

## COUNTRY ANALYSIS BRIEFS

# Venezuela

Last Updated: September 2006

## Background

**Venezuela contains some of the largest oil and natural gas reserves in the world. It consistently ranks as one the top suppliers of U.S. oil imports and is among the top ten crude oil producers in the world.**

After a period of modest economic growth in 2000 and 2001, the Venezuelan economy entered into recession in 2002. Political conflict, particularly a nationwide strike beginning early in December 2002, further compounded the deteriorating economic situation. On December 2, 2002, opponents of President Chavez organized a nationwide strike to call for an early referendum on the President's rule. Employees from Venezuela's state-owned oil company Petroleos de Venezuela S.A. (PdVSA) also joined the strike, shutting down a large portion of the country's oil industry and drastically reducing the production of Venezuelan oil and its delivery to internal and external markets. President Chavez declared the strikers' demands unconstitutional and dismissed nearly half of PdVSA's workforce. In 2003, the strike, along with the implementation of currency controls, severely impacted Venezuela's economy, with real gross domestic product (GDP) contracting 29 percent in the first quarter, and 9.2 percent for the entire year, after already contracting 8.9 percent in 2002.

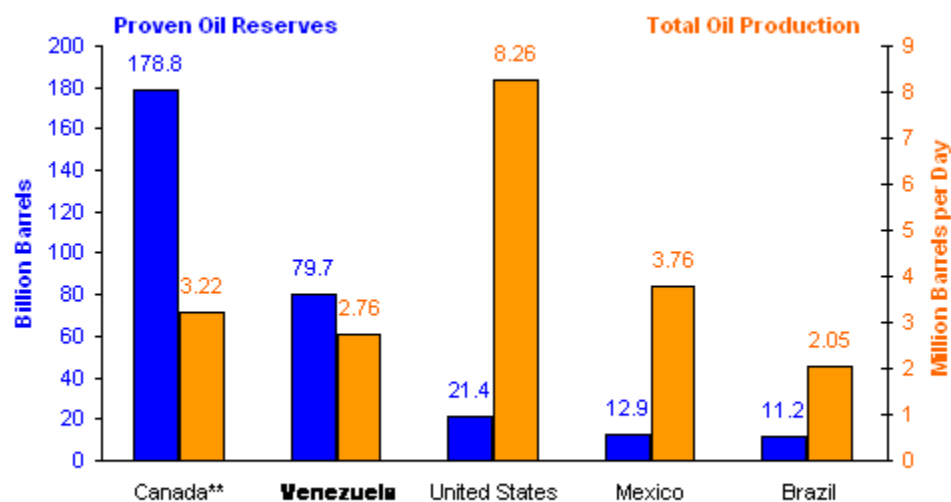


The Venezuela's economy has now almost fully recovered from the 2002-2003 period, registering real GDP growth of 17.7 percent in 2004 and 9.3 percent in 2005. High world oil prices have helped fuel Venezuela's recovery, as the petroleum industry is the mainstay of the country's economy. The oil sector accounts for more than three-quarters of total Venezuelan export revenues, about half of total government revenues, and about one-third of total GDP.

## Oil

**Venezuela was the world's eighth-largest net oil exporter in 2005.**

According to *Oil and Gas Journal* (OGJ), Venezuela had 79.7 billion barrels of proven conventional oil reserves, the largest amount in the Western Hemisphere. This estimate, however, does not include substantial extra-heavy and bitumen deposits, which could be as high as 270 billion barrels. Venezuela is a founding member of the Organization of Petroleum Exporting Countries (OPEC), and it is a significant supplier of crude oil to the world market: in 2005, Venezuela was the world's eight largest net oil exporter, and the largest net oil exporter in the Western Hemisphere.

**Western Hemisphere Proven Oil Reserves and Oil Production, 2006\***

Source: *Oil and Gas Journal*; EIA, *Short Term Energy Outlook*

\*Jan-Aug only

\*\*includes oil sands

**PdVSA is Venezuela's most important source of government revenues and export earnings.**

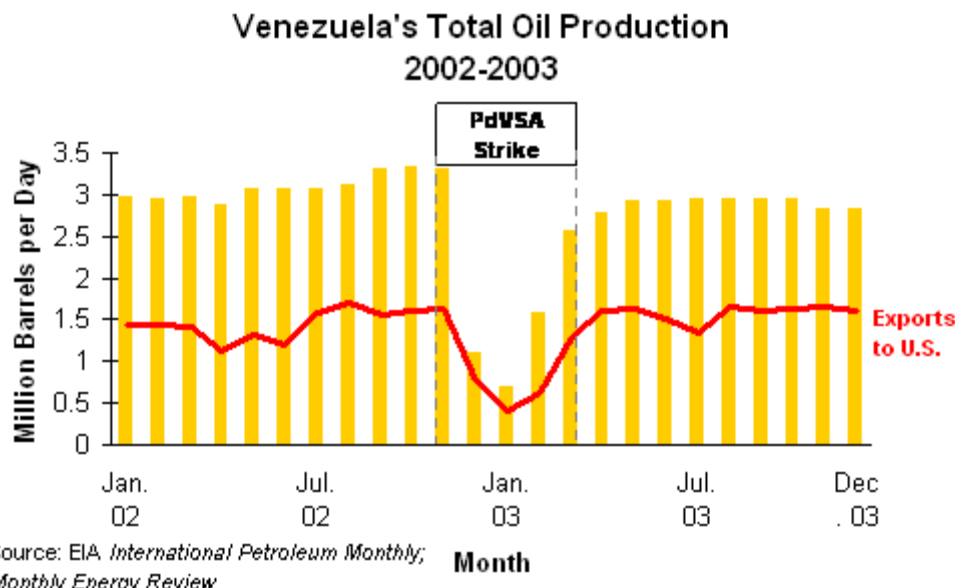
#### Sector Organization

Venezuela nationalized its oil industry in 1975-1976, 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 about one-third of the country's GDP, 50 percent of the government's revenue and 80 percent of Venezuela's exports earnings. In recent years, under the influence of President Chavez, the Venezuelan government has reduced PdVSA's previous autonomy and amended the rules regulating the country's hydrocarbons sector. An example of this trend is the November 2004 appointment of Rafael Rodriguez, Chavez's energy minister, as chairman of PdVSA.

Nearly one-half of PdVSA's employees walked off the job on December 2, 2002 in protest against the rule of President Chavez. The strike severely impacted PdVSA, practically bringing all the company's operations to a halt. Venezuela's national oil production dropped from 3.3 million bbl/d in November 2002 to 700,000 bbl/d in January 2003, almost all of which represented foreign operators in the country. Since the strike ended in early 2003, there has been significant progress in restoring production. However, industry analysts speculate that the strike did permanent damage to PdVSA's production capacity. PdVSA fired 18,000 workers following the strike, draining the company of technical knowledge and expertise. Some analysts have pointed out that the government's hurried restoration of PdVSA's production may have caused reservoir damage, potentially accelerating the rate of decline in those fields in coming years.

#### Investment in Maintaining/Expanding Production

PdVSA has stated that it will invest \$26 billion in expanding hydrocarbon reserves and production between 2004-2009, with the goal of increasing national oil production to at least 5 million bbl/d. Industry analysts estimate that PdVSA must spend some \$3 billion each year just to maintain production levels at existing fields, as many of these fields suffer annual decline rates of 25 percent. Affecting PdVSA's ability to meet its investment goals are the increasing demands placed upon its finances by the Venezuelan government. In 2004, the Venezuelan government established a special development fund to finance infrastructure projects throughout the country; PdVSA will supply billions of dollars per year directly to this fund, bypassing the Venezuelan Central Bank. Further, government plans have the company spending an additional \$2-3 billion per year on additional social programs. The effect of these new funding priorities has been significant, with PdVSA now spending more per year on social programs than investments into maintaining and expanding its oil production capacity.



Along with these directly-administered programs, PdVSA pays billions of dollars each year to the Venezuelan government in the form of income taxes and royalties. Finally, because of the numerous international agreements between Venezuela and its neighbors (see below), PdVSA is selling significant amounts of oil below market value, further eroding its available cash flow. It is unclear how the company will be able to afford its ambitious investment plans and continue to meet government financial demands, though PdVSA officials have mentioned that the company might increase its international borrowing.

**Venezuela opened its  
oil sector to foreign  
operators in the  
1990s.**

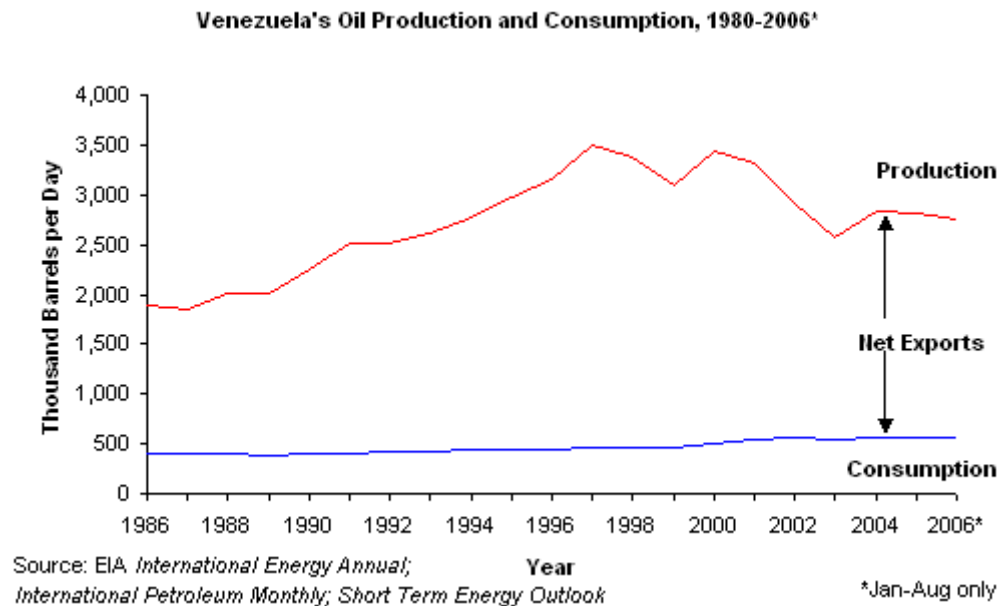
**Foreign Operators**

In the 1990s, Venezuela opened its upstream oil sector to private investment. This collection of policies, called *apertura*, facilitated the creation of 32 operating service agreements (OSA) with 22 separate foreign oil companies, including international oil majors like Chevron, BP, Total, and Repsol-YPF. Under these contracts, companies operated oil fields, and PdVSA paid these companies a fee and purchased the produced crude at a price pegged to market rates. PdVSA also offered eight blocks under risk/profit sharing agreements (RPSA), under which PdVSA had an option to purchase up to a 35 percent equity stake in the project, if the foreign operator discovered commercial quantities of oil in the exploration phase. Finally, PdVSA holds shares in four "strategic associations" that produce extra-heavy crude, for eventual upgrading to syncrude (see below for more details).

In 2001, Venezuela passed a new Hydrocarbons Law that superseded the previous 1943 Hydrocarbons Law and 1975 Nationalization Law. Under the 2001 law, royalties paid by private companies increased from 1-17 percent to 20-30 percent. Further, the law guarantees PdVSA a majority share of any new projects. Finally, the law stipulates that all future foreign investment would be in the form of joint ventures (JV) with PdVSA, rather than the aforementioned OSA, RPSA, or strategic associations. In August 2003, Venezuela's Ministry of Energy and Mines (MEM) transferred PdVSA's 33 operating contracts, the four strategic associations, and the risk exploration contracts to subsidiary Corporacion Venezolana de Petroleo (CVP). Rafael Ramirez later announced that the Energy Ministry would introduce legislation by the end of 2006 that would further increase the royalty and income tax rates on the four strategic associations to 33.3 percent and 50 percent, respectively.

The Venezuelan government began in 2005 to put into practice the changes embodied in the 2001 law. MEM announced in April 2005 that foreign operators would be required to convert all OSA projects to new JV agreements, including the higher royalty, tax rates, and level of PdVSA ownership stipulated by the 2001 law. By April 2006, the Venezuelan government had signed deals to transition the 32 OSA contracts to the new JV structure. In 2006, it began to formally establish these new JV companies, with CVP having a 60 percent stake in most of the new companies. For example, in August 2006, CVP signed two deals with BP, creating JV companies called Boqueron and Petroperija to operate the Boqueron (7,500 bbl/d) and DZO (12,000 bbl/d) fields, respectively, in Zulia state. One additional effect of this change in contract terms is the

status of the oil reserves held by the JV companies; according to a statement by Rafael Ramirez in early 2006, foreign oil companies will not be able to book, for accounting purposes, those oil reserves held by the JV companies.



The contractual transitions in late 2005-early 2006 focused on the old OSA contracts. However, the 2001 Hydrocarbons Law also brought into question the status of the four strategic associations. In May 2006, the Congress passed a measure recommending that the Venezuelan government take a majority share in the strategic associations. However, there are concerns about the feasibility of Venezuela's takeover of the strategic associations. For example, the four projects have an estimated \$6 billion in debt held by private investors, which the Venezuelan government would have to assume. In addition, the Venezuelan government would become responsible for a larger share of the capital expenditure budgets of the four projects, a funding obligation that would compete with other spending priorities.

As well as changing the current nature of foreign participation in its oil sector, Venezuela has begun a campaign to collect taxes retroactively on foreign operators. According to Semit, the Venezuelan tax agency, foreign oil companies owe \$4 billion in back taxes through 2001, the farthest date in the past that Venezuelan law authorizes Semit to collect taxes. When Venezuela authorized the OSA projects in the 1990s, it classified the foreign operators as "contracted help," therefore eligible for a 34 percent income tax rate, rather than the 50 percent income tax rate levied on oil operations. Semit announced in 2005 that this original classification was illegal, therefore OSA operators owned some \$3 billion in back taxes. In a similar vein, Semit claimed that foreign partners in the strategic associations owed \$1 billion in back taxes. The Semit campaign against oil operators was part of a larger, economy-wide effort by the agency to increase tax collection rates in the country.

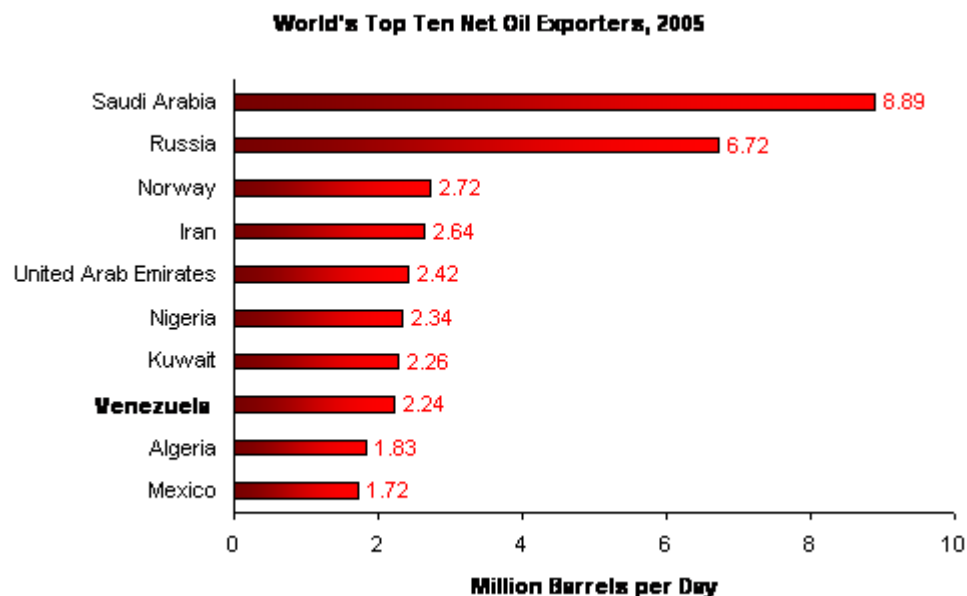
It is unclear how these recent events will influence foreign investment in Venezuela's oil sector. For example, while the foreign companies taking part in the strategic associations disputed the legality of the royalty hike, they acquiesced to the government's demands: in light of the increasing efficiency of the projects and prevailing high world oil prices, the hike will likely only have a small impact on the profitability of their operations. Further, OSA participants complained that the new JV structure and higher tax and royalty rates would make their projects unprofitable. However, all 22 companies operating OSA projects agreed to pay at least part of the back taxes demanded by Semit and as of August 2006, 13 former OSA participants had fully completed the transition to the new JV structures.

**In general, PdVSA is directly responsible for 50-60 percent of Venezuela's national oil production.**

#### **Exploration and Production**

Venezuela's actual level of crude oil production is difficult to determine, with the country and independent industry analysts offering differing estimates. According to statements by the Venezuelan government, the country currently produces 3.3 million bbl/d of oil. On the other

hand, most industry analysts and EIA estimate that the country currently produces 2.8-2.9 million bbl/d of oil. These estimates conclude that the country has not fully recovered from the strikes of 2002-2003 and that secondary indicators, such as economic data from Venezuela's central bank, support a lower production figure. Another factor that complicates comparisons of Venezuelan oil production estimates are methodological and classification issues. For example, EIA estimates that, of Venezuela's 2.8 million bbl/d of oil production, 2.5 million bbl/d is crude oil and 300,000 bbl/d is condensate, natural gas liquids (NGL), and Orimulsion (see below). On the other hand, it is unclear what "other liquids" are included in the official estimates of 3.3 million bbl/d of oil production. Another methodological issue is the measuring of crude oil production by the four extra-heavy strategic associations (see below). Some analysts count the extra-heavy oil produced by the associations as part of Venezuela's crude oil production. Others (including EIA) count the upgraded syncrude produced by the four as part of Venezuela's crude oil production, which is about 10 percent lower than the volume of the original extra-heavy feedstock.



In the past, Venezuela regularly exceeded its OPEC crude oil production quota. However, since his election in 1998, President Chavez has maintained a policy of strong adherence to the country's quota, seeking to increase oil revenues through higher world oil prices rather than increased production. In order to meet its quota obligations, Venezuela has occasionally shut-in some production and delayed bringing new capacity online. Most independent analysts believe, though, that Venezuela is currently producing well below its current (July 2005) quota of 3.22 million bbl/d of crude oil.

#### *PdVSA*

It is difficult to assess how much oil PdVSA actually produces, due to the issues discussed above. Independent analysts estimate that the company produces around 1.6 million bbl/d of crude oil, or around 60 percent of Venezuela's total crude oil production (Note: this estimate includes 100,000 bbl/d of crude oil production capacity that was formerly held by OSA operators, but is now operated directly by PdVSA). This represents a decrease of 30 percent below independent estimates of pre-strike PdVSA crude oil production of 2.2 million bbl/d. On the other hand, PdVSA executives maintain that the company has fully revoked from the strike and currently produces at least 2.2 million bbl/d.

Venezuela has four major sedimentary basins: Maracaibo, Falcon, Apure, and Oriental. The crude oil held in these fields has an average API gravity of less than 20°, making Venezuela's conventional crude oil heavy by international standards. As a result, much of Venezuela's oil production must go to specialized domestic and international refineries. The Maracaibo basin contains slightly less than half of PdVSA's oil production. The fields in this area are very mature, requiring heavy investment to maintain current capacity. Centers of production in the area include Tomoporo, Lagunillas, and Tiajuana. In late 2004, PdVSA completed an expansion project at the

Tomoporo field that increased production to 116,000 bbl/d from 100,000 bbl/d. PdVSA stated that Tomoporo contains over one billion barrels of recoverable reserves, and the company hopes that future expansion will increase production at the field to 250,000 bbl/d by 2008. Adjacent to Tomoporo, PdVSA is also conducting exploratory operations in the Franquera field, which it believes contains 500 million barrels of reserves. PdVSA hopes to increase production from the Tiajuana field from its current 312,000 bbl/d to 527,000 bbl/d by 2012. In order to mitigate steep decline rates in the Maracaibo Basin, PdVSA re-injects natural gas into the reservoirs in order to increase pressure.

In general, the fields in the Oriental basin are less mature than those in the west, and they were some of the first fields brought online after the 2002-2003 strike. In November 2004, the company announced that it had discovered sizable deposits of medium crude oil in the Travis field, also in Monagas state.

#### *Joint Ventures and Operating Service Agreements*

As mentioned above, Venezuela is in the process of converting the former OSA contracts into new JV companies (see above). The agreements cover some 32, mostly marginal fields operated by 22 foreign and domestic companies. According to industry estimates, these fields produced around 600,000 bbl/d of crude oil prior to the JV conversion. However, as part of the transition to the new JV structure, PdVSA assumed 100,000 bbl/d of production capacity formerly operated by OSAs, leaving current estimates of total JV production at around 400,000 bbl/d.

#### *Risk/Profit Sharing Agreements (RPSA)*

Of the eight RPSA contracts originally awarded by PdVSA, three resulted in the discovery of significant amounts of oil reserves: La Ceiba, Golfo de Paria Este and Golfo de Paria Oeste (West). ConocoPhillips plans to bring the 55,000-bbl/d Corocoro field onstream, along with equity partners PdVSA (35 percent) and Eni (26 percent). First production from the project will likely occur in early 2007. ConocoPhillips is also actively exploring in its Golfo de Paria Este block.

#### *Strategic Associations*

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. Estimates of the recoverable reserves from the Orinoco Belt range from 100 to 270 billion barrels. PdVSA has established four strategic associations to exploit these resources. The strategic associations convert the extra heavy crude and bitumen from approximately 9° API to lighter, sweeter crude, known as syncrude, at the Jose refinery complex on Venezuela's northern coast. According to industry estimates, the four projects currently produce a combined 580,000 bbl/d of syncrude (see table).

Venezuela plans to aggressively develop the Orinoco Belt oil resources in the coming years. PdVSA has begun a reserves certification program to increase the amount of proven oil reserves held by the country. The program, dubbed "Magna Reserva," includes seismic studies conducted by their company and several foreign partners in 27 blocks, and it is the first step towards more aggressive development of the Orinoco Belt reserves: companies that participate in the Magna Reserva will be the first considered for new upstream developments. PdVSA has teamed almost exclusively with foreign national oil companies for the program, including Petrobras (Brazil), Petropars (Iran), CNPC (China), and ONGC (India).

The certification program has begun to yield some concrete project proposals. In 2006, Petrobras and PdVSA established a joint venture to develop the Carabobo I block, which Petrobras is exploring as part of the Magna Reserva program. The project would initially produce 20,000 bbl/d of extra-heavy crude oil, peaking at 200,000 bbl/d. An offsite upgrader would further process the crude oil into lighter syncrude. Initial plans for the \$4 billion project include first production by the end of 2008.

Despite the controversy over back taxes or the increased royalty rate on syncrude projects (see above), existing Orinoco operators are also showing interest in expanding their projects in the area. ConocoPhillips began an aggressive drilling campaign at its Petrozuata project in 2006, aiming to increase extra-heavy crude oil production to 145,000 bbl/d. Chevron, operator of the Hamaca project, signed a letter of intent with PdVSA in April 2005 to invest \$6 billion in a new syncrude project, with potential output of 200,000-400,000 bbl/d. Total and PdVSA began negotiations in March 2005 on a plan to build a \$5 billion second phase of the Sincor project. Any new syncrude project would fall under Venezuela's 2001 Hydrocarbons Law, rather than the existing agreements, meaning higher royalty rates and requirements for PdVSA majority ownership of any new developments.

<i>Orinoco Belt Strategic Associations</i>				
<b>Project Name (New Name)</b>	<b>Petrozuata (Junin)</b>	<b>Cerro Negro (Carabobo)</b>	<b>Sincor (Boyaca)</b>	<b>Hamaca (Ayacucho)</b>
<b>Partners (percent)</b>	PdVSA (49.9), ConocoPhillips (50.1)	PdVSA (41.67), ExxonMobil (41.67), BP (16.66)	PdVSA (38), Total (47), Statoil (15)	PdVSA (30), ConocoPhillips (40), Chevron (30)
<b>Startup Date</b>	October 1998	November 1999	December 2000	October 2001
<b>Extra-Heavy Crude Production (bbl/d; API)</b>	120,000; 9.3°	120,000; 8.5°	200,000; 8- 8.5°	200,000; 8.7°
<b>Syncrude Production (bbl/d; API)</b>	104,000; 19-25°	105,000; 16°	180,000; 32°	190,000; 26°

#### *Orimulsion*

Orimulsion® is a patented product developed by PdVSA for use as a boiler fuel. PdVSA markets Orimulsion as an alternative to coal or fuel oil, especially in power plants. It is a mixture of approximately 70 percent natural bitumen, 30 percent water, and less than 1 percent surfactants (emulsifiers). Bitumen is a non-oil hydrocarbon and not counted towards Venezuela's OPEC crude oil production quota.

The future of Orimulsion production is unclear. In 2005, PdVSA announced that it would cease Orimulsion production and close its sole production facility in Cerro Negro. According to the company, high world oil prices meant that it was more profitable to sell Orimulsion feedstock directly. However, in 2006, PdVSA and CNPC inaugurated the new Sinovensa project, which will supply two power plants in China and meet some of PdVSA's Orimulsion supply commitments. Sinovensa currently produces 80,000 bbl/d of Orimulsion, eventually peaking at 125,000 bbl/d.

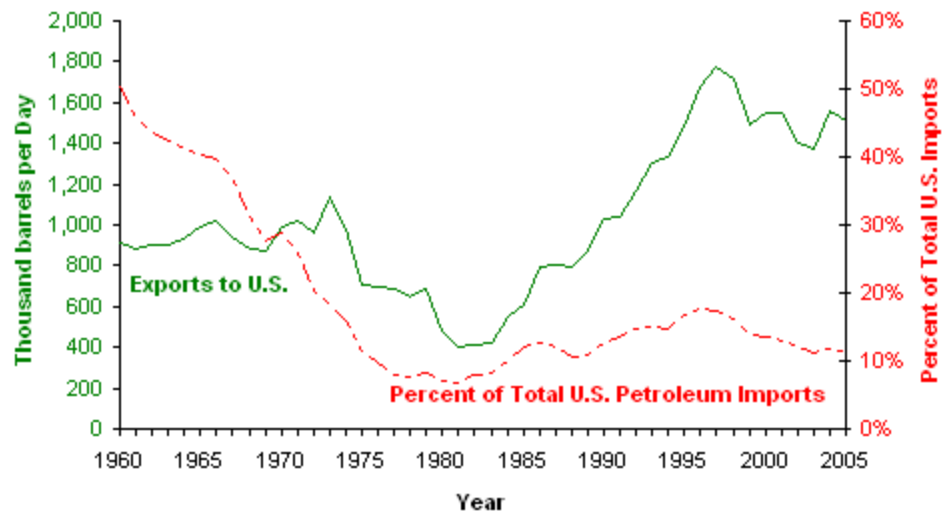
**Venezuela  
consistently ranks as  
one of the top four  
sources of U.S. oil  
imports.**

#### **Exports**

The United States is the largest destination of Venezuela's petroleum exports. During the first half of 2006, Venezuela exported 1.45 million bbl/d of crude oil and petroleum products to the United States, 8 percent lower than the same period last year. Over the long term, Venezuela's exports to the United States have increased, but its share of U.S. total imports has fallen from 50 percent in 1960 to 11 percent in 2005. The U.S. Gulf Coast is the largest recipient of these imports, with refineries there specifically configured to handle Venezuelan crude varieties.

Besides the United States, other important destinations of Venezuelan petroleum exports include South America, Europe, and the Caribbean, though much of the crude oil that is exported to the Caribbean is later re-exported as petroleum products to the United States. One of the fastest growing destinations of Venezuelan crude oil exports has been China. FACTS reported that China imported 69,600 bbl/d of crude oil from Venezuela during the first half of 2006, up from 27,500 bbl/d during the same period in 2005. Venezuelan petroleum product exports to China are also increasing, especially fuel oil and Orimulsion from the Sinovensa facility (see above). In recent years, Venezuela has prioritized the diversification of its petroleum export destinations away from the United States, but the U.S. market will likely still remain Venezuela's most important market for the foreseeable future.

### Venezuelan Petroleum Exports to the United States, 1960-2005



Source: EIA *Annual Energy Review*

#### *Discounted Oil Programs*

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 auspices of the San Jose Accord, Venezuela and Mexico provide eleven Central American and Caribbean nations (Barbados, Belize, Costa Rica, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Nicaragua, Panama and the Dominican Republic) with crude oil and products under preferential terms. Venezuela also has additional bilateral agreements with Cuba and Jamaica, sending those countries 92,000 bbl/d and 21,000 bbl/d, respectively, of crude oil and petroleum products under favorable terms.

In late 2005, Venezuela and thirteen Caribbean countries signed the PetroCaribe agreement. Designed to complement the existing San Jose Accord, PetroCaribe will provide 72,000 bbl/d of discounted crude oil and refined products to the region. PetroCaribe allows the importing countries to pay for a portion of the oil imports with long-term, low-interest loans or barter oil for goods such as foodstuffs. There have been some logistical difficulties in the implementation of PetroCaribe, and it is difficult to assess how much oil Venezuela actually provides to these countries.

Venezuela has also targeted bilateral deals towards South America. In 2005, PdVSA signed deals with Paraguay and Uruguay to supply discounted petroleum products and work to upgrade the countries' refineries to process Venezuelan crude varieties. In August 2005, Venezuela agreed to provide Ecuador with a temporary crude oil loan to help the country through a disruption to its production facilities.

#### **Pipelines**

Venezuela has an extensive domestic oil pipeline system, providing transportation from production centers to refineries and coastal export terminals. Currently, the country does not have any export pipelines, but there has been some discussion about constructing an oil pipeline to port in Colombia along the Pacific Ocean. This would facilitate greater Venezuelan crude exports to Asia, bypassing the Panama Canal bottleneck or the high costs of shipping around Cape Horn. There has been some discussion of Chinese oil firms providing financing for such a pipeline, but no solid plans have yet emerged.

***PdVSA operates one of the largest refining networks in the Western Hemisphere.***

#### **Refining**

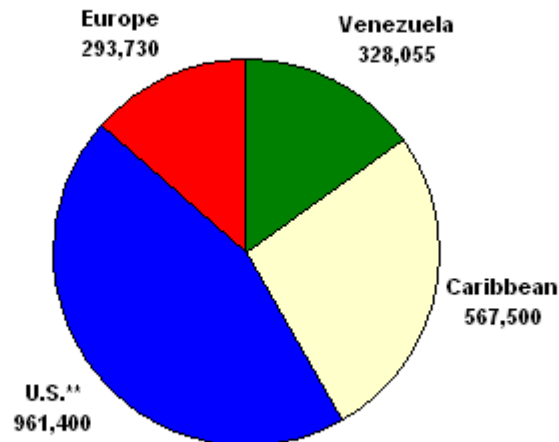
According to OGJ, Venezuela has 1.28 million barrels per day (bbl/d) of crude oil refining capacity, all operated by PdVSA. The major facilities include the Paraguana Refining Center (955,000 bbl/d), Puerto de la Cruz (195,000 bbl/d), and El Palito (126,900 bbl/d). PdVSA announced in August 2005 that it would spend \$5 billion to build three new refineries in Venezuela and upgrade two existing facilities, El Palito and Puerto la Cruz.



### CITGO

CITGO is a wholly-owned subsidiary of PdVSA that has some 14,000 branded retail outlets (both directly owned and affiliates) in the United States. CITGO operates three product refineries (Lake Charles, LA; Corpus Christi, TX; Lemont, IL), with a combined crude oil distillation capacity of 755,400 bbl/d. The company also holds a 50 percent stake in Lyondell's Houston, TX refinery, though Lyondell announced in August 2006 that it will be buying CITGO's stake for \$2 billion. Finally, CITGO operates two asphalt refineries (Paulsboro, NJ; Savannah, GA), which it has been trying to sell. CITGO sources most of its crude oil under long-term contracts with PdVSA, though the Lemont facility receives most of its feedstock from Canada. Besides its holding through CITGO, PdVSA also owns shares in some U.S. crude oil refining capacity directly, including a 50 percent stake in the Chalmette facility in Louisiana and certain units at ConocoPhillips' Sweeny, Texas refinery.

**PdVSA's Crude Oil Refining Capacity<sup>a</sup>, by Region, 2006**  
(thousand barrels per day)



<sup>a</sup>Includes direct operatorship and equity stakes

\*\*Reflects sale of share in Lyondell refinery

Source: PdVSA, CITGO, *Oil and Gas Journal*

### Caribbean/South America

In October 1998, PdVSA acquired a 50 percent equity interest in the Hovensa refinery, located in St. Croix, U.S. Virgin Islands. Amerada Hess holds the other 50 percent interest in the refinery, which had a capacity of 495,000 bbl/d in 2006. In the Netherlands Antilles, PdVSA leases the 320,000-bbl/d Emmastad refinery on the island of Curacao. Most of the products produced by these refineries are exported to the U.S.

PdVSA has looked toward South America to further increase its regional refining capacity. In February 2005, PdVSA signed an agreement with Petrobras to build a new, 200,000-bbl/d refinery in the northeastern Brazilian state of Pernambuco at a cost of \$2.5 billion. The two hope to bring the facility online by 2011. In August 2006, Petrobras began preparing an environmental impact statement for the project.

### Europe

PdVSA participates in two joint refining ventures in Europe, with the company controlling 294,000 bbl/d of refining capacity in the region. PdVSA holds a 50 percent stake in AB Nynas, a Swedish company that operates five refineries: Nynashamm (Sweden), Gothenburg (Sweden), Antwerp (Belgium), Eastham (England), and Dundee (Scotland); PdVSA's share of this capacity is 50,500 bbl/d. PdVSA also holds a 50 percent stake in Ruhr Oel, in partnership with BP. Ruhr Oel holds ownership stakes in five German refineries, Gelsenkirchen, Neustad, Karlsruhe, and Schwedt, with PdVSA's share of this capacity at 243,000 bbl/d. Since December 2003, PdVSA has sought a buyer for its stake in Ruhr Oel. Most recently, it has negotiated with Lukoil about purchasing the stake, though BP holds the right of first refusal.

## Natural Gas

**Venezuela has the second-largest**

According to *Oil and Gas Journal*, Venezuela had 151 trillion cubic feet (Tcf) of proven natural gas reserves, the second largest in the Western Hemisphere behind the United States. In 2004, the

**natural gas reserves in the Western Hemisphere, of which 90 percent are associated.**

country produced 961 billion cubic feet (Bcf) of natural gas, while consuming the same amount. Crude oil production constrains natural gas production in Venezuela, as an estimated 90 percent of gas resources are associated.

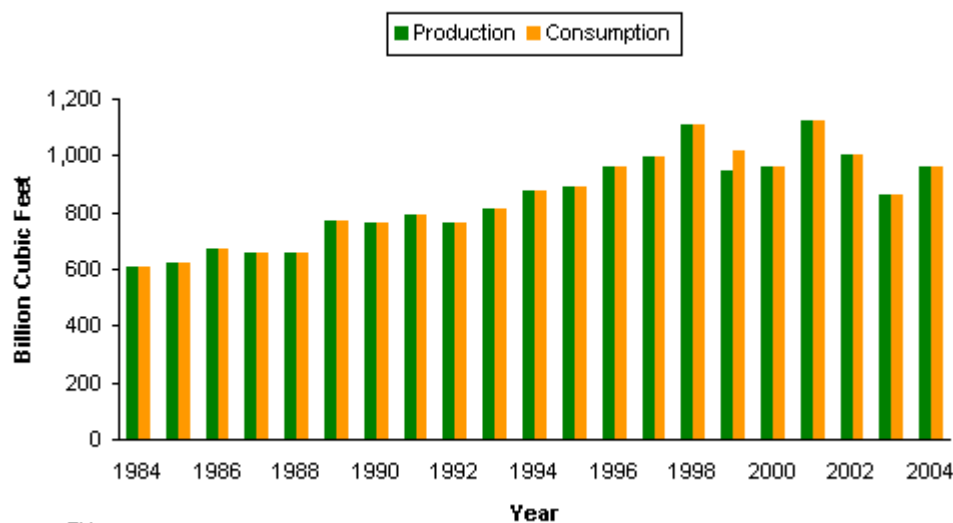
According to Enagas, the principle government agency charged with regulating the natural gas sector, the petroleum industry consumes over 70 percent of Venezuela's natural gas production, with the largest share of that consumption in the form of re-injection to aid crude oil extraction. Indeed, a shortage of natural gas in western Venezuela is one cause for declining crude oil production there, with Venezuela exploring imports from Colombia as a possible remedy (see below).

### Sector Organization

**The 1999 Gas Hydrocarbons Law allows foreign investors to own 100 percent of non-associated natural gas projects.**

PdVSA has traditionally monopolized Venezuelan natural gas production. However, in the late 1990s, the Venezuelan government began to emphasize the opening and development of the natural gas sector. In 1999, the country adopted the Gas Hydrocarbons Law, which opened all aspects of the sector to private investment. The goals of the law included the development of natural gas resources, especially non-associated fields; expansion of domestic natural gas transport network and creation of a general distribution system; promotion of natural gas export projects; and increased consumption of natural gas by the power and petrochemical industries.

**Venezuela's Natural Gas Production and Consumption, 1984-2004**



Source: EIA

The Gas Hydrocarbons Law also allowed private operators to own 100 percent of non-associated projects, a sharp contrast to the ownership rules in the oil sector. Furthermore, royalty and income tax rates on non-associated natural gas projects are much lower than corresponding rates for oil projects.

### Exploration and Production

In June 2001, PdVSA held its first non-associated natural gas licensing round for 11 exploration blocks, of which it awarded six. A consortium led by Total won the Yuca Placer Norte and Sur blocks, with other blocks awarded to Repsol-YPF, Pluspetrol, and Petrobras. In April 2004, Total began first production in the Yuca Placer blocks, with an initial output of 100 million cubic feet per day (MMcf/d). Through later stages of the project, Total planned to bring output up to 300 MMcf/d. The Yuca Placer blocks contain an estimated 1-2 Tcf of natural gas reserves.

Repsol-YPF is the largest private natural gas producer in Venezuela, with 2005 production of 337 MMcf/d. In September 2005, Repsol-YPF began production from the first stage of its Barrancas Block project, which contains an estimated 2-6 Tcf of natural gas reserves. The project integrates natural gas production and an 80-megawatt (MW) power station in Portuguesa. Repsol-YPF plans to later develop a second stage of the project, consisting of a 450-MW power plant in Obispos.

### *Plataforma Deltana*

PdVSA awarded exploration blocks to Chevron and Statoil in 2003 in the Plataforma Deltana area, located off Venezuela's northeast coast adjacent to the country's maritime boundary with Trinidad and Tobago. PdVSA estimates that Plataforma Deltana contains 40 Tcf of natural gas reserves. Chevron began exploration in 2004 of the Loran field (Block 2), drilling three wells. The company also announced in June 2005 that it had drilled a successful exploratory well in its adjacent Lau-Lau field (Block 3) that tested at 51 Mmcf/d. Statoil holds the exploration license for the Cocuina field (Block 4). The company began drilling in 2005, however, due to safety concerns about the drilling equipment, it ceased its drilling program until August 2006. PdVSA has had difficulty attracting interest in the remaining two blocks of Plataforma Deltana. It has twice offered Block 5, with no takers. The company has been in negotiations with BP over Block 1, also known as El Dorado, but there have been no firm commitments; in August 2006, PdVSA announced that it would develop Block 1 itself, without an international partner.

Greater development of Plataforma Deltana will likely depend upon cooperation with Trinidad and Tobago, which already has sizable production activities in its adjacent territorial waters. Venezuela and Trinidad and Tobago began negotiations in 2004 to delineate cross-border reserves, and these negotiations continued in 2006. The two countries have also discussed the idea of exporting Venezuelan natural gas via Trinidad and Tobago's Atlantic LNG facility (see [Caribbean Regional Analysis Brief](#) for more info), but there has not been any concrete work in this regard.

<i>Status of Major Venezuelan Natural Gas Projects</i>			
<b>Name</b>	<b>Operator</b>	<b>Status</b>	<b>Notes</b>
Yucal Placer	Total	Producing 100 Mmcf/d	Planned expansion to 300 Mmcf/d
Barrancas	Repsol-YPF	Producing 20 Mmcf/d; expansion planned	Integrated with power plant.
Loran	Chevron	Exploration	Part of Plataforma Deltana
Lau-Lau	Chevron	Successful exploratory well in June 2005	Part of Plataforma Deltana
Cocuina	Statoil	Exploratory drilling resumed in August 2006.	Part of Plataforma Deltana
Mariscal Sucre	PdVSA	Development	Might incorporate an LNG export terminal

### *Latest Licensing Rounds*

#### ***Venezuela launched its latest natural gas licensing round in late 2006.***

Venezuela held a natural gas licensing round in 2005. The round, dubbed the Rafael Urdaneta project, covered offshore acreage in the Gulf of Venezuela adjacent to Falcon state, with estimated reserves of 25 Tcf. In the first phase of the bidding round, Venezuela awarded Russia's Gazprom two blocks, Urumaco I and Urumaco II, while it awarded the Cardon III block to Chevron. In the second phase, Repsol-YPF and Italy's Eni won the Cardon IV block, Petrobras and Japan's Teikoku won the Moruy II block, and Vinccler Oil and Gas (subsidiary of Canada's PetroFalcon) won the Castilletes NE II block (Venezuela later cancelled the award of Castilletes NE II to Vinccler and refunded the company's \$7 million bid). Two additional blocks, Cardon II and Urumaco III, were not awarded during the round, though PdVSA later signed a memorandum of understanding with Iran's Petropars in August 2006 to jointly develop Cardon II.

Venezuela launched its latest natural gas bidding round in August 2006. The round includes three exploration blocks near La Blanquilla island and another near La Pescadora, containing estimated reserves of 7.0 Tcf. According to PdVSA, it would take a 70 percent ownership stake in the Blanquilla A block and a 35 percent stake in the rest.

### **Pipelines**

#### *Domestic System*

A lack of adequate domestic natural gas transport and distribution infrastructure has prevented Venezuela from fully exploiting its gas resources. In March 2004, PdVSA awarded three contracts to domestic companies for construction of the Central-Occidental Interconnection (ICO) pipeline. The 250-mile ICO will connect Venezuela's natural gas transport systems in the central and western parts of the country, supplying larger volumes of natural gas to western Venezuela for re-

injection into oil fields. According to PdVSA, the first stage of the project, a connection between the natural gas fields in Falcon state and the Paraguana refining complex, came onstream in December 2005 and will eventually delivering 40-100 Mmcf/d. The second stage will connect the existing Ule-Amuay and Anaco-Barquisimeto pipelines. PdVSA plans to utilize most of the capacity of the ICO for enhanced oil recovery in aging western oilfields.

#### *International Connections*

In July 2006, construction began on a natural gas pipeline linking Colombia with Venezuela. The 130-mile, 150-Mmcf/d system will connect Colombian natural gas production in Punta Ballenas with oil production facilities in the Lake Maracaibo area. Initially, the pipeline will supply Venezuela with additional natural gas supplies for enhanced oil recovery, but Venezuela eventually plans to reverse the flow of the pipeline once it has further developed its own domestic natural gas reserves. Once reversed, the countries have floated the idea of eventually extending the system to Central America via Panama.

In December 2005, Argentina, Brazil, and Venezuela signed an accord to begin a feasibility study for a 5,000-mile natural gas pipeline system linking the three countries, called the Gasoducto del Sur. The plan would cost an estimated \$20 billion and also incorporate Uruguay, Paraguay, and Bolivia. The plan, however, has not moved beyond the planning stages: factors that could undermine the project's feasibility include its high cost, disagreements about pricing, and questions about the availability of Venezuelan natural gas production to supply the system.

#### **Liquefied Natural Gas (LNG)**

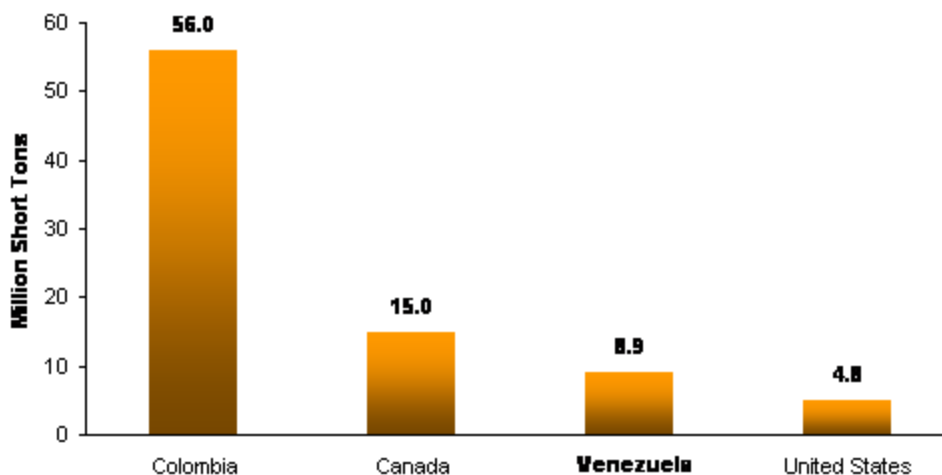
In December 2002, PdVSA, Royal Dutch Shell, and Mitsubishi signed a preliminary agreement to develop the Mariscal Sucre LNG project, located on the Paria peninsula in northeastern Venezuela. However, in August 2005, PdVSA announced that it would develop Mariscal Sucre itself and, for the time being, not go forward with the LNG export terminal. PdVSA will initially develop the offshore Rio Caribe and Mejillones fields for the domestic market. However, PdVSA maintains that there are sufficient natural gas reserves to support an LNG export terminal in later stages, incorporating the nearby Patao and Dragon fields. Any such terminal, though, would likely not start operations before 2010.

## **Coal**

***Venezuela exports almost all of its coal production.***

Venezuela has recoverable coal reserves of approximately 528 million short tons (Mmst), most of which is bituminous. The country produced 8.96 Mmst of coal in 2004, while consuming only 0.01 Mmst. While Venezuela's coal production is relatively low, it is the third-largest net coal exporter in the Western Hemisphere due to its low domestic consumption. Most coal exports go to other countries in Latin America, but sizable amounts also go to the eastern United States and Europe.

**Top Net Coal Exporters in the Western Hemisphere, 2004**



Source: EIA, *International Energy Annual*

Venezuela's coal sector is dominated by Carbozulia. Formerly a subsidiary of PdVSA, Carbozulia is now controlled by Venezuela's state development agency, Corpozulia. Two of the largest coal mines in Venezuela are Gusare and Guajira: Gusare is a joint venture of Corpozulia, Peabody Energy, and Anglo American, while Guajira is a joint venture of Carbozulia and Interamerican Coal Holding.

Coal production has been limited during the last several years by infrastructure and transportation constraints, but there are plans for additional infrastructure investments to remove these obstacles. In 2005, Carbozulia formed a joint venture with Brazilian coal mining firm Companhia Vale do Rio Doce, dubbed Carosuramerica, to expand coal production in Venezuela to 10 Mmst by 2015. The plans include the construction of a railway linking coal mines to the coast (coal is currently carried via truck) and a new deepwater port.

## Electricity

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

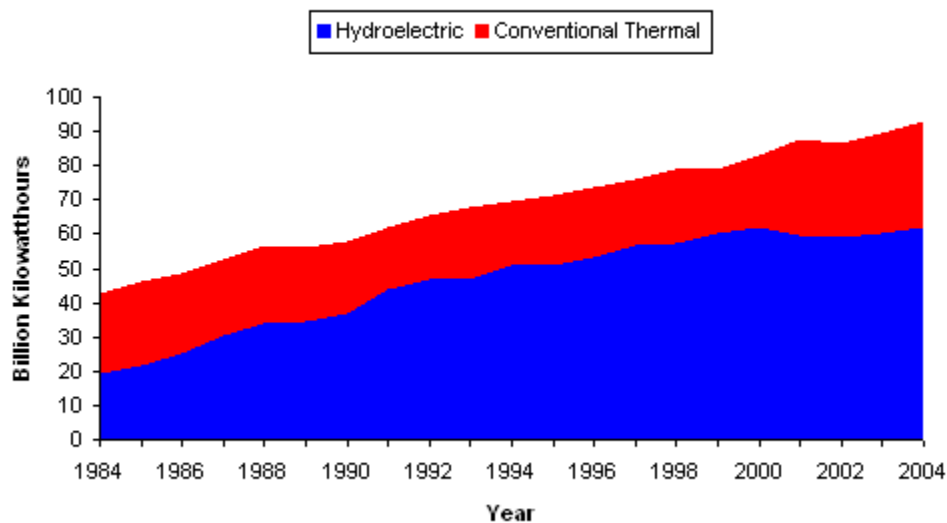
In 2004, Venezuela had 20.6 gigawatts of installed generating capacity, of which 61 percent was hydroelectric, the remainder consisting of conventional thermal. In 2004, the country generated 93.0 billion kilowatthours (Bkwh) of electricity, while consuming 86.5 Bkwh. Electricity consumption in Venezuela has steadily risen over the past two decades, increasing by an average annual rate of 4.6 percent since 1980.

Electricity disruptions and failures continue to be a problem in Venezuela. For example, the Oficina de Operacion de Sistema Interconectados (OPSIS), the principle government agency charged with regulating the electricity system, stated that there were 52 major power failures in the country during the first eight months of 2005. One of the causes of these power outages is electricity theft, with illegal hookups accounting for an estimated 25 percent of Venezuela's total consumption.

## Sector Organization

The generating sector is open to private companies, but state-owned actors control the vast majority of installed capacity. The largest public company is Electrificacion del Caroni (EDELCA), a subsidiary of the state-owned mining company Corporacion Venezolana de Guayana (CVG); according to OPSIS, EDELCA supplied 72 percent of Venezuela's total electricity supply during the first seven months of 2006. The largest private sector generating company is La Electricidad de Caracas (EDC), majority-owned by US-based AES, which supplied 9 percent of Venezuela's electricity supply during the first seven months of 2006.

Venezuela's Electricity Generation, by Source, 1984-2004



Source: EIA, *International Energy Annual*

There is a high degree of vertical integration within the electricity sector, with the largest generating companies also acting as the largest distributors. OPSIS is responsible for managing and operating Venezuela's national transmission grid.

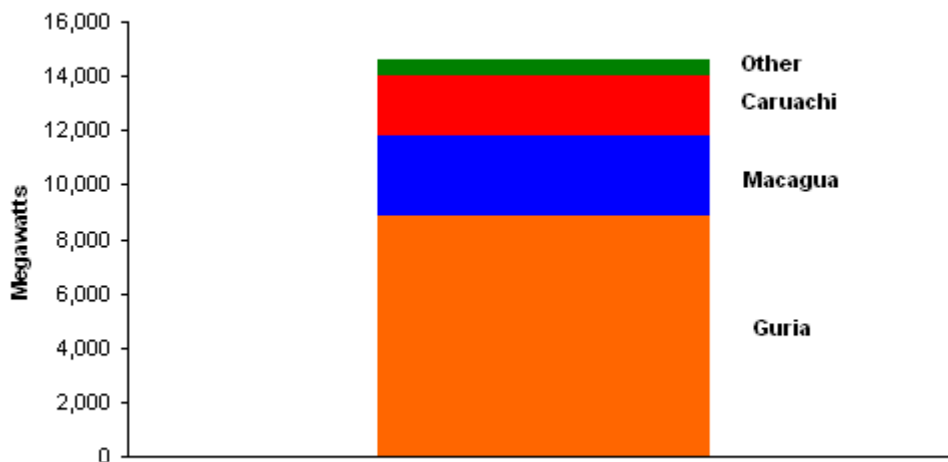
### Privatization

Electric sector privatization was underway when the current administration came into power in 1998. In September 1999, the Electric Service Law (LSE), which provides a framework for the deregulation of the electric utility industry in Venezuela, was enacted. On December 14, 2000, the Ministry of Energy and Mines enacted the Electric Law Regulations pursuant to the LSE. The LSE required integrated electric companies to divide generation, transportation, distribution, and marketing assets into independent companies, which would operate autonomously by January 2003. However, the Venezuelan government has indefinitely postponed further privatization of the electricity sector. Recent plans call for generation and marketing to be deregulated and opened to competition, whereas distribution and transmission will remain regulated businesses.

### Hydroelectricity

As mentioned above, hydroelectricity provides the bulk of Venezuela's electricity supply. The Caroni River in Guayana state is the center of the country's hydro production. EDELCA operates the 8,900-megawatt (MW) Guri (Raul Leoni) facility on the Caroni, the second-largest hydroelectric plant in the world, after Itaipu on the Paraguay/Brazil border (once fully operational, China's Three Gorges Dam will be larger than both of these). EDELCA also operates the 2,900-MW Macagua and the 2,200-MW Caruachi facilities, both on the Caroni. EDELCA is currently building a fourth plant on the Caroni, the 2,200-MW Tocoma dam, with scheduled completion in 2010.

**Capacities of Venezuela's Hydroelectric Facilities, 2006**



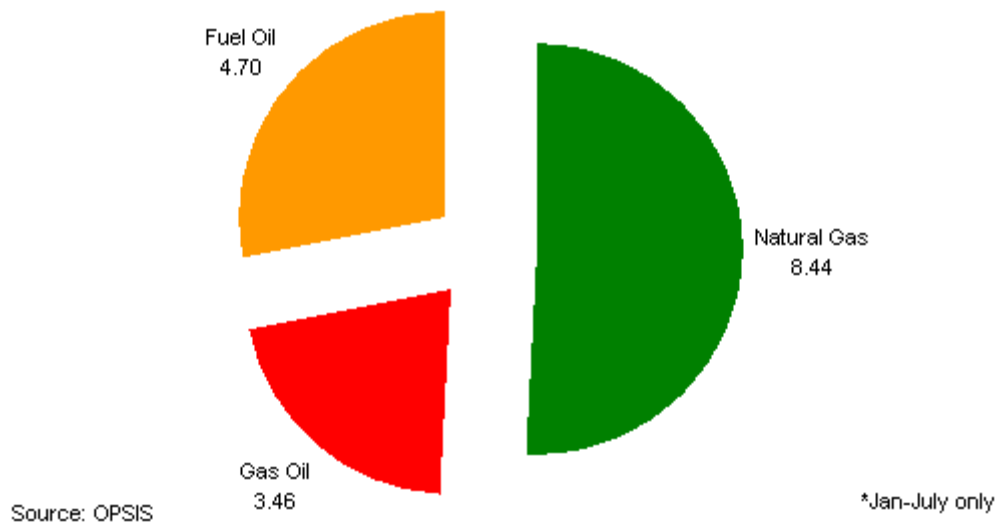
Source: OPSIS

### Conventional Thermal

Natural gas powers most conventional thermal electricity generation in Venezuela, fueling 50 percent of conventional thermal generation in the first seven months of 2006, according to OPSIS; fuel oil (28 percent) and gas oil (21 percent) provide the remainder. EDC is the largest operator of conventional thermal capacity with 2,200 MW.

There has been increasing investment in conventional thermal capacity as a means to reduce reliance upon hydropower and utilize domestic hydrocarbon resources. PdVSA announced in 2005 that it would spend \$500 million to build three thermal plants in northern Venezuela. CADEFE plans to build two power plants at refineries in the country: one at Puerto La Cruz, the other at Paraguana. In late 2004, CADEFE also stated that it was studying the feasibility of building Venezuela's first coal-fired power plant, a 300-MW facility in Tachira state, in cooperation with Russia's Energoprom.

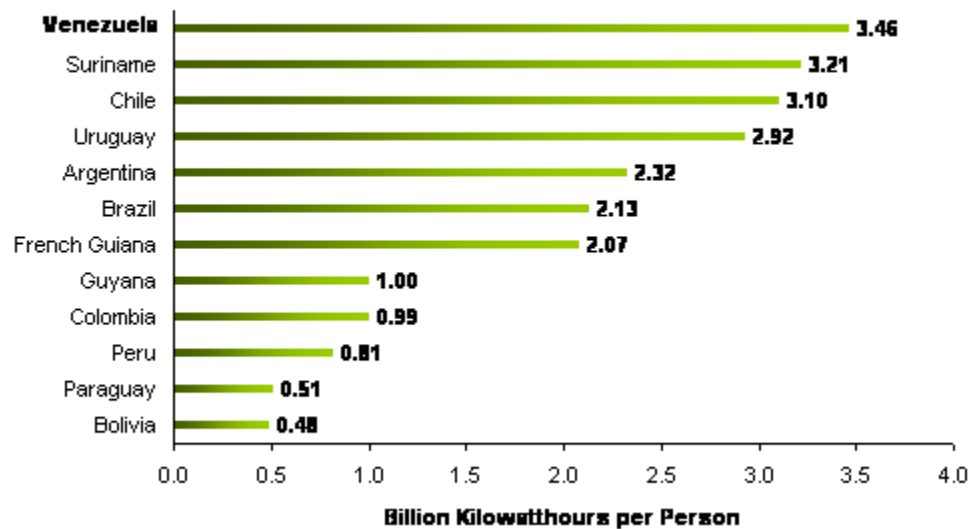
**Venezuela's Conventional Thermal Generation, by Fuel Source, 2006\***  
(Billion Kilowatthours)



**International Connectors**

According to OPSIS, Venezuela had net electricity exports of 0.31 Bkwh during the first seven months of 2006, most of which was sent to Brazil via the Sana Elena/Boa Vista Interconnector. Venezuela also trades a small amount of electricity with Colombia via two links, the Cuatricentenario/Cuestecitas Interconnector and the El Corozo/San Mateo Interconnector.

**South American Per Capita Electricity Consumption, 2004**



**Environment**

**Venezuela has the highest carbon intensity in Latin America.**

Considering the long history of Venezuela's hydrocarbon industry and its present status as one of the world's top oil producers, it is no surprise that the country is a top emitter of carbon dioxide in Latin America. Venezuela's per capita CO2 emissions are the highest in the region. Similarly, the oil-driven Venezuelan economy means the country has the highest rates of both energy and carbon intensity in the region. Hydropower accounts for the bulk of Venezuela's electricity generation, but the country's use of other renewable energy sources as part of its energy consumption balance is tiny.

A number of Venezuela's environmental problems stem from its many years as a petroleum producer, although some issues, such as deforestation, are of more recent origin. The hydrocarbon industry is a major contributor to air pollution in Venezuela, and spills from oil development in the Maracaibo Basin have created water pollution problems.

Click [here](#) to view the full environmental report.

## Profile

### Country Overview

<b>Chief of State</b>	President Hugo Chavez (since February 1999)
<b>Location</b>	Northern South America, bordering the Caribbean Sea and the North Atlantic Ocean, between Colombia and Guyana
<b>Independence</b>	5 July 1811 (from Spain)
<b>Population (2005E)</b>	25,375,281

### Economic Overview

<b>Currency/Exchange Rate (9/13/2006)</b>	1 Bolivar (VEB) = 0.0005 USD
<b>Inflation Rate (2005E)</b>	16.0%
<b>Gross Domestic Product (GDP, 2005E)</b>	\$127 billion
<b>Real GDP Growth Rate (2005E)</b>	9.3%
<b>Unemployment Rate (2005E)</b>	12.2%
<b>External Debt (2005E)</b>	\$41.5 billion
<b>Exports (2005E)</b>	\$55.5 billion
<b>Exports - Commodities</b>	petroleum, bauxite and aluminum, steel, chemicals, agricultural products, basic manufactures
<b>Exports - Partners (2004E)</b>	US 58.7%, Netherlands Antilles 4.1%, Canada 2.5%
<b>Imports (2005E)</b>	\$24.0 billion
<b>Imports - Commodities</b>	raw materials, machinery and equipment, transport equipment, construction materials
<b>Imports - Partners (2004E)</b>	US 33.2%, Colombia 5.7%, Brazil 5%, Germany 4%
<b>Current Account Balance (2005E)</b>	\$25.4 billion

### Energy Overview

<b>Proven Oil Reserves (January 1, 2006E)</b>	79.7 billion barrels
<b>Oil Production (2006E)</b>	2.8 million barrels per day, of which 90% was crude oil.
<b>Oil Consumption (2005E)</b>	579 thousand barrels per day
<b>Crude Oil Distillation Capacity (2006E)</b>	1,282.1 thousand barrels per day
<b>Proven Natural Gas Reserves (January 1, 2006E)</b>	151.4 trillion cubic feet
<b>Natural Gas Production (2004E)</b>	960.6 billion cubic feet
<b>Natural Gas Consumption (2004E)</b>	960.6 billion cubic feet
<b>Recoverable Coal Reserves (2003E)</b>	528 million short tons
<b>Coal Production (2004E)</b>	8.96 million short tons
<b>Coal Consumption (2004E)</b>	0.01 million short tons
<b>Electricity Installed Capacity</b>	20.6 gigawatts



**(2004E)**

<b>Electricity Production (2004E)</b>	93 billion kilowatt hours
<b>Electricity Consumption (2004E)</b>	86.5 billion kilowatt hours
<b>Total Energy Consumption (2004E)</b>	2.9 quadrillion Btus*, of which Natural Gas (40%), Oil (39%), Hydroelectricity (22%), Coal (0%), Nuclear (0%), Other Renewables (0%)
<b>Total Per Capita Energy Consumption (2003E)</b>	113.4 million Btus
<b>Energy Intensity (2004E)</b>	16,578.2 Btu per \$2000-PPP**

## Environmental Overview

<b>Energy-Related Carbon Dioxide Emissions (2003E)</b>	140.9 million metric tons, of which Oil (52%), Natural Gas (42%), Coal (0%)
<b>Per-Capita, Energy-Related Carbon Dioxide Emissions (2003E)</b>	5.5 metric tons
<b>Carbon Dioxide Intensity (2004E)</b>	0.8 Metric tons per thousand \$2000-PPP**
<b>Environmental Issues</b>	sewage pollution of Lago de Valencia; oil and urban pollution of Lago de Maracaibo; deforestation; soil degradation; urban and industrial pollution, especially along the Caribbean coast; threat to the rainforest ecosystem from irresponsible mining operations
<b>Major Environmental Agreements</b>	party to: Antarctic Treaty, Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Marine Life Conservation, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands signed but not ratified:: none of the selected agreements

## Oil and Gas Industry

<b>Organization</b>	State-owned Petroleos de Venezuela, SA (PdVSA) is most dominant player, though foreign firms play an important role.
<b>Major Oil/Gas Ports</b>	Amuay, Cardon, Puerto de la Cruz
<b>Foreign Company Involvement</b>	BP, ChevronTexaco, CNPC, ConocoPhillips, ExxonMobil, Repsol-YPF, Shell, Statoil, Total
<b>Major Refineries (capacity, bbl/d)</b>	Paraguana Refining Center (955,000), Puerto de la Cruz (195,000), El Palito (126,900), San Roque (5,200)

\* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.

\*\*GDP figures from OECD estimates based on purchasing power parity (PPP) exchange rates.

## Links

### EIA Links

[International Petroleum Monthly](#)  
[EIA - Country Information on Venezuela](#)  
[Table 3a: OPEC Oil Production from EIA](#)

### U.S. Government

[U.S. Embassy in Caracas, Venezuela](#)  
[CIA World Factbook - Venezuela](#)  
[U.S. State Department's Consular Information Sheet - Venezuela](#)  
[U.S. State Department Background Notes - Venezuela](#)

### Associations and Institutions

[Organization of American States \(OAS\)](#)

### Foreign Government Agencies

[Banco Central de Venezuela](#)  
[Corporación Venezolana de Guayana](#)  
[Instituto Nacional de Estadística](#)  
[Oficina de Operación de Sistemas Interconectados \(OPSIS\)](#)  
[Ministerio de Energía y Minas](#)

### **Oil and Natural Gas**

[Amerivan](#)  
[Anadarko Petroleum Corporation](#)  
[British Petroleum \(BP\)](#)  
[ChevronTexaco](#)  
[China National Petroleum Corporation](#)  
[Citgo](#)  
[ConocoPhillips](#)  
[Fortum](#)  
[Harvest Natural Resources](#)  
[AB Nynäs Petroleum](#)  
[OMV AG](#)  
[Otepi](#)  
[PdVSA](#)  
[Petrobras Energía](#)  
[PetroFalcon](#)  
[Petro-Canada](#)  
[Sincor](#)  
[Statoil](#)  
[Teikoku Oil Co](#)  
[Ypergas](#)

### **Electricity**

[CADAFE](#)  
[CVG Electrificación del Caroní, C.A – EDELCA](#)  
[Electricidad de Valencia](#)  
[Energía Eléctrica de Barquisimeto \(ENELBAR\)](#)  
[Fundelec](#)  
[La Cámara Venezolana de la Industria Eléctrica \(CAVEINEL\)](#)  
[Sistema Eléctrico del Estado Nueva Esparta \(Seneca\)](#)

## **Sources**

Business News Americas  
Cambridge Energy Research Associates  
CIA World Factbook  
Citgo  
ConocoPhillips  
Deutsche Bank  
Dow Jones  
Economist Intelligence Unit ViewsWire  
Energy Compass  
Energy Day  
Electric Utility Week  
Financial Times  
FinancialWire  
Global Insight  
Global Power Report  
International Gas Report  
International Energy Agency  
International Oil Daily  
La Cámara Venezolana de la Industria Eléctrica (CAVEINEL)  
Latin America Monitor  
Latin America Economic Outlook  
Latin American Economy and Business  
Latin Finance  
Miami Herald  
Ministerio de Energía y Minas  
New York Times  
Noticias Financieras

Oficina de Operación de Sistemas Interconectados (OPSIS)  
Oil and Gas Journal  
Oil Daily  
Petrobras Energía  
Petroleum Economist  
Petroleum Finance Week  
Petroleum Intelligence Weekly  
Platt's Oilgram News  
PdVSA  
Power Engineering International  
Repsol-YPF  
Reuters  
Sincor  
The Oil and Gas Journal  
Toronto Star  
TotalFinaElf  
U.S. Department of Commerce  
U.S. Energy Information Administration  
U.S. Securities and Exchanges Commission  
Wood MacKenzie  
World Gas Intelligence  
World Markets Analysis  
World Oil  
Worldwide Energy  
Worldwide Projects

## Contact Info

cabs@eia.doe.gov  
(202)586-8800  
[cabs@eia.doe.gov](mailto:cabs@eia.doe.gov)