U.S. Energy Information Administration

‹ Countries

Venezuela

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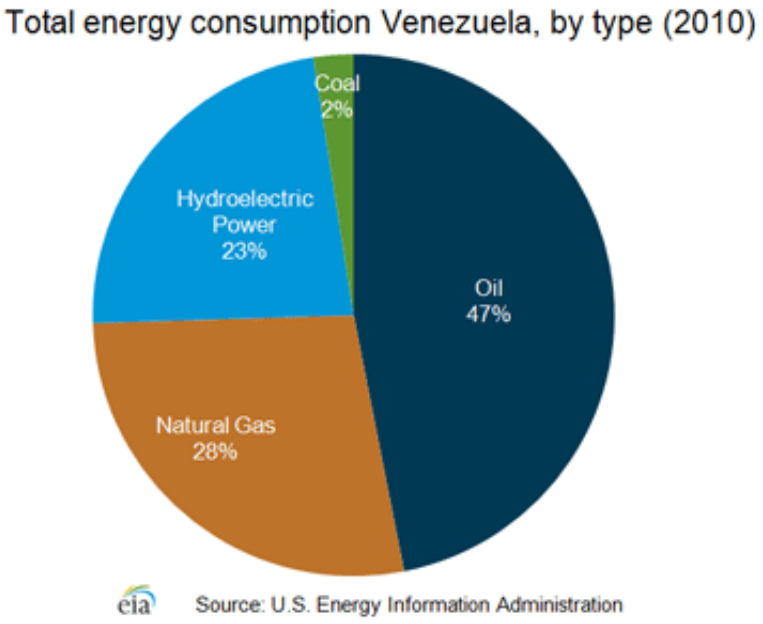
Background

Venezuela contains some of the largest oil and natural gas reserves in the world. It consistently ranks as one of the top suppliers of oil to the U.S.

Venezuela is one of the world's largest exporters of crude oil and the largest in the Western Hemisphere. The oil sector is of central importance to the Venezuelan economy. As a founding member of the Organization of the Petroleum Exporting Countries (OPEC), Venezuela is an important player in the global oil market.

In 2010, Venezuela consumed 3.2 quadrillion British thermal units (BTUs) of total energy. Oil represents the bulk of total energy consumption in Venezuela. Hydroelectricity and natural gas each account for over 20 percent, while coal accounts for the remainder of energy use. Over the last decade the share of oil consumption in the country's total energy mix has risen from 36 percent to 47 percent, largely because the Venezuelan government subsidizes liquid fuels.



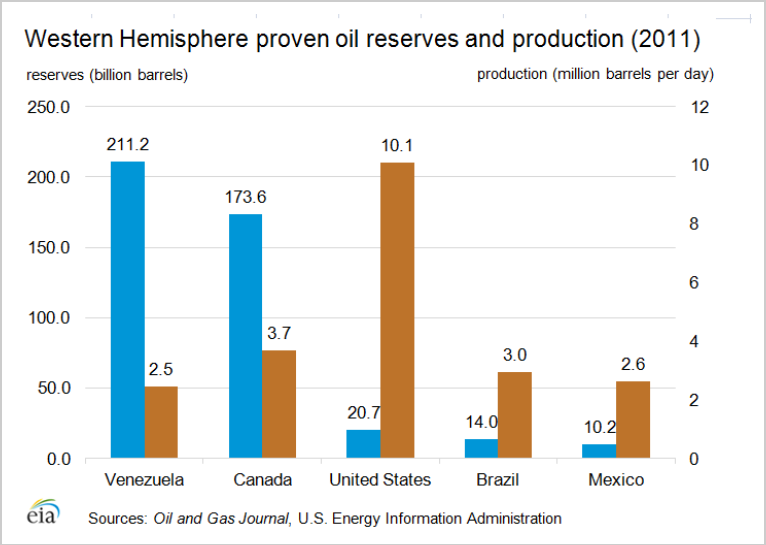
Oil

Venezuela was the world's eighth-largest net oil exporter in 2010.

According to *Oil and Gas Journal* (OGJ), Venezuela had 211 billion barrels of proven oil reserves in 2011, the second largest in the world. This number constitutes a major upward revision – two years ago the same publication listed the country's reserves at 99.4 billion barrels. The update results from the inclusion of massive reserves of extra-heavy oil in Venezuela's Orinoco belt. Reserves could be even bigger at 316 billion barrels, with further investigation from the "Magna Reserva" project.

In 2010 the country had net oil exports of 1.7 million barrels per day (bbl/d), the eighth-largest in the world and the largest in the Western Hemisphere. While crude oil production for 2011 increased 100,000 bbl/d (and equaled 2009 levels), overall production levels have declined by roughly one-quarter since 2001. Natural decline at older fields, maintenance issues, and the need for increasing foreign investment are behind this trend. In addition, net oil exports have also declined since domestic consumption has increased 39% since 2001.

As of 2010, Venezuela maintained roughly 5,500 miles of oil pipelines to service the country's domestic consumption. While discussions to build an international pipeline with Colombia are ongoing, Venezuela currently has no international oil pipelines.



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. Along with being Venezuela's largest employer, PdVSA accounts for a significant share of the country's GDP, government revenue, and export earnings. During the 1990s, Venezuela took steps to liberalize the petroleum sector. However, since the election of Hugo Chavez in 1999, Venezuela has 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.

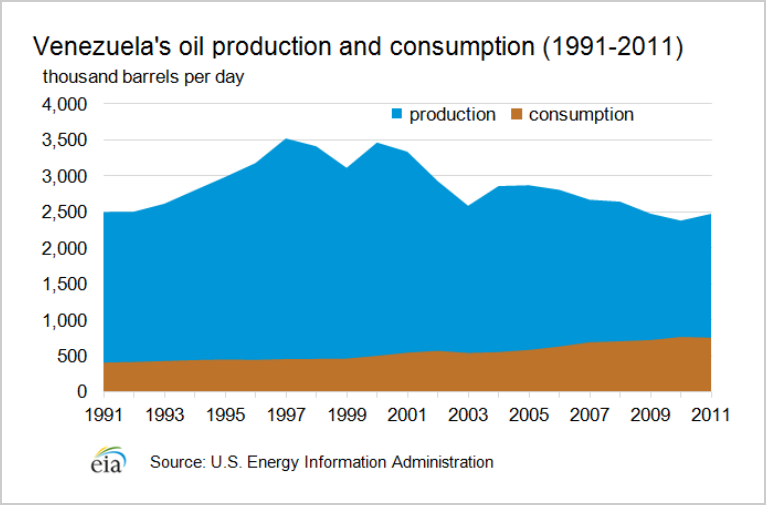
In 2002, nearly half of PdVSA's employees walked off the job in protest against the rule of President Chavez, largely bringing the company's operations to a halt. In the wake of the strike, PdVSA fired 18,000 workers and overhauled the internal organization in order to solidify government control. In 2006, Chavez implemented the nationalization of oil exploration and production in Venezuela, mandating a renegotiation of a 60% minimum PdVSA share in projects. Sixteen firms, including Chevron and Shell, complied with new agreements, while Total and Eni were forcibly taken over. Venezuela is also increasing pressure on foreign operators that remain in the country to increase investment to offset recent production declines.

Exploration and production

EIA estimates that the country produced around 2.47 million bbl/d of oil in 2011. Crude oil represented 2.24 million bbl/d of this total, with condensates and natural gas liquids (NGLs) accounting for the remaining production. Estimates of Venezuelan production vary from source to source, partly due to measurement methodology. For instance, some analysts directly count the extra-heavy oil produced in Venezuela's Orinoco Belt as part of Venezuela's crude oil production. Others (including EIA) count it as upgraded syncrude, whose volume is about 10 percent lower than that of the original extra-heavy feedstock.

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 Maracaibo basin, which contains slightly less than half of Venezuela's oil production. Many of Venezuela's fields are very mature, requiring heavy investment to maintain current capacity. Industry analysts

estimate that PdVSA must spend some $3 billion each year just to maintain production levels at existing fields, given decline rates of at least 25 percent.



Orinoco heavy oil belt

Venezuela contains billions of barrels in extra-heavy crude oil and bitumen deposits, most of which are situated in the Orinoco Belt in central Venezuela. According to a study released by the U.S. Geological Survey, the mean estimate of recoverable oil resources from the Orinoco Belt is 513 billion barrels of crude oil. PdVSA began the 'Magna Reserva' project in 2005, which involved dividing the Orinoco region into four areas and further divided into 28 blocks and quantifying the reserves in place. This initiative resulted in the upgrading of Venezuelan reserve estimates by more than 100 billion barrels.

In the 1990's, Venezuela's PdVSA established four strategic associations to exploit these resources. After the implementation of the nationalization policy in 2007, the strategic associations led by ConocoPhillips, ExxonMobil, and Total with minority stakes held by Chevron, BP, Statoil and PdVSA became newly formed mixed companies led by PdVSA holding majority shares. The nationalization also resulted in the exit of ConocoPhillips and ExxonMobil, who were unable to reach new agreements.

These projects involve converting the extra heavy crude and bitumen to lighter, sweeter crude, known as syncrude. The upgrading facilities themselves introduce another element of risk into Venezuela's petroleum supply chain. While the country's four upgraders have installed production capacity of about 600,000 bbl/d of syncrude, industry estimates place these projects' production levels at less than 500,000 bbl/d due to maintenance and safety issues.

Venezuela plans to develop further the Orinoco Belt oil resources in the coming years. In 2009 Venezuela signed bilateral agreements for the development of four major blocks in the Junin area. Last year the country awarded two more major development licenses in the Carabobo region. Venezuela expects these projects to add more that 2,000,000 bbl/d of heavy oil production capacity by the end of the decade (see table).

Existing and planned Orinoco Belt projects

	Actual/ planned	Current/ projected heavy

Grouping	Project	planned Startup date	crude production	Partners
Active Projects	Petroanzoategui (Petrozuata)	1998	107,000	PdVSA (100)%
	Petromonagas (Cerro Negro)	1999	104,730	PdVSA (83.34%), BP* (16.66%)
	Petrocedeno (Sincor)	2000	144,000	PdVSA (60%), Total (30.3%), Statoil (9.7%)
	Petropiar (Hamaca)	2001	131,100	PdVSA (70%), Chevron (30%)
Bilateral Agreements	Junin-2	2012	200,000	PDVSA (60%), PetroVietnam(40%)
	Junin-4	2012	400,000	PDVSA (60%), CNPC (40%)
	Junin-5	2013	240,000	PDVSA (60%), Eni (40%)
	Junin-6	2014	450,000	PDVSA (60%), Russian Consortium (40%)
Carabobo Bid Round	Carabobo-1	2013	400,000	PDVSA (60%), Indian Consortium (18%), Petronas (11%), Repsol YPF (11%)
	Carabobo-3	2013	400,000	PDVSA (60%), Chevron (34%), Japanese Consortium (5%), Suelopetrol (1%)

Sources: PdVSA, Global Insight, Wood Mackenzie
**BP has agreed to sell their share to TNK-BP*

Venezuela was able to secure these recent agreements; however, given recent regulatory and operational problems, considerable uncertainty surrounds the future of Orinoco production.

Exports

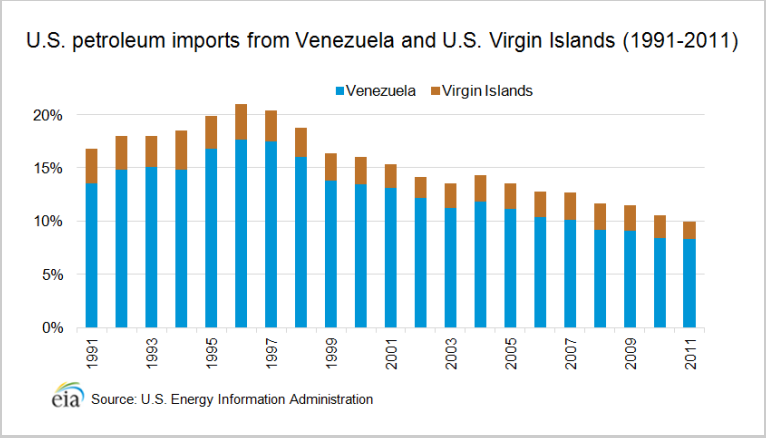
Recent statistics show that Venezuela's petroleum exports have dropped by almost 50 percent, since peaking at 3.06 million bbl/d in 1997. Venezuela sends a large share of its oil exports to the United States because geographic proximity enhances export profitability and

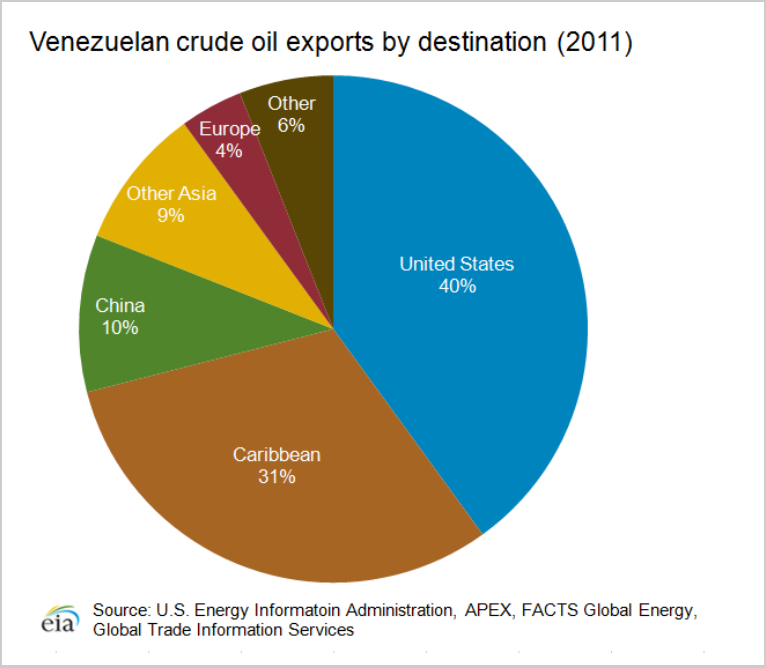
because refineries on the U.S. Gulf Coast are specifically designed to handle heavy Venezuelan crude.

Currently, Venezuela is the United States' fourth largest supplier of imported crude oil and petroleum products behind Canada, Mexico, and Saudi Arabia. However, U.S. imports from Venezuela have declined in recent years. In 2011, the United States imported 951,000 bbl/d of crude oil and petroleum products from Venezuela, just 8.3 percent of total American imports. Even factoring in 186,000 bbl/d of U.S. imports from the U.S. Virgin Islands, which are almost exclusively petroleum products refined from Venezuelan crude, the significance of Venezuela to the American energy sector is in decline (see chart).

In recent years, Venezuela has attempted to diversify its crude oil export destinations away from the United States. While the United States accounts for the bulk of exports, other important destinations of Venezuelan petroleum exports include the Caribbean, Asia, and Europe (see chart). One of the fastest growing destinations of Venezuelan crude oil exports has been China. In 2011, China imported 230,000 bbl/d of crude oil from Venezuela, up from only 19,000 bbl/d in 2005.

Venezuela provides a sizable amount of crude oil and refined products to its regional neighbors at below-market prices and with favorable financing terms. Under the Petrocaribe initiative, Venezuela provides crude oil and refined products to numerous countries in the Caribbean and Central America, offering favorable financing and long repayment terms that often feature barter arrangements instead of cash transactions. In addition, Venezuela has a separate supply agreement with Cuba. According to industry reports, these preferential supply agreements amount to more than 400,000 bbl/d of Venezuelan exports.



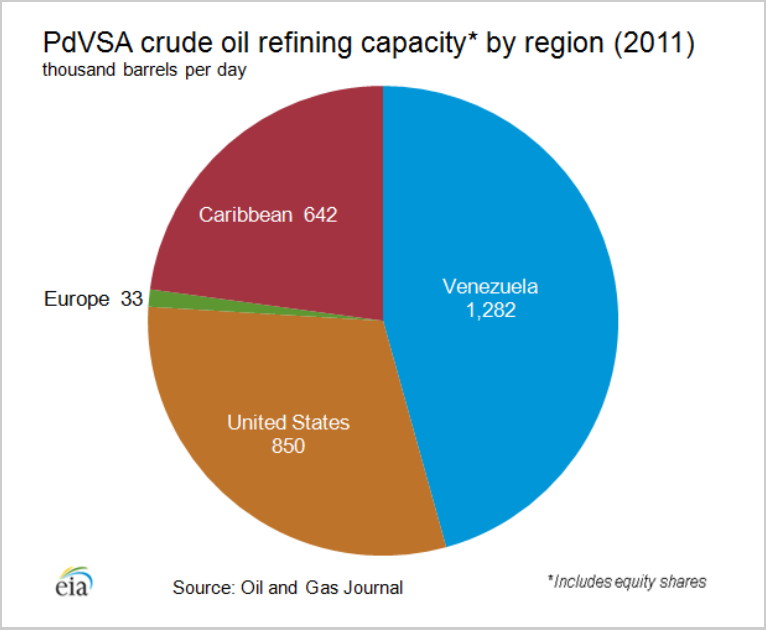


Refining

According to *OGJ*, Venezuela had 1.28 million bbl/d of crude oil refining capacity in 2012, all operated by PdVSA. The major facilities include the Paraguana Refining Center (955,000 bbl/d), Puerto de la Cruz (195,000 bbl/d), El Palito (126,900 bbl/d), and San Roque (5,200 bbl/d). Through PdVSA and its subsidiary CITGO, Venezuela also controls significant refining capacity outside of the country (see chart) giving it a total global refining capacity of 2.8 million bbl/d.

The largest share of Venezuela's global downstream operations is in the United States. CITGO, a wholly-owned subsidiary of PdVSA, operates three refineries (Lake Charles, LA; Corpus Christi, TX; Lemont, IL), with a combined crude oil distillation capacity of 755,400 bbl/d. CITGO's gulf coast refineries source most of their crude oil with PdVSA under long-term supply contracts. PdVSA also owns a 50-percent stake in the 189,000-bbl/d Chalmette facility in Louisiana.

In 2009 ConocoPhillips exercised the option to purchase PdVSA's share of their refinery in Sweeny, Texas. This move, coupled with Venezuela's sale of its equity stake in Germany's Ruhr Oel GmbH to Rosneft, constitutes a substantial contraction of Venezuela's net global capacity. Minor equity acquisitions in the Caribbean have partially offset this change. Venezuela plans to expand domestic refineries and into other global refining markets. Domestically, Venezuela plans to add a capacity of more than 400,000 bbl/d by 2020. Notable planned global refinery builds include a 400,000 bbl/d joint venture with PetroChina in Guandong province, a 300,000 bbl/d joint venture with Petroecuador in Manabi, and a 230,000 bbl/d joint venture with Petrobras in northeastern Brazil.

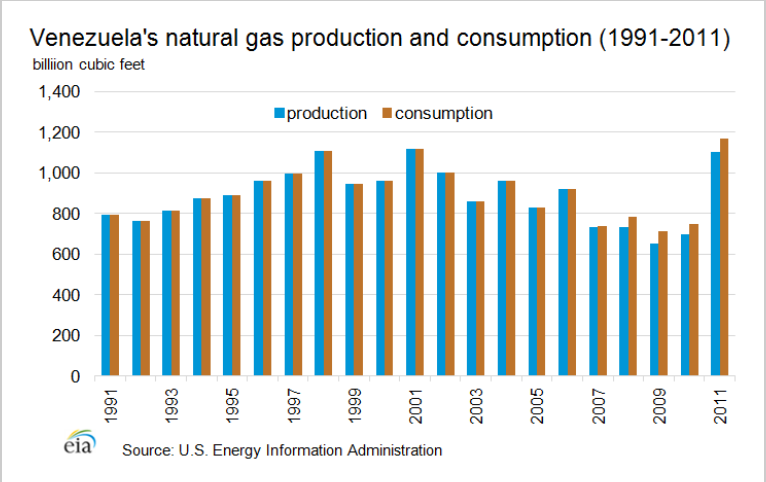


Natural gas

Venezuela has the second-largest natural gas reserves in the Western Hemisphere.

According to *OGJ*, Venezuela had 195 trillion cubic feet (Tcf) of proven natural gas reserves in 2012, the second largest in the Western Hemisphere behind the United States. In 2011, the country produced 1.1 trillion cubic feet (Tcf) of dry natural gas, while consuming nearly 1.2 Tcf (see chart).

The petroleum industry consumes the majority of Venezuela's gross natural gas production, with the largest share of that consumption in the form of gas re-injection to aid crude oil extraction. Due to the declining output of mature oil fields, natural gas use for enhanced oil recovery has increased by more than 50 percent since 2005. To meet the growing industrial demand, Venezuela imports gas from Colombia and the United States. The government has prioritized developing domestic natural gas production for not only industrial need but also for residential and commercial markets, and consequently is developing its gas infrastructure in support of this effort.



Sector organization

In 1999, Venezuela adopted the Gas Hydrocarbons Law, which was intended to diversify the economy through facilitating non-associated natural gas development and expanding the role of natural gas in Venezuela's energy sector. This legislation allows private operators to own 100 percent of non-associated projects, in contrast to the ownership rules in the oil sector. It also mandates lower royalty and income tax rates on non-associated natural gas projects compared to oil projects. The law gives PdVSA the right to purchase a 35 percent stake in any project that moves into commercial status. In 2007, Chavez announced a public referendum on proposed Constitutional amendments, one of which would entitle the state to a controlling stake in new gas projects, similar to that of the oil sector. However, the Venezuelan people defeated the referendum in December 2007. Since then, the state has yet to re-propose amendments to the gas law.

PdVSA produces the largest amount of natural gas in Venezuela, and it is also the largest natural gas distributor. A number of private companies also currently operate in Venezuela's gas sector. Participants with significant assets include Repsol-YPF, Chevron, and Statoil.

Exploration and production

An estimated 90 percent of Venezuela's natural gas reserves are associated, meaning that they are located along with oil reserves. Following Chavez's announcement of the "Socialist Gas Revolution", in 2009, the Energy and Petroleum Ministry announced plans to increase natural gas production to roughly 14 billion cubic feet per day (Bcf/d) and begin exporting by 2015. Currently, Venezuela is working to increase the production of non-associated gas, largely through the development of its offshore reserves. Onshore, PdVSA is working towards raising production and capacity at existing sites, including Anaco field, 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 Blanquilla-Tortuga areas off of Venezuela's northeast coast. Venezuela has also awarded exploratory blocks to Gazprom and Chevron to develop the potential 26 tcf gas blocks in the Gulf of Venezuela in the northwestern part of the country.

Offshore exploration has yielded numerous successful finds, including Repsol-YPF and Eni's discovery of 6-8 Tcf of recoverable natural gas in the Cardon IV block in the Gulf of Venezuela — one of the largest natural gas discoveries in the history of the country. Additionally, PdVSA had found a field with a potential 7.7 Tcf gas reserve at Tia Juana Lago in the Sur area. For Venezuela's offshore gas development to move forward in a meaningful way, international partners will need to play a central role in production. PdVSA does not have experience in producing non-associated gas — the company's most recent attempt at operating an offshore natural gas project resulted in the sinking of the Aban Pearl semi-submersible drilling rig in May 2010.

Pipelines and liquefied natural gas (LNG)

In recent years, Venezuela has improved its 2,750 mile domestic natural gas transport network to allow greater domestic utilization and movement of natural gas production with the roughly 190 mile Interconnection Centro Occidente (ICO) system. The ICO connects the eastern and western parts of the country, making natural gas more easily available for domestic consumers and for re-injection into western oil fields. Upon its expected

completion in late 2012, the ICO will have a capacity of 520 million cubic feet per day (MMcf/d). In addition, the 300 mile SinorGas pipeline project will transport gas produced offshore to the domestic pipeline network via Sucre and Anzoategui.

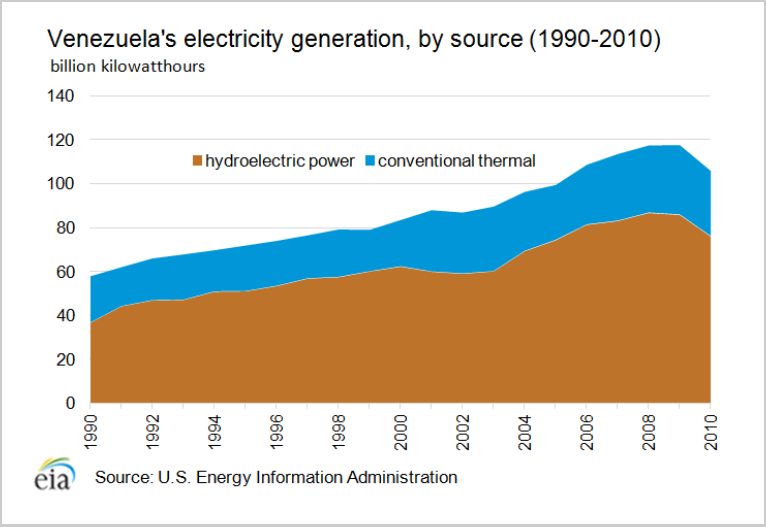
In 2008, the Antonio Ricaurte pipeline came online, connecting Venezuela with Colombia. Currently, the pipeline allows Colombia to export natural gas to Venezuela, with contracted volumes ranging between 80 and 150 MMcf/d. Current plans then call for the flow of the pipeline to be reversed, with Venezuela exporting 140 MMcf/d of natural gas to Colombia.

In September 2008, Venezuela signed initial agreements to create three joint venture companies to pursue LNG projects along the northern coast of the country. Although PdVSA signed contracts with a number of international investors for these projects, continued negotiations, difficulties, and feedstock concerns are likely to delay its 2014 start date.

Electricity

Like most South American countries, Venezuela depends upon hydroelectricity for the bulk of its electricity needs.

In 2010, Venezuela had nearly 25 gigawatts of installed generation capacity. The country generated roughly 105 billion kilowatthours of electricity in 2010, 72 percent of which was hydroelectric power. For most of the 2000s electricity consumption expanded at more than twice the rate of installed capacity, leaving the Venezuelan power grid stretched by the end of the decade. A major drought in 2009-2010 forced President Chavez to declare an "electricity emergency" and led the government to implement painful demand-reduction policies. As a result, in 2010 total electricity generation was 48% less than in 2008.



Sector organization

Large, state-owned companies dominate the electricity sector in Venezuela. The government controls the electricity sector through The National Electricity Corporation (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 around three-quarters of the country's total electricity supply.

Hydroelectricity

Hydroelectricity provides the bulk of Venezuela's electricity supply. Most of the country's hydro production facilities are located on the Caroni River in the Guayana region. The 8,900-megawatt Guri Hydroelectric Power Plant on the Caroni is one of the largest hydroelectric dams in the world and provides the majority of Venezuela's electric power. Water levels at the Guri Dam dropped to record-low levels during the 2009-2010 drought, forcing the country to implement rolling blackouts, reduce industrial production, and fine large users for excessive consumption. Venezuela plans to expand hydroelectric production in the future.

Conventional thermal

Natural gas powers around one-half of the conventional thermal electricity generation in Venezuela; fuel oil and diesel power the rest. There has been increasing investment in conventional thermal capacity as a means to reduce reliance on hydropower and utilize domestic hydrocarbon resources. PdVSA began generating power for its own consumption in 2010 to manage power-supply risks in the oil production sector. Especially in the case of conventional thermal generation from liquid fuels, expansion of conventional thermal generation capacity could further reduce Venezuela's oil exports.

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