Independent Statistics & Analysis
U.S. Energy Information Administration

Background Reference: Venezuela

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Overview

Venezuela's output has fallen significantly since global crude oil prices fell from their peak in mid-2014. The production declines have been especially acute since mid-2016, with Venezuela's crude oil output falling by 755,000 barrels per day (b/d) between June 2016 and May 2018.

Figure 1. Venezuela

The Venezuelan economy relies heavily on crude oil. Crude oil revenues have fallen significantly, falling to $22 billion in 2016, according to EIA's estimates of Venezuela's net oil export revenues. In 2011, Venezuela's net oil export revenues were more than $73 billion (in 2016 dollars).

The chronic problems in Venezuela's oil industry that led to the steep production declines are unlikely to change any time soon.

Venezuela's economic and political instability

The Venezuelan government is facing high levels of debt and hyperinflation. During the last quarter of 2017, Venezuela was late in making some bond payments, and the main rating agencies declared the country in selective default. During 2018, more than $9 billion in bond payments will come due, raising the possibility of a general default. In addition to the approximately $64 billion of debt in traded bonds, Venezuela owes $26 billion to creditors and $24 billion in commercial loans, according to Torino Capital estimates, although some estimates place Venezuelan debt at $150 billion.[1]

Venezuela's economy contracted by nearly 9% in 2017, based on estimates from Oxford Economics. Although the Venezuelan government has not published any economic data in more than two years, Venezuela's National Assembly reported in mid-March 2018 that inflation was more than 6,000% between February 2017 and February 2018. The International Monetary Fund projects that inflation will soar to 13,000% in 2018 and expects that Venezuela's economy will contract 15%, resulting in a cumulative gross domestic product (GDP) decline of nearly 50% from 2013 to 2018.

Petroleum and other liquids

Oil sector organization

Venezuela nationalized its oil industry in the 1970s, creating Petroleos de Venezuela S.A. (PdVSA), the country's state-run oil and natural gas company. In addition to being Venezuela's largest employer, PdVSA accounts for a significant share of the country's gross domestic product (GDP), government revenue, and export earnings. During the 1990s, Venezuela took steps to liberalize the petroleum sector. However, following the election of Hugo Chavez in 1999, Venezuela increased public participation in the oil industry. The Chavez government initially raised tax and royalty rates on new and existing projects and mandated majority PdVSA ownership of all oil projects.

In 2002, conflicts between PdVSA's employees and the government led to a strike in protest against the rule of then-President Chavez, largely bringing the company's operations to a halt. In the wake of the strike, PdVSA overhauled the internal organization to solidify government control. The government laid off thousands of PdVSA workers who had participated in the strike, resulting in a massive loss of expertise at the company, which especially affected PdVSA's technical capabilities. As a result, crude oil production in Venezuela never recovered to pre-2002 levels, declining nearly every year since then. In 2006, Chavez implemented the nationalization of oil exploration and production in Venezuela, requiring that joint ventures (JVs) with PdVSA renegote to a 60% minimum PdVSA share in projects.

A number of these JVs currently operate in Venezuela, including JVs with U.S. companies and a number of Chinese and Russian operators. In addition to the oil companies involved in the JVs, international oil

service companies such as Halliburton, Schlumberger, Weatherford, and Baker-Hughes have made significant investments in Venezuela. However, as Venezuela's economy has worsened, these oil service companies have not been paid for oil field services rendered to PdVSA, which has accumulated very large arrears over the past few years. PdVSA now owes more than $1 billion, including some of the companies' write-offs of arrears and accounts receivable.

Exploration and production

Most of Venezuela's proved oil reserves are heavy crude oil deposits located in its Orinoco Oil Belt (OOB) in central Venezuela, making Venezuela's crude oil somewhat expensive to produce, but relatively technically simple.

Spread over 19,000 square miles, OOB is divided into 36 blocks within 4 exploration areas: Boyaca, Junin, Ayachucho, and Carabobo. Venezuela allows foreign firms to invest, but the country requires PdVSA to hold at least 60% equity in joint ventures. Major joint venture partners include Chevron, China National Petroleum Corporation, ENI, Statoil, Total, and Rosneft.

In addition to the Orinoco Oil Belt area, Venezuela also has reserves in and around Lake Maracaibo in the western part of the country.

Figure 2. Venezuela's Orinoco Belt

Petroleum production has decreased from production peaks in the late 1990s to early 2000s. The production decreases experienced by the sector following the 2002–03 strike largely resulted because of technical expertise losses and the diversion of revenues to social programs rather than to reinvestment in petroleum production. More recent and more accelerated declines, however, have resulted from the breakdown in the economy, largely non-existent capital expenditures in the sector, and overall mismanagement of the industry.

Venezuela's conventional crude oil is heavy and sour by international standards. As a result, much of Venezuela's oil production must go to specialized domestic and international refineries. The country's

most prolific production area is the OOB. Production of heavy oil from the OOB had been increasing until 2016 and had accounted for an increasing share of total output. Production areas in the west, once a prolific source of oil, are home to many of Venezuela's mature fields, which have seen declines in production as PdVSA's strategy has focused on developing the heavy oil projects rather than the traditional western Maracaibo-Falcon Basin area. As a result of this pivot towards the OOB, production of medium and light oil has seen a decline in output in the past decade.

Venezuela had become increasingly reliant on its JV partners to produce its crude oil. In 2017, about half of Venezuela's crude oil production originated in JV projects, and the proportion of JV-produced oil had been rising since at least 2010. By comparison, JVs accounted for about 30% of total production in Venezuela in 2010. However, since 2017 this share has fallen significantly.

Table 1. Venezuela's oil joint venture projects with foreign partners

Joint venture name	Estimated production in 2017 ('000 b/d)	Participating companies and their shares (%)
Petrolera Bielovenezolana	12.6	PdVSA (60), Belorusneft (40)
Petrozumano	2.4	PdVSA (60), CNPC (40)
Venangocupet	5.7	PdVSA (60), Cupet (20), Sonangol (20)
Petropiar	146.6	PdVSA (70), Chevron (30)
Petromonagas	114.1	PdVSA (60), Rosneft (40)
Petrolera Sinovensa	128.7	PdVSA (60), CNPC (40)
Petrocedeno	101.4	PdVSA (60), Total (30.3), Statoil (9.7)
Petrozamora	102.2	PdVSA (60), Gazprombank (40)
Petroboscan	86.2	PdVSA (60), Chevron (39.2), Inepetrol (0.8)
Petroquiriquire	32.5	PdVSA (60), Repsol (40)
Petroindependencia	38.1	PdVSA (60), Chevron (34), INPEX and Mitsubishi (5), Suelpetrol (1)
Petrosucre	23.9	PdVSA (74), Eni (26)
Petroregional del Lago	22.2	PdVSA (60), Shell (40)
Petrocarabobo	24.7	PdVSA (71), Repsol (11), ONGC Videsh (11), Indian Oil (7)
Petrolera Indovenezolana	17	PdVSA (60), ONGC Videsh (40)
Petromiranda	14.2	PdVSA (60), Rosneft (40)
Petrojunin	14.3	PdVSA (60), Eni (40)
Petroritupano	4.3	PdVSA (60), Pampa (22), Anadarko (18)
Petrowarao	2.1	PdVSA (60), Perenco (40)
Baripetrol	0.5	PdVSA (60), Perenco (17.5) PFC (5), Suizum (17.5)
Petromacareo	0	PdVSA (60), PetroVietnam (40)*
PetroCabimas	17	PdVSA (60), Suelopetrol (40)
Petrodelta	26.6	PdVSA (60), DP Delta Finance BV (40)
Petrolera Kaki	0.4	PdVSA (60), Inemaca (22.67), Inversiones Polar (17.33)
Petrocuragua	0.3	PdVSA (60), OPEN (12), CIP (28)

Petrocumarebo	0	PdVSA (60), PFC (40)
Petrolera Paria	0	PdVSA (60), Sinopec (32), INE Oil (8)
Petrolera Guiria	0	PdVSA (64.25), ENI (19.5), INE Oil (19.5)
PetroUrica	0.3	PdVSA (60), CNPC (40)
PetroVictoria	0	PdVSA (60), Rosneft (40)
Lagopetrol	1.3	PdVSA (69), Integra (26.35), Ehcopek (3.1), CIP (1.55)
Petroboqueron	3.2	PdVSA (60), Rosneft (26.67), PEI (13.33)
Petrolera Sinovenzolana	0.8	PdVSA (75), CNPC (25)
Petrowayu	0.7	PdVSA (60), Pampa (36), Anadarko (4)
Petrourdaneta	1.7	PdVSA (60), Odebrecht (40)
Petroindependiente	2.1	PdVSA (74.8), Chevron (25.2)
Petroguarico	0.6	PdVSA (70), INPEX (30)
Petronado	0.5	PdVSA (60), Compania de Combustibles (26), Petroamazonas (8.4), Korea National Oil Corporation (5.6)
Petroperija	7.1	PdVSA (60), Rosneft (40)
Petrokarina	0.4	PdVSA (60), Pampa (29.2), Inversora Mata (10.8)
Petroven-Bras	0	PdVSA (60), Pampa (29.2), Coroil (10.8)

Source: U.S. Energy Information Administration, based on information reported by PdVSA's JV partners, IPD Latin America, Energy Intelligence, NewsBase Latin America Oil & Gas Monitor, BN Americas, and Rystad Energy

Trade

The United States is the primary destination for Venezuelan crude oil shipments. The other significant destinations of Venezuelan crude oil exports are Asia, the Caribbean nations, and to a lesser extent, Europe.

In the past, Venezuela provided sizable volumes of crude oil and refined products to its regional neighbors under various initiatives, including Petrocaribe, which was established in 2005. Members of Petrocaribe include Antigua and Barbuda, Bahamas, Belize, Cuba, Dominica, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Dominican Republic, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Saint Lucia, and Suriname. Under the Petrocaribe initiative, Venezuela offers favorable financing and long repayment terms that often feature barter arrangements instead of cash transactions. These favorable terms included deferred payments amortized over 25 years at low interest rates (as low as 1%).[2]

In mid-June 2018, PdVSA announced that it is indefinitely suspending fuel exports to Antigua and Barbuda, Belize, Dominica, El Salvador, Haiti, Nicaragua, St. Vincent and the Grenadines, and St. Kitts and Nevis. The eight nations accounted for about 38,000 b/d of Petrocaribe volumes. Exports to Cuba will reportedly continue.[3]

Before 2012, the United States imported Venezuelan petroleum products via the U.S. Virgin Islands. However, since the U.S. Virgin Island's Hovensa refinery was shut down in 2012, the U.S. Virgin Islands no longer exports refined Venezuelan petroleum.

U.S. exports of petroleum products to Venezuela have increased largely because of a lack of the funds needed to maintain domestic refineries. U.S. exports of petroleum products to Venezuela peaked in 2012 at 85,000 b/d. Before 2012, Venezuela imported primarily methyl tertiary butyl ether (MTBE), intended for blending in gasoline, motor gasoline, and distillate fuel oil, but the country has since begun to import increasing volumes of finished motor gasoline and distillate because its domestic refining system increasingly does not meet domestic demand.

Table 2. Venezuela's oil crude grades and their characteristics

Grade	API gravity (°)	Sulfur content (%)	Comments
Merey-16	15.9	2.7	Requires coking units and complex refineries for processing, making it an attractive stream for U.S. and some Chinese refiners.
Boscan	10.7	5.2	Some Boscan volumes are shipped to China as loan repayments, and the remainder is sold under flexible term contracts.
Mesa-30	29.1	1.08	Produced from PdVSA's El Furrial complex in Monagas state. Crude oil from the field is sold as a distinct stream—Mesa-30—and is blended with extra-heavy OOB crude oil to form the Merey-16 stream.
Santa Barbara	39.3	0.48	Mainly sources from the Santa Barbara field (Monagas state), although a number of other, smaller fields also contribute volumes. Most of the Santa Barbara stream is consumed domestically.
Hamaca	26	1.55	Sourced from the extra-heavy Hamaca (or Ayacucho) field, located in the OOB, and then upgraded at the Jose upgrading and terminal complex. The Hamaca project is operated by the PdVSA and Chevron JV, Petropiar, and it upgrades extra-heavy 8.5° API crude into lighter, synthetic 26° API crude. Most of the Hamaca volumes were exported in 2017,
Monagas-18	18	3.34	Synthetic crude oil produced in the OOB and then upgraded at the Petromonagas facility in the Jose Industrial Complex.

Source: Energy Intelligence, *World Crude Oil Data*, Venezuela

Refining

Nearly all of Venezuela's refining facilities have fallen into disrepair, and some facilities lack feedstock to run at rates higher than 20%–30%. A number of facilities have suffered damage from fires and operational accidents during the past few years, and PdVSA lacks the funds to repair them or invest sufficient capital to keep the facilities operating.

Venezuela's major facilities include the Paraguana Refining Center (nameplate capacity 955,000 b/d), Puerto de la Cruz (nameplate capacity 195,000 b/d), El Palito (nameplate capacity 140,000 b/d), and San Roque (nameplate capacity 5,800 b/d). PdVSA also owns the 16,000 b/d Bajo Grande refinery, but this facility was shut down in August 2016. In addition, San Roque operates infrequently as a result of lack of crude oil feedstock.

PdVSA also operates significant refining capacity outside the country. The largest share of Venezuela's foreign downstream operations is in the United States, followed by significant operations in the Caribbean and stakes in Europe.

CITGO, a wholly-owned subsidiary of PDVSA, operates three refineries (Lake Charles, Louisiana; Corpus Christi, Texas; and Lemont, Illinois), with a combined crude oil distillation capacity of about 758,000 b/d.

PdVSA used to own a 50% stake in the Louisiana Chalmette refinery, but in 2015, ExxonMobil and PdVSA reached an agreement with PBF Energy for the sale of the refinery. Similarly, the Sweeney, Texas refinery is no longer part of PdVSA's refining portfolio since September 2015, when federal court in New York ruled that ConocoPhillips is the sole owner of the facility. The court case and ruling were the result of a contractual dispute between PdVSA and ConocoPhillips.

PdVSA, through its subsidiary PDV Europe B.V., also owns a 50% stake of Nynas AB and its refineries across Europe. PdVSA also owns a 25% stake in the Eastham, United Kingdom refinery, which is a joint venture with Shell.

In the Caribbean, PdVSA owns about 600,000 b/d of nominal refining capacity, including facilities in Curacao, Aruba, Jamaica, and the Dominican Republic, although, operational capacity is much lower. For example, the Isla refinery in Curacao has a nameplate capacity of 335,000 b/d, but its operating capacity in the first quarter of 2018 was lower than 100,000 b/d because one of the refineries' distillation units was out of service. In early April 2018, the refinery was almost completely shut down as PdVSA has been unable to pay for the light crude oil that is processed at the refinery and lacked funds to repair the steam and power issues at the facility.

PdVSA owned a 49% stake in Cuba's Cienfuegos 65,000 b/d refinery but appears to have pulled out of the partnership sometime in 2017. In December 2017, Granma, the Cuban Communist Party's newspaper, reported that since August 2017, the Cienfuegos refinery had been operating as a fully Cuban state entity. PdVSA has not issued any statements regarding this change.

Table 3. PdVSA's refinery capacity by region, 2018, barrels per day

	Nameplate capacity	Operating capacity	PdVSA's share of nameplate capacity
Venezuela	1,303,800	625,800	1,303,800
United States	749,000	749,000	749,000
Caribbean	640,000	305,000	604,000
Europe	84,000	84,000	38,000
Total	2,776,800	1,763,800	2,694,800

Source: *Oil and Gas Journal*, PdVSA, IPD Latin America, trade press

Natural gas

Natural gas sector organization

In 1999, Venezuela adopted the Gas Hydrocarbons Law, which was intended to diversify the economy through encouraging nonassociated natural gas development and through expanding the role of natural gas in Venezuela's energy sector. This legislation allows private operators to own 100% of nonassociated projects, in contrast to the ownership rules in the oil sector. The legislation also requires lower royalty and income tax rates on nonassociated natural gas projects than on oil projects. The law gives PdVSA the right to purchase a 35% stake in any project that moves into commercial status.

PdVSA produces the largest amount of natural gas in Venezuela, and it is also the largest natural gas distributor. In addition, a number of private companies currently operate in Venezuela's natural gas sector. In 2001, Venezuela awarded nonassociated gas production licenses to Repsol and Total, and it awarded additional licenses through 2010 under a cost-recovery scheme that was deemed more attractive to companies. The government compensated companies under a pricing scheme that would allow the companies to recover both the operating and capital expenditures as well as build in a profit margin. However, this pricing scheme expired in December 2015 and the government has not replaced it.

Because natural gas is currently sold at a regulated price, and often below cost, natural gas production in the country is not economically viable for PdVSA, which purchases natural gas from producers at *cost of service* and sells it on the domestic market at a government-controlled price.

Given Venezuela's precarious economic, political, and social situation, natural gas production is unlikely to become a priority for the government.

Exploration and production

With its traditional focus on crude oil, Venezuela has not sufficiently incentivized natural gas production domestically. As a result, despite the sizable reserves and relatively minor geological risk, natural gas production has lagged behind domestic consumption for more than a decade. IPD Latin America estimated that in 2017, only about 12% of Venezuela's natural gas was produced by private companies via nonassociated gas licenses. Nearly all of the remaining natural gas output was production associated with crude oil by PdVSA or its JVs.[4]

An estimated 90% of Venezuela's natural gas reserves are associated, meaning they are located in the same place as oil reserves. The country's petroleum industry is a major consumer of natural gas production, and the reinjected volumes are primarily used for natural gas reinjection to increase crude oil extraction. Because of the declining output of mature oil fields, natural gas use for enhanced oil recovery has consistently accounted for more than 40% of total production since at least 2004. The share of reinjected natural gas peaked at 60% in 2009.

Venezuela's government has long planned to increase production of nonassociated natural gas, largely through the development of its offshore reserves. These plans have been delayed as a result of lack of capital and foreign investment.

Onshore, PdVSA is working to increase production and capacity at existing sites, including in the Anaco field, the Barrancas field, and Yucal Placer. Offshore, PdVSA has awarded exploration blocks to international oil companies, including Total, Statoil, and Chevron, in the Plataforma Deltana, Marsical Sucre, and in the Blanquilla-Tortuga areas off Venezuela's northeast coast. Offshore exploration has yielded many successful natural gas finds, including Repsol-YPF's and ENI's discovery of 6 trillion cubic feet (Tcf)–8 Tcf of recoverable natural gas in the Perla field, located in the Cardon IV block in the Gulf of Venezuela—one of the largest natural gas discoveries in the history of the country. In July 2015, operations began at the Perla field project.[5]

Table 4. Venezuela's natural gas projects with foreign partners

Joint venture/project name	Estimated production in 2017 (Mcf/d)	Participating companies and their shares (%)
Bielovenezolana (Zamaca West)	unknown	Belarusneft (40.0%), PdVSA Gas (60.0%)
Cardon IV (Perla)	490	Eni (50.0%), Repsol (5.00%)
Ypergas (Yucal-Placer)	150	Total (69.5%), Repsol (15.0%), Inepetrol (10.2%), Otepi (5.3%)
Quiriquire Gas	128	Repsol (60.0%), PdVSA Gas (40.0%)
Gas Guarico	80	INPEX (70.0%), PdVSA Gas (30.0%)

Source: U.S. Energy Information Administration, based on information reported by PdVSA and its JV partners, IPD Latin America, NewsBase Latin America Oil & Gas Monitor, BN Americas, and Rystad Energy

Pipelines

Before the onset of the current economic crisis, Venezuela improved its 2,750-mile domestic natural gas pipeline transport network to allow greater domestic movement and use of natural gas with the nearly 190-mile Interconnection Centro Occidente (ICO) system. The ICO connects the eastern and western parts of the country, making natural gas more readily available for domestic consumers and for reinjection into western oil fields. In addition, the 300-mile SinorGas pipeline project will transport natural gas produced offshore to the domestic pipeline network via the states of Sucre and Anzoategui.

The Antonio Ricaurte pipeline, connecting Venezuela with Colombia, came online in 2008. The pipeline allowed Colombia to export natural gas to Venezuela, with contracted volumes ranging between 80 million cubic feet per day (MMcf/d) and 150 MMcf/d. Although Venezuela planned to eventually export 140 MMcf/d of natural gas to Colombia, difficulties surrounding the development of its resources required Venezuela to continue to import natural gas from Colombia.

Electricity

Electricity Sector Organization

Large, state-owned companies dominate the electricity sector in Venezuela. The government controls the electric sector through the CORPOELEC, a state-owned holding company created in 2007 to consolidate the power sector. CORPOELEC is responsible for the entire electricity supply chain, controlling all major electricity companies in Venezuela, including Electrificacion del Caroni (EDELCA), which supplies more than 70% of the country's electricity.

Supply

Hydroelectricity provides most of Venezuela's electricity supply. The country's hydroelectric production facilities are primarily located on the Caroni River in the Guayana region. The 10,200-megawatt Guri hydroelectric power plant on the Caroni is one of the largest hydroelectric dams in the world and provides most of Venezuela's electric power.

About half of the electricity generation from fossil fuels in Venezuela is from natural gas, and the rest is from fuel oil and diesel. The government increased investment in conventional fossil fuel-fired electric generation capacity to reduce the reliance on hydropower and to increase use of domestic hydrocarbon

resources before the onset of the current economic crisis. However, all investment in the electricity sector appears to have stopped.

Notes

- In response to stakeholder feedback, the U.S. Energy Information Administration has revised the format of the *Country Analysis Briefs*. As of December 2018, updated briefs are available in two complementary formats: the Country Analysis Executive Summary provides an overview of recent developments in a country's energy sector and the Background Reference provides historical context. Archived versions will remain available in the original format.
- Data presented in the text are the most recent available as of December 12, 2018.
- Data are EIA estimates unless otherwise noted.

Endnotes

[1] Financial Times, "Venezuela debt: U.S., Russia, and China play for high stakes," https://www.ft.com/content/f51c4880-cddc-11e7-b781-794ce08b24dc
[2] Petrocaribe. "About Petrocaribe." http://www.petrocaribe.org/.
[3] Antigua Daily Observer, "Venezuela suspends oil delivery to Antigua and Barbuda and others," June 12, 2018
[4] IPD Latin America, "Venezuela's Natural Gas Sector: Getting to Yes," (March 30, 2018)
[5] Ibid.