attract investors.
- Protect shareholders, investors and stakeholders rights.
- Encourage financial markets confidence.
- Accomplish the highest corporate governance standards.

Statement of the Nation as Majority Shareholder

Ecopetrol's majority shareholder (the Nation, represented by the Ministry of Finance and Public Credit), is unilaterally committed to protect the interests of the minority shareholders in the following topics:

- *Composition of Board of Directors:* including in its list of candidates a Representative for hydrocarbon producing departments operated by Ecopetrol and a Representative for the minority shareholders, who will be chosen by the 10 shareholders with the largest stock participations.

According to corporate governance practices recommended by the OECD, organization to which Colombia is in the process of access, the National Government begun to implement the practice of reducing the participation of Directors with a ministerial level in Ecopetrol's Board of Directors. Thus, in 2018 in the General Shareholders' Assembly, the National Government nominated two (2) non-independent Directors none of which has a ministerial rank.
- *Dividend policy:* guaranteeing the right of each shareholder to receive his pro rata dividends in accordance with Colombian law.
- *Issues not included in the agenda of extraordinary meetings of the General Shareholders Assembly:* permitting a vote on those initiatives submitted by one or more shareholders representing at least 2% of the subscribed shares of the company.
- *Asset disposal:* ensuring that any asset disposal of an amount equal or higher than 15% of the stock exchange capitalization of Ecopetrol is discussed and decided by the General Shareholders' Assembly and that the Nation will only vote affirmatively if the vote of minority shareholders is equal to or exceeds 2% of the shares subscribed by shareholders other than the Nation.

7.1 Bylaws

The Bylaws of Ecopetrol S.A. are contained in Public Deed No. 5314 of December 14, 2007, issued by the Second Notary of Bogotá; amended by Public Deed No. 560 of May 23, 2011, issued by the Notary Forty- Six of Bogotá, Deed No. 666 of May 7, 2013, issued by the Notary Sixty-Five of Bogotá, and Deed No. 1049 of May 19, 2015, issued by the Notary Second of Bogotá. In addition, the bylaws were recently amended in the ordinary meeting of the General Shareholders Assembly held on March 23, 2018. The text of the amended bylaws is yet to be recorded in public deed and registered before the mercantile registry, which in Colombia is the Chamber of Commerce. An English translation of the amended bylaws is included as Exhibit 1.1 to this annual report.

This summary does not purport to be complete and is qualified by reference to our bylaws, which are filed as an exhibit to this annual report. For a description of the provisions of our bylaws relating to our Board of Directors and its committees, see the sections *Corporate Governance—Board of Directors—Board Practices* and *Corporate Governance—Board of Directors—Board Committees*.

General Shareholder's Meeting

Shareholders' meetings may be ordinary or extraordinary. Ordinary meetings will take place in our legal domicile located in Bogota, Colombia, within the first three months following the end of each fiscal year, on the day and at the time set forth in the notice for the General Shareholders Assembly. The call for the General Shareholders Assembly is published on the Ecopetrol S.A. website and in a newspaper of wide circulation 30 calendar days prior to the date on which the meeting will take place and on the Sunday previous to the meeting, must be published at Ecopetrol S.A.'s website www.ecopetrol.com.co.

In the General Shareholders Assembly, our Board of Directors and the external auditor are appointed and our annual financial statements, profit distribution, audit and management reports, including our corporate governance report and sustainability report, and any other matter provided under applicable law or our corporate bylaws are approved.

Extraordinary meetings of shareholders may be called by our Board of Directors, by our president or chief executive officer, by our external auditor, or by shareholders holding at least 5% of the shares outstanding, or when unforeseen or urgent needs of the Company require it. Calls to extraordinary meetings should be made at least 15 calendar days prior to the date of the meeting, with the exception of the case where the Law requires a greater time between the summons and the meeting. Such a call is published on the Ecopetrol S.A. website and in a newspaper of wide circulation. The meeting notice must specify the agenda for the meeting.

The required quorum for both ordinary and extraordinary meetings is a plural number of shareholders representing 50% plus one of the subscribed shares entitled to vote and decisions are approved with a majority of the members present. This quorum is exempted in the case of "second-call meetings," which may take place when a meeting fails to obtain the required quorum and is called within a period between 10 business days and 30 business days from the first date, in which case decisions may be adopted by a majority of the shares present regardless of the number represented.

Decisions made at ordinary and extraordinary shareholders' meeting must be approved by a plural number of shareholders representing the majority of the shares present. Colombian law requires supermajorities in the following cases:

- The vote of at least 70% of the shares present and entitled to vote at the ordinary shareholders' meeting is required to approve the issuance of stock not subject to preemptive rights;
- The vote of at least 78% of the shares represented entitled to vote is required to approve the distribution of the annual net profits. In the absence of this special majority, at least 50% of the net profits must be distributed. If the sum of all legal reserves (statutory, legal and optional) exceeds the amount of the outstanding capital, the Company must distribute at least 70% of the annual net profits;
- The vote of at least 80% of the shares represented is required to approve the payment of dividends in shares; and
- The vote of 100% of the outstanding and issued shares is required to replace a vacancy on the Board of Directors without applying the electoral quotient system.

Shareholders may be represented by proxies provided that the proxy: (1) is in writing (faxes and electronic documents are valid), (2) specifies the name of the representative, (3) specifies the date or time of the meeting for which the proxy is given and (4) includes other information specified by the applicable law. Proxies granted abroad do not require legalization or an apostille.

During our ordinary annual shareholders' meeting, our employees and Directors are only allowed to represent their own shares, unless they act as legal representatives.

Preference Rights and Restrictions Attaching to Our Shares

We have only one class of stock without special rights or restrictions (ordinary shares). Our shareholders do not have any type of preemptive rights.

Under Commercial Colombian law, our shareholders have the following economic privileges and voting rights:

- To participate and vote on the decisions of the General Shareholders Assembly;
- To receive dividends based on the financial performance of the Company in proportion to their share ownership;
- To transfer and sell shares according to our bylaws and Colombian law;
- To inspect corporate books and records with 15 business days prior to the ordinary shareholders' meeting where the year-end financial statements are to be approved;
- Upon liquidation, to receive a proportional amount of the corporate assets after the payment of external liabilities; and
- To sell the shares, known as right of withdrawal (*derecho de retiro*), if a corporate restructuring affects the economic or voting rights of the shareholders in the terms and conditions established under Colombian law.

Our bylaws and corporate governance code provide additional rights to our minority shareholders. These rights include:

- *Sale of Assets.* For a ten-year period counted from the date of subscription of the declaration of the Nation dated February 16, 2018 or until the Nation loses its status as majority shareholder, the Nation guarantees that any sale of 15% or more of our assets requires the approval of the General Shareholders Assembly and that the Nation would only be allowed to vote its shares in favor of the proposal if 2% or more of our minority shareholders accept the proposal.
- *Candidate List.* Pursuant to our bylaws and Law 1118 of 2006, the Nation will include in its candidate list for election of members of the Board of Directors one member selected by the departments that produce hydrocarbons. In addition, pursuant to the declaration of the Nation dated February 16, 2018, the Nation will include in its candidate list for election of members of the Board of Directors one member selected by the ten largest minority shareholders. The minority shareholders' right to select a candidate loses its effect when minority shareholders, according to their share participation, name a member to our Board of Directors.
- *Extraordinary Meetings.* Our bylaws and corporate governance code provide that the entity exercising permanent control over Ecopetrol must instruct the Company's CEO or External Auditor to call an extraordinary meeting of the Company's shareholders when so requested by a plurality of shareholders holding at least 5% of the total number of outstanding shares. Such requests shall be made in writing and must clearly indicate the purpose of the meeting.
- *Investor Attention Office.* Ecopetrol has an investor attention office, a specialized unit responsible for receiving complaints from our shareholders. Pursuant to our bylaws, shareholders holding at least 5% of the total number of shares outstanding may request that the investor attention office conduct a special audit, provided that such audit does not hinder the day-to-day operations of the Company, of the following documents: the income statement; the proposal for the distribution of profits; the report of the Board of Directors as to the economic and financial status of our Company; the report from our general counsel as to the legal status of our Company; and the report from the independent auditors. Special audits cannot be made of documents that contain scientific, technological or statistical information of our Company, or agreement that gives us competitive and economic advantages over our competitors, or in respect of any document related to intellectual property. Shareholders also have the right to propose good corporate governance recommendations to the office for the protection of investors.

- *Others.* Pursuant to our bylaws, shareholders holding at least 5% of the total number of shares outstanding may propose recommendations to our Board of Directors pertaining to the management of our Company. Any shareholder may file a written petition to our Board of Directors to investigate corporate governance violations that the shareholder believes to have been committed.

Amendments to Rights and Restrictions to Shares

We have only one class of stock and it has no special rights or restrictions (ordinary shares). Our shareholders do not have any type of preemptive rights. The rights given to our shareholders by law are described in our bylaws and may only be modified through an amendment to the law.

The additional rights given to our minority shareholders in our bylaws and corporate governance code may only be modified through an amendment of those internal documents.

Limitations on the Rights to Hold Securities

There are no limitations in our bylaws or Colombian law on the rights of Colombian residents or foreign investors to own the shares of our Company, or on the right to hold or exercise voting rights with respect to those shares, except in cases of legal representation and except that the Nation must hold a minimum of 80% of our capital stock at all times.

Restrictions on Change of Control Mergers, Spin-offs or Transformations of the Company

Under Colombian law and our bylaws, the General Shareholders Assembly has full authority to approve any mergers, spin-offs or transformations. Corporate restructurings are subject to the requirement that the Nation must hold a minimum of 80% of our common stock at all times. So long as Law 1118 of 2006 is in effect, there cannot be any restructuring that result in a change of control of our Company.

Ownership Threshold Requiring Public Disclosure

The Corporate Governance Code, Title III, Chapter 1, Section 5, states: Identification of Major Shareholders. The shareholding composition of the Company, indicating at least the twenty (20) people with the greatest number of shares, is disclosed on Ecopetrol's website at www.ecopetrol.com.co. Colombian securities regulations set forth the obligation to disclose any material event or *hecho relevante*. Any transfer of shares equal or greater than 5% of our capital stock, or any legal entity or individual acquiring a percentage of shares that would make him the beneficial owner of 5% or more of our capital stock, is a material event, and therefore, must be disclosed to the Superintendence of Finance. The regulation includes other criteria in order to identify when to report a material event other than the situations described in the previous sentence.

External Auditor

Pursuant to our bylaws, the external auditor will be appointed for periods of two (2) years and may be reelected consecutively for two (2) periods, and it may once again be hired after one (1) period away from the position. At the General Shareholders Assembly on March 23, 2018, the shareholders appointed Ernst & Young as external auditor of Ecopetrol for the fiscal year 2018.

7.2 Code of Ethics

We have recently updated our code of ethics, which considers, as ethical principles of the organization, the integrity, responsibility, respect and commitment to life. Our code of ethics also states that we must comply with the provisions contained in the applicable national and international laws in the countries where we have operations, including the U.S. and Colombia.

In our code, we define the guidelines for the following aspects: conflict of interest; ethical conflict; prohibition of bribery and violations of the FCPA; Integrity in accounting; prevention of money laundering and financing of terrorism; gifts, amenities and hospitalities; protection and use of resources; information management and security; social responsibility and respect for human rights; whistleblowing channel; and examples of ethical behaviors.

Our code of ethics applies to our Board of Directors, our Chief Executive Officer, our Chief Financial Officer, principal accounting officer, persons performing similar functions and in general to all of the other employees of the company and its affiliates.

All of our agreements with suppliers or third parties include a provision relating to compliance with applicable anti-bribery and anti-corruption regulations. These agreements also require our suppliers and third parties to accept our Code of Ethics and our compliance manuals.

Our code of ethics is available on our website at: <https://www.ecopetrol.com.co/wps/portal/es/ecopetrol-web/responsabilidad-corporativa/etica-y-cumplimiento/codigo-etica-conducta>

7.3 Board of Directors

The information below sets forth the names and business experience of each of our current Directors elected at the General Shareholders Ordinary Meeting held on March 23, 2018 for one year term beginning on that date, as of the date hereof:

Alfonso Camilo Barco Muñoz (51) Director General of State Owned Enterprises of the Ministry of Finance and Public Credit, has experience in corporate finance, project management and corporate governance. He has served as advisor of Special Projects in the Ministry of Finance and Public Credit, General Director of Investment Banking of BBVA Colombia and CFO of Interconexión Eléctrica S.A. Dr. Barco is a lawyer from Universidad del Rosario, with a specialization in financial law from Universidad de los Andes. He also has a certification in finance from the London School of Economics and in Business from the University Of Chicago School of Business. To date, he is a member of the board of directors at Generadora y Comercializadora de Energía del Caribe S.A. E.S.P. (GECELCA) and Bancoldex, representing the Ministry of Finance and Public Credit. Currently Dr. Barco is a non-independent member of Ecopetrol's Board of Directors.

Mauricio Cabrera Galvis (66) currently serves as Director of the firm Cabrera & Bedoya Investment Bankers. He has been President of the FES Foundation and Banco de Occidente. He has served as Director and Financial Consultant of INCORBANK S.A. and as Public Credit Director in the Ministry of Finance and Public Credit of Colombia. He has been Technical Vice President of the Banking Association of Colombia and Head of the Global Programming Unit of the National Planning Department. He was Dean of the Faculty of Economics at the Universidad Externado de Colombia and an appointed economist in the Western Hemisphere Department of the International Monetary Fund. His studies include an undergraduate degree in Philosophy from Universidad Javeriana, a Master's Degree in Economics from Universidad de los Andes, and he took Ph.D. classes from the London School of Economics. Mr. Cabrera is currently part of the Board of Directors of Industria de Licores del Valle, Clínica DIME, ASTORGA and Fabricato. Mr. Cabrera has served as an independent Director of Ecopetrol's Board of Directors since March 31, 2016. Currently Mr. Cabrera is an independent Director of Ecopetrol's Board of Directors.

Jorge Londoño Saldarriaga (70) is currently an Operating Partner of Advent International and serves as a consultant in strategic and financial areas with a broad group of companies in the industrial, finance, and infrastructure and technology sectors. In 1993 he joined the Board of Directors of the BIC (now BANCOLOMBIA, NYSE CIB), and in 1996 he assumed the Presidency of the BIC, which he held for 15 years. Mr. Londoño has a business degree from Universidad EAFIT and later, he received a master's degree in Economic Development (M.Phil.) from the University of Glasgow, Scotland. He is a member of the Board Directors of Organización Corona and Corona Industrial, Banco Falabella Colombia, LifeMiles and member of the Superior Council of the Universidad EAFIT. Currently Mr. Londoño is an independent member of Ecopetrol's Board of Directors.

Claudia Isabel Gonzalez (48) has more than twenty years of experience in the public sector and is currently the Legal Secretary of the Presidency of the Republic. She served as General Secretary of the Ministry of Finance and Public Credit from 2012 until the beginning of 2017 and from the Ministry of Mines and Energy from the end of 2011 until mid-2012. She also worked in the Ministry of National Defense, in the Financial Fund for Projects and Development (FONADE), she was the National Administrative and Financial Director of the Office of the General Prosecutor of the Nation and Technical Deputy Director of the National Planning Department. Additionally, she worked as a Ferrovías employee and as head of the Human Resources Division of the Territorial Development Financier (FINDETER). Ms. González is a lawyer from Universidad del Rosario and specialized in Financial Legislation at the Universidad de los Andes. She is currently a member of the Board of Directors of Central de Inversiones S.A (CISA) and Fiduprevisora S.A. Currently, Ms. González is a non-independent member of Ecopetrol's Board of Directors.

Jaime Ardila Gomez (62) served as CEO of General Motors for South America from the year 2010 until February 2016. Within General Motors he held different positions such as President for Brazil and Mercosur; CFO for Latin America, Africa and the Middle East; CEO and Managing Director in Argentina; CEO and Managing Director in COLMOTORES, CEO and Managing Director in Ecuador; Omnibus BB, CFO in Chile; and Treasurer in Mexico, among others. He also served as Managing Director in Colombian Operations for N.M. Rothschild and Sons and Secretary General of the Ministry of Industry and Trade in Colombia. Mr. Ardila holds a B.A. in economics from the University of Bogota Jorge Tadeo Lozano and a master degree in economics from the London School of Economics. He is Chairman of the Board of Goldman Sachs BDC, member of the Board of Directors of Accenture and founder of the consulting firm The Hawksbill Group. Mr. Ardila has served as a Director of Ecopetrol's Board of Directors since March 31, 2016. Currently Mr. Ardila is an independent Director of Ecopetrol's Board of Directors.

Carlos Alfredo Cure Cure (74) served as Ambassador of Colombia in Venezuela from August 5, 2011 until June 22, 2013. Before serving as ambassador, Mr. Cure was appointed CEO of Bavaria S.A., the largest brewery in Colombia. Additionally, he was an advisor to the Board of Directors of Grupo Olimpica S.A. and member of the Board of Avianca S.A. (Colombia's national airline). He acted as deputy financial manager of Cementos del Caribe, CEO of Cementos Toluviejo and CEO of Astilleros Unión Industrial. Mr. Cure holds a degree in Civil Engineering from the National University of Medellín. Mr. Cure has served as an independent Director of Ecopetrol's Board of Directors since September 5, 2015, in which he currently is the chairman of Ecopetrol's Board of Directors. Currently Mr. Cure is an independent Director of Ecopetrol's Board of Directors.

Joaquín Moreno Uribe (69) started his career as Director for Constructions and Engineering of Urbanas, in Bucaramanga, Colombia. He joined then the Royal Dutch/Shell Group (RDS) of companies for more than 33 years. His career in Shell was comprised by different roles at technical, management and leadership levels, in different sectors of the Oil & Gas Industries (Upstream and Downstream), Chemicals, Metals and Coal. He has worked across America and Europe, including several appointments at regional, global and corporate levels at the Headquarters of the RDS Group in London and The Hague. Mr. Moreno has also served as Country Chairman and President for Shell in Mexico, Colombia and Venezuela, as well as Regional CEO for the Northern Latin American Region (Peru, Ecuador, Venezuela, Colombia and Mexico). On his return to Colombia, he was appointed by the President of the Republic, as High Presidential Commissioner – Ad Honorem- in charge of coordinating the reconstruction of the areas affected by the heavy rain season and floods of early 2005, in the Region of Santander and Northern Santander. Joaquin Moreno earned a degree in civil engineering from Universidad Industrial de Santander and completed an Advanced Management Program (AMP) at Harvard University Business School. Mr. Moreno has been a member of the boards of directors of various local and international companies, as well as academic Institutions and Think Tanks of Management and Leadership initiatives. Mr. Moreno has served as an independent Director at Ecopetrol's Board of Directors since March 27, 2008. During this period, he has acted as president of the Audit and Risk Committee, of the Compensation and Nomination Committee, as well as of the Business Committee.

Hernando Ramirez Plazas (64) has held positions at Universidad Surcolombiana, as Dean of the Faculty of Engineering, Academic Vice-Principal, Principal, and Professor. He has worked at the National Institute of Health and at the Ministry of Health. He had a role as an external evaluator for Colciencias in technology development and innovation projects in the area of natural gas. Additionally, he has acted as a trainer in gas issues for production personnel at Canacol Energy Inc., and he currently provides professional services to Comfamiliar Huila. Mr. Ramirez is a Chemical Engineer graduated from Universidad Nacional de Colombia, with a Master's Degree in Public Health from the same University, and a Specialization in Gas Engineering from Universidad de Zulia (Venezuela). Currently, Dr. Ramirez is an independent member of Ecopetrol's Board of Directors.

Carlos Gustavo Cano Sanz (71) has been President of the Colombian Agriculture Association (SAC); founder and director of Corporación Colombia Internacional (CCI); President of the Agrarian Fund; President of the newspaper El Espectador; and he currently teaches in the Master of Corporate Finance at CESA University and in Universidad de los Andes in the Business School. He was Minister of Agriculture between August 7, 2002 and February 3, 2005 and Co-Director of Banco de la República between February 4, 2005 and January 31, 2017. He is an Economist from Universidad de los Andes in Bogotá; with a master's degree in Economics from the University of Lancaster in England; postgraduate in Government, Business and International Economics at Harvard University in Boston and postgraduate studies at the Instituto de Alta Dirección Empresarial (INALDE) of Bogotá. He is a member of the Superior Council of the EAFIT University of Medellín, of the Consultative Committee for Agriculture of Bancolombia, and of the Group on Earth Observations Global Water Sustainability (GEOGLOWS) in the United States. Mr. Cano has served as an independent Director in Ecopetrol's Board of Directors, since March 31, 2017. Currently Mr. Cano is an independent member of Ecopetrol's Board of Directors.

7.3.1 Board Practices

Our Board of Directors is composed of nine members and is responsible for, among other things, establishing our general business policies. The majority of the Board of Directors must be independent, and must be elected pursuant to the criteria set out in paragraph two, Article 44, Law 964, 2005, and in accordance with the procedure determined in Decree 3923, 2006, or any other provisions that regulate, amend, replace or add such regulations. In addition, pursuant to our bylaws and in accordance with the procedures described therein, our majority shareholder must include, in its list of candidates for the last two seats in the Board of Directors, the name of one individual jointly proposed by departments that produce hydrocarbons and one individual jointly proposed by the ten minority shareholders with the highest equity participation. According to Colombian law, the members of the Board of Directors must be elected by the General Shareholders Assembly in accordance with a proportional representation system similar to cumulative voting (through an electoral quota voting system). The number of votes required to fill each position is calculated by dividing the number of possible votes by the number of open board positions. The members of the Board of Directors may be elected without an electoral quota voting system when there is unanimity. Pursuant to our bylaws, positions on our Board of Directors are filled either by person or by position and, beginning in 2019, Directors will be elected for a two-year term. Currently, we have one Director appointed by his position: The General Director of State Participations of the Ministry of Finance and Public Credit. Our current Directors were elected at the General Shareholders Assembly held on March 23, 2018. Members of the Board may be reelected indefinitely.

Our CEO is appointed by the Board of Directors and has two alternates. The CEO is elected for a two-year term, may be reelected indefinitely and freely removed prior to the expiration of his term. In accordance with our bylaws, the Board of Directors must evaluate the annual performance of the CEO and such results must be published in Ecopetrol's web page or in an alternative media vehicle.

The compensation of our Directors is set exclusively by the shareholders at the General Shareholders Assembly. Directors are compensated for attending board meetings and committee meetings. A Board meeting requires a quorum of at least five members and decisions are approved with a majority of the Directors present. In the practice a consensus decision making operates in the Board.

Under Colombian law, a director or executive officer must abstain from participating in any transaction that may result in a conflict of interest or that involves competing with the company, unless authorized at a General Shareholders Assembly. The general shareholders may approve or reject the transaction giving rise to the conflict of interest with the vote of the majority of the shares present at the General Shareholders Assembly. If the director or executive officer who has the conflict is a shareholder, his or her vote must be excluded. We disclose conflicts of interest of our employees, executive officers and Directors in our annual reports.

Neither our bylaws nor our corporate governance code provide a retirement age for our Directors. Under our bylaws, there is no requirement for a person to have a minimum number of shares to be elected as a Director. Colombian law provides that Directors willing to sell or purchase shares in our Company need prior authorization from the entire Board of Directors. Colombian law does not impose any limitation as to the number of shares that may be acquired by a Director.

7.3.2 Board Committees

Pursuant to our bylaws, our Board of Directors has the ability to constitute the committees it considers necessary. The Board of Directors currently has four committees (audit and risk committee, corporate governance and sustainability committee, compensation and nomination committee and business committee. These committees establish guidelines, set specific actions and evaluate and submit proposals designed to improve performance in the areas under their supervision and control. The committees are comprised of members of the Board of Directors who are also appointed by the same members. The chairman of each of the committees must be an independent Director. In addition to applicable regulations, the committees also have their own specific regulations that establish their purposes, duties and responsibilities.

Table 60 – Composition of committees of the Board of Directors as of March 22, 2018

Audit and Risk Committee	Compensation and Nomination Committee
Horacio Ferreira Rueda*	Minister of Finance and Public Credit
Jaime Ardila Gomez	Carlos Cure Cure
Joaquin Moreno Uribe	Joaquín Moreno Uribe
Yesid Reyes Alvarado*	Mauricio Cabrera Galvis
Carlos Gustavo Cano Sanz	
Corporate Governance and Sustainability Committee	Business Committee
Minister of Finance and Public Credit	Minister of Finance and Public Credit
Horacio Ferreira Rueda**	Horacio Ferreira Rueda***
Carlos Cure Cure	Joaquín Moreno Uribe
Yesid Reyes Alvarado**	Carlos Cure Cure
Jaime Ardila Gómez	Jaime Ardila Gómez
Carlos Gustavo Cano Sanz	Carlos Gustavo Cano Sanz
Mauricio Cabrera Galvis	Mauricio Cabrera Galvis

* Not elected to the Board of Directors at the General Shareholders Ordinary Meeting on March 23, 2018. Replacement will be elected to the Audit and Risk Committee after this annual report.

** Not elected to the Board of Directors at the General Shareholders Ordinary Meeting on March 23, 2018. Replacement will be elected to the Corporate Governance and Sustainability Committee after this annual report.

*** Not elected to the Board of Directors at the General Shareholders Ordinary Meeting on March 23, 2018. Replacement will be elected to the Business Committee after this annual report.

Audit and Risk Committee

Our audit and risk committee, which must be comprised of at least three members, all of them independent Directors, is our highest internal control body and provides support to our Board of Directors on risk, accounting and financial matters. It is in charge of guaranteeing the design, implementation and supervision of our internal control over financial reporting. It also ratifies the annual hydrocarbons reserves report and provides support for our Board on analyzing topics related to financial matters, risks, control environment and the assessment of the Company's internal and external auditors.

All committee members are required to be knowledgeable in accounting matters and at least one of them is required to be an expert in financial and accounting matters.

Our Board of Directors has determined that Jaime Ardila Gómez qualifies as an "audit committee financial expert" and he is independent under the definition of "independent" applicable to us under the rules of the NYSE.

The audit and risk committee approves on a case-by-case basis any engagement of our external independent auditors to provide services different than those related to auditing our financial statements. Occasionally, the audit and risk committee will have no doubt that these additional services do not compromise the external auditor's independence. When in doubt, the committee will request the opinion of the internal auditor.

Compensation and Nomination Committee

Our compensation and nomination committee, which must be comprised of at least three members, including at least one independent director, provides general guidelines for the selection and compensation of our executive officers and employees.

Corporate Governance and Sustainability Committee

Our corporate governance and sustainability committee, which must be comprised of at least three members, including at least one independent director, makes proposals to our Board of Directors to ensure and supervise the fulfillment of our good corporate governance and sustainability practices in accordance with our corporate governance code.

Business Committee

Our business committee, which must be comprised of at least five members, including at least one independent Director, assists our Board in analyzing potential business ventures. Based on its delegation of power, the committee studies and analyzes capital expenditure policies, major investment projects, strategy, new business and other matters that would help us move forward in our efforts toward the consolidation of our strategy. The primary criteria used in the committee's decision-making process are the optimization of our portfolio and the proper allocation of our resources.

7.4 Compliance with NYSE Listing Rules

The following is a summary of the significant differences between our corporate governance practices and those required for U.S. companies under the NYSE listing standards.

NYSE Standards

Director Independence

The majority of the board of directors must be independent. §303A.01. "Controlled companies," which would include Ecopetrol if we were a U.S. issuer, are exempt from this requirement. A controlled company is one in which more than 50% of the voting power is held by an individual, group or another company, rather than the public. §303A.00.

Our Corporate Governance Practices

Pursuant to our bylaws, the majority of the Board of Directors must be independent. As of the date of this annual report, we have seven independent Directors and two non-independent Directors.

NYSE Standards***Executive Sessions***

The non-management directors of each listed company must meet at regularly scheduled executive sessions without management. §303A.03.

Nominating/Corporate Governance and Sustainability Committee

A nominating/corporate governance and sustainability committee composed entirely of independent directors is required. The committee must have a charter specifying the purpose, duties and evaluation procedures of the committee. §303A.04. “Controlled companies” are exempt from these requirements. §303A.00.

Compensation Committee

A compensation committee composed entirely of independent directors is required, which must evaluate and approve executive officer compensation. The committee must have a charter specifying the purpose, duties and evaluation procedures of the committee. §303A.05. “Controlled companies” are exempt from this requirement. §303A.00.

Audit and Risk Committee

An audit committee with a minimum of three independent directors satisfying the independence and other requirements of Rule 10A-3 under the Exchange Act and the more stringent requirements under the NYSE standards is required. §§303A.06 and 303A.07.

Equity Compensation Plans

Equity compensation plans and all material revisions thereto require shareholder approval, subject to limited exemptions. §§303A.08 and 312.03.

Corporate Governance Guidelines

Listed companies must adopt and disclose corporate governance guidelines. §303A.09.

Our Corporate Governance Practices

A comparable rule does not exist under Colombian law. Except for our audit and risk committee, our Board of Directors does not meet without management.

Colombian law does not require the establishment of a nominating and a corporate governance and sustainability committee composed entirely of independent directors. Pursuant to our board charter, these committees shall be composed of a majority of independent Directors.

Colombian law does not require the establishment of a compensation committee composed entirely of independent directors. Pursuant to our board charter, this committee shall be composed of a majority of independent Directors.

According to Law 964 of 2005, Colombian companies that are authorized to issue securities by the Superintendence of Finance must have an audit committee that satisfies the requirements of Law 964 of 2005, including its minimum number of members, independence criteria and audit related duties. Our audit and risk committee is composed entirely of independent Directors, and the committee meets the requirements of Law 964 of 2005 and Rule 10A-3 under the Exchange Act.

Under Colombian law, no similar right to vote on equity compensation plans and material revisions thereto is given to shareholders. We do not give our shareholders the right to vote on equity compensation plans and material revisions thereto.

The Superintendence of Finance recommends the adoption of corporate governance guidelines to all Colombian issuers. According to Superintendence of Finance Circular No. 028, 2014, the adoption of corporate governance guidelines is voluntary. Listed companies must annually publish a corporate governance survey comparing their corporate governance standards with those recommended by the Superintendence of Finance. Our corporate governance code and our survey of the adoption of Colombian practices are available on our website at <http://www.ecopetrol.com.co>.

NYSE Standards

Code of Ethics for Directors, Officers and Employees

Corporate governance guidelines and a code of business conduct and ethics is required, with disclosure of any waiver for directors or executive officers. The code must contain compliance standards and procedures that will facilitate the effective operation of the code. §303A.10.

7.5 **Management**

The following presents information concerning our executive officers and senior management. Unless otherwise noted, the majority of these individuals are Colombian citizens.

Felipe Bayon Pardo (52) has served as the Chief Executive Officer of Ecopetrol since September 2017. Prior to being appointed Chief Executive Officer, Mr. Bayón served as Chief Operating Officer of Ecopetrol from February 2016 to September 2017. Mr. Bayon holds a degree in Mechanical Engineering from the Universidad de Los Andes (Bogotá). He has over 26 years of experience in the oil and gas industry. For more than 20 years, he worked at BP plc, most recently as Senior Vice-President of BP America and Head of Global Deepwater Response. From 2005 to 2010, he was the Regional President of BP Southern Cone (South America), and prior to 2005 he worked in BP's headquarters as Chief of Staff to the Upstream CEO and Head of the Executive Office for Exploration and Production. He began his career in 1995 in BP Colombia, as a Project Engineer, where he held various positions until becoming Vice-President of Operations in Colombia. Prior to this, he worked for Shell.

María Fernanda Suarez (43) has served as the Chief Financial Officer of Ecopetrol since August 2015. Ms. Suárez holds a degree in Business Administration from CESA and a master's degree in Policy Management from Georgetown University. Ms. Suárez has 22 years of experience in the public and private sectors. She has held various positions in these sectors, including Director of Public Credit and National Treasury at Ministry of Finance and Public Credit, Chief Investment Officer at Porvenir (largest asset manager in Colombia with AUM~US\$40 billion) and other high-level positions at Citibank, ABN AMRO and Bank of America. She has served on the board of directors for ISA, Isagen, XM, FEN, Cenit and Ocesa.

Hector Manosalva (56) joined Ecopetrol in 1986 and has served as Vice-President for Development and Production since July, 2014. Mr. Manosalva holds a degree in Petroleum Engineering from the Universidad de America (Bogotá), completed post-graduate studies in finance at the Universidad EAFIT and Executive Management at the Universidad de los Andes. Over the course of his career at Ecopetrol, Mr. Manosalva has held various positions, including Executive Vice-President for Production and Exploration, Vice-President of Production, Production Manager of the Central Region, President of Colombia's Advisor for Safety and Security of National Energy Infrastructure, Director of HSE and Corporate Social Responsibility, Production Manager of the Southern Region and Head of the Production Planning Division.

Max Torres (60) has served as Exploration Vice-President since September 2014. Mr. Torres holds a B.S. degree in Geology from Universidad Nacional of Tucumán in Argentina and an M.S. in Stratigraphy from Georgia State University. He has more than 28 years of experience in oil and gas exploration and production and is a proven world class oil and gas finder and a champion of Latin American oil and gas exploration. Among his many professional accomplishments, Mr. Torres was directly responsible for the 16 Tcfg Perla gas field discovery in Venezuela, the 275 Tcfg super giant Galkynysh gas field discovery in Turkmenistan, as well as other oil and gas discoveries. Prior to joining Ecopetrol, Mr. Torres worked at Repsol from 1997 to 2013 as Exploration Director for Europe and the Middle East, Exploration Director for Europe and Africa and Exploration Director for Latin America. * *Voluntary resignation effective May 7, 2018.*

Our Corporate Governance Practices

We have adopted a code of ethics which complies with applicable U.S. and Colombian law. Our code of ethics applies to our chief executive officer, chief financial officer, principal accounting officer, persons performing similar functions and to all of the employees, members of the Board of Directors, suppliers, and contractors of Ecopetrol S.A. and its corporate group. Our code of ethics is available on our website at <http://www.ecopetrol.com.co>

Rafael Espinosa (50) has served as Vice-President of Transportation since September 2016. Mr. Espinosa holds a bachelor's degree in Civil Engineering from Universidad Santo Tomas in Colombia and a MBA from Universidad de los Andes (Bogotá). He has worked for Ecopetrol for the last 23 years and has held various positions within the company, including Operations and Maintenance General Manager, Pipelines Manager, Central Operation Superintendent, Chief of Operations Department, Plant Coordinator, Pipeline Maintenance Engineer and Community Relationships Engineer.

Rafael Guzman (51) joined Ecopetrol in 2010 and has served as Technical Vice-President since May 2013. Mr. Guzman holds a B.S. degree in Petroleum Engineering from Universidad America in Colombia (1995), a M.S. in Petroleum Engineering and a PhD in Petroleum Engineering with minor in Mathematics both from Stanford University. Mr. Guzman has been with Ecopetrol since October 2010, where he has held several positions as regional production manager. Prior to that, Mr. Guzman worked with ENI in managerial positions in Europe and Latin America.

Alberto Consuegra Granger (58) has served as Vice-President of Supply and Services since August 2016. He is currently deputizing as President for Cenit Transportes, Ecopetrol's brand in the Midstream segment. Mr. Consuegra holds a degree in Civil Engineering from Universidad de Cartagena and has a master's degree in Pavements and Construction Management from Texas A&M University. Before joining Ecopetrol, he was Vice-President of Exploration and Production at Equion Energia Limited, where he also served as the Vice-President for Projects and Production during the period 2011-2016. Alberto began his professional career in 1984 by working for Morrison Knudsen International as a contract coordinator during the construction of the Cerrejon project. In 1993 he joined Ecopetrol, working in the projects Group, afterwards, he went on to BP Exploration, where he worked for 16 years starting as a contract coordinator, then as procurement and contract manager, then human resource manager for the Andean area, and finally as leader of the Colombian Performance Unit until end of 2010.

Tomas Hernandez (63) has served as Vice-President of Refining and Industrial Processes in Ecopetrol since February 2016. He has over 39 years of multinational experience in the field of oil and gas sector. He has worked as Business Manager at Chevron's Pascagoula refinery in the United States, General Manager for Marketing Operations for Chevron Texaco in Latin America and Africa-Europe-Pakistan Regions and has spent over 20 years in managerial positions in various refineries at Chevron. Prior to joining Ecopetrol, he was Deputy Upgrader Manager at Petropiar, a non-operated joint venture in which Chevron holds a 30% interest. Mr. Hernandez graduated from the University of Missouri – Rolla (University of Science and Technology Missouri) in 1978 with a Bachelor of Science Degree in chemical engineering.

Jürgen Loeber (60) has served as the Projects & Engineering Vice-President of Ecopetrol since May 2016. Mr. Loeber holds a degree in Business Administration from Universidad del Norte and specialization in Project Management. He joined the Army Corps of Engineers as reserve officer and reached a captain rank. He has over 30 years of experience in the Oil & Gas industry. For the last 10 years, he worked at Equion Limited (formerly BP Exploration Colombia) as Project Director. From 2001 to 2006, he was Project Director for Wood Group Colombia. From 1992 to 2001 he worked for BP in various countries as project manager, construction manager and project control engineer. He began his career in 1985 in Exxon as financial analyst.

Pedro Manrique (53) was named Commercial and Marketing Vice President as of April 2017. Mr. Manrique holds a bachelor's degree in Electrical Engineering from the Universidad Industrial de Santander, Colombia. He has a Master's degree in Industrial and Systems Engineering from the University of Florida and an MBA from the IE Business School in Madrid, Spain. Mr. Manrique has 27 years of experience in the oil and gas industry. His previous position was as the Commercial and Business Planning Manager for Chevron Latin America, in Caracas, Venezuela. At Chevron he also served as Commercial and Business Development Manager in Chevron Colombia based in Bogotá, Colombia. During his career he also worked Enron Energy Services as Risk Manager, out of their headquarter offices in Houston, Texas. He has also served as member of the Leadership Team of Chevron Latin America and as member of the national operations council of natural gas in Colombia, among many other responsibilities.

Carlos Alberto Vargas Medina (48) has served as Vice-President of Transformation since December 2015. Mr. Vargas holds a degree in Petroleum Engineering from America University. He has 25 years of experience across the integrated oil and gas value chain with a focus in drilling and well interventions and an expertise in exploration, appraisal, development and production onshore and offshore wells. He has held management positions in the United Kingdom, Argentina, Bolivia and Colombia, where he has developed key skills in strategy, performance management systems, risks management, HSE and integration of multicultural and multidisciplinary teams. Prior to taking his current position, he was the Vice-President of Drilling and Completions at Equion.

Fernán Ignacio Bejarano Arias (61) has served as Vice-President of Legal Affairs and General Counsel at Ecopetrol since March 2016. Mr. Bejarano Arias holds a bachelor's degree in Law from Universidad Javeriana in Bogotá and an LLM from the American University (Washington D.C.). In his more than thirty years of professional experience, he has been a partner at the law firms of Estudios Palacios Lleras S.A, Bejarano Cárdenas y Ospina y Asociados Ltda and OPEBSA Compañía de Abogados S.A.S. and has worked for several years at important positions in the public sector, such as the Vice-Minister of Foreign Affairs, Secretary of the Monetary Board, Secretary of the Board of Directors of the Banco de la República (Colombian Central Bank), Office of Legal Affairs Counselor at the Presidency of the Republic of Colombia, Vice-President of Legal Affairs and General Counsel at Corporación Financiera Colombiana. Mr. Bejarano Arias has been a professor at the Faculty of Law of the Universidad Javeriana, and has been arbitrator before the Center for Arbitration and Conciliation of the Bogotá Chamber of Commerce.

María Juliana Alban (41) has served as Compliance Vice-President and Compliance Officer since July 2015. Ms. Alban holds a law degree from Universidad Sergio Arboleda with a specialization in Commercial and Financial Law from the same institution. Since 2007, Ms. Alban has worked in the Attorney General's Office (Procuraduría General de la Nación) as Attorney General for State Contracts, General Secretary and Chief of Legal Office, among other positions within the institution.

Alejandro Arango (58) has served as Vice-President of Human Resources at Ecopetrol S.A. since October 2014. He has more than 20 years of professional experience around the world and has worked as a Vice-President of Human Resources at Banco Santander in Colombia and as Human Resources Director of the Consumer Finance Division, Strategy Division and Cards Division at Banco Santander in Spain. Mr. Arango has also served as Human Resources Director for the Asia Pacific region at Banco Santander in Hong Kong and as a Global Human Resources Division T&O, among others. Mr. Arango holds a degree in Strategic Marketing from CESA School of Business and a bachelor's degree in Theology from the Universidad Hochschule Sankt Georgen (Frankfurt) and a bachelor's degree in Philosophy from Javeriana University.

Andres Mantilla (47) has served as the Director of the Colombian Petroleum Institute of Ecopetrol, the technology development center of the company, since September 2013. He holds a degree in Petroleum Engineering from Universidad Industrial de Santander, Colombia, Master of Science degree in Petroleum Engineering from Stanford University, and a Ph.D. in Geophysics from Stanford University. His professional work includes the leadership and management of oil and gas technology development, demonstration and implementation teams. He worked for Ecopetrol holding various positions between 1994 and 2006. Before rejoining Ecopetrol in 2013, he worked for BP Colombia, Marathon Oil Company and Maersk Oil. During his professional career he has had exposure to exploration and production projects and the evaluation of new ventures in Colombia, the Gulf of Mexico, the North Sea, West Africa, South America and the Middle East.

Eduardo Uribe Botero (58) has served as Vice-President of Sustainable Development and Environmental since August 2015. Mr. Uribe holds a degree in Agricultural Engineering from Caldas University, a master's of science in Soil Chemistry and a Ph.D. in Fertility and Management of Tropical Soils. He has over 25 years of experience in the private and public sectors. In 1994, he was appointed the first Vice-Minister of the Environment in Colombia. In recent years he has served as a strategic, environmental and social advisor to companies and organizations in the fields of hydrocarbons, mining, energy, forestry, environmental and agribusiness through the consulting firm Optim Consulting.

Carlos Andrés Santos Nieto (40) has been temporarily appointed as Vice-President of Supply and Services since February 2018. Mr. Santos is an Economist from Universidad Externado de Colombia and holds a post-graduate degree in International Economics from the same institution and a college diploma course in Advanced Negotiations from Universidad CESA several and other negotiations training provided by BP in Colombia, Alaska and London. His latest position was Procurement and Supply Chain Manager at the Company. Prior to joining the Company, he served as Offshore Business Unit General Manager in Coremar Group and Procurement & Supply Chain Manager Drilling, Wells, Subsurface and Offshore in Equion Energia Limited (Former BP Exploration Colombia). He also served as Latin America Procurement Sourcing Manager for Merck Sharp & Dhome and Procurement & Supply Chain Manager Specialist for Quala Colombia S.A. He has held various positions within BP as PSCM Drilling & Wells Category Lead – Iraq SPU in London, PSCM Market Intelligence Lead & Deflation Project Lead in Alaska, PSCM Specialist D&W in Alaska, PSCM Specialist O&M in Colombia, PSCM Commercial Analyst in Colombia and PSCM Specialist Business Support in Colombia.

Mónica Jiménez González (42) has served as Secretary General of Ecopetrol SA since July 2016. Ms. Jiménez holds a law degree from University of the Andes (Bogotá) and has been allowed to practice as a foreign lawyer in Canada. She holds a post-graduate degree in Civil and State Responsibility from the Universidad Externado de Colombia and a Master of Science in Development Studies from the London School of Economics and Political Science (LSE). Before studying abroad, Ms. Jimenez worked as a lawyer at a Colombian law firm and then as lawyer advising the Minister and the Deputy Minister of Defense of Colombia in matters related to international law. Prior to returning to Colombia, she lived in Canada for 13 years, time during which she worked as a lawyer in a boutique law firm specialized in international law and then, in a major Canadian law firm in Vancouver, BC.

None of our Directors or executive officers has any familial relationship with any Director or executive officer.

7.6 Compensation of Directors and Management

Based on a resolution adopted at our annual shareholders' meeting in 2012, compensation for Directors' attendance in person at meetings of the Board of Directors and/or committee meetings increased from the equivalent of four to six minimum monthly wage salaries, which totals approximately COP\$4.4 million for 2017 and COP\$4.1 million for 2016. See Note 3.1 to our consolidated financial statements for more details.

The total compensation paid to our Directors, executive officers and senior management active as of December 31, 2017 during 2017 amounted to COP\$20.12 billion.

Only one of our executive officers is eligible to receive pension and retirement benefits from us. The total amount set aside to provide pension and retirement benefits to our eligible executive officers totals COP\$5,401 million.

7.7 Share Ownership of Directors and Executive Officers

No individual Director or executive officer beneficially owns more than 1% of our outstanding shares.

The following executive officers own shares of Ecopetrol:

Table 61 – Officers owning Ecopetrol's shares

Executive Officer	Shares	%
Felipe Bayón Pardo	8,418	0.00002047%
Héctor Manosalva	49,380	0.00012010%
Rafael Espinosa Rozo	7,200	0.00001751%

Under Colombian law, all of our shareholders have the same economic privileges and voting rights.

7.8 Controls and Procedures

Disclosure Controls and Procedures

As required by Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as of December 31, 2017, we evaluated the design and effectiveness of our financial disclosure controls and procedures under the supervision and participation of our management, including our Chief Executive Officer and Chief Financial Officer. There are inherent limitations to the effectiveness of any system of disclosure controls and procedures, including the possibility of human error and the circumvention or overriding of the controls and procedures. Accordingly, even if effective, disclosure controls and procedures can only provide reasonable assurance of achieving their control objectives.

Based upon this evaluation, our Chief Executive Officer and Chief Financial Officer concluded that as of the end of the period covered by this annual report, our disclosure controls and procedures were effective to provide reasonable assurance that the information required to be disclosed in the reports that we file and submit under the Securities Exchange Act of 1934 is recorded, summarized and reported as and when required and is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

Management's Annual Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15(d)-15(f) under the Securities Exchange Act of 1934. Our internal control over financial reporting is a process designed under the supervision of our Chief Executive Officer and Chief Financial Officer, and affected by our board of directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of our financial statements for external reporting purposes in accordance with generally accepted accounting principles, and it includes those policies and procedures that:

- pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect transactions and dispositions of our assets;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures are being made only in accordance with authorization of our management and directors; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on our financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Therefore, effective control over financial reporting cannot, and does not, provide absolute assurance of achieving our control objectives. Also, projection of any evaluation of the effectiveness of the internal controls to future periods is subject to the risk that controls may become inadequate because of changes in conditions or that the degree of compliance with the policies or procedures may deteriorate.

As of the year ended December 31, 2017, our management conducted an assessment of the effectiveness of our internal control over financial reporting in accordance with the criteria established in the publication "Internal Control – Integrated Framework (2013)", issued by the Committee of the Sponsoring Organizations of the Treadway Commission, as well as the rules set by the SEC in its Final Rule "Management's Report on Internal Control Over Financial Reporting and Certification of Disclosure in Exchange Act Periodic Reports."

Based on the assessment performed, management concluded that our internal control over financial reporting was effective as of the end of the period covered by this annual report.

The effectiveness of our internal control over financial reporting has been audited by Ernst & Young Audit S.A.S., an independent registered public accounting firm, as stated in their audit report accompanying our consolidated financial statements.

Audit and Non-Audit Fees

Our consolidated financial statements for the fiscal years ended December 31, 2017 and December 31, 2016 were audited by Ernst & Young Audit S.A.S. Our consolidated financial statements for the fiscal year ended December 31, 2015 were audited by PricewaterhouseCoopers Ltda.

The following table sets forth the fees billed to us by Ernst & Young Audit S.A.S. during the fiscal years ended December 31, 2017 and December 31, 2016.

Table 62 – Fees Billed to us by Ernst & Young Audit S.A.S.

	As of December 31,	
	2017	2016
	(in millions of Colombian Pesos, excluding 16% value added tax)	
Audit fees	10,946	7,800
Audit-related fees	167	538
Tax fees	135	916
All other fees	-	-
Total	11,248	9,254

Audit Fees. The audit fees listed in the table above are the aggregated fees billed by Ernst & Young Audit S.A.S. in connection with their audits of our annual consolidated financial statements (IFRS), interim consolidated financial statements (under IFRS), statutory audits of Ecopetrol S.A. and its consolidated subsidiaries and some of its associate entities (under local GAAP) and review of periodic documents filed with the SEC. In addition, these audit fees include fees related to our independent auditors' audits of our internal controls over financial reporting.

Audit-related Fees. The audit-related fees listed in the table above are the fees billed by Ernst & Young Audit S.A.S. in connection with their agreed-upon procedures of our variable compensation bonus system and its review procedures in connection with the offering document related to the SEC-registered bonds we reopened in 2016.

Tax Fees. The tax fees listed in the table above correspond to (i) advising some subsidiaries about the tax consequences associated with new or proposed legislation, and (ii) rendering advice to some subsidiaries on the likely tax consequences of proposed transactions and the appropriate methods of structuring and reporting.

Changes in Internal Control over Financial Reporting

There were no changes made in our internal control over financial reporting during the year ended December 31, 2017 that have materially affected or are reasonably likely to materially affect the Company's internal controls over financial reporting.

Attestation Report of the Registered Public Accounting Firm

Ernst & Young Audit S.A.S.'s attestation report on our internal control over financial reporting is included in their audit report accompanying our consolidated financial statements. See [Report of Independent Registered Public Accounting Firm](#) to the consolidated financial statements.

Significant Changes

For a description of significant events since December 31, 2017, please see Note 35 to our consolidated financial statements.

8. **Financial Statements**

Ecopetrol S. A.

Consolidated Financial Statements

At December 31, 2017 and 2016 and for three years ended December 31, 2017, 2016 and 2015

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Report of Independent Registered Public Accounting Firm

To the Shareholders and the Board of Directors of Ecopetrol S.A. and subsidiaries

Opinion on the Financial Statements

We have audited the accompanying consolidated statements of financial position of Ecopetrol S.A. and subsidiaries (the Company) as of December 31, 2017 and 2016, the related consolidated statements of profit or loss, comprehensive income, changes in equity, and cash flows, for the years ended December 31, 2017 and 2016, and the related notes and financial statement schedules in exhibits 1 and 2 (collectively referred to as the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the consolidated financial position of the Company at December 31, 2017 and 2016, and the results of its operations and its cash flows for the years ended December 31, 2017 and 2016, in conformity with International Financial Reporting Standards as issued by the International Accounting Standards Board.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2017, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated April 19, 2018 expressed an unqualified opinion thereon.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Ernst & Young Audit S.A.S.

We have served as the Company's auditor since 2016.

Bogota, Colombia

April 19, 2018

Report of Independent Registered Public Accounting Firm

To the Shareholders and the Board of Directors of Ecopetrol S.A. and subsidiaries

Opinion on Internal Control over Financial Reporting

We have audited Ecopetrol S.A. and subsidiaries' internal control over financial reporting as of December 31, 2017, based on criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Ecopetrol, S.A. and subsidiaries (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2017, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated statements of financial position of the Company as of December 31, 2017 and 2016, the related consolidated statements of profit or loss, comprehensive income, changes in equity and cash flows for the years ended December 31, 2017 and 2016, and the related notes and financial statement schedules on exhibits 1 and 2, and our report dated April 19, 2018 expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Annual Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Ernst & Young Audit S.A.S.

Bogota, Colombia

April 19, 2018

Report of Independent Registered Public Accounting Firm

To the Board of Directors
And Shareholders of Ecopetrol S. A.

In our opinion, the accompanying consolidated statements of profit and loss, other comprehensive income, changes in equity and cash flows for the year ended December 31, 2015 present fairly, in all material respects, the results of operations and cash flows of Ecopetrol S.A. and its subsidiaries (the "Company") for the year ended December 31, 2015, in conformity with International Financial Reporting Standards as issued by the International Accounting Standards Board. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit of these statements in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

/s/ PricewaterhouseCoopers Ltda.

Bogotá, Colombia

April 28, 2016, except for the change in the manner in which the company presents dry wells in the consolidated statements of cash flows as to which the date is May 30, 2017.

Ecopetrol S.A.

Consolidated statement of financial position

(Figures expressed in millions of Colombian pesos)

	Note	As of December 31,	
		2017	2016
Assets			
Current assets			
Cash and cash equivalents	6	7,945,885	8,410,467
Trade and other receivables, net	7	6,098,918	4,212,701
Inventories, net	8	4,601,396	3,841,901
Other financial assets	9	2,967,878	5,315,537
Current tax assets	10	625,374	1,129,098
Equity instruments measured at fair value	11	-	51,610
Other assets	12	880,425	1,035,632
		23,119,876	23,996,946
Assets held for sale	13	104,140	132,216
Total current assets		23,224,016	24,129,162
Non-current assets			
Investment in associates and joint ventures	14	1,330,460	1,552,694
Trade and other receivables, net	7	777,132	729,410
Property, plant and equipment	15	61,404,374	62,328,502
Natural and environmental resources	16	21,308,265	22,341,047
Intangible assets	17	380,226	272,132
Deferred tax assets	10	4,016,161	4,248,014
Other financial assets	9	3,565,847	1,371,358
Goodwill	19	1,159,922	1,159,922
Other assets	12	681,009	826,736
Total non-current assets		94,623,396	94,829,815
Total assets		117,847,412	118,958,977
Liabilities			
Current Liabilities			
Loans and borrowings	20	5,144,504	4,126,203
Trade and other payables	21	6,968,207	6,854,363
Provisions for employee benefits	22	1,829,819	1,974,496
Current tax liabilities	10	2,005,688	2,130,940
Accrued liabilities and provisions	23	558,828	821,954
Other liabilities		339,565	439,274
		16,846,611	16,347,230
Liabilities related to assets held for sale	13	-	40,128
Total current liabilities		16,846,611	16,387,358
Non-current liabilities			
Loans and borrowings	20	38,403,331	48,095,824
Trade and other payables	21	29,469	23,893
Provisions for employee benefits	22	6,502,475	3,901,082
Deferred tax liabilities	10	1,333,280	1,639,703
Accrued liabilities and provisions	23	5,978,621	5,095,916
Other liabilities		537,926	254,700
Total non-current liabilities		52,785,102	59,011,118
Total liabilities		69,631,713	75,398,476
Equity			
Subscribed and paid in capital	24	25,040,067	25,040,067
Reserves		2,177,869	1,558,844
Retained earnings		5,210,302	(402,462)
Other equity items		14,006,715	15,830,409
Equity attributable to owners of parent		46,434,953	42,026,858
Non-controlling interest		1,780,746	1,533,643
Total equity		48,215,699	43,560,501
Total liabilities and equity		117,847,412	118,958,977

Ecopetrol S.A.**Consolidated statement of profit or loss**

(Expressed in millions of Colombian pesos, except for the earnings (loss) per share expressed in full pesos)

		For the years ended December 31,		
	Note	2017	2016	2015
Sales revenue	25	55,954,228	48,485,561	52,347,271
Cost of sales	26	(36,908,325)	(34,251,423)	(36,994,516)
Gross profit		19,045,903	14,234,138	15,352,755
Administrative expenses	27	(1,764,524)	(1,923,268)	(1,700,985)
Operations and project expenses	27	(2,926,065)	(2,751,687)	(4,034,268)
Recovery of (expense for) impairment of long-term assets, net	18	1,311,138	(928,747)	(7,864,875)
Other operating income, net	28	505,403	274,112	378,538
Operating income		16,171,855	8,904,548	2,131,165
Financial results, net	29			
Finance income		1,159,356	1,311,743	621,924
Finance expenses		(3,660,601)	(3,463,540)	(2,718,414)
Foreign exchange gain (loss)		5,514	976,430	(5,566,614)
		(2,495,731)	(1,175,367)	(7,663,104)
Share of profits (losses) of associates and joint ventures	14	93,538	61,345	(46,687)
Profit (loss) before income tax expense		13,769,662	7,790,526	(5,578,626)
Income tax expense	10	(5,800,268)	(4,543,046)	(710,353)
Net profit (loss) for the period		7,969,394	3,247,480	(6,288,979)
Net profit (loss) attributable to:				
Owners of parent		7,178,539	2,447,881	(7,193,859)
Non-controlling interest		790,855	799,599	904,880
		7,969,394	3,247,480	(6,288,979)
Basic and diluted earnings (loss) per share		174.6	59.5	(175.0)

Ecopetrol S.A.
Consolidated statement of other comprehensive income
(Figures expressed in millions of Colombian pesos)

	For the years ended December 31,		
	2017	2016	2015
Net profit (loss) for the period	7,969,394	3,247,480	(6,288,979)
Other comprehensive income			
Other comprehensive income to be reclassified to profit or loss in subsequent periods (net of taxes):			
Unrealized gain (loss) on hedges:			
Cash flow hedge for future exports	(84,837)	461,424	(217,291)
Hedge of a net investment in a foreign operation	57,997	(155,359)	-
Cash flow hedge with derivative instruments	35,768	33,869	(60,083)
Equity instruments measured at fair value:			
Unrealized (loss) gain	(7,828)	126,205	(106,911)
Realized (loss) gain	-	(68,497)	(19,405)
Foreign currency translation	(257,147)	(925,981)	5,979,644
	(256,047)	(528,339)	5,575,954
Other comprehensive income not to be reclassified to profit or loss in subsequent periods (net of taxes):			
Remeasurement (loss) gain on defined benefit plans	(1,548,043)	(1,153,442)	1,404,602
Others (losses) gains	(11,817)	(46,826)	58,643
	(1,559,860)	(1,200,268)	1,463,245
Other comprehensive income for the year, net of tax	(1,815,907)	(1,728,607)	7,039,199
Total comprehensive income for the year, net of tax	6,153,487	1,518,873	750,220
Comprehensive results attributable to:			
Owners of parent	5,353,778	784,658	(328,604)
Non-controlling interest	799,709	734,215	1,078,824
	6,153,487	1,518,873	750,220

Ecopetrol S.A.

Consolidated statement of changes in equity

(Figures expressed in millions of Colombian pesos)

	Note	Attributable to owners of parent					Total	Non-controlling interest	Total equity
		Subscribed and paid-in capital	Additional paid-in capital	Reserves	Other comprehensive income	Retained earnings			
Balance as of December 31, 2016		25,040,067	6,607,699	1,558,844	9,222,710	(402,462)	42,026,858	1,533,643	43,560,501
Net income		-	-	-	-	7,178,539	7,178,539	790,855	7,969,394
Dividends declared	24.4	-	-	-	-	(945,684)	(945,684)	(551,494)	(1,497,178)
Release of reserves, net		-	-	619,025	-	(619,025)	-	-	-
Other movements		-	1	-	2	(1,066)	(1,063)	(48)	(1,111)
Other comprehensive income:									
Gain (loss) on hedging instruments:									
Cash flow hedge for future exports		-	-	-	(84,837)	-	(84,837)	-	(84,837)
Hedge of a net investment in a foreign operation		-	-	-	57,997	-	57,997	-	57,997
Cash flow hedge with derivative instruments		-	-	-	25,984	-	25,984	9,784	35,768
Loss on equity instruments measured at fair value	11	-	-	-	(7,828)	-	(7,828)	-	(7,828)
Foreign currency translation		-	-	-	(255,153)	-	(255,153)	(1,994)	(257,147)
Actuarial valuation losses		-	-	-	(1,548,043)	-	(1,548,043)	-	(1,548,043)
Other movements		-	-	-	(11,817)	-	(11,817)	-	(11,817)
Balance as of December 31, 2017		25,040,067	6,607,700	2,177,869	7,399,015	5,210,302	46,434,953	1,780,746	48,215,699

	Note	Attributable to owners of parent					Total	Non-controlling interest	Total equity
		Subscribed and paid-in capital	Additional paid-in capital	Reserves	Other comprehensive income	Retained earnings			
Balance as of December 31, 2015		25,040,067	6,607,699	5,546,570	10,846,004	(6,814,432)	41,225,908	1,875,055	43,100,963
Net income		-	-	-	-	2,447,881	2,447,881	799,599	3,247,480
Dividends declared		-	-	-	-	-	-	(1,029,612)	(1,029,612)
Legal reserve used to offset previous year loss	24	-	-	(3,869,907)	-	3,869,907	-	-	-
Appropriation of reserves, net		-	-	(117,819)	-	117,819	-	-	-
Other movements		-	-	-	-	(23,637)	(23,637)	(6,086)	(29,723)
Other comprehensive income:									
Gain (loss) on hedging instruments:									
Cash flow hedge for future exports	31	-	-	-	461,424	-	461,424	-	461,424
Hedge of a net investment in a foreign operation	31	-	-	-	(155,359)	-	(155,359)	-	(155,359)
Cash flow hedge with derivative instruments		-	-	-	24,546	-	24,546	9,323	33,869
Net fair value gain on equity instruments measured at fair value	11	-	-	-	57,708	-	57,708	-	57,708
Foreign currency translation		-	-	-	(811,345)	-	(811,345)	(114,636)	(925,981)
Actuarial valuation losses	22	-	-	-	(1,153,442)	-	(1,153,442)	-	(1,153,442)
Other movements		-	-	-	(46,826)	-	(46,826)	-	(46,826)
Balance as of December 31, 2016		25,040,067	6,607,699	1,558,844	9,222,710	(402,462)	42,026,858	1,533,643	43,560,501

Ecopetrol S.A.

Consolidated statement of changes in equity

(Figures expressed in millions of Colombian pesos)

	Notes	Attributable to owners of parent					Non-controlling interest	Total equity	
		Subscribed and paid-in capital	Additional paid-in capital	Reserves	Other comprehensive income	Retained earnings			
Balance as of December 31, 2014		10,279,175	6,607,612	17,963,370	3,980,749	8,192,040	47,022,946	1,511,282	48,534,228
Net income		-	-	-	-	(7,193,859)	(7,193,859)	904,880	(6,288,979)
Dividends declared	24	-	-	-	-	(5,468,521)	(5,468,521)	(715,051)	(6,183,572)
Appropriation of reserves, net		-	-	2,344,095	-	(2,344,095)	-	-	-
Capitalization of reserves		14,760,895	-	(14,760,895)	-	-	-	-	-
Other movements		(3)	87	-	-	3	87	-	87
Other comprehensive income									
Loss on hedging instruments:									
Cash flow hedge for future exports	31	-	-	-	(217,291)	-	(217,291)	-	(217,291)
Cash flow hedge with derivative instruments		-	-	-	(43,590)	-	(43,590)	(16,493)	(60,083)
Net fair value (loss) on equity instruments measured at fair value	11	-	-	-	(126,316)	-	(126,316)	-	(126,316)
Foreign currency translation		-	-	-	5,789,207	-	5,789,207	190,437	5,979,644
Actuarial valuation gains	22	-	-	-	1,404,602	-	1,404,602	-	1,404,602
Other movements		-	-	-	58,643	-	58,643	-	58,643
Balance as of December 31, 2015		25,040,067	6,607,699	5,546,570	10,846,004	(6,814,432)	41,225,908	1,875,055	43,100,963

Ecopetrol S.A.

Consolidated statement of cash flows

(Figures expressed in millions of Colombian pesos)

		For the years ended December 31,		
	Note	2017	2016	2015
Cash flow provided by operating activities:				
Net profit (loss) for the period		7,969,394	3,247,480	(6,288,979)
Adjustments to reconcile the net profit (loss) to net cash provided by operating activities:				
Income tax expense	10	5,800,268	4,543,046	710,353
Depreciation, depletion and amortization	15,16,17	8,281,347	7,607,000	6,770,358
Foreign exchange loss	29	(5,514)	(976,430)	5,566,614
Finance cost of loans and borrowings	29	2,385,994	2,765,024	1,768,618
Finance cost of post-employment benefits and abandonment costs	29	753,047	580,491	627,827
Dry wells	16	898,264	342,691	1,266,440
Loss on disposal of non-current assets		26,686	78,990	59,932
Gain in acquisition of interests in joint operations	32.3	(451,095)	-	-
Loss on (recovery of) impairment of short term assets		30,600	74,393	(8,698)
(Recovery of) loss on impairment of long term assets	18	(1,311,138)	928,747	7,864,875
Gain on fair value adjustment of financial assets		(104,706)	(59,593)	(109,673)
Share of profit (loss) of associates and joint ventures	14	(93,538)	(61,345)	46,687
Net gain on the sale of assets held for sale		(166,389)	-	-
Gain on sale of equity instruments measured at fair value		(13,236)	(47,129)	(72,339)
Hedge ineffectiveness		8,918	-	-
Realized foreign exchange cash flow hedges	25	(160,772)	(33,074)	(7,646)
Income tax paid		(4,217,303)	(4,347,364)	(3,148,028)
Net change in operational assets and liabilities:				
Trade and other receivables		(2,189,473)	(1,400,583)	751,031
Inventories		(323,626)	(217,198)	(183,231)
Trade and other payables		21,417	(619,131)	(2,202,808)
Tax assets and liabilities		(493,533)	2,547,232	(1,964,995)
Provisions for employee benefits		(227,384)	(11,677)	(206,444)
Provisions and contingencies		104,135	(827,153)	(216,939)
Other assets and liabilities		451,263	118,523	654,960
Net cash generated by operating activities		16,973,626	14,232,940	11,677,915
Cash flow from investing activities:				
Investment in property, plant and equipment	15	(2,363,283)	(3,646,929)	(8,548,933)
Investment in natural and environmental resources	16	(3,426,405)	(2,121,295)	(6,856,761)
Acquisition of interests in joint operations	32.3	(141,950)	-	-
Acquisitions of intangibles	17	(175,868)	(69,253)	(112,255)
Sales (purchases) of other financial asset		564,754	(5,446,507)	1,208,898
Interests received		405,562	386,001	293,507
Dividends received		270,136	437,803	423,856
Proceeds from sales of assets held for sale		159,041	-	-
Proceeds from sales of equity instruments measured at fair value	11	56,930	966,715	613,998
Proceeds from sales of property, plant and equipment		267,324	109,896	166,211
Net cash used in investment activities		(4,383,759)	(9,383,569)	(12,811,479)
Cash flow used in financing activities:				
Proceeds from borrowings		444,827	4,594,640	10,985,933
Repayment of borrowings		(9,007,340)	(3,149,917)	(4,903,592)
Interest payments		(2,696,979)	(2,495,446)	(1,981,127)
Capitalizations		-	-	3
Dividends paid		(1,504,647)	(1,712,298)	(5,493,400)
Net cash used in financing activities		(12,764,139)	(2,763,021)	(1,392,183)
Exchange difference in cash and cash equivalents		(290,310)	(226,333)	1,458,019
Net (decrease) increase in cash and cash equivalents		(464,582)	1,860,017	(1,067,728)
Cash and cash equivalents at the beginning of the year		8,410,467	6,550,450	7,618,178
Cash and cash equivalent at the end of the year	6	7,945,885	8,410,467	6,550,450
Non-cash transactions				
Capitalization of reserves		-	-	14,760,895
Payment of income tax through the offset of balances in favor		-	656,121	894,451

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1. Reporting entity

Ecopetrol S.A. ("Ecopetrol") is a mixed economy company, of a commercial nature, incorporated in 1948 in Bogotá - Colombia, parent company of the Ecopetrol Business Group. Its corporate purpose is to conduct commercial or industrial activities related to the exploration, exploitation, production, refining, transportation, storage, distribution and commercialization of hydrocarbons and their derivatives and products, directly or through its subsidiaries (collectively referred to as "Ecopetrol Business Group").

11.51% of Ecopetrol shares are publicly traded on the Stock Exchanges of Colombia and New York. The remaining shares (88.49% of the total outstanding shares) are owned by the Colombian Ministry of Finance and Public Credit.

The address of the main office of Ecopetrol is Bogotá - Colombia, Carrera 13 No. 36 - 24.

2. Basis for presentation

2.1 Statement of compliance and authorization of financial statements

These consolidated financial statements of Ecopetrol and its subsidiaries as of December 31, 2017 and 2016 and for the years ended December 31, 2017, 2016 and 2015 have been prepared in accordance with International Financial Reporting Standards (IFRS), issued by the International Accounting Standards Board (IASB).

Accounting policies described in Note 4 have been applied consistently in all periods.

These consolidated financial statements were approved and authorized for issuance by the Board of Directors of Ecopetrol on April 19, 2018.

2.2 Basis for consolidation

The consolidated financial statements were prepared by consolidating all companies set out in Exhibit 1, which are those over which Ecopetrol exercises direct or indirect control. Control is achieved when the Group:

- Has power over the investee (including rights to manage relevant activities);
- Is exposed, or has the rights, to variable returns from its involvement with the investee; and
- Has the ability to use its power to affect its operational returns. This instance occurs when the Group has less than a majority of the voting rights of an investee, and it still has the power over the investee to provide it with the practical ability to direct the relevant activities of the investee unilaterally. The Group considers all relevant facts and circumstances in assessing whether or not the Company's voting rights in an investee are sufficient or not to give it power, including:
 - a) The percentage of the Group's voting rights relative to the size and apportionment of the shares of other vote holders;
 - b) Potential voting rights held by the Group, other vote holders or other parties;
 - c) Rights arising from other contractual arrangements; and
 - d) Any additional facts and circumstances that indicate that the Group has, or does not have, the current ability to direct the relevant activities, at the time that decisions need to be made, including voting patterns at previous shareholders' meetings.

Subsidiaries are consolidated from the date on which control is obtained until the date that such control ceases.

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All inter-company assets and liabilities, equity, income, expenses and cash flows relating to transactions between entities of the Ecopetrol Business Group were eliminated on consolidation. Unrealized losses are also eliminated. Non-controlling interest represents the proportion of profit, other comprehensive income and net assets in subsidiaries that are not attributable to Ecopetrol shareholders.

The following subsidiaries were incorporated in 2017:

- a) **Esentia Resinas del Perú SAC:** wholly-owned subsidiary in Refining whose corporate purpose is the commercialization of polypropylene resins and master batches in Peru.
- b) **ECP Hidrocarburos México S.A. de CV:** wholly-owned subsidiary in Exploration and Production, engaged in operating oil contracts in Mexico, starting with blocks 6 and 8 of Round 2.1 in shallow waters.

2.3 Measurement basis

The consolidated financial statements have been prepared on a historical cost basis, except for financial assets and liabilities that are measured at fair value through profit or loss and/or changes in other comprehensive income at the end of each reporting period, as explained in the accounting policies included below.

Historical cost is generally based on fair value of the consideration given in exchange for goods and services.

The fair value is the price that would be received from selling an asset or that would be paid for transferring a liability among market participants, in an orderly transaction, on the date of measurement. When estimating the fair value, the Ecopetrol Business Group uses assumptions that market participants would use for pricing an asset or liability at current market conditions, including risk assumptions.

2.4 Functional and presentation currency

The consolidated financial statements are presented in Colombian Pesos, which is the Ecopetrol's functional currency. For each Group entity its functional currency is determined based of the main economic environment where it operates.

The statements of profit or loss and cash flows of subsidiaries with functional currencies different from Ecopetrol S.A.'s functional currency are translated at the exchange rates on the dates of the transaction or based on the monthly average exchange rate. Assets and liabilities are translated at the closing rate and other equity items are translated at exchange rates at the time of the transaction. All resulting exchange differences are recognized in other comprehensive income. On disposal of all or significant part of a foreign operation, the cumulative translation adjustment related to the particular foreign operation is reclassified to profit or loss.

The financial statements are presented in Colombian pesos rounded up to the closest million unit (COP 000,000) except when otherwise indicated.

2.5 Foreign currency

Transactions in foreign currencies are initially recorded by the Group's entities at their respective functional currency spot rates at the transactions date. Monetary items denominated in foreign currencies are translated at the functional currency spot rates prevailing at the reporting date. Differences arising on settlement or translation or monetary items are recognized in profit or loss, in financial results, net, except those resulting from the conversion of loans and borrowings designated as cash flow hedges or net investment in a foreign operation hedge, which are recognized in other comprehensive income within equity. When the hedged item affects the financial results, exchange differences accumulated in equity are reclassified to profit or loss as part of operating results.

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Non-monetary items measured at fair value that are denominated in a foreign currency are translated using the exchange rates prevailing on the date when the fair value is determined. The gain or loss arising on translation of non-monetary items measured at fair value is treated in line with the recognition of the gain or loss on the change in fair value of the item.

2.6 Classification of assets and liabilities as current and non-current

The Ecopetrol Business Group presents assets and liabilities in the consolidated statement of financial position based on whether assets are classified as current or non-current.

An asset or liability is classified as current when:

- It is expected to be sold or consumed in the ordinary course of business;
- Held mainly for the purpose of trading;
- Expected to mature in twelve months or less; and,
- Cash or a cash equivalent, unless the exchange of such asset or liability is restricted or to be used to settle a liability more than twelve months after the reporting period; or
- In the case of a liability, there is no unconditional right to defer settlement of the liability until at least twelve months after the reporting period.

Other assets and liabilities are classified as non-current.

Deferred tax assets and liabilities are classified as non-current assets and liabilities.

2.7 Earnings (loss) per share (basic and diluted)

Basic earnings (loss) per share is calculated by dividing the profit for the year attributable to equity holders of Ecopetrol S.A., the parent company, by the weighted average number of ordinary shares outstanding during the year. There is no potential dilution of shares.

2.8 Reclassifications

As of December 31, 2017, the Group changed the presentation of deferred tax assets and liabilities balances by offsetting deferred tax balances levied by the same taxation authority. As a result, the Group reclassified the corresponding amounts as of December 31, 2016 to conform them to the current year's presentation, which had an immaterial impact in the deferred tax assets and deferred tax liabilities line items as of December 31, 2016. In addition, such reclassifications did not have an impact in the statements of cash flows, profit or loss and changes in equity for the year ended December 31, 2016. See additional details in Note 10 - Taxes.

3. Significant estimates and accounting judgments

The preparation of the consolidated financial statements requires management to make judgements, estimates and assumptions that affect the reported amounts of assets, liabilities, sales revenues, costs and commitments recognized in the financial statements and the accompanying disclosures. The Group based its assumptions and estimates on parameters available when the consolidated financial statements were prepared. Uncertainty about these assumptions and estimates could result in outcomes that required a material adjustment to the carrying amount of assets or liabilities affected in future periods. Changes in estimates are adjusted prospectively in the period in which the estimate is revised.

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In the process of applying the Group's accounting policies, management has made the following judgments and estimates which have the most significant impact on the amounts recognized in the consolidated financial statements:

3.1 Oil and gas reserves

Hydrocarbon reserves are estimates of the amount of hydrocarbons that can be economically and legally extracted from the Group's oil and gas properties.

The reserves estimation is conducted annually as of December 31 in accordance with the United States Securities and Exchange Commission (SEC) definitions and rules set forth in Rule 4-10(a) of SEC Regulation S-X and the disclosure guidelines contained in the SEC final rule - Modernization of Oil and Gas Reporting.

As required by current regulations, the future estimated date on which a field will no longer produce for economic reasons, is based on actual costs and average of crude prices (calculated as the arithmetical average of prices on the first day of the past 12 months). The estimated date for end of production will affect the amount of reserves, unless the prices have been defined by contractual agreements; therefore, if the prices and costs change from one year to the other, the proved reserves estimate also changes. Generally, our proved reserves decrease as prices go down and increase when prices go up.

Reserves estimation is an inherently complex process and it involves professional judgments. Reserves estimations are prepared using geological, technical and economic factors, including projections of future production rates, oil prices, engineering data and duration and amount of future investments, and they imply a certain degree of uncertainty. These estimations reflect the regulatory and market conditions existing on the date of reporting, which could significantly differ from other conditions during the year or in future periods. Any changes in regulatory and/or market conditions and assumptions could materially affect the reserves estimation.

Impact of oil reserves and natural gas in depreciation and depletion

Changes to estimations for proven developed reserves may affect the carrying amounts of exploration and production assets, natural resources and environment, goodwill, liabilities for dismantling and depreciation, depletion and amortization. With all other variables remaining unchanged, a decrease in estimated proven reserves would increase, prospectively, depreciation, depletion and amortization costs, while an increase in reserves would reduce depreciation and amortization expenses, as depreciation, depletion and amortization charges are calculated using the units of production method.

Information about the carrying amounts of exploration and production assets and the amounts charged to income, including depreciation, depletion and amortization, is presented in Notes 15 and 16.

3.2 Asset impairment (recovery)

Management uses its professional judgment in assessing the existence of evidence of an expense for (recovery of) impairment, based on internal and external factors.

When an indicator of impairment or reversal of a prior periods impairment exists, the Group estimates the recoverable amount of the cash generating units (CGU), which is considered the greater of fair value less costs of disposal and the value in use.

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The assessments require the use of estimates and assumptions, such as, among other factors: (1) estimation of the volumes and market value of oil and natural gas reserves; (2) production profiles for oilfields and the future production of refined and chemical products; (3) investments, taxes and future costs; (4) useful life of assets; (5) long-term prices; (6) the discount rate, which is revised annually and determined as the weighted average cost of capital (WACC); and (7) changes in environmental regulation. The recoverable amount is compared to the carrying amount of the asset, thus determining whether the asset is impaired or if the impairment recognized in prior periods should be reversed.

A previously recognized impairment loss is reversed only if there has been a change in the assumptions used to determine the assets or in the CGU's recoverable amount since the last impairment loss was recognized. The reversal is limited so that the carrying amount of an asset or CGU, other than goodwill, does not exceed either its recoverable amount, or the carrying amount that would have been determined (net of amortization or depreciation) had no impairment loss been recognized for the asset or CGU in prior periods.

Future oil price assumptions are estimated at current market conditions. Expected production volumes, which comprise proven and unproved reserves, are used for impairment testing because management believes this to be the most appropriate indicator of expected future cash flows, which would also be considered by market participants. Reserves estimates are inherently imprecise and subject to risk and uncertainty. Furthermore, projections about unproved volumes are based on information that is necessarily less robust than what is available for mature reservoirs.

These estimates and assumptions are subject to risk and uncertainty. Therefore, there is a possibility that changes in circumstances will impact these projections, which may also impact the recoverable amount of assets and/or CGUs, hence, may also affect the recognition of an impairment loss or the reversal of prior period impairment amounts.

3.3 Exploration and evaluation costs

The application of the Group's accounting policy for exploration and evaluation costs requires judgment in order to determine whether future economic benefits are likely, either from future exploitation or sale, or whether activities have not reached a stage which permits a reasonable assessment of the existence of reserves. Certain exploration and evaluation costs are initially capitalized when it is expected that commercially viable reserves will result. The Group uses its professional judgment of future events and circumstances and makes estimates in order to annually assess the generation of future economic benefits for extracting oil resources, as well as technical and commercial analyses to confirm its intention of continuing their development. Changes regarding available information such as drilling success level or changes in the project's economics, production costs, and investment levels, as well as other factors, may result in capitalized exploration drilling costs being recognized in profit or loss for the period. The expenses for dry wells is included in operating activities in the consolidated statement of cash flows.

3.4 Determination of cash generating units (CGU)

The allocation of assets in cash generating units requires significant judgment, as well as assessments regarding integration among assets, the existence of active markets, and similar exposure to market risk, shared infrastructure, and the way in which management monitors the operations. See Note 4.12 - Impairment of non-financial assets for more information.

3.5 Abandonment and dismantling costs of fields and other facilities

According to environmental and oil regulations, the Group is required to bear the costs for the abandonment of oil extraction and transportation facilities, which include the cost of plugging and abandoning wells, dismantling facilities, and environmental remediation in the affected areas.

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Estimated abandonment and dismantling costs are recorded at the time of the installation of the assets and are reviewed annually.

The calculations for these estimations are complex and involve significant judgments by Management. The ultimate decommissioning costs are uncertain and cost estimates can vary in response to many factors, including changes to relevant legal requirements, the emergence of new restoration techniques or experience at other production sites. The expected timing, extent and amount of expenditure may also change, for example, in response to changes in internal cost projections, changes in reserve estimates, future inflation rates and discount rates. The Group considers that the abandonment and dismantling costs are reasonable, based on the experience of the Group and market conditions; nevertheless, significant variations in external factors used for the calculation of the estimation could significantly impact the amounts recorded in the financial statements.

3.6 Pension plan and other benefits

The determination of expenses, liabilities and adjustments relating to pension plans and other defined retirement benefits makes it necessary for management to use its judgment in the application of actuarial assumptions made in the actuarial calculation. The actuarial assumptions include estimates regarding future mortality, retirement, changes in compensation and discount rate in order to reflect the time value of money, in addition to the rate of return on the plan's assets. Due to the complexity in the valuation of these variables, as well as their long term nature, the estimated amounts are quite sensitive to any change in these assumptions.

These assumptions are reviewed on an annual basis and may differ materially from actual results due to changes in economic and market conditions, regulatory changes, judicial rulings, higher or lower retirement rates, or longer or shorter life expectancies among employees.

3.7 Goodwill impairment

In December of each year, the Group performs an annual impairment test on goodwill to assess if its carrying amount may be impaired.

The determination of the recoverable amount is described in note 4.12 and its calculation requires assumptions and estimates. The Group considers that the assumptions and estimations used are reasonable and supportable based on the current market conditions and are aligned to the risk profile of the related assets. However, if different assumptions and estimations are used, they could lead to different results. Valuation models used to determine fair value are sensitive to changes in the underlying assumptions. For example, sales volumes and prices that will be paid for the purchase of raw materials are assumptions that may vary in the future. Adverse changes in any of these assumptions could lead to the recognition of goodwill impairment.

3.8 Litigation

The Group is subject to claims relating to regulatory and arbitration proceedings, tax assessments and other claims arising in the normal course of business. Management evaluates these claims based on their nature, the likelihood that they materialize and the amounts involved, to decide on the amounts recognized and/or disclosed in the financial statements.

This analysis, which may require considerable judgment, includes the assessment of current legal proceedings brought against the Group and claims not yet initiated. A provision is recognized when the Group has a present obligation derived from a past event, it is likely that an outflow of resources of economic benefits will be required to settle the obligation, and a reliable estimate of the amount of such obligation can be made.

3.9 Taxes

Calculation of the income tax provision requires interpretation of tax law in the jurisdictions where the Ecopetrol Business Group operates. Significant judgment is required to determine estimates for income tax on taxable profits and to evaluate the recoverability of deferred tax assets, which are based on the ability to generate sufficient taxable income during the periods in which such deferred taxes could be used or deduct.

To the extent that future cash flows and taxable income differ significantly from the estimates, the Group's ability to realize the deferred tax assets recorded could be affected.

Furthermore, changes in tax rules could limit the capacity of the Group to obtain tax deductions in future years, as well as the recognition of new tax liabilities resulting from auditing conducted by the tax authorities.

Tax positions taken involve a thorough assessment by Management, and are reviewed and adjusted in response to situations such as expiration in the applicability of laws, closing of tax audits, additional disclosures caused by any legal issue or a court decision relevant to a particular tax issue. The Group records provisions based on estimated potential liabilities that could be derived from a tax audit. The amount of these provisions depends on factors such as previous experience in tax audits and different interpretations of tax legislation. The actual results may differ from the estimates recorded.

3.10 Hedge accounting

The process of identifying hedging relationships between hedged items and the underlying instruments (derivative and non-derivative such as long-term foreign currency-denominated debt), and their corresponding effectiveness, requires the use of judgment by management. The Group periodically monitors the alignment between its hedge instruments and its risk management policy.

4. Accounting policies

The accounting policies indicated below have been applied consistently for all the periods presented.

4.1 Financial instruments

The classification of financial instruments depends on the nature and purpose for which the financial assets or liabilities were acquired and is determined at the time of initial recognition. Financial assets and financial liabilities are initially measured at their fair value.

Transaction costs that are directly attributable to the acquisition or issue of financial assets and financial liabilities (other than financial assets and financial liabilities at fair value through profit or loss) are added to or deducted from the fair value of the financial assets or financial liabilities, as appropriate, on initial recognition. Transaction costs directly attributable to the acquisition of financial assets or financial liabilities at fair value through profit or loss are recognized immediately in profit or loss.

All financial assets are initially recorded at fair value. Loans and trade receivables, other receivables and financial assets held-to-maturity are measured subsequently measured at amortized cost using the effective interest method.

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Equity investments available for sale that do not have a market quotation price and for which fair value cannot be reliably measured are measured at cost less any impairment identified at the end of each reporting period.

Measurements at fair value

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The fair value measurement is based on the presumption that the transaction to sell the asset or transfer the liability takes place in the principal market of the asset or liability or in the absence of a principal market in the most advantageous market for the asset or liability.

All assets and liabilities for which fair value is measured or disclosed in the financial statements are classified within the following scale based on the lowest level input that is significant to the fair value measurement as a whole, as follows:

- Level 1: Quoted (unadjusted) market prices in active markets for identical assets or liabilities. The fair value of the Group's marketable securities that a quoted market price is based on Level 1 inputs.
- Level 2: Valuation techniques for which the lowest level input that is significant to the fair value measurement is directly or indirectly observed. Level 2 inputs include prices of similar assets, prices obtained through quotations made by stockbrokers, and prices that can be substantially corroborated with other observable data with the same contractual terms.

For derivative contracts for which a quoted market price is not available, fair value estimations are generally determined using models and other valuation methods, the key inputs for which include future prices, volatility estimates, price correlation, counterparty credit risk and market liquidity, as appropriate. For other assets and liabilities, fair value estimations are generally based on the net present value of expected future cash.

- Level 3: Valuation techniques for which the lowest level input that is significant to the fair value measurement is unobservable. The Group does not use Level-3 inputs for the measurement of financial assets and liabilities. The Group may use Level-3 inputs for the calculation the recoverable amount of certain non-financial assets for the purpose of impairment testing.

Effective interest rate method

The effective interest rate method is a method of calculating the amortized cost of a financial instrument and accounting of income or financial cost over the relevant period. The effective interest rate is the discount rate that exactly discounts estimated future cash receipts or payments (including all fees, transaction costs and other premiums or discounts) through the expected life of the financial instrument (or, when appropriate, at a shorter period), to the net carrying amount on initial recognition.

Impairment

The Group evaluates, on each reporting date, if there is objective evidence that a financial asset or group of financial assets are impaired. Financial assets are evaluated for the impairment indicators at the end of each reporting period. Financial assets are considered to be impaired when there is objective evidence that, as a result of one or more events that occurred after initial recognition, the estimated future cash flows of the asset have been affected. For financial assets measured at amortized cost, the amount of the impairment loss recognized is the difference between the asset's carrying amount and the present value of estimated future cash flows, discounted at the financial asset's original effective interest rate.

De-recognition of financial assets

Ecopetrol derecognizes a financial asset only upon the expiration of the contractual rights to the cash flows of the asset or, when it has transferred its rights to receive such cash flows or has assumed the obligation to pay the cash flows received in full without material delay to a third party and (a) it has transferred substantially all the risks and benefits inherent in the ownership of the financial asset or (b) it has neither transferred nor retained substantially all the risks and benefits of the asset, but has transferred control of the asset.

When the Group does neither transfer nor retain substantially all the risks and benefits of the asset or transfer control of the asset, the Group continues to recognize the transferred asset, to the extent of its continuing participation, and it also recognizes the associated liability.

4.1.1 Cash and cash equivalents

Cash and cash equivalents include cash on hand, financial investments that are highly liquid, bank deposits and special funds with original maturity dates of ninety days or less which are subject to an insignificant risk of changes in value.

4.1.2 Financial assets

The Group classifies its financial assets in the following categories:

- a) Financial assets measured at fair value through profit or loss

Financial assets at fair value through profit or loss are financial assets held for trading and financial assets designated at the time of the initial recognition at fair value through profit or loss. Financial assets are classified as held for trading if they are acquired to be sold or repurchased in the short term. They are recognized at their fair value and losses or profits arising at the time of re-measurement are recognized in the statement of profit or loss.

- b) Financial assets measured at fair value with changes in other comprehensive income

These are equity instruments of other non-controlled and non-strategic companies not allowing for any type of control or significant influence thereon and where the Group's management does not intend to negotiate with them in the short-term. These investments are recorded at their fair value and unrealized gains or losses are recognized in other comprehensive income and credited to the available for sale reserve until the investment is derecognized, at which time, the cumulative gain or loss is recognized in other operating income, or the investment is determined to be impaired, when the cumulative loss is reclassified from the available to sale reserve to the statement of profit or loss.

- c) Loans and receivables

Loans and receivables are non-derivative financial assets with fixed or determinable payments that are not quoted in an active market. Loans and receivables, including trade and other receivables, are measured initially at fair value and then at amortized cost using the effective interest rate method, less impairment.

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Loans to employees are initially recorded using the present value of the future cash flows, discounted at the current market rate for similar loans. If the interest rate is less than the current market rate, fair value will be less than the amount of the loan. This difference is recorded as a benefit to employees.

4.1.3 Financial liabilities

Financial liabilities correspond to the financing obtained by the Group through bank credit facilities and bonds, accounts payable to suppliers and creditors.

Bank credit facilities and bonds are initially recognized at their fair value, net of transactions cost. After initial recognition, interest-bearing credit facilities and bonds are subsequently measured at amortized cost, using the effective interest rate method. The effective interest method amortization is included as a financial expense in the statement of profit or loss.

Accounts payable to suppliers and creditors are short-term financial liabilities recorded at nominal value, since it does not significantly differ from fair value.

A financial liability is derecognized when the obligation specified in the corresponding contract is paid or expired. When an existing financial liability has been replaced by another from the same lender, under substantially different terms, or the terms of an existing liability are substantially modified, such modification is treated as the derecognition of the original liability and recognized as a new liability. The difference between the respective carrying amounts is recognized in the statement of profit or loss.

4.1.4 Derivative financial instruments and hedging activities

Financial derivative instruments are initially recognized in the statement of financial position as assets or liabilities and are measured at fair value on the date on which the derivative is recorded and subsequently measured at fair value. Changes in the fair value of derivatives are recognized as gains or losses in the statement of profit or loss, except for the effective portion of cash flow hedges, which is recognized in other comprehensive income and later reclassified to profit or loss when the hedge item affects profit or loss.

Changes in fair value of derivative contracts, which do not qualify or are not designated as hedges, including forward contracts for the purchase and sale of commodities under negotiation for physical delivery or receipt of the commodity are recorded in profit or loss.

Derivatives embedded in the host contract are accounted for as separate derivatives at fair value if their economic characteristics and risks are not closely related to those of the host contracts and the and the host contracts are not held for trading or designated at fair value through profit or loss. These embedded derivatives are measured at fair value with changes in fair value recognized in profit or loss.

4.1.5 Hedging operations

For purposes of hedge accounting, hedges are classified as:

- Fair value hedges, when hedging the exposure to changes in fair value of a recognized asset or liability, or unrecognized firm commitment, or an identifiable portion of such asset, liability or firm commitment.
- Cash flow hedges when hedging the exposure to variability in cash flows that is either attributable to a particular risk associated with a recognized asset or liability or a highly probable forecast transaction.
- Hedges of a net investment in a foreign operation.

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At the inception of the hedging relationship, the Group formally designates and documents the hedge relationship between the hedging instrument and the hedged item, together with its risk management objectives and strategy to perform hedging transactions. Such hedges are expected to be highly effective in achieving offsetting changes in fair value or cash flows and are assessed on an ongoing basis to determine that they have been highly effective throughout the financial reporting periods for which they were designated.

4.1.5.1 Cash flow hedge

The effective portion of the gain or loss of the hedging instrument is recognized in other comprehensive income, while any ineffective portion is recognized in the consolidated statement of profit or loss, in the net financial results line item.

The amounts previously recognized in other comprehensive income are transferred to profit or loss, when the hedged transaction affects profit or loss. When the hedged item is the cost of a non-financial asset or liability, the amounts previously recognized in other comprehensive income are transferred to the initial carrying amount of the non-financial asset or liability.

If the hedging instrument expires or is sold, terminated or exercised without replacement or rollover, or if its designation as a hedge is revoked or when the hedge no longer meets the criteria for hedge accounting, any cumulative gain or loss previously recognized in other comprehensive income remains separately in equity until the forecast transaction occurs is recognized in the consolidated statement of profit or loss. When it is no longer expected that the initially hedged transaction will occur.

Ecopetrol designates long-term loans as hedging instruments for its exposure to the exchange risk in future oil exports. See Note 30 for further information.

4.1.5.2 Hedge of net investment in a foreign operation

Hedges of net investment in a foreign operation are accounted in a way similar to the cash flow hedges.

Gains or losses on of the hedging instrument related to the effective portion of the hedge are recognized in other comprehensive income, while any gains or losses relating to the ineffective portion are recognized in the statement profit or loss. Cumulative gains or losses recorded in equity is transferred to the consolidated statement of profit or loss when the foreign operation is partially or totally disposed of.

Ecopetrol allocates long-term loans as hedging instruments for its exposure to foreign exchange risk on its investment in subsidiaries whose functional currency is the U.S. dollar. See Note 30 for further information.

4.2 Inventories

Inventories are stated at the lower of cost and net realizable value.

Inventories mainly comprise crude oil, fuels and petrochemicals and consumable inventories (spares and supplies).

The cost of crude oil is the production costs, including transportation costs.

The cost required to bring the pipeline into working order, is treated as part of the related pipeline.

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The cost of other inventories is determined based on the weighted average cost method, which includes acquisition costs (deducting commercial discounts, rebates and other similar items), transformation, and other costs incurred to bring inventory to their current location and condition, such as transportation costs.

Consumable inventories (spares and supplies) are recognized as inventory and then charged to expense, maintenance or project to the extent that such items are consumed.

Ecopetrol estimates the net realizable value of inventories at the end of the period. When the circumstances that previously caused inventories to be written down below cost no longer exist, or when there is clear evidence of an increase in the net realizable value because of a change in economic circumstances, the amount of the write-down is reversed. The reversal cannot be greater than the amount of the original write-down, so that the new carrying amount will always be the lower of the cost and the revised net realizable value.

4.3 Related parties

Related parties are considered those in which one party has the ability to control, or has joint control of the other, or exercises significant influence over the other party in making financial or operational decisions, or is a member of key management personnel (or close relative of a member). The Group considers related parties to be associates, joint ventures, key management executives, entities managing resources for payment of employee post-employment benefit plans and Colombian government entities for the purposes of certain relevant transactions, such as the purchase of hydrocarbons and the fuel price stabilization fund (see Note 4.16).

4.3.1 Investments in associates

An associate is an entity over which the Ecopetrol Business Group has significant influence but not control. Significant influence is the power to participate in the financial and operational policy decisions of the investee, but it is not control or joint control over those policies. Generally, these entities are those in which the Group holds an equity interest with voting rights of 20% to 50%. See Exhibit I - Consolidated companies, associates and joint ventures for further details.

Investments in associates are accounted for using the equity method. Under this method, the investment in an associate is initially recognized at cost. The carrying amount of the investment is adjusted to recognize changes in the Group's share of net assets of the associate since the acquisition date. Goodwill related to the associate is included in the carrying amount of the investment and is not tested for impairment separately.

The Group's share of the results of operations of the associate is recognized in the consolidated statement of profit or loss. Any change in other comprehensive income is recognized in other comprehensive income of the Group.

After application of the equity method, the Group determines if it is necessary to recognize an impairment on its investment in its associate. At each reporting date, the Group determines whether there is objective evidence that the investment is impaired. If there is such evidence, the amount of the impairment is calculated as the difference between the recoverable amount and its carrying value, and then the impairment is recognized in the consolidated statement of profit or loss.

When necessary, the Group makes adjustments to the accounting policies of associates to ensure consistency with the policies adopted by the Group. Additionally, the equity method of these companies is measured on their most recent financial statements.

4.3.2 Joint ventures

A joint venture is a type of joint arrangement whereby the parties that have joint control of the arrangement have rights to the net assets of the joint arrangement. Joint control exists only when decisions about the relevant activities require unanimous consent of the parties sharing such control. The accounting treatment for the recognition of joint ventures is the same as investments in associates.

4.4 Joint operations

A joint operation is a type of joint arrangement whereby the parties that have joint control of the arrangement have rights to the assets and obligations for the liabilities, relating to the arrangement.

Joint operation contracts are entered into between Ecopetrol and third parties to share risk, secure capital, maximize operating efficiency and optimize the recovery of reserves. In these joint operations, one party is designated as the operator to execute the operations and report to partners according to their participating interests. Likewise, each party takes its share of the produced hydrocarbons (crude oil or gas) according to their share in production.

When Ecopetrol participates as a non-operator partner, it records the assets, liabilities, sales revenues, cost of sales and expenses based on the operator's report. When Ecopetrol is the direct operator of joint venture contracts, it records its percentage of assets, liabilities, sales revenues, costs and expenses, based on the participation of each partner in the items corresponding to assets, liabilities, sales revenues, costs and expenses.

When the Group acquires or increases its participation in a joint operation in which the activity constitutes a business combination, such transaction is recorded applying the acquisition method in accordance with IFRS 3 - Business combination. The acquisition cost is the sum of the consideration transferred, which corresponds to the fair value, on the date of acquisition of the assets transferred and the liabilities incurred. Any transaction cost related to the acquisition or increased share in the joint operation that constitutes a business combination is recognized in the consolidated statement of profit or loss.

The excess of the sum of the consideration transferred and the amount paid in the operation is recognized as goodwill. If the result is in an excess value of the net assets acquired over the amount paid in the operation, the difference is recognized as income in the consolidated statement of profit or loss on the date of recognition of the transaction.

4.5 Non-current assets held for sale

Non-current assets are classified as held for sale if their carrying values will be recovered principally through a sale transaction rather than through continued use. Non-current assets are classified as held for sale only when the sale is highly probable within one year from the classification date and the asset (or group of assets) is available for immediate sale in its present condition. These assets are measured at the lower of their carrying amount and fair value less related costs of disposal. See Note 13 for further information.

4.6 Property, plant and equipment

Recognition and measurement

Property, plant and equipment are stated at cost less accumulated depreciation and accumulated impairment losses. Tangible components related to natural and environmental resources are part of property, plant and equipment.

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The initial cost of an assets comprises its purchase price or construction cost, including import duties and non-refundable purchase taxes, any costs directly attributable to bringing the asset into operation, costs of employee benefits arising directly from the construction or acquisition, borrowing costs incurred that are attributable to the acquisition and construction of qualifying assets and the initial estimate of the costs of dismantling and abandonment of the item.

Spare parts and servicing equipment are recorded as inventories and recognized as an expense as they are used. Major spare parts and stand-by equipment that the entity expects to use during more than one period are recognized as property, plant and equipment.

Any gain or loss arising from the disposal of a property, plant and equipment is recognized in profit or loss of the period.

Subsequent disbursements

Subsequent disbursements correspond to all payments to be made on existing assets in order to increase or extend the initial expected useful life, increase productivity or productive efficiency, allow for significant reduction of operating costs, increase the level of reserves in exploration or production areas or replace a part or component of an asset that is considered critical for the operation.

The costs of repair, conservation and maintenance of a day to day nature are expensed as incurred. However, disbursements related to major maintenance are capitalized.

Depreciation

Property, plant and equipment is depreciated using the straight-line method, except for those associated with exploration and production activities which are depreciated using the units-of-production method. Technical useful lives are updated annually considering factors such as: additions or improvements (due to parts replacement or critical components for the asset's operation), technological advances, obsolescence and other factors; the effect of this change is recognized from the period in which it was executed. Depreciation of an asset starts when it is ready to be used.

Useful lives are determined based on the period over which an asset is expected to be available for use, physical exhaustion, technical or commercial obsolescence and legal limits or restrictions over the use of the asset.

The estimated useful life of assets fluctuates in the following ranges:

Plant and equipment	15 - 65 years
Pipelines, networks and lines	10 - 59 years
Buildings	12 - 80 years
Other	5 - 33 years

Land is recorded separately from buildings and facilities and is not subject to depreciation.

Depreciation methods and useful lives are reviewed annually and adjusted if appropriate.

4.7 Natural and environmental resources

Recognition and measurement

Ecopetrol uses the successful efforts method to account for exploration and production of crude oil and gas activities, following the provisions of IFRS 6 – Exploration for the evaluation of mineral resources.

Exploration costs

Acquisition and exploration costs are recorded as exploration and evaluation assets until the determination of whether the exploration drilling is successful or not; if determined to be unsuccessful, all costs incurred are recognized as expenses in the consolidated statement of profit or loss.

Exploration costs are those incurred with the objective of identifying areas that are considered to have prospects of containing oil and gas reserves, including geological and geophysical, seismic costs, viability, and others, which are recognized as expenses when incurred. Furthermore, disbursements associated with the drilling of exploratory wells and those related to stratigraphic wells of an exploratory nature are charged as assets until it is determined if they are commercially viable; otherwise, they are expensed in the consolidated statement of profit or loss as dry wells expense. Other expenditures are recognized as expenses when incurred.

An exploration and evaluation asset is no longer classified as such when the technical feasibility and commercial viability of extracting a mineral resource are demonstrable. Exploration and evaluation assets are reclassified to the natural and environmental resources account after being assessed for impairment.

All capitalized costs are subjected to technical and commercial revisions at least once a year to confirm the evaluation and exploration efforts continue on the fields; otherwise, these costs are written off through to profit or loss.

Exploration costs are net of the revenues obtained from the sale of crude oil during the extensive testing period, net of cost of sales, since they are considered necessary to complete the asset.

Development costs

Development costs correspond to those costs incurred to obtain access to proved reserves and to provide facilities for extracting, treating, gathering and storing. When a project is approved for development, the corresponding capitalized acquisition and exploration costs are classified as natural and environmental resources and costs subsequent to the exploration phase are capitalized as development costs of the properties that contain such natural resources. All development costs are capitalized, including drilling costs of unsuccessful development wells.

Production costs

Production costs are those incurred to operate and maintain productive wells, and are part of the corresponding equipment and facilities. Production activity includes extraction of oil and gas to the surface, its gathering, treatment and processing as well as storage in the field. Production costs are expenses recorded in the consolidated statement of profit or loss as incurred unless they add oil and gas reserves, in which case they are capitalized.

Production and support equipment is recognized at cost and is part of property, plant and equipment subject to depreciation.

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Capitalized costs also include decommissioning, dismantling, retiring and restoration costs, as well as the estimated cost of future environmental obligations. The estimation includes plugging and abandonment costs, facility dismantling and environmental recovery of areas and wells. Changes arising in new abandonment liability estimations and environmental remediation are capitalized in the carrying amount of the related asset.

Depletion

Depletion of natural and environmental resources is determined using the unit-of-production method per field, using proved developed reserves as a base, except in limited exceptional cases that require greater judgment by Management to determine a better amortization factor of future economic benefits over the useful life of the asset. Depreciation rates are reviewed annually, based on reserves reports and the impact of any changes is recognized prospectively in the financial statements.

Reserves are audited by internationally recognized external consultants and approved by the Company's Board of Directors. Proved reserves consist of the estimated quantities of crude oil and natural gas demonstrated with reasonable certainty by geological and engineering data to be recoverable in future years from known reserves under existing economic and operating conditions, that is, at the prices and costs that apply at the date of the estimation.

Impairment

Assets associated to exploration, evaluation and production are subject to review for possible impairment in their carrying amount. See notes 3.2 – Asset impairment (recovery) and 4.12 - Impairment of non-financial assets.

4.8 Capitalization of borrowing costs

Borrowing costs related to the acquisition, construction or production of a qualifying asset that requires a substantial period of time to get ready for its intended use are capitalized as part of the cost of such asset when it is probable that future economic benefits associated with the item will flow to the Group and costs can be measured reliably. Other borrowing costs are recognized as finance costs. Projects that have been suspended but that the Group intends to continue to pursue their development in the future, are not considered qualifying assets for the purpose of capitalization of borrowing costs.

4.9 Intangible assets

Intangible assets with a defined useful life, are stated at cost less accumulated amortization and any impairment loss. Intangible assets are amortized under the straight-line method, over their estimated useful lives. The estimated useful lives and amortization method are revised at the end of each reporting period; any change in estimates is recognized on a prospective basis.

The disbursements in relation to research activities are expensed as incurred.

4.10 Goodwill

Goodwill is initially measured at cost (being the excess of the aggregate of the consideration transferred and the amount recognized for non-controlling interest and any previous interest held over the net identifiable assets acquired and liabilities assumed). After initial recognition goodwill is measured at cost less any accumulated impairment loss. Goodwill is not amortized but tested for impairment annually.

4.11 Leases

Leases are classified as finance leases whenever the terms of the lease transfer substantially all the risks and rewards of ownership. All other leases are classified as operating leases.

Assets held under finance leases, when Ecopetrol is the lessee, are recognized in the consolidated statement of financial position at an amount equal to the fair value of the leased asset or, if lower, the present value of the minimum lease payment. These assets are depreciated over the asset's useful life. When there is no reasonable certainty that the company will obtain ownership of the asset at the end of the contract, the leased assets are depreciated in the shortest period between the asset estimated useful life and the lease term.

The corresponding liability to the lessor is included in the consolidated statement of financial position as a finance lease obligation, in the loans and financing line item.

Lease payments are apportioned between financial charges and reduction of lease liabilities in order to achieve a constant rate of interest on the liability remaining balance. Interest expense is recognized in profit or loss.

Operating lease payments are recognized as an expense on a straight-line basis over the lease term, except where another systematic prorating basis is more representative of the time pattern of economic benefits from the lease. Contingent rentals arising under operating leases are recognized as an expense in the period in which they are incurred.

4.12 Impairment of non-financial assets

In order to evaluate if any tangible or intangible assets are impaired, Ecopetrol compares its carrying amount with its recoverable amount at the end of each reporting period or earlier, if there is any indicator that an asset may be impaired.

For purposes of impairment testing, the assets are grouped into cash generating units (CGU), provided that those assets individually considered do not generate cash inflows that, to a greater extent, are independent from those generated by other assets or CGUs. The group of assets in different CGUs requires the exercise of professional judgment and the consideration, among other parameters, of the business segments. In this sense, in the Exploration and Production segment, each CGU corresponds to each one of the different contractual areas commonly called "fields"; by exception, in those cases where the cash inflows generated by several fields are interdependent from each other, those fields are grouped into a single CGU. In the case of the Refining and Petrochemicals segment, each CGU corresponds to each one of the refineries of the Ecopetrol Business Group and for the Transportation segment; each pipeline is taken as an independent CGU.

The recoverable amount of the asset is the higher amount of the fair value less costs of disposal or its value in use. If the recoverable amount of an asset (or of a CGU) is lower than its net carrying amount, such amount (or that of the CGU) is reduced to its recoverable amount, recognizing an impairment loss in the statement of profit or loss.

Fair value less costs of disposal is usually higher than the value in use for the asset's in the production segment due to some significant restrictions in the estimation of future cash flows, such as: a) future capital expenses that improve the CGU performance, which could result in expected increase of net cash flows, and b) items before taxes that reflect specific business risks, resulting in a higher discount rate.

Fair value less costs of disposal is determined as the sum of the future discounted cash flows adjusted to the estimated risk. The estimations of expected future cash flows used in the assessment of impairment of the assets include estimates of futures commodity prices, supply and demand estimations, and the margins of the products.

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Fair value less costs of disposal, as described above, is compared to valuation multiples and quoted prices of shares in companies comparable to Ecopetrol, in order to determine if it is reasonable.

When an impairment loss is recorded, future amortization expenses are calculated on the basis of the adjusted recoverable amount. Impairment losses may be recovered only if the recovery is related to a change in estimations used after impairment loss was recognized. These recoveries do not exceed the carrying amount of the assets net of depreciation or amortization that would have been determined if such impairment had not been recognized.

The carrying amount of non-current assets reclassified as assets held-for-sale is compared to its fair value less costs of disposal. No other provision for depreciation, depletion or amortization is recorded if the fair value less costs of sale is lower than the carrying amount.

4.13 Provisions and contingent liabilities

Provisions are recognized when Ecopetrol has a current obligation (legal or implied) as a result of a past event, it is probable that Ecopetrol will be required to settle the obligation, and a reliable estimation can be made of the amount of the obligation. Where applicable, they are recorded at present value, using a rate reflecting the liability specific risk.

Future environmental decommissioning costs related to current or future operations, are accounted for as expenses or assets, as the case may be. Expenditures related to past operations that do not contribute to the obtaining of current or future benefits, are expensed as incurred.

The recognition of these provisions coincides with the identification of an obligation related to environmental remediation and Ecopetrol uses available information to determine a reasonable estimation of the related cost.

Provisions for which a negative outcome is assessed as possible are not recognized but are disclosed in the explanatory notes; including those for which the amount cannot be estimated.

If there is an expectation that the provision will be reimbursed, either in whole or in part, for example by virtue of an insurance contract, the amounts expected to be reimbursed are recognized as a separate asset only when such reimbursement is almost certain.

If the effect of the time value of money is significant, the provisions are discounted using the current market rate before taxes reflecting, as applicable, the liability specific risks. When recognizing the discount, the increase of the provision resulting from time elapsed is recognized as financial cost in the profit or loss statement.

Asset retirement obligation

Liabilities associated with the retirement of assets are recognized when there are current obligations, either legal or implied, related to the abandonment and dismantling of wells, facilities, pipelines, buildings and equipment.

The obligation is usually recorded when the assets are installed or the surface or the environment are altered at the operating sites. These liabilities are calculated using the discounted cash flow method, using a pre-tax rate reflecting current market conditions similar liabilities and considering the economic limits of the field or the useful life of the respective asset. When it is not possible to determine a reliable estimation in the period in which the obligation originates, a provision is recognized when there is sufficient information available to make the best estimation.

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The carrying amount of the provision is reviewed and adjusted annually considering changes in the assumptions used for its estimation, using a rate that reflects the liability specific risk. Any change in the present value of the estimated expenditure is reflected as an adjustment to the provision and the corresponding property, plant and equipment and natural and environmental resources. When a decrease in the asset retirement obligation related to a producing asset exceeds the carrying amount of the asset, the excess is recognized in the consolidated statement of profit or loss. The financial cost of updating these liabilities is recognized in results for the period as financial expense.

4.14 Income tax and other taxes

Income tax expense is comprised of income tax payable for the period (including, income tax and income tax for equality - CREE, as appropriate) and the effect of deferred taxes in each period.

Current income taxes are recognized in income except when they relate to items recognized in other comprehensive income, in which case the corresponding tax effect is also recognized in other comprehensive income. Income tax assets and liabilities are presented separately in the consolidated statement of financial position except where there is a right of set-off within fiscal jurisdictions and an intention to settle such balances on a net basis.

4.14.1 Current income tax

The Group determines the provision for income tax based on the highest amount between taxable income and presumptive income (the minimum estimated amount of taxable profit on which the law expects to quantify and collect income taxes). Taxable income differs from profit before tax as reported in the consolidated statement of profit or loss, because of: items of income or expense that are taxable or deductible in other periods, special taxable deductions, tax losses and income and line items measured that, according to applicable tax laws in each jurisdiction, are considered nontaxable or nondeductible.

4.14.2 Deferred income tax

Deferred tax is provided using the liability method for temporary differences between the carrying amounts of existing assets and liabilities in the consolidated financial statements and their respective tax bases. A deferred tax liability is recognized for all taxable temporary differences. A deferred tax asset is recognized for all deductible temporary differences and for all accumulated tax losses, if there is a reasonable expectation that the Group will generate future tax profits against which they will be used.

Deferred taxes on assets and liabilities are calculated based on the tax rates that are expected to apply during the years in which temporary differences between the carrying amounts and tax bases are expected to be reversed.

The carrying amount of a deferred tax asset is subject to review at the end of each reporting period and it is reduced to the extent it is no longer probable that there Group will generate enough future taxable profit to realize such deferred tax asset.

In the statement of financial position, deferred tax assets are reflected net and as an offset against deferred tax liabilities, depending on the overall tax position in a particular jurisdiction and on the same taxable entity.

Deferred taxes are not recognized when they arise in the initial recognition of an asset or liability in a transaction (except in a business combination) and at the time of the transaction, does not affect the accounting or tax profit, or in respect of the taxes on the possible future distribution of accumulated profits of subsidiaries or investments accounted for by the equity method, if at the time of the distribution it may be controlled by Ecopetrol and it is probable that the retained earnings will be reinvested by the Group companies and, therefore, will not be distributed to Ecopetrol.

4.14.3 Other taxes

The Group recognizes in profit or loss the costs and expenses related to other taxes than the income tax, such as the wealth tax, which is determined based on the tax equity, the industry and commerce tax on income obtained in the municipalities for performance of commercial, industrial and service activities, and the transport tax on volumes loaded in the transport systems. Taxes are calculated in accordance with current tax regulations. For more details, see Note 10.

4.15 Employee benefits

Salaries and benefits for Ecopetrol staff are governed by the Colombian Collective Labor (Agreement 01 of 1977), and, by the Colombian Substantive Labor Code. In addition to the legally mandated benefits, employees are entitled to fringe benefits which are subject to the place of work, type of work, length of service, and basic salary. An annual interest of 12% is recognized on accumulated severance amounts for each employee, and the payment of compensation is provided for when special circumstances arise resulting in the non-voluntary termination of the contract, without justified cause, and in periods other than the probationary period.

Ecopetrol belonged to the special pension regime under which pension liabilities are Ecopetrol's responsibility and not pension fund's responsibility. However, Law 797 of January 29, 2003 and Legislative Act 001 of 2005 determined that Ecopetrol will no longer belong to the said regime and that from that point on employees would be part of the General Pension Regime. Consequently, pension obligations related to employees pensioned until July 31, 2010 are still Ecopetrol's responsibility. Employees are entitled to such pension bonus if they worked with Ecopetrol prior to January 29, 2003, but whose labor agreement expired without renewal before that date.

All labor benefits of employees who joined Ecopetrol before 1990 are Ecopetrol's responsibility, without the involvement of any social security entity or institution. Service cost for the employee and his/her relatives registered with the Group is determined by means of a mortality table, prepared based on facts occurring during the year.

For employees who joined Ecopetrol after the Act 50 of 1990 went in effect, Ecopetrol makes periodic contributions for severance payments, pensions and labor risks to the respective funds.

In 2008, Ecopetrol partially commuted the value corresponding to monthly pension payments from its pension liabilities, transferring such liabilities and their underlying amounts to autonomous pension funds (PAP, for its acronym in Spanish). The funds transferred, and returns on those funds, cannot be redirected nor they can be returned to the Group until all of the pension obligations have been fulfilled. The commuted obligation covers allowances and pension bonds payments; while health and education remains under the labor liability in charge of Ecopetrol.

Employee-benefits are divided into four groups comprised as follows:

a) Short-term employee benefits and post-employment defined benefits:

Benefits to employees in the short term mainly correspond to those which payment will be made in the term of twelve months following the closing of the period in which the employees have rendered their services. These mainly include salaries, severance payments, vacation, bonuses and other benefits.

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Post-employment benefits of defined contributions correspond to the periodic payments for severance, pensions and labor risk payments that the Group makes to the respective funds that assume these obligations in their entirety.

The above benefits are recognized as an expense with an associated liability after deducting any already paid amounts.

b) Post-employment defined benefit plans:

In the defined benefits plan, the Group provides the benefits agreed to current and former employees and assumes the actuarial and investment risks.

The following benefits are classified as long-term defined benefit plans recognized in the financial statements according to the calculations of an independent actuary:

- Pensions
- Pension bonds
- Health
- Educational plan
- Retroactive severances

Liabilities recognized in the statement of financial position in respect of these benefit plans are the present value of the defined benefit obligation at the date of the statement of financial position, less the fair value of plan assets.

The defined benefit obligation is calculated annually by independent actuaries using the projected credit unit method, which takes into account employees' years of service and, for pensions, average or final pensionable remuneration. This obligation is discounted at its present value using interest rates of high-quality government bonds denominated in the currency in which the benefits will be paid and of a duration consistent with the plan obligations.

These actuarial calculations involve several assumptions that could differ from the events that will effectively take place in the future. Said assumptions include the determination of the discount rate, future salary increases, mortality rates and future pension increase. Because of the complexity of the calculation, the underlying assumptions and long-term nature of these plans, the obligations for defined benefits are extremely sensitive to changes in assumptions. All key assumptions are revised at the end of the reported period.

In determining the appropriate discount rate, in absence of a broad high quality bond market, Management considers interest rates corresponding to the class B TES bonds issued by the Colombian Government as its best reference, at an appropriate discount rate with maturities extrapolated in line with the term expected for each benefit plan. The mortality rate is based on the particular country's rate, which latest version is the RV08 mortality table published in resolution 1555 of October 2010. The future salary and pension increases are linked to the country's future inflation rates. Note 22 - Provisions for employee benefits provides further details on key assumptions used.

The amounts recognized in the consolidated statement of profit or loss related to employees defined benefit plans are comprised mainly by service cost and the net financial expense. Service cost includes mainly the increase in present value of the benefit obligation during the period (current service cost) and the amount resulting from a new benefit plan. Plan amendments corresponds to changes in benefits and are usually recognized when all legal and regulatory approvals have been obtained and the effects have been conveyed to the employees involved. The net financial expense is calculated using the net liability for defined benefits as compared with the yield curve of the discount rate at the beginning of each year for each plan. The net defined benefit liability or asset resulting from actuarial profits and losses, the asset ceiling effect and the asset profitability, excluding the value of recognized in the consolidated statement of profit or loss, are recognized in other comprehensive income.

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When the plan assets exceed the gross obligation, the recognized asset is limited to the lower of the surplus in the defined benefits plan and the ceiling of assets determined using a discount rate based on Colombian Government bonds.

(a) Other long term benefits

Other long-term benefit is the five-year term bonus which also considered in the actuarial calculation. This benefit is a cash bond that accumulates annually and is paid every five years to employees. The Group recognizes in the consolidated statement of profit or loss the service cost, the net financial cost and the adjustment to the obligation of the defined benefit plan.

(b) Termination benefits

Termination benefits are recognized only when a detailed plan exists for such process and there is no possibility to withdraw the offer. The Group recognizes a liability and an expense for termination benefits at the earliest date between the date when the offer of such benefits cannot be withdrawn and the date when the restructuring costs are recognized.

4.16 Sales revenue recognition

Sales revenue from crude oil and natural gas sales is recognized at the time of transfer of title to the buyer, including risks and rewards of ownership. In the case of refined and petrochemical products, sales revenue is recognized when products are shipped by the refinery and subsequently adjusted in accordance with price changes when dealing with regulated price products, as explained below. Sales revenue from transportation services is recognized when products are transported and delivered to the buyer in accordance with contractual terms. In all other cases, sales revenue is recognized at the time it is earned and a true, probable and quantifiable right to demand its payment arises.

Under current regulations, Ecopetrol and Refinería de Cartagena S.A. sell regular gasoline and mid-distillates at a regulated price.

In accordance with Decree 1068 of 2015, the Ministry of Mines and Energy calculates semiannually and settles Ecopetrol's net position to be stabilized for each fuel by the Fuel Price Stabilization Fund (FEPC, for its acronym in Spanish). The amount to be settled is calculated as the volume sold during the corresponding period multiplied by the difference between the international parity price and the reference price actually charged. The net position is calculated by adding all differentials throughout the six month period in Colombian pesos in favor of the Group and chargeable to the FEPC. The international parity price is the daily price of gasoline and diesel oil of the respective month in Colombian pesos, indexed to the United States of America Gulf market price, calculated in accordance with Resolution 18 0522 of 2010. The reference price is the price per gallon fixed by the Ministry of Energy and Mines, at which refiners or importers sell gasoline or diesel to the national market. Therefore, this difference represents a higher or lower value of sales revenues for Ecopetrol S.A. and Refinería de Cartagena S.A.

4.17 Costs and expenses

Costs and expenses are presented according to their nature; they are detailed in the related disclosures in cost of sales, and administrative, operating, projects and other associated expenses.

4.18 Finance income (expenses)

Finance income and expenses include mainly: a) borrowings costs on loans and financing, except for those that are capitalized on qualifying asset, b) gains and losses on changes in fair value of financial instruments measured at fair value through profit or loss, c) currency exchange differences of financial assets and liabilities, except for debt instruments designated as hedging instruments, d) interest expenses as a result of discounting long-term liabilities (abandonment costs and pension liabilities), e) dividends derived from equity instruments measured at fair value with changes in other comprehensive income.

4.19 Information by business segment

Ecopetrol presents the respective disclosures relative to its business segments in its consolidated financial statements in accordance with paragraph 4 of IFRS 8 - Operation segments.

The operation of the Ecopetrol Business Group is performed through three business segments: 1) Exploration and Production, 2) Transport and Logistics, and 3) Refining, Petrochemical and Biofuels. This segmentation is based on management of objectives and corporate strategic plan, considering that these businesses: (a) are engaged in differential commercial activities, which generate sales revenue and incur costs and expenses; (b) the operational results are revised regularly by the Group's Governance that makes operational decisions to allocate resources to the various segments and assess their performance; and (c) there is differentiated financial information available. Internal transfers represent sales to inter-company segments and are registered and presented at market prices.

- a) **Exploration and production:** This segment includes activities related to the exploration and production of oil and gas. Sales revenues are derived from sales of oil and natural gas at market prices to other segments and to third parties (domestic and foreign distributors). Costs include costs incurred in production. Expenses include all exploration costs that are not capitalized.
- b) **Transport and Logistics:** This segment includes sales revenue and costs associated with the transport and distribution of hydrocarbons, derivatives and products operation.
- c) **Refining and Petrochemicals:** This segment mainly includes activities performed at the Barrancabermeja and Cartagena refineries, where crude from production fields is transformed. The sales revenue from products are realized to other segments and domestic and foreign customers and include refined and petrochemical products at market prices and some fuels at regulated price. This segment also includes industrial service sales to customers.

See figures of the information by segments in Note 33.

5. New accounting standards and regulatory changes

Ecopetrol adopted for the first time the following amendments to the IFRS issued by the IASB, applicable for the period covered by this report:

- Amendments to IAS 7 statement of cash flows - Disclosure initiative: requires entities to disclose changes in their liabilities arising from financing activities, including those arising from cash and non-cash flows (including, among others, the effect of fluctuations in the Colombian peso-U.S. dollar exchange rate). The adoption of the amendments to IAS 7 had no impact on the amounts recognized in the financial statements. The Group provides the information for the current period and the comparative period, required by this standard in Note 20 - Loans and borrowings.

The following accounting standards will become effective in future periods and are being implemented and /or assessed:

- IFRS 9 "Financial instruments" replaced IAS 39 "Financial Instruments: Recognition and Measurement" and entered into force for annual periods beginning on January 1, 2018. IFRS 9 includes standards on: 1) the classification and measurement of financial assets and liabilities, 2) impairment of financial assets, and 3) hedge accounting. Ecopetrol will apply these standards on their effective date.

In relation to classification and measurement, the Group made an assessment on its financial assets and liabilities and concluded that: a) the valuation of financial assets and liabilities measured at amortized cost is consistent with the Group's business model, which seeks to pay or receive cash flows at a certain moment; b) the amortized cost valuation method does not apply to short-term accounts payable and receivables, as they do not have an associated interest rate and their settlement is less than one year; and c) investment portfolios and financial derivatives continue to be measured at fair value with changes in fair value through profit or loss, in compliance with their function within the Group's business model.

Based on the aforementioned evaluations, the current classification of the Group's financial instruments is consistent with its business model and no significant change to the current accounting is expected.

With respect to the impairment assessment model applied to financial assets valued at amortized cost, Management believes that the adoption of IFRS 9 will not result in any impact, taking into account processes executed to monitor credit risk, knowledge prior to the financial situation of the counterparties with which transactions are made, and the quality of the portfolio.

Finally, with respect to the hedging accounting model, as an accounting policy, the Group decided to continue applying the guidance of IAS 39 for existing operations. Should Ecopetrol decide to establish new hedges, the requirements of IFRS 9 will be assessed to establish the relationship of those hedges to and their alignment with risk management objectives, as well as the qualitative and quantitative components to be considered for effectiveness of the assessment.

- IFRS 15 "Revenue from ordinary activities in contracts with customers" provides a five-step model to account revenue arising from contracts with customers, focusing on the identification and fulfillment of performance obligations. IFRS 15 replaces IAS 18 "Revenue" and is effective for annual periods beginning on or after January 1, 2018. According to the new standard, revenues are recognized when performance obligations are satisfied and there is no indication that the price or variable consideration are not measurable or realizable. Likewise, the recognition of revenue is observed when the client obtains control of the goods or services offered in an amount that reflects the consideration that the entity expects to receive in exchange for those goods or services. The standard also contains presentation and disclosure requirements that are more detailed than those defined by IAS 18, which represents an increase in the volume of disclosures required in the financial statements.

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The Ecopetrol Business Group will apply this standard on January 1, 2018, using the modified retrospective method, which allows adjusting the calculated impacts within equity, at the date of initial application, without adjusting the comparative years. Management estimates that the adoption of the new standard will not have a material effect; nevertheless, the adoption will require the implementation of new internal controls, changes in accounting procedures and policies to allow documentation on the adoption of the standard and its future application.

During the process of implementing IFRS 15, sources of ordinary income were assessed, considering the identification of contracts with customers, performance obligations, the determination of transaction prices, the association of prices with performance obligations, and the recognition of income when such obligations are fulfilled. The analysis included the following aspects by segment:

Exploration and production: Revenues in this segment correspond to the sale of oil and natural gas. The Group assessed the following: agreements with partners in joint operations, long-term contracts, over and underlifting, production, royalties, role of principal and agent, purchase and sale agreements, take-or-pay agreements and variable price components. No significant impacts were identified for the recognition, measurement or presentation of revenue in this segment.

The Group assessed whether the operating partner in a joint operation can have a contract with another non-operator partner to market and sell the non-operator product to a third party. The analysis included whether one of the parties acts as principal or agent in the agreement. The operator evaluates whether it records gross income based on total production or net income based on its net operating interest. The non-operator evaluates the moment of revenue recognition. The Ecopetrol Business Group does not maintain significant agreements with non-operating partners whereby it assumes the role of agent.

Transport and Logistics: Revenues in this segment correspond to the income from transport, storage and wholesale commercialization of crude or refined products derived from petroleum either by pipeline, rail, barge or truck. Pipelines and other transportation systems can be used to move crude oil from production sites to refineries and deliver the various refined products to fuel distributors. The main aspects evaluated are ship or pay and ship and pay contracts, variable price components and deposit agreements. The Ecopetrol Business Group has evaluated the performance obligations established in the provision of service, noting that there are no conditions with effects on the variable price related to volumetric adjustments or other contractual conditions that prevent recognition of income.

Take-or-pay contracts: Commodity sales contracts and some firm storage and transportation contracts can be structured as more complex purchase or minimum payment contracts, which specify minimum quantities of product that a customer will pay, even if they choose not to receive or use them. The quantities of products that a customer chooses not to take or use in the specified delivery period are called "deficient quantities."

No significant impacts were identified for recognition, measurement or reporting of revenue for this segment.

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Refining, Petrochemicals and Biofuels: Revenues in these segments correspond to the refining of oil, the processing and purification of natural gas, and the production of petrochemicals and biofuels. The main aspects assessed are long-term contracts, variable price components, non-monetary agreements, discounts, financing components and refinery network deliveries. No significant impacts were identified for the recognition, measurement or reporting of revenue for this segment.

For each of these segments, income is recognized when the goods or services have been delivered to customers at the established delivery points (when the performance obligation is fulfilled), whereby the transfer of the goods takes place and the risks associated with the products have been accepted by customers.

Regarding the agent and principal structure, as part of the process of selling products or services, the Ecopetrol Business Group enters into contracts to acquire, on behalf of the customer, other products or provide services. Under these contracts, the Ecopetrol Business Group is considered as the entity responsible for fulfilling the specific performance obligation. In some cases an inventory risk is not maintained before or after having sold the good or rendered the service. The Ecopetrol Business Group has assessed the impact on recognition in both cases and does not expect significant effects in the adoption of the new standard.

As a result of the analysis of these segments, it was concluded that: a) for contracts with several performance obligations, the Group concluded that such contracts are interdependent; therefore, the prices assigned are not independent and the application of a pricing methodology was not required; b) the Ecopetrol Business Group acts as principal in its transactions where it controls assets before transferring them to a client; c) the Group recognizes variable considerations in transaction prices unless they cannot be reliably measured, in which case the recognition is deferred until the uncertainty is resolved; d) the product's method is used by the Group to recognize income from long-term contracts with partial deliveries of goods; e) no effects associated with contract costs were identified when they were recognized in the accounting period and capitalization of the costs is not required; and, f) non-monetary agreements are recognized at fair value.

- IFRS 16 "Leases" provides a new model for a lessee's accounting, according to which all leases, other than those of short-term and with small amounts, will be recognized in the balance sheet, as an asset (right of use) and a liability (financial lease) and in the statement of profit or loss, the respective amortization of the right of use during the term of the lease. IFRS 16 will be effective for annual periods beginning on or after January 1, 2019, with limited possibilities for early implementation. IFRS 16 replaces the current IAS 17 "Leases" and IFRIC 4 "Determination of whether an agreement contains a lease".

IFRS 16 "Leases" contains a new model for the identification of leases and their treatment in the financial statements for lessees. As a result of its implementation, oil and gas companies could recognize more assets and liabilities, mainly derived from the rental of drilling equipment and offices.

Ecopetrol has completed its initial assessment and started an action plan for its implementation. The Group will continue to perform a more detailed analysis of the potential impact on the financial statements from the adoption of IFRS 16 and does not expect to adopt it in advance.

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- Amendments to IFRS 10 and IAS 28: Asset sale or contribution between an investor and its associate or joint venture.

The amendments address the conflict between IFRS 10 and IAS 28 as to the treatment of control loss of a subsidiary that is sold or contributed to an associate or joint venture. The amendments clarify that the gain or loss resulting from the asset sale or contribution that constitutes a business, as defined in IFRS 3, between the investor and its associate or joint venture, is recognized in its entirety. However, any gain or loss resulting from an asset sale or contribution that is not a business, is recognized only up to the interests of investors who are not related to the associate or joint venture. The IASB has deferred the effective date of these amendments indefinitely, but an entity that early adopts it must apply them prospectively.

- Annual Improvements to IFRS Standards 2014-2016 cycle: Modifications to the following standards:
 - IFRS 12: The interpretation clarifies the scope of the standard by specifying that disclosure requirements in the standard, except those listed in paragraphs B10 to B16, apply to the interests of an entity listed in paragraph 5 (subsidiaries, joint arrangements, associates and non-consolidated structured entities), which are classified as held for sale or discontinued operations in accordance with IFRS 5.
 - IFRIC 22 Transactions in foreign currency and early consideration: The interpretation deals with transactions in foreign currency where:
 - There is a consideration that is denominated in foreign currency;
 - The entity recognizes an asset for early payment or a deferred tax liability with respect to such consideration, before the recognition of the related asset, expense or income; and
 - The asset for said advance or deferred tax liability is not monetary.

The Interpretations Committee reached the following conclusions:

- The date of the transaction, in order to determine the exchange rate, is the date of the initial recognition of the non-monetary advance or deferred tax liability.
- If there are several payments received in advance, a transaction date is established for each payment.

These new accounting policies are subject to change until the Group presents its first financial statements on the initial application date.

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6. Cash and cash equivalents

Cash and cash equivalents details as of December 31, 2017 and 2016 is as follows:

	2017	2016
Banks	5,484,981	3,319,465
Short-term investments	2,459,438	5,090,048
Cash	1,466	954
	<u>7,945,885</u>	<u>8,410,467</u>

As of December 31, 2017, cash and cash equivalents balance included COP \$ 96,758 and COP \$ 114,206 as of December 31, 2016, of restricted cash to be used exclusively for the payment of loans principal and interest obtained by Oleoducto Bicentenario and Oleoducto de los Llanos. The use of short-term financial investments depends on the liquidity needs of the Group.

The fair value of cash and cash equivalents approximates their book value due to their short-term nature.

The return on cash and cash equivalents for the year ended December 31, 2017 was approximately 4.2% (2016 - 3.5%).

The following table reflects the credit quality of issuers of investments included in cash and cash equivalents:

Rating	2017	2016
AAA	2,807,170	3,198,394
A1	2,922,714	1,466,015
BRC1 +	1,152,593	312,290
F1	896,231	545,872
Aa3	99,029	-
Aa2	27,868	-
A-2	27,350	-
No rating available	12,750	67,185
F2	180	409,717
A1+	-	73,470
F1+	-	2,188,471
Prime-2	-	78,989
F3	-	37,172
Prime-3	-	32,748
B	-	144
	<u>7,945,885</u>	<u>8,410,467</u>

See credit risk policy in Note 30.3.

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7. Trade and other receivables, net

The balance of trade and other receivables, net of allowance for doubtful accounts, is comprised as follows as of December 31, 2017 and 2016:

	2017	2016
Current		
Customers		
Foreign	2,052,829	1,366,322
Domestic	1,533,058	1,180,577
Fuel price stabilization fund (1)	2,256,312	1,203,811
Related parties (Note 31)	23,013	97,730
Industrial services	26,223	60,025
Accounts receivable from employees (2)	34,461	42,407
Other	173,022	261,829
	6,098,918	4,212,701
Non-current		
Accounts receivable from employees (2)	484,504	425,468
Related parties (Note 31)	154,810	170,121
Fuel price stabilization fund (1)	77,510	77,510
Other	60,308	56,311
	777,132	729,410

- (1) Accounts receivable from the Ministry of Finance and Public Credit, arising from the differences between the international parity price of regular motor gasoline and diesel and the prices charged by the Group, in accordance with Resolution 180522 issued on March 29, 2010, as amended. The Ministry of Finance and Public Credit actually settles the payments.
- (2) Ecopetrol transferred the administration, management and control of loans granted to employees to Cavipetrol ("Corporación de los trabajadores de la Empresa Colombiana de Petróleos Ecopetrol S.A.").

The following shows the changes in the allowance for doubtful accounts for the year ended December 31, 2017 and 2016:

	2017	2016
Opening balance	144,329	160,406
Additions of allowances, net	35,229	19,438
Accounts receivable write-off and uses	(9,542)	(35,515)
Closing balance	170,016	144,329

8. Inventories, net

The balance of inventories, net of allowance for losses, as of December 31, 2017 and 2016 is as follows:

	2017	2016
Crude oil	1,836,363	1,557,267
Fuels and petrochemicals	1,481,777	1,270,870
Materials for the production of goods	1,283,256	1,013,764
	4,601,396	3,841,901

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The following is the changes of the allowance for losses, for the years ended December 31, 2017 and 2016:

	<u>2017</u>	<u>2016</u>
Opening balance	265,435	198,539
Additions	9,134	41,957
Foreign currency translation	(4,266)	50,053
Uses	(75,796)	(25,114)
Closing balance	194,507	265,435

9. Other financial assets

The balance of other financial assets as of December 31, 2017 and 2016 is as follows:

	<u>2017</u>	<u>2016</u>
Assets measured at fair value through profit or loss		
Investment Portfolio - Local currency	3,310,338	2,519,311
Investment Portfolio - Foreign currency	3,194,287	4,116,987
	6,504,625	6,636,298
Assets measured at amortized cost	3,636	4,152
Hedging instruments	25,464	46,445
Total	6,533,725	6,686,895
Current	2,967,878	5,315,537
Non-current	3,565,847	1,371,358
	6,533,725	6,686,895

The average return of the investment portfolio in Colombian pesos and U.S. dollars was 7.4% (2016- 8.1%) and 1.1% (2016 - 0.8%), respectively.

Changes in fair value are recognized in financial result (Note 29).

9.1 Restrictions

As of December 31, 2017 and 2016, there were no investment with a restricted use.

On November 6, 2016, through the Ministries of Mines and Energy and Finance and Public Credit, the termination of Ecopetrol's sequester status in the process of nullity and re-establishment of rights filed against the Comuneros de Santiago de las Atalayas was confirmed. In view of the foregoing, the restricted assets related to this case were released Ecopetrol (see Note 23.3 – Comuneros – Santiago de las Atalayas provisions, for further information).

9.2 Maturity

The following are the maturities of other financial assets as of December 31, 2017 and 2016:

	<u>2017</u>	<u>2016</u>
Up to 1 year	2,967,878	5,315,537
1-2 years	1,588,145	838,786
2-5 years	1,817,558	497,204
> 5 years	160,144	35,368
	6,533,725	6,686,895

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9.3 Fair value

The following is the balance of other financial assets by fair value hierarchy level as of December 31, 2017 and 2016:

	2017	2016
Level 1	317,912	25,066
Level 2	6,186,713	6,611,232
	<u>6,504,625</u>	<u>6,636,298</u>

There were no transfers between hierarchy levels for the years ended December 31, 2017 and 2016.

The securities comprising Ecopetrol's portfolio are valued on a daily basis according to the instructions issued by the Financial Superintendence of Colombia. To this end, the information provided by authorized entities is used, which includes data from active markets. For cases in which market data is not available, other directly or indirectly observable data is used.

For U.S. dollar-denominated investments, fair value is based on information released by Bloomberg while for investments denominated in Colombian pesos, fair value is provided by Infovalmer, an entity authorized by the Financial Superintendence of Colombia to provide this service.

Within the investment hierarchy process, in addition to the information used for the valuation, other relevant aspects are taken into account, such as the issuer's rating, investment rating, and the risk analysis of the issuer performed by Ecopetrol, which makes it possible to establish the appropriate hierarchy level for investments.

9.4 Credit rating

The following table reflects the credit quality of the issuers of other financial assets measured at fair value through profit or loss:

Rating	2017	2016
AAA	3,175,727	1,858,665
A1	1,149,606	3,060,660
AA+	1,067,989	50,192
BBB-	378,939	-
A	300,179	-
AA-	233,668	3,730
A+	175,767	-
BBB	21,835	-
AA	-	5,289
F1+	-	1,636,039
No rating available	915	21,723
	<u>6,504,625</u>	<u>6,636,298</u>

See credit risk policy in Note 30.3.

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10. Taxes

10.1 Current tax assets and liabilities

The balance of current tax assets and tax liabilities as of December 31, 2017 and 2016 is as follows:

	2017	2016
Current tax assets		
Income tax (1)	165,437	308,868
Credit tax balance (2)	234,410	598,140
Other taxes	225,527	222,090
Total	625,374	1,129,098
Current tax liabilities		
Income tax (1)	1,305,011	1,478,294
National tax and surcharge on gasoline	136,706	324,402
Carbon tax	51,383	-
Other taxes (3)	512,588	328,244
Total	2,005,688	2,130,940

- (1) Corresponds to the resulting value after subtracting advanced tax payments, favorable balances and advance payments settled in the previous year's statement. The main variation compared to the previous period corresponds to the decrease in non-deductible expenses, and the effects of the tax reform on issues such as depreciation and exchange difference.
- (2) Includes mainly the value added tax (VAT) receivable balance.
- (3) Mainly includes VAT payable balances and industry and commerce tax.

10.2 Income tax

In accordance with Law 1819/2016 (Tax Reform), the tax regulation applicable in Colombia for the 2017 taxable year and subsequent years is as follows:

- a) The income tax rate will be 34% for the taxable year 2017 and 33% for the taxable year 2018 and subsequently.
- b) A surtax was established on income tax for 2017 and 2018, of 6% and 4%, respectively, which is applicable when taxable income exceeds COPS800 million.
- c) Companies located in a free trade zone are taxed at a rate of 20%. If the Group located in a free trade zone has a Legal Stability Contract (hereinafter CEJ, for its acronym in Spanish), the income tax rate will continue to be 15% during the term of the said contract. This applies to Reficar, Bioenergy Zona Franca and Comai.
- d) Presumptive income will be calculated by applying a 3.5% rate to the liquid equity balance of the immediately preceding year. For entities that have a CEJ, the stabilized rate for the calculation of presumptive income will continue to 3%, during the term of the contract.
- e) For fiscal year 2017, the Ecopetrol Business Group has companies that are subject to a 40% income tax rate, companies in Free Trade Zones that are subject to a 15% income tax rate (which have CEJ) and 20% income tax rate, and other entities that are subject to statutory income tax rates in the country where they are incorporated.

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- f) Aligns the tax depreciation systems to accounting depreciation and establishes a limit to the annual depreciation deductible amount based on the table established in the tax reform. Tax amortization of oil and gas investments is calculated based on the technical production unit method which is aligned with accounting amortization.
- g) The cost of acquisition of exploration rights, G & G, exploratory drilling, etc., is capitalized for tax purposes until the technical and commercial feasibility of extracting the resource is achieved.
- h) Accumulated tax loss balance generated starting January 1, 2017 can be offset with the liquid income generated over the following 12 years (unlimited for those with CEJ).
- i) For the period January 1, 2013 through December 31, 2016, taxable income in Colombia was subject to a 25% income tax rate with an additional 9% related to the income tax for equality "CREE", excluding tax payers who, based on an express provision manage special rates, and 10% rate on income from occasional profits; 15% income tax rate for companies in the free trade zone pay, and those not generating net income or whose net taxable income or with net taxable income lower than the presumptive income at 3% rate on equity.

On December 23, 2014, through Law 1739, a surtax on income for equality - CREE was established for the years 2015, 2016, 2017 and 2018, which is applicable entities with taxable income above COP\$800 million, at rates of 5%, 6%, 8% and 9% per year, respectively.

For taxable year 2016, the Ecopetrol Business Group had companies subject to a 40% income tax rate, companies in free trade zones subject to a 15% and 20% income tax rate, and other entities that were subject to statutory income tax rates in the country where they are incorporated, and some other entities that pay taxes under presumptive taxable income in Colombia.

- j) As of December 31, 2017 and 2016, Refinería de Cartagena, Bioenergy, and Ecopetrol Costa Afuera S.A.S., subsidiaries, have accrued accumulated tax losses that can be offset with future taxable income of COP\$4,288,957 and COP\$ 3,352,216, respectively, originated between 2009 and 2017. As per current tax legislation, accumulated tax losses accrued starting fiscal year 2007 can be offset, or tax adjusted, at any time, against taxable income without prejudice of the periods in which the entity was subject to the presumptive income regime. Accumulated tax losses cannot be transferred to its shareholders. However, in accordance with Article 290 of Law 1819 of 2016, the unused accumulated tax losses through December 31, 2016, can be offset based on a formula contained in that article.

As of December 31, 2017, deferred tax assets related to unused accumulated tax losses, which do not expire, amounted to COP\$611,766 attributable to the Refinería de Cartagena. Such deferred tax assets were calculated based on COP\$4,078,439 of accumulated income tax losses. The recognition of this deferred tax is based on the refinery's operational stability of the refinery presented in 2017, the projection of margins and the optimization of costs.

The assessment of the accumulated tax losses related to companies Ecopetrol Costa Afuera S.A.S., Bioenergy and Bioenergy Zona Franca with respect to deferred tax is mentioned in this note under the chapter titled "Deferred Income Tax".

In accordance with Article 290 of Law 1819 of 2016, the unused presumptive income surplus and minimal base surplus generated before 2017 on income tax and CREE can be used based on a formula contained in said Article and subject to the terms established in Article 189 of the Tax Code.

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Statute of limitations of review for tax returns

Tax returns may be reviewed by the tax authorities within 5 years following the filing date and/or amendment, if the returns reflected tax losses.

As of the year 2017, the statute of limitations covering tax returns will be 3 years as of the date of expiration or as of the filing date, when these have been filed extemporaneously. With respect to transfer pricing, the statute of limitations will be 6 years.

With respect to tax returns with favorable balances, the statute of limitations will be 3 years as of the filing date of the request for devolution or offsetting.

With regard to tax returns in which tax losses are offset, these will be considered determined after 6 years counted as of their filing date. With respect to tax returns where tax losses are calculated, the statute of limitations will be 12 years and if the losses are offset within the last 2 years of the 12-year period, the statute of limitations will be extended up to 3 additional years from the year of offsetting.

Income tax expense

The following is a detail of the income tax recognized in profit or loss for the years ended December 31, 2017, 2016 and 2015:

	2017	2016	2015
Current income tax	5,144,962	4,517,336	3,510,546
Adjustments to prior years' tax	(68,270)	-	-
Deferred income tax	723,576	25,710	(2,800,193)
Income tax expenses	5,800,268	4,543,046	710,353

Reconciliation of the income tax expenses

The reconciliation between the income tax expenses and the tax determined based on the official rate applicable to the Group in Colombia is as follows:

	2017	2016	2015
Net income (loss) before income tax	13,769,662	7,790,526	(5,578,626)
Statutory rate	40%	40%	39%
Income tax at statutory rate	5,507,865	3,116,210	(2,175,664)
ETR reconciliation items:			
Effect in changes in tax rates and tax base (CREE tax)	910	807,989	2,063,782
Non-deductible wealth tax	85,872	229,375	253,422
Foreign currency translation and exchange difference	(186,787)	(234,316)	-
Prior year taxes	274,777	140,630	(21,233)
Non-deductible expenses	129,531	486,300	251,246
Valuation of investments	-	-	48,129
Non-taxable income	(11,900)	(3,142)	(19,986)
Income tax calculated	5,800,268	4,543,046	710,353
Current	5,076,692	4,517,336	3,510,546
Deferred	723,576	25,710	(2,800,193)
	5,800,268	4,543,046	710,353

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The effective tax rate (ETR) as of December 31, 2017 was 42.1% (2016 - 58.3%). The decrease compared to the previous year is mainly due to the following: a) Decrease in non-deductible expenses due to the effects of the transportation tax; b) Adjustment for differential of taxable bases; c) The adjustment for differential tax rates of the Group other than the nominal 40%, where the most significant item is the deferred tax asset to be amortized in the long term, with a rate lower than the nominal rate; and d) The adjustment of the wealth tax due to the effect of the rate, which is 0.4% for 2017, compared to 1% in 2016.

Income and supplementary tax returns for taxable years 2011, 2012, 2014, 2015 and 2016, and CREE returns for taxable years 2014, 2015 and 2016 of the Ecopetrol Business Group are subject to acceptance and review by the tax authorities. Management of the Ecopetrol Business Group companies considers that the amounts accounted as liability for payable taxes are sufficient and are supported by current regulations, doctrine and case law applicable to any claim that could be eventually filed with respect to such years. The Group's strategy is not making tax decisions based on aggressive or less-assured positions that could put into question its tax returns.

Deferred income tax

The following is the detail of the deferred tax balance on gains as of December 31, 2017 and 2016:

	<u>2017</u>	<u>2016</u>
Deferred tax assets	4,016,161	4,248,014
Deferred tax liabilities	(1,333,280)	(1,639,703)
Net deferred income tax	<u>2,682,881</u>	<u>2,608,311</u>

The deferred income tax assets and liabilities are reported net in compliance with the requirements of international financial reporting standards (IAS 12). As of December 31, 2017 and 2016, the deferred tax detail is as follows:

	<u>2017</u>	<u>2016</u>
Deferred tax assets (liabilities)		
Provisions (3)	1,840,988	1,875,965
Employee benefits (2)	1,373,561	656,997
Loss carry forwards	611,766	477,808
Accounts payable	208,618	311,607
Accounts receivable	94,864	133,840
Property plant and equipment and Natural and environmental resources (1)	(1,006,299)	(220,315)
Goodwill	(408,932)	(345,288)
Borrowings and other financial liabilities	-	(113,497)
Others	(31,685)	(168,806)
	<u>2,682,881</u>	<u>2,608,311</u>
Deferred tax assets	4,016,161	4,248,014
Deferred tax liabilities	(1,333,280)	(1,639,703)
	<u>2,682,881</u>	<u>2,608,311</u>

(1) For tax purposes, natural and environmental resources and property, plant and equipment have a useful life and a depreciation and amortization calculation methodology different from those determined as per international accounting standards.

(2) Actuarial calculations for health, retirement pensions, education, pension bonds and other benefits to long-term employees.

(3) The most representative item corresponds to the provision for well abandonment.

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The table above takes into consideration the offsetting of deferred tax assets and deferred tax liabilities within the same tax jurisdiction. The overall deferred tax position in a particular tax jurisdiction determines if a deferred tax balance is presented within deferred tax assets or deferred tax liabilities. Accordingly, certain deferred tax assets are presented within deferred tax liabilities, and certain deferred tax liabilities within deferred tax assets.

The following is the detail of the deferred tax assets (liabilities) for the years ended December 31, 2017 and 2016:

	Property plant and equipment and Natural resources	Provisions	Employee benefits	Loss carry forwards	Accounts payable
As of December 31, 2015	205,499	1,824,844	-	238,193	726,256
Recognized in profit or loss	(425,814)	51,121	40,300	239,615	(414,649)
Recognized in OCI	-	0	616,697	-	-
As of December 31, 2016	(220,315)	1,875,965	656,997	477,808	311,607
Recognized in profit or loss	(785,984)	(34,977)	(22,818)	133,958	(102,989)
Recognized in OCI	-	-	739,382	-	-
As of December 31, 2017	(1,006,299)	1,840,988	1,373,561	611,766	208,618

	Goodwill	Borrowings and other financial liabilities	Accounts receivable	Others	Total
As of December 31, 2015	(262,290)	(540,811)	17,927	3,804	2,213,422
Recognized in profit or loss	(82,998)	427,314	115,913	23,488	(25,710)
Recognized in OCI	-	-	-	(196,098)	420,599
As of December 31, 2016	(345,288)	(113,497)	133,840	(168,806)	2,608,311
Recognized in profit or loss	(63,644)	113,497	(38,976)	78,357	(723,576)
Recognized in OCI	-	-	-	58,764	798,146
As of December 31, 2017	(408,932)	-	94,864	(31,685)	2,682,881

The Ecopetrol Business Group offsets assets and liabilities for deferred taxes only if it has a legally enforceable right to offset current tax liabilities and assets; and in the case of deferred tax on assets and liabilities, to the extent that they also correspond to income taxes required by the same tax jurisdiction and the same tax authority.

Pursuant to current tax law, losses generated in income and supplementary taxes and/or income tax for equality - CREE before 2017, must be offset with the net income obtained in 2017 and subsequent periods, taking into account the formula set forth in Section 5, Article 290 of Law 1819 of 2016. Tax losses determined must not be tax readjusted.

As of the tax year 2017, companies can offset tax losses obtained in the current period defined, with taxable income generated through the next 12 taxable periods, following the attainment of said tax losses, without prejudice of the period's presumptive income.

Deferred tax assets related to tax losses generated by Bioenergy S.A. and Bioenergy Zona Franca in the amount of COP\$(53,328), and excess presumptive income of Refinería de Cartagena in the amount of COP\$(44,475) were written off in 2016 because, even though they can be offset in the long term, Management concluded that having a conservative position, it is not likely that the deferred tax assets related to such tax losses and excess of presumptive income would be recoverable in the short term.

If the Group would have recognized the deferred tax assets that were not recognized, the income for the period ended on December 31, 2017, would have increased by COP\$ 97,803.

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In accordance with tax provisions applicable until December 31, 2016, the surplus of presumptive income and the minimum base generated before 2017 in income and supplementary taxes and in the income tax for equality - CREE, respectively, can be offset with ordinary net income obtained by the Group in the next five years, using for such purpose the formula set forth in Section 6, Article 290 of Law 1819 of 2016.

The movements of deferred income tax for the years ended December 31, 2017 and 2016 are as follows:

	2017	2016
Opening balance	2,608,311	2,213,422
Deferred tax recognized in profit or loss	(723,576)	(25,710)
Deferred tax recognized in other comprehensive income (a)	798,146	420,599
Closing balance	2,682,881	2,608,311

(a) The following is the composition of the income tax recorded against other comprehensive income:

	Pre-tax	Deferred Tax	After tax
December 31, 2017			
Actuarial valuation gains (losses)	2,251,656	(739,382)	1,512,274
Cash flow coverage for crude exports	80,896	(54,056)	26,840
Other	12,119	(4,708)	7,411
	2,344,671	(798,146)	1,546,525
December 31, 2016			
Actuarial valuation gains (losses)	1,770,139	(616,697)	1,153,442
Cash flow hedging for future crude oil exports	(537,353)	220,596	(316,757)
Derivative financial instruments	(56,804)	22,722	(34,082)
Other	-	(47,220)	(47,220)
	1,175,982	(420,599)	755,383

Deferred tax assets (liabilities) not recognized

As of December 31, 2017, deferred tax assets (liabilities) are not recognized in the difference between the accounting and tax bases related to investments in companies of the Ecopetrol Business Group, as there is no intention to sell any of these investments in the foreseeable future.

10.3 Other taxes

10.3.1 Tax on dividends

The new tax on dividends will be applicable to foreign companies and entities on profits generated starting 2017.

The rate of this tax will be 5%. Furthermore, the tax rate for dividends will be 35%. In this scenario, the 5% tax on dividends will apply to the amount of the tax distribution, once it has been reduced with the 35% income tax.

For taxed individuals residing in Colombia, the tax on dividends will have a maximum 10% rate that will be applied on non-taxed dividends, and 35% with respect to taxed dividends distributed.

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There are no effects on income tax related to dividend payments made by the Group to its shareholders during 2017 and 2016.

10.3.2 Transfer prices

Income tax payers carrying out operations with related parties abroad or located in free trade zones or companies located in countries considered tax havens, must determine their ordinary and extraordinary revenues, costs and deductions, considering the arm's length principle for such transactions.

Such companies submitted their transfer-pricing information statement for the 2016 tax year and their respective supporting documents.

For the 2017 tax year, the transactions performed with related parties abroad, as well as the business conditions for such operations and their general structure, did not vary significantly as compared with the previous year. Therefore, it can be inferred that said transactions were performed in accordance with the arm's length principle. It is estimated that no adjustments will be required from the analysis of transfer prices in 2017, which entail amendments of the income provision of taxable year 2017.

10.3.3 Value added tax (VAT)

As of tax year 2017, the general sales tax rate is 19%, with a differential 5% rate for some goods and services is maintained in accordance with Articles 184 and 185 of Law 1819 of 2016.

As of tax year 2017, the VAT was extended to the sale of goods at large, the sale or concession of intangibles related to industrial property and to the provision of services in Colombia, or from services abroad, except for express exclusions of the norm, pursuant to Article 173 of Law 1819 of 2016.

Likewise, Article 194 of this Law stipulated that the term for filing requests for VAT deductions will be 3 bimonthly periods immediately following the period of causation.

10.3.4 Wealth tax

Law 1739 of 2014 established the wealth tax for natural and juridical persons whose possession of wealth at January 1, 2015 exceeds COP\$1,000 million. The taxable base for companies is the gross equity value held as of January 1, 2015, 2016 and 2017, less the debts valid on the same dates.

The applicable rate will depend on the taxable base of each taxpayer and the paid value will not be deductible or discountable on income and supplementary taxes or income tax for equality - CREE, nor can they be offset by these, or any other taxes.

In 2017, the wealth tax paid by the Group amounted to COP\$226,778, which was recognized as an expense in the period (2016 - COP\$569,756).

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11. Equity instruments measured at fair value

As of December 31, 2016, Equity instruments measured at fair value mainly included the shares that Ecopetrol owned in Empresa de Energía de Bogotá S.A.E.S.P, which were sold as part of the shareholding sales plan, authorized by the National Government through Decree 2305 of November 13, 2014. During the 2017, Ecopetrol completed the sales of shares under the sales plan with the following:

- On July 29, 2017, the sale of 10,999,163 shares took place, at a selling price of COP\$2,000 pesos per share. This sale amounted to COP\$21,998.
- On October 19, 2017, the shareholding sales plan was completed, with the sale of the remaining 17,465,872 shares at a price of COP\$2,000 pesos per share. This sale amounted to COP\$34,932.

The movement of equity instruments measured at fair value as of December 31, 2017 and 2016 is as follows:

	2017	2016
Opening balance	51,610	913,488
Fair value adjustments	(7,828)	126,205
Proceeds from sale of shares	(56,930)	(966,715)
Profit (loss) on sale of shares	13,236	(21,368)
Transfers	(88)	-
Closing balance	-	51,610

12. Other assets

The balance as of December 31, 2017 and 2016 of other assets is comprised as follows:

	2017	2016
Current		
Partners in joint operations (1)	583,656	735,032
Prepaid expenses	115,866	140,606
Advanced payments to contractors and suppliers	103,762	151,871
Related parties (Note 31)	7,716	7,135
Other assets	69,425	988
	880,425	1,035,632
Non-current		
Abandonment and pension funds (2)	323,621	312,423
Employee benefits	202,012	187,969
Advanced payments and deposits	74,225	63,402
Judicial deposits and attachments	43,248	140,338
Trust funds	32,748	87,602
Other assets	5,155	35,002
	681,009	826,736

(1) Corresponds to the net value of cash calls and cutbacks generated in relation to the operations carried out with partners through Exploration and Production (E&P) contracts, Technical Evaluations (TEA) contracts and agreements entered in to with the National Hydrocarbons Agency (ANH), as well as through association contracts and other types of contracts.

(2) Corresponds to Ecopetrol's share in trusts established to support costs of abandonment of wells and dismantling of facilities as well as the payment of future retirement pensions in some association contracts.

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13. Assets held for sale and their related liabilities

The balance as of December 31, 2017 and 2016 of assets held for sale and their related liabilities, which do not correspond to discontinued operations, included:

	<u>2017</u>	<u>2016</u>
Assets held for sale		
Surplus project materials (1)	56,049	65,703
Property, plant and equipment (2)	48,091	36,902
Oil fields (3)	-	29,611
	<u>104,140</u>	<u>132,216</u>
Liabilities related to assets held for sale		
Oil fields (3)	-	40,128
	<u>-</u>	<u>40,128</u>

- (1) Mainly includes assets remaining from the expansion project of the oil pipeline for transport of extra heavy crude conducted by Oleoducto Central SA - Ocesa. In 2017, the Group sold part of these assets, generating a loss of COP\$2,337 and expects to continue selling the remainder of these assets during 2018 depending on market conditions.
- (2) Includes buildings and land belonging to Ecopetrol and Andean Chemicals Ltd., the latter related to Louisiana Green Fuels (ethanol plant, water plant and harvesters). The Group recorded an impairment loss on these assets of COP\$11,292 and continues with its plan to sell these assets depending on market conditions.
- (3) Corresponds mainly to the Sogamoso, Rio Zulia, Rio de Oro and Puerto Barco, Santana, Nancy Maxine Burdine and Valdivia Almagro oil fields, awarded through an auction in November 2016. During the second and third quarter of 2017, Ecopetrol obtained the approval of the assignment of rights of these areas by the ANH, with the transfer of the assets and the corresponding sale being formalized. These operations generated a net profit of COP \$ 168,726. The liabilities associated with these assets corresponded to the dismantling and abandonment of the Group's obligations.

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14. Investments in associates and joint ventures

The details on the participations, economic activity, address, area of operations and financial information of the investments in joint ventures and associates can be found in Exhibit 1.

14.1 Composition and movements

The balance as of December 31, 2017 and 2016 of investments in associates and joint ventures, is as follows:

	2017	2016
Investment in joint ventures		
Equion Energy Limited	1,057,466	1,156,430
Offshore International Group	845,325	937,938
Ecodiesel Colombia SA	38,383	39,525
	1,941,174	2,133,893
Less impairment:		
Equion Energy Limited	(296,427)	(253,683)
Offshore International Group	(539,465)	(577,053)
	1,105,282	1,303,157
Investments in associates		
Invercolsa SA	223,963	243,156
Serviport SA	9,905	5,255
Olefinas Port Society	1,214	1,126
	235,082	249,537
Less impairment: Serviport SA	(9,904)	-
	225,178	249,537
	1,330,460	1,552,694

The following is the movement of investments in companies:

For the year ended December 31, 2017:

	Associates	Joint ventures	Total
Opening balance	249,537	1,303,157	1,552,694
Effects of equity method through:			
Profit or loss	46,669	46,869	93,538
Other comprehensive income	-	(14,752)	(14,752)
Dividends declared	(61,124)	(224,837)	(285,961)
Impairment (Note 18.1.2)	(9,904)	(5,155)	(15,059)
Closing balance	225,178	1,105,282	1,330,460

For the year ended December 31, 2016:

	Associates	Joint ventures	Total
Opening balance	69,516	1,862,418	1,931,934
Effects of equity method through:			
Profit or loss	48,299	13,046	61,345
Other comprehensive income	173,772	(49,127)	124,645
Dividends declared	(42,050)	(384,787)	(426,837)
Impairment (Note 18.1.2)	-	(127,858)	(127,858)
Reclassifications	-	(10,535)	(10,535)
Closing balance	249,537	1,303,157	1,552,694

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14.2 Restrictions on investments

The number of shares held by Ecopetrol in Invercolsa S.A. has been subject to a legal dispute with another shareholder of this company. The courts decided in favor of Ecopetrol through a ruling IN 2011, whereby it was determined that 324 million shares, equivalent to 11.58% of Invercolsa S.A.'s share capital should be returned to Ecopetrol. Ecopetrol's equity share in said company is 43.35%. The dividends paid in relation to the shares returned to Ecopetrol are also subject to controversy. As of December 31, 2017, the settlement of these claims is still pending.

14.3 Additional information about associates and joint ventures

The breakdown of assets, liabilities and results of the two main investments in associates and joint ventures, Equion Energy Limited and the Offshore International Group, as of December 31, 2017 and 2016 is as follows:

	2017		2016	
	Equion Energy Limited	Offshore International Group	Equion Energy Limited	Offshore International Group
Statement of financial position				
Current assets	909,927	289,618	712,078	317,700
Non-current assets	955,849	1,568,395	1,406,510	1,693,947
Total assets	1,865,776	1,858,013	2,118,588	2,011,647
Current liabilities	430,130	192,513	417,203	147,090
Non-current liabilities	98,835	657,746	170,527	671,577
Total liabilities	528,965	850,259	587,730	818,667
Equity	1,336,811	1,007,754	1,530,858	1,192,980
Other complementary information				
Cash and cash equivalents	170,618	32,490	300,689	22,224
Current financial liabilities	336,352	97,960	328,497	21,408
Non-current financial liabilities	2,921	214,259	309	356,353

	2017		2016		2015	
	Equion Energy Limited	Offshore International Group	Equion Energy Limited	Offshore International Group	Equion Energy Limited	Offshore International Group
Statement of profit or loss						
Sales revenue	1,213,692	393,210	1,204,301	379,811	1,218,796	463,660
Costs	(793,999)	(508,461)	(969,318)	(502,107)	(958,467)	(654,095)
Administrative expenses and others	12,188	(103,340)	(44,810)	(221,238)	(74,258)	(128,895)
Financial income (expenses)	2,373	(20,264)	59,143	(12,010)	37,970	(8,528)
Income tax	(180,546)	60,575	30,199	107,507	(209,221)	90,294
Financial year results	253,708	(178,280)	279,515	(248,037)	14,820	(237,564)
Other comprehensive results	913,728	-	935,847	-	1,024,423	-
Other complementary information						
Dividends paid to the Ecopetrol Business Group	217,075	-	375,035	-	284,984	-
Depreciation and amortization	557,970	232,953	678,488	228,250	642,369	229,317

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Included below, there is a reconciliation of equity between the most significant participations and the carrying amount of investments as of December 31, 2017 and 2016:

	2017		2016	
	Equion Energy Limited	Offshore International Group	Equion Energy Limited	Offshore International Group
Equity of the associate	1,336,811	1,007,754	1,530,858	1,192,980
% of Ecopetrol's ownership	51%	50%	51%	50%
Ecopetrol's ownership	681,773	503,877	780,738	596,490
Additional value of the investment	375,693	341,448	375,693	341,448
Impairment	(296,427)	(539,465)	(253,684)	(577,053)
Carrying amount of the investment	761,039	305,860	902,747	360,885

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15. Property, plant and equipment

The following shows a breakdown of the changes in property, plant and equipment and depreciation and impairment for the years ended December 31, 2017 and 2016:

	Plant and equipment	Pipelines, networks and lines	Work in progress (1)	Buildings	Lands	Other	Total
Cost							
Balance as of December 31, 2016	42,608,276	29,087,782	4,874,406	6,911,757	3,894,220	3,482,439	90,858,880
Additions/capitalizations	904,854	876,940	(102)	363,836	14,631	203,124	2,363,283
Increase in abandonment costs	51,619	105,097	-	-	-	-	156,716
Capitalized financial interests	38,847	33,875	8,501	6,941	1,027	20,113	109,304
Exchange differences capitalized	2,636	2,299	577	471	70	672	6,725
Disposals	(67,326)	(56,147)	(26,991)	(6,539)	(23)	(2,727)	(159,753)
Foreign currency translation	(136,501)	(49,800)	(13,302)	(4,904)	(7,850)	(3,394)	(215,751)
Transfers (2)	(840,511)	2,000,003	(976,771)	347,024	(62,720)	(893,531)	(426,506)
Balance as of December 31, 2017	42,561,894	32,000,049	3,866,318	7,618,586	3,839,355	2,806,696	92,692,898
Accumulated depreciation and impairment losses							
Balance as of December 31, 2016	(15,511,995)	(9,965,554)	(262,597)	(2,088,478)	(26,852)	(674,902)	(28,530,378)
Depreciation expense	(1,996,614)	(1,479,792)	-	(416,698)	-	(106,878)	(3,999,982)
Recovery (losses) for impairment (Note 18)	1,014,613	316,360	(372,804)	11,538	(7,794)	16,006	977,919
Disposals	54,244	13,464	-	807	-	2,583	71,098
Foreign currency translation	15,166	32,729	-	3,929	-	3,802	55,626
Transfers (2)	1,644,613	(1,378,833)	81,981	(179,660)	(4,876)	(26,032)	137,193
Balance as of December 31, 2017	(14,779,973)	(12,461,626)	(553,420)	(2,668,562)	(39,522)	(785,421)	(31,288,524)
Net balance as of December 31, 2016	27,096,281	19,122,228	4,611,809	4,823,279	3,867,368	2,807,537	62,328,502
Net balance as of December 31, 2017	27,781,921	19,538,423	3,312,898	4,950,024	3,799,833	2,021,275	61,404,374

(1) The balance of work in progress as of December 31, 2017, mainly includes investments in production at the Castilla field, the integral plan of electrical energy and secondary recovery of Yarigui and the modernization project of the Barrancabermeja refinery.

(2) Transfers correspond mainly to transfers to: a) inventory of project materials for use in the operation for COP\$ 250,239, b) classification of the intangible part of projects to natural resources for COP\$ 7,222 and c) others for COP\$ 31,852.

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	<u>Plant and equipment</u>	<u>Pipelines, networks and lines</u>	<u>Work in progress (1)</u>	<u>Buildings</u>	<u>Lands</u>	<u>Other</u>	<u>Total</u>
Cost							
Balance as of December							
31, 2015	37,360,222	26,856,085	11,015,010	6,479,356	4,068,951	3,653,798	89,433,422
Additions/capitalizations	1,457,547	1,383,352	(107,181)	360,596	41,202	511,413	3,646,929
(Decrease) increase in abandonment costs	(84,780)	(78,712)	-	-	-	6,137	(157,355)
Capitalized interest	-	-	205,662	-	-	37,116	242,778
Exchange differences capitalized	-	-	8,639	-	-	-	8,639
Disposals	(158,193)	(21,814)	(16,031)	(12,540)	713	(15,455)	(223,320)
Foreign currency translation	(42,870)	(298,750)	(1,629,613)	(9,832)	(69,878)	12,416	(2,038,527)
Other (reclassifications) (2)	4,076,350	1,247,621	(4,602,080)	94,177	(146,768)	(722,986)	(53,686)
Balance as of December 31, 2016	42,608,276	29,087,782	4,874,406	6,911,757	3,894,220	3,482,439	90,858,880
Accumulated depreciation and impairment							
Balance as of December							
31, 2015	(13,469,749)	(8,572,373)	(19,566)	(1,698,791)	(13,689)	(554,181)	(24,328,349)
Depreciation expense	(1,869,604)	(1,426,659)	-	(392,294)	-	(102,621)	(3,791,178)
Impairment (Note 17)	(659,223)	33,048	(3,270)	57,157	24,067	(13,517)	(561,738)
Disposals	121,382	14,022	-	7,021	15	11,524	153,964
Foreign currency translation	272,582	138,611	38,904	12,658	-	8,007	470,762
Other (reclassifications) (2)	92,617	(152,203)	(278,665)	(74,229)	(37,245)	(24,114)	(473,839)
Balance as of December 31, 2016	(15,511,995)	(9,965,554)	(262,597)	(2,088,478)	(26,852)	(674,902)	(28,530,378)
Net balance as of December 31, 2016	27,096,281	19,122,228	4,611,809	4,823,279	3,867,368	2,807,537	62,328,502

(1) The balance of work in progress as of December 31, 2016, mainly includes investments made in the development projects of the Castilla y Chichimene fields, integral energy plan (PIEEL for its acronym in Spanish), primary and secondary development of the Tibú-Socuabo project and modernization of the Refinería de Barrancabermeja.

(2) Corresponds mainly to transfers to: a) inventory of project materials for use in the operation for COPS\$(712,967) mainly Ecopetrol and Reficar, b) opening of the intangible part of projects to natural resources for COPS\$68,750 and c) other COPS\$116,692.

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16. Natural and environmental resources

The following is the movement of natural resources and amortization and impairment for the years ended December 31, 2017 and 2016:

	Oil investments	Asset retirement cost	Exploration and evaluation (1)	Total
Cost				
Balance as of December 31, 2016	47,079,096	2,304,915	4,818,124	54,202,135
Additions/capitalizations	2,422,203	59,345	944,857	3,426,405
Acquisition of interests in joint operations (Note 32.3)	141,950	-	-	141,950
Adjustment to fair value of participation in joint operations (Note 32.3)	451,095	-	-	451,095
Increase (decrease) in abandonment costs	224	(143,241)	25,935	(117,082)
Disposals	(38,072)	(629)	(214,850)	(253,551)
Dry wells (2)	-	-	(898,264)	(898,264)
Capitalized financial interests	72,395	-	9,952	82,347
Exchange differences capitalized	4,913	-	675	5,588
Foreign currency translation	(62,446)	(573)	(14,504)	(77,523)
Transfers (3)	112,500	(4,554)	(163,117)	(55,171)
Balance as of December 31, 2017	50,183,858	2,215,263	4,508,808	56,907,929
Accumulated amortization and impairment losses				
Balance as of December 31, 2016	(30,470,415)	(1,390,673)	-	(31,861,088)
Depletion expense	(3,979,179)	(194,140)	-	(4,173,319)
Recovery (losses) for impairment (Note 18)	376,934	-	-	376,934
Disposals	37,808	290	-	38,098
Foreign currency translation	42,114	245	-	42,359
Transfers (3)	(22,225)	(423)	-	(22,648)
Balance as of December 31, 2017	(34,014,963)	(1,584,701)	-	(35,599,664)
Net balance as of December 31, 2016	16,608,681	914,242	4,818,124	22,341,047
Net balance as of December 31, 2017	16,168,895	630,562	4,508,808	21,308,265

- (1) The balance of exploration and evaluation includes mainly investments made in the Purple Angel, Tayrona and unconventional hydrocarbons projects and in the developing fields, Piedemonte, Castilla y Tibú.
- (2) Includes mainly dry wells in operation of: 1) Ecopetrol S.A. for (COP\$450,524): Kronos, Brama, Catfish and Venus, among others, 2) Ecopetrol America Inc for (COP\$312,684): Warrior # 2 and Parmer and 3) Ecopetrol Costa Afuera for (COP\$57,877): Molusco.
- (3) Corresponds mainly to transfers to property, plant and equipment.

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	Oil investments	Asset retirement cost	Exploration and evaluation (1)	Total
Cost				
Balance as of December 31, 2015	44,148,353	1,762,374	6,189,142	52,099,869
Additions/capitalizations	3,045,474	10,391	(934,570)	2,121,295
Increase (decrease) in abandonment costs	-	566,213	(4,062)	562,151
Disposals	(26,548)	(37,942)	(121,032)	(185,522)
Dry wells (2)	-	-	(342,691)	(342,691)
Capitalized financial interests	-	-	98,431	98,431
Exchange differences capitalized	-	-	7,259	7,259
Foreign currency translation	(352,766)	(8,049)	(103,728)	(464,543)
Other	264,583	11,928	29,375	305,886
Balance as of December 31, 2016	47,079,096	2,304,915	4,818,124	54,202,135
Accumulated depreciation and impairment loss				
Balance as of December 31, 2015	(26,874,774)	(1,181,798)	-	(28,056,572)
Depletion expense	(3,496,998)	(208,769)	-	(3,705,767)
Impairment (Note 18)	(239,151)	-	-	(239,151)
Disposals	26,320	37,942	-	64,262
Foreign currency translation	218,898	5,171	-	224,069
Other	(104,710)	(43,219)	-	(147,929)
Balance as of December 31, 2016	(30,470,415)	(1,390,673)	-	(31,861,088)
Net balance as of December 31, 2015	17,273,579	580,576	6,189,142	24,043,297
Net balance as of December 31, 2016	16,608,681	914,242	4,818,124	22,341,047

- (1) The balance of exploration and evaluation mainly includes investments in production projects of direct operation in Castilla, Chichimene and Piedemonte. Additionally, it includes offshore exploration projects: Fuerte Sur, Kronos and Tayrona and Onshore: Caño Sur block, CPO 10 and non-conventional hydrocarbons program.
- (2) Includes dry wells in operation of: 1) Ecopetrol for COP\$302,965; 2) ECP Oil and Gas Germany GmbH for COP\$26,273; 3) Ecopetrol America Inc. for COP\$5,032; 4) Hocol S.A. for COP\$5,049 and 5) Ecopetrol Brasil for COP\$3,372.
- (3) Corresponds mainly of transfers to: a) non-current assets held for sale for COP\$244,387 and b) property, plant and equipment for COP\$(68,898) and c) other COP\$(17,532).

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Accounting for suspended exploratory wells

The following table shows the classification by ages, from the completion date, of the exploratory wells that are suspended as of December 31, 2017, 2016 and 2015:

	2017	2016	2015
Between 1 and 3 years (a)	600,767	1,300,874	490,184
Between 3 and 5 years (b)	791,261	197,997	100,316
More than 5 years (c)	250,219	153,552	161,392
Total suspended exploratory wells	1,642,247	1,652,423	751,892
No. of projects exceeding 1 year	24	24	59
Wells under 1 year of suspended	2,480	528,313	280,801

- (a) Corresponds mainly to discovery wells of Ecopetrol America Inc: Leon 2 and Warrior # 1, which are under evaluation.
- (b) The balance corresponds mainly to discovery wells of Ecopetrol America Inc: Leon 1, which are under evaluation and Rydberg which is currently working on the development plan and feasibility studies.
- (c) Corresponds mainly to wells of Offshore International Group, which are temporarily abandoned.

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17. Intangible assets

The following is the movement of intangibles and their amortization and impairment for the years ended December 31, 2017 and 2016:

	Licenses and software	Other intangibles (1)	Total
Cost			
Balance as of December 31, 2016	784,320	138,982	923,302
Acquisitions	169,545	6,323	175,868
Disposals	(9,469)	-	(9,469)
Foreign currency translation	(1,414)	(92)	(1,506)
Transfers	17,574	23,339	40,913
Balance as of December 31, 2017	960,556	168,552	1,129,108
Accumulated amortization			
Balance as of December 31, 2016	(583,680)	(67,490)	(651,170)
Amortization of the period	(89,216)	(18,830)	(108,046)
Disposals	8,744	-	8,744
Foreign currency translation	979	-	979
Transfers	(2,242)	2,853	611
Balance as of December 31, 2017	(665,415)	(83,467)	(748,882)
Net balance as of December 31, 2016	200,640	71,492	272,132
Net balance as of December 31, 2017	295,141	85,085	380,226
Useful life	< 5 years	< 7 years	
Cost			
Balance as of December 31, 2015	733,115	244,063	977,178
Additions	63,560	5,693	69,253
Disposals	(29,099)	-	(29,099)
Foreign currency translation	(9,359)	(149)	(9,508)
Reclassifications	26,103	(110,625)	(84,522)
Balance as of December 31, 2016	784,320	138,982	923,302
Accumulated amortization			
Balance as of December 31, 2015	(533,784)	(55,343)	(589,127)
Amortization expense	(81,913)	(28,142)	(110,055)
Disposals	29,097	-	29,097
Foreign currency translation	8,527	1	8,528
Reclassifications	(5,607)	15,994	10,387
Balance as of December 31, 2016	(583,680)	(67,490)	(651,170)
Balance as of December 31, 2015	199,331	188,720	388,051
Balance as of December 31, 2016	200,640	71,492	272,132
Useful life	< 5 years	< 7 years	

(1) Corresponds mainly to easements.

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18. Impairment of long-term assets

As mentioned in Note 4.12, each year the Group assesses whether there are indications of impairment of its assets or cash-generating units or whether an impairment loss recognized in previous periods may be reversed.

The impairment of our non-current assets includes expenses (or recovery) of impairment of property, plant and equipment and natural resources, investments in companies, goodwill and other non-current assets. The Group is exposed to future risks derived mainly from variations in: (i) the oil prices outlook, (ii) refining margins and profitability, (iii) cost profile, (iv) investments and maintenance expenses, (v) amounts of recoverable reserves, (vi) market and country risk assessments reflected in the discount rate, and (vii) changes in domestic and international regulations, among others.

Any change in the foregoing variables used to calculate the recoverable amount of a non-current asset can have a material effect on the recognition or either losses or recovery of impairment charges in the profit or loss statement. In our business segments highly sensitive variables can include, among others: (i) in the exploration and production segment, variations of the hydrocarbon prices outlook; (ii) in the refining segment, changes in product and crude oil prices, discount rate, refining margins, changes in environmental regulations, cost structure and the level of capital expenditures; and (iii) in the transport and logistics segment, changes in tariffs regulation and volumes transported.

Expense (recovery) for impairment

Based on impairment tests conducted by the Group, the following (recoveries) losses for impairment of long term assets for the years ended December 31, 2017, 2016 and 2015 are presented:

Expense (recovery of) impairment by segment	2017	2016	2015
Production and exploration	(183,718)	196,448	4,504,495
Refining and Petrochemicals	(1,067,965)	773,361	3,278,993
Transport and Logistics	(59,455)	(41,062)	81,387
	(1,311,138)	928,747	7,864,875
Recognized in:			
Property, plant and equipment (Note 15)	(977,919)	561,738	4,144,754
Natural resources (Note 16)	(376,934)	239,151	2,865,076
Investment in joint ventures and associates (Note 14)	15,059	127,858	588,144
Other non-current assets	28,656	-	-
Goodwill	-	-	266,901
	(1,311,138)	928,747	7,864,875

18.1 Exploration and production segment

The expenses for (recovery of) asset impairment of the Exploration and Production segment for the years ended December 31 of 2017, 2016 and 2015 is as follows:

	2017	2016	2015
Oilfields	(188,873)	68,590	3,649,451
Investment in joint ventures and associates (Note 14)	5,155	127,858	588,144
Goodwill	-	-	266,900
	(183,718)	196,448	4,504,495

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18.1.1 Oilfields

In 2017, based on new market variables, incorporation of new reserves, Ecopetrol's crude oil basket price discounts as compared to the ICE Brent crude price, available technical and operational information, there was a partial reversal of an impairment recognized in previous years for the oil fields that operate in Colombia CPO09, Casabe and Oripaya and in fields operated abroad Gunflint Dalmatian and K2, and an impairment in the Tibú, Underriver, Provincia and Orito fields.

In 2016, as a result of the revision of prospective oil prices in the long term, it was identified that some impairments recognized in previous years for oil fields could be recovered due to an improved future price scenarios. The main fields on which there was a recovery of impairment were Chichimene, Caño Sur, Apiay and Llanito. Similarly, the new technical information and operational aspects that gave rise to changes in investment levels caused an impairment in the Casabe, Tibú, Gunflint and Niscota fields.

The breakdown of the expenses for (recovery of) impairment of fields for the years ended December 31, 2017, 2016 and 2015 includes:

2017

Cash generating units	Carrying amount	Recoverable amount	Expense for (recovery of) impairment
Oil fields in Colombia			
Expense	2,172,747	1,588,207	584,540
Recovery	13,229,212	23,906,828	(298,210)
Fields operated abroad			
Recovery	748,510	1,324,010	(475,203)
			<u><u>(188,873)</u></u>

2016

Cash generating units	Carrying amount	Recoverable amount	Expense for (recovery of) impairment
Oil fields in Colombia			
Expense	5,258,265	4,902,943	1,117,020
Recovery	17,502,391	36,704,807	(1,090,434)
Fields operated abroad			
Expense	688,895	647,272	42,004
			<u><u>68,590</u></u>

2015

Cash generating units	Carrying amount	Recoverable amount	Expense for (recovery of) impairment
Oil fields in Colombia	10,323,500	7,645,665	2,430,923
Fields operated abroad	1,242,979	24,451	1,218,528
			<u><u>3,649,451</u></u>

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The assumptions used in the model to determine the recoverable amount include:

- The fair value less costs of disposal of the Exploration and Production segment assets was determined based on cash flows after tax derived from the business plans approved by Group's management, which are developed based on long-term macroeconomic policies and fundamental assumptions of supply and demand. The fair value category is level 3.
- Balance of oil and gas reserves, in addition to proven reserves included in Note 34; probable and possible reserves were also considered, adjusted by different risk factors.
- The real discount rate determined as the average weighted cost of capital of market participants (WACC) established for each company in the segment with rates ranging between 7.9% and 8.9% (2016 – 7.9% and 8.9%).
- Oil price - Brent: The forecasts include US\$52.9/barrel for 2018, US\$72.5/barrel average for the next six years and US\$81.9/barrel as of 2030. In 2016, the assumptions made used a price of US\$56.8/ barrel in 2017, US \$67.9/barrel average for the medium term and US\$80/ barrel in the long term. International oil price projections were carried out by an independent agency specializing in oil and gas, which takes into account the current scenarios of oil quota agreements of the OPEC (Organization of Petroleum Exporting Countries) and the impact of the changes in specifications issued by the international agreement to prevent pollution by ships (Marpol) as of the year 2020 on crude and fuels with high sulfur content.

The aggregation of assets to identify the CGUs is consistent as compared to the previous period.

18.1.2 Investment in associates and joint ventures from Exploration and Production segment

Investments in associated companies and joint ventures in the segment are recorded through the equity method. Ecopetrol evaluates if there is any objective evidence to determine if the value of such investments has deteriorated in the period, especially those Companies that were acquired with goodwill.

As a result, Ecopetrol recognized an expense for (recovery of) impairment in the value of its investments in companies as of December 31, as follows:

	2017	2016	2015
Equion Energy Limited	42,744	81,155	172,528
Offshore International Group	(37,589)	46,703	415,616
Total	5,155	127,858	588,144

The assumptions used to determine the recoverable amount of the companies assessed are those described in Note 18.1.1, except for the use of a discount rate in real terms in 2017 for Equion Energía Limited of 8.2% (2016 - 8.9%) and for Offshore International Group of 8.6% (2016 - 8.0%).

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In 2017, because of new market variables, new reserves, price differentials against reference indicators, and available technical and operational information, there was a recovery of an impairment recognized in previous years for Offshore International Group and Equion Energy.

For 2016, in spite of better forecasts of oil prices in the long term, there was an additional impairment in the investment in the Offshore International Group for the reversion to local authorities of some low-prospective success exploration blocks, high geological risk, and low economic viability with respect to a new price scenario.

18.2 Refining and Petrochemical segment

The Cash Generating Units with an expense for (recovery of) impairment in the Refining and Petrochemical segment for the years ended December 31 of 2017, 2016 and 2015 include:

2017

Cash generating units	Carrying amount	Recoverable amount	(Recovery) expense for impairment
Refinería de Cartagena	20,578,412	22,012,710	(1,434,298)
Refinería de Barrancabermeja (projects)	1,172,773	898,786	273,987
Bioenergy	757,741	665,395	92,346
	<u>22,508,926</u>	<u>23,576,891</u>	<u>(1,067,965)</u>

2016

Cash generating units	Carrying amount	Recoverable amount	Expenses for impairment
Refinería de Cartagena	21,672,367	21,206,515	465,852
Bioenergy	925,955	618,446	307,509
	<u>22,598,322</u>	<u>21,824,961</u>	<u>773,361</u>

2015

Cash generating units	Carrying amount	Recoverable amount	Expenses for impairment
Refinería de Cartagena	26,561,335	23,335,096	3,226,240
Bioenergy	642,139	589,386	52,753
	<u>27,203,474</u>	<u>23,924,482</u>	<u>3,278,993</u>

The aggregation of assets for identifying the CGUs is consistent across these periods.

18.2.1 Refinería de Cartagena

The recoverable amount of the Refinería de Cartagena was calculated based on the fair value less costs of disposal, which is higher than its value in continued use. The fair value less costs of disposal of the Refinería de Cartagena was determined based on cash flows after taxes that are derived from business plans approved by the Group's management, which are developed based on market prices provided by a third party expert, which considers long-term macroeconomic variables and fundamental supply and demand assumptions for crude and refined products. The fair value category is level 3.

The assumptions to determine the recoverable amount included: a) a gross refining margin determined by crude oil feedstock and products price outlook provided by an independent third party expert; b) an actual discount rate of 6.0% (2016 - 6.3%) determined under WACC methodology; c) current conditions or benefits, or similar, as an industrial user of goods and services of the free trade zone and during the validity of the license; d) level of costs and long-term operating expenses in line with international refinery standards of similar configuration and conversion capacity, e) refinery throughput and production, and f) level of continued investment.

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In 2017, we recorded a partial reversal of the impairment recorded in previous periods primarily as a result of: a) an improved outlook in refining margins due to the ratification of the implementation of the International Convention for the Prevention of Pollution from Ships (Marpol) starting in 2020; b) a lower discount rate resulting from the application of WACC methodology; and c) operational and financial optimizations identified as part of the stabilization of the refinery.

In 2016, we recorded an impairment caused mostly by adjustment of operational variables based on what was that observed during the stabilization period, offset by a lower discount rate and better refining margins.

18.2.2 Refinería de Barrancabermeja

In compliance with the provisions of IAS 36 - Impairment of the value of assets, during 2017 the Refinería de Barrancabermeja recognized COP\$273,987 for impairment, mainly related to the write off of certain management and financial capitalized balances associated with the suspended the modernization project of the Refinery. This suspension is in response to capital discipline criteria implemented to ensure the growth and financial sustainability of Ecopetrol S.A. and the Ecopetrol Business Group in the adverse context that the hydrocarbons sector experienced in previous years. This project is being assessed within the Group's strategic plan; and when the project is reactivated, any impairment loss recognized in previous years may be subject to recovery.

18.2.3 Bioenergy

The recoverable amount of Bioenergy was calculated based on the fair value less the costs of disposal level with value hierarchy 3, which is greater than the value in continued use and corresponds to the future cash flows discounted after taxes on profit.

The assumptions used in the model to determine the recoverable amount included: a) forecast of ethanol prices based on projections made by Ecopetrol specialists based on independent third party sources; and b) a 6.2% discount rate in real terms (2016 – 6.7% in real terms) determined under the WACC methodology.

In 2017 and 2016, we recorded an impairment mainly due to updating of the dates of entry into operation of the project, the stabilization process of the industrial plant, and the updating of operational variables.

18.3 Transport and Logistics segment

In 2017, there was a recovery of an impairment for the Transportation and Logistics segment for COP\$59,455, mainly in Oleoducto del Sur, which includes, among others, the Trans Andino Pipeline. The recovery was due to the inclusion of the Port of Tumaco in that generating unit.

The recovery of COP\$41,062 in 2016 was caused mainly by the incorporation of flows associated with the San Fernando - Apiay system project, which affects the recoverable amount of Los Llanos transport line, but was offset by the impairment of the Sur transport line.

The recoverable amount of these assets was determined based on its fair value with costs of disposal with value hierarchy 3, which corresponds to discounted cash flows based on the hydrocarbon production curves and tariffs regulated by the Ministry of Mines and Energy and the Energy and Gas Regulating Commission - CREG. The real discount rate used in the valuation was 5.0% (2016 -4.98%).

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19. Goodwill

The balance as of December 31, 2017 and 2016 of goodwill in acquisitions of subsidiaries is as follows:

	2017	2016
Transport and Logistics		
Oleoducto Central S.A.	683,496	683,496
Exploration and Production		
Hocol Petroleum Ltd.	537,598	537,598
Refining and Petrochemicals		
Andean Chemical Ltd	127,812	127,812
Propilco S.A	108,137	108,137
	1,457,043	1,457,043
Less impairment Hocol Petroleum Ltd.	(297,121)	(297,121)
	1,159,922	1,159,922

As of December 31, 2017 and 2016, the Group assessed the recoverability of the carrying value of goodwill generated in the acquisition of subsidiaries. The recoverable amount was determined based on the realization value less costs of disposal using the present value of future cash flows for each of the companies acquired with goodwill. The source of information used the financial projections of each company derived from the business plans approved by management, which were developed based on long term macro-economic factors such as price curves and margins and fundamental assumptions of supply and demand. As a result of the analysis, the Group did not recognize any goodwill impairment.

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20. Loans and borrowings

Exhibit 2 details the main conditions of the most significant loans of the Business Group.

20.1 Composition of loans and borrowings

The balances of the loans and financing, which are recorded at amortized cost, as of December 31, 2017 and 2016 are:

	Weighted average effective interest rate as of December 31		2017	2016
	2017	2016	2017	2016
Local currency				
Bonds	8.9%	8.6%	1,692,471	2,008,203
Syndicated loan	8.7%	9.5%	3,307,950	3,828,329
Other (1)	7.7%	9.1%	978,795	905,266
			5,979,216	6,741,798
Foreign currency				
Bonds	6.1%	6.1%	29,166,594	29,310,165
Commercial loans – Refinería de Cartagena	4.3%	4.1%	7,401,781	7,988,678
Commercial loans	4.3%	2.9%	528,815	7,945,693
Other (1)			471,429	235,693
			37,568,619	45,480,229
			43,547,835	52,222,027
Current (2)			5,144,504	4,126,203
Non-current			38,403,331	48,095,824
			43,547,835	52,222,027

(1) Includes financial leasing and debt in connection with build, operate, maintenance and transfer (BOMT) contracts.

(2) The increase in the current portion is mainly due to the expiration of: i) the first tranche of local bonds issued by Ecopetrol S.A. in 2013, and ii) the 5-year series of international bonds issued in 2013 by Ecopetrol S.A.. These bonds mature in August and September 2018, respectively.

20.2 Main movements of loans and borrowings

Bonds - foreign currency

- On June 8, 2016, Ecopetrol reopened its bonds due in September 2023 for US\$ 500 million, with payment of principal at maturity and interest payable semiannually at a coupon fixed rate of 5.875%. The current total amount of the bond in force is US\$ 1,800 million.

Foreign currency commercial loans

- On June 30, 2017, Ecopetrol prepaid all of its international syndicated loan, whose nominal value was US\$ 1,925 million and original maturity in February 2020. This loan was a hedging instrument for future oil exports.
- On December 15, 2017, Ecopetrol prepaid the loan entered into in January 2016 with The Bank of Tokyo-Mitsubishi UFJ, Ltd. (BTMU), for a nominal value of US\$ 175 million, which had an original term of 5 years, amortizable with 2.5 years of grace on principal repayments and interest payable semiannually at the Libor 6M rate (6 months) + 145 basis points.

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- On December 15, 2017, Ecopetrol prepaid the loan acquired in May 2016 with Export Development Canada (EDC), for a nominal value of US\$ 300 million, which had an original term of 5 years, with principal payable at maturity and interest payable semiannually at the Libor 6M rate (6 months) + 140 basis points.

Local currency commercial loans

- On February 23, 2016, Ecopetrol entered into a bilateral commercial credit agreement with Bancolombia SA for COP\$990,000, which was prepaid in October 2016. This loan had a term of 8 years, amortizable with 2 years of grace on principal repayments, with interest payable semiannually at a DTF TA + 560 basis points.
- On August 14, 2017, Ecopetrol entered into an agreement for a committed credit line with Bancolombia S.A. for COP\$990,000 as a contingent financing mechanism, has available for 2 years, with the following conditions: 10-year term from the date of the first disbursement, 2 years of grace on principal repayments, interest rate of IBR, at six months + 300 basis points and a commission of availability of 7.2 basis points per year on the amount not disbursed during the availability period. Under this facility, Bancolombia SA undertakes to disburse the resources when required by Ecopetrol as per the terms and conditions previously agreed between the parties. As of December 31, 2017, the use of resources from this credit line has not been required.

20.3 Maturity of loans and borrowings

The following are the maturities of loans and borrowing as of December 31, 2017:

	Up to 1 year (1)	1-5 years	5-10 years	> 10 years	Total
Local Currency					
Bonds	253,172	742,512	322,956	373,831	1,692,471
Syndicated loan	739,348	2,009,420	559,182	-	3,307,950
Other	98,729	415,599	308,121	156,346	978,795
	1,091,249	3,167,531	1,190,259	530,177	5,979,216
Foreign currency					
Bonds	2,651,174	9,948,238	12,018,813	4,548,369	29,166,594
Commercial loans – Refinería de Cartagena	958,918	3,635,848	2,807,015	-	7,401,781
Commercial loans	153,873	315,849	59,093	-	528,815
Other	289,290	119,014	63,125	-	471,429
	4,053,255	14,018,949	14,948,046	4,548,369	37,568,619
	5,144,504	17,186,480	16,138,305	5,078,546	43,547,835

(1) Includes short-term credit and the current portion of long-term debt, as applicable.

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The following are the maturities of loans and borrowing as of December 31, 2016:

	Up to 1 year (1)	1 - 5 years	5-10 years	> 10 years	Total
Local currency					
Bonds	312,207	955,204	357,015	383,777	2,008,203
Commercial loans	793,743	2,375,023	659,563	-	3,828,329
Others	58,952	333,372	339,009	173,933	905,266
Total local currency	1,164,902	3,663,599	1,355,587	557,710	6,741,798
Foreign currency					
Bonds	1,648,707	10,956,507	12,133,576	4,571,375	29,310,165
Commercial loan Refinería de Cartagena	875,734	3,549,216	3,472,379	91,349	7,988,678
Other commercial loans	371,804	7,450,587	123,302	-	7,945,693
Other	65,056	114,226	56,411	-	235,693
Total foreign currency	2,961,301	22,070,536	15,785,668	4,662,724	45,480,229
	4,126,203	25,734,135	17,141,255	5,220,434	52,222,027

(1) Includes short-term credit and the current portion of long-term debt, as applicable.

20.4 Breakdown by type of interest rate and currency

The following is the breakdown of loans and borrowing by type of interest rate as of December 31, 2017 and 2016:

	2017	2016
Local currency		
Fixed rate	143,156	299,472
Floating rate	5,836,060	6,442,326
	5,979,216	6,741,798
Foreign currency		
Fixed rate	35,062,742	35,719,486
Floating rate	2,505,877	9,760,743
	37,568,619	45,480,229
	43,547,835	52,222,027

The floating rate loans in local currency are indexed mainly to the CPI (Consumer Price Index) and the DTF (Fixed Term Deposits); and those in foreign currency loans at LIBOR plus a spread.

20.5 Loans designated as hedging instrument

As of December 31, 2017, the Group designated US\$8,532 million (2016 - US\$10,512 million) of foreign currency debt as a hedging instrument of which, US\$5,200 million is used to hedge the net investment in foreign operations with the US dollar as their functional currency and US\$3,332 million is used to hedge the cash flows of future crude oil exports. See Note 30 - Risk management, for further information.

20.6 Guarantees and covenants

Financing obtained directly by Ecopetrol S.A. in capital markets has no guarantees granted or financial covenant restrictions, due to the support of the Colombian Government through the Ministry of Finance and Public Credit.

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Until December 13, 2017, when Ecopetrol voluntarily assumed the international loan held by Reficar, in its capacity as sponsor, the following restrictions applied to Reficar: maintain a minimum debt service coverage ratio of 1.35:1; obligation to maintain a commercial trust and a depositary agreement for receiving resources of the new refinery to fulfill specific purposes such as operating expenses, interest and others.

The following is a summary of certain restrictions contained in certain loan instruments of Ecopetrol's subsidiaries:

- The loan entered into by Oleoducto de los Llanos is guaranteed with the economic rights of the ship-or-pay transportation agreements with Meta Petroleum Corp and also includes certain restrictions regarding capital contributions and asset disposal.
- The syndicated loan entered into by Oleoducto Bicentenario requires that this subsidiary maintain an established relationship of leverage and solvency and cash flow / service to the debt.
- The loan entered into by Bioenergy with Bancolombia is guaranteed with the La Esperanza 1 and 2 fields in the amount of COP\$6,343 and there are certain restrictions on the variation of direct or indirect ownership by Ecopetrol S.A. in this subsidiary.

Ecopetrol and its subsidiaries were in compliance with these restrictions as of December 31, 2017 and 2016.

20.7 Fair value of loans

The fair value of loans and borrowings is COP\$45,781,317 and COP\$52,109,438 as of December 31, 2017 and 2016, respectively.

For fair value measurement, local currency bonds were valued using Infovalmer reference prices, while bonds in U.S. dollars, were valued using Bloomberg. With regard to the other financial obligations for which there is no market benchmark, a discount to present value technique was used. These rates incorporate market risk through some benchmarks (Libor, DTF) and the Group's credit risk (spread).

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20.8 Movement of net financial debt

The following is the movement of net financial debt as of December 31, 2017, 2016 and 2015:

	Cash and equivalents	Other financial assets (1)	Loans and borrowings	Net financial debt
Balance as of December 31, 2015	6,550,450	1,585,379	(53,223,338)	(45,087,509)
Cash flow	2,086,350	5,446,507	1,050,723	8,583,580
Exchange difference:				
Recognized in profit or loss	(226,333)	(12,837)	1,252,420	1,013,250
Recognized in other comprehensive income	-	-	612,983	612,983
Financial cost registered to projects	-	-	(357,107)	(357,107)
Financial income (expense) recognized in profit or loss	-	59,593	(2,765,024)	(2,705,431)
Foreign currency translation	-	(6,462)	593,384	586,922
Other movements not generating cash flow (2)	-	(385,285)	613,932	228,647
Balance as of December 31, 2016	8,410,467	6,686,895	(52,222,027)	(37,124,665)
Cash flow	(174,272)	(564,755)	11,259,492	10,520,465
Exchange difference:				
Recognized in profit or loss	(290,310)	208,394	147,993	66,077
Recognized in other comprehensive income	-	-	70,958	70,958
Financial cost registered to projects	-	-	(203,964)	(203,964)
Financial income (expense) recognized in profit or loss	-	104,706	(2,385,994)	(2,281,288)
Foreign currency translation	-	39,628	(76,171)	(36,543)
Other movements that do not generate cash flow	-	58,857	(138,122)	(79,265)
Balance as of December 31, 2017	7,945,885	6,533,725	(43,547,835)	(29,068,225)

- (1) The balance of other financial assets as of December 31, 2015 includes the value of the securities related to Santiago de las Atalayas for COP\$699,832, which at that date were restricted.
- (2) Corresponds to operations with remittances financed in dollars with domestic banks for the payment of imports.

21. Trade and other payables

The balance of trade and other payables, as of December 31, 2017 and 2016, is comprised as follows:

	2017	2016
Suppliers	5,088,957	4,687,353
Partners' advances	880,420	864,971
Withholding tax	376,169	379,194
Related parties	129,520	114,420
Insurance and reinsurance	121,555	110,530
Agreements in transport contracts (1)	91,324	111,899
Deposits received from third parties	25,523	209,570
Dividends payable (2)	3,723	11,193
Various creditors	280,485	389,126
	6,997,676	6,878,256
Current	6,968,207	6,854,363
Non-current	29,469	23,893
	6,997,676	6,878,256

- (1) Corresponds to the value of debt from agreements in transport contracts of oil pipelines and poliducts, impacted by volumetric adjustments, compensation for quality and other inventory management agreements.
- (2) Dividends declared at the General Shareholders' Meeting on 2016 profits, amounting to COP\$945,684, were paid in April 2017.

The carrying amount of trade accounts and other accounts payable approximates their fair value due to their short-term nature.

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22. Provisions for employees benefits

The following are the balances of provisions for employee benefits as of December 31, 2017 and 2016:

	2017	2016
Post-employment benefits		
Healthcare	5,367,005	4,475,540
Pension	1,327,859	76,695
Education	502,260	333,379
Bonds	348,442	263,563
Other plans	77,636	67,945
Termination benefits - Voluntary retirement plan	155,286	161,796
	7,778,488	5,378,918
Social benefits and salaries	485,939	423,360
Other employee benefits	67,867	73,300
	8,332,294	5,875,578
Current	1,829,819	1,974,496
Non-current	6,502,475	3,901,082
	8,332,294	5,875,578

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22.1 Post-employment benefits liability (asset)

The following table shows the movement in liabilities and assets, net of post-employment benefits and termination benefits, as of December 31, 2017 and 2016:

	Pension and bonds (1)		Other		Total	
	2017	2016	2017	2016	2017	2016
Liabilities for employee benefits						
Opening balance	12,463,433	10,435,546	5,041,133	4,170,047	17,504,566	14,605,593
Current service cost	-	-	52,164	53,771	52,164	53,771
Past service cost	-	-	-	164,271	-	164,271
Interest expense	872,524	876,076	350,060	333,894	1,222,584	1,209,970
Actuarial losses (gains)	1,621,184	1,915,767	1,012,205	616,834	2,633,389	2,532,601
Benefits paid	(809,677)	(763,956)	(350,130)	(297,684)	(1,159,807)	(1,061,640)
Closing balance	14,147,464	12,463,433	6,105,432	5,041,133	20,252,896	17,504,566
Plan assets						
Opening balance	12,123,175	11,181,604	2,473	-	12,125,648	11,181,604
Return on assets	848,677	950,704	385	-	849,062	950,704
Contributions to funds	-	-	22,465	-	22,465	-
Variation in the ceiling of assets	-	379,884	-	-	-	379,884
Benefits paid	(809,677)	(771,528)	(22,078)	2,406	(831,755)	(769,122)
Actuarial gains (losses)	308,988	382,511	-	67	308,988	382,578
Closing balance	12,471,163	12,123,175	3,245	2,473	12,474,408	12,125,648
Net post-employment benefits liability	1,676,301	340,258	6,102,187	5,038,660	7,778,488	5,378,918

(1) There is no cost for the pension and pension plans service, due to the fact that the beneficiaries were retired as of July 31, 2010.

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The following table shows the movement in profit and loss and in other comprehensive income as of December 31, 2017 and 2016:

	<u>2017</u>	<u>2016</u>
Recognized in profit or loss		
Current service cost	52,164	53,771
Past service cost	-	164,271
Interest expense, net	373,522	259,266
Remedies	13,889	-
	<u>439,575</u>	<u>477,308</u>
Recognized in other comprehensive income		
Healthcare	(794,535)	(792,093)
Pension and pension bonds	(1,312,195)	(1,533,256)
Education and severance	(203,779)	175,259
Termination benefits - Voluntary retirement plan	(3)	67
Change in the effect of the asset ceiling	-	379,884
	<u>(2,310,512)</u>	<u>(1,770,139)</u>
Deferred tax	762,469	616,697
Other comprehensive income, net of taxes	<u>(1,548,043)</u>	<u>(1,153,442)</u>

22.2 Plan assets

Plan assets are resources held by pension trusts, for payment of pension obligations. Payments for health and education post-employment benefits is Ecopetrol's responsibility. The destination of trust resources and its yields cannot be changed or returned to the Group until all pension obligations have been fulfilled.

The following is the composition of the plan assets of pension and pension bonds by type of investment as of December 31, 2017 and 2016:

	<u>2017</u>	<u>2016</u>
Bonds issued by the national government	4,349,400	4,410,326
Bonds of private entities	2,967,030	2,880,958
Other local currency	2,337,580	2,910,083
Other public bonds	1,149,200	693,061
Variable yield	605,380	305,052
Bonds of foreign entities	558,920	622,817
Other foreign currency	503,653	300,878
	<u>12,471,163</u>	<u>12,123,175</u>

46.0% of plan assets are classified as level 1 in the fair value hierarchy, where prices for the assets are directly observable on actively traded markets, and 54.0% are classified as level 2.

The fair value of level 2 plan assets is calculated using prices quoted in the assets' market. The Group obtains these prices through reliable financial data providers recognized in Colombia or abroad depending on the investment.

For the securities issued in local currency, the fair value of plan assets is calculated using information published by Infovalmer, a price supplier authorized by the Financial Superintendence of Colombia. According to its methodology, prices are calculated based on market information on the valuation date or estimated from historical inputs according to the criteria established for the calculation of each of the prices.

The average price is calculated based on the most representative market of the transactions carried out through electronic platforms approved and supervised by the regulator.

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On the other hand, the estimated price is calculated for investments that do not reflect enough information to estimate an average market price, replicating the quoted prices for similar assets or prices obtained through quotes from brokers. This estimated price is also given by Infovalmer as a result of the application of robust methodologies approved by the financial regulator and widely used by the financial sector.

The following table reflects the credit quality of the issuers and counterparties in assets held by the autonomous pension funds:

Rating	2017	2016
AAA	4,870,932	4,467,642
Nation	4,471,274	4,610,251
AA+	690,391	470,944
BAA2	371,972	141,940
BBB	246,795	150,808
F1+	230,321	416,439
BBB-	192,636	23,237
BBB+	159,103	193,835
BRC 1+	118,008	309,282
AA	58,234	79,750
BAA3	45,699	131,993
A	39,048	4,175
A3	29,098	61,325
AA3	27,051	14,385
AA-	18,770	34,197
VRR1 +	14,112	55,821
BAA1	5,296	5,274
Other qualifications	9,621	66,470
No rating available	872,802	885,407
	<u>12,471,163</u>	<u>12,123,175</u>

See credit risk policy in Note 30.3.

22.3 Actuarial assumptions

The following are the actuarial assumptions used in determining the present value of defined employee benefit obligations used for the actuarial calculations as of December 31, 2017 and 2016:

2017	Pension	Bonds	Health	Education	Other benefits (1)
Discount rate	6.50%	6.25%	6.50%	5.50%	5.51%
Salary growth rate	N/A	N/A	N/A	N/A	4.75% / 4.25%
Expected inflation rate	3.00%	3.00%	3.00%	3.00%	3.00%
Pension growth rate	3.00%	N/A	N/A	N/A	N/A
Cost trend					
Short-term rate	N/A	N/A	6.00%	4.00%	N/A
Long-term rate	N/A	N/A	4.00%	4.00%	N/A

2016	Pension	Bonds	Health	Education	Other benefits (1)
Discount rate	7.25%	7.00%	7.25%	6.50%	6.67%
Salary growth rate	N/A	N/A	N/A	N/A	4.25%
Expected inflation rate	3.00%	3.00%	3.00%	3.00%	3.00%
Pension growth rate	3.00%	N/A	N/A	N/A	N/A
Cost trend					
Short-term rate	N/A	N/A	3.00%	4.00%	N/A
Long term rate	N/A	N/A	4.00%	4.00%	N/A

N/A: Not applicable for this benefit.

(1) Weighted average discount rate.

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The cost trend is the projected increase for the initial year, which includes the expected inflation rate.

The mortality table used for the calculations was that of 'Valid Annuitant' for men and women based on the experience gained for the period 2005-2008 of the Colombian Social Security Institute.

22.4 Maturity of benefit obligation

The cash flows required for payment of post-employment obligations are the following:

Period	Pension and bonds	Other benefits	Total
2018	880,298	374,315	1,254,613
2019	877,165	355,241	1,232,406
2020	899,128	358,292	1,257,420
2021	921,333	361,655	1,282,988
2022	952,531	362,998	1,315,529
2023-2026	5,201,619	1,824,756	7,026,375

22.5 Sensitivity analysis

The following sensitivity analysis shows the effect of such possible changes on the obligation for defined benefits, while keeping the other assumptions constant, as of December 31, 2017:

	Pension	Bonds	Health	Education	Other benefits
Discount rate					
-50 basis points	13,948,863	1,032,967	5,775,492	527,839	242,117
+50 basis points	12,440,607	948,129	4,962,688	480,224	230,501
Inflation rate					
-50 basis points	12,386,975	946,675	N/A	N/A	156,021
+50 basis points	14,003,214	1,033,715	N/A	N/A	161,094
Salary growth rate					
-50 basis points	N/A	N/A	N/A	N/A	76,336
+50 basis points	N/A	N/A	N/A	N/A	79,150
Cost trend					
-50 basis points	N/A	N/A	4,982,874	479,829	N/A
+50 basis points	N/A	N/A	5,797,753	528,104	N/A

22.6 Voluntary retirement plan

In August 2016, the Group offered a voluntary retirement plan to 200 employees who met certain criteria. As of December 31, 2017 and 2016, 137 employees were part of plan, with a corresponding cost of COP\$155,286 (2016 - COP\$161,796). This plan includes benefits such as monthly income, education and health benefits until the date on which the employee is granted their retirement pension.

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23. Accrued liabilities and provisions

Below is the breakdown of the changes in the different categories of provisions and contingencies as of December 31, 2017 and 2016:

	Asset retirement obligation	Litigation		Environmental contingencies and others	Total
Balance as of December 31, 2016	5,064,660	209,932		643,278	5,917,870
Increase in abandonment costs	39,634	-		-	39,634
Additions (recoveries)	110,587	(19,185)		106,532	197,934
Uses	(66,469)	(7,742)		(19,613)	(93,824)
Financial costs	379,891	-		(367)	379,524
Foreign currency translation	(979)	(39)		718	(300)
Transfers (1)	-	-		96,611	96,611
Balance as of December 31, 2017	5,527,324	182,966		827,159	6,537,449
Current	199,824	159,881		199,123	558,828
Non-current	5,327,500	23,085		628,036	5,978,621
	5,527,324	182,966		827,159	6,537,449

	Asset retirement obligation	Litigation	Comuneros provision	Environmental contingencies and others	Total
Balance as of December 31, 2015	4,452,369	99,798	702,486	822,694	6,077,347
Increase in abandonment costs	404,797	-	-	-	404,797
Additions (recoveries)	18,285	44,120	(702,486)	(74,312)	(714,393)
Uses	(68,460)	(4,585)	-	(31,218)	(104,263)
Financial costs	317,448	-	-	(173)	317,275
Foreign currency translation	(14,703)	(355)	-	(2,759)	(17,817)
Transfers (1)	(45,076)	70,954	-	(70,954)	(45,076)
Balance as of December 31, 2016	5,064,660	209,932	-	643,278	5,917,870
Current	330,057	146,767	-	345,130	821,954
Non-current	4,734,603	63,165	-	298,148	5,095,916
	5,064,660	209,932	-	643,278	5,917,870

(1) Mainly includes transfers to liabilities associated with assets held for sale.

23.1 Asset retirement obligation

The estimated liability for asset retirement obligation costs corresponds to the future obligation to restore environmental conditions to a level similar to that existing before the start of projects or activities, as described in Note 3.5 - Abandonment and dismantling costs of fields and other facilities. As these relate to long-term obligations, this liability is estimated by projecting the expected future payments and discounting at present value with a rate indexed to the Group's financial obligations, taking into account the temporality and risks of this obligation. The discount rates used in the estimate of the obligation as of December 31, 2017 were: Exploration and Production 6.93% (2016 - 7.93%), Transportation and Logistics 7.02% (2016 - 8.20%) and Refining and Petrochemicals 7.37% (2016 - 8.99%).

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23.2 Litigation

The following is a summary of the main legal proceedings recognized in the statement of financial position whose amount exceeds COP\$13,000 million, where the expectation of loss is probable and could imply an outflow of resources as of December 31, 2017 and 2016:

Proceeding	2017	2016
Provision for the payment of the 2016 legal stability contract premium with the Ministry of Finance and Public Credit regarding investment in Reficar	64,104	59,528
Litigation with Schrader Camargo, supplier of Reficar	17,003	17,003
Settlement before the Procuraduría General de la Nación with the firms Acciona Infraestructura S.A. and Mantenimiento y Montajes S.A., August 18, 2016. In 2017, it was ruled in favor of the Group and the provision was reversed.	-	44,986

23.3 Comuneros - Santiago de las Atalayas provisions

On November 8, 2016, the Ministry of Mines and Energy concluded that the resources that were restricted in relation to this process were not royalties and, therefore, were not due to the Comuneros.

In accordance with the foregoing, the resources held by Ecopetrol are its property, without any claim or discussion to date regarding ownership title thereof. On November 8, 2016, the amount claimed reached COP\$688,664, originated mostly from the valuation and financial yield of the fund where the resources were deposited. The recovery of this provision was recognized in the net financial results of the period ending December 31, 2016.

23.4 Environmental contingencies and others

These corresponds to contingencies for environmental incidents and obligations related to environmental compensation and mandatory investment of 1% for the use of, exploitation of or effect on natural resources imposed by national, regional and local environmental authorities. Mandatory investment of 1% is based on the use of water taken directly from natural sources in accordance with the provisions of Law 99 of 1993, Article 43, Decree 1900 of 2006, Decree 2099 of 2017 and 075 and 1120 of 2018 in relation to the projects that Ecopetrol develops in Colombia.

The Colombian Government through the Ministry of Environment and Sustainable Development, issued in December 2016 and in January 2017 the Decrees 2099 and 075, which modify the Single Regulatory Decree of the environment and sustainable development sector, Decree 1076 of 2015, related to the mandatory investment for the use of water taken directly from natural sources.

The main changes established by these decrees were related to the areas and lines of investment and the basis for settlement of the obligations. Similarly, June 30, 2018 was declared the maximum date to modify investment plans that were underway.

On June 30, 2017, Ecopetrol filed with the National Environmental Licensing Authority (ANLA) certain investment plans to meet the 1% mandatory investment based on the new decrees, relative to investment lines, maintaining the settlement base of Decree 1900.

As of December 31, 2017, the provision for the 1% mandatory investment for the use of water was estimated based on the parameters established in Decree 1076 of 2015. The Group is in the process of analyzing the impact of the applicability of the changes set out in the aforementioned decrees.

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Ocensa

Some requests for arbitration were filed by some of Ocensa's shippers in connection with the tariff and monetary conditions established in the transportation contracts for the use of the increased capacity of the pipeline resulting from the P-135 project. Similar claims could be brought by other shippers of the aforementioned project.

Frontera Energy Colombia Corp. Sucursal Colombia entered into a memorandum of understanding for a comprehensive settlement agreement that is pending the approval by Frontera's arbitration panel. If the arbitration panel approves the settlement agreement, it will resolve any pending proceedings and controversies among the parties, and both parties will execute the amendments to the Agreements.

The recognized provision is based on the risk assessment carried out by Ocensa and its advisors, without implying the recognition of the validity of the claims of the shippers.

23.5 Legal proceedings not provided for

The following is a summary of the main contingent liabilities that have not been recognized in the statement of financial position as, according to the evaluations made by internal and external advisors of the Group, the expectation of loss is not probable as at December 31, 2017 and 2016:

Proceedings	2017	2016
Environmental damage caused by a terrorist attack in 2015 against the Transandino pipeline.	209,220	-
Breaking of the economic and financial balance with contractor for the construction of the transport system.	110,266	-
On March 14, 2016, a lawsuit was filed for default settling the contract between Konidol and Ecopetrol, which caused Ecopetrol incurred excess costs in the maintenance contract in 2016.	62,131	62,131
Salary readjustments to the amounts established by Ecopetrol for personnel, related to a contract with a third party for the commissioning and construction of surface facilities for production and exploration projects.	60,313	-
Compensation to third parties for damage caused by hydrocarbon spills during a tanker truck accident on the Villeta - Guaduas road oil spills.	43,333	43,333
Contractual imbalance with a third party in relation to road connection works.	31,679	-
Settlement of differences with a supplier under a contract whose purpose was the engineering, procurement and construction management of project P135. Although the parties reached a preliminary settlement agreement, the Comptroller General's Office did not approve it and the process continues in the evidentiary stage. The result of these processes is subject to the decision of the arbitrator.	30,027	-
Contractual controversy with a third party in relation with seismic acquisition services and seismic program processing.	30,000	-
Recalculation of legal and non-legal social benefits on sums paid for the benefit of saving incentives.	16,562	16,562
Controversy regarding income tax returns for taxable years 2010 and 2011 of Hocol, related to deductions in exploration fixed assets. In September 2017, Hocol paid taxes on the tax revenue processes of taxable years 2010 and 2011 of \$ 89,271	-	344,915

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23.6 Details of contingent assets

The following is a breakdown of the Group's principal contingent assets, where the associated contingent gain is likely, but not certain as of December 31, 2017 and 2016:

Proceedings	2017	2016
Ocensa claim that seeks the payment of the negative balance by Equion Energia Limited and Santiago Oil Group, which are reflected in Ocensa's volumetric balances.	112,735	-
Claim for reimbursement based on a disagreement with Ecopetrol corresponding to investment in facilities in the Guaduas field of the "Rio Seco" association contract.	40,711	40,746
Environmental incident in 2011, in the Caño Limón Coveñas Pipeline.	35,000	-
Criminal claim filed by Ecopetrol against the administrator of agreements with a corporation for alleged document falsification.	32,000	-
Breach of a pipe purchase order because the physical characteristics of the coating do not match what was contracted.	21,232	21,232
Nullity of administrative act issued by the DIAN, which ordered a special contribution for public works contracts.	13,214	13,214
Claim against Metapetroleum for damage suffered due to the late delivery of crude volumes under the Quifa association contract.	-	25,421

Refinería de Cartagena

On March 8, 2016, Reficar presented a request for Arbitration before the International Chamber of Commerce against Chicago Bridge & Iron Group NV, CB&I (UK) Limited and CBI Colombiana S.A. (collectively, "CB&I") related to the contract for the construction, procurement and engineering entered into by Reficar and CB&I for the expansion of Refinería de Cartagena, in Cartagena, Colombia. Reficar is the claimant in the arbitration process of the CCIO and requests at least US\$2 billion from CB&I. On May 25, 2016, CB&I filed a counterclaim of approximately US\$213 million. On June 27, 2016, Reficar filed its reply to CB&I's counterclaim denying and disputing the declarations and the relief requested by CB&I. On April 28, 2017, Reficar submitted its Non-Exhaustive Statement of Claim and CB&I submitted its Statement of Counterclaim. According to the latest modification of the procedural calendar, the arbitral tribunal will hold the hearing in 2019 and will likely issue the final award in the second half of 2019.

In relation to this matter, as of December 31, 2017, there is an amount of approximately US\$122 million, in invoices paid by Reficar to CB&I, under the PIP and MOA agreements, of the EPC contract. The proof of the sources for these invoices, delivered by CB&I, have not been accepted by of AMEC Foster Wheeler - PCIB.

23.7 Investigations of control entities

As part of the investigations carried out by various control entities of the modernization and expansion project (the “Project”) of Refinería de Cartagena, Reficar has been officially informed of the following investigations and proceedings:

a) Office of the Comptroller General (Contraloría General de la República)

Because of the modifications of the schedule and budget related to the Project, the Office of the Comptroller General initiated a special audit investigation of the Project in 2016 and delivered a final report to Reficar on December 5, 2016. The report made 36 findings most of which were related to increased costs compared to budget for services, labor and materials.

As a result of the findings described above, the Office of the Comptroller General opened actions for financial responsibility (proceso de responsabilidad fiscal) against 36 individuals and the six companies involved in the Project, including current and former members of Ecopetrol’s Board of Directors; former members of Reficar’s Board of Directors; current and former employees of Ecopetrol; and former employees of Reficar, as well as Chicago Bridge & Iron Group N.V., CBI - Chicago Bridge & Iron company (CB&I) Americas Ltd., Chicago Bridge & Iron Group CB&I UK Limited, CBI Colombiana S.A., Foster Wheeler USA Corporation and Process Consultants Inc.

One current member of Ecopetrol’s Board of Directors being investigated in these proceedings.

In January 2017, the Office of the Comptroller General initiated another special audit in Reficar and delivered a final report to Reficar on July 12, 2017. In this report the Office of the Comptroller General concluded that, in their opinion, Reficar’s 2016 Financial Statements do not reasonably represent, in all material aspects, the entity’s financial position as of December 31, 2016.

b) Attorney General’s Office (Procuraduría General de la Nación)

Reficar has been officially informed that the Attorney General’s Office currently has one ongoing investigation relating to the Project. The investigation initiated in 2012 against members of Reficar’s Board of Directors at the time, as well as certain current and former officers of Reficar.

On September 12, 2017 the Attorney General’s Office issued a list of charges related to the failure to fulfill some of their duties as administrators and/or for acting “ultra vires” in the exercise of their functions against: (i) Javier Genaro Gutiérrez (Ecopetrol CEO, 2007-2015), (ii) Felipe Laverde (Reficar General Counsel, 2009-March 2017), (iii) Pedro Rosales (Ecopetrol Downstream Executive Vice President, 2008-2015), (iv) Diana Constanza Calixto (Ecopetrol Head of the Corporate Finance Unit, 2009-2014) and (v) Reyes Reinoso Yañez (Reficar CEO, 2012-2016)

The Attorney General’s Office closed the case against the rest of the members of Reficar’s Board of Directors and the rest of the current and former officers of Reficar.

c) Prosecutor’s Office (Fiscalía General de la Nación)

The Prosecutor’s Office is conducting an investigation. In connection therewith, between July 25 and August 2, 2017 the Prosecutor’s Office indicted the following individuals with charges, the majority of which are related to offenses against the public administration and illegal interest in the execution of agreements:

(i) Orlando José Cabrales Martínez (Reficar CEO, 2009-2012); (ii) Reyes Reinoso Yañez (Reficar CEO, 2012-2016); (iii) Felipe Laverde Concha (Reficar General Counsel, 2009-March 2017); (iv) Pedro Alfonso Rosales Navarro (Ecopetrol Downstream Executive Vice President, 2008-2015); (v) Masoud Deidehban (CBI Executive Project Director); (vi) Phillip Asherman (CBI CEO) and (vii) Carlos Lloreda (Reficar’s statutory auditor from 2013-2015).

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The arraignment hearing is scheduled to take place on May 30, 2018.

Ecopetrol is not in a position to forecast the results of these investigations; nor is it possible to evaluate the probability of any consequence that may impact the financial statements, such as additional provisions, fines or ignorance of tax deductions that affect the amounts of deferred tax assets.

As of the date of this report, the financial statements continue to adequately disclose the financial and operational situation of Ecopetrol in all material aspects and its internal controls remain in force.

24. Equity

The main components of equity are detailed below:

24.1 Subscribed and paid-in capital

Ecopetrol's authorized capital amounts to \$36,540,000, and is comprised of 60,000,000,000 ordinary shares, of which 41,116,694,690 have been subscribed, and 11.51% (4,731,905,873 shares) are held privately and 88.49% (36,384,788,817 shares) are held by the Colombian Government. The value of the reserve shares amounts to \$11,499,933 comprised of 18,883,305,310 shares. As of December 31, 2017 and 2016, subscribed and paid-in capital amounts to \$25,040,067. There are no potentially dilutive shares.

24.2 Additional paid-in capital

Additional paid-in capital mainly corresponds to: (i) share premium from the Group's capitalization in 2007, for COP\$4,457,997, (ii) COP\$31,377 share premium from the placement of shares on the secondary market, arising from the calling of guarantees from debtors in arrears, according to the provisions of Article 397 of the Code of Commerce, (iii) share premium from the sale of shares awarded in the second capitalization, which took place in September 2011, of COP\$2,118,468, and (iv) additional paid-in capital receivables for COP\$(142).

24.3 Equity reserves

The following is the composition of the Group's reserves as of December 31, 2017 and 2016:

	<u>2017</u>	<u>2016</u>
Legal reserve	1,426,151	1,269,680
Fiscal and statutory reserves	512,632	289,164
Occasional reserves	239,086	-
Total	<u>2,177,869</u>	<u>1,558,844</u>

The movement of equity reserves is the following for the years ended December 31, 2017 and 2016:

	<u>2017</u>	<u>2016</u>
Opening balance	1,558,844	5,546,570
Release of reserves	(289,164)	(406,983)
Allocation to reserves	908,189	289,164
Legal reserve used to offset previous year loss (Note 24.4)	-	(3,869,907)
Closing balance	<u>2,177,869</u>	<u>1,558,844</u>

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Legal reserve

The Colombian Code of Commerce establishes that 10% of net income is allocated to legal reserves until their balance reaches 50% of subscribed capital. The legal reserve can be used to offset losses or distributed in the event of the Company's liquidation.

Occasional reserves

Occasional reserves correspond to allocation of net income as approved at the shareholders at the Stockholders' meeting to carry out new explorations. On March 31, 2017, the Stockholders' Meeting approved the appropriation of occasional reserves for the establishment of a reserve for new explorations for the amount of COP \$ 239,086.

Tax and mandatory reserves

The Colombian tax regime allows for the allocation of up to 70% of the period's net income to a reserve when the value of the depreciation expense recorded in the financial statements. This reserve may be released in future periods to the extent that depreciation expenses exceeds the amount deducted for income tax purposes or the assets that generated the higher value deducted are sold.

In addition, Decree 2336 of 1995 set out the obligation to establish a reserve for the changes in valuation of investments. Unrealized fair value gains are allocated to a reserve.

24.4 Retained earnings and dividends

The following is the balance and movement of retained earnings as of December 31, 2017 and 2016:

	<u>2017</u>	<u>2016</u>
Opening balance	(402,462)	(6,814,432)
Profit attributable to owners of Ecopetrol's shareholders	7,178,539	2,447,881
Release of reserves	289,164	406,983
Allocation to reserves	(908,189)	(289,164)
Dividends declared (1)	(945,684)	-
Legal reserve used to offset previous year loss (2)	-	3,869,907
Other movements	(1,066)	(23,637)
Closing balance	<u><u>5,210,302</u></u>	<u><u>(402,462)</u></u>

(1) The Company distributes dividends based on its separate annual financial statements, prepared under International Financial Reporting Standards accepted in Colombia (NCIF, by its acronym in Spanish). The Ordinary General Shareholders' Meeting, held on March 31, 2017, approved the proposal for profit distribution proposal for 2016 and set the distribution of dividends of COP\$945,684.

Dividends paid in 2017 attributable to the shareholders of Ecopetrol S.A. amounted to COP\$945,661 (2016 - COP\$690,177) and those of the non-controlling interest of subsidiary companies to COP \$ 558,986 (2016 - COP\$1,022,121).

(2) The Ordinary General Meeting of Shareholders, held on March 31, 2016, approved the proposal for profit distribution, which established that there would be no distribution for the year 2015, given the net loss occurred in that year; in addition, the shareholders voted to use the legal reserve to offset this loss, as permitted by the Article 456 of the Colombian Code of Commerce. The amount of losses offset by releases from the legal reserve after tax and mandatory allocations amounted to COP\$3,869,907.

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24.5 Other comprehensive income attributable to owners of parent

The following is the composition of the other comprehensive income attributable to the shareholders of the parent company, Ecopetrol S.A., net tax as of December 31, 2017 and 2016:

	<u>2017</u>	<u>2016</u>
Actuarial gain on defined benefit plans	(553,091)	994,953
Gain (loss) on equity instruments measured at fair value (1)	-	7,828
Cash flow hedges for future exports (Note 30.2.2)	159,295	244,131
Hedge of a net investment in a foreign operation (Note 30.2.3)	(97,362)	(155,359)
Cash flow hedge with derivative instruments	6,942	(19,042)
Others	-	11,817
Foreign currency translation	7,883,231	8,138,382
	<u>7,399,015</u>	<u>9,222,710</u>

(1) During 2016 the Group reclassified to the statement of profit or loss COP\$68,497 (2015 - COP\$19,405) arising from the realization of accumulated fair value gains on equity of assets available for sale - Empresa de Energía de Bogotá and Interconexión Eléctrica S.A.

24.6 Earnings (loss) per share

	<u>2017</u>	<u>2016</u>	<u>2015</u>
Profit (loss) attributable to Ecopetrol's shareholders	7,178,539	2,447,881	(7,193,859)
Weighted average number of outstanding shares	41,116,694,690	41,116,694,690	41,116,694,690
Net basic earnings (loss) per share (Colombian pesos)	<u>174.6</u>	<u>59.5</u>	<u>(175.0)</u>

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25. Sales revenue

The following is the breakdown of sales revenue for the years ended December 31, 2017, 2016 and 2015:

	2017	2016	2015
National sales			
Mid-distillates	9,590,326	8,553,503	10,215,224
Gasoline	6,990,187	6,092,739	6,128,208
Services	3,873,352	4,043,284	4,435,274
Natural gas	1,815,754	1,988,336	1,845,345
Crude oil	909,871	553,666	491,279
Plastic and rubber	833,982	724,708	724,392
LPG and propane	509,619	405,869	335,494
Asphalts	275,803	340,400	461,188
Other products	1,207,245	994,645	988,346
	26,006,139	23,697,150	25,624,750
Recognition of price differential (1)	2,229,953	1,048,022	441,871
	28,236,092	24,745,172	26,066,621
Foreign sales			
Crude oil	21,479,063	17,278,579	21,181,265
Fuel oil	1,982,408	2,158,539	2,166,469
Gasoline and turbo fuels	1,223,994	1,046,758	93,125
Diesel	1,213,740	1,604,498	81,982
Plastic and rubber	1,169,101	1,171,342	1,096,730
Natural gas	32,303	58,809	182,950
LPG and propane	15,631	8,568	-
Trading of crude	-	-	1,309,196
Cash flow hedge for future exports – Reclassification to profit or loss (Note 30.2.2)	160,772	33,074	7,646
Other	441,124	380,222	161,287
	27,718,136	23,740,389	26,280,650
	55,954,228	48,485,561	52,347,271

(1) Corresponds to the application of Decree 1880 of September 2014 and Resolution 180522 of 2010, which defined the procedure for price differentials (value generated by the difference between the parity price and the regulated price, which can be positive or negative). See Note 4.16 – Sales revenue recognition, for more details.

Sales by geographic areas

The following are the sales revenue by geographic area for the years ended December 31, 2017, 2016 and 2015:

	2017	%	2016	%	2015	%
Colombia	28,236,092	50.5%	24,745,172	51.0%	26,066,621	49.8%
United States	12,532,932	22.4%	11,956,967	24.7%	11,921,720	22.8%
Asia	6,136,796	11.0%	2,717,414	5.6%	6,123,593	11.7%
Central America and the Caribbean	6,070,565	10.8%	3,551,894	7.3%	3,366,978	6.4%
South America and others	1,947,226	3.5%	2,568,163	5.3%	886,433	1.7%
Europe	1,030,617	1.8%	2,945,951	6.1%	3,981,926	7.6%
	55,954,228	100%	48,485,561	100%	52,347,271	100%

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Concentration of customers

During 2017, Organización Terpel S.A. represented 14.3% of sales revenue for the period (2016 - 14.4% and 2015 - 14.4%); no other customer represented more than 10% of our sales. The commercial relationship with this customer is for the sale of refined products and transportation services. Sales to this customer are recognized in the Refining and Petrochemical and Transport and Logistics segments. Organización Terpel is the leader in these areas thanks to its network of gas stations and its strategy of sales to the industrial and the aviation segments.

26. Cost of sales

The following is the cost of sales breakdown by function for the years ended December 31, 2017, 2016 and 2015:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
Variable costs			
Imported products (1)	11,637,419	12,049,477	12,935,878
Depreciation, amortization and depletion	5,765,186	5,333,245	5,166,455
Purchases of hydrocarbons - ANH (2)	4,338,576	3,178,199	3,741,010
Purchases of crude in association and concession	2,240,704	1,517,829	1,928,938
Process materials	889,122	608,535	366,454
Hydrocarbon transport services	665,714	783,307	1,380,733
Electric energy	561,424	618,675	424,920
Purchases of other products and gas	488,056	519,884	703,163
Taxes and contributions (3)	449,959	478,332	481,029
Services contracted in associations	195,689	305,326	563,032
Others (4)	(663,916)	(432,694)	(322,547)
	<u>26,567,933</u>	<u>24,960,115</u>	<u>27,369,065</u>
Fixed costs			
Depreciation and amortization	2,366,849	2,050,739	1,433,263
Maintenance	2,038,970	1,998,128	2,334,130
Labor costs	1,815,213	1,571,511	1,542,701
Services contracted	1,414,056	1,083,176	1,301,094
Services contracted in associations	1,008,336	1,260,470	1,415,422
General costs	510,128	383,842	461,994
Materials and operating supplies	468,205	333,258	435,238
Taxes and contributions	343,505	391,032	461,624
Hydrocarbon transport services	333,671	157,463	147,733
Non-capitalized costs of projects	41,459	61,689	92,252
	<u>10,340,392</u>	<u>9,291,308</u>	<u>9,625,451</u>
	<u>36,908,325</u>	<u>34,251,423</u>	<u>36,994,516</u>

(1) Imported products correspond mainly to diesel fuel and diluent to facilitate the transport of heavy crude oil.

(2) Corresponds to purchases of crude oil by Ecopetrol from the National Hydrocarbons Agency (ANH) derived from national production, both of the Group in direct operation and of third parties.

(3) Includes gas royalties paid and carbon tax.

(4) Corresponds to the capitalization of production costs to inventory.

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27. Administrative, operations and project expenses

The following is the detail of administration, operation and project expenses, according to their function, for the years ended December 31, 2017, 2016 and 2015:

	2017	2016	2015
Administrative expenses			
General expenses	723,341	556,563	393,971
Labor expenses	624,424	657,051	491,748
Taxes (1)	362,963	663,889	730,841
Depreciation and amortization	53,796	45,765	84,425
	1,764,524	1,923,268	1,700,985
Operations and project expenses			
Exploration costs	1,341,940	728,590	1,584,249
Commissions, fees, freights and services	471,657	568,513	878,259
Taxes	324,223	286,331	348,871
Labor expenses	310,947	278,383	309,021
Maintenance	122,273	147,197	181,630
Depreciation and amortization	95,516	177,252	86,215
Fee for regulatory entities	63,470	87,325	77,909
Corporate projects	29,702	301,854	456,159
Others	166,337	176,242	111,955
	2,926,065	2,751,687	4,034,268

(1) Mainly corresponds to the recognition of the wealth tax. See Note 10 - Taxes.

28. Other operating income net

The following is the detail of other operating income or expenses for the years ended December 31, 2017, 2016 and 2015:

	2017	2016	2015
(Expense) recovery of provisions for litigations	(72,408)	112,999	205,879
Expense for gas pipeline availability BOMT contracts (1)	(72,318)	(125,077)	(124,957)
Impairment expense of short-term assets	(68,800)	(98,739)	(2,858)
Profit (loss) on sale of assets	40,227	(82,200)	6,744
Gain on acquisition of interests in joint operation (Note 32.3)	451,095	-	-
Compensation received	-	17,790	29,848
Deferred income BOMT contract's (2)	-	211,768	193,197
Other income	227,607	237,571	70,685
	505,403	274,112	378,538

(1) Corresponds to the services rendered in connection with the BOMT contracts for the construction, operation, maintenance and transfer of gas pipelines with Transgas. This contract terminated in August 2017.

(2) Corresponds to the amortization of the deferred income recognized by Ecopetrol in 2007 for the advance payment made by the Ministry of Finance and Public Credit of the obligations by Ecogas, in relation to the BOMT contracts for the construction, operation, maintenance and transfer of gas pipelines, signed between Ecopetrol and Transgas de Occidente, Centragas and Gases de Boyacá and Santander S.A. in 1997. The amortization of this deferred income ended in December 2016.

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29. Financial result, net

The following is the detail of financial results for the years ended December 31, 2017, 2016 and 2015:

	2017	2016	2015
Finance income			
Results from financial assets and others	739,148	136,715	164,615
Yields and interests	405,562	386,001	293,506
Gain on sale of equity instruments	13,236	47,129	72,339
Resources from Santiago de las Atalayas (1)	-	688,664	-
Other financial income	1,410	53,234	91,464
	1,159,356	1,311,743	621,924
Finance expenses			
Interest (2)	(2,385,994)	(2,765,024)	(1,768,618)
Financial cost of other liabilities (3)	(753,047)	(580,491)	(627,827)
Results from financial assets	(481,308)	(48,997)	(167,869)
Other financial expenses	(40,252)	(69,028)	(154,100)
	(3,660,601)	(3,463,540)	(2,718,414)
Foreign exchange gain (loss), net	5,514	976,430	(5,566,614)
Financial result, net	(2,495,731)	(1,175,367)	(7,663,104)

- (1) Corresponds to the recovery of the provision “Comuneros – Santiago de las Atalayas”. Its balance consisted mainly from the valuation and financial gains generated while the cash that was subject to the reserve (see Note 23.3 for more information).
- (2) As of December 31, 2017, borrowing costs for the financing of developing natural resources and property, plant and equipment of COP\$191,651 (2016 - COP\$341,209 and 2015 - COP\$744,426) were capitalized.
- (3) Includes the financial expense of the asset retirement obligation and the liabilities for post-employment benefits.

30. Risk management

30.1 Commodity price risk

Ecopetrol’s business is significantly impacted by international prices for crude oil and refined products. The prices for these products are volatile and drastic changes could adversely affect the Group business prospects and results of operations.

A large proportion of Ecopetrol’s sales revenues come from sales of crude oil, natural gas and refined products. These products are indexed to international reference prices such as the Brent index. Consequently, fluctuations in those international indexes have a direct effect on the financial condition and Group’s results of operations.

Prices of crude oil, natural gas and refined products have historically fluctuated as a result of a variety of factors including, among others, competition within the oil and natural gas industry; changes in international prices of natural gas and refined products; long-term changes in the demand for crude oil, natural gas and refined products; regulatory changes; changes in the cost of capital; adverse economic conditions; transactions in derivative financial instruments related to oil and gas and development or availability of alternative fuels.

The Ecopetrol Business Group has a policy approved by the Board of Directors that allows it to use derivative financial instruments in the organized over the counter (OTC) market to cover itself from the risk of price fluctuations of crude oil and refined products associated with physical transactions. The Group has established appropriate processes to handle risk which include constant monitoring of physical and financial markets to identify risks in order to subsequently prepare and execute hedging strategies.

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Ecopetrol does not regularly use derivative instruments to hedge exposures to sales or purchase price risks. The impact of the settlement of the price hedges made in 2016 and 2015 was not material and was made as hedging instruments to mitigate risk at different price indices to the benchmark of the Group's international trade strategy on exports of crude and imports of products.

In 2017, hedging transactions were not carried out with derivative instruments. In 2016 and 2015, then outstanding price hedges were settled in full, with an impact on the result of the period of COP\$3,181 and COP\$4,141, respectively.

30.2 Exchange rate risk

The Ecopetrol Business Group operates mainly in Colombia makes sales in the local and international markets. It is exposed to exchange rate risk, which arises from various foreign currency exposures due to commercial transactions and assets and liabilities denominated in foreign currency. The impact of exchange rate fluctuations, especially the Colombian peso/U.S. dollar exchange rate, has been material in previous years. To mitigate this risk, the Group's risk management strategy involves the use of non-derivative financial instruments related to cash flow hedges for future exports and net investment of foreign operations to minimize exchange rate risk exposure.

The U.S. dollar/Colombian peso exchange rate has fluctuated over the last few years. The Colombian peso appreciated on average by 3.3% in 2017. During 2016 and 2015, the Colombian peso depreciated by 11.2% and 37.3%, respectively. The closing exchange rates were COP\$2,984.00 COP \$3,000.71 and COP \$3,149.47 to US\$1.00 for 2017, 2016 and 2015, respectively.

When the Colombian peso appreciates in relation to the U.S. dollar, export sales revenue decreases when converted to Colombian pesos; however, imported goods, oil services and interest on foreign debt denominated in U.S. dollars become less expensive. Conversely, when the Colombian peso depreciates, export revenues, when translated to Colombian pesos, increases, and imports and servicing of the external debt become more expensive.

The following table sets out the carrying amount for financial assets and liabilities denominated in foreign currency as of December 31, 2017 and 2016:

(in US\$ Million)	2017	2016
Cash and cash equivalents	1,203	1,916
Other financial assets	1,072	1,367
Trade receivables and payables, net	(7)	(282)
Loans and borrowings	(12,590)	(15,172)
Net liability position	(10,322)	(12,171)

Of the total net liability position, US\$8,532 million relates to financial liabilities designated as non-derivative hedging instruments of Ecopetrol, on which unrealized foreign exchange gains and losses are recognized in other comprehensive income, within equity. Likewise, US\$ 1,699 million corresponds to the net liability position in U.S. dollars of Ecopetrol Business Group companies whose functional currency is the U.S. dollar, without affecting profit or loss and US\$91 million correspond to the net liability position in U.S dollars of Ecopetrol Business Group companies whose functional currency is Colombian pesos with foreign exchange affects the profit or loss.

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30.2.1 Sensitivity analysis for exchange rate risk

The Group's risk management strategy involves the use of non-derivative financial instruments related to cash flow hedges for future exports and hedges of a net investment in a foreign operation in order to minimize exposure to currency rate risk, which is detailed below. The following is the effect of a change of 1% and 5% in the exchange rate of the Colombian peso as compared with the U.S. dollar, on the balance of financial assets and liabilities denominated in foreign currency as of December 31, 2017:

Scenario / Variation in the exchange rate	Effect on income before taxes (+/-)	Effect on other comprehensive income (+/-)
1%	2,715	305,293
5%	13,577	1,526,465

The sensitivity analysis only includes financial assets and liabilities in foreign currency at the closing date.

30.2.2 Cash flow hedge for future exports

Ecopetrol is exposed to foreign exchange risk given that a significant percentage of its income from crude oil exports is denominated in U.S. dollars. In recent years, the Group has acquired long-term debt for investment activities in the same currency in which it expects to receive the cash flow of its export sales revenues. This situation creates a natural hedge relationship due to the fact that the risks generated by the foreign exchange difference of export sales revenues when booked in Ecopetrol's functional currency (Colombian pesos) are naturally hedged with the foreign exchange variances of the long-term debt, in line with the Group's risk management strategy.

With the objective of presenting in the financial statements the effect of the existing natural hedge between exports and debt, understanding that the exchange rate risk materializes when the exports are made, on October 1, 2015, the Board of Directors designated the sum of US\$5,440 million of Ecopetrol's foreign currency debt as a hedge instrument of future revenue from crude oil exports, for the period 2015-2023, in accordance with IAS 39 - Financial instruments: Recognition and Measurement.

Hedge accounting records the impact on the statement of profit or loss at the time of realization of the hedged risk. For this to happen, every month when foreign currency debt is converted to Colombian pesos based on the closing rate for the period, the effects for exchange difference are recognized in other comprehensive income, within equity and, as crude oil exports take place and the hedge occurs and sales revenue is recognized, cumulative exchange differences held within other comprehensive income are reclassified to profit or loss statement, impacting operating income.

The following is the movement of foreign currency debt designated as a non-derivative hedging instrument for the years ended December 31, 2017 and 2016:

(US\$ Million)	2017	2016
Hedging instrument at the beginning of the period	5,312	5,376
Reassignment of hedging instruments	1,803	870
Realization of exports	(1,803)	(870)
Capital payments (1)	(1,980)	(64)
Hedging instrument at the end of the period	3,332	5,312

- (1) On June 30, 2017, Ecopetrol prepaid the entire outstanding balance of the international syndicated loan whose nominal value was US\$ 1,925 million and original maturity date was in February 2020.

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The following is the movement of accumulated foreign currency gains and losses in respect of the cash flow hedge recognized in other comprehensive income for the years ended December 31, 2017 and 2016:

	2017	2016
Opening balance	(244,131)	217,291
Exchange difference	15,934	(724,395)
Reclassification to profit or loss	160,772	(33,074)
Ineffectiveness	(9,247)	-
Deferred income tax	(82,622)	296,047
Closing balance	(159,294)	(244,131)

The expected reclassification of the cumulative exchange rate difference in other comprehensive income to the profit or loss statement, taking an exchange rate of COP\$2,984 per US\$1.00 is as follows:

Year	Before taxes	Taxes	After taxes
2018	95,462	(33,439)	62,023
2019	66,039	(23,132)	42,907
2020	23,804	(8,338)	15,466
2021	21,541	(7,545)	13,996
2022	21,541	(7,545)	13,996
2023	16,786	(5,880)	10,906
	245,173	(85,879)	159,294

30.2.3 Hedge of a net investment in a foreign operation

The Board of Directors approved the application of net investment hedge accounting from June 8, 2016. The measure is intended to reduce the volatility of non-operating income due to exchange rate variations. The net investment hedge will be applied on a portion of Group's investments in foreign operations, in this case on investments in subsidiaries which have the US dollar as their functional currency, using a portion of the Group's US dollar denominated debt as the hedging instrument.

Ecopetrol designated the net investments in Ocesa, Ecopetrol America Inc., Hocol Petroleum Ltd. (HPL) and Reficar and as hedged items and as a hedging instrument and US\$5,200 million of the Group's US dollar debt as the hedging instrument.

The following is the movement of accumulated foreign currency gains and losses in respect of the net investment hedge recognized in other comprehensive income for the years ended December 31, 2017 and 2016:

	2017	2016
Opening balance	155,359	-
Exchange difference	(86,892)	231,879
Ineffectiveness	329	-
Deferred income tax	28,566	(76,520)
Closing balance	97,362	155,359

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30.2.4 Hedging with derivatives to minimize currency risk

The Group carries out forwards hedging operations using the Non-Delivery modality, for mitigating the volatility of the exchange rate in the cash flow required for operations of its subsidiary, Ocesa, whose functional currency is the US dollar. The forward hedging instruments used enable setting sales prices in US dollars, mitigating the foreign exchange variation given Ocesa's obligations relative to operational cost and tax payments are payable in Colombian pesos. The accounting policy applicable to this operation is described in the Note 4.1.5.1.

As of December 31, 2017, there are forward contracts with a net short position for US\$325 million (2016 - US\$323 million) with maturities between January and December 2018.

The impact on the statement of profit or loss for the settlement of these hedges amounted to COP\$99,971 (2016- COP\$42,865 of profit) and the amount recognized in the other comprehensive income was a gain of COP\$35,769 (2016 gain of COP\$33,869).

30.3 Credit risk

Credit risk is the risk that the Group may suffer financial losses as a consequence of default of: a) payments by its clients for the sale of crude oil, gas, products or services; b) financial institutions in which it keeps investments, or c) by counterparties with which it has contracted financial instruments.

30.3.1 Credit risk for customers

In the selling process of crude oil, gas, refined products and petrochemicals, and transport services, the Group may be exposed to credit risk in the event that customers fail to fulfill their payment obligations. The Group's risk management strategy has designed mechanisms and procedures that aim to minimize such events, thus safeguarding the Group's cash flow.

The Group performs a continuous analysis of the financial strength of its counterparties, by classifying them according to their risk level and financial guarantees in the event of a default of payments. Similarly, the Group continuously monitors national and international market conditions for early alerts of major changes that may have an impact on the timely payment of obligations from customers of the Group.

Allowances for loan losses are set by individual analysis of each customer's situation. The Group performs administrative and legal actions required to recover amounts past due and charges interest from customers that fail to comply with payment policies.

Ecopetrol does not have a significant concentration of credit risk. An aging analysis of the accounts receivable portfolio in arrears, but not impaired, as of December 31, 2017 and 2016 is as follows:

	<u>2017</u>	<u>2016</u>
Less than 3-month overdue	65,354	179,008
Between 3- and 6-month overdue	1,131	14,275
More than 6-month overdue	79,688	103,574
	<u>146,173</u>	<u>296,857</u>

30.3.2 Credit quality of resources in financial assets

Following the promulgation of Decree 1525 of 2008, which provides general rules on investments for public entities, Ecopetrol's management established guidelines for our investment portfolios. These guidelines determine that investments in Ecopetrol's U.S. dollar portfolio are generally limited to investments of our excess cash in fixed-income securities issued by entities rated A or higher in the long term and A1/P1/F1 or higher in the short term (international scale) by Standard & Poor's Ratings Services, Moody's Investors Service or Fitch Ratings. In addition, Ecopetrol S.A. may also invest in securities issued or guaranteed by the U.S. government or Colombian government, without regard to the ratings assigned to such securities. In Ecopetrol's Colombian Peso portfolio, it must invest our excess cash in fixed-income securities of issuers rated AAA in the long term, and F1+/BRC1+ in the short term (local scale) by Fitch Ratings Colombia or BRC Standard & Poor's. In addition, Ecopetrol may also invest in securities issued or guaranteed by the Colombian government without rating restrictions.

In order to diversify risk in our Colombian Peso portfolio, Ecopetrol does not invest more than 10% of the excess of cash in one specific issuer. In the case of our U.S. dollar portfolio, it does not invest more than 5% of the excess of cash in one specific issuer in the short term (up to one year), or 1% in the long term.

Ecopetrol's investment portfolio in U.S. dollars is segmented into four tranches, each one matching our liquidity needs. The working capital tranche is calculated taking into account our cash flow needs for the next 60 days. The liquidity tranche is calculated as the contingent cash flow needs over the working capital, taking into account the development of capital expenditures related to projects. The asset liability tranche is built to match our long-term debt. The investment tranche includes the remaining amount of the total portfolio after deducting the amounts pertaining to the above mentioned tranches and after subtracting the Colombian Peso portfolio.

Ecopetrol's investment portfolio in Colombian Pesos is segmented in two tranches, each one matching our liquidity needs. The first tranche is calculated taking into account our cash flow needs for the next 30 days, and the second tranche is built for investment purposes.

The credit rating of issuers and counterparties in transactions involving financial instruments is disclosed in Note 6 - Cash and cash equivalents, Note 7 - Other financial assets and Note 21 - Provisions for employee benefits.

30.4 Interest rate risk

Interest rate risk arises from Ecopetrol's exposure to changes in interest rates because the Ecopetrol Business Group has investments in fixed and floating-rate instruments and has issued floating rate debt linked to LIBOR, DTF and IPC interest rates. Thus, interest rate volatility may affect the fair value and cash flows of the Group's investments and the financial expense of floating rate loans and financing.

As of December 31, 2017, 19% (2016, 31%) of the Group's indebtedness is linked to floating interest rates. As a result, if market interest rates rise, financing expenses will increase, which could have an adverse effect on the results of operations.

Ecopetrol controls the exposure to interest rate risk by establishing limits to exposure duration, Value at Risk - VAR and *tracking error*.

Autonomous equities linked to Ecopetrol's pension obligations are also exposed to changes in interest rates, as they include fixed and floating rate instruments that are marked to market. Colombian regulation for pension funds, as stipulated in the Decree 941 of 2002 and Decree 1861 of 2012, indicates that they have to follow the same regime as the regular obligatory pension funds in their moderate portfolio.

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The following table provides information about the sensitivity of Group's results and other comprehensive income for the next 12 months to variations in interest rate of 100 basis points:

	Effect on profit or loss (+/-)		Effect on Other
	Financial assets	Financial Liabilities	Comprehensive Income (+/-) Plan assets
+100 basis points	(66,120)	112,383	(171,031)
-100 basis points	66,120	(112,282)	183,988

A sensitivity analysis of discount rates on pension plan assets and liabilities is disclosed in Note 22 – Provisions for employee benefits.

30.5 Liquidity risk

The ability to access capital necessary to finance the Group's investment plans on acceptable terms can be limited due to deterioration in market conditions. A new financial crisis could worsen risk perception in emerging markets.

Events impacting the political and regional environment of Colombia, could make it difficult for our subsidiaries to access capital markets. These conditions, together with potential significant losses in the financial services sector and changes in credit risk assessments, may make it difficult to obtain financing on favorable terms. As a result, the Group may be forced to review the opportunity and scope of its investment plans as necessary, or access financial markets under less favorable terms, thereby negatively affecting the Group's results of operations and financial position.

Liquidity risk is managed in accordance with the Group's policies aimed at ensuring that there are sufficient net funds to meet the Group's financial commitments within its maturity schedules with no additional costs. The main method for the measurement and monitoring of liquidity is cash flow forecasting.

During 2017, the Group used US\$2,400 million as part of its liquidity surpluses to prepay part of its foreign currency debts that had original maturities between 2020 and 2021. The details of these movements are described in Note 20 - Loans and borrowings.

The following is a summary of the maturity of financial liabilities as of December 31, 2017. The amounts disclosed in the table are the contractual undiscounted cash flows. The payments in foreign currency were restated taking a constant exchange rate of COP\$2,984.00 per US dollar. Consequently, these amounts may not reconcile with the amounts disclosed on the consolidated statement of financial position:

	Up to 1 year	1-5 years	5-10 years	> 10 years	Total
Loans (payment of principal and interest)	5,040,130	28,151,892	18,873,280	15,484,650	67,549,952
Trade and other payables	6,968,207	134,815	-	-	7,103,022
Total	12,008,337	28,286,707	18,873,280	15,484,650	74,652,974

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30.6 Capital management

The main objective of the capital management of the Ecopetrol Business Group is to ensure a financial structure that optimizes the cost of capital, maximizes the rate of return to its shareholders and allows access to financial markets at a competitive cost to cover financing needs that support an investment grade credit rating profile.

Net financial debt is calculated by taking short-term and long-term loans and borrowings less cash and cash equivalents and investments in securities as of December 31 of each year. The level of leverage is calculated as the ratio between net financial debt and the sum of equity and net financial debt. The following is the information of these indicators as of December 31, 2017 and 2016:

	2017	2016
Loans and borrowings (Note 20)	43,547,835	52,222,027
Cash and cash equivalents (Note 6)	(7,945,885)	(8,410,467)
Other financial assets (Note 9)	(6,533,725)	(6,686,895)
Net financial debt	29,068,225	37,124,665
Equity (Note 24)	48,215,699	43,560,501
Leverage	37.61%	46.01%

The movement of the net financial debt is detailed in Note 20.8.

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31. Related parties

Balances with associates and joint ventures as of December 31, 2017 and 2016 are as follows:

	Accounts receivable	Accounts receivable - Loans	Other assets	Accounts payable	Loans	Other liabilities
Joint Ventures						
Equion Energy Limited (1)	4,010	-	7,716	101,472	259,760	7
Ecodiesel Colombia S.A.	362	-	-	22,228	-	-
Associates						
Invercolsa S.A.	18,641	-	-	-	-	-
Offshore International Group Inc. (2)	-	154,810	-	-	-	-
Serviport S.A.	-	-	-	5,820	-	-
Balance as of December 31, 2017	23,013	154,810	7,716	129,520	259,760	7
Current	23,013	-	7,716	129,520	259,760	7
Non-current	-	154,810	-	-	-	-
	23,013	154,810	7,716	129,520	259,760	7

	Accounts receivable	Accounts receivable - Loans	Other assets	Accounts payable	Loans
Joint Ventures					
Equion Energy Limited	97,601	-	7,135	89,666	30,644
Ecodiesel Colombia SA	129	-	-	20,765	-
Offshore International Group (2)	-	170,121	-	-	-
Associates					
Serviport SA	-	-	-	3,989	-
Balance as of December 31, 2016	97,730	170,121	7,135	114,420	30,644
Current	97,730	-	7,135	114,420	30,644
Non-current	-	170,121	-	-	-
	97,730	170,121	7,135	114,420	30,644

Loans with related parties:

- (1) Deposits held by Equion in Capital AG for a nominal value of US\$ 77 million with maturity in January 2018 and a weighted average rate of 1.44%.
- (2) Loan granted by Ecopetrol SA to Savia Perú SA (subsidiary of Offshore International Group) for US\$57 million in 2016, with an interest rate of 4.99% payable semiannually from 2017 and maturing in 2021. The balance in nominal value of this loan as of December 31, 2017 is US\$49 million.

The amounts outstanding are not guaranteed and will be settled in cash. No expense has been recognized in the current period or in previous periods with respect to uncollectible or doubtful accounts related to the amounts owed by related parties.

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The main transactions with related parties for years ended December 31, 2017, 2016 and 2015 are detailed as follows:

	2017		2016		2015	
	Sales and services	Purchases and others	Sales and services	Purchases and others	Sales and services	Purchases and others
Joint Ventures						
Equion Energy Limited	425,881	598,636	491,698	418,618	515,968	190,158
Ecodiesel Colombia SA	6,583	259,269	5,744	265,584	7,245	267,647
Offshore International Group	15,188	-	6,285	-	-	-
Associates						
Serviport SA	-	-	-	24,572	-	-
Total	447,652	857,905	503,727	708,774	523,213	457,805

The dividends received from these Companies are related in note 14 - Investments in associates and joint ventures.

31.1 Key executives management

In accordance with the approval given by the shareholders' meeting in 2012, compensation paid to directors for attending the meetings of the Board of Directors and / or committees increased from four to six minimum legal monthly salaries in force, or approximately to COP\$4,426,000 for 2017, from COP\$4,140,000 for 2016 and COP\$3,870,000 for 2015. For non-face-to-face sessions, 50% of the quota for face-to-face meetings is set. The members of the Board of Directors do not have any kind of variable remuneration. The amount paid in 2017 for compensation to members of the Board of Directors amounted to COP\$1,877 (2016 - COP\$1,253).

The total compensation paid to Directors as of December 31, 2017 amounted to COP\$20,669 (2016 - COP\$13,901). Directors are not eligible to receive pension and retirement benefits. The total amount reserved as of December 31, 2017 to provide pension and retirement benefits to our eligible executive officers amounted to COP\$5,401 (2016 - COP\$4,674).

As of December 31, 2017, the following key management officers owned less than 1% of the outstanding shares of Ecopetrol S.A. as follows:

Key management personnel	% Shares
Felipe Bayón	<1% outstanding shares
Mauricio Cárdenas Santamaría	<1% outstanding shares
Héctor Manosalva Rojas	<1% outstanding shares
Rafael Espinosa Roza	<1% outstanding shares

31.2 Post-employment benefit plans

The administration and management of resources for payment of Ecopetrol's pension obligations are managed by autonomous pension funds (PAPs, by its acronym in Spanish) which serve as guarantee and payment sources. These funds were established in compliance with the provisions of Decree 2153 of 1999 which authorized, as of December 31, 2008 partial commutation of the value corresponding to monthly payments, bonuses and contributions, transferring said obligations and money supporting them to autonomous patrimonies for pensions.

As of December 31, 2017 and 2016, the entities managing these resources were: Fiduciaria Bancolombia, Fiduciaria de Occidente and Consorcio Ecopetrol PAAC (comprised of Fiduciaria La Previsora, Fiduciaria Bancoldex, Fiduciaria Agraria and Fiduciaria Central). These entities will manage pension resources for a five-year term (2016 - 2021) and as consideration they receive a remuneration with fixed and variable components which is calculated on the gross yield of the portfolios and are charged to manage resources.

31.3 Government related parties

The Colombian Government controls Ecopetrol with a stock ownership of 88.49%. The most significant transactions with governmental entities are comprised as follows:

a) Purchase of oil from the National Hydrocarbons Agency - ANH

The Group has a direct relationship with ANH, an entity which operates under the rules of the Ministry of Mines and Energy, whose objective is to manage the oil and gas reserves and resources owned by the Colombian Nation.

Ecopetrol purchases the crude oil that the ANH receives from all producers in Colombia at the prices set in accordance with a jointly established formula, which reflects the export sale prices (crude oils and products), adjusted for API gravity quality, sulfur content, transportation rates from the wellhead to the ports of Coveñas and Tumaco, refining process cost and a commercialization rate. This contract was extended to June 30, 2018.

From December 2013 the Group commercialized, on behalf of the ANH, the natural gas received by the latter in kind from producers. Since January 2014, ANH has received royalties in cash for the production of natural gas.

The purchase value of oil and gas from ANH is detailed in Note 26 - Cost of sales.

Additionally Ecopetrol, like other oil companies, takes part in "rounds" for the allocation of exploration blocks in Colombia without implying special treatment for Ecopetrol on account of it being an entity whose majority shareholder is the Colombian Government.

b) Price differential

Regular gasoline and diesel sale prices are regulated by the National Government. In this case, there are differentials between the volume reported by the Colombian companies at the time of the sale and the difference between the international parity price and the regulated price actually charged, where the parity price is the daily price of gasoline and diesel oil of the respective month in Colombian pesos, indexed to the United States of America Gulf market, calculated in accordance with Resolution 18 0522 of 2010 and the Producer Price reference defined by the Ministry of Mines and Energy. These differentials may be in favor or against the producers. The value of this differential is detailed in Note 25 - Sales revenue and 7 – Trade and other receivables, net.

c) National Tax and Customs Direction

Ecopetrol, just like any other company in Colombia, has tax obligations that it must comply with and does not have any other kind of association or commercial relationship with the National Tax and Customs Direction. For more information see Note 10 – Taxes.

d) Comptroller General of the Republic

Ecopetrol, just like any other state entity in Colombia, is obliged to comply with the requirements set out by the Comptroller General of the Republic and make an annual payment to this entity on account of a maintenance fee. Ecopetrol does not have any other kind of association or commercial relationship with this entity.

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32. Joint operations

The Group carries out exploration and production operations through Exploration and Production (E&P) Contracts, Technical Evaluation (TEA) Contracts and Agreements signed with the National Hydrocarbons Agency or ANH, as well as through Partnership Contracts and other types of contracts. The main joint operations in 2017 are as follows:

32.1 Contracts in which Ecopetrol is not the operator

Partners	Contract	Type	% Participation	Geographic area of operations
Occidental Andina LLC	Chipirón	Production	30-40%	Colombia
	Harvest		30%	
	Cravo Norte		50%	
	Rondón		50%	
Chevron Petroleum Group	Guajira	Production	57%	Colombia
Mansarovar Energy Colombia Ltd	Nare	Production	50%	Colombia
Meta Petroleum Corp	Quifa	Production	40%	Colombia
Equion Energy Limited	Piedemonte	Production	50%	Colombia
	Casanare		64%	
	Corocora		56%	
	Estero		89%	
	Garcero		76%	
Perenco Colombia Limited	Orocúe	63%		
ONGC Videsh Limited	RC-10 Caribbean Round	Exploration	50%	North Caribbean Offshore
Petrobras, Repsol & Statoil	Tayrona	Exploration	30%	North Caribbean Offshore
Repsol & Statoil	TEA GUA OFF-1	Exploration	50%	North Caribbean Offshore
Anadarko	Fuerte Norte	Exploration	50%	North Caribbean Offshore
Shell	Deep Rydberg/Aleatico	Exploration	29%	Gulf of Mexico
Repsol - Leon	Lion	Exploration	40%	Gulf of Mexico
Noble Energy	Gunflint	Production	32%	Gulf of Mexico
Murphy Oil	Dalmatian	Production	30%	Gulf of Mexico
Anadarko	K2	Production	21%	Gulf of Mexico
Equion Energia Limited	Niscota	Production	20%	Brazil
Chevron	CE-M-715_R11	Exploration	50%	Brazil

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32.2 Contracts in which Ecopetrol is the operator

Partners	Contract	Type	% Participation	Geographic area of operations
ExxonMobil Exploration Colombia	VMM29 CR2 C62	Exploration	50%	Colombia
Talisman Colombia Oil	CPO9	Exploration	55%	Colombia
ONGC Videsh Limited Colombia Branch	RC9	Exploration	50%	Colombia
CPVEN Sucursal Colombia	VMM32	Exploration	51%	Colombia
Shell Exploration and Production Hocol S.A.	CR4 AMA4	Exploration	50%	Colombia
SK Innovation Co Ltd.	San Jacinto	Exploration	70%	Colombia
Repsol Exploración Colombia S.A.	Catleya	Exploration	50%	Colombia
Emerald Energy PLC Suc. Colombia Gas Ltd.	Cardon CPO9 - Akacias	Exploration Production	50% 55%	Colombia Colombia
Occidental Andina LLC	La Cira Infantas Teca	Production	58% 86%	Colombia Colombia
Ramshorn International Limited	Guariques I	Production	50%	Colombia
Equion Energy Limited	Cusiana	Production	98%	Colombia
Perenco Oil And Gas	San Jacinto Rio Paez	Production	18%	Colombia
Cepsa Colombia	San Jacinto Rio Paez	Production	18%	Colombia
Total Colombia	Mundo Nuevo	Exploration	15%	Colombia
Talisman Oil & Gas Lewis	Mundo Nuevo Clarinero	Exploration Exploration	15% 50%	Colombia Colombia
Maurel & Prom Suramerica	CPO17	Exploration	50%	Colombia
Equion Energia Limited	Alto Magdalena Pipeline	OAM	45%	Colombia
Emerald Energy	Alto Magdalena Pipeline	OAM	45%	Colombia
Frontera Energy	Alto Magdalena Pipeline	OAM	45%	Colombia
ONGC Videsh Limited	Block RC-9 Contract- Caribbean Round No. 37-2007	Exploration	50%	Gulf of Mexico
JX Nippon	FAZ-M-320_R11	Exploration	70%	Brazil
JX Nippon	POT-M-567_R11	Exploration	100%	Brazil

32.3 Relevant operations during the period

During 2017 and 2016, the following significant events occurred in respect of our joint operations contracts:

a) Acquisition of interests in joint operations

On December 11, 2017, Ecopetrol América Inc. acquired the 11.6% interest in the K2 oil field in the Gulf of Mexico MCX Exploration USA LLC (“MCX”), increasing its share from 9.2% to 20.8%.

The acquisition of MCX’s interest was recognized in accordance with policy 4.4 Joint Operations. To determine the fair value of the assets acquired and liabilities assumed, the income approach model was used, using the discounted cash flow and market data to determine the fair values of oil and gas properties. This model incorporated future commodity prices, estimated volumes of oil and gas reserves, future developments, operating costs, future abandonment and packing costs and a risk adjusted discount rate.

The fair value of the consideration transferred in the operation was US\$47.6 million (COP\$141,950), the fair value of the net assets acquired was US\$198.4 million before deferred taxes (US\$146 million net of deferred taxes) with recognition of a gain of US\$150.8 million before deferred taxes (US\$98 million after deferred taxes) in the period’s statement of profit or loss (equivalent to COP\$451,095 before deferred taxes), mainly due to the transaction price being fixed before the closing date of the transaction and the fair value of the net identifiable assets acquired having increased during the interim period.

Transaction costs incurred in the operation amounted to US \$ 0.2 million, recognized in profit or loss for the year.

b) Termination of the Rubiales and Piriri field contracts

On July 1, 2016, Ecopetrol took over the direct operation of the Rubiales and Piriri fields, which up to that date had been operated by Pacific Rubiales Energy. Upon termination of the contract Ecopetrol gained control over the assets and the obligations associated with the BOMT contracts for US\$46 million.

c) Termination of the Tauramena association agreement

On July 3, 2016, the Tauramena Association Agreement was terminated and for this reason, Ecopetrol began to operate directly the Cusiana field, Casanare. Since its commercialization in 1993, it was operated first by BP and then by Equion. Cusiana represents for Ecopetrol a 98% participation in the Unified Exploitation Plan (PEU) of the field, while Equion and Emerald maintain 2%.

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33. Information by segments

A description of the Group's business segments is in Note 4.19 – Information by business segment.

33.1 Statement of profit or loss

The following segment information is reported based on the information used by the Board of Directors as the top body to make strategic and operational decisions of these business segments. The performance of the segments are based primarily on an analysis of income, costs, expenses and results for the period generated by each segment which are regularly monitored.

The information disclosed in each segment is presented net of transactions between the Ecopetrol Business Group companies.

Below are the consolidated statements of profit or loss by segment for the years ended December 31, 2017, 2016 and 2015:

	For the year ended on December 31, 2017				
	Exploration and Production	Refining and Petrochemicals	Transport and Logistics	Eliminations	Total
Third-party sales	25,004,320	27,343,359	3,606,549	-	55,954,228
Inter-segment sales	11,490,614	1,300,657	6,991,515	(19,782,786)	-
Total sales revenue	36,494,934	28,644,016	10,598,064	(19,782,786)	55,954,228
Fixed costs	8,055,925	2,886,745	2,637,604	(3,239,880)	10,340,394
Variable costs	18,254,159	23,968,650	634,231	(16,289,109)	26,567,931
Cost of sales	26,310,084	26,855,395	3,271,835	(19,528,989)	36,908,325
Gross profit	10,184,850	1,788,621	7,326,229	(253,797)	19,045,903
Administrative expenses	781,386	516,501	466,669	(32)	1,764,524
Operation and project expenses	2,070,916	965,457	142,847	(253,155)	2,926,065
Impairment of non-current assets	(183,718)	(1,067,965)	(59,455)	-	(1,311,138)
Other operating income and expenses, net	(545,218)	11,694	28,121	-	(505,403)
Operating income	8,061,484	1,362,934	6,748,047	(610)	16,171,855
Financial result, net					
Financial income	1,062,393	164,006	106,659	(173,702)	1,159,356
Financial expenses	(2,288,576)	(1,110,874)	(434,664)	173,513	(3,660,601)
Foreign exchange gain (loss), net	(101,030)	163,992	(57,448)	-	5,514
	(1,327,213)	(782,876)	(385,453)	(189)	(2,495,731)
Share of profits of associates	120,786	15,245	(42,493)	-	93,538
Income before tax	6,855,057	595,303	6,320,101	(799)	13,769,662
Income tax	(3,034,556)	(238,625)	(2,527,087)	-	(5,800,268)
Net profit (loss) for the period	3,820,501	356,678	3,793,014	(799)	7,969,394
Profit (loss) attributable to:					
Group owners of parent	3,820,501	358,859	2,999,978	(799)	7,178,539
Non-controlling interest	-	(2,181)	793,036	-	790,855
	3,820,501	356,678	3,793,014	(799)	7,969,394
Supplementary information					
Depreciation, depletion and amortization	5,981,294	1,188,871	1,111,182	-	8,281,347

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For the year ended December 31, 2016

	Exploration and Production	Refining and Petrochemicals	Transportation and Logistics	Eliminations	Total
Third-party sales	20,527,332	24,194,024	3,764,205	-	48,485,561
Inter-segment sales	7,693,878	629,690	6,884,571	(15,208,139)	-
Total sales revenue	28,221,210	24,823,714	10,648,776	(15,208,139)	48,485,561
Fixed cost	6,940,074	2,458,745	2,861,269	(2,968,780)	9,291,308
Variable cost	16,032,574	20,385,242	488,522	(11,946,223)	24,960,115
Cost of sales	22,972,648	22,843,987	3,349,791	(14,915,003)	34,251,423
Gross profit	5,248,562	1,979,727	7,298,985	(293,136)	14,234,138
Administrative expenses	832,266	574,413	516,884	(295)	1,923,268
Operation and projects expenses	1,656,960	1,206,718	180,353	(292,344)	2,751,687
Impairment of non-current assets	196,448	773,361	(41,062)	-	928,747
Other operating income and expenses, net	(349,419)	20,947	53,559	801	(274,112)
Operating income	2,912,307	(595,712)	6,589,251	(1,298)	8,904,548
Financial result, net					
Financial income	983,472	46,469	61,373	220,429	1,311,743
Financial expenses	(2,017,641)	(952,006)	(262,844)	(231,049)	(3,463,540)
Foreign exchange gain (loss), net	923,573	94,715	(41,858)	-	976,430
	(110,596)	(810,822)	(243,329)	(10,620)	(1,175,367)
Share of profit of associates	39,397	22,785	(837)	-	61,345
Income before tax	2,841,108	(1,383,749)	6,345,085	(11,918)	7,790,526
Income tax	(1,518,738)	(446,595)	(2,577,713)	-	(4,543,046)
Net income for the period	1,322,370	(1,830,344)	3,767,372	(11,918)	3,247,480
Income attributable to:					
Group owners of parent	1,322,370	(1,823,020)	2,960,449	(11,918)	2,447,881
Non-controlling interest	-	(7,324)	806,923	-	799,599
	1,322,370	(1,830,344)	3,767,372	(11,918)	3,247,480
Supplementary information					
Depreciation, depletion and amortization	5,482,827	1,145,780	978,394	-	7,607,001

For the year ended December 31, 2015

	Exploration and Production	Refining and Petrochemicals	Transportation and Logistics	Eliminations	Total
Third-party sales	25,669,213	22,456,866	4,221,192	-	52,347,271
Inter-segment sales	6,063,398	788,810	6,623,358	(13,475,566)	-
Total Revenue	31,732,611	23,245,676	10,844,550	(13,475,566)	52,347,271
Fixed costs	7,208,632	1,902,797	3,304,815	(2,790,793)	9,625,451
Variable costs	18,500,240	18,856,011	439,607	(10,426,793)	27,369,065
Cost of sales	25,708,872	20,758,808	3,744,422	(13,217,586)	36,994,516
Gross income	6,023,739	2,486,868	7,100,128	(257,980)	15,352,755
Administrative expenses	731,626	451,250	518,109	-	1,700,985
Operation and projects expenses	2,969,723	1,155,301	157,596	(248,352)	4,034,268
Impairment of non-current assets	4,504,497	3,278,993	81,388	-	7,864,878
Other operating income and expenses, net	(399,954)	122,595	(101,182)	-	(378,541)
Operating income	(1,782,153)	(2,521,271)	6,444,217	(9,628)	2,131,165
Finance results, net					
Financial income	536,121	135,622	86,568	(136,387)	621,924
Financial expenses	(1,774,090)	(451,906)	(492,485)	67	(2,718,414)
Foreign exchange gain (loss), net	(4,798,741)	(949,176)	181,303	-	(5,566,614)
	(6,036,710)	(1,265,460)	(224,614)	(136,320)	(7,663,104)
Share of profit of companies	(70,407)	23,187	533	-	(46,687)
Income before tax	(7,889,270)	(3,763,544)	6,220,136	(145,948)	(5,578,626)
Income tax	2,037,650	(257,256)	(2,490,747)	-	(710,353)
Net income (loss) for the period	(5,851,620)	(4,020,800)	3,729,389	(145,948)	(6,288,979)
Income attributable to:					
Group owners of parent	(5,851,620)	(4,016,050)	2,819,759	(145,948)	(7,193,859)
Non-controlling interest	-	(4,750)	909,630	-	904,880
	(5,851,620)	(4,020,800)	3,729,389	(145,948)	(6,288,979)
Supplementary information					
Depreciation, depletion and amortization	5,318,587	570,033	881,738	-	6,770,358

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	Exploration and Production	Refining and Petrochemicals	Transportation and Logistics	Eliminations	Total
Local sales					
Med-distillates	25,782	10,206,599	-	(17,157)	10,215,224
Gasoline	-	6,464,661	-	(336,453)	6,128,208
Services	118,812	198,369	10,822,078	(6,703,985)	4,435,274
Natural gas	2,198,284	-	-	(352,939)	1,845,345
Crude oil	5,847,368	-	-	(5,356,089)	491,279
Diesel and asphalts	49,583	411,605	-	-	461,188
Plastic and rubber	-	724,392	-	-	724,392
L.P.G. and propane	154,201	190,346	-	(9,053)	335,494
Other products	262,906	1,070,725	22,472	(367,757)	988,346
	8,656,936	19,266,697	10,844,550	(13,143,433)	25,624,750
Recognition of price differential	-	441,871	-	-	441,871
	8,656,936	19,708,568	10,844,550	(13,143,433)	26,066,621
Foreign sales					
Crude	21,495,762	-	-	(314,497)	21,181,265
Fuel oil	-	2,166,469	-	-	2,166,469
Trading of crude	1,309,196	-	-	-	1,309,196
Natural gas	233,500	-	-	(50,550)	182,950
Gasoline and turbo fuel	27,756	65,369	-	-	93,125
Diesel	-	81,982	-	-	81,982
Plastic and rubber	-	1,096,730	-	-	1,096,730
Cash flow hedging – Reclassification to profit or loss	7,646	-	-	-	7,646
Other products and services	1,815	126,558	-	32,914	161,287
	23,075,675	3,537,108	-	(332,133)	26,280,650
Total revenue	31,732,611	23,245,676	10,844,550	(13,475,566)	52,347,271

33.3 Capital expenditures by segments

The following are the investments amounts made by each segment for the years ended December 31, 2017, 2016 and 2015:

2017	Exploration and Production	Refining and Petrochemicals	Transport and Logistics	Total
Property, plant and equipment	927,282	606,749	829,252	2,363,283
Natural and environmental resources	3,568,355	-	-	3,568,355
Intangibles	154,155	4,941	16,772	175,868
	4,649,792	611,690	846,024	6,107,506
2016	Exploration and Production	Refining and Petrochemicals	Transport and Logistics	Total
Property, plant and equipment	1,208,464	1,099,850	1,338,615	3,646,929
Natural and environmental resources	2,121,295	-	-	2,121,295
Intangibles	53,774	10,274	5,205	69,253
	3,383,533	1,110,124	1,343,820	5,837,477
2015	Exploration and Production	Refining and Petrochemicals	Transport and Logistics	Total
Property, plant and equipment	2,460,975	3,590,279	2,497,679	8,548,933
Natural and environmental resources	6,856,761	-	-	6,856,761
Intangibles	69,126	18,494	24,635	112,255
	9,386,862	3,608,773	2,522,314	15,517,949

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34. Contractual obligations

The Group has several commitments and contractual obligations that may require future disbursement of funds. The main commitments are related to a) payments of loans and borrowings, which are disclosed in Note 30.5, b) payment of benefits post-employment, the amounts of which in the next 5 years are disclosed in Note 22.4 c) future payment commitments in service contracts, operational leasing, gas and energy supplies, purchase of assets and others, and d) commitments of exploration activities and others with the National Hydrocarbons Agency in current contracts.

The details of the commitments and contractual obligations can be found in section 4.8 Financial Review - Financial Indebtedness and Other Contractual Obligations.

35. Subsequent events

- On April 13, 2018, Ecopetrol redeemed all of its outstanding 4.250% notes due September 18, 2018 in an aggregate principal amount of US\$350 million. The notes were issued in September 2013.
- On March 14, 2018, Ecopetrol formed the subsidiary Ecopetrol Energía SAS E.S.P., domiciled in Colombia, whose corporate purpose is the commercialization of electric energy for the Ecopetrol Business Group. Ecopetrol has a direct participation of 99% in the capitalization of the new subsidiary, and indirect participation in the remaining 1% interest through Andean Chemicals Ltd.
- On March 2, 2018, a seepage of water and traces of crude oil occurred near the Lisama 158 well, located in the village of La Fortuna, in the Middle Magdalena Valley of Colombia. Ecopetrol activated its contingency plan to contain the spill. It is estimated that 550 barrels of crude, mixed with mud and rainwater, seeped into the streams of La Lisama and Caño Muerto. As of March 30, 2018, the Lisama 158 well was sealed and stopped flowing. Ecopetrol has ordered an investigation to determine the cause of the seepage. As of the date of this annual report, the National Environmental Licenses Agency (ANLA) has opened an investigation into the incident and the Prosecutor's Office and other control entities may also open investigations. Besides the notice of seven constitutional actions for protection of fundamental rights. Ecopetrol is not aware of any other third party claims in connection with this incident, it cannot offer any assurance as to whether or not there will be third party actions in the future.
- As part of the investigations carried out by various control entities of the modernization and expansion project of Reficar the following developments in the investigations and proceedings have occurred:

Office of the Comptroller General (Contraloría General de la República): On February 2, 2018, the Legal Accounts Commission of the National House of Representatives of the Republic of Colombia informed Reficar that the House of Representatives decided, through Resolution No. 2713, that it would not close the General Budget, Treasury Account or the National Balance Sheet for the 2016 fiscal year, since the 2016 Financial Statements of several state entities, among them Reficar, had received a negative opinion from the Office of the Comptroller General. Pursuant to Resolution No. 2713, Colombian control entities have been ordered to initiate disciplinary, fiscal and/or penal investigations.

Ecopetrol is not in a position to forecast the results of these investigations; nor is it possible to evaluate the probability of any consequence that may impact the financial statements, such as additional provisions, fines or ignorance of tax deductions that affect the amounts of deferred tax assets.

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Supplemental information on oil and gas producing activities (unaudited)

The information in this note is referred to as “unaudited” as a means of clarifying that it is not covered by the audit opinion of the independent registered public accounting firm that has audited and reported on the “Consolidated Financial Statements”.

In accordance with the requirements of the United States Securities and Exchange Commission (SEC), Rule 4-10(a) of Regulation S-X, Release 33-8879, Accounting Standards Codification 932 and the ASU- 2010-03 “Oil and Gas reserve Estimation and Disclosures” rule, this section provides supplemental information on oil and gas exploration and producing activities of the Group. The information included in sections a) to c) provides historical cost information pertaining to costs incurred in exploration, property acquisitions and development, capitalized costs and results of operations. The information included in sections d) and e) presents information on Ecopetrol’s estimated net proved reserve quantities, standardized measure of estimated discounted future net cash flows related to proved reserves and changes in estimated discounted future net cash flows.

The following information corresponds to Ecopetrol’s oil and gas producing activities as of December 31 2017, 2016 and 2015, and includes information related to the Group’s consolidated subsidiaries as well as its investments the joint ventures Equion Energía Limited and Offshore International Group. The oil and gas exploration and production activities of these two joint ventures are immaterial, as such the corresponding information has not been disclosed separately.

Under the SEC final rule optional disclosure of possible and probable reserves is allowed but, the Group opted not to do so. Ecopetrol estimated its reserves without considering non-traditional resources.

(a) Capitalized costs relating to oil and gas exploration and production activities

	<u>2017</u>	<u>2016</u>	<u>2015</u>
Natural and environmental properties	48,129,595	47,097,475	45,789,713
Wells, equipment and facilities - property, plant and equipment	30,405,565	29,931,039	21,822,897
Exploration and production projects	6,632,812	6,855,832	9,145,198
Accumulated depreciation, depletion and amortization	(51,791,897)	(49,714,944)	(39,743,147)
Net capitalized cost	<u>33,376,075</u>	<u>34,169,402</u>	<u>37,014,661</u>

It includes information of the Exploration and Production segment subsidiaries.

In accordance with IAS 37, costs capitalized to natural and environmental properties include provisions for asset retirement obligations of COP\$598,125, COP\$766,909 and COP\$580,575 during 2017, 2016 and 2015, respectively.

(b) Costs incurred in oil and gas exploration and developed activities

Costs incurred are summarized below and include both amounts expensed and capitalized in the corresponding period.

	<u>2017</u>	<u>2016</u>	<u>2015</u>
Acquisition of proved properties (1)	591,875	-	-
Acquisition of unproved properties (2)	164,180	-	357,772
Exploration costs	1,095,588	852,097	1,012,264
Development costs	3,599,385	2,190,426	8,018,131
	<u>5,451,028</u>	<u>3,042,523</u>	<u>9,388,167</u>

(1) On December 11, 2017, Ecopetrol América Inc. acquired the 11.6% interest in the K2 oil field in the Gulf of Mexico from MCX; increasing its share from 9.2% to 20.8%.

(2) Corresponds mainly to investments made by Ecopetrol América Inc in offshore exploration projects of the Warrior and Rydberg wells. For 2015, relates to drilling for the Leon 2 exploratory project, operated by Repsol as well as acquisition of the lease sales 235 and 246 (unproven lands).

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(c) Results of operations for oil and gas exploration and production activities

The Group's results of operations from oil and gas exploration and production activities for the years ended December 31, 2017, 2016 and 2015 are as follows:

	2017	2016	2015
Net revenues			
Sales	29,823,565	21,322,662	26,039,708
Transfers	7,518,216	7,734,195	5,692,902
	37,341,781	29,056,857	31,732,610
Production costs (1)	6,535,794	5,785,950	6,006,563
Depreciation, depletion and amortization (2)	6,349,382	5,927,466	6,234,190
Other production costs (3)	14,066,593	12,370,540	14,457,836
Exploration expenses (4)	1,342,952	730,393	1,586,940
Other expenses (5)	882,743	1,684,590	6,364,414
	29,177,464	26,498,939	34,649,943
Income before income tax expense	8,164,317	2,557,918	(2,917,333)
Income tax expense	(3,678,955)	(1,367,357)	(371,376)
Results of operations for exploration and production activities	4,485,362	1,190,561	(3,288,709)

- (1) Production costs are lifting costs incurred to operate and maintain productive wells and related equipment and facilities including costs such as operating labor, materials, supplies, and fuel consumed in operations and the costs of operating natural gas liquids plants. In addition, they include expenses related to the asset retirement obligations that were recognized during 2017, 2016 and 2015 of COP\$380,810, COP\$305,653 and COP\$206,570, respectively.
- (2) In accordance with IAS 37 the expense related to asset retirement obligations that were recognized during 2017, 2016 and 2015 in depreciation, depletion and amortization, were COP\$179,601, COP\$188,370 and COP\$294,849, respectively.
- (3) Corresponds to transportation costs and naphtha that are not part of the Group's lifting cost.
- (4) Exploration expenses include the costs of geological and geophysical activities as well as the non-productive exploratory wells.
- (5) Corresponds to administration and marketing expenses.

During 2017, 2016 and 2015, the Group transferred approximately 20.1%, 17.7% and 17.9%, respectively, of its crude oil and gas production; (percentages based on the value sales in Colombian pesos) to intercompany business units. Those transfers were 48.4%, 46.1% and 37.4%, respectively of crude oil and gas production volume (including Reficar).

The intercompany transfers were realized at market prices.

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(d) Reserve information

Ecopetrol follows international standards for estimating, classifying and reporting reserves framed under SEC definitions. The process is led by the Reserves Department which submits the report to the Board of Directors for approval.

The reserves were audited at a level of 99% by 2 specialized auditing companies: DeGolyer and MacNaughton and Ryder Scott Group. According to these certifications the reserves report complies with the content and guidelines set forth in Rule 4-10 of Regulation S-X issued by the United States SEC.

The following information relates to the net proven reserves owned by the Ecopetrol Business Group in 2017, 2016 and 2015, and corresponds to the official reserves statements prepared by the Group:

	2017			2016			2015		
	Oil (Mbls)	Gas (Gpc)	Total (Mbe)	Oil (Mbls)	Gas (Gpc)	Total (Mbe)	Oil (Mbls)	Gas (Gpc)	Total (Mbe)
Proved reserves:									
Opening balance	1,033	3,218	1,598	1,239	3,479	1,849	1,465	3,529	2,084
Revisions of previous estimates (1)	124	294	175	(50)	(23)	(54)	(64)	225	(25)
Improved recovery	72	4	73	11	1	11	16	3	17
Purchases	3	2	4	-	-	-	-	-	-
Extensions and discoveries	44	-	43	22	25	27	24	-	24
Production	(188)	(264)	(234)	(189)	(264)	(235)	(202)	(278)	(251)
Closing balance	1,088	3,254	1,659	1,033	3,218	1,598	1,239	3,479	1,849
<i>Proved developed reserves:</i>									
Opening balance	779	3,131	1,329	913	3,176	1,470	1,042	3,284	1,618
Closing balance	818	3,158	1,372	779	3,131	1,329	913	3,176	1,470
<i>Proved undeveloped reserves:</i>									
Opening balance	254	87	269	326	303	379	423	245	466
Closing balance	270	96	287	254	87	269	326	303	379

(1) Represents changes in previous proved reserves, upward or downward, resulting from new information (except for an increase in proved area), usually obtained from development drilling and production history or result from changes in economic factors.

For additional information about the changes in Proved Reserves and the process for estimating reserves, see section 3.4.3 - Business Overview - Exploration and Production - Reserves.

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(e) Standardized measure of discounted future net cash flows relating to proved oil and gas quantities and changes therein

The standardized measure of discounted future net cash flows related to the above proved crude oil and natural gas reserves is calculated in accordance with the requirements of ASU 2010-03. Estimated future cash inflows from production under SEC requirements are computed by applying unweighted arithmetic average of the first-day-of-the-month for oil and gas price to year-end quantities of estimated net proved reserves, with cost factors based on those at the end of each year, currently enacted tax rates and a 10% annual discount factor. In our view, the information so calculated does not provide a reliable measure of future cash flows from proved reserves, nor does it permit a realistic comparison to be made of one entity with another because the assumptions used cannot reflect the varying circumstances within each entity. In addition, a substantial but unknown proportion of future real cash flows from oil and gas production activities is expected to derive from reserves which have already been discovered, but which cannot yet be regarded as proved.

	2017	2016	2015
Future cash inflows	182,114,282	140,458,230	176,865,586
Future costs			
Production	(70,159,534)	(60,705,779)	(76,363,169)
Development	(14,860,992)	(12,005,835)	(16,498,118)
Income taxes	(23,660,328)	(15,400,000)	(30,052,830)
Future net cash flow	73,433,428	52,346,616	53,951,469
10% discount factor	(22,216,583)	(18,221,004)	(19,117,422)
Standardized measure of discounted net cash flows	51,216,845	34,125,612	34,834,047

The following are the principal sources of change in the standardized measure of discounted net cash flows in 2017, 2016 and 2015:

	2017	2016	2015
Net change in sales and transfer prices and in production cost (lifting) related to future production	26,918,170	3,603,876	(50,472,025)
Changes in estimated future development costs	(1,978,913)	(4,767,340)	592,529
Sales and transfer of oil and gas produced, net of production costs	(30,805,987)	(23,270,907)	(25,726,047)
Net change due to extension discoveries	284,374	154,352	(93,190)
Net change due to purchase and sales of minerals in place	211,777	(83,450)	-
Net change due to revisions in quantity estimates	9,090,882	(2,570,103)	(985,217)
Previously estimated development costs incurred during the period	3,482,570	5,042,697	10,769,369
Accretion of discount	4,416,512	5,423,781	11,321,221
Timing and other	11,934,458	6,394,404	(4,381,037)
Net change in income taxes	(6,462,611)	9,364,255	18,775,304
Aggregate change in the standardized measure of discounted future net cash flows for the year	17,091,232	(708,435)	(40,199,093)

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Exhibit 1. Consolidated subsidiaries, associates and joint ventures

Consolidated subsidiary companies (1/2)

Group	Functional currency	Ownership interest Ecopetrol	Activity	Country/Domicile	Geographic area of operations	Equity, net	Profit (loss) of the year	Total assets	Total liabilities
Ecopetrol Global Energy SLU	U.S. Dollar	100%	Investment vehicle	Spain	Spain	3,056,580	102,120	3,056,719	139
Ecopetrol Oleo é Gas do Brasil Ltda.	Real	100%	Exploration and exploitation of hydrocarbons	Brazil	Brazil	36,385	(54,591)	50,933	14,548
Ecopetrol del Perú S.A.	U.S. Dollar	100%	Exploration and exploitation of hydrocarbons	Peru	Peru	48,969	(2,271)	51,792	2,823
Ecopetrol America Inc.	U.S. Dollar	100%	Exploration and exploitation of hydrocarbons	United States	United States	2,964,718	163,529	3,368,997	404,279
Black Gold Re Ltd.	U.S. Dollar	100%	Reinsurer of Ecopetrol and its subordinates	Bermuda	Bermuda	607,199	28,135	729,125	121,926
Ecopetrol Germany Gmbh	U.S. Dollar	100%	Exploration and exploitation of hydrocarbons	Germany	Angola	2,345	(118)	2,773	428
Hocol Petroleum Limited	U.S. Dollar	100%	Investment vehicle	Bermuda	Bermuda	2,223,406	(135,261)	2,223,464	58
Hocol S.A.	U.S. Dollar	100%	Exploration, exploitation and production of hydrocarbons	Cayman Islands	Colombia	1,529,052	(60,103)	2,747,950	1,218,898
Andean Chemicals Ltd.	U.S. Dollar	100%	Investment vehicle	Bermuda	Bermuda	5,168,133	(526,869)	5,169,911	1,778
Refineria de Cartagena S.A *	U.S. Dollar	100%	Refining, commercialization and distribution of hydrocarbons	Colombia	Colombia	17,008,913	39,195	25,805,231	8,796,318
Propileno del Caribe Propilco S.A.	U.S. Dollar	100%	Production and commercialization of polypropylene resin	Colombia	Colombia	1,414,530	225,175	1,927,883	513,353
COMAI - Compounding and Masterbatching Industry	Colombian Peso	100%	Manufacture of polypropylene compounds and masterbatches	Colombia	Colombia	141,580	114,241	202,879	61,299

* Information taken from the audited financial statements.

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Consolidated subsidiaries (2/2)

Group	Functional currency	Ownership interest Ecopetrol	Activity	Country/Domicile	Geographic area of operations	Equity, net	Profit (loss) of the year	Total assets	Total liabilities
Bioenergy S.A.	Colombian Peso	99,04%	Production of biofuels	Colombia	Colombia	335,858	(237,846)	433,582	97,724
Bioenergy Zona Franca SAS	Colombian Peso	99,04%	Production of biofuels	Colombia	Colombia	246,866	(197,949)	702,627	455,761
Amandine Holdings Corp.	Colombian Peso	99,04%	On sale	Panama	Panama	6,657	-	6,657	-
The Arces Group Corp.	Colombian Peso	99,04%	On sale	Panama	Panama	5,100	-	5,100	-
Cenit SAS	Colombian Peso	100%	Storage and transportation by hydrocarbon pipelines	Colombia	Colombia	13,801,943	3,014,820	15,243,690	1,441,747
Oleoducto Central SA - Ocesa	U.S. Dollar	72,65%	Transportation by crude oil pipelines	Colombia	Colombia	3,014,831	1,667,219	6,205,436	3,190,605
Oleoducto de los Llanos	Colombian Peso	65%	Transportation by crude oil pipelines	Panama	Colombia	1,106,571	321,792	1,919,509	812,938
Oleoducto de Colombia SA - ODC	Colombian Peso	73%	Transportation by crude oil pipelines	Colombia	Colombia	351,308	202,432	555,250	203,942
Bicentenario de Colombia SAS	Colombian Peso	55,97%	Transportation activity by crude oil pipelines	Colombia	Colombia	1,069,490	385,500	3,205,369	2,135,879
Ecopetrol Capital AG	U.S. Dollar	100%	Financing, liquidation of financing of group companies or any type of company	Switzerland	Switzerland	1,240,473	145,970	5,806,746	4,566,273
Ecopetrol Global Capital SLU	Euro	100%	Investment vehicle	Spain	Spain	20	(51)	39	19
Esenttia Resinas del Perú	U.S. Dollar	100%	Marketing polypropylene resins and masterbatches	Peru	Peru	3,866	(84)	15,981	12,115
Ecopetrol Costa Afuera SAS	Colombian Peso	100%	Offshore Caribbean exploration	Colombia	Colombia	15,671	(69,242)	139,192	123,521
ECP Hidrocarburos de México SA de CV	U.S. Dollar	100%	Offshore Caribbean exploration	Mexico	Mexico	4,100	(3,653)	5,851	1,751

Ecopetrol S.A.
Notes to the consolidated financial statements
(Figures expressed in millions of Colombian pesos, unless otherwise stated)

Associated companies and joint ventures

Group	Functional currency	Ownership interest Ecopetrol	Activity	Country/Domicile	Geographic area of operations	Equity, net	Profit (loss) of the year	Total assets	Total liabilities
Associates									
Invercolsa SA (*)	Colombian Peso	43%	Holding with investments in transport and distribution of natural gas and LPG	Colombia	Colombia	516,640	84,628	560,368	43,728
Serviport SA (*)	Colombian Peso	49%	Services for the support of loading and unloading of oil ships, supply of equipment, technical inspections and load measurements	Colombia	Colombia	20,212	2,031	70,966	50,754
Sociedad Portuaria Olefinas y Derivados S.A. (*)	Colombian Peso	50%	Construction, use, maintenance and administration of port facilities, ports, private docks.	Colombia	Colombia	2,847	178	3,189	342
Joint Ventures									
Equion Energy Limited	U.S. Dollar	51%	Exploration, exploitation and production of hydrocarbons	United Kingdom	Colombia	1,336,811	253,709	1,865,776	528,965
Ecodiesel Colombia SA (*)	Colombian Peso	50%	Production, marketing and distribution of biofuels and oleo chemicals	Colombia	Colombia	76,766	13,236	128,420	51,654
Offshore International Group (*)	U.S. Dollar	50%	Exploration, development, production and processing of hydrocarbons	United States	Peru	1,007,754	(178,280)	1,858,013	850,259

(*) Information available as of November 30, 2017

Ecopetrol S.A.
Notes to the consolidated financial statements
(Figures expressed in millions of Colombian pesos, unless otherwise stated)

Exhibit 2 - Conditions of the most significant loans

Class of credit	Group	Initial Date	Expiry Date	Currency	Original/nominal value in original currency	Outstanding balance Dec 31, 2017	Outstanding balance Dec 31, 2016	Type of interest	Amortization of the principal	Payment of interest
Banks, domestic currency	Ecopetrol S.A.	Dec-10	Dec-20	COP	479,900	479,900	479,900	Floating	Bullet	Half-yearly
		Dec-10	Dec-40	COP	284,300	284,300	284,300	Floating	Bullet	Half-yearly
		Aug-13	Aug-18	COP	120,950	120,950	120,950	Floating	Bullet	Half-yearly
		Aug-13	Aug-23	COP	168,600	168,600	168,600	Floating	Bullet	Half-yearly
		Aug-13	Aug-28	COP	347,500	347,500	347,500	Floating	Bullet	Half-yearly
		Aug-13	Aug-43	COP	262,950	262,950	262,950	Floating	Bullet	Half-yearly
Local Currency syndicated loan	Ecopetrol S.A.	May-13	May-25	COP	1,839,000	1,532,500	1,736,833	Floating	Half-yearly	Half-yearly
	Bicentenario SAS	Jul-12	Jul-24	COP	2,100,000	1,373,750	1,549,625	Floating	Quarterly	Quarterly
	ODL Finance SA	Aug-13	Aug-20	COP	800,000	352,000	480,000	Floating	Quarterly	Quarterly
Bonds, foreign currency	Ecopetrol S.A.	Jul-09	Jul-19	USD	1,500**	1,500	1,500	Fixed	Bullet	Half-yearly
		Sept-13	Sept-18	USD	350**	350	350	Fixed	Bullet	Half-yearly
		Sept-13	Sept-23	USD	1,300**	1,300	1,300	Fixed	Bullet	Half-yearly
		Sept-13	Sept-43	USD	850	850	850	Fixed	Bullet	Half-yearly
		May-14	May-45	USD	2,000**	2,000	2,000	Fixed	Bullet	Half-yearly
		Sept-14	May-25	USD	1,200**	1,200	1,200	Fixed	Bullet	Half-yearly
		June-15	June-26	USD	1,500**	1,500	1,500	Fixed	Bullet	Half-yearly
		June-16	Sept-23	USD	500**	500	500	Fixed	Bullet	Half-yearly
		May-14	May-21	USD	500	500	500	Fixed	Bullet	Half-yearly
		International commercial credits	Ecopetrol S.A.	Feb-15	Feb-20	USD	1,925**	-	1,925	Floating
Jul-13	Jul-23			USD	245**	147	171	Floating	Half-yearly	Half-yearly
Jul-13	Jul-19			USD	151**	35	66	Floating	Half-yearly	Half-yearly
May-16	May-21			USD	300**	-	300	Floating	Bullet	Half-yearly
Feb-16	Feb-21			USD	175	-	175	Floating	Half-yearly	Half-yearly
Dec-11	Dec-27			USD	2,747	2,012	2,177	Fixed	Half-yearly	Half-yearly
Ecopetrol S.A.	Dec-11	Dec-27	USD	310	227	246	Floating	Half-yearly	Half-yearly	
	Dec-11	Dec-25	USD	440	344	374	Floating	Half-yearly	Half-yearly	

**Financial debt designated as hedging instrument (See Note 30.2).

9. Signature Page

SIGNATURES

The registrant hereby certifies that it meets all of the requirements for filing on Form 20-F and that it has duly caused and authorized the undersigned to sign this annual report on its behalf.

Ecopetrol S.A.

By: /s/ María Fernanda Suárez
Name: María Fernanda Suárez
Title: Chief Financial Officer

By: /s/ Felipe Bayón Pardo
Name: Felipe Bayón Pardo
Title: Chief Executive Officer

Dated: April 19, 2018

10. **Exhibits**

Exhibit No.	Description
<u>1.1</u>	<u>Amended and Restated Bylaws of Ecopetrol S.A., dated March 23, 2018 (English Translation).</u>
<u>4.1</u>	<u>Transportation Agreement between Ecopetrol S.A. and Oleoducto Central S.A., dated March 31, 1995 (incorporated by reference to Exhibit 4.1 on Form 20-F filed with the U.S. Securities and Exchange Commission on September 12, 2008 (File No. 001-34175)) (English Translation).</u>
<u>4.2</u>	<u>Supplementary Agreement to Transportation Agreement between Ecopetrol S.A. and Oleoducto Central S.A., dated January 17, 2013 (incorporated by reference to Exhibit 4.2 on Form 20-F filed with the U.S. Securities and Exchange Commission on April 29, 2013 (File No. 001-34175)) (English Translation).</u>
<u>4.3</u>	<u>Natural Gas Transportation Agreement between Ecopetrol S.A. and Transportadora de Gas del Interior S.A. ESP, dated October 1, 2008 (incorporated by reference to Exhibit 4.3 on Form 20-F filed with the U.S. Securities and Exchange Commission on April 29, 2013 (File No. 001-34175)) (English Translation).</u>
<u>4.4</u>	<u>Supplementary Agreement No. 1, dated December 5, 2008, to the Natural Gas Transportation Agreement between Ecopetrol S.A. and Transportadora de Gas del Interior S.A. ESP, dated October 1, 2008 (incorporated by reference to Exhibit 4.4 on Form 20-F filed with the U.S. Securities and Exchange Commission on April 29, 2013 (File No. 001-34175)) (English Translation).</u>
<u>4.5</u>	<u>Supplementary Agreement No. 2, dated April 11, 2012, to the Natural Gas Transportation Agreement between Ecopetrol S.A. and Transportadora de Gas Internacional S.A. E.S.P., dated October 1, 2008 (incorporated by reference to Exhibit 4.5 on Form 20-F filed with the U.S. Securities and Exchange Commission on April 29, 2013 (File No. 001-34175)) (English Translation).</u>
<u>4.6</u>	<u>Crude Oil Transportation Services Agreement between Ecopetrol S.A. and Cenit Transporte y Logística de Hidrocarburos S.A.S., dated April 1, 2013 (incorporated by reference to Exhibit 4.6 on Form 20-F filed with the U.S. Securities and Exchange Commission on April 29, 2013 (File No. 001-34175)) (English Translation).</u>
<u>4.7</u>	<u>Refined Products Transportation Services Agreement between Ecopetrol S.A. and Cenit Transporte y Logística de Hidrocarburos S.A.S., dated April 1, 2013 (incorporated by reference to Exhibit 4.7 on Form 20-F filed with the U.S. Securities and Exchange Commission on April 29, 2013 (File No. 001-34175)) (English Translation).</u>
<u>4.8</u>	<u>Indenture, dated as of July 23, 2009, between the Company and The Bank of New York Mellon, as trustee (incorporated by reference to Exhibit 4.2 to the Company's Form F-4 filed with the U.S. Securities and Exchange Commission on July 31, 2009 (File No. 333-160965)).</u>
<u>4.9</u>	<u>Bicentenario Transport Contract between Oleoducto Bicentenario de Colombia S.A.S. and Ecopetrol S.A., dated June 20, 2012 (incorporated by reference to Exhibit 4.9 on Form 20-F filed with the U.S. Securities and Exchange Commission on April 25, 2014 (File No. 001-34175)) (English Translation).</u>
<u>4.10</u>	<u>Amendment No. 1 to the Indenture, dated as of June 26, 2015, between the Company and The Bank of New York Mellon, as trustee (incorporated by reference to Exhibit 4.10 on Form 6-K of the Company furnished to the U.S. Securities and Exchange Commission on June 25, 2015 (File No. 001-34175)).</u>
<u>4.11</u>	<u>Supplementary Agreement No. 2, dated March 28, 2014, to the Bicentenario Transport Contract between Oleoducto Bicentenario de Colombia S.A.S. and Ecopetrol S.A., dated June 20, 2012 (incorporated by reference to Exhibit 4.11 on Form 20-F filed with the U.S. Securities and Exchange Commission on April 28, 2016 (File No. 001-34175)) (English Translation).</u>
<u>4.12</u>	<u>Supplementary Agreement No. 4, dated April 6, 2015, to the Bicentenario Transport Contract between Oleoducto Bicentenario de Colombia S.A.S. and Ecopetrol S.A., dated June 20, 2012 (incorporated by reference to Exhibit 4.12 on Form 20-F filed with the U.S. Securities and Exchange Commission on April 28, 2016 (File No. 001-34175)) (English Translation).</u>
<u>4.13</u>	<u>Amendment No. 6, dated April 25, 2016, to the Crude Oil Transportation Services Agreement between Ecopetrol S.A. and Cenit Transporte y Logística de Hidrocarburos S.A.S., dated April 1, 2013 (incorporated by reference to Exhibit 4.13 on Form 20-F filed with the U.S. Securities and Exchange Commission on May 31, 2017 (File No. 001-34175)) (English Translation).</u>

[4.14](#) [Amendment No. 7, dated December 28, 2016, to the Crude Oil Transportation Services Agreement between Ecopetrol S.A. and Cenit Transporte y Logística de Hidrocarburos S.A.S., dated April 1, 2013 \(incorporated by reference to Exhibit 4.14 on Form 20-F filed with the U.S. Securities and Exchange Commission on May 31, 2017 \(File No. 001-34175\)\) \(English Translation\).](#)

[8.1](#) [List of subsidiaries of Ecopetrol S.A.](#)

[12.1](#) [Section 302 Certification of the Chief Executive Officer.](#)

[12.2](#) [Section 302 Certification of the Chief Financial Officer.](#)

[13.1](#) [Section 906 Officer Certification.](#)

[99.1](#) [Third-Party Reserve Report of Ryder Scott Company, L.P.](#)

[99.2](#) [Third-Party Reserve Report of DeGolyer and MacNaughton.](#)

101* The following materials from the Ecopetrol S.A. Annual Report on Form 20-F for the year ended December 31, 2017 formatted in Extensible Business Reporting Language (XBRL): (i) the Consolidated Statements of Financial Position, (ii) the Consolidated Statements of Profit or Loss, (iii) the Consolidated Statements of Other Comprehensive Income, (iv) the Consolidated Statements of Changes in Equity, (v) the Consolidated Statements of Cash Flows and (vi) related notes to the Consolidated Financial Statements.

* To be filed by amendment.

11. Cross-reference to Form 20-F

		Sections
Item 1.	Identity of Directors, Senior Management and Advisers	N/A
Item 2.	Offer Statistics and Expected Timetable	N/A
Item 3.	Key Information	
	A. Selected Financial Data	1.3
	B. Capitalization and Indebtedness	N/A
	C. Reasons for the Offer and Use of Proceeds	N/A
	D. Risk Factors	5.1
Item 4.	Information on the Company	Note 1 to the consolidated financial statements
	A. History and Development of the Company	2.1; 3.1; Note 1 to the consolidated financial statements
	B. Business Overview	2; 3.3 – 3.9; 4.5.1
	C. Organizational Structure	3.2
	D. Property, Plants and Equipment	3.4 – 3.6; 4.6.2; Notes 15, 16 and 17 to the consolidated financial statements
	E. Oil and Gas Disclosures	3.3 – 3.6; Notes 15, 16 and Supplemental information on Oil and Gas producing activities (unaudited by EY) to the consolidated financial statements
Item 4A.	Unresolved Staff Comments	None
Item 5.	Operating and Financial Review and Prospects	
	A. Operating Results	3.8; 4; 5.1; 5.2
	B. Liquidity and Capital Resources	2.1; 4.6; 4.8; Consolidated statements of cash flow and Notes 9, 20, 29 and 30.6 to the consolidated financial statements
	C. Research and development, Patents and Licenses, etc.	3.7; Note 17 to the consolidated financial statements
	D. Trend Information	4.10
	E. Off-Balance Sheet Arrangements	4.9
	F. Tabular Disclosure of Contractual Obligations	4.8
	G. Safe Harbor	1.2
Item 6.	Directors, Senior Management and Employees	
	A. Directors and Senior Management	7.3; 7.5

	B. Compensation	7.6; Notes 4, 22 and 31 to the consolidated financial statements
	C. Board Practices	7.3
	D. Employees	3.12
	E. Share Ownership	7.7
Item 7.	Major Shareholders and Related Party Transactions	
	A. Major Shareholders	6.3; 6.8; 7.7
	B. Related Party Transactions	3.10; Note 31 to the consolidated financial statements
Item 8.	C. Interests of Experts and Counsel	N/A
	Financial Information	
	A. Consolidated Statements and Other Financial Information	4; 5.3; 6.2; 8
Item 9.	B. Significant Changes	7.8; Note 35 to the consolidated financial statements
	The Offer and Listing	
	A. Offer and Listing Details	6.3
	B. Plan of Distribution	N/A
	C. Markets	6.3
	D. Selling Shareholders	N/A
	E. Dilution	N/A
	F. Expenses of the Issue	N/A
Item 10.	Additional Information	
	A. Share Capital	N/A
	B. Memorandum and Articles of Association	7.1
	C. Material Contracts	3.4.4; 4.8; Exhibits 4.1 – 4.12
	D. Exchange Controls	5.1.4; 6.6
	E. Taxation	4.2.1; 6.5; Note 10 to the consolidated financial statements
	F. Dividends and Paying Agents	N/A
	G. Statements by Experts	N/A
	H. Documents On Display	1.1
	I. Subsidiary Information	N/A
Item 11.	Quantitative and Qualitative Disclosures About Market Risk	4.10; 5.1.1; 5.2.1; 5.2.3; Note 30 to the consolidated financial statements
Item 12.	Description of Securities Other than Equity Securities	
	A. Debt Securities	N/A
	B. Warrants and Rights	N/A
	C. Other Securities	N/A
	D. American Depositary Shares	6.4
Item 13.	Defaults, Dividend Arrearages and Delinquencies	None
Item 14.	Material Modifications to the Rights of Security Holders and Use of Proceeds	None
Item 15.	Controls and Procedures	5.2; 7.8
Item 16A.	Audit Committee Financial Expert	7.3.2
Item 16B.	Code of Ethics	7.2; 7.4
Item 16C.	Principal Accountant Fees and Services	7.8
Item 16D.	Exemptions from the Listing Standards for Audit Committees	N/A
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Item 16F.	Changes in Registrant's Certifying Accountant	7.8
Item 16G.	Corporate Governance	7.4
Item 16H.	Mine Safety Disclosure	N/A
Item 17.	Financial Statements	N/A
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BYLAWS OF ECOPETROL S.A.

CHAPTER I: LEGAL NATURE, CORPORATE NAME, INCORPORATION, DOMICILE AND DURATION

ARTICLE ONE. LEGAL NATURE – CORPORATE NAME.- ECOPETROL S.A. is a corporation, of commercial nature, comprised of public and private shareholders, that carries out its corporate purpose in a competitive manner with private entities. Hereinafter and for the purposes of this document, it will be referred to as “Ecopetrol” or the “Company”.

As established by law, Ecopetrol is a mixed-economy company, from the national order, and assigned to the Ministry of Mines and Energy. All legal acts, agreements and actions required to carry out its corporate purpose are governed exclusively by the rules of private law, regardless of the percentage of the state shareholding in the Company's capital stock.

ARTICLE TWO. DOMICILE.- The main domicile of Ecopetrol is the city of Bogotá D.C. the Company may open subsidiaries, branch offices and agencies throughout the country and abroad.

ARTICLE THREE. DURATION.- The duration of the Company is one hundred (100) years as of its establishment.

CHAPTER II: CORPORATE PURPOSE

ARTICLE FOUR. CORPORATE PURPOSE.- The corporate purpose of Ecopetrol is to carry out, in Colombia or abroad, commercial and industrial activities related to the exploration, operation, refining, transportation, storage, distribution and marketing of hydrocarbons and their byproducts.

Additionally, the following activities are part of the corporate purpose of Ecopetrol:

- 1) Administration and management of all assets that were returned to the Government after the termination of the former De Mares Concession. Additionally, over such assets, Ecopetrol shall have, all the powers provided by Law.
 - 2) Exploration and operation of hydrocarbons in oil areas or fields that, prior to January 1, 2004: a) were linked to executed agreements or, b) were being directly operated by Ecopetrol.
 - 3) Exploration and operation of oil areas or fields assigned to Ecopetrol by the National Hydrocarbons Agency - ANH, or the entity acting as such.
 - 4) Exploration and operation of hydrocarbons abroad, directly or through agreements entered into with third parties.
 - 5) Export and import of hydrocarbons, its derivatives and their byproducts.
 - 6) Production, processing, blending, transportation, storage, distribution and/or marketing (purchase and sale), and industrialization of hydrocarbons, their byproducts, and products owned by Ecopetrol or by third parties, domestic or imported.
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- 7) Refining, processing, and any other type of industrial process or petrochemical of the hydrocarbons, its derivatives, similar products, in the grounds of the Company or of third parties.
 - 8) Transportation and storage of hydrocarbons, their byproducts and similar, through transportation or storage systems.
 - 9) Export and import of fuels and oxygenating components of vegetable origin.
 - 10) Construction, operation and maintenance of ports infrastructure for the export and import of hydrocarbons, and their byproducts or oxygenating components.
 - 11) Develop all of the activities required within the electric energy process, in order to generate energy that satisfies the Company's own needs in all its business segments and, furthermore, sell its surplus and buy in case of shortages as a main source or as backup for its operations.
 - 12) Design, construct, operate, and maintain port infrastructure for the export and import of hydrocarbons, its derivatives, products or oxygenates.
 - 13) Construct, operate, administer, maintain, dispose and manage all infrastructure, facilities and property that is required to achieve the Company's corporate purpose.
 - 14) Establish and be part of all types of companies, including sole proprietorships, as well as open branches and agencies that are necessary for the proper implementation of its corporate purpose. The participation permitted by this clause may include involvement in companies whose activity differs from the one of the Company, provided that, in the opinion of the Board of Directors, this is appropriate for the implementation of the corporate purpose.
 - 15) Concluding all kinds of credit and financing operations with financial entities or insurers.
 - 16) Guarantee third-party obligations within the scope of its business and within the framework of its corporate purpose, with the prior authorization of its Board of Directors.
 - 17) Securitizing assets and investments.
 - 18) Placing their surplus cash and reserves in the capital market, temporarily or permanently, and subscribing bonds, acquiring securities, shares, interests, rights, making deposits or performing any type of investment and treasury operation with authorized financial entities.
 - 19) Obtain and exploit industrial property rights on trademarks, drawings, insignia, patents for new technologies and products, results from research, and creations by the Company's competent units, as well as any other intangible property.
 - 20) Training personnel in all specialties required for the proper implementation of the corporate purpose.
 - 21) Participate in research, scientific or technological activities related to its corporate purpose, or to activities that are supplementary, related or useful thereto, as well as taking advantage of them and applying them technically and economically.
 - 22) Participate in the financing, structuring and implementation of social programs for the community, especially with the communities that are located in places where the Company has influence.
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- 23) Carry out the above activities and any other investments, legal acts or related activities which are supplementary or useful for the implementation of its corporate purpose and activities in relation to hydrocarbons, their byproducts, refined products, similar, or products that are able to substitute those mentioned.
- 24) Participating in the advancement of social programs for the community, especially with the community that is in places where the Company has influence.
- 25) All other duties assigned by Law.

PARAGRAPH: Ecopetrol must accomplish its corporate purpose in a competitive manner, meeting criteria of economic and financial profitability in consideration of the market circumstances and the risks inherent to the industry, while also attending to the needs of the corporate group in which Ecopetrol is the parent company.

CHAPTER III: CAPITAL, SHARES AND SHAREHOLDERS RIGHTS

ARTICLE FIVE. COMPANY CAPITAL.- The Company has an authorized share capital of thirty-six trillion five hundred forty thousand billion pesos legal tender (\$36,540,000,000,000.00), divided into sixty billion (60,000,000,000) ordinary shares with a par value of six hundred nine pesos (\$609) each, represented in accordance with the provisions of these Bylaws.

ARTICLE SIX. SHARE ISSUANCE.- Ecopetrol may issue shares within the authorized capital limit, in accordance with the limitations established by Law.

ARTICLE SEVEN. SHAREHOLDER REGISTER.- The Company will keep a Stock Ledger that has been registered beforehand with the Chamber of Commerce of the main corporate domicile and this register will contain the names of the shareholders, the number of shares corresponding to each of them, the security or securities with their respective numbers and registration dates, the sales and transfers, pledges, usufructs, and judicial attachments and claims, as well as any other act subject to registration pursuant to the law. In the event that the shares are dematerialized, they will be represented by a macro security, which will be held in safekeeping and managed in the central securities depository, which will make annotations regarding the subscribers thereof and will keep the Stock Ledger. Shareholders may request a certificate through their direct depositor, which legitimizes them to exercise the rights inherent to their status.

The Company recognizes the person that appears registered in the Stock Ledger as the owner of shares, and only for the number of securities and under the conditions that are registered therein.

ARTICLE EIGHT. SECURITIES OR CERTIFICATES.- The shares of the Company may circulate in physical or dematerialized form.

- a) Shares that circulate physically or in materialized form, will be represented by securities bearing the handwritten signature of the President and of the Secretary of the Company or whomever acts as such, and will be issued in a numeric and continuous series and must comply with all requirements pursuant to Article 401 of the Commerce Code, or the regulations that amend, replace or add to it.
-

Until the total amount per share has been paid in its entirety, only provisional securities will be issued to the subscribers. All provisional securities will be exchanged for permanent securities when the shares represented by them are fully paid. The securities may be issued for groups or lots of shares, or for each specific share.

The shareholders will be responsible for any taxes or fees imposed on the issuance of shares that circulate physically or in materialized form, as well as for those generated by transfers, transmission or changes regarding their ownership.

- b) Certificates relating to the shares that are placed, transferred or taxed and that circulate in a dematerialized manner will be safeguarded and managed by a specialized entity or a Centralized Securities Depository with experience in this type of activity. The holders may request a certificate that guarantees the exercise of the rights inherent to the status of shareholder. The entity responsible for management will make the corresponding annotations regarding the subscribers of the shares and will keep the Shareholder Register. The content and characteristics of the certificates will be subject to the relevant legal requirements. Until the value of the shares has been fully paid, the Company may only issue provisional certificates.

The circulation, charges and other matters and operations related to the dematerialized shares will be governed by what is established in the laws applicable to dematerialized securities.

ARTICLE NINE. SHAREHOLDER DEFAULT.- When a shareholder fails to pay an installment on a due date for the shares it has subscribed, it cannot exercise the rights inherent to such shares. The Company, at the discretion of the Board of Directors, will proceed with the judicial collection or sell (at the expense of the defaulter and through a broker) the shares they have subscribed, or to allocate the amount received to the release of the number of shares corresponding to the installments paid, after deduction of twenty percent (20%) of such sums as compensation for the damage that will be presumed caused.

ARTICLE TEN. SHAREHOLDER RIGHTS.- All ordinary shares confer to the shareholder an equal right to the corporate assets and to the profits that are distributed, and each of them has the right to one vote in the deliberations of the General Shareholders Assembly, within the legal limitations.

The shareholders of the Company, in addition to what is established by law, will enjoy the following rights and guarantees:

- 1) Participate in the deliberations of the General Shareholders Assembly and exercise their voting rights to make the decisions that correspond to the General Shareholders Assembly, including the appointment of bodies and individuals whom, in accordance with the law and these Bylaws, must be appointed by the shareholders and, if necessary, have effective mechanisms for representation in said Meetings.
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- 2) Receive, as a dividend, a percentage of the profits of the Company in pro rata to the shares that the shareholder holds in the Company. Ecopetrol allocates the profits in accordance with the provisions set forth by law and these Bylaws.
 - 3) Have access to the Company's public information in a timely and comprehensive manner, and freely inspect the books and other documents referred to in Articles 446 and 447 of the Commercial Code or the laws that modify, replace or add something to them, within fifteen (15) business days prior to the meeting of the General Shareholders Assembly in which the end-of-year financial statements are considered.
 - 4) Receive by pro rata, part of the corporate assets at the time of liquidation, if applicable and, once the Company's external liabilities have been paid, in proportion to the shares they hold therein.
 - 5) Be represented by a third party, as established by a written document in which they express the name of the party that will represent them and the scope of the mandate. The powers of representation for purposes of the General Shareholders Assembly must be subject to the provisions of Article 184 of the Commercial Code, or the regulations that amend, replace or add to it.
 - 6) Transfer or dispose their shares, as established by law and these Bylaws.
 - 7) Provide recommendations on corporate governance to the Company, through written requests presented to the Shareholder and Investor Attention Office.
 - 8) Request, with other shareholders, that a special Shareholders Assembly be held, in accordance with the provisions of Article 17 of these Bylaws.
 - 9) Request authorization from the Shareholder and Investor Service Office to commission specialized audits, at their expense and under their responsibility, provided that such audit does not hinder the day-to-day operations of the Company, under the following terms:
 - a) Specialized audits may be carried out at any time and on the documents authorized by Article 447 of the Commercial Code, upon request of a plural number of shareholders representing at least five percent (5%) of the Company's subscribed shares.
 - b) Specialized audits may not cover documents that are confidential in nature, in accordance with the law, in particular Article 15 of the Constitution and Article 61 of the Commercial Code, as well as Letter g) of Article 4, Law 964 of 2005 and the regulations that govern, amend, replace or add to these.
 - c) Scientific, technical, economic, and statistic information shall not be subject to specialized audits either, in accordance with the applicable legislation. This shall also be the case for technical and scientific information regarding prospects for reservoirs, obtained directly by the Company or its partners, as well as the information derived from contracts that represent competitive advantages; this type of information will enjoy the commercial confidentiality set out by Colombian commercial law. In any case, specialized audits must deal with specific matters and cannot be conducted on industrial secrets or on matters whose confidentiality is protected by the legislation on intellectual property rights.
 - d) In no case, the specialized audits may imply impairment to managers' autonomy, in accordance with legal and bylaw powers.
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- e) The working documents of the special auditor will subject to reserve and must be conserved for a time no less than five (5) years, as of the date of elaboration.
 - f) The request to carry out specialized audits will be submitted in writing to the Shareholder and Investor Attention Service Office, stating the reasons why they are to be carried out, the facts and operations to be audited, and the duration. The persons hired to perform the specialized audits must be qualified professionals, recognized as such in accordance with the law, and they shall comply with the requirements set out by the law and these Bylaws for being a Statutory Auditor of the Company. The external auditor will be chosen in accordance with procedures that ensure their objective selection and independence.
 - g) The Shareholder and Investor Attention Service Office must process the request in question in an expeditious and efficient manner, facilitating the activities of the auditor, in coordination with the Company's units that must cooperate in order for the audit to be possible.
 - h) The results of the specialized audit will first be reported to the President of the Company, who has thirty (30) business days to comment. These results and the comments from the President will be shared with the Board of Directors and with the appropriate control and oversight administrative entities. In the event there is a breach of law, matters will be transferred to the competent authorities.
- 10) Submit proposals related to the proper progress of the Company to the Board of Directors, with other shareholders, provided that they represent at least five percent (5%) of the subscribed shares. The proposals must indicate the address and name of the person to whom the response to the request will be sent, and with whom the Board will act, if deemed necessary. In any case, the topics of such proposals may not be related to industrial secrets or information that is strategic to the Company's development. These requests must be submitted in writing to the Shareholder and Investor Service Office or the department that acts as such. In turn, this Office must submit them to the Board or to the relevant institutional committee for its examination and potential approval by the Board of Directors. In order to give answer to these requests, the Board of Directors must abstain from supplying information that is confidential or place Ecopetrol's business at risk, or affects the rights of third parties or that, if disclosed, may be used to the detriment of the Company.
- 11) When they deem that a rule of the Corporate Governance Code has been ignored or breached, they may contact the Company's Board of Directors in writing, stating the reasons and facts on which they base their claim, indicating their name, citizenship card number, address, telephone number and city, in order to guarantee that it will be possible to answer their request. The Secretary General, or the person acting as such, will send the above request to the Board of Directors. The Board will evaluate the request, give the response they consider, and take the necessary measures so that the relevant provisions are not breached. The Board of Directors may exercise this duty by appointing a committee to review such request.
- 12) Shareholders may exercise their exit rights in accordance with the terms and conditions established by law, and if such is the case, avail themselves with the conditions that the Nation will establish in the Declaration of the Majority Shareholder.
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13) All rights granted by the law and these Bylaws.

PARAGRAPH ONE: FAIR TREATMENT TO SHAREHOLDERS AND INVESTORS.- In order to guarantee the full exercise of Shareholders rights and obligations that the Company has towards its investors and shareholders, the Company will give them equal treatment regarding requests, claims, and information, regardless of the value of their investment or the number of shares that they represent.

All shareholders of the Company will be treated fairly, considering that each shareholder has the same rights according to the number and class of shares held.

PARAGRAPH TWO: DISPUTE SETTLEMENT MECHANISMS.- Any disputes between the Company and its shareholders will be resolved by means of a direct settlement, which will start with the reception of the notification of disagreement. If no agreement is reached within sixty (60) business days, the parties can choose to resolve the disagreement either through the ordinary jurisdiction or through the Superintendence of Companies.

ARTICLE ELEVEN. INDIVISIBILITY OF THE SHARES.- Shares will belong individually to the shareholders, as a result, when by any legal disposition or by agreement, one or more shares belong to a plural number of individuals, the Company will registry of the shares in favor of all joint owners, who must designate a common representative that will exercise the rights that correspond to them as Shareholders of the Company.

The appointment of this representative will be made in accordance with the provisions of Article 378 of the Commercial Code or the standard that amends or replaces it.

ARTICLE TWELVE. REPRESENTATION AND VOTE UNITY. - Each shareholder, whether an individual or legal entity, may only appoint a single representative to act before the General Shareholders Assembly, regardless of the number of shares held by it.

The representative or agent of a shareholder may not split the vote of their principal, which means that they are not allowed to vote with one or several shares held by the represented party in a certain sense or for certain individuals, and use other share(s) to vote differently or for other individuals. However, this individuality of the vote does not prevent a representative of several shareholders from voting in each case following the separate instructions issued by each shareholder, or each represented group or principal.

CHAPTER IV: DIRECTION AND MANAGEMENT

ARTICLE THIRTEEN. CORPORATE BODIES.- The direction, management and representation of the Company will be the responsibility of the following main bodies:

- a) General Shareholders Assembly.
 - b) Board of Directors, and
 - c) President.
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PARAGRAPH: The Company will have a Secretary of the General Shareholders Assembly and a Secretary of the Board of Directors.

The Secretary, or whoever replaces him in his absolute or temporary absences, will be responsible for keeping the minute books and attesting before third parties regarding what is contained therein. This will be in addition to the duties set out in these Bylaws, the Regulations of the Company, and those assigned by the General Shareholders Assembly, the Board of Directors and the President.

The Secretary, or whoever replaces him in his absolute or temporary absences, will take special care to maintain the confidentiality that corresponds to the Company's books and documents according to the Law and commercial practices.

**CHAPTER V:
GENERAL SHAREHOLDERS ASSEMBLY**

ARTICLE FOURTEEN. COMPOSITION OF THE GENERAL SHAREHOLDERS ASSEMBLY.- The General Shareholders Assembly is comprised by the representatives of the shares with the necessary quorum, and under the terms prescribed in these Bylaws and in the law.

ARTICLE FIFTEEN. DUTIES OF THE GENERAL SHAREHOLDERS ASSEMBLY.- The General Shareholders Assembly will exercise the following duties, both in ordinary meetings and in special meetings:

- a) Appoint the person who will be the chair of the meeting.
 - b) Examine, approve or reject the end-of-year financial statements and the accounts that the Managers must submit.
 - c) Appoint and remove the members of the Board of Directors.
 - d) Appoint and remove the Statutory Auditor, and set their fees.
 - e) In accordance with the law, order the distribution of profits resulting from the financial statements, determining the amount of profits to be distributed, and the term and the methods for payment of the dividends. The General Shareholders Assembly may determine that the amounts available at any time for dividend distribution be fully or partially capitalized, and that their value be distributed in Company shares among the shareholders, pro rata with those held at the time of capitalization.
 - f) Define how the way to cancel losses if there were any to offset losses, if any.
 - g) Authorize the issuance and placement of shares in reserve, provided that this is done without being subject to the right of preference, likewise with the issuance of convertible bonds.
 - h) Authorize any issuance of preferred or dividend right shares and order the reduction or elimination of preferences.
 - i) Determine the reserves that must be established, in addition to statutory reserves.
 - j) Order the repurchase of own shares and their subsequent sale.
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- k) Adopt all measures required for compliance with these Bylaws or required in the interests of the Company.
- l) Study and approve the amendments to the Bylaws, in accordance with the rules that govern the matter.
- m) Approve the valuation of the contributions in goods received by the Company in payment for the subscription of shares, after the date of their issuance.
- n) Consider and approve, as appropriate, the reports from the managers and/or the legal representative regarding the state of company business, as well as the report from the statutory auditor, if applicable.
- o) Approve all mergers, spin-offs or transformations.
- p) Approve authorized capital increases.
- q) Issue its own regulations.
- r) All others assigned by law or these Bylaws.

PARAGRAPH: The Nation undertakes, in accordance with its shareholding, that the disposal of assets of which its amount is equal to or greater than 15% of the market capitalization of Ecopetrol, will be discussed and decided within the General Shareholders Assembly, and the Nation may only vote in a favorable way if the vote of the minority shareholders is equal to or greater than 2% of the shares subscribed by shareholders other than the Nation.

Notwithstanding the foregoing, if the established majority referred to in this paragraph is not achieved, the Nation may request that a new Shareholders Assembly be held under the terms established in these Bylaws, and at said meeting such decisions may be taken with the majority provided in the Law or in these Bylaws.

ARTICLE SIXTEEN. ORDINARY MEETINGS.- The ordinary meetings of the General Shareholders Assembly will be held at the registered office of the company's domicile within the first three months of each year, on the date and at the time indicated in the notice. The notice will be issued by the President thirty (30) calendar days prior to the scheduled date for the meeting, by publishing the notice on the Company's website www.ecopetrol.com.co, or whichever site takes its place, as well as in a newspaper that is widely circulated nationwide.

In the ordinary meetings, the General Shareholders Assembly must deal with the following issues, in addition to those assigned by Law:

- a) Examine the position of the Company.
 - b) Appoint the managers and other employees to be appointed by it.
 - c) Determine the economic guidelines of the Company.
 - d) Analyze the accounts and financial statements for the last fiscal year.
 - e) Decide on the disposal and distribution of profits.
 - f) Approve all measures aimed at ensuring compliance with the corporate purpose.
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PARAGRAPH ONE: Additionally, Ecopetrol will implement the following corporate governance best practices: (i) on the Sunday prior to the date of the ordinary meeting of the Shareholders Assembly, it will issue a reminder, by means of a notice published in a newspaper that is widely circulated nationwide, and on the website www.ecopetrol.com.co, or whichever site takes its place, regarding the date, time and place of the meeting, (ii) and at least three (3) calendar days prior to the date of the ordinary meeting it will use the website www.ecopetrol.com.co, or whichever site takes its place, to publish the agenda for the meeting of the Shareholders Assembly and the proposals from management.

PARAGRAPH TWO: If it is not duly summoned, the General Shareholders Assembly will be legally entitled to hold such meeting on the first business day of the month of April, at 10:00 a.m. at the offices of the main domicile where the Company's management operates.

ARTICLE SEVENTEEN. EXTRAORDINARY MEETINGS.- The General Shareholders Assembly may be called to extraordinary meetings when required on account of unforeseen or urgent needs of the Company, following notice from the President, the Board of Directors or the Statutory Auditor, such notice must include the agenda, date, time and place where it will take place.

Likewise, an extraordinary meeting maybe called by order or directly summoned by the Superintendent, or whomever has its duties, when so requested by a plural number of shareholders representing at least five percent (5%) of the total subscribed shares.

Calls to extraordinary meetings will be made by the President with fifteen (15) calendar days in advance of the date set for holding the meeting by means of a publication on the Company's website of the announcement of the meeting, www.ecopetrol.com.co or whichever website functions in its places, as well as on a newspaper of wide and national circulation.

The notice will indicate the matters on the Agenda to be considered by the General Shareholders Assembly in its extraordinary meeting.

PARAGRAPH: Additionally, Ecopetrol will implement the following corporate governance best practices: (i) on the Sunday prior to the date of the extraordinary meeting of the General Shareholders Assembly, it will issue a reminder, by means of a notice published in a newspaper of wide and national circulation, and on the website www.ecopetrol.com.co, or whichever site takes its place, regarding the agenda, date, time and place of the meeting, and (ii) at least three (3) calendar days prior to the date of the special meeting, it will use the website www.ecopetrol.com.co, or whichever site takes its place, to publish the agenda for the General Shareholders Assembly and the proposals from the management.

The Nation agrees to use its vote to support initiatives that are made in order to include additional issues to those mentioned in the agenda for the extraordinary meetings of the General Shareholders Assembly, provided that such initiatives are submitted by one or more shareholders representing at least two percent (2%) of the subscribed shares.

ARTICLE EIGHTEEN. UNIVERSAL MEETING.- Notwithstanding the provisions of these Bylaws regarding the convening to ordinary and extraordinary meetings, the General Shareholders Assembly may meet, without prior notice, at any place, if there is a will to do so, when the totality of the subscribed shares is represented. It may deal with any matter, unless the law establishes otherwise.

ARTICLE NINETEEN. QUORUM.- The General Shareholders Assembly shall deliberate with a plural number of shareholders that represent, at least half plus one of the subscribed shares. Decisions will always be taken by the majority of votes present, unless the law establishes special majorities.

PARAGRAPH: If the General Shareholders Assembly is summoned to a meeting and it is not held due to a lack of quorum, a new meeting will be summoned and it will meet and decide validly with one or several shareholders, regardless of the number of shares represented. The new meeting must be held no sooner than ten (10) business days and no later than thirty (30) business days counted from the date set for the initial meeting. When the Shareholders Assembly gathers in an ordinary session in its own right on the first business day of the month of April, it may also validly deliberate and make decisions under the terms of this article.

CHAPTER VI: BOARD OF DIRECTORS

ARTICLE TWENTY. BOARD OF DIRECTORS. - The Board of Directors of the Company will have nine (9) principal members with no alternates, who will be elected by the General Shareholders Assembly using the electoral quotient system, for periods of two (2) years, being possible that such members be re-elected for an indefinite period. The elected persons may not be replaced in partial elections without proceeding to a new election using the electoral quotient system, unless the vacancies are decided unanimously.

The appointment to the Board of Directors of the Company, may be carried out in personal capacity or as the holder of a specific public office. If there is no new elections of Board members it will be understood that the appointment has been extended until a new appointment is made. The Board of Directors will be subject to the inabilities and incompatibilities that the law may establish.

PARAGRAPH ONE: INDEPENDENT MEMBERS OF THE BOARD OF DIRECTORS.- The majority of the members of the Board of Directors shall be independent. The election of the independent members of the Board of Directors will be performed in accordance with the criteria provided in Paragraph Two of the Article 44 of Law 964 of 2005 and in accordance with the procedure established in Decree 3923 of 2006, or any provision that governs, amends, replaces or adds to these.

The members of the Board of Directors who are elected as independent, will commit in writing, upon accepting the position, to maintain their standing as independent members during the performance of their duties. If, for any reason, they lose such condition, they must resign from the position and the President of Ecopetrol will be able to call an extraordinary meeting of the General Shareholders Assembly, so that they can be replaced.

PARAGRAPH TWO: The Nation agrees that, in the meetings of the General Shareholders Assembly in which the members of the Board of Directors will be elected, the list of candidates that The Nation presents will include (for lines eight and nine) individuals proposed by the Hydrocarbon-Producing Departments in which Ecopetrol operates, and individuals proposed by the minority shareholders, as follows:

- a) In applying the provisions of paragraph one, Article 5, Law 1118 of 2006, regarding line eight, the Nation's list of candidates for members of the Board of Directors shall include a person nominated by the Governors of the Hydrocarbon-Producing Departments operated by Ecopetrol. The name of the respective candidate must be chosen by the Governors of said Departments by simple majority, through a prior vote. The result of this must be sent to the Ministry of Finance and Public Credit no later than ten (10) days prior to when the respective meeting will be held. In the event that, for any reason, the name of the candidate is not submitted within the established timeframe, the Nation's list of candidates for members of the Board of Directors shall include one of the persons that has been designated by the Governors, who, in any case, must meet the requirements established in this paragraph.

Hydrocarbon-Producing Departments operated by Ecopetrol shall be understood according to Law 1530 of 2012, article 4, paragraph 1 or any law that additions, modify or replace this law.

- b) In line nine, the Nation's list of candidates for members of the Board of Directors shall include a person designated by the ten (10) minority shareholders with the largest shareholding. The name of the respective candidate must be chosen by simple majority, through a prior vote. The result of this must be sent to the Ministry of Finance and Public Credit no later than ten (10) days prior to when the respective meeting will be held. If such minority shareholders fail to reach an agreement, the Nation's list will include the person designated by the five (5) minority shareholders with the largest shareholding. If such shareholders do not reach an agreement prior to the date of the meeting in which the respective election is to be carried out, the Nation will be able to propose a candidate who must, in any case, meet the requirements established in this paragraph.

For the purpose of sections a) and b) of this paragraph, it shall be understood that the Nation's commitment to vote for candidates proposed by the minority shareholders of Ecopetrol and the Hydrocarbon-Producing Departments operated by Ecopetrol, shall be subject to the condition that each proposed candidate meets the following conditions:

- (i) That the profiles conform to those defined for members of the Board of Directors of Ecopetrol, in accordance with the provisions set forth in these Bylaws.
 - (ii) The members comply with the requirements of an independent member, at least, in accordance with the definition of independence established in the paragraph of Article 44, Law 964 of 2005 or any provision that governs or amends it.
 - (iii) The Nation's agreement established in section b) of this article, shall no longer be valid at the moment in which the minority shareholders can, in accordance with their shareholding, appoint a member of the Board of Directors of Ecopetrol in their own right. The foregoing is without prejudice to the validity of the Declaration of the Nation, in its capacity as majority shareholder of Ecopetrol, signed on February 16, 2018.
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PARAGRAPH THREE: The fees for members of the Board of Directors will be set by the General Shareholders Assembly and paid by the Company for attendance at the meetings of the Board of Directors and the Committees. This compensation shall be set in accordance with the nature of the Company, the responsibility inherent to the position and market guidelines. This information will be disclosed on the website www.ecopetrol.com.co, or whichever site takes its place.

PARAGRAPH FOUR: The members of the Board of Directors will be evaluated in accordance with the mechanism defined by the Board itself.

At each ordinary meeting, the Board of Directors shall provide the General Shareholders Assembly with a report on the operation of the Board of Directors, which shall take into account the attendance at the meetings of the Board and its Committees, performance and participation therein, and the results of the Board's assessment. The results of the assessments for the Board of Directors will be published on the Company's website www.ecopetrol.com.co, or whichever site takes its place.

PARAGRAPH FIVE: The rules on the appointment and functions of the Chairman of the Board of Directors and the Secretary are contemplated in the Internal Regulations of the Board of Directors that is published on the website of The Company www.ecopetrol.com.co.

ARTICLE TWENTY-ONE. PROFILES OF THE MEMBERS OF THE BOARD OF DIRECTORS.- The members of the Board of Directors will be committed to the Company's corporate vision and must at least meet the following requirements: (i) have knowledge and experience in the activities inherent to the Company's corporate purpose and/or have knowledge and experience in the field of industrial and/or commercial, financial, stock market, administrative, legal or related science activities, have more than 15 years of professional experience; (iii) enjoy a good reputation and be recognized for their professional competence and integrity, and (iv) not belonging simultaneously to more than five (5) boards of directors of corporations (*Sociedades Anónimas*), including Ecopetrol's Board.

The profiles of the members of the Board of Directors will be reviewed and updated by the Board of Directors or the institutional committee that the Board decides.

ARTICLE TWENTY-TWO. MEETINGS.- The Board of Directors will hold ordinary meetings at least eight (8) times a year at the offices of the Company or at the place indicated by it, on the date and time that it establishes and, in a special capacity, when summoned by itself, the President of Ecopetrol or its Board of Directors, the Statutory Auditor or two (2) of its members.

The summon to meetings, both ordinary and extraordinary, will be made by means of a communication sent to each of the members, at least five (5) calendar days in advance. Such communication may be sent through any suitable means, such as fax or email.

The deliberations of the Board of Directors may be suspended and then resumed as many times as decided by the majority of the members present at the meeting.

The Board of Directors shall elect its Chairperson and Vice Chair from its members, and their role will be to chair and direct the ordinary and extraordinary meetings of the Board of Directors and they shall be elected for periods of two (2) years. At the sessions in which both the Chairperson and Vice Chair are absent, the attendees may appoint the person who will chair the respective meeting from among their members.

The Secretary General, or their delegate, will act as secretary of the Board of Directors. In meetings where they are absent, attendees may appoint (from among its members) the person who will assume the duties of the Board's Secretary.

PARAGRAPH ONE: QUORUM.- The Board of Directors shall deliberate with a number equal to or greater than five of its members. Decisions shall be made through a majority of the votes from the members present.

PARAGRAPH TWO: UNIVERSAL MEETINGS OF THE BOARD OF DIRECTORS.-The Board of Directors may meet validly at any date, time and place, without prior notice, when:

- (i) All members of the Board of Directors are present.
- (ii) They decide to declare the session as convened.

During the universal meetings, the Board of Directors may deal with any type of matter that relates to its duties, unless the law establishes otherwise.

ARTICLE TWENTY-THREE. DUTIES.- The Board of Directors as the body that provides guidance and, will have the following duties:

- 1) Appoint, evaluate and remove the President of Ecopetrol; set its compensation in accordance with the responsibility of the position and market guidelines.
 - 2) Issue its own regulations.
 - 3) Authorize in advance, the following decisions or activities, and all others that require its authorization in accordance with these Bylaws:
 - a) The incorporation, capital contribution or liquidation of all kind of companies, including sole proprietorships, direct subsidiaries and indirect subsidiaries, as well as the opening and closing of branches and agencies, both in Colombia and abroad, when it deems appropriate.
 - b) Participation with individuals or legal entities, national or foreign, governed by public or private law, in Colombia or abroad in the establishment of companies, partnerships, corporations and foundations that have an equal, similar, related or supplementary purpose, or a purpose that is necessary or useful to the implementation of the corporate purpose of Ecopetrol.
 - c) The acquisition of interests and rights in previously incorporated companies that have the same, similar, connected or complimentary purpose, and such acquisition is required because it is useful and it is appropriate for the proper development of the corporate purpose of Ecopetrol. This, in addition to participating in partnerships, corporations or non-profit organizations that have been previously incorporated, or withdrawing from them.
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- d) The disposal of shares, interests, contractual positions and rights in companies in which it has an interest, under the terms of the legal provisions governing the sale of shares in state entities.
 - e) The execution and early termination of deals for the acquisition, sale or assignment of exploration and/or production rights relating to hydrocarbons.
 - f) The amendment of the exploration and production agreements executed before January 1, 2004 (Partnership Contracts).
 - g) Encumber, dispose of or limit the right of ownership over assets owned by Ecopetrol, other than hydrocarbons, their byproducts, and refined or petrochemical products.
- 4) Examine and approve the annual reports that the President must submit on the work carried out by the Company.
 - 5) Establish the size of personnel plant, the compensation policy, and approve the top-level organizational structure. For purposes of these Bylaws, those forming part of the first level dependencies shall be construed as those who, as part of their duties, report directly to the President.
 - 6) Appoint and remove the employees who lead the first level areas of the Company, being able to assign these functions to the President of the Company.
 - 7) Implement the decisions adopted by the General Shareholders Assembly related to the repurchase of shares of the Company.
 - 8) Intervene in all activities that, in its judgment, have the purpose to improve the development of the Company's activities. To this end, it may request regular reports from the first level workers of the Company, including reports on corporate business strategies and risks faced by the Company and, if deemed necessary, it may make these known to the shareholders through the Shareholder and Investor Service Office, and design strategies to deal with such risks in a timely manner.
 - 9) Present to the General Shareholders Assembly with the accounts, financial statements and inventories relating to the Company, propose the approval of reserve funds that are additional to statutory funds, and propose the distribution of dividends.
 - 10) Examine, when it deems necessary, the documents and books of the Company, and present to the General Shareholders Assembly a detailed report on the state of corporate business, in accordance with Articles 46 and 47, Law 222 of 1995, or the provisions that replace or amend them.
 - 11) Together with the President of the Company, present to the General Shareholders Assembly the financial statements for each fiscal year (for approval), accompanied by the documents established in Article 446 of the Commercial Code, or in the provisions that govern or amend this.
 - 12) Comply with the provisions of Article 447 of the Commercial Code, or the provisions that govern or amend this.
 - 13) Serve as an advisory body for all matters that the President of the Company requires.
 - 14) Approve the Corporate Governance Code that is submitted to it by the President of the Company, and any subsequent and proposed amendments or adjustments to it.
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- 15) Grant permits or licenses to the President of the Company, and appoint a person in charge in the event that the President's alternates are absent.
 - 16) Adopt specific measures regarding the governance of the Company, its conduct and its information, in order to ensure respect for the rights of those who invest in its shares or any other securities that it issues, in accordance with the parameters set by market regulation bodies, while also ensuring the proper management of its affairs and public knowledge of its work.
 - 17) Together with the President of the Company, submit a report to the General Shareholders Assembly describing the matters set forth in section 16 above.
 - 18) Verify the effectiveness and transparency of the Company's accounting systems and submit regular reports to shareholders on the financial and governance position of the Company.
 - 19) Ensure that Ecopetrol's economic relations with its shareholders (including the majority shareholder and its subsidiaries companies) fall within the limits and conditions established by law and regulations on the prevention, management and settlement of conflicts of interest established in these Bylaws and, in any case, under market conditions.
 - 20) Establish the mechanisms necessary to ensure that when an Ecopetrol employee discloses (either to the Audit and Risks Committee of the Board of Directors or to their immediate superiors) information of which they have knowledge regarding a potential conflict of interest within the Company or irregularities regarding accounting or financial information, they will not suffer discrimination or negative consequences, and in general, will be protected from any retaliation resulting from this.
 - 21) Request the President of the Company to hire the external advisors chosen by the Board of Directors, when deemed necessary in order to perform their duties, or as additional support for the Committees of the Board of Directors, in accordance with the terms and conditions established in the Internal Regulations of the Board of Directors.
 - 22) Comply with the duties assigned to it by law in terms of the prevention and control of money laundering and terrorist financing laws that are valid and applicable, at a national and international level.
 - 23) Regulate and implement the issuance and placement of shares and bonds convertible into shares. Likewise, authorize and implement the issuance and placement of non-convertible bonds in shares, as well as other debt securities that allow the financing of the Company. In any case, the Board of Directors may entrust the President of the Company with the approval of the subscription regulations, the prospectus of issuance and all other documents related to the issue and placement of securities.
 - 24) Authorize the execution of loans and financing operations that have a term greater than one (1) year, from entities that are legally authorized for such purpose, as well as the granting of the guarantees that may be applicable.
 - 25) Appoint and remove the legal representatives of the Company and their respective alternates.
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- 26) Approve the granting of guarantees to third parties within the course of the Company's business and within the framework of its corporate purpose, in accordance with the provisions of these Bylaws.
- 27) Ensure the effectiveness of the internal control and risk management systems.
- 28) The Board of Directors of the Company, in its capacity as the strategic guiding body, will have the following duties:
- a) Approve the strategy and business plan for Ecopetrol group.
 - b) Approve the budget and investment plan for Ecopetrol group and issue the rules for their elaboration and execution.
 - c) Approve the consolidated objectives and targets Ecopetrol group.
 - d) Issue compensation guidelines for Ecopetrol and its subsidiaries companies.
 - e) Approve the consolidated financial statements.
 - f) Approve the new business of Ecopetrol group.
- 29) All others assigned by Law and these By-Laws.

PARAGRAPH ONE: The Board of Directors may order the President to perform some of the functions assigned to it, except for those that by law expressly must be exercised by the Board of Directors.

PARAGRAPH TWO: The Board of Directors establish commissions for special work or studies within the Board itself.

ARTICLE TWENTY-FOUR. COMMITTEES OF THE BOARD OF DIRECTORS.- The Board of Directors may have institutional committees in accordance with the law, or those established by the Board itself, composed of members of the Board of Directors, appointed by the Board itself. At least one (1) member of each Committee shall be independent. The foregoing is without prejudice to the minimum number of independent members that the Audit and Risks Committee must comprise by law.

For its operation, in addition to the provisions of current regulations that are applicable, the Committees will have Internal Regulations that establish their objectives, duties and responsibilities.

CHAPTER VII: GENERAL REGULATIONS FOR THE SHAREHOLDERS MEETING AND THE BOARD OF DIRECTORS

ARTICLE TWENTY-FIVE. MINUTES FOR PERSONAL ATTENDANCE MEETINGS.- The minutes must comply with the provisions of Articles 189 and 431 of the Commercial Code, as applicable, and with the regulations or circulars that govern, amend or replace these. The minutes will be registered when said formality is necessary by legal mandate.

ARTICLE TWENTY-SIX. MEETINGS OF THE GENERAL SHAREHOLDERS ASSEMBLY AND THE BOARD OF DIRECTORS WITH NO PERSONAL ATTENDANCE.- In addition to the face-to-face meetings that are regulated in other sections of these Bylaws, the General Shareholders Assembly and the Board of Directors may meet with no personal attendance required when the provisions of article 19 of Law 222 of 1995 are complied with or the rules that replace or modify it.

Thus, there will be a meeting of the General Shareholders Assembly and of the Board of Directors when, by any means, all the shareholders or directors can discuss and decide through simultaneous or successive communication. In the latter case, the successive communication must occur immediately, as per the means employed.

Therefore, there will be General Shareholders Assembly or Board of Directors when through any mean all the shareholders or members can deliberate and decide through simultaneous or consecutive communication. In the latter case, the communications must be immediately received according to the method used.

ARTICLE TWENTY-SEVEN. DECISION-MAKING MECHANISM.- In accordance with the provisions of Article 20, Law 222 of 1995, or the rules that replace or amend it, the decisions of the General Shareholders Assembly or the Board of Directors shall be valid when all shareholders or directors express their voting decision in writing. In this event, the respective majority will be calculated based on the total shares in circulation or the members of the Board of Directors, as the case may be. If the shareholders or members have expressed their vote in separate documents, these must be received within a maximum period of one month, counted from the first communication received. The legal representative will inform the General Shareholders Assembly or the Board of Directors (as applicable) regarding the outcome of the decision, within five (5) business days following the receipt of the documents in which the vote is expressed.

ARTICLE TWENTY-EIGHT. MINUTES.- With regard to meetings where there is no personal attendance, or when there are decisions made through the mechanism established in the previous section, the corresponding minutes shall be prepared and recorded in the respective book within thirty (30) days following the date on which the decision was made. The Legal Representative and the Secretary of the Company, will sign the minutes. In the absence of the latter, any of the shareholders or members of the Board of Directors (as applicable) will sign the minutes for meetings in which there is no personal attendance.

With regard to meetings where there is no personal attendance, decisions will be void and null when adopted without the participation of a shareholder or member of the Board of Directors in the simultaneous or consecutive communications. Regarding decision-making through a written vote mechanism, the decisions adopted when the shareholders or members of the Board do not express the meaning of their vote or exceed the term mentioned in the previous article for the mailing of the vote by the end of one month, the decisions made will be ineffective.

ARTICLE TWENTY-NINE. CONFLICT OF AUTHORITY.- Any doubt or conflict regarding the duties or authority of the Board of Directors and the President will always be settled in favor of the Board of Directors. Conflicts between the duties of the Board of Directors and the General Shareholders Assembly will be settled in favor of the General Shareholders Assembly.

**CHAPTER VIII:
THE PRESIDENT**

ARTICLE THIRTY. PRESIDENT.- The management and General Legal Representation of Ecopetrol will be the responsibility of the President, who will be appointed by the Board of Directors.

The President shall be appointed for a two (2) year-term counted from its election, but may be re-elected for the same term more than once or removed freely from the position before expiration of the term. In cases where the Board does not appoint the President at the corresponding time, the previous President will continue to hold office until a new appointment is made. The election of the President will be carried out in accordance with criteria of suitability, knowledge, experience and leadership.

The Board of Directors must approve any change regarding the manner in which the President's work shall be evaluated, and such change must be approved by of a simple majority. Once the respective amendment comes into effect, the Board of Directors' Secretary will communicate this to all managers and the new system will be disclosed to all interested citizens through the Shareholder and Investor Service Office and through Ecopetrol's website www.ecopetrol.com.co, or whichever site takes its place.

PARAGRAPH: The evaluation of senior executives will be performed in accordance with the objectives defined by the Board of Directors. The Board of Directors must approve any change to the evaluation scheme described herein.

ARTICLE THIRTY-ONE. DUTIES OF THE PRESIDENT.-The President's will have the following duties:

- 1) Execute the strategy and business plan approved by the Board of Directors.
 - 2) Direct, coordinate, monitor, control and evaluate the execution and fulfillment of the objectives, duties, policies, plans, programs and projects inherent to the corporate purpose of Ecopetrol.
 - 3) Adopt the decisions and determine the appropriate acts in order to fulfill the Company's corporate purpose and duties, within the limits set out by law and in the bylaws.
 - 4) Implement the compensation policy, and present the Board of Directors with initiatives aimed at amending, supplementing or adjusting said policies.
 - 5) Execute and enforce all acts, operations, and authorizations comprised within the corporate purpose.
 - 6) Together with the Board of Directors, present to the General Shareholders Assembly the financial statements for each fiscal year (for approval), accompanied by the documents established in Article 446 of the Commercial Code, or in the provisions that replace, govern or amend this, as well as an additional certification signed by them and by the Vice President of Finance, if applicable, in which they state that they assume responsibility for the integrity and accuracy of the Company's financial statements. Similarly, they will submit, under the terms of Article 29, Law 222 of 1995, a special report that expresses the intensity of the economic relations existing between the parent company and its subordinate companies or subsidiaries.
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- 7) Make available to the shareholders (at least fifteen (15) business days prior to the date on which the ordinary meeting of the General Shareholders Assembly takes place) the documents listed in Article 446 of the Commercial Code or in the rules that replace, govern or amend it. This will be in accordance with the provisions of Article 447 of the Commercial Code, or the legal provisions that replace, govern or amend it.
 - 8) Submit the following documents to the Board of Directors:
 - a) The budget and investment plan for the Company and its subsidiaries companies.
 - b) Amendments to the budget and investment plan, in accordance with the provisions set out by the rules for its preparation, issued by the Board of Directors.
 - c) A quarterly analysis of budget execution, supplemented by the corresponding test balances and the approximate calculation of profit and loss, as well as information on costs and prices for products in domestic and foreign markets.
 - d) Annually, the financial reports, the financial statements, a report on the progress of the Company, the status of new works or expansion, the results for the exploration, drilling and operations carried out by the Company and its contractors, the initiatives, work plans, and all instructions and suggestions aimed at the improvement and rationalization of the Company's industrial and administrative systems.
 - e) All other information requested by the Board of Directors for the fulfillment of the duties assigned to it.
 - 9) Execute the budget in accordance with the rules for its execution, issued by the Board of Directors.
 - 10) Comply with and enforce the decisions of the Board of Directors.
 - 11) Design and execute the development plans, the annual action plans, and the investment, maintenance and expense programs.
 - 12) Exercise the commercial and legal representation of Ecopetrol, without prejudice to the powers and rights conferred to the Legal Representatives for Judicial and Extrajudicial Affairs and the Legal Representative for the Provision of Goods and Services.
 - 13) Direct Ecopetrol's employment relations and appoint, remove and hire the Company's personnel in accordance with legal, regulatory and bylaw norms, and in compliance with the provisions of Section 6), Article 23 of these Bylaws. With the President order, these duties may be developed by Ecopetrol employees in accordance with the law.
 - 14) Make proposals to the Board of Directors on the appointment or removal of employees from the first level dependencies and, if necessary, remove any of these employees and appoint a temporary replacement (this situation must be reported to the Board of Directors).
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- 15) Represent the shares, participations or interests that Ecopetrol has in companies, partnerships, foundations, or any other type of association.
 - 16) Present before the General Shareholders Assembly, during the ordinary meetings, the financial statements, the accounts, and the profit distribution project and a report that includes the duties and functions of the Board of Directors, and its internal Committees. Additionally, and in the terms of article 29 of Law 222 of 1995, a special report indicating the type of economic relations existing between the parent company and its subsidiaries or subsidiaries with the respective controlled companies.
 - 17) Summon the Board of Directors and the General Shareholders Assembly to ordinary and extraordinary meetings.
 - 18) Present the Board of Directors with and ensure ongoing fulfillment of the specific measures regarding the governance of the Company, its conduct and its information, in order to ensure respect for the rights of those who invest in its shares or in any other securities it issues, while also ensuring proper management of its affairs and public knowledge of its work.
 - 19) Treat all shareholders fairly.
 - 20) Provide the market with timely, complete and accurate information about the Company's financial statements and its business and administrative conduct, without prejudice to the provisions of Articles 23 and 48, Law 222 of 1995, or the rules that replace or amend these.
 - 21) Compile in a Corporate Code of Good Governance (that will be presented to the Board of Directors and whose approval is the responsibility of the Board of Directors) to compile all the rules and systems required by law, and always keep this code available at the facilities so that it can be read.
 - 22) Avoid and reveal disclose potential conflicts of interest between them and the Company, or with shareholders, suppliers or contractors, reporting their existence to the members of the Board of Directors and, if applicable, to the General Shareholders Assembly, though refraining from deliberating or issuing their opinion on the contentious issue, according with the law and the procedure established within the Company.
 - 23) Submit a semi-annual report to the Board of Directors regarding the operations, agreements or contracts entered into by the Company with its subsidiaries companies within said period, and the conditions thereof, which in any case must be conducted under market conditions. These relationships will be disclosed in the notes to the Company's financial statements, as well as in the report referred to in Article 29, Law 222 of 1995. Subsidiaries companies will be construed as companies that are consistent with the provisions of Articles 260 and 261 of the Commercial Code or those that amend, replace or add to these.
 - 24) Establish and maintain the Company's Internal Control System.
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- 25) Fulfill the duties that, in matters regarding the prevention and control of money laundering and terrorist financing, are assigned to them by law, especially those issued by the Financial Superintendence of Colombia.
- 26) Appoint the employees of the Company in the Boards of directors of the Companies in which Ecopetrol has a participation as a shareholder in Colombia or abroad.
- 27) Perform all other duties established by Law.

PARAGRAPH: The President will organize the government of the Company for which, without the authorization of another body, will be able to assign other workers of the Company to carry out some of their functions, except those that by legal mandate, must be exercised directly by the President.

When for the development of the assigned faculties, the worker requires legal capacity in order to carry out agreements that are binding to the Company, the assignment of the President must be accompanied by the respective act of representation, which may be revoked at any time.

ARTICLE THIRTY-TWO. LEGAL REPRESENTATION OF THE COMPANY.- The President is the general legal representative of the Company, who will have the commercial and legal representation of Ecopetrol for all purposes and will have two (2) personal alternates. The alternates of the President will be appointed by the Board of Directors, for two-year periods and may be freely re-elected or removed at any time. When the Board of Directors does not appoint the alternates when needed, the previous ones will continue in their position until new appointments are made.

However, for more efficiency in the ordinary course of business, the Company will have, additionally, a Legal Representative for Judicial Affairs, and a Legal Representative for Purposes of the Supply of Goods and Services.

LEGAL REPRESENTATIVE FOR JUDICIAL AND OUT-OF-COURT AFFAIRS.- The Company will have one (1) legal representative for Judicial and Out-of-Court Affairs, who will have one (1) personal alternate who will replace it during its temporary, absolute or accidental absences, and such alternate will have identical powers.

The legal representative for Judicial and Out-of-Court Affairs will represent the Company in the following matters: a) Receive all kinds of notifications regarding actions and administrative investigations and lawsuits filed or initiated against the Company in any kind of judicial, out-of-court, administrative or police action or proceedings. b) Represent the Company in all kind of judicial, administrative, police, arbitration or out-of-court proceedings, in which the Company is a party. For this purpose, the Legal Representative for Judicial and Out-of-Court Affairs or its alternate will be fully authorized to receive, withdraw, settle and conciliate on behalf of the Company. c) Respond on behalf of the Company, all kinds of judicial and out-of-court questions that may be directed to the Company. d) Represent the Company in all kinds of administrative actions initiated by or against it, before any administrative, police or judicial authority. e) Initiating and carrying out, on behalf of the Company, all kinds of requests, petitions or procedures before any administrative, police or judicial authority, including the power to file any appeal on behalf of the Company. f) Granting, on behalf of the Company, powers of attorney to the lawyers who will exercise representation and legal status in all kinds of judicial, police or administrative proceedings in which the Company is a party. For this purpose, the Representative or their alternate may confer powers of attorney to receive, withdraw, settle and conciliate on behalf of the Company. They may revoke the granted powers of attorney at any time.

The legal representative for Judicial and Out-of-Court Affairs and its alternate will be appointed by the Board of Directors for periods of two (2) years and may be re-elected indefinitely or freely removed at any time. The Legal Representative for Judicial and Out-of-Court Affairs and its alternate will continue in their positions until such time that the Board of Directors appoints another person in their place.

LEGAL REPRESENTATIVE FOR PURPOSES OF THE SUPPLY OF GOODS AND SERVICES.- The Company will have one Legal Representative for Purposes of the Supply of Goods and Services, who will have one (1) personal alternate who will replace it during their temporary, absolute or accidental absences, and such alternate shall have identical powers.

The Legal Representative for Purposes of the Supply of Goods and Services and its alternate will be appointed by the Board of Directors for periods of two (2) years and may be re-elected indefinitely or freely removed at any time. During their temporary, absolute or accidental absences, an alternate with identical power will replace them. The Legal Representative for Purposes of the Supply of Goods and Services and their alternate will continue in their positions until such time that the Board of Directors appoints another person in their place.

CHAPTER IX: STATUTORY AUDITOR

ARTICLE THIRTY-THREE. STATUTORY AUDITOR.- The Company will have a Statutory Auditor along with their respective alternate, who will replace them during their absolute, temporary or accidental absences, both of whom shall be elected by the General Shareholders Assembly.

In terms of electing the people who are going to occupy the position of Statutory Auditor or their alternate, the Company may only elect individuals or legal entities duly registered in the Register for the Central Board of Accountants and who meet the requirements established in Law 43 of 1990 or in the standards that govern, amend or replace it, or whichever standards are applicable.

The election of the Statutory Auditor will be carried out based on an objective and transparent pre-selection carried out by the Audit and Risks Committee of the Board of Directors.

The Audit Committee of the Board of Directors will do the election of the External Auditor through an objective and transparent pre selection of candidates.

The Audit and Risks Committee of the Board of Directors will evaluate the candidates and present a recommendation to the General Shareholders Assembly, during which an order of eligibility will be established, based on criteria of experience, service, costs and knowledge of the sector.

The shareholders may propose additional candidates for Statutory Auditor to the Audit and Risks Committee, provided that their profiles comply with the provisions of the law and these Bylaws. They may also express any dissatisfaction with the current Statutory Auditor to the Shareholder and Investor Service Office, being the Audit and Risks Committee the one who will evaluate the case, so that it can be brought to the General Shareholders Assembly, which will make the decision on the matter.

PARAGRAPH ONE: In the event that the Statutory Auditor is a legal entity, it must appoint a public accountant to carry out the duties of statutory auditor so that the role can be performed personally, under the terms of Article 215 of the Commercial Code or the rules that replace or amend it. In the event that the person appointed is absent, the alternates will act in their place

PARAGRAPH TWO: The Statutory Auditor will receive the payment indicated by the General Shareholders Assembly, in accordance with criteria such as suitability, professional experience in auditing similar companies, and market guidelines.

PARAGRAPH THREE: In accordance with the provisions of Article 206 of the Commerce Code, or the rules that replace or amend it, the Statutory Auditor's term will be equal to that of the Board of Directors, but in any case, they may be removed at any time by the General Shareholders Assembly through a vote representing half plus one of the shares present at the relevant meeting.

ARTICLE THIRTY-FOUR. DUTIES OF THE STATUTORY AUDITOR.- Without prejudice to the duties indicated by laws and regulations, the responsibilities of the Statutory Auditor are as follows:

- 1) Ensure that the transactions that are concluded or carried out on behalf of the Company comply with the requirements of these Bylaws, the decisions of the General Shareholders Assembly and the Board of Directors.
 - 2) Examine all transactions, inventories, minutes, books, correspondence, account vouchers and business relating to the Company.
 - 3) Verify the cash count on the occasions that the Statutory Auditor deems appropriate.
 - 4) Verify of all the Company's securities, as well as the others that it has in safekeeping.
 - 5) Inspect the assets of the Company and ensure that measures are taken for the conservation and security thereof.
 - 6) Report (expressly and in writing) the irregularities noted in the Company's minutes of the Shareholders Assembly, the Audit and Risks Committee, the Board of Directors or the President, as appropriate.
 - 7) Authorize the Company's financial statements by means of their signature.
 - 8) Summon the General Shareholders Assembly to special meetings, in accordance with the provisions of Article 17 of these Bylaws.
 - 9) Comply with the provisions of Article 447 of the Commerce Code or the legal provisions that govern or amend it.
 - 10) Cooperate with the competent authority for the inspection and monitoring of the Company, and provide it with any reports that may be required or requested.
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- 11) Act in the deliberations of the General Shareholders Assembly and those of the Board of Directors, when summoned to them, with the right to speak but not to vote.
- 12) Fulfill all other duties indicated by law and these Bylaws, as well as those that are entrusted to them by the Audit and Risks Committee and the General Shareholders Assembly (provided such duties are compatible with the law and Bylaws).
- 13) Ensure that management complies with the specific duties established by the monitoring bodies, especially those related to the duties of information and the Corporate Governance Code.
- 14) Report relevant findings to the Company's bodies, to the authorities and to the market, as appropriate.
- 15) Be aware of the complaints filed for breach of the rights of shareholders and investors, as well as the results of these investigations, which will be conveyed to the Board of Directors and made known to the General Shareholders Assembly.
- 16) Ensure that the Company's accounts and the minutes for sessions of the General Shareholders Assembly and the Board of Directors are kept regularly, and that the Company's correspondence and account vouchers are duly kept, issuing the necessary instructions for such purposes.
- 17) All others indicated in Article 207 of the Commerce Code or other legal provisions

PARAGRAPH ONE: The Statutory Auditor will not have the authority to intervene in Ecopetrol's administrative activities. They may only perform the administrative duties inherent to the role of Statutory Auditor.

PARAGRAPH TWO: In order to communicate the material findings, the Statutory Auditor must:

- 1) Report any irregularities that occur in Ecopetrol's operation and in the implementation of its business, in writing and in a timely manner, to the Board of Directors, the General Shareholders Assembly, the Audit and Risks Committee or the President, as appropriate in accordance with the competence of the body and the magnitude of the finding in the judgment of the Statutory Auditor.
- 2) Summon extraordinary meetings of the General Shareholders Assembly when necessary.
- 3) Inform the legal representative of securities holders, when deemed necessary, in the event there are debt securities.

PARAGRAPH THREE: On a permanent basis, management will use Ecopetrol's website www.ecopetrol.com.co or whichever site takes its place (available to the market and shareholders) to publish the latest report from the Statutory Auditor, together with its annexes and the details of the findings and qualifications presented.

ARTICLE THIRTY-FIVE. DISQUALIFICATIONS FOR THE POSITION OF STATUTORY AUDITOR.- In addition to the disqualifications and incompatibilities established in law, Ecopetrol's Statutory Auditor may not be anyone who has received income from the Company and/or its subsidiaries, where such income represents twenty-five percent (25%) or more of their latest annual income from the immediately preceding year, or persons who perform or exercise (in the Company and/or its subsidiaries companies, directly or through third parties) services other than those of Statutory Auditor, thereby compromising their independence for exercising the position. The Statutory Auditor will be appointed for periods of two (2) years and may be reelected consecutively for two (2) periods, and it may once again be hired after one (1) period away from the position.

**CHAPTER X:
FINANCIAL STATEMENTS, PROFIT DISTRIBUTION, AND RESERVE FUNDS**

ARTICLE THIRTY-SIX: FINANCIAL STATEMENTS.- On the thirty-first (31st) of December of each year the accounts will be closed and the financial statements of the Company will be produced.

ARTICLE THIRTY-SEVEN: FUTURE EXPENSES.- In order to calculate the income statement, funds must be appropriated in advance to cover future-but-certain expenses, such as company benefits, depreciation, amortization, and taxes, among others.

ARTICLE THIRTY- EIGHT. PROFITS.- Of the net profits calculated in accordance with Article 39 of these Bylaws, ten percent (10%) will be taken for the statutory reserve, until it is equal to half of the subscribed capital. When this limit is reached, the Company will not be obliged to continue carrying this ten percent (10%) to this account, unless the General Shareholders Assembly so provides. However, if it decreases, the same ten percent (10%) of the profits will be appropriated until the reserve once again reaches the limit of fifty percent (50%) of the subscribed capital.

ARTICLE THIRTY-NINE. DIVIDENDS.- For purposes of the distribution of profits as provided in Articles 155 and 454 of the Commercial Code or the rules that replace or amend them, net profits shall be considered as those resulting from the application of the following procedure:

- 1) The profits made by the Company are based on the real and reliable Financial Statements for each year, and from this value only the items corresponding to the following are subtracted: (i) Financing the losses from previous years that affect the capital, i.e. when as a consequence thereof the net equity is reduced below the subscribed capital (if any); (ii) The statutory reserve and bylaw-related reserves (if any), and (iii) Appropriations for the payment of income and ancillary taxes.
 - 2) Using the balance thus determined, the percentages to be distributed shall be applied in accordance with the provisions of the Law. This value shall be the minimum amount to be distributed as a dividend in each period.
 - 3) The amounts resulting after having distributed the minimum dividends will be available so that the General Shareholders Assembly can establish incidental reserves or so that they can be distributed as dividends in addition to the minimum dividends established in number 2) above.
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ARTICLE FOURTY. LOSSES.- Losses, if any, will be cancelled using the reserves allocated for that purpose and, failing that, using the legal reserve. Reserves whose purpose is to absorb certain losses cannot be used to cover other losses, unless the General Shareholders Assembly so decides. If the statutory reserve is insufficient to cancel the losses, the company's profits for the following years will be applied to this end, until the loss is extinguished, and during such time it shall not be possible to allocate the profits differently. The meeting may adopt or order measures leading to the restoration of net equity when losses arise that have placed such equity below fifty percent (50%) of the subscribed capital of the Company, e.g. measures such as the sale of valued company assets, the reduction of subscribed capital (carried out in accordance with the law), or the issuance of new shares. Any of these measures must be taken within eighteen (18) months following the determination of the loss. Failing this, the Company must be dissolved.

CHAPTER XI: DISSOLUTION AND LIQUIDATION

ARTICLE FORTY-ONE. DISSOLUTION.- The Company will only be dissolved due to the causes provided in Article 457 of the Commercial Code or the rules that replace or amend them.

ARTICLE FORTY-TWO. LIQUIDATION.- If the Company is dissolved, its liquidation will commence immediately. To this end, it should be taken into account that:

- 1) Excluding the event of an express legal exception, any act that deviates from this purpose will result in the unlimited, joint and several liability of the Liquidator or Liquidators and the Statutory Auditor who failed to intervene.
- 2) The following words must be added to the company name: UNDER LIQUIDATION. If this requirement is ignored, the Liquidator or Liquidators and the Statutory Auditor who failed to intervene shall be liable in an unlimited, joint and several manner for the damage and losses that may occur.

PARAGRAPH: In the event of liquidation, in-kind contributions will be returned to the person who provided them, in the corresponding proportion, once Article 240 of the Commercial Code and the other applicable legal provisions in such case have been applied.

ARTICLE FORTY-THREE. LIQUIDATOR.- The liquidation of the Company shall be performed by the person appointed by the General Shareholders Assembly and in accordance with Article 228 of the Commercial Code, or the provisions that supplement, govern or amend it. The Liquidator will execute any action under its exclusive liability.

ARTICLE FORTY-FOUR. POWERS OF THE LIQUIDATOR.- The President, in their capacity as liquidator, or the liquidators appointed by the General Shareholders Assembly, have the obligations and powers conferred to them by Articles 232, 233 and 238 of the Commercial Code.

ARTICLE FORTY-FIVE. POWERS OF THE GENERAL SHAREHOLDERS ASSEMBLY.- During the liquidation, the powers of the General Shareholders Assembly will remain as they were during the existence of the Company, with the only limitations being those that the liquidation status imposes.

**CHAPTER XII:
FINAL REGULATIONS**

ARTICLE FORTY-SIX. TRANSPARENCY.- Ecopetrol group, its managers, employees and beneficiaries have expressly adopted a zero-tolerance policy against fraud, bribery, corruption, any violations to the Foreign Corrupt Practices Act ("FCPA"), money laundering and terrorist financing. Furthermore, they manifestly reject any behavior that may constitute a breach of the Colombian Constitution, local or foreign law, as applicable. Likewise, they reject all conducts infringing or not acknowledging the content of the Code of Ethics and the internal regulation. Based on this, the Company undertakes to:

- 1) Refrain from participating in events considered compliance risks (fraud, bribery, violations to FCPA, money laundering and terrorist financing).
- 2) Promote, maintain and strengthen the Compliance Program, the Internal Control System and an ethics and transparency culture in the Company to prevent and mitigate the materialization of compliance risks.
- 3) Have in place tools to identify the risks of the Company and that include means of control to mitigate such risks.
- 4) Reject and penalize behaviors involving the materialization of any of the risks set forth in this article.
- 5) Zero-tolerance of acts of favoritism or nepotism in selection processes.
- 6) Have in place adequate and confidential channels to receive and manage complaints, dilemmas and enquiries submitted by employees and people interested in the transparency of the Company.
- 7) Cooperate with national and foreign authorities in carrying out any inquiry and/or investigation involving Ecopetrol Group, its employees, contractors, suppliers, partners or allies.
- 8) Have within its organizational structure, an independent unit that ensures the adoption and management of the Compliance Program, the Internal Control System, and fosters its enforcement and articulation in Ecopetrol and the companies of Ecopetrol Group. This unit will have functional reporting to the Audit and Risks Committee of the Board of Directors.

ARTICLE FORTY-SEVEN. DUTIES AND RESPONSIBILITIES OF MANAGERS.- The duties and responsibilities of Ecopetrol will be those included in managers shall relate to those established in Article 23 of, Law 222 of 1995 and Article 200 of the Commerce Code, and in the legal provisions that govern, amend or replace these, or that are applicable.

ARTICLE FORTY-EIGHT. INCOMPATIBILITIES AND INHABILITES.-

- 1) The members of the Board of Directors and the employees of Ecopetrol will be subject to the inabilities and incompatibilities set out in the Political Constitution, the law, and the provisions contained in these Bylaws on such issues and on conflicts of interest, as well as the rules that govern, amend or replace these.
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- 2) No member of the Board of Directors or employee of the Company may reveal disclose to third parties (to third parties) the Company's operations, plans or initiatives, or communicate any technical procedure or the results for the explorations exploration or activities of conducted by Ecopetrol, except with such unless there is an instruction or order in this regard from a competent state authority.
- 3) The members of the Board of Directors and employees at Ecopetrol's managerial, adviser or executive levels:
 - a) May not, during the performance of their duties or within the year following their retirement, provide their professional services to the Company, or enter into any contract with the Company (on their own behalf or through a third party), or manage their own or others' business with the Company, except when actions against them are initiated by the entity they serve or have served.
 - b) May not get involved, for any reason whatsoever or at any time, in business that they have been aware of or undertaken during the performance of their duties.

PARAGRAPH ONE: The foregoing does not prevent the members of the Board of Directors or employees at any level from acquiring the goods or services that the Company supplies to the public under conditions common to all those who request them.

PARAGRAPH TWO: Employees from the managerial, advisor or executive levels may be members of the boards of directors of the companies in which Ecopetrol has a shareholding, without it being understood as a conflict of interest such duty with the exercise of the management of the Company.

ARTICLE FORTY-NINE. CONFLICTS OF INTEREST.- Among others, a conflict of interest shall be deemed to exist when:

- a) There are opposing interests between a Manager or any employee of the Company and the interests of Ecopetrol, which may lead them to making decisions or acting for their own benefit or the benefit of third parties and to the detriment of the interests of the Company, or
- b) When there is any circumstance that may diminish independence, fairness or objectivity in the actions of a Manager or any employee of Ecopetrol, and this may be detrimental to the interests of the Company.

For these purposes, Managers shall be construed as the persons defined as such in Article 22, Law 222 of 1995 or any rule that adds to, amends or replaces it.

PARAGRAPH TWO: DISCLOSURE OF CONFLICTS IN THE COMPANY.- The President members of the Board of Directors and all of Ecopetrol employees must disclose any conflict between their personal interests and the interests of Ecopetrol when dealing with its main shareholder and its subsidiaries companies, customers, suppliers, contractors and any person who conducts or intends to conduct business with the Company or with companies in which it has a shareholding or interests (direct or indirect).

PARAGRAPH THREE: MANAGEMENT OF CONFLICTS OF INTEREST.- In order to resolve situations involving conflicts of interest, the following procedure will be followed:

- a) In the event that the conflict of interest involves an employee of the Company, other than Managers at the Company they must inform their line manager in writing so that the latter may decide on the matter, and if they deem that the conflict of interest exists, such line manager will appoint someone to replace the person involved in the conflict of interest.
- b) In the event that the conflict of interest involves a Manager at Ecopetrol, matters shall proceed as provided in Section 7, Article 23, Law 222 of 1995 or the rules that may add to, amend or replace it.

ARTICLE FIFTY. ECOPETROL S.A. APPLICABLE LAW.- The legal system applicable to the Company will be that indicated in law, which, for the legal acts, agreements and actions necessary to manage and implement the corporate purpose, is exclusively Private Law.

ARTICLE FIFTY-ONE.- Ecopetrol, its managers and employees undertake the obligation to comply with the corporate governance practices, which have been voluntarily adopted by the Company

ARTICLE FIFTY-TWO. SUPPLEMENTARY RULES.- In matters not provided for in these Bylaws, the relevant legal provisions shall apply.

Subsidiaries of Ecopetrol S.A.

The following table sets forth our subsidiaries, their respective countries of incorporation, our percentage ownership in each (both directly and indirectly through other subsidiaries) at March 31, 2018.

COMPANY	COUNTRY OF INCORPORATION	OWNERSHIP
ANDEAN CHEMICALS LIMITED	Bermuda	100.00%
BLACK GOLD RE LIMITED	Bermuda	100.00%
CENIT TRANSPORTE Y LOGÍSTICA DE HIDROCARBUROS S.A.S.	Colombia	100.00%
ECOPETROL CAPITAL AG	Switzerland	100.00%
ECOPETROL GLOBAL ENERGY S.L.U.	Spain	100.00%
ECOPETROL GLOBAL CAPITAL S.L.U. ***	Spain	100.00%
EQUION ENERGÍA LIMITED	United Kingdom	51.00%
HOCOL PETROLEUM LIMITED	Bermuda	100.00%
BIOENERGY S.A.S.**	Colombia	99.10%
BIOENERGY ZONA FRANCA S.A.S.**	Colombia	99.10%
COLOMBIA PIPELINES LIMITED**	United Kingdom	51.00%
COMPOUNDING AND MASTERBATCHING INDUSTRY LTDA - COMAI**	Colombia	100.00%
ECOPETROL AMERICA INC**	United States	100.00%
ECOPETROL DEL PERU S.A.**	Peru	100.00%
ECOPETROL OLEO & GAS DO BRASIL LTDA**	Brazil	100.00%
ECP OIL AND GAS GERMANY GMBH**	Germany	100.00%
HOCOL S.A.**	Cayman Islands	100.00%
OLEODUCTO BICENTENARIO DE COLOMBIA S.A.S.**	Colombia	55.97%
OLEODUCTO CENTRAL S.A. - OCENSA**	Colombia	72.65%
OLEODUCTO DE COLOMBIA S.A. - ODC**	Colombia	73.00%
OLEODUCTO DE LOS LLANOS ORIENTALES S.A.**	Panama	65.00%
REFINERIA DE CARTAGENA S.A. *	Colombia	100.00%
PROPILCO S.A.*	Colombia	100.00%
SANTIAGO OIL COMPANY**	Cayman Islands	51.00%
ESENTTIA RESINAS DEL PERU SAC**	Peru	100.00%
ECP HIDROCARBUROS DE MÉXICO **	Mexico	100.00%
ECOPETROL ENERGÍA SAS ESP **	Colombia	100.00%
ECOPETROL COSTA AFUERA COLOMBIA S.A.S.**	Colombia	100.00%

*Direct and indirect participation.

**Solely indirect participation through other subsidiaries or affiliates.

*** Ecopetrol Global Capital S.L.U. was liquidated on April 4, 2018.

CERTIFICATION

I, Felipe Bayón Pardo, certify that:

1. I have reviewed this annual report on Form 20-F of Ecopetrol S.A.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the company as of, and for, the periods presented in this report;
4. The company's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the company and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the company, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the company's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the company's internal control over financial reporting that occurred during the period covered by the annual report that has materially affected, or is reasonably likely to materially affect, the company's internal control over financial reporting; and
5. The company's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the company's auditors and the audit committee of the company's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the company's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the company's internal control over financial reporting.

Dated: April 19, 2018

By: /s/ Felipe Bayón Pardo
Name: Felipe Bayón Pardo
Title: Chief Executive Officer

CERTIFICATION

I, María Fernanda Suárez, certify that:

1. I have reviewed this annual report on Form 20-F of Ecopetrol S.A.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the company as of, and for, the periods presented in this report;
4. The company's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the company and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the company, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the company's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the company's internal control over financial reporting that occurred during the period covered by the annual report that has materially affected, or is reasonably likely to materially affect, the company's internal control over financial reporting; and
5. The company's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the company's auditors and the audit committee of the company's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the company's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the company's internal control over financial reporting.

Dated: April 19, 2018

By: /s/ María Fernanda Suárez
Name: María Fernanda Suárez
Title: Chief Financial Officer

Certification
Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
(Subsections (a) and (b) of Section 1350, Chapter 63 of Title 18, United States Code)

Pursuant to section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of section 1350, chapter 63 of title 18, United States Code), each of the undersigned officers of Ecopetrol S.A. (the "Company"), does hereby certify, to such officer's knowledge, that:

The annual report on Form 20-F for the fiscal year ended December 31, 2017 (the "Form 20-F") of the Company fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934 and information contained in the Form 20-F fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: April 19, 2018

By: /s/ Felipe Bayón Pardo
Name: Felipe Bayón Pardo
Title: Chief Executive Officer

Dated: April 19, 2018

By: /s/ María Fernanda Suárez
Name: María Fernanda Suárez
Title: Chief Financial Officer



RYDER SCOTT COMPANY
PETROLEUM CONSULTANTS

TBPE REGISTERED ENGINEERING FIRM F-1580
 1100 LOUISIANA SUITE 4600

HOUSTON, TEXAS 77002-5294

FAX (713) 651-0849
 TELEPHONE (713) 651-9191

February 19, 2018

Ecopetrol
 Cra. 13 No. 36-24
 Edificio Principal, Piso 7
 Bogotá, D.C., Colombia

Gentlemen:

At the request of Ecopetrol, Ryder Scott Company, L.P. (Ryder Scott) has prepared an estimate of the proved reserves attributable to certain properties of Ecopetrol, as of December 31, 2017. The subject properties are located in the country of Colombia and the United States of America. Ryder Scott estimated the reserves based on the definitions and disclosure guidelines of the United States Securities and Exchange Commission (SEC) contained in Title 17, Code of Federal Regulations, Modernization of Oil and Gas Reporting, Final Rule released January 14, 2009 in the Federal Register (SEC Regulations). Our third party study, completed on January 20, 2018 and presented herein, was prepared for public disclosure by Ecopetrol in filings made with the SEC in accordance with the disclosure requirements set forth in the SEC regulations.

The properties evaluated by Ryder Scott account for a portion of Ecopetrol's total net proved reserves as of December 31, 2017. Based on information provided by Ecopetrol, the third party estimate conducted by Ryder Scott addresses 67 percent of the total proved developed net liquid hydrocarbon reserves and 75 percent of the total proved undeveloped net liquid hydrocarbon reserves, of Ecopetrol. The Ryder Scott review also addresses 80 percent of the total proved developed net gas reserves and 75 percent of the total proved undeveloped net gas reserves, of Ecopetrol.

The estimated reserve amounts presented in this report, as of December 31, 2017, are related to hydrocarbon prices. The hydrocarbon prices used in the preparation of this report are based on the average prices during the 12-month period prior to the "as of date" of this report, determined as the unweighted arithmetic averages of the prices in effect on the first-day-of-the-month for each month within such period, unless prices were defined by contractual arrangements, as required by the SEC regulations. Actual future prices may vary significantly from the prices required by SEC regulations; therefore, volumes of reserves actually recovered may differ significantly from the estimated quantities presented in this report. The results of Ryder Scott's estimates are summarized as follows.

SUITE 600, 1015 4TH STREET, S.W. CALGARY, ALBERTA T2R 1J4
 621 17TH STREET, SUITE 1550 DENVER, COLORADO 80293-1501

TEL (403) 262-2799
 TEL (303) 623-9147

FAX (403) 262-2790
 FAX (303) 623-4258

SEC PARAMETERS
Estimated Net Reserves
Certain Interests of
ECOPETROL
As of December 31, 2017

	Proved		Total Proved
	Developed	Undeveloped	
<i>Net Remaining Reserves</i>			
Oil/Condensate - MBarrels	497,019	184,574	681,593
Plant Products - MBarrels	49,483	18,285	67,768
Sales Gas - MMCF	2,304,998	68,969	2,373,967
Fuel Gas - MMCF	220,191	2,834	223,025

Liquid hydrocarbons are expressed in thousand standard 42 gallon barrels. All gas volumes are reported on an “as sold” basis expressed in millions of cubic feet (MMCF) at the official temperature and pressure bases of the areas in which the gas reserves are located. Further, they include Ecopetrol’s participation interest in properties operated by Ecopetrol America Incorporated, Equion Energía Ltd. and Hocol Petroleum Ltd. The proved liquid hydrocarbon reserves volumes are exclusive of royalties. The net gas reserves volumes include certain gas royalty volumes paid in cash.

Reserves Included in This Report

The proved reserves included herein conform to the definition as set forth in the Securities and Exchange Commission’s Regulations Part 210.4-10(a). An abridged version of the SEC reserves definitions from 210.4-10(a) entitled “Petroleum Reserves Definitions” is included as an attachment to this report.

The various proved reserve status categories are defined under the attachment entitled “Petroleum Reserves Status Definitions and Guidelines” in this report.

No attempt was made to quantify or otherwise account for any accumulated gas production imbalances that may exist. The proved gas volumes included herein do not attribute gas consumed in operations as reserves. Non-hydrocarbon or inert gas volumes have been excluded from the reserves reported herein.

Reserves are those estimated remaining quantities of petroleum that are anticipated to be economically producible, as of a given date, from known accumulations under defined conditions. All reserve estimates involve an assessment of the uncertainty relating the likelihood that the actual remaining quantities recovered will be greater or less than the estimated quantities determined as of the date the estimate is made. The uncertainty depends chiefly on the amount of reliable geologic and engineering data available at the time of the estimate and the interpretation of these data. The relative degree of uncertainty may be conveyed by placing reserves into one of two principal classifications, either proved or unproved. Unproved reserves are less certain to be recovered than proved reserves, and may be further sub-classified as probable and possible reserves to denote progressively increasing uncertainty in their recoverability. At Ecopetrol’s request, this report addresses only the proved reserves attributable to the properties evaluated herein.

Proved oil and gas reserves are “those quantities of oil and gas which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be economically producible from a given date forward.” The proved reserves included herein were estimated using deterministic methods. If deterministic methods are used, the SEC has defined reasonable certainty for proved reserves as a “high degree of confidence that the quantities will be recovered.”

Proved reserve estimates will generally be revised only as additional geologic or engineering data become available or as economic conditions change. For proved reserves, the SEC states that “as changes due to increased availability of geoscience (geological, geophysical, and geochemical), engineering, and economic data are made to the estimated ultimate recovery (EUR) with time, reasonably certain EUR is much more likely to increase or remain constant than to decrease.” Moreover, estimates of proved reserves may be revised as a result of future operations, effects of regulation by governmental agencies or geopolitical or economic risks. Therefore, the proved reserves included in this report are estimates only and should not be construed as being exact quantities, and if recovered, the revenues therefrom, and the actual costs related thereto, could be more or less than the estimated amounts.

The proved reserves reported herein are limited to the period prior to expiration of current contracts providing the legal rights to produce, or a revenue interest in such production, unless evidence indicates that contract renewal is reasonably certain. Furthermore, properties in the different countries may be subjected to significantly varying contractual fiscal terms that affect the net revenue to Ecopetrol for the production of these volumes. The prices and economic return received for these net volumes can vary significantly based on the terms of these contracts. Therefore, when applicable, Ryder Scott reviewed the fiscal terms of such contracts and discussed with Ecopetrol the net economic benefit attributed to such operations for the determination of the net hydrocarbon volumes and income thereof. Ryder Scott has not conducted an exhaustive audit or verification of such contractual information. Neither our review of such contractual information nor our acceptance of Ecopetrol’s representations regarding such contractual information should be construed as a legal opinion on this matter.

Ryder Scott did not evaluate the country and geopolitical risks in the countries where Ecopetrol operates or has interests. Ecopetrol’s operations may be subject to various levels of governmental controls and regulations. These controls and regulations may include, but may not be limited to, matters relating to land tenure and leasing, the legal rights to produce hydrocarbons including the granting, extension or termination of production sharing contracts, the fiscal terms of various production sharing contracts, drilling and production practices, environmental protection, marketing and pricing policies, royalties, various taxes and levies including income tax, and foreign trade and investment and are subject to change from time to time. Such changes in governmental regulations and policies may cause volumes of proved reserves actually recovered and amounts of proved income actually received to differ significantly from the estimated quantities.

The estimates of proved reserves presented herein were based upon a detailed study of the properties in which Ecopetrol owns an interest; however, we have not made any field examination of the properties. No consideration was given in this report to potential environmental liabilities that may exist nor were any costs included for potential liabilities to restore and clean up damages, if any, caused by past operating practices.

Estimates of Reserves

The estimation of reserves involves two distinct determinations. The first determination results in the estimation of the quantities of recoverable oil and gas and the second determination results in the estimation of the uncertainty associated with those estimated quantities in accordance with the definitions set forth by the Securities and Exchange Commission's Regulations Part 210.4-10(a). The process of estimating the quantities of recoverable oil and gas reserves relies on the use of certain generally accepted analytical procedures. These analytical procedures fall into three broad categories or methods: (1) performance-based methods; (2) volumetric-based methods; and (3) analogy. These methods may be used individually or in combination by the reserve evaluator in the process of estimating the quantities of reserves. Reserve evaluators must select the method or combination of methods which in their professional judgment is most appropriate given the nature and amount of reliable geoscience and engineering data available at the time of the estimate, the established or anticipated performance characteristics of the reservoir being evaluated and the stage of development or producing maturity of the property.

In many cases, the analysis of the available geoscience and engineering data and the subsequent interpretation of this data may indicate a range of possible outcomes in an estimate, irrespective of the method selected by the evaluator. When a range in the quantity of reserves is identified, the evaluator must determine the uncertainty associated with the incremental quantities of the reserves. If the reserve quantities are estimated using the deterministic incremental approach, the uncertainty for each discrete incremental quantity of the reserves is addressed by the reserve category assigned by the evaluator. Therefore, it is the categorization of reserve quantities as proved, probable and/or possible that addresses the inherent uncertainty in the estimated quantities reported. For proved reserves, uncertainty is defined by the SEC as reasonable certainty wherein the "quantities actually recovered are much more likely than not to be achieved." The SEC states that "probable reserves are those additional reserves that are less certain to be recovered than proved reserves but which, together with proved reserves, are as likely as not to be recovered." The SEC states that "possible reserves are those additional reserves that are less certain to be recovered than probable reserves and the total quantities ultimately recovered from a project have a low probability of exceeding proved plus probable plus possible reserves." All quantities of reserves within the same reserve category must meet the SEC definitions as noted above.

Estimates of reserves quantities and their associated reserve categories may be revised in the future as additional geoscience or engineering data become available. Furthermore, estimates of reserves quantities and their associated reserve categories may also be revised due to other factors such as changes in economic conditions, results of future operations, effects of regulation by governmental agencies or geopolitical economic risks as previously noted herein.

The proved reserves for the properties included herein were estimated by performance methods, the volumetric method, or a combination of performance and volumetric methods. The following table summarizes the approximate percent of reserves estimated by each of these methods.

Approximate Percent Proved Reserves Estimated by the Various Methods

Method	Gas		Liquid Hydrocarbons	
	Developed	Undeveloped	Developed	Undeveloped
Volumetric	2.7%	4.2%	0.8%	2.0%
Performance	83.5%	0%	90.2%	0%
Analogy	0%	0%	0%	0%
Combination	13.8%	95.8%	9.0%	98.0%

These performance methods include, but may not be limited to, decline curve analysis and analogy which utilized extrapolations of historical production and pressure data available through November 2017 in those cases where such data were considered to be definitive. The data utilized in this analysis were supplied to Ryder Scott by Ecopetrol and were considered sufficient for the purpose thereof. The volumetric method was used where there were inadequate historical performance data to establish a definitive trend and where the use of production performance data as a basis for the reserve estimates was considered to be inappropriate. The volumetric analysis utilized pertinent well and seismic data supplied to Ryder Scott by Ecopetrol that were available through November 2017. The data utilized from the well and seismic data incorporated into our volumetric analysis were considered sufficient for the purpose thereof.

To estimate economically recoverable proved oil and gas reserves and related future net cash flows, we consider many factors and assumptions including, but not limited to, the use of reservoir parameters derived from geological, geophysical and engineering data that cannot be measured directly, economic criteria based on current costs and SEC pricing requirements, and forecasts of future production rates. Under the SEC regulations 210.4-10(a)(22)(v) and (26), proved reserves must be anticipated to be economically producible from a given date forward based on existing economic conditions including the prices and costs at which economic producibility from a reservoir is to be determined. While it may reasonably be anticipated that the future prices received for the sale of production and the operating costs and other costs relating to such production may increase or decrease from those under existing economic conditions, such changes were, in accordance with rules adopted by the SEC, omitted from consideration in making this evaluation.

Ecopetrol has informed us that they have furnished us all of the material accounts, records, geological and engineering data, and reports and other data required for this investigation. In preparing our forecast of future proved production and income, we have relied upon data furnished by Ecopetrol with respect to property interests owned, production and well tests from examined wells, normal direct costs of operating the wells or leases, other costs such as transportation and/or processing fees, ad valorem and production taxes, recompletion and development costs, development plans, abandonment costs after salvage, product prices based on the SEC regulations, adjustments or differentials to product prices, geological structural and isochore maps, well logs, core analyses, and pressure measurements. Ryder Scott reviewed such factual data for its reasonableness; however, we have not conducted an independent verification of the data furnished by Ecopetrol. We consider the factual data used in this report appropriate and sufficient for the purpose of preparing the estimates of reserves herein.

In summary, we consider the assumptions, data, methods and analytical procedures used in this report appropriate for the purpose hereof, and we have used all such methods and procedures that we consider necessary and appropriate to prepare the estimates of reserves herein. The proved reserves included herein were determined in conformance with the United States Securities and Exchange Commission (SEC) Modernization of Oil and Gas Reporting; Final Rule, including all references to Regulation S-X and Regulation S-K, referred to herein collectively as the "SEC Regulations." In our opinion, the proved reserves presented in this report comply with the definitions, guidelines and disclosure requirements as required by the SEC regulations.

Future Production Rates

For wells currently on production, our forecasts of future production rates are based on historical performance data. If no production decline trend has been established, future production rates were held constant, or adjusted for the effects of curtailment where appropriate, until a decline in ability to produce was anticipated. An estimated rate of decline was then applied to depletion of the reserves. If a decline trend has been established, this trend was used as the basis for estimating future production rates.

Test data and other related information were used to estimate the anticipated initial production rates for those wells or locations that are not currently producing. For reserves not yet on production, sales were estimated to commence at an anticipated date furnished by Ecopetrol. Wells or locations that are not currently producing may start producing earlier or later than anticipated in our estimates due to unforeseen factors causing a change in the timing to initiate production. Such factors may include delays due to weather, the availability of rigs, the sequence of drilling, completing and/or recompleting wells and/or constraints set by regulatory bodies.

The future production rates from wells currently on production or wells or locations that are not currently producing may be more or less than estimated because of changes including, but not limited to, reservoir performance, operating conditions related to surface facilities, compression and artificial lift, pipeline capacity and/or operating conditions, producing market demand and/or allowables or other constraints set by regulatory bodies.

Hydrocarbon Prices

The hydrocarbon prices used herein are based on SEC price parameters using the average prices during the 12-month period prior to the “as of date” this report, determined as the unweighted arithmetic averages of the prices in effect on the first-day-of-the-month for each month within such period, unless prices were defined by contractual arrangements. For hydrocarbon products sold under contract, the contract prices, including fixed and determinable escalations, exclusive of inflation adjustments, were used until expiration of the contract. Upon contract expiration, the prices were adjusted to the 12-month unweighted arithmetic average as previously described.

Ecopetrol furnished us with the above mentioned average prices in effect on December 31, 2017. These initial SEC hydrocarbon prices were determined using the 12-month average first-day-of-the-month benchmark prices appropriate to the geographic area where the hydrocarbons are sold. These benchmark prices are prior to the adjustments for differentials as described herein. The table below summarizes the “benchmark prices” and “price reference” used for the geographic area included in the report. In certain geographic areas, the price reference and benchmark prices may be defined by contractual arrangements. In cases where there are numerous contracts or price references within the same geographic area, the benchmark price is represented by the unweighted arithmetic average of the initial 12-month average first-day-of-the-month benchmark prices used.

The product prices that were actually used to determine the future gross revenue for each property reflect adjustments to the benchmark prices for gravity, quality, local conditions and/or distance from market, referred to herein as “differentials.” The differentials used in the preparation of this report were furnished to us by Ecopetrol. The differentials furnished to us were accepted as factual data and reviewed by us for their reasonableness; however, we have not conducted an independent verification of the data used by Ecopetrol to determine these differentials.

In addition, the following table summarizes the net volume weighted benchmark prices adjusted for differentials and referred to herein as the “average realized prices.” The average realized prices shown in the table below were determined from the total future gross revenue before production taxes and the total net reserves for the geographic area and presented in accordance with SEC disclosure requirements for each of the geographic areas included in the report.

Geographic Area	Product	Price Reference	Average Benchmark Prices	Average Realized Prices
North and South America	Oil/Condensate	Brent	\$ 54.93/Bbl	\$ 42.91/Bbl
	NGLs	Brent	\$ 54.93/Bbl	\$ 33.69/Bbl
	Gas	Contract	Contract	\$ 4.47/MCF

The liquid prices above, as provided by Ecopetrol, used the ICE Brent published by Bloomberg as reference. The effects of derivative instruments designated as price hedges of oil and gas quantities are not reflected in our individual property evaluations. For the properties reviewed by Ryder Scott, approximately 75 percent of the future gross income is derived from the sale of liquid hydrocarbons and 25 percent from gas sales.

Costs

Operating costs used in our evaluation were based on the operating expense reports of Ecopetrol and include only those costs directly applicable to the evaluated assets. The operating costs include a portion of general and administrative costs allocated directly to the leases and wells. The operating costs furnished to us were accepted as factual data and reviewed by us for their reasonableness; however, we have not conducted an independent verification of the operating cost data used by Ecopetrol. No deduction was made for loan repayments, interest expenses, or exploration and development prepayments that were not charged directly to the assets.

Development costs were furnished to us by Ecopetrol and are based on authorizations for expenditure for the proposed work or actual costs for similar projects. The development costs furnished to us were accepted as factual data and reviewed by us for their reasonableness; however, we have not conducted an independent verification of these costs. The estimated net cost of abandonment after salvage was included for properties where abandonment costs net of salvage were significant. The estimates of the net abandonment costs furnished by Ecopetrol were accepted without independent verification.

The proved developed and undeveloped reserves in this report have been incorporated herein in accordance with Ecopetrol's plans to develop these reserves as of December 31, 2017. The implementation of Ecopetrol's development plans as presented to us and incorporated herein is subject to the approval process adopted by Ecopetrol's management. As the result of our inquiries during the course of preparing this report, Ecopetrol has informed us that the development activities included herein have been subjected to and received the internal approvals required by Ecopetrol's management at the appropriate local, regional and/or corporate level. In addition to the internal approvals as noted, certain development activities may still be subject to specific partner AFE processes, Joint Operating Agreement (JOA) requirements or other administrative approvals external to Ecopetrol. Additionally, Ecopetrol has informed us that they are not aware of any legal, regulatory or political obstacles that would significantly alter their plans. While these plans could change from those under existing economic conditions as of December 31, 2017, such changes were, in accordance with rules adopted by the SEC, omitted from consideration in making this evaluation.

Current costs used by Ecopetrol were held constant throughout the life of the properties.

Standards of Independence and Professional Qualification

Ryder Scott is an independent petroleum engineering consulting firm that has been providing petroleum consulting services throughout the world since 1937. Ryder Scott is employee-owned and maintains offices in Houston, Texas; Denver, Colorado; and Calgary, Alberta, Canada. We have over eighty engineers and geoscientists on our permanent staff. By virtue of the size of our firm and the large number of clients for which we provide services, no single client or job represents a material portion of our annual revenue. We do not serve as officers or directors of any privately-owned or publicly-traded oil and gas company and are separate and independent from the operating and investment decision-making process of our clients. This allows us to bring the highest level of independence and objectivity to each engagement for our services.

Ryder Scott actively participates in industry-related professional societies and organizes an annual public forum focused on the subject of reserves evaluations and SEC regulations. Many of our staff have authored or co-authored technical papers on the subject of reserves related topics. We encourage our staff to maintain and enhance their professional skills by actively participating in ongoing continuing education.

Prior to becoming an officer of the Company, Ryder Scott requires that staff engineers and geoscientists have received professional accreditation in the form of a registered or certified professional engineer's license or a registered or certified professional geoscientist's license, or the equivalent thereof, from an appropriate governmental authority or a recognized self-regulating professional organization.

We are independent petroleum engineers with respect to Ecopetrol. Neither we nor any of our employees have any financial interest in the subject properties and neither the employment to do this work nor the compensation is contingent on our estimates of reserves for the properties which were reviewed.

The results of this study, presented herein, are based on technical analysis conducted by teams of geoscientists and engineers from Ryder Scott. The professional qualifications of the undersigned, the technical person primarily responsible for overseeing, reviewing and approving the evaluation of the reserves information discussed in this report, are included as an attachment to this letter.

Terms of Usage

The results of our third party study, presented in report form herein, were prepared in accordance with the disclosure requirements set forth in the SEC regulations and intended for public disclosure as an exhibit in filings made with the SEC by Ecopetrol.

We have provided Ecopetrol with a digital version of the original signed copy of this report letter. In the event there are any differences between the digital version included in filings made by Ecopetrol and the original signed report letter, the original signed report letter shall control and supersede the digital version.

The data and work papers used in the preparation of this report are available for examination by authorized parties in our offices. Please contact us if we can be of further service.

Very truly yours,

RYDER SCOTT COMPANY, L.P.
TBPE Firm Registration No. F-1580

/s/ Mario A. Ballesteros, P.E.

Mario A. Ballesteros, P.E.
TBPE License No. 107132
Managing Senior Vice President



MAB (DPR)/pl

Professional Qualifications of Primary Technical Person

The conclusions presented in this report are the result of technical analysis conducted by teams of geoscientists and engineers from Ryder Scott Company, L.P. Mario A. Ballesteros was the primary technical person responsible for overseeing the independent estimation of reserves, future production and income to render the audit conclusions of the report presented herein.

Mr. Ballesteros, an employee of Ryder Scott Company, L.P. (Ryder Scott) since 2006, is a Managing Senior Vice President and also serves as an Engineering Group Leader responsible for coordinating and supervising staff and consulting engineers of the company in ongoing reservoir evaluation studies worldwide. Before joining Ryder Scott, Mr. Ballesteros served in a number of engineering positions with Chevron. For more information regarding Mr. Ballesteros geographic and job specific experience, please refer to the Ryder Scott Company website at www.ryderscott.com/Company/Employees.

Mr. Ballesteros earned a Bachelor of Science degree in Mechanical Engineering in 1991 and a Masters of Petroleum Engineering degree in 1993 from the University of Tulsa. He also earned a Masters in Finance in 2000 from the Meta University in Colombia. He is a registered Professional Engineer in the State of Texas.

In addition to gaining experience and competency through prior work experience, the Texas Board of Professional Engineers requires a minimum of fifteen hours of continuing education annually, including at least one hour in the area of professional ethics, which Mr. Ballesteros fulfills. Mr. Ballesteros has attended formalized training and conferences including dedicated to the subject of the definitions and disclosure guidelines contained in the United States Securities and Exchange Commission Title 17, Code of Federal Regulations, Modernization of Oil and Gas Reporting, Final Rule released January 14, 2009 in the Federal Register.

Based on his educational background, professional training and more than 21 years of practical experience in the estimation and evaluation of petroleum reserves, Mr. Ballesteros has attained the professional qualifications as a Reserves Estimator and Reserves Auditor set forth in Article III of the "Standards Pertaining to the Estimating and Auditing of Oil and Gas Reserves Information" promulgated by the Society of Petroleum Engineers as of February 19, 2007.

PETROLEUM RESERVES DEFINITIONS

**As Adapted From:
RULE 4-10(a) of REGULATION S-X PART 210
UNITED STATES SECURITIES AND EXCHANGE COMMISSION (SEC)**

PREAMBLE

On January 14, 2009, the United States Securities and Exchange Commission (SEC) published the “Modernization of Oil and Gas Reporting; Final Rule” in the Federal Register of National Archives and Records Administration (NARA). The “Modernization of Oil and Gas Reporting; Final Rule” includes revisions and additions to the definition section in Rule 4-10 of Regulation S-X, revisions and additions to the oil and gas reporting requirements in Regulation S-K, and amends and codifies Industry Guide 2 in Regulation S-K. The “Modernization of Oil and Gas Reporting; Final Rule”, including all references to Regulation S-X and Regulation S-K, shall be referred to herein collectively as the “SEC Regulations”. The SEC Regulations take effect for all filings made with the United States Securities and Exchange Commission as of December 31, 2009, or after January 1, 2010. Reference should be made to the full text under Title 17, Code of Federal Regulations, Regulation S-X Part 210, Rule 4-10(a) for the complete definitions, as the following definitions, descriptions and explanations rely wholly or in part on excerpts from the original document (direct passages excerpted from the aforementioned SEC document are denoted in italics herein).

Reserves are those estimated remaining quantities of petroleum which are anticipated to be economically producible, as of a given date, from known accumulations under defined conditions. All reserve estimates involve some degree of uncertainty. The uncertainty depends chiefly on the amount of reliable geologic and engineering data available at the time of the estimate and the interpretation of these data. The relative degree of uncertainty may be conveyed by placing reserves into one of two principal classifications, either proved or unproved. Unproved reserves are less certain to be recovered than proved reserves and may be further sub-classified as probable and possible reserves to denote progressively increasing uncertainty in their recoverability. Under the SEC Regulations as of December 31, 2009, or after January 1, 2010, a company may optionally disclose estimated quantities of probable or possible oil and gas reserves in documents publicly filed with the Commission. The SEC Regulations continue to prohibit disclosure of estimates of oil and gas resources other than reserves and any estimated values of such resources in any document publicly filed with the Commission unless such information is required to be disclosed in the document by foreign or state law as noted in §229.1202 Instruction to Item 1202.

Reserves estimates will generally be revised as additional geologic or engineering data become available or as economic conditions change.

Reserves may be attributed to either natural energy or improved recovery methods. Improved recovery methods include all methods for supplementing natural energy or altering natural forces in the reservoir to increase ultimate recovery. Examples of such methods are pressure maintenance, natural gas cycling, waterflooding, thermal methods, chemical flooding, and the use of miscible and immiscible displacement fluids. Other improved recovery methods may be developed in the future as petroleum technology continues to evolve.

Reserves may be attributed to either conventional or unconventional petroleum accumulations. Petroleum accumulations are considered as either conventional or unconventional based on the nature of their in-place characteristics, extraction method applied, or degree of processing prior to sale. Examples of unconventional petroleum accumulations include coalbed or coalseam methane (CBM/CSM), basin-centered gas, shale gas, gas hydrates, natural bitumen and oil shale deposits. These unconventional accumulations may require specialized extraction technology and/or significant processing prior to sale.

Reserves do not include quantities of petroleum being held in inventory.

Because of the differences in uncertainty, caution should be exercised when aggregating quantities of petroleum from different reserves categories.

RESERVES (SEC DEFINITIONS)

Securities and Exchange Commission Regulation S-X §210.4-10(a)(26) defines reserves as follows:

Reserves. *Reserves are estimated remaining quantities of oil and gas and related substances anticipated to be economically producible, as of a given date, by application of development projects to known accumulations. In addition, there must exist, or there must be a reasonable expectation that there will exist, the legal right to produce or a revenue interest in the production, installed means of delivering oil and gas or related substances to market, and all permits and financing required to implement the project.*

Note to paragraph (a)(26): *Reserves should not be assigned to adjacent reservoirs isolated by major, potentially sealing, faults until those reservoirs are penetrated and evaluated as economically producible. Reserves should not be assigned to areas that are clearly separated from a known accumulation by a non-productive reservoir (i.e., absence of reservoir, structurally low reservoir, or negative test results). Such areas may contain prospective resources (i.e., potentially recoverable resources from undiscovered accumulations).*

PROVED RESERVES (SEC DEFINITIONS)

Securities and Exchange Commission Regulation S-X §210.4-10(a)(22) defines proved oil and gas reserves as follows:

Proved oil and gas reserves. *Proved oil and gas reserves are those quantities of oil and gas, which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be economically producible—from a given date forward, from known reservoirs, and under existing economic conditions, operating methods, and government regulations—prior to the time at which contracts providing the right to operate expire, unless evidence indicates that renewal is reasonably certain, regardless of whether deterministic or probabilistic methods are used for the estimation. The project to extract the hydrocarbons must have commenced or the operator must be reasonably certain that it will commence the project within a reasonable time.*

(i) *The area of the reservoir considered as proved includes:*

(A) *The area identified by drilling and limited by fluid contacts, if any, and*

(B) *Adjacent undrilled portions of the reservoir that can, with reasonable certainty, be judged to be continuous with it and to contain economically producible oil or gas on the basis of available geoscience and engineering data.*

PROVED RESERVES (SEC DEFINITIONS) CONTINUED

(ii) *In the absence of data on fluid contacts, proved quantities in a reservoir are limited by the lowest known hydrocarbons (LKH) as seen in a well penetration unless geoscience, engineering, or performance data and reliable technology establishes a lower contact with reasonable certainty.*

(iii) *Where direct observation from well penetrations has defined a highest known oil (HKO) elevation and the potential exists for an associated gas cap, proved oil reserves may be assigned in the structurally higher portions of the reservoir only if geoscience, engineering, or performance data and reliable technology establish the higher contact with reasonable certainty.*

(iv) *Reserves which can be produced economically through application of improved recovery techniques (including, but not limited to, fluid injection) are included in the proved classification when:*

(A) *Successful testing by a pilot project in an area of the reservoir with properties no more favorable than in the reservoir as a whole, the operation of an installed program in the reservoir or an analogous reservoir, or other evidence using reliable technology establishes the reasonable certainty of the engineering analysis on which the project or program was based; and*

(B) *The project has been approved for development by all necessary parties and entities, including governmental entities.*

(v) *Existing economic conditions include prices and costs at which economic producibility from a reservoir is to be determined. The price shall be the average price during the 12-month period prior to the ending date of the period covered by the report, determined as an unweighted arithmetic average of the first-day-of-the-month price for each month within such period, unless prices are defined by contractual arrangements, excluding escalations based upon further conditions.*

PETROLEUM RESERVES STATUS DEFINITIONS AND GUIDELINES

As Adapted From:
RULE 4-10(a) OF REGULATION S-X PART 210
UNITED STATES SECURITIES AND EXCHANGE COMMISSION (SEC)

and

PETROLEUM RESOURCES MANAGEMENT SYSTEM (SPE-PRMS)
Sponsored and Approved by:
SOCIETY OF PETROLEUM ENGINEERS (SPE),
WORLD PETROLEUM COUNCIL (WPC)
AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (AAPG)
SOCIETY OF PETROLEUM EVALUATION ENGINEERS (SPEE)

Reserves status categories define the development and producing status of wells and reservoirs. Reference should be made to Title 17, Code of Federal Regulations, Regulation S-X Part 210, Rule 4-10(a) and the SPE-PRMS as the following reserves status definitions are based on excerpts from the original documents (direct passages excerpted from the aforementioned SEC and SPE-PRMS documents are denoted in italics herein).

DEVELOPED RESERVES (SEC DEFINITIONS)

Securities and Exchange Commission Regulation S-X §210.4-10(a)(6) defines developed oil and gas reserves as follows:

Developed oil and gas reserves are reserves of any category that can be expected to be recovered:

- (i) *Through existing wells with existing equipment and operating methods or in which the cost of the required equipment is relatively minor compared to the cost of a new well; and*
- (ii) *Through installed extracting equipment and infrastructure operational at the time of the reserves estimate if the extraction is by means not involving a well.*

Developed Producing (SPE-PRMS Definitions)

While not a requirement for disclosure under the SEC regulations, developed oil and gas reserves may be further sub-classified according to the guidance contained in the SPE-PRMS as Producing or Non-Producing.

Developed Producing Reserves

Developed Producing Reserves are expected to be recovered from completion intervals that are open and producing at the time of the estimate.

Improved recovery reserves are considered producing only after the improved recovery project is in operation.

Developed Non-Producing

Developed Non-Producing Reserves include shut-in and behind-pipe reserves.

Shut-In

Shut-in Reserves are expected to be recovered from:

- (1) completion intervals which are open at the time of the estimate but which have not yet started producing;*
- (2) wells which were shut-in for market conditions or pipeline connections; or*
- (3) wells not capable of production for mechanical reasons.*

Behind-Pipe

Behind-pipe Reserves are expected to be recovered from zones in existing wells which will require additional completion work or future re-completion prior to start of production.

In all cases, production can be initiated or restored with relatively low expenditure compared to the cost of drilling a new well.

UNDEVELOPED RESERVES (SEC DEFINITIONS)

Securities and Exchange Commission Regulation S-X §210.4-10(a)(31) defines undeveloped oil and gas reserves as follows:

Undeveloped oil and gas reserves are reserves of any category that are expected to be recovered from new wells on undrilled acreage, or from existing wells where a relatively major expenditure is required for recompletion.

- (i) Reserves on undrilled acreage shall be limited to those directly offsetting development spacing areas that are reasonably certain of production when drilled, unless evidence using reliable technology exists that establishes reasonable certainty of economic producibility at greater distances.*
- (ii) Undrilled locations can be classified as having undeveloped reserves only if a development plan has been adopted indicating that they are scheduled to be drilled within five years, unless the specific circumstances, justify a longer time.*
- (iii) Under no circumstances shall estimates for undeveloped reserves be attributable to any acreage for which an application of fluid injection or other improved recovery technique is contemplated, unless such techniques have been proved effective by actual projects in the same reservoir or an analogous reservoir, as defined in paragraph (a)(2) of this section, or by other evidence using reliable technology establishing reasonable certainty.*

DeGolyer and MacNaughton
5001 Spring Valley Road
Suite 800 East
Dallas, Texas 75244

March 7, 2018

Board of Directors
Ecopetrol S.A.
Calle 35 No. 7-21 Piso 1
Bogota, D.C.
Colombia

Ladies and Gentlemen:

Pursuant to your request, we have conducted a reserves evaluation of the net proved hydrocarbon reserves, as of December 31, 2017, of certain selected properties in Colombia and Peru that Ecopetrol S.A. has represented are owned by Ecopetrol S.A., its wholly owned subsidiary Hocol Petroleum Limited, and through its ownership interest in Savia Peru S.A. (collectively, "ECOPETROL"). This evaluation was completed on March 7, 2018. ECOPETROL has represented that these properties account for 27 percent on a net equivalent barrel basis of ECOPETROL's net proved reserves as of December 31, 2017. ECOPETROL has also represented that these properties account for 33 percent of ECOPETROL's total proved developed net liquid hydrocarbon (oil, condensate, and natural gas liquids (NGL)) reserves, 20 percent of its total proved developed net gas reserves, 25 percent of its total proved undeveloped net liquid hydrocarbon reserves, and 25 percent of its total proved undeveloped net gas reserves. The net proved reserves estimates have been prepared in accordance with the reserves definitions of Rules 4-10(a) (1)-(32) of Regulation S-X of the Securities and Exchange Commission (SEC) of the United States. This report was prepared in accordance with guidelines specified in Item 1202 (a)(8) of Regulation S-K and is to be used for inclusion in certain SEC filings by ECOPETROL.

Reserves estimates included herein are expressed as net reserves. Gross reserves are defined as the total estimated petroleum to be produced from these properties after December 31, 2017. Net reserves are defined as that portion of the gross reserves attributable to the interests owned by ECOPEPETROL after deducting all interests owned by others, including royalties paid in kind. ECOPEPETROL has advised that in September 2013, Resolución n° 877 was enacted by the Government of Colombia, requiring that oil and condensate royalties be paid in kind and gas and natural gas liquids (NGL) royalties be paid in cash. Based on this legislation, and at the request of ECOPEPETROL, royalties associated with gas and NGL reserves have been considered as a cash payment and are therefore included in the net gas and NGL reserves estimated herein. ECOPEPETROL has also advised that for the properties in Peru evaluated herein, all royalties are paid in kind.

Estimates of reserves should be regarded only as estimates that may change as further production history and additional information become available. Not only are such estimates based on that information which is currently available, but such estimates are also subject to the uncertainties inherent in the application of judgmental factors in interpreting such information.

Data used in this evaluation were obtained from reviews with ECOPEPETROL personnel, from ECOPEPETROL files, from records on file with the appropriate regulatory agencies, and from public sources. In the preparation of this report we have relied, without independent verification, upon such information furnished by ECOPEPETROL with respect to property interests, production from such properties, current costs of operation and development, current prices for production, agreements relating to current and future operations and sale of production, and various other information and data that were accepted as represented. A field examination of the properties was not considered necessary for the purposes of this report.

Methodology and Procedures

Estimates of reserves were prepared by the use of appropriate geologic, petroleum engineering, and evaluation principles and techniques that are in accordance with practices generally recognized by the petroleum industry as presented in the publication of the Society of Petroleum Engineers entitled "Standards Pertaining to the Estimating and Auditing of Oil and Gas Reserves Information (Revision as of February 19, 2007)." The method or combination of methods used in the analysis of each reservoir was tempered by experience with similar reservoirs, stage of development, quality and completeness of basic data, and production history.

Based on the current stage of field development, production performance, the development plans provided by ECOPETROL, and the analyses of areas offsetting existing wells with test or production data, reserves were classified as proved.

When applicable, the volumetric method was used to estimate the original oil in place (OOIP) and the original gas in place (OGIP). Structure and isopach maps were constructed to estimate reservoir volume. Electrical logs, radioactivity logs, core analyses, and other available data were used to prepare these maps as well as to estimate representative values for porosity and water saturation. When adequate data were available and when circumstances justified, material-balance and other engineering methods were used to estimate OOIP or OGIP.

Estimates of ultimate recovery were obtained after applying recovery factors to OOIP or OGIP. These recovery factors were based on consideration of the type of energy inherent in the reservoirs, analyses of the petroleum, the structural positions of the properties, and the production histories. When applicable, material-balance and other engineering methods were used to estimate recovery factors. In such cases, an analysis of reservoir performance, including production rate, reservoir pressure, and gas-oil ratio behavior, was used in the estimation of reserves.

For depletion-type reservoirs or those whose performance disclosed a reliable decline in producing-rate trends or other diagnostic characteristics, reserves were estimated by the application of appropriate decline curves or other performance relationships.

In certain cases, when the previously named methods could not be used, reserves were estimated by analogy with similar wells or reservoirs for which more complete data were available.

Reserves were estimated to the economic limit or the expiration date of a production license, whichever occurs first. In certain licenses where ECOPETROL has signed agreements with partners, ECOPETROL's license ownership reverts to 100 percent following expiration of the license agreement.

Oil, condensate, and NGL reserves estimated in this report are expressed in terms of 42 United States gallons per barrel. Condensate reserves are to be recovered by conventional field operations. For reporting purposes, oil and condensate reserves have been estimated separately and are presented herein as a summed quantity. In this report, NGL reserves are defined to be propane, butane, and C₅₊ and are to be recovered by low-temperature separation.

Gas quantities estimated herein are expressed as marketable gas, fuel gas, and sales gas at a temperature base of 60 degrees Fahrenheit and a pressure base of 14.7 pounds per square inch absolute. Marketable gas is defined as the total gas produced from the reservoir after reduction for shrinkage resulting from field separation; processing, including removal of the nonhydrocarbon gas to meet pipeline specifications; and flare and other losses but not from fuel usage. Fuel gas is defined as that portion of the gas consumed in field operations and is estimated as reserves. Sales gas is defined as the total gas to be produced from the reservoirs, measured at the point of delivery, after reduction for fuel usage, flare, and shrinkage resulting from field separation and processing.

The proved reserves for the properties evaluated herein were estimated by the performance method, the volumetric method, or a combination of performance and volumetric methods. The following table summarizes the approximate percentage of net reserves estimated by each of these methods.

Method	Percent Net Proved Reserves Estimated by Method			
	Gas		Liquid Hydrocarbons	
	Developed (percent)	Undeveloped (percent)	Developed (percent)	Undeveloped (percent)
Volumetric	0	0	0	0
Performance	6	66	96	84
Combination	94	34	4	16

Definition of Reserves

Petroleum reserves included in this report are classified as proved. Only proved reserves have been evaluated for this report. Reserves classifications used in this report are in accordance with the reserves definitions of Rules 4-10(a) (1)-(32) of Regulation S-X of the SEC. Reserves are judged to be economically producible in future years from known reservoirs under existing economic and operating conditions and assuming continuation of current regulatory practices using conventional production methods and equipment. In the analyses of production-decline curves, reserves were estimated only to the limit of economic rates of production under existing economic and operating conditions using prices and costs consistent with the effective date of this report, including consideration of changes in existing prices provided only by contractual arrangements but not including escalations based upon future conditions. The petroleum reserves are classified as follows:

Proved oil and gas reserves – Proved oil and gas reserves are those quantities of oil and gas, which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be economically producible—from a given date forward, from known reservoirs, and under existing economic conditions, operating methods, and government regulations—prior to the time at which contracts providing the right to operate expire, unless evidence indicates that renewal is reasonably certain, regardless of whether deterministic or probabilistic methods are used for the estimation. The project to extract the hydrocarbons must have commenced or the operator must be reasonably certain that it will commence the project within a reasonable time.

(i) The area of the reservoir considered as proved includes:

(A) The area identified by drilling and limited by fluid contacts, if any, and (B) Adjacent undrilled portions of the reservoir that can, with reasonable certainty, be judged to be continuous with it and to contain economically producible oil or gas on the basis of available geoscience and engineering data.

(ii) In the absence of data on fluid contacts, proved quantities in a reservoir are limited by the lowest known hydrocarbons (LKH) as seen in a well penetration unless geoscience, engineering, or performance data and reliable technology establishes a lower contact with reasonable certainty.

(iii) Where direct observation from well penetrations has defined a highest known oil (HKO) elevation and the potential exists for an associated gas cap, proved oil reserves may be assigned in the structurally higher portions of the reservoir only if geoscience, engineering, or performance data and reliable technology establish the higher contact with reasonable certainty.

(iv) Reserves which can be produced economically through application of improved recovery techniques (including, but not limited to, fluid injection) are included in the proved classification when:

(A) Successful testing by a pilot project in an area of the reservoir with properties no more favorable than in the reservoir as a whole, the operation of an installed program in the reservoir or an analogous reservoir, or other evidence using reliable technology establishes the reasonable certainty of the engineering analysis on which the project or program was based; and (B) The project has been approved for development by all necessary parties and entities, including governmental entities.

(v) Existing economic conditions include prices and costs at which economic producibility from a reservoir is to be determined. The price shall be the average price during the 12-month period prior to the ending date of the period covered by the report, determined as an unweighted arithmetic average of the first-day-of-the-month price for each month within such period, unless prices are defined by contractual arrangements, excluding escalations based upon future conditions.

Developed oil and gas reserves – Developed oil and gas reserves are reserves of any category that can be expected to be recovered:

(i) Through existing wells with existing equipment and operating methods or in which the cost of the required equipment is relatively minor compared to the cost of a new well; and

(ii) Through installed extraction equipment and infrastructure operational at the time of the reserves estimate if the extraction is by means not involving a well.

Undeveloped oil and gas reserves – Undeveloped oil and gas reserves are reserves of any category that are expected to be recovered from new wells on undrilled acreage, or from existing wells where a relatively major expenditure is required for recompletion.

- (i) Reserves on undrilled acreage shall be limited to those directly offsetting development spacing areas that are reasonably certain of production when drilled, unless evidence using reliable technology exists that establishes reasonable certainty of economic producibility at greater distances.
- (ii) Undrilled locations can be classified as having undeveloped reserves only if a development plan has been adopted indicating that they are scheduled to be drilled within five years, unless the specific circumstances justify a longer time.
- (iii) Under no circumstances shall estimates for undeveloped reserves be attributable to any acreage for which an application of fluid injection or other improved recovery technique is contemplated, unless such techniques have been proved effective by actual projects in the same reservoir or an analogous reservoir, as defined in [section 210.4-10 (a) Definitions], or by other evidence using reliable technology establishing reasonable certainty.

Primary Economic Assumptions

The following economic assumptions were used for estimating existing and future prices and costs, expressed in United States dollars (U.S.\$):

Oil, Condensate, and NGL Prices

ECOPETROL has represented that the oil, condensate, and NGL prices were based on a 12-month average price, calculated as the unweighted average of the first-day-of-the-month price for each month within the 12-month period prior to the end of the reporting period. The volume-weighted average adjusted product prices attributable to estimated proved reserves for the properties in Colombia evaluated herein were U.S.\$51.27 per barrel for oil and condensate and U.S.\$26.69 per barrel for NGL, based on a 12-month average Brent reference price of U.S.\$54.93 per barrel. ECOPETROL supplied differentials by field to the Brent reference price. ECOPETROL has also represented that the volume-weighted average adjusted product prices attributable to estimated proved reserves for the properties in Peru evaluated herein were U.S.\$51.76 per barrel for oil and condensate and U.S.\$45.37 per barrel for NGL based on the 12-month average Ardjuna and Minas crude reference prices. These prices were held constant for the lives of the properties.

Sales Gas Prices

ECOPETROL has represented that the sales gas prices for the properties in Colombia evaluated herein are defined by contractual agreements based on specific market conditions. The volume-weighted average adjusted product price attributable to estimated proved reserves was U.S.\$2.89 per thousand cubic feet. ECOPETROL has also represented that the sales gas prices for the properties in Peru evaluated herein are defined by contractual agreements based on specific market conditions, and the average adjusted product price attributable to estimated proved reserves was U.S.\$0.92 per thousand cubic feet. These prices were held constant for the lives of the properties.

Operating Expenses, Capital Costs, and Abandonment Costs

Operating expenses and capital costs, based on information provided by ECOPETROL, were used in estimating future costs required to operate the properties. In certain cases, future costs, either higher or lower than existing costs, may have been used because of anticipated changes in operating conditions. These costs were not escalated for inflation. Abandonment costs were provided by ECOPETROL.

While the oil and gas industry may be subject to regulatory changes from time to time that could affect an industry participant's ability to recover its reserves, we are not aware of any such governmental actions which would restrict the recovery of the December 31, 2017, estimated proved reserves.

DeGolyer and MacNaughton's estimates of ECOPETROL's net proved reserves attributable to the reviewed properties were based on the definitions of proved reserves of the SEC and are summarized as follows, expressed in millions of barrels (MMbbl), millions of cubic feet (MMcf), and millions of barrels of oil equivalent (MMboe):

**Estimated by DeGolyer and MacNaughton
Net Proved Reserves
as of
December 31, 2017**

	Oil and Condensate (MMbbl)	NGL (MMbbl)	Marketable Gas (MMcf)	Fuel Gas (MMcf)	Sales Gas (MMcf)	Oil Equivalent (MMboe)
South America						
Proved Developed	260.466	5.894	617,095.830	73,846.072	543,249.758	374.622
Proved Undeveloped	66.121	0.702	23,945.201	5,871.430	18,073.771	71.024
South America Total Proved	326.586	6.596	641,041.031	79,717.502	561,323.529	445.646

Notes:

1. Totals may vary due to rounding.
2. Marketable gas is converted to oil equivalent using an energy equivalent factor of 5,700 cubic feet of gas per 1 barrel of oil equivalent.

In our opinion, the information relating to estimated proved reserves of oil, condensate, natural gas liquids, and gas contained in this report has been prepared in accordance with Paragraphs 932-235-50-4, 932-235-50-6, 932-235-50-7, and 932-235-50-9 of the Accounting Standards Update 932-235-50, *Extractive Industries – Oil and Gas (Topic 932): Oil and Gas Reserve Estimation and Disclosures* (January 2010) of the Financial Accounting Standards Board and Rules 4-10(a) (1)–(32) of Regulation S-X and Rules 302(b), 1201, 1202(a) (1), (2), (3), (4), (8), and 1203(a) of Regulation S-K of the Securities and Exchange Commission; provided, however, that estimates of proved developed and proved undeveloped reserves are not presented at the beginning of the year.

To the extent the above-enumerated rules, regulations, and statements require determinations of an accounting or legal nature, we, as engineers, are necessarily unable to express an opinion as to whether the above-described information is in accordance therewith or sufficient therefor.

DeGolyer and MacNaughton is an independent petroleum engineering consulting firm that has been providing petroleum consulting services throughout the world since 1936. DeGolyer and MacNaughton does not have any financial interest, including stock ownership, in ECOJETROL. Our fees were not contingent on the results of our evaluation. This letter report has been prepared at the request of ECOJETROL. DeGolyer and MacNaughton has used all assumptions, data, procedures, and methods that it considers necessary and appropriate to prepare this report.

Submitted,

/s/ DeGolyer and MacNaughton
DeGOLYER and MacNAUGHTON
Texas Registered Engineering Firm F-716

/s/ Thomas C. Pence, P.E.

[SEAL]

Thomas C. Pence, P.E.
Senior Vice President
DeGolyer and MacNaughton

CERTIFICATE of QUALIFICATION

I, Thomas C. Pence, Petroleum Engineer with DeGolyer and MacNaughton, 5001 Spring Valley Road, Suite 800 East, Dallas, Texas, 75244 U.S.A., hereby certify:

1. That I am a Senior Vice President of DeGolyer and MacNaughton, which company did prepare the letter report addressed to ECOPETROL dated March 7, 2018, and that I, as Senior Vice President, was responsible for the preparation of this letter report.
2. That I attended Texas A&M University, and that I graduated with a Bachelor of Science degree in Petroleum Engineering in 1982; that I am a Registered Professional Engineer in the State of Texas; that I am a member of the Society of Petroleum Engineers and that I have in excess of 35 years of experience in oil and gas reservoir studies and reserves evaluations.

/s/ Thomas C. Pence, P.E.

[SEAL]

Thomas C. Pence, P.E.
Senior Vice President
DeGolyer and MacNaughton
