The International Energy Sector: Opportunities for Virginia Defense Companies

2015

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Going Global Defense Initiative

Equinox Energy Solutions Latin America

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EXECUTIVE SUMMARY

This report presents an overview of the energy and refining sectors of Colombia, Mexico, Chile and Brazil. The overview includes an initial assessment on world energy and refining markets, followed by information on the market, the different key players in each market, economic, political and legislation information pertaining to the sector, and a section on trends and opportunities. The ultimate goal of the study is to present to Virginia companies who wish to penetrate the markets in these four countries with sufficient information to decide whether or not they offer interesting investment opportunities.

World energy markets are continually expanding, and companies spend billions of dollars annually to maintain and increase their oil and power production. Oil and energy touch our lives on a daily basis, and without them we would be unable to do much of what we take for granted today. Both the oil and the power industries are mayor players in world economics, influencing government economic and environmental policies, impacting consumption, public and private revenues, and individual welfare, and they will continue to do so for the foreseeable future.

As of 2014, 8.5% of total production of crude oil in the world is produced in Central and South America. Venezuela and Brazil lead the group of producing countries with a production contribution of 38% and 28% respectively with Argentina, Mexico, Colombia and Ecuador following, with percentages of 12%, 10%, 9% and 8% respectively. It is worth noting that some of these countries are currently developing processes of capacity expansion in both exploration and refining, which will reflect in a 10% growth by the end of 2015. In addition, it’s proven reserves represent 20% of total global reserves, making it the second region with the largest reserve in time (according to the reserves / production ratio) and the first region with the greatest potential due to its low rate of industrial development and its limited exploitation.

World production of crude oil in 2013 was 86.8 million bpd, of which the region contributed with a production of 10.3 million bpd, which is equivalent to a share of approximately 12%. Based on 2013 production volumes, the proven crude oil reserves worldwide, average is 52 years. Specifically, the Central and South American region has reserves for 91 years, a figure not unlike that of all the OPEC countries, which have reserves for 92 years.

In terms of refining capacity, the region processed approximately 7 million bpd, representing 8% of the world total. During 2013 a total volume of 2,376 million barrels of crude oil and about 2,347 Mbep of petroleum products were processed. Moreover, 4.4 million barrels of crude oil and 767 thousand barrels of petroleum products were exported, and 392,000 barrels of crude oil and 2 million barrels of petroleum products were imported. Considering the above, international trade in oil and petroleum products in the region, represents approximately 9.4% of world trade in exports and 4.3% in imports.

During 2014, 8.8 million barrels of oil and petroleum products were consumed, which represents about 10% of world consumption. The three countries with the highest consumption of oil during that year were the United States, China and Japan.

Figures for the last ten years show that poorer countries have the lowest power consumption rates. However, developing regions such as South America currently have the highest rates of growth in utilization and consumption, with a consistent growth for the coming decades.

The development of Central and South America has been positive, showing an increase of 3.43% between 2013 and 2014, compared with an annual average of 2.9% over the last twelve years, with Peru being responsible for the high rates of energy consumption growth (8.24% last year against an annual
average of 5.4% in the previous twelve years); and Chile (6.7% compared to an average of 3.3%), which is largely due to the growing demand presented by the mining sector in Atacama. Other countries like Mexico, Ecuador, Brazil and Colombia showed lower growth rates with positive behaviors that go far beyond those of Europe and North America.

Today, nuclear energy accounts for 7% of the world’s primary energy consumption and 15% of global electricity. This index is more important in industrialized countries (19% of electricity production in the US, 28% in the European Union, 30% in Japan and 75% in France). In September 2011, the Atucha II nuclear power plant was inaugurated in Argentina, and Brazil is building Angra 3, in addition to the other six nuclear power plants existing in the region.

Currently, Central and South America have a 25% share of renewable energy in the energy mix, which compared to other world regions (Europe, North America, Asia) is higher mainly due to the increased use of hydropower and biofuels in several countries of South America. Similarly, the region has significant potential renewable resources (water, solar, wind, biomass, etc.) that could significantly increase this indicator. Despite this consideration, oil and its byproducts (41%), natural gas (28%) and minerals such as coal (24%) still dominate the energy mix.
COLOMBIA

COUNTRY OVERVIEW

Key Facts:
- Capital: Bogotá
- Population: 46 million, including 85 ethnic groups
- President: Juan Manuel Santos
- Land Area: 439,735 square miles
- Language: Spanish
- Currency: Colombian Peso (COP)

Colombia has a total area of 439,735 square miles, of which 38,691 miles are marine area and 401,044 square miles are land. With many different ecosystems within its territory, Colombia is one of the world's most biologically diverse countries. Approximately 58 percent of the country is covered by natural forest. Colombia has the second largest population in South America, after Brazil, with more than 46 million citizens.

Situated in the northwest corner of South America, Colombia is the only country in the region with both a Pacific and Caribbean coast. It shares borders with Panama, Venezuela, Brazil, Peru and Ecuador, and maritime boundaries with Costa Rica, Nicaragua, Honduras, Jamaica, the Dominican Republic and Haiti. Colombia is a free market economy with major commercial and investment ties to countries around the world, including the United States.

In 2014, cement, gold, coal, and emeralds were among the countries leading industries, and petroleum and coal were, respectively, the first- and third-leading export commodities. Colombia also produced sizable amounts of common clay, kaolin, dolomite, gypsum, limestone, hydrated lime and quicklime, magnesite, nitrogen (content of ammonia), rock and marine salt, sand, gravel, marble, feldspar, phosphate rock, and sodium compounds (sodium carbonate), as well as small quantities of sulfur (native, from ore), asbestos, bauxite, bentonite, calcite, diatomite, fluorite, mercury, mica, talc, soapstone, prophylite, dolomite, and zinc.

OIL IN COLOMBIA

The fastest growing sector in the country has been the mining and energy sector, which is comprised of the mining, oil, gas, and energy industries. In the last decade, this sector increased from US $ 8,300 million in 2000 to over US $ 50,000 million in 2011 and is estimated to continue its rapid growth during the first half of this decade. Of the previously mentioned industries, oil has been largely responsible for these growth figures, which boosted the growth of exploration and refining to 3.4% in the last decade. In recent years, exploration activity has increased in the following manner: in 2008 growth reached 15.4%; in 2009 it reached 15.4%; in 2010, 16.9%; in 2011, 17.7%; in 2012, 18.4%; in 2013, 19% and in 2014 it reached 19.4%. For the first half of 2014, the contribution to the GDP of the mining, oil and electricity industry was equivalent to 33.5% of total GDP.

In Colombia, non-renewable natural resources, including oil are owned by the State. Oil policy is defined by the National Government through the Ministry of Mines and Energy and, until May 28, 2003, Ecopetrol, as an entity of the State, was in charge of its management. That same year, and after carrying out several studies intended to encourage the exploration of oil in Colombia and prolong the self-sufficiency of this resource in the country, the Government issued Decree Law 1760, whereby the ANH (National Hydrocarbons Association) was created, and the administration of hydrocarbons, as well as underwriting and
administration of contracts for exploration and exploitation in the country were handed over from Ecopetrol.

Oil potential (oil and natural gas) in Colombia is estimated at more than 47,000 million barrels of oil equivalent, distributed in 18 sedimentary basins covering an area of 1,036,400 km$^2$. About 82% of said sedimentary area is available for the exploration and exploitation of oil and natural gas. The basins of greater exploration activity are those located in the Upper and Middle Magdalena Valleys, Catatumbo, La Guajira, the Eastern Cordillera, Putumayo and Llanos Orientales.

The most important discoveries made in Colombia in terms of deposits are the La Cira-Infantas in Barrancabermeja; Chuchupa in La Guajira; Caño Limon in Arauca; and Cusiana-Cupiagua in Casanare. Moreover, oil production centers are located in the departments of Meta, Casanare, Arauca, Santander, Antioquia, Bolivar, Boyacá, Huila, Tolima, La Guajira, Putumayo and Norte de Santander.

In June 2014, average oil production reached 1,008,000 barrels per day (bpd) with an average refining capacity of 342,000 barrels per day distributed as follows, Barrancabermeja refinery with 250,000 bpd, Cartagena refinery with 80,000 bpd, Orito and Aplay Refineries with 6,000 bpd each. It is worth noting that the Cartagena refinery, owned by Ecopetrol, is undergoing an expansion since 2010 and it is expected that the plant could in itself eventually produce a total of one million barrels of oil per day. These plants process the crude and the fuel for supplying total internal demand and the requirement of export products. The Barrancabermeja Industrial Complex also serves about 75% of the demand for petrochemical and industrial products.

The two major refineries in the country (Barrancabermeja and Cartagena) produce motor gasoline (regular and premium), benzene, white gasoline, diesel, kerosene, Jet-A, jet fuel, propane gas, fuel oil, sulfur, paraffin waxes, lubricant bases, low density polyethylene, aromatics, asphalts, alkyl benzene, cyclohexane, aliphatic solvents, medium distillates and propane. Currently, these two refineries are subject to optimization programs to increase capacity and improve fuel quality in order for them to meet the new environmental requirements.

During the first half of 2014, the average price of Brent (London), to which most oil exports are tied, was $101.2 USD, however starting June 2014 the price of oil fell by 30 per cent, placing the price per barrel at $72 USD starting December 2014 and ending the month at USD60.43. This was due to poor economic performances in China, Brazil and Europe that generated a significant drop in the demand for crude. Moreover, rising rates of global supply, in particular accelerated production, as is the case in the United States, partly due to Shale Gas; continued productivity growth in Russia despite sanctions due to the crisis in Ukraine; increased production in Libya and Iraq, that are not affected by the political crisis and armed conflict; and OPEC countries which continue with their increased production policies, generated an oversupply in the oil market which significantly affected oil prices.

**POWER GENERATION IN COLOMBIA**

As of 2014, the proportion of power generation on the National Grid in Colombia is divided into 64.2% hydro generation, 30.45% thermal and 5.3% from small plants and co-generators.

There are three major river systems in Colombia. The east area of the Andes Mountains, which comprises almost two-thirds of the country, consists of two large drainage basins. The Orinoco basin in the northeast includes the major tributaries of the Arauca, the Meta, and the Guaviare rivers, all of which flow eastward to Venezuela (the Arauca and the Meta each form part of Colombia’s border with Venezuela, as does the Orinoco itself). The Amazon basin, in southeastern Colombia, includes the eastward-flowing

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1 ECONOMÍA 7 JUL 2014-Producción de crudo en junio fue de 1’008.000 barriles diarios-EL ESPECTADOR
2 www.investing.com/commodities/brent-oil-historical-data
Vaupés, the Apaporis and Caquetá, which also flow eastward and merge near the Brazilian border, and the Putumayo, which flows southeastward into Brazil and forms part of Colombia's border with both Ecuador and Peru. A small section of the Amazon itself forms a part of Colombia's southern border with Brazil. The major river system within and west of the Andes is the Magdalena (Colombia's longest river), with its principal tributary, the Cauca, which both flow northward and merge about 150 kilometers south of where the Magdalena joins the Caribbean Sea, in the city of Barranquilla. There is also a Pacific drainage basin, but it is relatively small and has no major river systems.

Colombia has abundant water resources for hydroelectric power, and is second only to Brazil in hydroelectric potential in Latin America. Much of Colombia's hydroelectric generation is located in the mountainous northwest part of the country, which produces about 40% of the hydroelectric power, or slightly more than one-quarter of the total electricity generation. Several of the power plants in Antioquia (State) are actually located between two rivers. The plants take in water from one river and empty it into another after it passes through the turbines.

There are presently three hydroelectric facilities in Colombia with capacity for more than 1,000 MW and another dozen with capacity for more than 200 MW. Colombia's hydroelectric generating capacity is split among many companies. Empresas Publicas de Medellín (EPM), headquartered in Antioquia, presently operates eleven hydroelectric power plants of at least 10 MW, and consolidates more than 2,100 MW in total hydroelectric generating capacity. Other companies with significant hydroelectric generation capacities include ISAGEN (headquartered in Bogotá), with more than 1,800 MW (most of which is generated in the San Carlos Power Plant, presently Colombia's largest-capacity hydroelectric facility), Empresas Energia del Pacifico (EPSA), Empresa de Generación (EMGES), and AES. Aside from these, there are several smaller companies who own relatively minor amounts of hydroelectric generating capacity.

In the last 20 years, the field of thermoelectric generation in Colombia has evolved significantly, and has effectively become the support for the hydroelectric sector. The response to the recession faced by the electricity generation sector in the nineties has evolved into an industry that is consolidated with new projects derived from natural gas, coal and liquid fuels.

The creation of most thermoelectric companies came by following the drought caused by "El Niño" in the nineties. The need to ration power (black-out) that took place between 1991 and 1992 was the driver for the reform process in the energy sector. In addition to the drought, another aspect that gave way to the blackout was the structural imbalance between hydraulic and thermal generation. From this situation arose the urgency and need to develop thermal power generation projects that would rebalance supply in the country. At that time, the government proposed two specific objectives; first, to shift the proportion between hydropower and thermal power from 80/20 to 70/30, and, secondly, to recover 20% of the thermoelectric generation capacity that already existed but was not in optimal conditions. The backup strategy for hydroelectric power then became a priority, and clarified the need for the participation of the private sector.

This new approach to the energy industry gave rise to several thermoelectric plants, which now generate 30% of the electricity consumed under normal conditions in the country. These thermoelectric plants are capable of taking on up to 70% of the energy generation in the country in times of drought and thus ensure 24-hour service. Currently, Colombia has approximately 30 thermoelectric plants of which 50% are operating on a regular basis.

In Colombia thermoelectric power originates from three sources: liquid fuels, gas and coal, hence its operation and regulation differs in each case. For thermoelectric generation diesel and fuel oil is used. Most power plants are dual, i.e. they allow for the use of natural gas or liquid fuel. Liquid fuels have become more interesting due to the increased production of the oil industry in recent years, the expansion of reserves and regulatory stability. Today several dual generation projects are underway, which also meet with the necessary modifications for compliance with the high environmental standards.
One of the most abundant energy resources in Colombia is coal; geological reserves amount to approximately 6.648 million tons, and mining operations are located in the 3 mountain ranges and the Atlantic Coast. From La Guajira to Cauca, the quality of coal varies in terms of calorific value, amount of sulfur and other technical specifications. The coal used to generate energy in Colombia comes mostly from Norte de Santander, Boyacá, Santander, Cordoba and Cundinamarca.

Power generation from coal has several advantages that increase the competitiveness of the sector. It is a fuel that is abundant in Colombia and therefore is economical, and unlike gas and liquid fuels, does not depend on others for its transportation given that each coal plant has its own transport infrastructure. From the moment gas began to be part of the energy mix, the country has been concerned about increasing reserves and boosting all exploration projects and alternative curriculums to meet domestic demand in different sectors: industrial, domestic, vehicular and thermal energy.

The north of Colombia has the best potential for wind power generation. In the Upper Guajira, Empresas Públicas de Medellín (EPM) has set up the first wind farm in the country. It is called Jepirachi, and its 15 turbines generate 19.5 MW. Another source of energy in the country is biomass, there are biomass production studies using sugarcane with an estimated annual production of 1.5 million tons, and rice husks in volumes of more than 450,000 tons per year. The most suitable places for generating this form of energy are the departments of Santander and Norte de Santander, the Llanos Orientales, and the Caribbean coast.

The Geothermal Atlas of Colombia shows that the areas with the highest potential for this type of energy are Chiles-Cerro Negro, the Azufral volcano in Nariño, Sierra Nevada National Park, and the geothermal area of Paipa, Boyacá. Current utilization is limited to a few dozen geothermally heated bathing pools, which cumulatively have a thermal capacity of about 13 MW and an annual energy use of about 270 terajoules. There is a 150 MW geothermal energy project in the planning stages, sponsored by Geotermia Andina, which would be located near Villamaria, Caldas.

There are many players in Colombia's electricity generation market. The largest are EMGESA with headquarters located in Bogotá, which owns about 2,500 MW of capacity, mostly hydroelectric, and EPM with headquarters located in Medellín, which owns about 2,600 MW of capacity, mostly hydroelectric. The largest thermoelectric generator in Colombia is Termobarranquilla S.A. (TEBSA), located in Barranquilla, which owns the largest thermal-electric gas-fueled power plant in Colombia, with a total capacity of 890 MW, and consists of five combined cycle and two single cycle turbine units.

<table>
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<tr>
<th>Technology</th>
<th>Power (MW)</th>
<th>Percentage (%)</th>
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<tbody>
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<td>Hydraulic</td>
<td>9319.8</td>
<td>64</td>
</tr>
<tr>
<td>Thermal</td>
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<td>31</td>
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<tr>
<td>Small plants</td>
<td>662.3</td>
<td>4.5</td>
</tr>
<tr>
<td>Co-generators</td>
<td>66.3</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>14,569.4 MW</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
MARKET SEGMENTS

OIL REFINERIES

Ecopetrol and its business group produced 788,000 BOE per day, with an annual growth of 4.5% in 2014. Castilla, Chichimene, Rubiales, Quifa and La Cira Infantas were the fields that contributed the most to this growth. The new optimization center in the Barrancabermeja refinery started its operation and the status for the expansion and modernization of the Cartagena refinery increased by 87.5%.

According to Merco, Ecopetrol was recognized as the company with the best reputation, with the most valuable brand in the country and the seventh in Latin America, and a preferred place to work by Colombians.

Ecopetrol, has international operations in the Gulf Coast of the United States, Brazil and Peru, and was ranked 43 in the Petroleum Intelligence Weekly (PIW) list of the 50 largest oil and gas companies in the world, one of the world's most important annual rankings.

PLAYERS IN THE REFINING SECTOR

Ecopetrol

Ecopetrol is a national mixed economy company, of a commercial nature, organized as a corporation and attached to the Ministry of Mines and Energy. Today, Ecopetrol is number 43 among the 50 largest oil and gas companies in the world, according to PIW, one of the world's most important rankings, and its market capitalization amounts to US $ 79.05 billion as of December 31, 2013.

The story of the oil industry in Colombia began in 1905, when the Government signed two Concessions for exploration purposes: the Seas Concession and the Barco Concession. Royalties between 7% and 14% over the production were agreed to. Tropical Oil Company then bought the Seas Concession, and the first oil fields started yielding revenues. On August 25, 1951 the reversal of the Seas Concession was implemented; i.e. all concession property became the property of the nation. In order to manage this equity, Law 165 of 1948 created the Colombian oil company, Ecopetrol, which from that day forward took on the responsibility of its operation, as a state-owned company. After this, and until the seventies, it operated as an integrated state-owned company with little technical capacity to grow aggressively. It then focused its efforts on self-sufficiency and concentrated in the upstream segment of the business, which generated positive results for a short period of time. In 2003, it was restructured as Ecopetrol S.A., a strategy that has allowed for the redesign of its business portfolio and competition in the upstream segment through new contracts.

On September 23, 2007, Ecopetrol presented the first IPO for the purchase of shares in the Colombia Stock Exchange. On September 12, 2008, through JP Morgan Chase, Ecopetrol received approval from the Securities and Exchange Commission to initiate the sale of its shares in the NYSE through ADRs under the symbol EC, starting September 18, 2008, with an initial price equivalent to 20 ordinary shares. In July 2011, Ecopetrol launched a second share issue in the amount of $ 2,500 billion pesos.

Ecopetrol participates in all stages of exploration, production, marketing and processing of hydrocarbons into fuels and higher value-added products such as petrochemicals. It also participates in the biofuels business through Ecodiesel and Bioenergy and through international investments undertaken in recent years is present in Brazil, Peru and the Gulf of Mexico (United States).

It has drilling fields in central, southern, eastern and northern Colombia; two refineries (Barrancabermeja and Cartagena); ports for export and import of fuels and crude on both coasts, and owns most of the country's pipelines which connect production with major consumption centers and marine terminals.
During the third quarter of 2011, Ecopetrol, in partnership with Pacific Rubiales, successfully drilled the Rubiales-Piriri field, which has more than 340 million barrels reservoir and is expected to have 1,857 million barrels that could be classified as “probable and possible reservoirs" if production is extended beyond May 2016. Its average production in 2013 was 724,100 boe per day.

The business plan approved by the Board for 2014 - 2020, includes investments for the Business Group in the amount of US $ 68,580 million. Ecopetrol will allocate 81% of this investment to exploration and production, mainly to field development and increased exploratory activity; 10% will be invested in the downstream segment, where the main objective is to continue ensuring the modernization of the refineries in Barrancabermeja and Cartagena, and the remaining 9% will be invested in strengthening the national transport and evacuation network. As of December 2014, this investment plan is under revision due to the impact of dropping oil prices on industry finances; however, the Ministry of Mines and Energy has already indicated that there will be a reduction in investments for 2015 in the order of 25%, and Ecopetrol has indicated also that it will reduce its operating expenses.

Barrancaberera Refinery (Barrancabermeja Industrial Complex)

Location: Barrancabermeja (Santander).
Business: Refining of crude and petrochemicals.
Installed capacity: 250 kbd
Production: Engine gasoline (regular and premium), benzene, white gasoline, diesel, kerosene, Jet-A, jet fuel, propane gas, fuel oil, sulfur, paraffin waxes, lubricant bases, low density polyethylene, aromatic, asphalts, alkylbenzene, cyclohexane, aliphatic solvents.

The Barrancabermeja Industrial Complex is located in the city of Barrancabermeja, in the central region of Colombia, on the bank of the Magdalena River, the country’s main waterway.

Located in a historic region, it is one of the first areas where oil exploitation began in the early twentieth century. Refining operations in 1922 operated with stills brought from Talara in Peru.

From an initial installed capacity of 1,500 barrels per day this immense building infrastructure is known today as Ecopetrol's Barrancabermeja Management Complex.

The complex extends over an area of 254 hectares, including more than fifty modern plants and processing, treatment, services and environmental control units.

Among them are five topping units, four catalytic cracking units, and two polyethylene plants, alkylation, sulfuric acid, paraffin, aromatics plants and processing plants for waste management.

It also has ancillary facilities that support with equipment and procedures that are not directly involved with refining but that serve vital functions in the operation. Such is the case of the boilers, hydrogen plant, cooling systems, the sulfur recovery systems and waste treatment or pollution control systems.

The Barrancabermeja Management Complex is responsible for generating 75 percent of the gasoline, fuel oil, diesel and other fuels needed by the country, as well as 70 percent of petrochemical products circulating in the domestic market.

In 2006, contracts were awarded for the implementation of the hydro-treatment project at the Barrancabermeja refinery, with an estimated investment of more than US $ 420 million, which will allow the refinery to increase its production to 750,000 barrels per day.

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3 http://www.serfinco.com.co- Ecopetrol
Oil and Gas Sector

Virginia Economic Development Partnership – International Trade
to meet revised quality standards for fuels produced in the industrial complex, among which is found a mass transit diesel with a maximum of 50 parts per million of sulfur.

In Ecopetrol's Barrancabermeja Refinery 15 petroleum products are produced with which more than 100,000 products are manufactured by the petrochemical industry.

**Cartagena Refinery (Reficar)**

Location: Mamonal (Bolivar).  
Business: Refining of crude and petrochemicals  
Installed capacity: 80 kbdp  
Production: Engine gasoline (regular and premium), diesel, Jet-A, jet fuel, fuel oil, virgin naphtha, high-octane gasoline, arotar (aromatic Tar), Sulfur, Propylene, Liquefied Petroleum Gas (LPG)

The Cartagena Refinery S.A. was born from an opportunity that the National Government granted to a private strategic partner to participate in the improvement and expansion of the refining sector, which until then had been under the responsibility of the public sector, with the perspective of strengthening energy self-sufficiency.

Its organization dates from 1997, when the Government adopted a strategy for opening the association schemes for the exploration, exploitation, processing and transformation of hydrocarbons.

In 2006, a process for the expansion project of the refinery began. This bid was awarded to a Swiss trading company by the name of Glencore. Glencore and Ecopetrol entered into a partnership to create Reficar - Cartagena Refinery S.A., a company responsible for developing the country's most important project in the last decade.

On February 16, 2009, Glencore decided to sell 51% of its shares to Ecopetrol in order to withdraw from the proposed expansion and modernization of the Cartagena refinery, given the inability to obtain the international loans required for the project.

On May 27, 2009, Ecopetrol confirmed its commitment to grow the business and through Andean Chemical closed the negotiation for the purchase of the 51% of shares owned by Glencore AG in Reficar. The acquisition of the shares was set at US $ 549 million.

This operation allowed Ecopetrol to move forward in its pursuit to increase its refining capacity to 650,000 barrels per day by 2015. The commitment now is to develop the project for the modernization of the refinery, which is key in generating synergies with the Barrancabermeja Refinery; and maximize the benefits for the business.

The expansion and modernization of the Cartagena refinery is undoubtedly the most ambitious work to date undertaken in Colombia, not only because the refinery is becoming one of the most productive and sophisticated plants in Latin America, but also because it is a project that requires an investment of over US $ 4,800 million.

The proposed expansion and modernization of Reficar, is currently underway in 130 hectares located at kilometer 10 on the road to Mamonal, inside the industrial area of Cartagena.

The project consists of 14 new units (plants) to improve product quality and produce other products with a higher value. These include the new crude distillation, vacuum distillation, coking, hydrocracker, alkylation, hydro-treatment, saturated gas, water treatment, power generation and UDC units.
35 tanks for fuel storage and other products will also be built. The tanks will be built in various sizes and capacities. The circular tanks, of which there will be 25 in total, will be manufactured in carbon steel to allow for the storage of crude oil, gasoline, diesel and jet fuel, while the spherical tanks, of which there will be 10 in total, were designed to inject butane, propane and LPG (Liquefied Petroleum Gas) at high pressure.

The new refinery will generate new products such as petcoke, of which an output of 75,000 tons is expected monthly.

POWER GENERATION

By year-end 2013, the effective net installed capacity in the SIN (National Interconnected Grid) was 14,559 MW, which compared to that recorded in 2012, reflected an increase of 198 MW, equivalent to a growth of 1.4%. This increase was mainly due to the entry into operation of the Amoyá-La Esperanza hydroelectric plant, with 80 MW, the Dario Valencia Samper unit 2 with 50 MW, and modernization of the thermoelectric plants that support the obligations of firm energy for reliability charges effective December 1, 2013 to November 30, 2014. Because of their significance, the fuel changes in Termosierra (gas to diesel), Flores I and Flores IV (diesel to gas) plants are worth noting.

As of July 2014, the energy demand for the National Interconnected System (SIN) was 5,513 GWh, which was located between the average scenario (5,458 GWh) and the high scenario (5,543 GWh) of the Mining and Energy Planning Unit. Similarly, between the months of July 2013 and July 2014 the demand for electricity in Colombia grew 3.5%, pulled by a construction industry growing at 17%.

By July 2014, the generation mix for the SIN was: 66.7% hydro, 27.5% thermal and 5.8% among minor players and co-generators. This corresponds to a total generation of 5,516.01 GWh, equivalent to an increase of 3.7% in comparison to the same month of the previous year.

As of January 31, 2014, the installed capacity of the Colombian power generating system reflected a total installed capacity of 14,569.4 MW, which means a slight increase of 13.7 MW compared to the installed capacity as of December 2013.

The Colombian power market has been very dynamic and, from its reorganization in 1994, has been sufficiently robust to meet the needs of the growing demand for energy in the country and adequately support critical hydrological situations that arise with the “El Niño” phenomenon.

Currently, the Colombian Association of Electric Power Generators -ACOLGEN- (a non-profit trade organization removed from political issues), promotes the free and fair competition and market development of the Colombian electricity sector, and in particular, activities related to power generation. This association is made up of 18 power-generating companies, which represent 86% of the effective net generating capacity in Colombia. It is open to all power generation companies that share its objectives and are willing to promote free and fair competition in the wholesale electricity market, regardless of the energy source used for its production. This trade association seeks to generate a value added to its members to guarantee sustainable growth, participate in sector policies and ensuing regulations. It acts as the spokesperson for the sector before the government, and as a cohesive agent for its members.

The following tables list the major power plants in the country including data such as generation capacity, owner, and location thereof. Table # 1 corresponds to hydroelectric generation plants and Table # 2 corresponds to thermoelectric generation plants segmented by fuel.

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4 International Mining report, Reporte minero internacional, September 2014
5 www.acolgen.org.co
### Table #1 – Hydroelectric Power Plants

<table>
<thead>
<tr>
<th>Hydroelectric Plant Name</th>
<th>Owner</th>
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<th>State</th>
<th>Capacity (MW)</th>
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<td>Boyacá</td>
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<td>EPM</td>
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<td>Antioquia</td>
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GENERATORS – KEY PLAYERS

Emgesa is a Colombian company dedicated to power generation and marketing in the Non-Regulated Market. It was created in 1997 as a result of the capitalization of the Energy Company of Bogota (EEB).

It is part of Enersis, a filial of the Enel Group. The Enel Group is the second largest electric utility in Europe in terms of installed capacity. In has operations in 32 countries, on 4 continents, it serves 61 million households and business customers and has more than 95.752 GW of installed capacity. In Latin America it has operations in Chile, Brazil, Colombia, Argentina and Peru.

In Colombia, Emgesa has ten hydroelectric and two thermal power plants, located in the departments of Cundinamarca and Bolivar.

It has a market share of 16% of the non-regulated market, an installed capacity of 2,915 MW and its quota of installed power capacity is 20%.

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Type</th>
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Emgesa is currently developing a new hydro project called "El Quimbo". This project has been plagued by cost overruns, protests, blockades, invasions and various legal actions that have generated significant delays. As of January 2015, the project has completed 4 years and two months of execution and is in its final stages. It is estimated that by July 2015 it will begin to generate about 5% of the national electricity demand, contributing 400 MW to the grid. The initial budget for the project was set at $ USD837 million and it was expected to be operational by December 2014. Due to the various delays, an estimated total investment is calculated at USD 1,093 million.

Once in operation, El Quimbo will use the waters of the Suaza and Magdalena rivers to provide approximately 2,216 GW/h per year and generate annual revenues for Emgesa ranging between 200 and 250 million dollars.
EPM was created on August 6, 1955, with the purpose of providing electrical, gas, water and sewage services. It is divided into various divisions according to the activities performed.

**EPM Aguas** is the division that manages the integrated management of the water cycle (excellent quality of the water supply and collection and treatment of wastewater), for the inhabitants of Medellín and its metropolitan area (Bello, Envigado, Itagüí, La Estrella, Sabaneta, Copacabana, Girardota, Caldas Barbosa), with a total of 974,781 customers.

EPM Aguas has:

- Drinking-water treatment plants: 11.
- Aqueduct mains: 3,580 kilometers.
- Collection and transport of wastewater: 4,367 kilometers.
- Coverage: 100% in the urban areas of the Aburrá Valley.

**EPM Gas Natural** has offered natural gas through a pipeline network since 1996, when it started its pilot phase, and in 1998 it began its program for mass distribution of natural gas through a household network serving the residential, commercial and industrial sectors of the Aburrá Valley. Today it is under full expansion in the 10 municipalities of the Aburrá Valley, including Medellin and other cities in Antioquia.
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<th>Plant Name</th>
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In addition to covering the residential sector, the service has diversified to meet the needs of industry, trade and vehicular transport. In order to meet the needs of this client base, EPM expanded its coverage to the municipalities of Guarne and Rionegro, in eastern Antioquia.

The proposed natural gas distribution project includes the construction of over 85 kilometers of primary networks that operate at pressures between 100 and 275 psig; 26 regulation stations, which reduce the pressure to 60 psig, to serve the residential and commercial sectors; in addition to meeting the requirements of the industrial sector; and finally, the construction of 4,650 kilometers of polyethylene networks to supply gas to retail customers at a maximum pressure of 60 psig.

**EPM Energía** occupies an important place in the electricity sector in Colombia, with a share of 21.11% of the demand served. For over five decades it has developed an important part of the hydroelectric system in Colombia. As of 2012 it has assets equivalent to COP 35,277 million.

The net effective power capacity for EPM is 3257.61 MW. Its power distribution system is equivalent to 16.2% of the national total.

It has 19 hydroelectric power stations, 1 thermoelectric power station and 1 wind farm.

Currently EPM is developing the country's largest energy project, the Ituango hydroelectric project. It will generate 2,400 MW of power generation using eight units (Francis type turbines). EPM will build, operate, maintain and market the Ituango hydroelectric project for 50 years, which is estimated to be operational by 2018.

May 2015 celebrates the 19th anniversary of the creation of ISAGEN S.A. E.S.P., a company that develops projects for the generation, production and sale of electricity. Isagen is attached to the Ministry of Energy and Mines.

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6 [www.epm.com](http://www.epm.com)
of Mines and Energy of Colombia. Its headquarters are located in Medellin and it has regional offices in Bogotá, Cali and Barranquilla.

Isagen has a total installed capacity of 3,032 MW distributed as follows: 2,732 MW in hydroelectric plants and 300 MW in thermoelectric plants, for a total of seven plants located in the departments of Antioquia, Tolima, Santander and Caldas.

During the last quarter of 2014, ISAGEN showed an increase in the generation of all its power plants which resulted in a cumulative generation of 2,999 GWh / year, and represented a growth of 14% in comparison to the same period in 2013. This increased generation came about due to increased water intake in all reservoirs, primarily in the Miel I hydroelectric plant, in the department of Caldas, and Manso and Guarino transfers. The Termocentro power plant in the Magdalena Medio, also had a higher generation during the quarter.

In December 2014, the Sogamoso Hydroelectric Project entered into operation. It is located in Santander, in the canyon where the Sogamoso River crosses the Serrania de La Paz, 75 km upstream from its mouth at the Magdalena River and 62 km downstream of the confluence of the Suarez and Chicamocha rivers.

The Sogamoso hydroelectric power plant has the three largest generation units in Colombia. With 820 MW of installed capacity and an average annual generation of 5,056 GWh-year, it is the fourth largest hydroelectric power plant in terms of installed capacity in the country. This hydroelectric power plant will increase the company’s energy production by 60% and will generate approximately 8.3% of the annual energy consumed by Colombians.

GENERATORS – OTHER PLAYERS

Celsia is a utility company specializing in the business of power generation and distribution. It currently has an installed capacity of 2,312 MW, represented in 23 plants located Colombia, Panama and Costa Rica.

In Colombia the company has a 50.01% stake in Empresa de Energía del Pacífico S.A. E.S.P., EPSA, which has operations in the four stages of the energy business: generation, transmission, distribution and marketing, and its operations are concentrated in the departments of Valle del Cauca, Cauca and Tolima. Likewise, EPSA also has a majority stake in Compañía de Electricidad de Tuluá S.A. E.S.P., which serves the municipality of Tuluá.

The company owns seven power plants in Panama and Costa Rica, which generate electricity using hydro, thermal and wind technologies

GENERADORA Y COMERCIALIZADORA DE ENERGIA DEL CARIBE S.A ESP – GECELCA, has an installed capacity of thermal generation equivalent to 1220 MW, supplied by its plants in Barranquilla (Atlántico) and Minguo (Guajira). It owns, operates and maintains units 1 and 2 of the Termoguajira plant, with an effective capacity of 151 MW each. Termoguajira is located in Minguo in the municipality of Dibulla, in La Guajira. These units operate on natural gas and can operate with coal.

GECELCA, participated in the first auction for the allocation of firm energy obligations in Colombia, developed by the CREG. At this auction the thermoelectric generation coal plant GECELCA 3 was allocated Firm Energy Obligations (OEF), for the period between December 1, 2012 and November 30, 2032.

GECELCA leads the GECELCA 3 project, the new thermoelectric power station located in the municipality of Puerto Libertador, in the department of Córdoba.
Termobarranquilla SA E.S.P. - TEBSA - is the largest thermal generator in Colombia; the plant is located on the North Coast of the department of Atlántico, municipality of Soledad. Its installed capacity is equivalent to 870 MW and in the near future will be expanded to 910 MW. Under normal conditions it generates over 10% of domestic demand, and can provide electrical power to most of the Colombian Atlantic Coast. It has become the fallback option in the region due to the unavailability of interconnection lines that connect the coast with the interior of the country, where power generation is mostly hydro.

TEBSA offers power generation, through GECELCA, its client, using combined cycle technology and its simple cycle power plant. The former consists of five gas turbines and two steam turbine generators operating in combined cycle to generate 750 MW.
SECTOR FORECAST

The energy industry, particularly the oil sector has been an important player in driving growth and economic development in Colombia. However, the rise seen since 2003 in the promotion of foreign investment and improved competitive scenarios for private companies has become stagnant. This is due to social and environmental issues, to negative impacts on infrastructure and declining reserves that endanger the good performance of this sector.

Currently, the Government has stated that it has reserves for approximately eight years, therefore the rate of production of one million barrels a day is not sustainable in the mid and long term. For this reason, the Government plans to focus efforts primarily on increasing oil reserves.

In this order, the Ministry of Mines and the National Hydrocarbons Agency are betting on opening up the offer for non-conventional reservoirs and the development of offshore activities. As an example, it has come to the conclusion that if the expectations for reserves of non-conventional oil are confirmed, the country could multiply its total reserves by six.

Of the 95 oil blocks auctioned in 2014, less than 30% of the available blocks were awarded. However, we emphasize that these were the subject of large companies such as Anadarko and ExxonMobil, Repsol, Statoil and Ecopetrol. On the other hand, on the almost 20 blocks of non-conventional reservoirs, only two bids were received.

Although significant investments are expected and new companies see significant potential in Colombia, the forecast for the oil industry does not reflect very positive results.

Furthermore, as an added factor to the declining levels of reserves, there are processes that hinder a dynamic and growing development, among these are worth noting the delays in issuing environmental licenses. Supposedly, the new environmental licensing decree is expected to promote efficiency in the assessment of applications without losing the technical rigor to ensure environmental sustainability.

However, the current situation must also be seen an opportunity to explore the possibility of investing in resources for the production of non-conventional energy, exploitation of renewable natural resources, and overall, in the development of alternative sources of energy such as wind power, considering the enormous potential of the country. Colombia has the necessary resources to be self-sufficient.

The model that promotes competition within a framework of interaction between supply and demand has served to consolidate a sector with a solid infrastructure for thermoelectric generation. This has allowed an industry to flourish, which several decades ago was not even considered relevant for the country. The thermal generation sector has properly started structuring an industry with great potential for expansion. This undertaking is no longer seen as the answer to the need to generate power in time of drought, but as a sector capable of transcending borders and conquering new markets.

In order for Colombia to maintain a high ranking in terms of energy security, environmental sustainability, and close the gap in service access to the entire population, it is necessary to maintain consistent and stable long-term policies for the energy sector. This is of significant importance if Colombia is to attract more investment from global energy leaders in the future.

According to several Latin American ex-Presidents, participating in the International Forum in Santo Domingo, “the Golden age of economic growth in Latin America has passed and the region is now faced with the challenge of deceleration, which poses significant issues for regional leaders, who must also address internal matters on safety, democratic strengthening and better wealth distribution.”

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7 “Latinoamérica enfrenta desaceleración y mayor distribución riqueza, dicen expertos”, El Espectador. Friday, January 30, 2014.
Due to the 60% drop in oil prices during the last six months, the oil industry has been forced to consider taking emergency measures in order to avoid a loss in equity. This situation not only forces them to reduce investment and operating expenses, but maybe payroll as well. Francisco José LLoreda, President of the Colombian Oil Association (ACP), states that although cutbacks are inevitable, the ACP is working together with the Government to find a solution to the problem that will safeguard the 110,000 jobs in the industry. On a rather pessimistic note, he states “this is a serious issue, I have the impression that the Government and the general public have not understood the seriousness of the matter: the initial impact is effectively on government revenues, and there are even some people who minimize its importance. The Fiscal Framework for the mid-term was based on a USD$98 barrel, and the price today is $48; this is USD $50 less per barrel. Not including the devaluation of the peso, the hole in public finances is equivalent to $300,000 million for every dollar lost per barrel.” Fortunately, oil prices have stabilized and a slight increase has been seen, (as of February 26, 2015 the Brent was at USD$59.91).

**OPPORTUNITIES FOR VIRGINIA COMPANIES**

The energy and oil industries are of significant importance for economic growth and social development. The Santos administration is open and willing to receive foreign investment and the participation of foreign companies in these industries. The Santos' administration Development Plan for 2014-2018 specifies the following as some of the areas where there are strategic opportunities for international cooperation:

- Science, innovation and technology; the satellite industry has grown significantly in the past decade and is considered a driver for technological innovation and development in other industries as well. It also promotes the development of environmental, public safety and cultural and social programs.
- IT Services, in terms of connectivity, software to guarantee transparency of information and operations, and end-user education (access, use and appropriation)
- Environmental management
- Comprehensive maritime security off-shore, by strengthening personnel training, environmental safety procedures, traffic control, signaling, and search and rescue procedures
- Technical training at all levels.
- Cyber security; best practices and software for surveillance and detection of cybercrimes
- Police force equipment and training

Based on expertise and knowledge of the oil and energy sector in Colombia, and in order to complement the general opportunities derived for governmental policies, the following is a general analysis of business opportunities for security and defense companies in the abovementioned sectors.

1. Perimeter Security Systems
   - Surveillance by satellite
   - Local video surveillance
   - Aerial video surveillance
     - Drones
     - Micro-drones
     - Aircraft

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» Tactical training for security personnel
» Equipment
  » Cameras
  » Monitors
  » Information centers

2. Secure communications
» Industrial wireless applications
» Data / Voice / Video
» Data Acquisition
» SCADA / Telemetry
» Mobile Data for Field Force Automation
» Control Process
» Telecom & Campus Connections
» Transaction / POS
» Mobile Data for Public Safety

3. Information security
» Implementation:
  » Data encryption
  » Confidentiality
  » Protocols
  » Risk analysis, impact, criticality and sensitivity
  » Access controls
  » Strategy
  » Network architecture
  » Contingency plans
  » Information assurance
  » Training for staff
  » Firewall
  » Administration of user accounts
  » Detection and intrusion prevention
  » Antivirus
  » Public key infrastructure
  » (SSL) Secure Socket Layers
  » Single connection "Single Sign-on SSO"
  » Biometrics
  » Privacy compliance
  » Remote access
  » Digital signature
  » Electronic data "EDI" and electronic transfer of funds "EFT"
  » Virtual private network "VPNs"
  » Secure electronic transfer "SET"
  » Computer forensics
» Data recovery
» Technologies of monitoring

» Certifications in:
  » CISM: Certified Information Security Manager
  » CISSP: Certified Information Systems Security Professional Certification
  » GIAC: Global Information Assurance Certification
  » CPTE Certified Penetration Testing Engineer
  » CPTC Certified Penetration Testing Consultant
  » CPEH Certified Professional Ethical Hacker
  » CISSO Certified Information Systems Security Officer
  » CSLO Certified Security Leadership Officer
  » ISO/IEC 27000-series
  » ISO/IEC 27001
  » ISO/IEC 27002

4. Global positioning systems
   » Personnel tracking
     » For staff located in high risk areas
     » For services providers located in high risk areas
   » Tracking of goods
     » Trucks
     » Containers
     » For personal vehicles
     » Specialized tools
     » Equipment and materials

5. Transportation
   » Armored vehicles
   » Helicopters
   » Trucks

6. Staff Services for
   » Remote Management for Physical Security
   » Bodyguards
   » Assessment
     » Kidnappings
     » Extortion
     » Terrorism

7. Prevention and care of natural disasters
   » Implementation of prevention protocols
   » Training
   » Risk reduction
   » Equipment
   » Implementation of contingency plans
SECURITY CONSIDERATIONS

The main security issues in Colombia are primarily associated to the internal conflict the country has lived under for the last sixty years. There is a portion of the territory that is affected by the conflict itself, areas where armed confrontations between the guerrillas and the army are frequent occurrences, entire populations that have been displaced over the years and innumerable refugees that flee to the cities in search of safety. The guerrilla also attacks the country’s infrastructure, including, roads, oil pipelines and energy transmission towers. Drug trafficking in Colombia remains an important concern for both the government and international organizations, including other countries. Even though major drug cartels have been disbanded and eliminated in the last two decades, there are still many small drug operations in cities such as Bogotá and Medellin, which in turn lead to other criminal activities.

During the last fifteen years, the overall situation of national security and defense has developed favorably as a result of the sustained work of the security forces and ongoing support of citizens. Armed criminal groups and gangs are being disjointed decisively, and the factors that enhance their ability to cause damage have been systematically beaten. Between 2010 and 2014, the Comprehensive Security Policy for Prosperity and the Sword of Honor and Greenheart Programs, allowed for the neutralization of 54 leaders of the FARC, 17 of the ELN and 42 of the BACRIM (Criminal gangs).

Likewise, the offensive capability of these groups has been reduced. During the previous four years, 248.1 tons of explosives were seized; 887 terrorist attacks were neutralized and prevented; 69,411 explosive devices were destroyed and 18,583 were seized. The strength of these operating results dramatically reduced the actions of these criminal structures, thus improving the security environment. By August 2014, 90% of municipalities had seen no terrorist attacks by the FARC and ELN and 95% had seen no subversive actions. Furthermore, 82% of the population did not report any terrorist activity or criminal gang structures.

Border areas face many problems that arise from the presence of illegal armed groups and transnational criminal organizations involved in drug, illegal arms and explosives trafficking, mainly along the borders with Ecuador and coastline territories in the Caribbean and Pacific; and illegal mining and illegal exploitation of natural resources in the border with Peru, Brazil and Panama, are issues that need to be addressed.

In his four-year plan, President Juan Manuel Santos addresses five transversal strategies as the basis for a more peaceful, equitable, and educated country.

1. Infrastructure and competitive strategies
2. Social mobility
3. Rural transformation and “Green growth”
4. Consolidation of a Constitutional State
5. Good governance

In order to succeed, these strategies need to address several of the more complex issues for the government: the armed conflict, insecurity, poverty, inequality, and a lagging educational system. For example, Colombia is among the top fifteen countries with the greatest inequality indexes.

The government also needs to strengthen its presence in rural areas of the country. The National Planning Department (DNP, 2014) calculates that a total of 269 registered armed conflict and violence acts occurred in 2013, which represents 25% of total municipalities. In the last three years, 60% of armed and illegal activities took place in Norte de Santander, Arauca, Putumayo, Nariño, Cauca and Antioquia, which also represent some of the areas where the judicial system is lacking: for example Norte de Santander, Putumayo and Nariño, concentrate 60% of illicit drug crops in 2013 (DNP, 2014); and the borders with Peru, Brazil and Panamá are the main areas for illegal mining and illicit exploitation of
natural resources (Ministry of Defense, 2011). 92% of attacks on oil and gas infrastructure occurred in Norte de Santander, Putumayo and Arauca; while 70% of attacks on power transmission towers occurred in Antioquia, Nariño and Cauca.

The judicial system also needs to strengthen its institutionalism, for example, only 5.1% of homicides entered into the judicial system between 2000 and 2012 resulted in a prison sentence, which sadly is a high percentage when compared to other types of crimes; personal injury (0.6%), sexual harassment (0.2%), crimes against public administration (0.6%) or terrorism (1.9%).

The private sector has the responsibility of participating proactively and constantly in achieving the goals set out by the government. Given their ability to generate social and economic opportunities, they must develop business models that factor in the countries current context in search of eliminating violence, inequality, human rights violations, and create virtuous cycles that promote social and economic inclusion. International entities and agencies, diplomatic missions and international NGOs, among others, are also invited to participate as allies in this process. They offer resources, technology and innovation, and knowledge. Some of the areas where the government is particularly interested in foreign cooperation are: innovation and technology, telecommunications, environmental management.

Advances in Equity and Poverty\textsuperscript{10}

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LEGAL CONSIDERATIONS

REGULATORY AUTHORITIES

In Colombia, the main regulatory authorities for the refining and energy sectors are the Ministry of Mining and Energy, the Ministry of Finance and Public Credit, the National Planning Department, the National Hydrocarbon Agency (ANH), the Mining and Energy Planning Unit (UPME) and the Energy and Gas Regulation Commission (CREG). In addition, the Superintendence of Public Utilities, the Superintendence of Finance, the Superintendence of Corporations, and the Superintendence of Ports and Transportation monitor the operations by companies in the sector.

Specifically, the Ministry of Mining and Energy defines government policies for the energy sector, the Superintendence of Public Utilities supervises and audits all public utilities, the CREG regulates technical and marketing operations sector, and the Mining and Energy Planning Unit is responsible for planning and expansion of the grid.

In an effort to reduce the concentration of natural gas supply in the market, in 2011, the Ministry of Mining and Energy, issued Decree 2100, which modifies the administration of natural gas royalties, in such a manner as to manage their marketing on behalf of the ANH. However, in 2013, the ANH issued Resolution No. 877 by which the collection of said royalties and the compensation caused from the exploitation of gas may once more be marketed by the operators, in the proportions stipulated in the corresponding contracts of exploration and production.

The energy sector was modified in 1994 by Act 142 of Household Public utilities, and Act 143 (Energy Act). According to Act 143, public, private or mixed entities are free to participate in sector activities under a free market economy. In order to operate or initiate projects, environmental, sanitary and water right permits must be obtained from the corresponding local authorities.

REGULATIONS FOR THE OIL INDUSTRY

The Oil industry is regulated primarily through the Oil Code, which was issued and enacted under Decree 106 of 1953, and its subsequent modifications, of which some are mentioned as follows: Act 10 of 1961 which restricted the activities for oil licensees and stipulated controls on the same; Law 20 of 1969 and Law 97 of 1993, which significantly restricted the interpretation and application of private property rights on national soil and non-renewable resources; Decree 2301 of 1974, which regulated the transfer of exploration and exploitation activities from the Nation to Ecopetrol, and Resolution No. 2543 of 1984, issued by the Ministry of Mines by which the proceedings for the approval of contract for the exploration and exploitation of hydrocarbons are regulated. Both the national government and the Ministry of Mines and Energy are constantly updating regulations through Decrees and Resolutions, and which can be found individually in the web site for the above-mentioned Ministry. The last major modification to the Code came about in 2005, by way of Decree 4299, which established the requirements, obligations and penalties applicable to the agents participating in the distribution chain of liquid fuels obtained from oil, with the exception of LPG.

The Oil Code comprises regulations on pricing, distribution of the different products and byproducts, royalties, specific environmental and tax legislation for the oil industry, foreign investment, import and export procedures, agent obligations and operations. The Colombian Trade, Tax and Labor Codes also include specific regulations for the oil industry as well as general regulations that apply.

Internal and export prices of oil and natural gas are determined by the Pricing Commission of Oil and Natural Gas of the Ministry of Mines.
Other influential players in the oil and gas sector are industry unions; their political power is significant and the collective bargaining agreements between the unions and Ecopetrol and other companies around wages and reparation have impacted the industry in the past. Just recently, in order to allow for the modernization of the Barrancabermeja Refinery, Ecopetrol had to sit down to reach an agreement with the USO, which took six months to complete. Unions are regulated by the Colombian Constitution, the Labor Code and are under the supervision of the Ministry of Labor.

Some of the more important union groups in Ecopetrol, the oil and gas and energy sectors, and other sectors as well are:

1. USO - Workers Union for the Oil Industry
2. Adeco - Professional and Technical Management Personnel Association for the Oil Industry in Colombia
3. Sindispetrol - National Workers Union for Operators, Contractors, Subcontractors of Services and Activities in the Industry
4. CUT – Central Union of Workers
5. CGT – General Confederation of Workers
6. CTC – Colombian Confederation of workers

REGULATION FOR GENERATION COMPANIES

Both the State and the private sector may participate in the implementation and operation of generation projects. The State is only authorized to enter into concession agreements related to generation when there is no other entity prepared to assume these activities under comparable conditions. The CREG receives daily offers on price and available capacity per hour for the following day by all generation participants in the wholesale market. Based on this information, the CREG completes an economic dispatch using an optimized procedure for the 24 hour period of the following day, taking into account the limitations of the grid, as well as other conditions required to meet expected energy demand for the next day safely, reliably and efficiently, from the standpoint of cost. In Colombia, unlike other countries where dispatch is based on variable production costs, dispatching is based on bids tendered by agents.

The energy exchange is a balancing market, where it sells or buys the excess or deficit of energy resulting from the performance of contracts against the actual energy demand for power generators and marketers. The energy exchange sets the spot price, which is determined after the day of operation by an optimized process for the period of 24 hours, known as ideal dispatch, which assumes an infinite capacity for network transmission and takes into account initial operating conditions, thus establishing what generators should be dispatched to meet actual demand.

The price paid to all generators dispatched, by price merit, is the price of the most expensive generator dispatched in each hour according to the ideal dispatch. The cost differences between 'economic dispatch "and the" ideal dispatch "are called" restriction costs ". The cost of each restriction is initially assigned to the agent responsible for the restriction, and when it is not possible to identify an agent it is distributed proportionately between all marketers in the system, according to their energy demand, and these costs are passed on to the end customers.

Generators connected to the grid system can also participate in the "Reliability Charge" which is a mechanism intended to encourage investment in generation capacity to ensure coverage of the country's demand in the long term. The charge consists of assigning Firm Energy Obligations (OEF) through a descending price auction for existing or new generators, who must guarantee the system said amount of energy for a given period. The allocation for existing generators is done annually and for new projects for up to 20 years. The OEF is a commitment made by the generating company, backed by its physical resources and that enables it to produce firm energy. The generator that acquires an OEF will receive a fixed compensation during the period of the agreement, whether the fulfillment of its obligation is required
or not. The price per KWh of OEF corresponds to the closing value at the auction for firm energy or reliability charge. When this firm energy is required, which occurs when the spot price exceeds the scarcity price, in addition to the Reliability Charge, the generator also receives the scarcity price, for each KWh generated with its OEF. If the energy generated is greater than the obligation specified in the OEF, this additional energy is paid at the spot price.

ENVIRONMENTAL LEGISLATION

Environmental regulation in Colombia is set within the legal framework of Act 99 of 1993, under which the Ministry of the Environment was also created. The Ministry defines, issues and executes policies and regulations for the recovery, preservation, protection, organization, management and use of renewable resources.

According to Act 99, power generation stations that have a total installed capacity above 10 MW must contribute to the conservation of the environment by paying a fee to the municipalities and environmental corporations in their places of operation. Hydroelectric power stations must pay 6% of their generation, and thermoelectric power stations must pay 6%, according to annual rates.

Lately, environmental regulations have focused on emissions, hydro policies (including water discharges and basin organizations), environmental licensing and penalties.

Any entity that is considering developing projects or activities that imply generation, interconnection, transmission or distribution of energy, and that may cause environmental damages must first request an environmental license.

Colombia is one of the 187 countries that participated and signed the Kyoto Protocol, and as such, is committed to the mitigation of environmental changes through the creation of projects that limit emissions or increase the capacity to capture CO₂ thorough energy efficient processes, the use of renewable energy and improved technologies.

In recent years the oil sector has grown significantly, which has led to an increase in environmental license requests for exploration and drilling projects. According to Decree 2820 of 2010, the Hydrocarbon Group of the National Authority for Environmental Licenses (ANLA) is responsible for analyzing environmental studies, including positive and negative financial impact, and issuing Environmental Licenses for the following activities:

1. Seismic exploration activities that require the construction of roads for vehicular traffic.

2. Seismic exploration activities in marine areas, inside the national territory, performed in depths of less than 200 meters.

3. Exploration drilling projects outside the existing hydrocarbon production fields, according to the area of interest indicated by the petitioner.

4. Exploitation of hydrocarbons, including drilling of wells of any kind, construction of facilities proper to the activity, additional works including internal transport of fluids by pipeline, internal storage, internal roads and other associated infrastructure works.

5. Transportation and handling of liquid and gaseous hydrocarbons developed outside the drilling fields involving the construction and installation of pipelines infrastructure with diameters greater than or equal to 6 inches (15.24 cm), including pumping and / or pressure reduction stations and related storage and flow control infrastructure; with the exception of those activities related to the distribution of household, commercial or industrial natural gas.
6. Delivery terminals and transfer stations for liquid hydrocarbons, understood as the storage infrastructure associated with the transport of oil, its products and byproducts.

7. The construction and operation of refineries and petrochemical facilities that are part of a refinery complex.

In addition, within the evaluation and surveillance framework of the ANLA, there are several other parties that participate in the process: Regional Autonomous Corporations, the Ministry of the Interior, and the Ministry of the Environment regarding the use of natural resources, relationships with indigenous and African-descent communities, environmental management and protection in the areas of influence of the projects. They must all participate in the ANLA processes by providing their opinion about their areas of competence to the extent required.

TAX LEGISLATION

Tax legislation in Colombia is based on the Colombian Tax Code, and taxes are collected and administered by the National Tax and Customs Department (DIAN). Taxes are administered at a national and municipal level.

The following are the main taxes that affect companies doing business in Colombia:

1. Income tax: The income tax is levied on a national level and on all net income earned by a taxpayer in the year for profits derived for the company’s main operations; the rate applied is 25%.

2. Capital gains tax: Capital gains tax is levied on a national level on all income derived from activities not considered part of the company’s main operations; the rate applied is 10%.

3. CREE (Equity tax): CREE is levied on a national level for all corporations, on all income earned by a taxpayer which are susceptible to increase equity of the company; the rate applied is 9% for 2015, and 8% subsequently.

4. VAT: VAT rates are established at 0%, 5% or 16% according to the good or service.

5. Tax on financial operations: a 0.4% rate is applied to all financial transactions.

6. Property tax: Local tax levied on property, rates range between 0.3 and 3.3%.

7. ICA: Local tax levied on industrial and trade operations, or services rendered, the rates range between 0.2 and 1.4%.

8. Excise tax: Indirect tax levied on the automobile, telecommunication, and food and beverage sectors, at rates of 4%, 8% and 16%.

9. Wealth tax: According to the new Tax Reform of 2014, for 2015 through 2017, corporations with equity above COP $1,000.000 million must pay a wealth tax which will be levied on their equity as of December 31 of each corresponding fiscal year, the rates will start at 1.3% for 2015, 1% for 2016 and 0.75% for 2017.

10. Gasoline and Diesel Tax: This tax is levied on a national level and is applied to the sale, withdrawal or import of gasoline or diesel fuel for individual use or import for sale. The rate applied is determined by gallon of gasoline or diesel fuel and adjusted according to DIAN decree.

11. Vehicle Tax: This tax is levied on the ownership or possession of vehicles, and canceled based on its market value.
FREE TRADE AGREEMENTS

Currently, Colombia has the following Free Trade Agreements or Economic Partnership agreements in effect, they are listed by the year they entered into force.

1994
1. Mexico
   As of September 2014, the trade balance with Mexico amounted to a deficit of USD 2,942.4 million FOB.\(^{11}\)

2. CARICOM (Trinidad and Tobago, Jamaica, Barbados, Guyana, Antigua and Barbuda, Belice, Dominica, Granada, Monserrat, San Cristobal and las Nieves, Saint Lucia, Saint Vincent and the Grenadines. For 2013, total trade between Colombia and CARICOM amounted to USD 1.727 million.\(^{12}\)

2009
3. Mercosur (Brazil, Argentina, Paraguay, and Uruguay)
   As of October 2014, the trade balance with Mercosur amounted to a deficit of USD 1,363 million FOB.\(^{13}\)

4. North Triangle
   The North Triangle Group is comprised of Guatemala, El Salvador and Honduras. However, the FTA was signed initially with Guatemala in 2009, and the following year with El Salvador and Honduras. As of October 2014, the trade balance with the North Triangle Groups amounted to USD 297,360 million FOB.\(^{14}\)

5. Chile
   As of September 2014, the trade balance with Chile amounted to a surplus of USD 121.4 million FOB.\(^{15}\)

2010
6. EFTA
   As of 2013, the trade balance with Switzerland amounted to a surplus of USD 35.4 million FOB. As for trade with Liechtenstein, Colombia imported products in the amount of USD 2,017 million FOB, and generated no exports. The trade balance with Iceland and Norway amounted to a deficit of USD 673 million FOB, and USD 16,991 million FOB, respectively.\(^{16}\)

2011
7. Canada
   As of September 2014, the trade balance with Canada amounted to a deficit of USD 312.6 million.\(^{17}\)

2012
8. USA\(^{18}\)
   The US and Colombia signed a FTA in 2012 by which more than 80% of US exports of consumer and industrial products will become duty free immediately, while the remaining 20% will be phased out over a course of 10 to 15 years, depending on the sector. As of September 204, the trade balance with the US amounted to a deficit of USD 2,278.8 million.\(^{19}\)

\(^{11}\) www.dane.gov.co
\(^{12}\) www.mincit.gov.co
\(^{13}\) www.mincit.gov.co
\(^{14}\) www.mincit.gov.co
\(^{15}\) www.dane.gov.co
\(^{16}\) www.mincit.gov.co
\(^{17}\) www.dane.gov.co
\(^{18}\) http://www.ustr.gov/uscolombiatpa/facts
\(^{19}\) www.dane.gov.co
9. European Union and Peru
As of September 2014, the trade balance with the European Union amounted to USD 1,287.4 million, and a USD 1,180.9 million deficit with Peru.\textsuperscript{20}

POLITICAL OUTLOOK

Colombia is a Presidential democracy. It is comprised of 32 departments (“departamentos”): Amazonas, Antioquia, Atlántico, Bolívar, Boyacá, Caldas, Caquetá, Casanare, Cauca, Chocó, Córdoba, Cundinamarca, Guainía, Guaviare, La Guajira, Magdalena, Meta, Nariño, Norte de Santander, Putumayo, Quindío, Risaralda, Archipelago of San Andrés, Providencia and Santa Catalina, Santander, Sucre, Tolima, Valle del Cauca, Vaupés and Vichada. The Capital is Bogotá.\textsuperscript{21}

The Government is bicameral, with a Senate and a Chamber of Representatives. The main political parties are: Liberal Party (LP), Conservative Party (CP), Social Party of National Unity (U), Democratic Center Party (CD), Radical Change Party (CR), Democratic Pole Party (PDA), and the Green Party (V). Elections are held every four years for both the President and the members of Congress. The last election took place in June 2014, where Juan Manuel Santos was reelected for a second term in office. Congressmen are elected in representation of their geographical regions on a proportional basis. Currently, the government party retains a majority in Congress, however it has two very strong opposing factions in the CD, which is ex-President Alvaro Uribe’s party, and is particularly against the manner in which the peace process has been approached, and the leftist parties, which are in favor of the peace process but against political control policies.

President Juan Manuel Santos based his presidential campaign on a negotiated end to the insurgency by the terrorist group known as Revolutionary Armed Forces of Colombia or FARC, and was challenged by hardliner and former cabinet member Oscar Ivan Zuluaga (also a protégé of Santo's predecessor, and former ally, President Alvaro Uribe).

Santos has generally enjoyed widespread approval since his election in June of 2010 for his management of the economy, international relations and the fight against corruption and insurgency. While maintaining Uribe’s firm stance on security and strong ties to the United States, he also emphasizes an agenda on social and economic reform. Negotiations for an end to the 50-year conflict with the FARC were the key domestic agenda in the second half of the government's term and continue to be a major focus of Santos's new term. Santos's foreign policy priorities have included the diversification of the country's trade and investment alliances, both within the region and towards Asia Pacific and Europe. President Santos continues efforts to improve Colombia's international engagement and image abroad, through the initiation of accession to the OECD, cooperation with NATO and pro tempore presidency of the Pacific Alliance, which it handed to Mexico in June 2014.

Peace talks between the FARC and the Colombian Government commenced in Havana, Cuba in November of 2012. The negotiations focus on five items: agrarian reform (including access to land); political participation for FARC members; drug trafficking, reparation for victims of the conflict; and the logistics for ending the armed conflict. Agreements have been reached on agrarian reform, drug trafficking and political participation. Negotiations continue on the two remaining issues, with varying degrees of optimism on a successful outcome, as well as on the implementations of the ensuing policies.

President Juan Manuel Santos’ new administration aims to achieve a social pact to enable Colombians to build a better country based on democratic prosperity. As its core is the creation of jobs to ensure a safe

\textsuperscript{20} www.dane.gov.co
\textsuperscript{21} www.cia.gov/library/publications/the-world-factbook
income, decent work and the benefit of social security for all Colombians. There are five driving forces behind this goal that have boosted the economy under his government: agriculture, social housing, mining, innovation and infrastructure.

The President appoints cabinet members, and the current Cabinet is comprised as follows:

<table>
<thead>
<tr>
<th>Ministry</th>
<th>Minister</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vice President</td>
<td>Germán Vargas Lleras</td>
</tr>
<tr>
<td>Ministry of the Interior</td>
<td>Juan Fernando Cristo</td>
</tr>
<tr>
<td>Ministry of Foreign Affairs</td>
<td>Maria Angela Holguin</td>
</tr>
<tr>
<td>Ministry of Defense</td>
<td>Juan Carlos Pinzón</td>
</tr>
<tr>
<td>Ministry of Justice</td>
<td>Yesid Reyes</td>
</tr>
<tr>
<td>Ministry of Finance</td>
<td>Mauricio Cárdenas</td>
</tr>
<tr>
<td>Ministry of Mines and Energy</td>
<td>Tomás Gonzalez</td>
</tr>
<tr>
<td>Ministry of Trade</td>
<td>Cecilia Alvarez</td>
</tr>
<tr>
<td>Ministry of Transport</td>
<td>Natalia Abello</td>
</tr>
<tr>
<td>Ministry of the Environment</td>
<td>Gabriel Vallejo</td>
</tr>
<tr>
<td>Ministry of Agriculture</td>
<td>Aurelio Iragorri</td>
</tr>
<tr>
<td>Ministry of Health</td>
<td>Alejandro Gaviria</td>
</tr>
<tr>
<td>Ministry of Housing</td>
<td>Luis Felipe Henao</td>
</tr>
<tr>
<td>Ministry of Labor</td>
<td>Luis Eduardo Garzón</td>
</tr>
<tr>
<td>Ministry of Education</td>
<td>Gina Parody</td>
</tr>
<tr>
<td>Ministry of Information Technology and Communications</td>
<td>Diego Molano</td>
</tr>
<tr>
<td>Ministry of Culture</td>
<td>Mariana Garcés</td>
</tr>
</tbody>
</table>

There are also 4 High Advisors, 2 Secretaries to the Presidency and, 2 decentralized agencies whose directors are appointed by the President.

<table>
<thead>
<tr>
<th>Office</th>
<th>Director</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Advisor for the Presidency</td>
<td>Nestor Humberto Martínez</td>
</tr>
<tr>
<td>High Advisor for Government and the Private Sector</td>
<td>María Lorena Gutierrez</td>
</tr>
<tr>
<td>High Advisor for Communications</td>
<td>Pilar Calderón</td>
</tr>
<tr>
<td>High Advisor for Post-Conflict, Human Rights and Security</td>
<td>Oscar Naranjo</td>
</tr>
<tr>
<td>Private Secretary to the President</td>
<td>Enrique Riveira</td>
</tr>
<tr>
<td>Legal Secretary to the President</td>
<td>Cristina Pardo</td>
</tr>
<tr>
<td>Director for the Administrative Department of Public Administration</td>
<td>Liliana Caballero</td>
</tr>
<tr>
<td>Director for the National Planning Department</td>
<td>Simón Gaviria</td>
</tr>
</tbody>
</table>
In the last decade, Colombia has become a key player in the region, thanks to the strength of its institutions, and the management and increased security throughout the entire territory. The Colombian State is a firm, strong democracy with a long historic tradition within the region.

It is a country of mega-diversity, committed to the environment, renewable energies and bio-fuels. It is also a safe and exotic tourist destination. It forms part of the group of emerging economies known as CIVETS and is now considered an important player in the mining and energy field.

However, there are still several issues that require consideration when assessing Colombia as a possible target for investment. Colombia is still a major supplier of cocaine, marijuana and heroin. The illicit narcotics trade is estimated to be worth approximately five to ten per cent of the GDP. The cultivation and trafficking of drugs continues to have a negative impact on security, the formal economy and the environment. In particular, the use of fragile tropical and jungle ecosystems to grow cocaine, including the use of agricultural chemicals, has caused significant environmental damage.

While human right abuses continue in Colombia, the situation has improved with an overall lessening of civil conflict. A program for land restitution commenced by Santos’ administration in 2011 has begun to address social injustices that have arisen from the country’s historical civil conflict. Historically, the major source of human rights abuses in Colombia has stemmed from the internal armed conflict between the army, paramilitary groups and the guerrillas. A July 2013 report indicated that across the length of the conflict, more than 5 million people have been forcibly displaced. 22

Although IT services have significantly improved in the last few years, there are still gaps in terms of access, use and appropriation. 51.7% of the population has internet access, 43.6% of households in department capitals uses the internet, however only 6.8% of the rural population has access to the service. There is still a need to promote the use and appropriation of IT services, through both connectivity and education.

The National Competitiveness Agenda for 2014 – 2018, focuses on the need to generate a greater economic and social growth and improve conditions for business activities for all players through eleven points, which are yet to be articulated by the government but include:

» Science, technology and innovation
» Regional development
» Infrastructure
» Agrarian transformation
» Industrial Transformation
» Education, employment and health
» Institutionalism
» Macroeconomic stability
» Justice
» Reduction of crime and corruption
» Fair competition

Transportation infrastructure is one of the main pillars of competitiveness as well as an economic growth and social driver. Historically, Colombia has lagged behind in this matter. According to the 2014-2015 Global Competitiveness Report by the OECD, Colombian infrastructure is ranked below emerging Asian countries and some Latin American countries. Colombia highways are ranked 129, railroads are ranked 102, ports are ranked 90, and airports ranked No. 78. The Government is trying to increase investments

22 www.hrw.org
in transport infrastructure to 3% of the GNP by the end of the decade. The National Infrastructure Agency (ANI) has begun the most ambitious highway construction program, known as the G4 Concession, which includes more than 40 projects, with an investment close to 47.000 million.

**ECONOMIC OUTLOOK**

**COLOMBIA ECONOMIC DATA**

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (million)</td>
<td>46.6</td>
<td>47.2</td>
</tr>
<tr>
<td>GDP per capita (USD)</td>
<td>7,946</td>
<td>8,023</td>
</tr>
<tr>
<td>GDP (USD bn)</td>
<td>370.3</td>
<td>378.3</td>
</tr>
<tr>
<td>Economic Growth (GDP, annual variation in %)</td>
<td>4.1</td>
<td>4.7</td>
</tr>
<tr>
<td>Domestic Demand (annual variation in %)</td>
<td>4.6</td>
<td>4.7</td>
</tr>
<tr>
<td>Consumption (annual variation in %)</td>
<td>4.7</td>
<td>4.6</td>
</tr>
<tr>
<td>Investment (annual variation in %)</td>
<td>4.6</td>
<td>6.1</td>
</tr>
<tr>
<td>Industrial Production (annual variation in %)</td>
<td>-0.2</td>
<td>-1.7</td>
</tr>
<tr>
<td>Retail Sales (annual variation in %)</td>
<td>4.1</td>
<td>4.7</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>10.4</td>
<td>9.7</td>
</tr>
<tr>
<td>Fiscal Balance (% of GDP)</td>
<td>-1.9</td>
<td>-2.2</td>
</tr>
<tr>
<td>Public Debt (% of GDP)</td>
<td>31.7</td>
<td>34.9</td>
</tr>
<tr>
<td>Money (annual variation in %)</td>
<td>16.5</td>
<td>14.7</td>
</tr>
<tr>
<td>Inflation Rate (CPI, annual variation in %, eop)</td>
<td>2.4</td>
<td>1.9</td>
</tr>
<tr>
<td>Inflation Rate (CPI, annual variation in %)</td>
<td>3.2</td>
<td>2.0</td>
</tr>
<tr>
<td>Inflation (PPI, annual variation in %)</td>
<td>-3.0</td>
<td>-0.5</td>
</tr>
<tr>
<td>Policy Interest Rate (%)</td>
<td>4.25</td>
<td>3.25</td>
</tr>
<tr>
<td>Stock Market (annual variation in %)</td>
<td>16.2</td>
<td>-11.2</td>
</tr>
<tr>
<td>Exchange Rate (vs USD)</td>
<td>1,767</td>
<td>1,930</td>
</tr>
<tr>
<td>Exchange Rate (vs USD, aop)</td>
<td>1,797</td>
<td>1,869</td>
</tr>
<tr>
<td>Current Account (% of GDP)</td>
<td>-3.1</td>
<td>-3.3</td>
</tr>
<tr>
<td>Current Account Balance (USD bn)</td>
<td>-11.6</td>
<td>-12.4</td>
</tr>
<tr>
<td>Trade Balance (USD billion)</td>
<td>1.0</td>
<td>-0.6</td>
</tr>
<tr>
<td>Exports (USD billion)</td>
<td>60.1</td>
<td>58.8</td>
</tr>
<tr>
<td>Imports (USD billion)</td>
<td>59.1</td>
<td>59.4</td>
</tr>
<tr>
<td>Exports (annual variation in %)</td>
<td>5.6</td>
<td>-2.2</td>
</tr>
<tr>
<td>Imports (annual variation in %)</td>
<td>9.0</td>
<td>0.5</td>
</tr>
<tr>
<td>International Reserves (USD)</td>
<td>37.5</td>
<td>43.6</td>
</tr>
<tr>
<td>External Debt (% of GDP)</td>
<td>21.3</td>
<td>24.3</td>
</tr>
</tbody>
</table>

Colombia is a country that offers both favorable and unfavorable conditions for investment. Institutionally it has a stable government that promotes economic development through sensible and well-documented policies, and it has a strong financial industry. It is strategically located in the region, allowing for ease of trade by way of the Pacific and the Caribbean oceans. It has abundant natural resources, in particular agricultural and mineral resources, such as oil, nickel, natural gas, iron ore, coal, platinum and emeralds. It is still primarily an agrarian country, with agriculture representing 5.2% of the GDP for 2013 and 4.7 for 2014, with coffee, flowers and bananas representing the main export products. However, the construction industry was the fastest growing sector in the country during 2013, with an increase of 12%. On the down side, the economy is sensitive to raw material prices, and trade is affected by the inadequacies for

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23 www.minhacienda.gov.co
24 www.dane.gov.co
its road and port infrastructures, which generate an increase in costs. Its large informal sector, in conjunction with serious shortcomings in education and health, and structural unemployment, poverty and inequality generate difficulties obstacles for economic growth.

According to World Bank data, Colombian economy has reflected sustainable growth for the past five years; for 2010, GDP growth closed at 4%, in 2011 at 6.6%, in 2012 at 4.0, and in 2013 at 4.7%. Estimated GDP growth for 2014 is expected at 4.7%, 2015 at 4.4% and 2016 and 2017 at 4.3%. Colombia’s economy slowed down in the second quarter of 2014, decelerating from Q1’s 6.5% expansion to a more moderate but still robust 4.3%. The slowdown was largely driven by shrinking net exports, and also by slower consumption and investment growth. Recent developments point to a further moderation in economic growth. The drop in the oil price and the resulting decline in government revenues are putting public finances under pressure, given that oil accounts for the lion’s share of the country’s exports as well as a significant part of government revenues. In order to cover the funding gap expected for next year, the government has passed a tax reform that introduces a tax on corporate profits and extends both an expiring wealth tax and a tax on financial transactions. Meanwhile, the Colombian peso dropped to the lowest level in more than five years, which, on a positive note, will help boost exports in the manufacturing and agricultural sector.

The oil and gas industry is a prime target for terrorism attacks. These attacks generally affect oil infrastructure and oil tankers, causing significant losses both in terms of product as well as for the environment. As of September 2014, 1400 attacks were perpetrated against Ecopetrol infrastructure, resulting in a loss of 17,000 barrels of crude oil and a cost of close to 60 thousand million pesos in reparations. However, it is worth mentioning that although attacks have increased, repair times have decreased, thus minimizing the environmental and operational impacts.

25 Worldbank, Global Economic Prospects, Latin America and the Caribbean, p.8.
MEXICO

COUNTRY OVERVIEW

Key Facts:
» Capital: Mexico City
» Population: 118.4 (2013)
» President: Enrique Peña Nieto
» Land Area: 1,220,606 square miles
» Language: Spanish
» Currency: Mexican Peso (MXN)

The official name of Mexico is the United States of Mexico. It is located in the northern hemisphere of the American continent; part of its territory is located in North America and the rest in Central America. Its land area is 1,220,606 square miles. Currently a borderline of 1,958 miles marks the northern border with the United States. To the south, Mexico borders with the Republics of Guatemala and Belize by a sinuous border, 713 miles long.

Mexico extends between parallel 14° 32' 27" at the mouth of the Suchiate River and parallel 32° 43' 06", passing through the confluence of the Gila River in Colorado; and between Greenwich western longitudes of 118° 22' 00" and 86° 42' 36" respectively.

It is one of five countries considered "mega-diverse". It is home to more than 12% of animal and plant species known in the world, which implies great responsibility at a regional and global level in terms of the environment.

Mexico is a representative, democratic and federal republic governed under the laws of its Constitution drafted in 1917.

Mexico is divided into 31 states and a Federal District, which seats the federal government. The states are: Aguascalientes, Baja California, Baja California Sur, Campeche, Coahuila, Colima, Chiapas, Chihuahua, Durango, Guanajuato, Guerrero, Hidalgo, Jalisco, México, Michoacán, Morelos, Nayarit, Nuevo León, Oaxaca, Puebla, Querétaro, Quintana Roo, San Luis Potosí, Sinaloa, Sonora, Tabasco, Tamaulipas, Tlaxcala, Veracruz, Yucatán and Zacatecas.

It currently has a network of ten free trade agreements with forty-five countries, thirty arrangements for the promotion and reciprocal protection of investments and nine agreements of limited scope (Economic Complementation Agreements and Partial Scope Agreements) under the Latin American Integration Association (ALADI). Due to the above, it is positioned as a gateway to a potential market of over one billion consumers and 60% of the global GDP.

It is considered a developing country with an economy strongly based on oil, remittances from Mexican migrants working abroad, tourism and growing industrial, mining and farming sectors.

It is worth noting that Mexico is the largest producer of silver in the world, with this being an essential part of mining activity in the country. Industrial activity is one of the most important economic activities, occupying a quarter of the economically active population; automotive, cement, steel, textile and chemical industries are among the most important of Mexican industries.
OIL IN MEXICO

The oil industry in Mexico is a fundamental part of its history, development and economy. Currently, the oil industry is the number one source of contributions received by the federal government.

In Mexico there are records of natural oil upwellings ("Chapopoteras"/ tar pits) since pre-Hispanic times. Toward the end of the XIX century, foreign companies began exploration activities in Mexico. Adolfo Autrey did the first well drilled in Mexico at a depth of 40 meters near the tar pits of Cougas, later known by the name of Furbero, near Papantla. This well was drilled in 1869, but was found dry.

In the 1880’s several shallow wells near the tar pits were drilled unsuccessfully, in the Cerro Viejo and Chapopote Nuñez Haciendas in the northern part of the State of Veracruz.

Late in 1899, Edward L. Doheny and his partner C.A. Canfield, prosperous oil producers from California, carried out an inspection in the region of Tampico. Starting from the north they reached San José de las Rusias, to the west they reached Tempoal and to the south San Jerónimo and Chinampa. Impressed by the number of tar pits near the railway stations of Ebano and Chijol, in the State of San Luis Potosí, in May 1900 they acquired the Tulillo Hacienda and organized the Mexican Petroleum Company of California. They started drilling on May 1, 1901, and by the end of 1903 they had drilled about 19 wells unsuccessfully. Doheny and Canfield had lost much of their fortunes in Ebano, when they decided to seek the advice of Engineer Ezequiel Ordóñez, a prestigious Mexican geologist. After analyzing the results, he recommended drilling a well near the volcanic neck, in a location known as Cerro de la Pez, where two large "chapopoteras" were located. The Pez No. 1 well, was completed on April 3, 1904, with a production of 1,500 barrels of oil per day, at a depth of 503 meters. This was the first truly commercial well drilled in Mexico.

In the southern state of Veracruz, another company discovered the San Cristobal field in 1906. The Sir Weetman Pearson Company, funded with English capital, arrived at the Tampico-Tuxpan region, and after several attempts, in May 1908 completed Well No. 2, in the San Diego de la Mar Hacienda, with a production of 2,500 barrels of oil per day. This was the first of a series of discoveries of rich oilfields, which came to be known as the "Faja de Oro" or Band of Gold.

International companies continued exploring the oil industry. In 1910, Standard Oil Company and Royal Dutch Shell arrived in Tampico, the latter belonging to a consortium of Dutch and English companies. The active oil wells that gained fame internationally were many, such as Casiano No. 7, which began production on September 8, 1910, and the Potrero del Llano, which was completed in 1911. But without a doubt, one of the most spectacular oil wells in the annals of history, not only in Mexico but also in the world, was Cerro Azul No. 4, drilled in 1916, and located by Ezequiel Ordóñez. Its production was estimated at 260,000 barrels per day.

Oil exploitation continued to develop in an irrational manner. The workers started a resistance movement against abuse and lack of guarantees for survival. They obtained the support of the authorities, and this finally led to the nationalization of oil.

The expropriation of oil in Mexico was formalized through the Act of Nationalization of the oil industry enacted in 1938, as a result of the implementation of the Expropriation Act of 1936 and Article 27 of the Mexican Constitution directed toward companies that exploited these resources, and announced by Decree on March 18, 1938, by President Lázaro Cárdenas del Río.

This involved the legal expropriation of machinery, equipment, buildings, refineries, distribution stations, ships, pipelines and generally, all movable and immovable property of the El Águila Mexican Oil Company (subsidiary of the Royal Dutch Shell), San Cristóbal, San Ricardo Shipping Company, Huasteca Petroleum Company (subsidiary of the Standard Oil Company of New Jersey, which later changed its name to a Amoco Corporation), Sinclair Pierce Oil Company, Mexican Sinclair Petroleum Corporation,
Standford and Company, Penn Mex Fuel Company, Richmond Petroleum Company, California Standard Oil Company of Mexico (today known as Chevron Corporation), El Agwi Oil Company, Imperio Gas and Fuel Company, Consolidated Oil Company of Mexico, San Antonio Mexican Steam Company, Sabalo Transportation Company, Clarita Sociedad Anónima and Cacalilao Sociedad Anónima, and its affiliates or subsidiaries, with the promise to pay the victims over a period of ten years according to the law, because these companies, which were incorporated under Mexican law, had refused to abide by the ruling of the Federal Conciliation and Arbitration Board in favor of paying higher wages to laborers and industry workers, and which was ratified by the Mexican Supreme Court.

With the creation of Petróleos Mexicanos (PEMEX) in 1938, the administration for national control divides the activity by areas and the involvement of Mexican technicians begins. According to the strategy for managing the operation by areas, the Northeast Zone, the North Zone and the South Zone are created. These divisions continue today.

By 1994, PEMEX had 474 producing fields, with 90% of production concentrated in 74 of them. Currently, the country is virtually self-sufficient in terms of fuel oil, other than those with low sulfur content, but is likely that they will moderately increase their imports to the extent that the reconfiguration of refineries progresses, which will increase gasoline production.

The products currently produced in the country’s refineries are LPG, regular and premium gasoline, diesel, jet fuel or Jet A, and fuel oil. Asphalt is obtained as a petroleum product. Much of the gas is burned because of insufficient infrastructure and because not many industries have resources to finance its conversion from fuel oil to gas.

The volume of total hydrocarbon reserves in Mexico as of January 1, 2014 was 42.154\textsuperscript{26} million barrels of oil equivalent (MMboe) in comparison to January, 2013, which was 44.530 million barrels of oil equivalent (MMboe). The proved reserves totaled 13.438 MMboe, probable reserves totaled 11,377 MMboe and possible reserves 17,342 MMboe.

In 2008, as part of the package of initiatives to reform the energy sector, the Federal government proposed the creation of a decentralized body attached to the SENER with technical and operational autonomy, which would serve as a support to the oil industry. In November of that same year, the National Hydrocarbons Commission Act (LCNH) was published, and in May 2009 the National Hydrocarbons Commission (CNH) was formally established. The basic purpose of the CNH is to regulate and supervise the exploration and extraction activities of hydrogen carbides found in mantels or deposits, whatever their physical state, including intermediate states, and include crude mineral oil, accompanied by or resulting from it. It also regulates and supervises the processing, transportation and storage activities that are directly related to hydrocarbon exploration and extraction projects.

**POWER GENERATION IN MEXICO**

Power generation began in Mexico in the late nineteenth century. The first power plant was installed in the country in 1879 in Leon, Guanajuato. Its production was destined for “The American” textile factory. Almost immediately this manner of generating electricity spread throughout the mining industry and subsequently, residential and public lighting was installed.

In 1889 the first hydroelectric plant in Batopilas (Chihuahua) came into operation, and it quickly extended its distribution networks to urban and commercial areas where the population had high purchasing power. However, during the regime of Porfirio Díaz, the power industry was awarded the condition of public utility service. The first 40 “arc” lamps in Constitution Square were installed, one hundred more were installed in Alameda, as well as on Reforma Street and some other avenues in Mexico City.

\textsuperscript{26} Las Reservas de Hidrocarburos de México, 1 de Enero de 2014, PEMEX Exploración y Producción
Some international companies with high financial and operational capacity set up subsidiaries in Mexico, such as The Mexican Light and Power Company, a Canadian company that set up in the Midwest; The American and Foreign Power Company consortium, with three interconnected systems in northern Mexico and Chapala Electric Company, in the west.

In the early twentieth century Mexico had a capacity of 31 MW, and private companies wholly owned the installed capacity. By 1910 it had increased to 50 MW, of which the Mexican Light and Power Company, through Necaxa, the first major hydroelectric plant located in Puebla, generated 80%. The three utilities companies owned the concessions and facilities of most of the small plants that worked exclusively in their regions. During this period the first effort to organize the electrical industry was implemented, through the creation of the National Commission for the Promotion and Control of the Power and Force Industry, which was later known as the National Motor Force Commission.

On December 2, 1933 it was decreed that power generation and distributions were public utility activities. In 1937 Mexico had 18.3 million inhabitants, of whom only seven million had electricity, provided under difficult conditions by the three private companies. At that time light outages were constant, and rates were very high, because these companies focused on urban markets, disregarding rural populations, where more than 62% of the population lived. By then the installed power generation capacity in the country was 629 MW.

In response to this situation, the federal government created the Federal Electricity Commission (CFE) on August 14, 1937, a non-profit entity that would organize and lead a national system for the generation, transmission and distribution of electricity, based on technical and economic principles, for the purpose of obtaining the best possible performance for the benefit of general interest, at minimum cost. (Law enacted in Merida, Yucatan on August 14 of 1937, and published in the Official Journal of the Federation on August 24 of that same year).

The first CFE power generation projects were carried out in Teloloapan (Guerrero), Pátzcuaro (Michoacán), Suchiate and Xia (Oaxaca), and Ures and Altar (Sonora).

The first major hydroelectric project began in 1938. The construction, which included canals, roads and highways would eventually become the Ixtapantongo Hydroelectric System in the State of Mexico, and would later be known as the Miguel Aleman Hydroelectric System.

By 1961 the total installed capacity in the country amounted to 3,250 MW. The CFE sold 25% of the energy it produced and its ownership in power generating plants went from zero to 54%.

In that decade, more than 50% of public investment was assigned to infrastructure. Generation centers were built, including Infiernillo and Temazcal and others, and by 1971, the installed capacity reached 7,874 MW.
It is worth noting that in its beginnings the Mexican power industry operated several isolated systems with different technical characteristics, and at one time, almost 30 distribution voltages, seven high-voltage transmission lines and two electrical frequencies of 50 and 60 Hertz coexisted. This hindered the supply of electricity, which led the CFE to define and unify the National Electric System’s technical and economic criteria, thus normalizing the operating voltages, standardizing equipment, reducing costs and manufacturing times, storage and inventories. Later, the frequencies were unified at 60 Hertz and CFE transmission systems integrated into the national grid.

In the 80s the growth in electricity infrastructure was slower than in the previous decade. This was mainly due to the decrease in the allocation of resources to the CFE. However, by 1991 the installed capacity had reached 26.797 MW.

In early 2000 the installed generation capacity had reached 35.385 MW, coverage of service was 94.70% at the national level, the transmission and distribution network amounted to 614.653 km and there were more than 18.6 million users, with nearly one million users added each year.

Starting October 2009, the CFE is responsible for providing power services throughout the country. The CFE is recognized as one of the largest electric utilities in the world, and maintains a comprehensive management approach to all processes related to the service.
MARKET SEGMENTS

OIL REFINERIES

Undoubtedly, the Energy Reform in late 2008 marked a precedent in the recent history of the country, particularly in the oil industry, devising a modern regulatory framework that has strengthened the institutions of the sector. Four years after the Reform, foresight becomes the first planning exercise that integrates a new vision for the development of the potential of the oil industry in Mexico, in order to guarantee the reliable and timely supply of hydrocarbons in the short-term and for future generations.

Mexico has refineries for the production of gasoline and other petroleum products in Salamanca, Salina Cruz, Minatitlan, Cadereyta, Tula and Ciudad Madero. All are owned by PEMEX and they all have very old and outdated technology. It is worth noting that the last refinery was built in 1979. A few years later it was decided that two new "turnkey" packages would be purchased for the optimization of said refinery, but due to budget limitations the packages were never installed, and by 1982 the government of Miguel de la Madrid decided to auction them off; one was sold to China and the other to Korea. Today this has great significance in the history of petroleum refining and the development of industry in Mexico as it is considered the beginning of the country’s Neo-liberal policies.

Currently, Mexico has to import 41.2% of its domestic demand for gasoline. Daily consumption is equivalent to 765,000 barrels and gasoline production in domestic refineries totals 450,000 barrels, or 58.8%. PEMEX produces 2.4 million barrels of crude per day and 5,700 million cubic feet of natural gas.

It is the country with the second highest crude refining capacity in Latin America and the Caribbean. Its crude processing capacity is estimated around 30% of the total capacity in Latin America and the Caribbean. Its largest refineries are “Jaime Antonio Dovali” which produces 330,000 bpd and “Miguel Hidalgo” with 325,000 barrels per day.

The refining industry in the country faces different challenges, among which are the increasing demand for petroleum products, associated to economic development; its environmental commitment through the development of increasingly cleaner fuels; and maximizing the value of processed oil by improving efficiencies and profitability. In addition, there are uncertainties regarding the availability of increasingly heavy crudes, which require more complex processes for the production of the oil the country needs.

Another major challenge faced by the refining industry in the near future will be the expansion of the distribution capacity and storage of petroleum products; in order to address this, it plans the expansion and relocation of storage terminals, the expansion of loading and unloading systems, the rehabilitation of tanks and security systems and the renewal of the local delivery fleet. The possible entry into operation of a new refinery in late 2015, which will increase the domestic production of oil, needs to be factored into this plan.

PLAYERS IN THE REFINING SECTOR

PEMEX

In 1937, after a series of events that significantly deteriorated the relationship between the workers and the companies, the former organized a strike against the foreign companies that paralyzed the country. The Conciliations and Arbitration Boards ruled in favor of the workers, and the foreign companies appeal before the Supreme Court. However, once again the Court rules in favor of the workers. The foreign companies refuse to obey the mandate and in response to this action, on March 18, President Lázaro Cárdenas del Río decrees the expropriation of all assets of the 17 companies who opposed the mandate, and on June 7 Petroleos Mexicanos (Pemex) is created.
Petroleos Mexicanos is the largest company in Mexico. It is also the largest taxpayer in the country and one of the largest companies in Latin America. Its administrative headquarters is located in the Pemex Executive Tower in Marina Nacional Avenue # 329, Colonia Petroleos Mexicanos, Miguel Hidalgo in Mexico City, and the adjoining buildings house its IT systems.

It is one of the few oil companies in the world that operates throughout the productive chain, from exploration, to distribution and marketing of end products, including petrochemicals. Its annual revenues amount to one trillion 647 billion pesos, its operation generate 905 billion pesos and investment amounts to 311 billion pesos.

Petróleos Mexicanos operates through a corporation, subsidiary entities and affiliates:

1. Pemex Exploración y Producción (Exploration and Production)
2. Pemex Refinación (Refining)
3. Pemex Gas y Petroquímicos Básicos (Gas and Basic Petrochemicals)
4. Pemex Petroquímica (Petrochemicals)
5. PMI Comercio Internacional S.A. de CV (Subsidiary Company).
6. Instituto Mexicano del Petróleo (Mexican Oil Institute)

Pemex subsidiary entities are decentralized agencies created by the federal government, while its subsidiary companies are companies that have been created under the applicable laws of each jurisdiction in which they were incorporated and managed as private companies.

It produces various types of fuels:

1. Crude
2. "Magna" Gasoline (87 octane)
3. "Premium" Gasoline (92 octane)
4. Diesel
5. Jet fuel
6. Fuel oil
7. Paraffin
8. Asphalt
9. Liquid gas
10. Natural gas
11. EkbēLa

Crude production has remained stable in the last few years, at 2.548 million barrels, and natural gas production at 6.385 million of cubic feet per day.

Also, in recent years the company has conducted discoveries confirming the oil potential in deep-water and the southeast basins. With the completion of the Kunah-1DL well more information on the Kunah field was obtained, and the gas potential in the deep-water Gulf of Mexico project B was confirmed. Also, the Supremus-1 and Trion-1 wells, located within the Area Perdido project, close to the marine boundaries, and completed in water depths nearly 3000 meters deep, allowed for the expansion of the area of oil exploration of the project.

The main oil states in terms of production are: Campeche, Tabasco, and Veracruz. Tamaulipas, and Chiapas.
The company has 400 production fields, 8,500 wells under exploitation and 243 offshore platforms. The crude obtained in these operating centers is treated in 6 of the country's refineries owned by Pemex.

1. "Ing. Héctor R. Lara Sosa" Refinery in Cadereyta Jiménez, Nuevo León
2. "Francisco I. Madero" Refinery in Ciudad Madero, Tamaulipas
3. "Gral. Lázaro Cárdenas" Refinery in Minatitlán, Veracruz
4. "Ing. Antonio M. Amor" Refinery in Salamanca, Guanajuato
5. "Ing. Antonio Dovalí Jaime" Refinery in Salina Cruz, Oaxaca
6. "Miguel Hidalgo" Refinery in Tula de Allende, Hidalgo

The 2013-2017 Business Plan for Pemex and its Subsidiary Entities defines the course required to fulfill the mandate for the creation of value and to achieve operational and financial sustainability in the medium and long term. The Plan is based on careful examination of the current situation and environment analysis. The objectives of the company for the coming years are detailed within four action items: growth, operational efficiency, corporate responsibility and the modernization of management; strategies and actions have also been established, such as:

1. Increase inventory reserves for new discoveries and reclassification
2. Increase the production of hydrocarbons
3. Obtain efficiency levels above international standards for the use of gas and for production costs.
4. Obtain higher than average operative performance in transformation activities.
5. Increase and adapt the industrial transformation capacity in order to guarantee the supply and maximize financial value.
6. Promote the development of the national petrochemical industry through its own and supplementary investments.
7. Optimize logistics and conditioning capacity for hydrocarbons.
8. Strengthen client service
9. Guarantee a safe and reliable operation
10. Improve environmental performance, business sustainability and community relations
11. Develop and provide qualified personnel and improve labor productivity
12. Increase the generation of value and the efficiency of the supply process and strengthen national supply.
13. Encourage the growth and improvement of business thorough technical developments
14. Strengthen process management and project execution
15. Maximize the value of international opportunities

In 2013, Pemex established alliances with Keppel Offshore & Marine, a Company dedicated to the construction of oil platforms. This company will begin the construction of six self-elevating drilling rigs in Altamira, Tamaulipas. It also established an alliance with PMI Holdings BV, which is a subsidiary of Pemex, and signed an investment contract for the purchase of 51% of the shares of the Spanish shipyard Hijos de J. Barreras SA, also known as Barreras Shipyard. Through this acquisition, Pemex will develop capabilities for building specialized vessels in Mexico in the mid-term, thus capitalizing on the technological development of the Galician naval sector in the oil industry.

**Ing. Hector R. Lara Sosa Refinery (Cadereyta Refinery)**

The "Ing. Hector R. Lara Sosa" Refinery transports crude oil for refining from Ciudad Madero, Tamaulipas, to its facilities. The refinery is located in the State of Nuevo León, in the municipality of Cadereyta Jimenez, 36 km east of the city of Monterrey. Its facilities cover a total area of 612 hectares, which are strategically located to meet the needs for petroleum products in the states of Nuevo Leon, Coahuila, Chihuahua, and partially in the states of Durango, San Luis Potosi and Tamaulipas.
Construction on the first floor for primary distillation at the Cadereyta refinery began in 1975, and operations began on February 12, 1979. "The Cadereyta" refinery currently has a refining capacity of 270,000 barrels per day. All products are certified ISO-9002.

1. Pemex Magna
2. Pemex Diesel
3. Pemex Premium
4. Jet fuel
5. Fuel oil
6. Asphalt
7. Sulfur
8. Propylene
9. Nafta gas
10. LPG

**Francisco I. Madero Refinery**

It is located on the left bank of the Panuco River, almost at the mouth of the Gulf of Mexico; within the municipality of Ciudad Madero, Tamaulipas; from where it takes its name.

Its production lines are certified by the Mexican Institute of Standardization and comply with the NMX-CC-004 Standard, which is the equivalent to the ISO 9002/94 standard on standard operating principles for safety and environmental protection.

Currently, the refinery has 20 processing plants in operation, which perform atmospheric distillation, vacuum distillation, catalytic cracking, hydro-treatment and petrochemical processes. It also has auxiliary facilities, such as power plant, storage tank farms, workshops, warehouses, docks, pumping stations connected to the Madero-Cadereyta pipeline, pumping facilities for petrochemical products, offices, sports fields and facilities and a residential community, among others.

The refinery’s nominal crude oil processing capacity is 186,000 bl/ day, distributed as follows:

- MA Distillation Plant 60,000 bl/day
- MB Distillation Plant 60,000 bl/day
- Combined Plant BA 52,000 bl/day
- Asphalt Plant MI 14,000 bl/day
- Total 186,000 bl/day

5 types of crude are processed at the refinery:

- Arenque.
- Tamaulipas.
- Panuco.
- Crudo mezcla.

The products obtained in the Madero Refinery meet the demand of its area of influence, and on occasion, some are exported per commercial agreements entered into by Pemex with overseas clients. The

Ing. Antonio Dovalí Jaime Refinery

The Ing Antonio Dovali Jaime Refinery is located in Salina Cruz, one of the 10 largest ports in the Mexican Pacific. Operations began in April 1979 and since then it has been constantly growing.

It occupies a total area of 600 hectares, located five kilometers northeast of the city and port of Salina Cruz in Oaxaca. The town of Salina Cruz is located on the Pacific Ocean and is listed as a deep-sea harbor.

Since its inception, operations at the Ing Jaime Antonio Dovalí refinery have seen steady growth; it ranks as the largest oil refining system in the country, with a capacity to process 330,000 bpd of crude.

Crude oil extracted from the fields located in the states of Tabasco, Chiapas and Campeche, is transported for collection and pumping to the station located in Nuevo Teapa. Part of this crude is sent to the Antonio Dovalí refinery through two 30 and 48 inches pipelines. Crude, either for processing or for export, is stored in 100, 200 and 500 thousand barrel tanks. The refinery has a capacity for 14 million barrels in 125 tanks, of which 20 store raw material, such as Istmo crude, Maya crude, as well as their mixtures and methanol; 39 store intermediate products such as primary fuel, slop, nova base, primary kerosine, primary jet fuel, primary diesel, light cycle oil, diesel, catalytic residues, recovered oil, and 66 store final products: butane-butylene, propylene, LPG, Pemex Magna gasoline, jet fuel, tractomex, desulfurized diesel, Pemex diesel, fuel, TAME and MTBE.

The distribution of refined products is carried out through auctions at the Ground Sales Terminal located in Salina Cruz in Oaxaca. This terminal supplies the area of influence that comprises the sales agencies in the state of Oaxaca; those of Tuxtla Gutierrez, Arriaga and Tapachula in Chiapas; as well as the states of Veracruz, Tabasco, Yucatan and Mexico. It is also of significant importance that the marine terminal of Pemex Refining is located on the coast, about 10 Km from the refinery. This allows tankers to take on crude oil and fuel for export, and transport it to the Mexican states located on the Pacific coast.

Ing. Miguel Hidalgo Refinery

It is located in the state of Hidalgo, in the municipality of Tula de Allende, 82 km. north of Mexico City. Its facilities cover a total area of 749 hectares, which are strategically located among the leading producers of crude oil and the largest consumer of fuel.

It was the first comprehensively planned refinery, with high capacity hydrocarbon processing plants. Its construction was carried out in several stages with the first stage inaugurated on March 18, 1976.

It is considered one of the most important in the country due to its installed capacity and market share, given that it processes 24% of the total crude oil refined in Mexico.

Currently, Tula has a refining capacity of 325,000 barrels per day. The production area is composed of 10 processing sectors, including processing plants, green plants, pumping systems, storage facilities and an ancillary services area.

The refinery has certified quality products: Jet Fuel, Propylene, Industrial Diesel, Pemex Diesel and Pemex Magna Gasoline. It is worth noting that the Quality Certificate Pemex Magna gasoline is valid internationally.
General Lazaro Cardenas Refinery

It is one of the oldest in the country and a pioneer in the refining of crude oil in Latin America. It is located in Minatitlan; hence the strategic importance of the complex for Veracruz and Pemex.

It has been in operation for 109 years. It began refining operations in 1906, becoming the first refinery in the country and the largest of its kind in Latin America in the early twentieth century.

Prior to the oil expropriation of 1938, the refinery was part of the S. Pearson and Son Limited consortium, and in 1909 it was sold to the English company “El Aguila” where it remained until the expropriation decree.

It supplies markets in the Southeast as well as part of the demand of Mexico City, the States that it supplies are: Puebla, Veracruz, Tabasco, Campeche, Yucatan and Quintana Roo. It currently processes between 210 and 215 thousand barrels of oil per day.
It produces a total of 10 different products, including eight products used as fuel and basic petrochemicals for the manufacture of plastics.

It has 27 industrial plants in an area covering 800 hectares, which produce crude oil and Butane mixture liquids.

Salamanca Refinery (Ing. Antonio M. Amor Refinery)

The “Ing. Antonio M. Amor” Refinery is located in the municipality of Salamanca, 60 km from the city of Guanajuato.

It is the only producer of lubricants, paraffin and isopropyl alcohol for distribution throughout the country, it also supplies products to the states of Durango, Nayarit, Jalisco, Colima, Michoacan, Guanajuato, Querétaro, Hidalgo, San Luis Obispo, Zacatecas and Aguascalientes.

On July 30, 1998, the Salamanca Refinery (Riama), celebrated its 48th year in operations and in this time it has obtained and maintains ISO-9002 quality certificates for its entire production system.

Currently, the Salamanca Refinery consists of 53 processing plants that produce 42 finished products. It began operations in 1950 and has grown in stages, with constructions occurring in 1955, 1962, 1970-1974, and 1979; with the latest occurring between 1992-1996 which focused on the ecological packaging plants. Older facilities represent the largest area of opportunity for substitution of new technology, including concepts for environmental protection, greater efficiency and profitability.

The refinery received from Calidad Mexicana Certificada, A.C., an auditing company, a document stating that the facilities’ processes have all been certified internationally under the ISO 9002 standard, after fully complying with the specifications set by the International Organization for Standardization, for its 53 processing plants, 42 finished products 400 storage tanks, and 2000 procedures, in which over 4600 workers are involved.

POWER GENERATION

Energy generation in the country is under the responsibility of the state-owned Federal Electricity Commission (CFE), which is responsible not only for the generation but also for transmission, distribution and sale of electricity. It currently serves 26.9 million people.

The national generation system has 177 power stations, which together produce 49.854 MW, including independent operators.
Clients are divided by activity: 0.62% of the supply goes to the service sector, 10.17% to the commercial sector, 0.78% for industrial activities, 0.44% for agricultural activities, with the most important users being households, with 87.99% of users. Moreover, demand increases by 1.1 million users every year.

The installed capacity includes all forms of generation; thermoelectric fuel oil power stations make up 44.80% of generation, hydroelectric power stations represent 22.17%, followed by coal-fired power stations which represent 5.22% of total electricity generated in the country, while nuclear plants contribute with 2.74%, geothermal plants with 1.92% of total generation and wind farms only 0.171%. Independent operators account for 22.98% of installed capacity, according to the CFE.

Power generation is obtained from several sources, the first ones and the oldest are hydroelectric plants, of which Chicoasén, in Chiapas; Manuel Moreno Torres, which generates 2,400 MW; Malpaso in Tecpatán, Chiapas; El Infiernillo, in La Union, Guerrero, which produces 1,000 MW; followed by Aguamilpa in Tepic; and Nayarit, which is capable of generating 960 MW, are among the most important in terms of generation capacity. The system also includes the Belisario Domínguez hydroelectric plant, or Angostura, located in Chiapas, which generates 900 MW; the Leonardo Rodríguez Alcaine hydroelectric Plant, known as “El Cajon” currently produces 750 MW from Santa María del Oro in Nayarit. Another important plant is Luis Donaldo Colosio, also known as Huites, which generates 422 MW peak capacity located in Choix, in Sonora.

For its part, the most important thermoelectric plants are Tuxpan, in Veracruz, which has 2,200 MW of generating capacity, Tula Hidalgo, which generates 1,546 MW, and Manzanillo, with 1,200 MW.

There are few geothermal plants included in the national grid, although three units in Cerro Prieto in Mexicali, Baja California, two units that produce 220 MW each and one producing 180 MW, are worth noting.

There are only two coal-fired power plants, they are located in Nava, Coahuila, and each of them generates between 1,200 to 1,400 MW.

There is only one nuclear plant, the Laguna Verde in Alto Lucero, Veracruz, and that in itself generates 1,365 MW.

Recently, the Federal government has emphasized the need to converge to alternate energy sources, such as wind farms. In 1982 the Guerrero Negro wind farm in Mulegé, Baja California was installed, and in 1994 the Venta wind farm in Juchitán, Oaxaca.
<table>
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<tr>
<th>Hydroelectric Plant Name</th>
<th>Owner</th>
<th>Commissioning</th>
<th>Capacity (MW)</th>
<th>Location</th>
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<td>Cd. Valles, San Luis Potosí</td>
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<td>Encanto</td>
<td>CFE</td>
<td>19/10/1951</td>
<td>10</td>
<td>Tlapacoyan, Veracruz</td>
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<tr>
<td>Falcón</td>
<td>CFE</td>
<td>15/11/1954</td>
<td>32</td>
<td>Nueva Cd. Guerrero, Tamaulipas</td>
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<tr>
<td>Fernando Hiriart Balderama</td>
<td>CFE</td>
<td>27/09/1996</td>
<td>292</td>
<td>Zimapán, Hidalgo</td>
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<td>(Zimapán)</td>
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<td>Humaya</td>
<td>CFE</td>
<td>27/11/1976</td>
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<td>Infiernillo</td>
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<td>28/01/1965</td>
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<td>Itzicuaro</td>
<td>CFE</td>
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<td>Peribán los Reyes, Michoacán</td>
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<td>Ixtaczoquitlán</td>
<td>CFE</td>
<td>10/09/2005</td>
<td>2</td>
<td>Ixtaczoquitlán, Veracruz</td>
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<tr>
<td>José Cecilio del Valle</td>
<td>CFE</td>
<td>26/04/1967</td>
<td>21</td>
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<td>Jumatán</td>
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<td>17/07/1941</td>
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<td>Tepic, Nayarit</td>
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<td>La Amistad</td>
<td>CFE</td>
<td>01/05/1987</td>
<td>66</td>
<td>Acuña, Coahuila</td>
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<tr>
<td>Leonardo Rodríguez Alcaín (El Cajón)</td>
<td>CFE</td>
<td>01/03/2007</td>
<td>750</td>
<td>Santa María del Oro, Nayarit</td>
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<td>Luis Donald Colosio</td>
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<td>15/09/1996</td>
<td>422</td>
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<td>(Huítes)</td>
<td>CFE</td>
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<tr>
<td>Luis M. Rojas</td>
<td>CFE</td>
<td>01/01/1963</td>
<td>5</td>
<td>Tonalá, Jalisco</td>
<td>1</td>
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</tbody>
</table>
GENERATORS – KEY PLAYERS

Federal Electricity Commission (CFE)

The Federal Electricity Commission (CFE) is a productive state-owned entity responsible for controlling, generating, transmitting and marketing electricity in all of Mexico. It was founded in August 14, 1937 by the Federal Government and its first projects were conducted in Teloloapan, Guerrero; Patzcuaro, Michoacan; Suchiate and Xia, Oaxaca; and Ures and Altar in Sonora. The CFE currently provides electricity to 26.9 million customers and annually adds more than a million customers to its base. Since October 2009, it took over operations of the Luz y Fuerza del Centro company. It is worth noting that it is the largest company in the power sector in Latin America.

Before its creation, power was supplied by three private companies: The Mexican Light and Power Company, serviced the central region; The American and Foreign Power Company consortium, with three interconnected systems serviced the northern region; and the Electric Company of Chapala, which serviced western Mexico.

On August 14, 1937, the Federal Electricity Commission was created, with the purpose of developing a national system for the generation, transmission and distribution of electricity, based on technical and economic principles, operating as a nonprofit organization at minimum costs, while benefitting general interests. On September 27, 1960, President Adolfo Lopez Mateos, completed the nationalization process for the power industry. Paragraph six of Article 27 of the Constitution states that the nation has the exclusive right to generate, transmit, transform, distribute and supply energy to the public.

The infrastructure to generate electric power is made up of 209 generating plants, having an installed capacity of 52,515 megawatts (MW). 22.67% of its installed capacity stems from 22 plants that were built using private capital by Productores Independientes de Energía (PIE).

The CFE creates electric power using various technologies and various primary energy sources. It has thermoelectric, hydroelectric, coal-fired, geothermal, and wind powered plants and facilities, as well as one nuclear power plant.

In order to take the power from its generating plants to the household of each one of its customers, the CFE has more than 756,000 Km. of power lines that transmit and distribute electric power.

Electricity reaches almost 190,000 communities (of these, 190,732 are not cities, while 3,667 are). Also, 97.60 % of the population uses electricity.

During the last decade, 42,000 solar modules have been installed in small communities very distant from large population centers. In the future, this technology will be the most widely used in the villages that do not have access to conventional electric power.

As to total sales volume, 99 % and the remaining 1 % is for export purposes.
<table>
<thead>
<tr>
<th>Power Plants</th>
<th>Location</th>
<th>Capacity (MW)</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petacalco (Plutarco Elias Calles)</td>
<td>Guerrero</td>
<td>2,778</td>
<td>7</td>
</tr>
<tr>
<td>Chicoacen (Manuel Moreno Torres)</td>
<td>Chiapas</td>
<td>2,400</td>
<td>8</td>
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<tr>
<td>Tuxpan (Adolfo Lopez Mateos)</td>
<td>Veracruz</td>
<td>2,263</td>
<td>7</td>
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<tr>
<td>Tula (Francisco Perez Rios) **</td>
<td>Hidalgo</td>
<td>2,095</td>
<td>11</td>
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<tr>
<td>Laguna Verde</td>
<td>Veracruz</td>
<td>1,610</td>
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<tr>
<td>Carbon II</td>
<td>Coahuila</td>
<td>1,400</td>
<td>4</td>
</tr>
<tr>
<td>Rio Escondido (Jose Lopez Portillo)</td>
<td>Coahuila</td>
<td>1,200</td>
<td>4</td>
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<tr>
<td>Infiernillo</td>
<td>Guerrero</td>
<td>1,160</td>
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<tr>
<td>Presidente Juarez (Rosarito)</td>
<td>Baja California</td>
<td>1,093</td>
<td>10</td>
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<tr>
<td>Mal Paso</td>
<td>Chiapas</td>
<td>1,080</td>
<td>6</td>
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<tr>
<td>Manzanillo I (Manuel Alvarez Moreno)</td>
<td>Colima</td>
<td>1,073</td>
<td>4</td>
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<tr>
<td>Valle de Mexico</td>
<td>Mexico</td>
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<td>Aguamampa (Solidaridad)</td>
<td>Nayarit</td>
<td>960</td>
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<tr>
<td>Angostura (Belisario Dominguez)</td>
<td>Chiapas</td>
<td>900</td>
<td>5</td>
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<td>Altamira</td>
<td>Tamaulipas</td>
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<td>Nayarit</td>
<td>750</td>
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<tr>
<td>Manzanillo Dos</td>
<td>Colima</td>
<td>700</td>
<td>2</td>
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<tr>
<td>Villa de Reyes</td>
<td>San Luis Potosi</td>
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<td>Puerto Libertad</td>
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<td>632</td>
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<td>El Encino (Chihuahua II)</td>
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<td>Mazatlan II (Jose Aceves Pozos)</td>
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<td>El Sauz</td>
<td>Queretaro</td>
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<td>Caracol (Carlos Ramirez Ullo)</td>
<td>Guerrero</td>
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<td>Cerro Prieto</td>
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<td>Guanajuato</td>
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<td>Huinala</td>
<td>Nuevo Leon</td>
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<td>Samalayuca II</td>
<td>Chihuahua</td>
<td>522</td>
<td>6</td>
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<tr>
<td>Rio Bravo Emilio Portes Gil</td>
<td>Tamaulipas</td>
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<td>Guaymas II (Carlos Rodriguez R.)</td>
<td>Sonora</td>
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<td>Dos Bocas</td>
<td>Veracruz</td>
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<td>Huinala II</td>
<td>Nuevo Leon</td>
<td>450</td>
<td>2</td>
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<td>Huites (Luis Donaldo Colosio)</td>
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<td>Penitas</td>
<td>Chiapas</td>
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<tr>
<td>San Lorenzo Potencia</td>
<td>Puebla</td>
<td>382</td>
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<td>Temascal</td>
<td>Oaxaca</td>
<td>354</td>
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<tr>
<td>Topolobampo II (Juan de Dios Batiz)</td>
<td>Sinaloa</td>
<td>320</td>
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<td>Samalayuca</td>
<td>Chihuahua</td>
<td>316</td>
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<td>Francisco Villa</td>
<td>Chihuahua</td>
<td>300</td>
<td>2</td>
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<td>Zimapan</td>
<td>Hidalgo</td>
<td>292</td>
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<tr>
<td>Otras Centrales</td>
<td></td>
<td>459</td>
<td>5,451</td>
</tr>
</tbody>
</table>
SECTOR FORECAST

In Mexico the expectations surrounding the impact of the Energy reform are palpable. The challenge is to promote economic growth and sustainability through policies that also protect the environment and generate well-being for the population. For example, according to Juan José Guerra Abud, Minister of Environment and Natural Resources:

*Nowadays the energy sector is essential to foster economic growth, and sustainable economic growth is a very important priority for us. It is not a matter of choosing between economic growth and sustainability; both have to go together to promote the well-being of Mexicans. It is critical that the majority of poor Mexicans improve their quality of life, which will happen once we manage to achieve sustainable use of our vast resources.*

The opening of the energy sector to private investment sets the spotlight on renewable resources. With Mexico transitioning from primary energies, such as hydrocarbons and associated products, to renewable energies, and with the vast available resources, these can only become a global competitive advantage. The CFE’s challenges entering this new arena should be: the promotion of competitiveness and productivity, lowering costs and facilitating the development of renewable energy; while guaranteeing the transparency of its activities. According to David Penchyna, President of the Senate’s Energy Commission, “…it is estimated that in five years, the country will double its current production of hydrocarbons while fuel oil for power generation could have been totally replaced with natural gas and other primary energies. At the same time, in five years, close to 30% of the national energy mix will come from renewable resources.”

Entering this new scenario, Mexico will need to learn new business, such as gasoline imports, commercialization of diesel, power generation schemes, and to move from an IPP to transmission and distribution.

The Mexican energy mix is expected to undergo a significant change, with renewable energy participation increasing to 35% by 2026. New installed renewable energy capacity will be driven by wind power, which by 2025 is expected to account for 60.3% of the national energy mix, followed by hydro with 24% and solar energy with 12%.

Moving forward, the drop in international oil prices has not only impacted the Mexican export mix but PEMEX finances as well. According to operating and financial reports issued by PEMEX, revenues from crude exports decreased by 3,177 million dollars between June and November of 2014, in comparison to the same time period in 2013.

The drop in oil prices has affected both PEMEX and the CFE. According to Pedro Joaquin Coldwell, Minister of Energy, a cut-back in investments and expenses must logically follow the decrease in revenues. Regarding PEMEX Farm-Outs, he stated that his belief is that Round One should continue and Farm-Outs increase rather than decrease. Unfortunately, he also noted that the government is analyzing the possibility of transferring personnel from the CFE and PEMEX into other government agencies such as the CNH, the CRE or even the Ministry itself.
OPPORTUNITIES FOR VIRGINIA COMPANIES

In his “Pacto con Mexico” Plan, President Peña Nieto identified certain areas which he considered strategic for the economic growth of Mexico. Among them there are specific areas where opportunities for foreign investment may be found, specifically in terms of safety, security and ICT:

» Crime prevention through intelligence technologies
» Investment in telecommunication technologies, including broadband access, radio, TV, phone and data services.
» Environmental management
» Technical training
» Data information technologies for use in transparency and anti-corruption programs
» Cyber security and cyber defense technologies

Based on expertise and knowledge of the oil and energy sector in Mexico, and in order to complement the general opportunities derived for governmental policies, the following is a general analysis of business opportunities for security and defense companies in the abovementioned sectors.

1. Perimeter Security Systems
   » Surveillance by satellite
   » Local video surveillance
   » Aerial video surveillance
      » Drones
      » Micro-drones
      » Aircraft
   » Tactical training for security personnel
   » Equipment
      » Cameras
      » Monitors
      » Information centers

2. Secure communications
   » Industrial wireless applications
   » Data / Voice / Video
   » Data Acquisition
   » SCADA / Telemetry
   » Mobile Data for Field Force Automation
   » Control Process
   » Telecom & Campus Connections
   » Transaction / POS
   » Mobile Data for Public Safety

3. Information security
   » Implementation:
      » Data encryption
      » Confidentiality
      » Protocols
» Risk analysis, impact, criticality and sensitivity
» Access controls
» Strategy
» Network architecture
» Contingency plans
» Information assurance
» Training for staff
» Firewall
» Administration of user accounts
» Detection and intrusion prevention
» Antivirus
» Public key infrastructure
» (SSL) Secure Socket Layers
» Single connection "Single Sign-on SSO"
» Biometrics
» Privacy compliance
» Remote access
» Digital signature
» Electronic data "EDI" and electronic transfer of funds "EFT"
» Virtual private network "VPNs"
» Secure electronic transfer "SET"
» Computer forensics
» Data recovery
» Monitoring Technologies

» Certifications in:
  » CISM: Certified Information Security Manager
  » CISSP: Certified Information Systems Security Professional Certification
  » GIAC: Global Information Assurance Certification
  » CPTE Certified Penetration Testing Engineer
  » CPTC Certified Penetration Testing Consultant
  » CPEH Certified Professional Ethical Hacker
  » CISSO Certified Information Systems Security Officer
  » CSLO Certified Security Leadership Officer
  » ISO/IEC 27000-series
  » ISO/IEC 27001
  » ISO/IEC 27002

4. Global positioning systems
   » Personnel tracking
     » For staff located in high risk areas
     » For services providers located in high risk areas
   » Tracking of goods
     » Trucks
     » Containers
» For personal vehicles
» Specialized tools
» Equipment and materials

5. Transport
» Armored vehicles
» Helicopters
» Trucks

6. Staff:
» Services for
  » Remote Management for Physical Security
  » Bodyguards
  » Assessment

7. Prevention and care of natural disasters
» Implementation of prevention protocols
» Training
» Risk reduction
» Equipment
» Implementation of contingency plans
SECURITY CONSIDERATIONS

Mexico is facing significant challenges on its Security and Defense front. In his Presidential Plan known as the Mexico Agreement or “Pacto por México”, President Peña Nieto outlined a series of programs to address the country’s main security issues. There are five agreements to the Mexico Agreement: Rule of Law and Freedom, Economic Growth, Employment and Competitiveness, Security and Justice, Transparency, Accountability, Fight against Corruption, and Democratic Governance. The pillars on which the Mexico Agreement is based are: Peace, Social Inclusion, Quality Education, Prosperity, and Global Responsibility. These agreements include programs that address structural issues regarding poverty, crime, corruption, human rights abuses, and migration, which are the main security problems facing Mexico at this time.

There have been advances in the last few months. For example, according to the Second Government Report 2013-2014, in the first seven months of 2014, homicide rates dropped by 27.3% in comparison to the same time period in 2013, kidnappings dropped by 6.8% and extortions by 20%.  

According to the Secretary of Government of Mexico, there are several structural issues in terms of social exclusion and poverty that increase the vulnerability of the population regarding violence and crime. The lack of job opportunities and unemployment and limited education to secondary and college education, as well as school drop-outs can lead individuals to consider crime as their only chance. Another risk factor that may lead to violence and crime is the lack of trust among the population itself, which is not conducive to conflict resolution, in conjunction with a low level of trust in police and judicial systems. This situation is seen in the many cases of impunity and corruption, as well as the deficient performance of justice institutions.

The affected population is unfortunately also the most vulnerable; the main victims and generators of violence are young people; and boys and girls, and rural communities are those that have been affected the most, with a significant impact on native communities.

<table>
<thead>
<tr>
<th>Security Issue</th>
<th>Government Plan</th>
<th>Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty</td>
<td>México Agreement</td>
<td>National Crusade against Hunger (CNCH)</td>
</tr>
<tr>
<td>Migration and Border Issues</td>
<td>México Agreement</td>
<td>Special Migration Program 2014-2018</td>
</tr>
<tr>
<td>Abuses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corruption</td>
<td>México Agreement</td>
<td>National System against Corruption Creation of a National Commission for the prevention, investigation, administrative penalization and reporting of acts of corruption. (Special emphasis will be placed on organizations such as Pemex and CFE)</td>
</tr>
<tr>
<td>Related Violence</td>
<td>Participation and Prevention Plan</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
These government programs pose interesting investment opportunities for the private sector, and international organizations. Some of them are detailed below.

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Government Plan</th>
<th>Detail/Examples</th>
</tr>
</thead>
</table>
| Education     | México Agreement| Information and School Management systems  
The government has a 7.567 million peso budget for its Education Reform project, which includes the development of IT platforms, physical infrastructure for 20,000 primary and secondary schools.  
PCs for public school students in the 5th and 6th grades |
| Defense of Human Rights | | Public Policy on Safety and Justice seeks to prevent crime through the use of intelligence and technology |
| Strengthening of strategic sectors: telecommunications, transport, financial services and energy | | Commitments 41-45 of the Mexico Agreement establish the need to develop a robust telecommunications network, including digital and broad band access, improving competitiveness in radio, TV, phone and data services  
The expansion of the CFE grid for optimal use of the 700MHz y 2.5GHz band and broad band access under a public grid scheme. |
| Strengthen Science Innovation and technology | | 1% of the GDP will be assigned to Science, Innovation and Technology.  
For 2014, the federal budget for science, innovation and technology amounted to 81,862 million pesos, which represents an increase of 28.6% above 2012.  
In investment alone, 2,288 million pesos were assigned of which a portion was allotted to the construction of the Technical Assistance Lab for Pemex Petrochemical, at the Mexican Oil Institute. |
| Sustainable Development | | Increase investment in R&D for renewable energy projects  
Programs to boost collection and storage of rainwater  
Improve infrastructure for waste management |
| Road infrastructure in the S-SE | | The South-South East region is lagging behind the rest of the country: the strategy includes programs for the expansion and upgrade of the road and railway infrastructure, digital integration, education and health infrastructure, and the development of industrial development, tourism, port, agricultural, fishing, and renewable energy hubs |
LEGAL CONSIDERATIONS

LABOR LAWS

Until recently, Mexican labor law was based exclusively on Article 123 of the Constitution, as well as the 1931 labor law. In November of 2012, the government enacted a new Labor Reform that aims to increase market flexibility and reduce hiring costs. Although its impact in terms of union transparency is not significant, it has the potential to increase productivity, employment and competitiveness. The new Law modifies labor regulations and allows employers to offer part-time work, hourly wages and engage in outsourcing. It also contains provisions that prohibit gender-based discrimination, and by eliminating the ban on part-time employment it makes finding employment easier for single parents and students. However, long-term change is hard to achieve given Mexico’s labor surplus and its large informal sector.

ENERGY REFORM

2013 marked the beginning of a new era for the Mexican Energy Sector, with President Enrique Peña Nieto’s government setting down the terms for the future of the energy sector through the 2013 Energy Reform and its subsequent implementation laws. The Energy reform opens up the power generation market to private parties and establishes the express constitutional prohibition on granting concessions to private parties for wheeling and distribution of electricity, as well as for planning and operational control of the National Electricity System (NES). Prior to this, the power generation market was under the monopoly of the Federal Energy Commission (CFE). The Energy Regulatory Commission (CRE) will regulate wheeling and distribution rates. The CFE will remain the sole developer of transmission infrastructure, but the National Energy Control Center (CENACE) will become the independent organism that operates and controls the NES. The private sector will be allowed to participate in the construction, maintenance and operation of the electrical grid. Within this operating framework, Mexico will pursue its ambitious goal of generating 35% of its energy from clean sources by 2024, and reducing its greenhouse emissions by 30% by 2020.

The Decree that regulates the Energy Reform may be summarized as follows:

- Solid, liquid and gas hydrocarbons will remain the property of the Nation.
- The Nation will perform oil and other hydrocarbon exploration and drilling activities, through contracts with state owned productive companies or private companies. Within the following 120 days after the Decree enters into force, Congress will prepare and approve the necessary modifications to the legal framework that regulates contractual relationships, services, shared production or profits, concession by the Government for the exploration and drilling of solid, liquid and gas hydrocarbons, among others, including those between state owned companies and private companies.
- In a time period no greater than two years from the date the Decree enters into force, PEMEX must transition from a decentralized organization to a state owned productive company, according to the regulations that will ensue.
- The purpose of PEMEX will be the creation of financial value, based on equity, corporate social and environmental responsibility. Its organization, structure and management will be based on international best practices, thus ensuring its technical and managerial autonomy.
- Five members of the Federal Government, including the President of the Secretary of Energy (SENER), and five independent members, will comprise PEMEX’s Management Board.
REGULATORY AUTHORITIES

The following government agencies and organizations will be responsible for monitoring and regulating the oil and gas sector:

1. The SENER (Ministry of Energy) will have the power to design licenses for the processing of crude, refining, natural gas processes, petrochemical production, transportation, storage and distribution of hydrocarbons and oil byproducts. It will also define the areas for exploration and drilling, as well as the type of contract awarded, (services, shared profit, shared production and licenses, or any combination thereof) and the technical aspects of each one.
2. The SHCP (Ministry of Finance and Public Credit) will define the financial and tax aspects of each contract.
3. The CNH (National Hydrocarbons Commission) will award the license according to the conditions stipulated by the SENER and the SHCP.
4. The CRE (Energy Regulatory Commission) will regulate and award storage, transportation and pipeline distribution permits.
5. A National Security Agency for Industrial Safety and Environmental protection for the hydrocarbon sector will be created for the regulation and monitoring of operational safety and protection of the environment.

A decentralized public organization, known as the National Control Center for Natural Gas will be created, and will be responsible for operating the transport and storage of gas along the national pipeline system. PEMEX and its subsidiary organizations will transfer the funds required for this.

ENVIRONMENTAL LEGISLATION

In conjunction with the Energy Reform, the Government has enacted a National Climate Change Law that establishes a legal framework for the regulation of public policies aimed at adapting to climate change, and implement mitigation strategies. The Government issued a National Climate Change Strategy, which stems from the aforementioned law, and which intends to give shape to the country’s change towards a sustainable economy over a time period of 40 years, and which can be summarized in the following eight points:

1. Reduce the vulnerability to climate change of Mexicans living in hazardous situations and strengthen their ability to adapt.
2. Diminish the vulnerability of production systems and strategic infrastructure related eventualities.
3. Strengthen the capacity of ecosystems to adapt to the effects of global warming.
4. Accelerate the transition towards clean energy sources.
5. Reduce the intensity of energy consumption through rational energy efficient schemes.
6. Shift towards sustainable city models, with intelligent mobility systems, integrated waste management, and low carbon footprint buildings.
7. Drive better farming – agricultural and livestock – and forestry practices, using REDD Plus schemes (Reduced Emissions from Deforestation and Forest Degradation).
8. Reduce the emissions of short life climate pollutants, as well as black carbon and methane to improve the health and well being of the Mexican people.

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General Environmental Law and Policies

Mexico is a signatory to the Kyoto Protocol and has shown every sign of taking environment policy seriously. Moreover, it needs to do so, because it has some very real environmental problems. The provision of clean water to Mexico City, air pollution in the capital, and deforestation in rural Mexico are some of the largest challenges. Helping the Mexican authorities is a marked decrease in population growth. While environmental policy has become more sophisticated, particularly in Mexico City and other major cities, the enforcement of environmental standards and regulations is often lacking. Many companies do not comply with existing regulations. Despite an increasing awareness among the broader – and particularly younger – population about environmental challenges, public pressure is very weak compared to many other OECD countries.

The General Law of Ecological Balance and Environmental Protection (Ley General del Equilibrio Ecológico y Protección al Ambiente) (hereinafter Ecology Law) is divided into six Titles which regulate the following areas: air pollution, hazardous waste, water quality, soil use and conservation, naturally protected areas, public participation, right to environmental information, land use, environmental impact assessments and noise.

Title I sets forth the general provisions regarding environmental policies, instruments and criteria; the grants of jurisdiction to and coordination of the federal and state governments; the environmental impact assessment (EIA) process; the ecological ordinance of the territory, environmental planning, economic instruments, the environmental regulation of human settlements, self-regulation and environmental audits, ecological research and education, and the legal framework for the Official Mexican Standards (Normas Oficiales Mexicanas (NOMs)) related to the environment.

Title II, on Biodiversity, establishes the procedures for developing and managing protected nature areas and restoration zones, and provides the general policies governing the wild flora and fauna.

Title III governs the sustainable use of natural elements and sets forth the general environmental provisions regulating the economic development of water, soil and non-renewable resources.

Title IV, entitled Environmental Protection (Protección al Ambiente), establishes general standards governing seven media-specific areas which include: the prevention of air, water and aquatic ecosystem pollution, soil, hazardous activities, hazardous waste and materials, nuclear energy, as well as noise, vibration, thermal and luminous energy, odors and visual pollution.

Title V creates policies and laws aimed at promoting public participation and guaranteeing the right to environmental information.

Finally, Title VI deals with administrative inspection and oversight procedures, safety measures, enforcement actions, the application of sanctions, review recourses, and a system for the filing of citizen complaints.

Article 15 of the Ecology Law sets forth nineteen broad principles that serve as the basis for national environmental protection policies and goals. The most important goals established under the Ecology Law are: the achievement of sustainable development and ecological balance, which is defined as the "interdependent relationship among the elements that comprise the environment which makes the existence, transformation and development of human and other living beings possible".

The Ecology Law also creates a series of administrative and environmental policy instruments which encompass: the national and local administrative programs and plans; the proclamation of environmental
regulations, criteria and environmental NOMs; the regulation of human settlements and zoning; the environmental impact assessment; measures for the protection of natural areas; ecological education and research; as well as fiscal incentives and the creation of environmental information systems.

The Ministry of the Environment and Natural Resources, (SEMARNAT) is the administrative authority responsible for most environmental issues under federal jurisdiction, and has delegations in each state for handling federal matters. All thirty-one states have created their own environmental legal regimes, as well as environmental state authorities in charge of enforcing such laws. The Federal District (Distrito Federal) is governed by the Environmental Law of the Federal District (Ley Ambiental del Distrito Federal), and the agency responsible for such matters is the Federal District Office for the Environment (Secretaría del Medio Ambiente).

The Ecology Law is complemented by a number of media-specific laws, regulations and Mexican Official Standards in the areas of; water, occupational health and safety; pesticides, fertilizers and toxic substances; fisheries; forestry; wildlife; mining; agriculture; energy; and transportation of hazardous materials. These separate laws and regulations are discussed in the relevant chapters.

The Federal Attorney General for Environmental Protection (Procuraduría Federal para la Protección al Ambiente (PROFEPA)) and the National Institute of Ecology (Instituto Nacional de Ecología (INE)) began to operate as agencies under SEMARNAT. The first is responsible for inspections and oversight of compliance with environmental laws, while the second currently carries on research.

Wildlife Conservation Management Units (Unidades de Manejo para la Conservación de la Vida Silvestre (UMAs)) were created, and Priority Species Recovery Projects (Proyectos de Recuperación de Especies Prioritarias (PREP)) were designed for threatened, endangered, endemic or special species. Sea and land Protected Nature Areas (Áreas Naturales Protegidas (ANP)) were designated, and in 2000 the National Commission for Protected Nature Areas (Comisión Nacional de Áreas Naturales Protegidas (CONANP)), responsible for all matters relating to such areas, was formed. The Mesoamerican Biological Corridor was also established.

Regional Sustainable Development Programs (Programas de Desarrollo Regional Sustentable (PRODERS)) were implemented in order to correct the shortcomings in Mexico's poorest regions, with a focus on sustainability.

**TAX LEGISLATION**

The SAT (Servicio de Administración Tributaria) is the government authority responsible for assessing and collecting federal taxes and customs duties, the Departments of Finance in each State are responsible for collecting state and local taxes. The following taxes affect corporations doing business in Mexico.

**Federal Corporate Income Tax rate:** The income tax rate for companies is 30% of the net income. Net income is determined by subtracting from the gross income those items that are deductible per the tax code, minus the fiscal losses from prior fiscal years. Additional deductions are allowed if the company is exclusively in the agriculture, livestock or fishing business (30% reduction). Branch tax rate are also 30% of the net income.

**Withholding Taxes:** As of January 1, 2014, there is a 10% withholding tax on dividends distributed by a Mexican entity to a non-resident company or individual.

**Interests:** a 4.9% tax applies to interest paid to foreign banks, registered as banks in Mexico and resident in tax treaty countries, as well as for interest paid on publicly traded securities in Mexico or traded abroad through banks and stockbroking firms in tax treaty countries, if the conditions are not met, the rate applied is 10%. A 15% tax applies to interest paid to reinsurance companies and interest on finance leasing. A 21% tax applies to interest that is not subject to the 4.9 or 10% rates, and interest paid
to non-resident suppliers financing the acquisition of materials and equipment included in the fixed assets of the acquirer. A 40% tax rate is applied to interest paid to a related party in a tax haven.

**Royalties:** Payments made abroad for technical assistance, know-how, use of models, plans, formulas, and similar, including the use of commercial, industrial or scientific information or equipment are subject to a 25% withholding tax. Royalties paid to a foreign licensor of patents, trademarks and trade names, without rendering technical assistance, are subject to a 35% withholding tax, unless otherwise specified under a tax treaty.

Businesses that pay fees or rentals to a non-resident must withhold a 25% tax on said payments.

Royalty payments, originating in Mexico, made to related parties in a tax haven, are subject to a 40% withholding tax.

Permanent establishments (“branches”) that distribute dividends or gains are subject to a 10% remittance tax over said monies.

A 16% VAT is applied to the supply of goods and services, the import of goods and services, and leasing transactions. Interest on non-business loans and credit card debt are also subject to VAT.

Municipal authorities levy taxes on the ownership of real property. A rate of 2-5% applies to the transfer of real estate.

**Social security contributions:** Employers must make monthly payments to IMSS (Mexican Social Security Institute) for the medical services to registered workers. Payment is estimated as 30% of the employee’s wages.

**Retirement Savings Tax:** part of the social security payment, which is deposited bi-monthly (every two months) in a special bank account (payment equal to 2% of the employee’s salary including benefits).

**Employee Housing Tax:** employers are required by law to furnish housing to their employees. This contribution is paid bi-monthly (every two months) to the INFONAVIT (Mexican Federal Government agency). This agency then in turn finances the purchase of housing by the workers. The payment is equal to 5% of the employee’s salary including benefits.

**Local Payroll Taxes:** Most cities in Mexico have a payroll tax. The rate varies between 1 and 3% (in Mexico City the rate is 2.5%)
Under mandatory profit sharing regulations, employers are required to distribute and pay 10% of their adjusted taxable income to employees. Actual distribution of profits must be paid within the following sixty (60) days of filing the income tax return, and no later than May 31 of the following year.

**Special Tax Incentives:**

**Maquila and Manufacture Programs:** Those companies in Mexico that wish to import items into Mexico for processing, assembly or transformation and re-export (or even import into the interior of Mexico) may receive import taxation advantages.

**Free Zone:** The Free Zone, also known as the Liberated Zone, the Perimeter Zone or Free Trade Zone is the area located along the Mexican international land borders, and which provides advantages for import and export to Mexico and other countries.
FREE TRADE AGREEMENTS

Since the 1990’s, Mexico has had a growing commitment towards trade integration and liberalization through the formation of free trade agreements (FTAs) and its trade policy is among the most open in the world. On June 18, 2012, President Barack Obama announced that an invitation was extended to Mexico to join the ongoing negotiations for the Trans-Pacific Partnership (TPP), a proposed free trade agreement involving the United States and eight other countries. Canada was also invited to join the negotiations. Mexico’s pursuit of FTAs with other countries not only provides economic benefits, but could also potentially reduce its economic dependence on the United States. The United States is, by far, Mexico’s most significant trading partner. Almost 80% of Mexico’s exports go to the United States and about 50% of Mexico’s imports are supplied by the United States. In an effort to increase trade with other countries, Mexico has a total of 12 free trade agreements involving 44 countries. These include agreements with most countries in the Western Hemisphere including the United States and Canada under the North American Free Trade Agreement (NAFTA), Chile, Colombia, Costa Rica, Nicaragua, Peru, Guatemala, Salvador, and Honduras. In addition, Mexico has negotiated FTAs outside of the Western Hemisphere and entered into agreements with Israel, Japan, and the European Union.

1994

1. NAFTA - North American Free Trade Agreement
   The North American Free Trade Agreement between the United States, Canada and Mexico entered into force on January 1, 1994. All duties and quantitative restrictions were eliminated on January 1, 2008. NAFTA creates the world’s largest free trade area, linking 450 million people and generating $17 trillion worth of goods and services. Total trade with North America as of 2014 amounted to USD 349,299 million.

1995

2. G3 FTA between Mexico, Colombia and Venezuela
   This Treaty aims to strengthen the commercial relationship between Mexico and South America, by allowing Mexico to consolidate its presence in this market. Under this FTA all duties are eliminated with the exception of textiles, petrochemical and agricultural products. In 2006, by decision of former president, Hugo Chavez, Venezuela decided to withdraw from this agreement. As of 2014, total trade between Mexico and Colombia amounted to USD 3,630.

3. FTA between Mexico and Costa Rica
   This was the first FTA between Mexico and a Central American country. All duties were eliminated for non-agricultural products to Costa Rica. In addition, rules to ensure national treatment to goods and services of both countries and mechanisms for the effective elimination of non-duty barriers were established. For 2014, total trade between Mexico and Costa Rica amounted to USD 2,710.

4. FTA between Mexico and Bolivia

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Through this FTA, duties were eliminated for 95 percent of Mexican exports to Bolivia, and 99 percent of Bolivian exports to Mexico. For 2014, total trade between Mexico and Bolivia amounted to USD 168 million.

1998
5. FTA between Mexico and Nicaragua
   In 2013, total trade between Mexico and Nicaragua amounted to USD 1,407,551 million, with this year recording the highest total trade in history, and in 2014 it amounted to USD 966 million.

1999
6. FTA between Mexico and Chile
   As a result of this FTA, in 2013, total trade between Mexico and Chile amounted to USD 3,523,091,000.

2000
7. FTA between Mexico and the European Union (TLCUEM)
   This Treaty created the first Free Trade Zone between Europe and the American Continent. Total trade for 2014 amounted to USD 43,686, million.

8. FTA between Mexico and Israel
   As a result of this FTA, in 2013, total trade between Mexico and Israel amounted to USD 517,821 million.

2001
9. FTA between Mexico and the European Free Trade Association (Iceland, Norway, Switzerland and Liechtenstein)
   As a result of this FTA, in 2014, total trade between Mexico and the EFTA amounted to USD 2,451 million.

10. FTA between Mexico and the North Triangle (El Salvador, Guatemala and Honduras)
    Since this FTA entered into effect, Mexico has significantly increased its exports to Central America. More than half of exports to the North Triangle are duty free, and total trade for 2014 amounted to USD 2,658 million.

2004
11. FTA with Uruguay
    This FTA has allowed Mexico to increase its presence and participation in Mercosur. Total trade for 2014 amounted to USD 467 million.

2005
12. Economic Partnership Agreement between Mexico and Japan
    Due to this Agreement bilateral trade has increased 85% since entering into force, and total trade for 2014 amounted to USD 13,340.

http://www.economia.gob.mx/comunidad-negocios/comercio-exterior/informacion-estadistica-y-arancelaria
http://www.economia.gob.mx/comunidad-negocios/comercio-exterior/informacion-estadistica-y-arancelaria
POLITICAL OUTLOOK

The United Mexican States is a federal republic which is comprised of 31 states or “estados” and one Federal District: Aguascalientes, Baja California, Baja California Sur, Campeche, Chiapas, Chihuahua, Coahuila de Zaragoza, Colima, Federal District, Durango, Guanajuato, Guerrero, Hidalgo, Jalisco, Mexico, Michoacan de Ocampo, Morelos, Nayrit, Nuevo León, Oaxaca, Puebla, Queretaro de Arteaga, Quintana Roo, San Luis Potosí, Sinaloa, Sonora, Tabasco, Tamaulipas, Tlaxcala, Veracruz, Veracruz de Ignacio de la Llave (Veracruz) and Yucatán.

The government is based on a congressional and multi-party system. The three main political parties are the National Action Party (PAN), the Institutional Revolutionary Party (PRI) and the Party of the Democratic Revolution (PDR). Presidential, Senate and Governor Elections are held every six years, however elections for the Chamber of Deputies and Legislatures are held every three years. Presidents and Senators are not eligible for reelection, and Deputies are not eligible for immediate reelection.

The 2000 elections marked the first time since the 1910 Mexican Revolution that a candidate from the opposition defeated the party in government, Vicente Fox, of the National Action Party (PAN) occupied the Presidency between 2000 and 2006, and was succeeded by another PAN candidate, Felipe Calderón; however in 2012, the PRI regained the presidency, under Enrique Peña Nieto.

Mexico mostly conforms to the standards of a Western-style electoral democracy. The electoral machinery is independent and respected, and the federal courts enjoy jurisdiction over district and lower-level courts, and also over state and municipal elections. Mexico’s elections are highly regulated by the state in order to prevent drug cartels from influencing the electoral process. The high degree of regulation applies to elections at the municipal, state and national level. The regulatory agency, the IFE, is constituted along party lines but with entrenched rules of minimum majorities, preventing domination by one party. Political parties are to a significant degree financed by the state and there are restrictions on the amount of fundraising permitted. According to the rules, political parties are not allowed to advertise directly at election time.

The Mexican president is required by law to produce a strategic plan his first year in office. In a significant break with tradition, President Peña Nieto has asked for input into his plan from all of Mexico’s political parties. His strategy is to use the national plan as a substitute for a congressional majority, with the hope that it will tie all parties around a set of long-term national agreements.

The presidential office offers positions of high prestige in Mexico. It is very involved with the legislative process. Due to the absence of a high-level career civil service, both the Cabinet and the presidential office are staffed with presidential appointments. The independence of figures within the executive is thus questionable since everyone of influence in the presidential office is a political appointee.

The current Cabinet is comprised as follows:

<table>
<thead>
<tr>
<th>Ministry of Government (SEGOB)</th>
<th>Miguel Angel Osorio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Foreign Affairs (SRE)</td>
<td>Jose Antonio Meade</td>
</tr>
<tr>
<td>Ministry of National Defense (SEDENA)</td>
<td>Salvador Cienfuegos</td>
</tr>
<tr>
<td>Maritime Ministry (SEMAR)</td>
<td>Vidal Francisco Soberón</td>
</tr>
<tr>
<td>Ministry of Minance and Public Credit (SHCP)</td>
<td>Luis Videgaray</td>
</tr>
</tbody>
</table>

In addition, there are five decentralized organizations which are fiscally dependent and whose general directors are appointed by the President:

<table>
<thead>
<tr>
<th>Organization</th>
<th>Director</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEMEX</td>
<td>Emilio Lozuya</td>
</tr>
<tr>
<td>Federal Energy Commission (CFE)</td>
<td>Enrique Ochoa</td>
</tr>
<tr>
<td>National Water Commission (CONAGUA)</td>
<td>David Korenfeld</td>
</tr>
<tr>
<td>Institute of Social Security and Services for Government Employees (ISSSTE)</td>
<td>Sebastián Lerdo de Tejada</td>
</tr>
<tr>
<td>Mexican Institute of Social Security (IMSS)</td>
<td>José Antonio González</td>
</tr>
</tbody>
</table>

For Mexico, one of the most important issues moving forward is governance. Mexico has the particularity of having OECD characteristics as well as problems that are not typically associated with OECD countries. Mexico’s elite generally has a forward-looking vision, they are comfortable both professionally and socially in western institutions, and many of them have advanced degrees, allowing them to be competitive internationally. Challenges include a wasteful and hierarchical education system, extreme poverty in many rural and some urban areas, corruption, organized crime, tax evasion and a clientelistic government at the state and municipal levels.

Ongoing economic and social issues include low real wages, underemployment for a large segment of the population, inequitable income distribution and few advancement opportunities for the indigenous population in the impoverished southern states.

In the last weeks of 2014, an outbreak of social unrest emerged that could end up having adverse effects on the economic activity. Massive protests in reaction to the Ayotzinapa tragedy in which 43 students were kidnapped and presumably murdered by the police and municipal authorities under the orders of organized crime have gripped Mexico City and other major cities. The government has been criticized for
its inability to respond to the crisis, which represents the most severe wave of social unrest since the Peña Nieto administration took office two years ago. This situation was compounded with recent scandals surrounding the President and his wife regarding a mansion valued at USD$ 7 million which allegedly was built for them, and is considered their home, but is owned by a government contractor.

Immigration issues have also been a concern in recent years. Apprehensions for illegal immigration along the US-Mexican border account for more than 96 percent of total apprehensions. The focus on the increased need for border control led to an increase in Border Patrol Staffing, and technological improvements such as long-range radar, drone surveillance and motion sensors, among others.  

![Border crossings graph](http://www.fairus.org/issue/us-mexico-border-fence-and-patrol-operations)
ECONOMIC OUTLOOK

MEXICO ECONOMIC DATA

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (million)</td>
<td>117.1</td>
<td>118.4</td>
</tr>
<tr>
<td>GDP per capita (USD)</td>
<td>10,140</td>
<td>10,658</td>
</tr>
<tr>
<td>GDP (USD bn)</td>
<td>1,187</td>
<td>1,262</td>
</tr>
<tr>
<td>Economic Growth (GDP, annual variation in %)</td>
<td>4.0</td>
<td>1.1</td>
</tr>
<tr>
<td>Domestic Demand (annual variation in %)</td>
<td>3.8</td>
<td>1.2</td>
</tr>
<tr>
<td>Consumption (annual variation in %)</td>
<td>4.9</td>
<td>2.5</td>
</tr>
<tr>
<td>Investment (annual variation in %)</td>
<td>4.5</td>
<td>-1.8</td>
</tr>
<tr>
<td>Industrial Production (annual variation in %)</td>
<td>2.7</td>
<td>-0.7</td>
</tr>
<tr>
<td>Retail Sales (annual variation in %)</td>
<td>3.7</td>
<td>-0.3</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>4.5</td>
<td>4.3</td>
</tr>
<tr>
<td>Fiscal Balance (% of GDP)</td>
<td>-2.6</td>
<td>-2.3</td>
</tr>
<tr>
<td>Public Debt (% of GDP)</td>
<td>35.2</td>
<td>38.3</td>
</tr>
<tr>
<td>Money (annual variation in %)</td>
<td>14.5</td>
<td>9.2</td>
</tr>
<tr>
<td>Inflation Rate (CPI, annual variation in %, eop)</td>
<td>3.6</td>
<td>4.0</td>
</tr>
<tr>
<td>Inflation Rate (CPI, annual variation in %)</td>
<td>4.1</td>
<td>3.8</td>
</tr>
<tr>
<td>Inflation (PPI, annual variation in %)</td>
<td>1.2</td>
<td>1.3</td>
</tr>
<tr>
<td>Policy Interest Rate (%)</td>
<td>4.50</td>
<td>3.50</td>
</tr>
<tr>
<td>Stock Market (annual variation in %)</td>
<td>17.9</td>
<td>-2.2</td>
</tr>
<tr>
<td>Exchange Rate (vs USD)</td>
<td>12.87</td>
<td>13.04</td>
</tr>
<tr>
<td>Exchange Rate (vs USD, aop)</td>
<td>13.16</td>
<td>12.76</td>
</tr>
<tr>
<td>Current Account (% of GDP)</td>
<td>-1.3</td>
<td>-2.1</td>
</tr>
<tr>
<td>Current Account Balance (USD bn)</td>
<td>-15.1</td>
<td>-25.9</td>
</tr>
<tr>
<td>Trade Balance (USD billion)</td>
<td>0.0</td>
<td>-1.2</td>
</tr>
<tr>
<td>Exports (USD billion)</td>
<td>370.8</td>
<td>380.0</td>
</tr>
<tr>
<td>Imports (USD billion)</td>
<td>370.8</td>
<td>381.2</td>
</tr>
<tr>
<td>Exports (annual variation in %)</td>
<td>6.1</td>
<td>2.5</td>
</tr>
<tr>
<td>Imports (annual variation in %)</td>
<td>5.7</td>
<td>2.8</td>
</tr>
<tr>
<td>International Reserves (USD)</td>
<td>163.5</td>
<td>176.5</td>
</tr>
<tr>
<td>External Debt (% of GDP)</td>
<td>19.2</td>
<td>20.5</td>
</tr>
</tbody>
</table>

Economic growth in Mexico is strengthening, benefiting from the pick-up in activity in the United States, with an expected growth of 3.2 per cent in 2014, accelerating from growth of 1.1 per cent in 2013. Economic growth in Mexico is strengthening, benefiting from the pick-up in activity in the United States, with an expected growth of 3.2 per cent in 2014, accelerating from growth of 1.1 per cent in 2013.49 Mexico’s economy gained momentum in the third quarter of 2014. Agriculture recorded a strong increase and construction registered notable growth, which suggests that the sector began to recover from the slump observed in the six previous quarters. More recent data suggest that economic growth is firming up in the final quarter of the year.

Mexico faces several significant issues both in the region and internationally. Since 2007, Mexico’s drug trafficking organizations have engaged in violent feuding, resulting in tens of thousands of drug related homicides. It is a major drug producing and transit nation, and is the second largest opium poppy grower in the world; U.S. authorities seized 2,162 kilos of heroin along the Mexican border in 2013. 50 The government conducts the largest illicit-crop eradication program in the world; however, it continues to be a primary transshipment country for US-bound cocaine from South America. Major drug syndicates

49 World Economic Situation and Prospects 2014, update as of mid-2014, United Nations Publication, pg. 15
control the majority of drug trafficking throughout the country. It also produces and distributes ecstasy, and is the largest foreign supplier of marijuana and methamphetamine to the US market. Lastly, it is an important money-laundering center in the region.

On the positive side, macroeconomic management in Mexico is generally considered good. The Finance Ministry and the Central Bank are currently considered responsible and effective. The economy is stable and growing despite recent global downturns and financial difficulties.

Mexico is an export economy linked to the North American markets. Some of the economic problems faced by the country are based on a lack of internal competition in key sectors such as telecommunications; however, the current government has made the increase of domestic competition a priority.

One of the most important issues in Mexican economy is the differentiation between the informal and the formal markets. The informal sector is made up of companies that are not legally registered for fiscal or insurance benefits, and therefore escape both the advantages and disadvantages of formal regulation. By OECD standards the size of the informal market is quite large.

51 http://www.cfr.org/mexico/mexicos-drug-war
CHILE

COUNTRY OVERVIEW

Key Facts:

» Capital: Santiago de Chile
» Population: 17,643,916
» President: Verónica Michelle Bachelet Jeria
» Land Area: 289,112 square miles
» Language: Spanish
» Currency: Chilean Peso (CPL)

Chile is the longest and narrowest country in the continent, with 4,329 km in length and only 177 km of average width. The Chilean territory is located in the south west of South America, between meridians 17° 30’ and 90° latitude south. It borders to the north with Peru, to the east with Bolivia and Argentina, to the west with the Pacific Ocean and to the south with the South Pole. Due to its topography and its prolonged extension from north to south, Chile has a variety of climates. It is desert from Arica to La Serena, from the central region to Concepción it has climates similar to the Mediterranean, from Concepción to Punta Arenas it has a mild rainy climate, and polar ice in Antarctica.

The estimated population for 2014 population is 17,643,916 inhabitants, with a density of 22.6 hbs. / Km2. Of these, 40% are concentrated in the metropolitan area of Santiago. The average age is 31.7 years.

In addition to Santiago (the capital, with 5,250,000 inhabitants) the most important cities are: Antofagasta, Concepción, Temuco, Valparaiso / Viña del Mar (main port) and Puerto Montt.

Chile has one of the most solid and open economies in South America and the world, with low tariffs and a strong export orientation. For over 12 years the Chilean GDP has been growing by 7% per year, with inflation falling steadily, to just over 4% annually. Chile is a member of APEC and MERCOSUR, and has signed trade agreements with the European Union, Mexico and Canada, among others.

Mining has been an important player in the Chilean economy in recent decades. Copper production stagnated at around 1.4 million tons per year during the 80’s, however during the next decade sustained growth was observed, with production reaching more than 4 million tons. Growth continued, although at a slower rate, and in recent years the production approaches 6 million tons per year. Chile used to produce 16% of the world’s copper before the 1990s, and today it produces 32%.

Moreover, the share of mining exports relative to total shipments of Chile remains the most important of the economy, amounting to 60% in recent years. Similarly, the mining industry is the largest tax contributor, with a share of around 15% in recent years.

OIL IN CHILE

In 1893, French explorers, Rousson and Willems, sent by their government, concluded that there were good chances of finding oil both in Tierra del Fuego (Chorrillo sector) and Dawson Island.

In mid-1899 the presumptions of French researchers were ratified when a worker from the Agua Fresca estate, Arturo Niño, accidentally discovered the first oil field in Chile, near the Canelos River, approximately thirty kilometers south of Punta Arenas, in Quemas Malas. Soon after, various business
companies were established in order to gather and integrate groups of people and capitalists, for oil exploration activities in Magallanes.

In 1906, the Agua Fresca Oil Union was created, composed by an important group of people belonging to the upper social, political and commercial class in Santiago (Julio Subercaseaux Claro, Juan Enrique Concha S. Paul Canessa and James Zanelli). Alexis Marcou was appointed manager, in his condition as founder, and he became the soul of the company.

A drilling machine was bought and an experienced technician hired who would take on the responsibility of conducting the drilling. French engineers were then brought in order to perform field studies. The hired technician, engineer D. H. MacMillen was in charge of the machinery acquired by the trade union; the Keystone probe arrived at the port of Punta Arenas later that same year.

On January 22, 1907, Marcou and MacMillen went to survey the area and determine the exact spot to drill the well and begin the installation of the probe, which was finally located on the north bank of the Canelos River. Initially, the mission had several problems that generated failures in the drillings. Some of the sites produced gas, others water or solid samples of bituminous appearance.

Faced with this situation and after countless attempts, Marcou realized that the oil wealth Magallanes possessed required greater technical and financial efforts, which were not easy to obtain in Chile. Years later (1917), this situation would cause the discrediting for oil exploration as an economic activity, due to the fraudulent discovery of oil in the well of Leñadura.

Finally, during the government of Carlos Ibáñez del Campo (1926) Act 4109 was enacted, which stipulated that all hydrocarbon deposits existing in the subsurface, regardless of their domain, are the property of the State. Thus, the state initiated drilling studies to assess the possibilities of finding commercially exploitable hydrocarbon deposits. However, these activities failed due to lack of funding, or simply due to not having the appropriate work elements.

In 1934, the government of President Arturo Alessandri Palma presents to the Chamber of Deputies a project to modify the rigid provisions of the Act of 1928, in order to allow the participation of private enterprise. Two years later, after these projects do not succeed, the government decides to assume responsibility under the direct supervision of the Department of Mines and Petroleum, which at that time was the Ministry of Development. In this manner drilling projects that had been in paralyzed in Punta Prat and Isla Riesco resumed, under the control of what came to be known as the Petroleum Exploration Service.

Despite the efforts of the then president, Pedro Aguirre Cerda, to activate Chilean oil prospecting, budgets were cut and no oil was found. In 1939 CORFO was created, which in 1943, under the presidency of Juan Antonio Ríos, recruited the United Geophysical Company, to begin projects in Magallanes and seismic exploration activities in Tierra del Fuego and the continent, under geologist Glenn Ruby. Engineers Eduardo Simián, Bernardo Grossling and Carlos Mordogovich, arrived from CORFO, to oversee the work of the American company.

Finally, on December 29, 1945, from the Springhill well on the Big Island of Tierra del Fuego, the first jet of Chilean oil began to flow, which would become the country's first commercial oil reservoir.

In 1950 oil production begins in Chilean fields, and after its implementation, it starts to export oil to Uruguay.

The same year, Gabriel González Videla enacted Law 9,618 by which the Empresa Nacional del Petroleo (ENAP) was created. This law confers rights of exploration, production, refining and sale of oil and its
byproducts to a Commercial Company attached to CORFO; an autonomous independent legal entity that would maintain its rights and responsibilities in the oil sector.

In its early days, Enap obtained goods level of production. However, this was not enough to completely replace the import of fuel. Nonetheless, the amount of oil exploited supplied various economic activities in Chile, such as transportation or industrial activity.

In terms of exploration and extraction of crude oil, deposits discovered in Chile are concentrated in the Magallanes Basin, in three areas known as Continent, Tierra del Fuego Island and Offshore "Districts". Currently, the increased production of crude oil and natural gas comes from offshore fields, which were developed during the eighties. However, crude oil production has fallen significantly, from 2,401 Mm$^3$ in 1981 to 148 Mm$^3$ in 2007.

As of March 2011, Chile produces only one percent of the total oil required to meet its energy needs and therefore depends almost entirely on foreign markets.

Currently, Chile imports over 60% of its oil from Ecuador and Brazil, and the remainder from Colombia, Ecuador and Argentina.

**ENERGY GENERATION IN CHILE**

During the first decades of the twentieth century, Chilean and foreign entrepreneurs created hundreds of small utilities in the towns and cities of Chile, of which the most important were the Chilean Electric Tramway and Light Company and the Transatlantic German Electricity Company operating in Santiago, and the General Electric Industrial Company, owned by Chilean capitalists which provided services from San Bernando to Temuco. In addition to this, many large mining industries set up their own power plants in an effort to modernize their operations.

At the beginning of 1920s, the generation and supply of energy underwent significant growth, reflected in the emergence of a new utility in Santiago, known as the Chilean Electricity Company, "Compañía Chilena de Electricidad Ltda". Given this expansion, the State had to regulate this activity and in 1925 the General Electricity Services Law was enacted.

The Chilean Electricity Company Ltd. was created as a private electricity distribution company on August 1, 1921, as a result of the merger between the Chilean Electric Tramway and Light Co. (founded in 1889) and the National Electric Power Company, which operated in Santiago since 1919.

Between 1929 and 1931, the South American Power Co., bought or entered into partnerships with several electrical entities operating in the central region including the Chilean Electricity Company Ltd. In the following years, other companies added to the facilities of company, also operating within the concession area, covering what is now the V Region and Metropolitan Area, and which together accounted for nearly half of the country's inhabitants.

The company was nationalized on August 14, 1970, under Law No. 17,323 which authorized the CORFO to acquire all the shares and assets. Since 1971 is has been known as Compañia Chilena de Electricidad S.A.

During 1983, the company began a process of re-privatization that culminated in August 1987, with total share capital in the hands of the private sector. As a result of this process, in November 1987, the first subsidiary company was created; Distribuidora Chilectra Metropolitana S.A., which in May 1994 was established as Chilectra S.A.
Chilectra became the leader in the national electricity market energy. In this context, on September 30, 1996 it acquired the Hill Electric Company S.A. (now Empresa Eléctrica de Colina Ltda.), located in the northern part of the company’s concession area.

This consolidation was reflected in Decree No. 621 published by the Ministry of Economy in the Official Journal on January 8, 1997, which granted it the concession that allowed it to distribute electricity in the Chacabuco province.

Chilectra, through its subsidiary, Luz Andes S.A. (now Luz Andes Limited), on August 11, 1998, began supplying power to the Valle Nevado ski resort. In that same year, it acquired 100% of the assets of the Municipal Electricity Company of Lo Barnechea, which allowed it to distribute energy to Farallones, El Colorado and La Parva.

The electricity market in Chile is made up of energy generation, transmission and distribution activities. These activities are developed by companies that are controlled entirely by private capital; therefore the State is limited to regulating, supervising and planning investments in generation and transmission, although the latter function is only seen as a non-compulsory recommendation. The state agency that regulates the electricity sector in Chile is the National Energy Commission (CNE), which is responsible for developing and coordinating plans necessary for its proper functioning.

There are approximately 40 generators, 10 transmission companies and 31 distribution companies in Chile.

There are four independent power systems in Chile: the Northern Interconnected System (SING), which provides services to the mining regions of the northern desert (23.2% of total installed capacity); the Central Interconnected System (SIC), which provides services to the central part of the country (75.8% of total installed capacity and 93% of the population); the Aysen Electrical System (0.3% of total capacity) and the Magallanes Electric System (0.6% of total capacity), which provides services to small areas of the southern tip of the country. The long distances between the four systems make it difficult to integrate.
MARKET SEGMENTS

OIL REFINERIES

The refining of crude oil in the country is run by the state company ENAP through its 3 plants.

After the discovery of the first oil well in the country, Chile set out to create the National Petroleum Company (ENAP). The discovery of oil in Springhill was conducted by a team of explorers led by engineer Eduardo Simian Gallet, and gave way to the drilling of new wells, which yielded positive results. In this manner, the team led by Simian recommended to the CORFO the creation of ENAP, as a way to commercially exploit the deposits discovered in Magallanes.

One of the first goals set by the fledgling company was the construction of an oil refinery in the country, a task that culminated in 1954 with the commissioning of the Concon Oil Refinery (today the Aconcagua Refinery). Then in 1959, the first logistics facilities for the storage and distribution of refined fuels in Maipú were built and, the following year, the Gregorio maritime terminal in Magallanes was completed.

In 1962, the Cullen Petrol Plant (Magallanes) came into operation, and in 1966 the second refinery in the country began operations, located in the Eighth Region (now the Bio Bio Refinery) and the construction of the pipeline from the refinery to San Fernando, in the Sixth Region were initiated. From this point, the pipeline connects with another pipeline managed by Sonacol that transports fuel to the Storage Plant located in Maipú, in the Metropolitan Region.

In 1981, ENAP integrated its logistics business, with storage facilities for liquid and gaseous fuels in Maipú, San Fernando and Linares. This activity is currently performed by the Department of Storage and Pipelines, owned by Enap Refineries S.A.

On January 1, 2004, all refineries were merged under one company: Enap Refinerías S.A.

The oil refinery located in Concon began operations in 1954 together with the Quintero Terminal, which receives crude oil from the Magellan Strait. In 1959, the Maipú Terminal was built, which connects via pipeline with the Concon refinery. Finally, in 1966 the Refinery Petrox began operations in Talcahuano. All of ENAP’s refining activities are performed by these two refineries, with the refinery located in Magallanes (Gregorio Refinery) acting in the capacity of supporting plant, should an increase in productivity be required.

REFINERIES BY KEY PLAYER

The National Petroleum Company is owned by the State of Chile. It was incorporated under Act No. 9618, enacted on June 19, 1950. Its statutes were approved by Decree 1.208, issued on October 10, 1950, by the then Ministry of Economy and Trade. It operates as a commercial company under a legal regime of public law and is administered autonomously. It has its own assets and legal personality, and is tied to the Ministry of Energy and the Ministry of Finance, with the latter for budgetary purposes.

The National Petroleum Company, ENAP, is a leading company in Chile, which operates in an integrated manner in the production, refining and marketing of hydrocarbons and their byproducts. Wholly owned by the state, the company plays a strategic role in the supply of fuels. Thanks to the sale of Liquefied Natural Gas that comes in from different markets to the Quintero terminal, its role has become key in supporting the country’s energy matrix.
Its overseas operations include production of oil and gas in Ecuador, Egypt and Argentina, all through partnerships with leading companies in the oil sector.

In Chile, ENAP operates through two business lines: Exploration and Production (E&P), which manages the exploration and production of hydrocarbons, and is also responsible for bidding and underwriting Special Petroleum Operation Contracts (CEOP), which allow companies associated with ENAP to explore blocks in the Magallanes Region. The operations of its international subsidiary, Sipetrol, which develops all ENAP operations abroad, also fall under its responsibility.

The second line of business, known as the Refining Line, operates the Aconcagua, Bio Bio and Gregorio Refineries, where crude oil is processed to transform it into fuel.

**ENAP Bio-Bio Refinery (formerly Petrox)** it supplies about 40% of the national market, its storage capacity for crude oil is approximately 489 Mm³ and its refining capacity at present is 18,000 m³ per day.

The crude processing and complementary loads plants it has are:

- Topping and Vacuum I
- Topping and Vacuum II
- Visbreaking
- Catalytic Cracking
- Continuous Catalytic Reformation
- Hydro-treatment Diesel 1
- Hydro-treatment Diesel 2
- Desulfurization of Cracking Gasoline (HDG)
- Hydrocracking, Benzene saturation
- Isomerization
- Separation and purification or polypropylene plant
- CHT Hydrogen Plant
- Coker
- Hydro-treatment of Diesel (HDT)

It also has a cogeneration plant owned by Petropower Energy Limited, the Bio Bio Hydrogen Plant, co-owned with SigdoKoppers S.A., Smooth Hydrocracking gas oil (MHC) plant and a regasification plant for Liquefied Natural Gas, in the commune of Pemuco, located in the Eighth Region.

There are also Merox kerosene, gasoline and liquefied gas treatment plants, sodium hydrosulfide plants, Sulfur No. 1 and No. 2 recovery plants, Gas Treatment, Acid Water Treatment, and Oily Water Treatment plants, water cooling, steam and electricity supply, and storage tanks for crude oil, intermediate and final products.

Other industrial facilities include pipelines for transporting finished products from the refinery to the city of San Fernando, which is connected to the Sonacol pipeline (on the stretch between San Fernando and Maipú), pumping stations in the Bio Bio Refinery, Chillán and Molina; pipelines from the refinery to the San Vicente maritime terminal to transport crude oil and finished products; the San Vicente Marine Terminal, where a new type of dock walkway and 2 marine terminals with underwater pipelines were installed; inner pipes from the vessels to the processing plants and from these plants to the intermediate and final product vessels; pipeline for the receipt and delivery of liquefied gas; pumps to ship products from the refinery to San Fernando and San Vicente; pumps in San Vicente for shipping product by sea and receiving crude imported via the same waterway; chemical laboratory; facilities and headquarters for
the Emergency Response Brigade, which operates with volunteers from the plant; specialized workshops to meet the maintenance and repair needs of all plants; Emergency electrical equipment that operate with diesel and natural gas, and a natural gas interconnected system for use as fuel in boilers and furnaces (steam generation).

ENAP Aconcagua Refinery (formerly R.P.C.)

The refinery production meets about 40% of the domestic fuel market demand. The main processing and supplementary charge plants are:

- Topping and Vacuum I
- Topping and Vacuum II
- Visbreaking
- Catalytic Cracking
- Continuous Reformaction
- Smooth Hydrocracking (two plants)
- Diesel and gasolina hydrodesulfurization
- Alkylation
- Solvent Plant
- Sulfuric acid Plant
- Isomerization Plant
- Delayed Coker Plant
- Sulfur Planta
- Hydrogen Plant (property of AGA)
- Coker Complex

Additionally, there are Merox treatment plants for turpentine and kerosene, gas treatment and oily water plants, supply plants, closed cooling water systems, flare systems, pipelines between the refinery and the Maritime Terminal of Quintero; internal pipelines between the vessel areas and the processing plants and between the plants and the intermediate and final product vessels; pumps to ship products from the refinery; the Maritime Terminal in Quintero has crude and byproduct tanks, pumps zones and four anchorages, including one monobuoy type for VLCC and Suezmax tankers; a chemical Laboratory; Truck freight yard; staff facilities for the Emergency Response Brigade; Headquarters for the Fire Department for 24-hour shifts; fire trucks, firefighting equipment; specialized workshops for maintenance and repair of all plants; Emergency diesel fuel and gas electrical equipment; and an interconnected natural gas system for use as fuel in boilers and furnaces (steam generation).

On Easter Island, ENAP Refineries S.A. has a concession for a terminal facility located in the area of Rada Vinapu. With a storage capacity of 4,800 cubic meters, the Vinapu Terminal guarantees the fuel supply for the island territory. These facilities are:

**Maritime Terminal:** it features an 8-inch underwater line about 500 meters long and an anchorage with moorings for vessels up to 110 meters long and 10 meters deep and up to 10,000 DWT, for unloading or loading.

**Ground Terminal:** 6 storage tanks for refined products, with a capacity of up to 800 cubic meters, used for storing Aviation Kerosene, 93 NOR Gasoline and B Diesel. It also has a truck loading system (pumps and loading island) and a fire control system. For product distribution it has a fleet of Tanks Trucks, composed of three trucks for Aviation Kerosene and two semitrailers for Gasoline and B Diesel.
Gregorio-Magallanes Refinery

This complex refines stores and transports fuels. The refining process of crude oil is done in the Gregorio Refinery and fractionation process for Raw Product in the Cabo Negro Plant.

In terms of logistics, the R&C Magallanes facilities are the Cabo Negro Terminal, Gregorio and Clarencia for receiving and shipping of products. These installations have storage facilities for crude oil, intermediate products for additional charges for the refineries, and finished products.

It has a storage capacity of approximately 221 thousand cubic meters. The fractionation plant or distillation unit, which processes crude at a rate of 1,650 cubic meters per day; is basically a topping unit.

During 2014, 268,000 m3 of oil were refined. The market basket is composed of 95% oil of national origin and 5% from Argentina. Light crude refining (° API> 26) is predominant, which allows for the supply of the regional demand for aviation kerosene and marine gas oil.

Of the total volume produced in the Gregorio refinery, 19% corresponds to naphtha, 14% to aviation kerosene; 22% to marine gas oil, and to 45% to reduced crude.

ENERGY GENERATION

This sector consists of utilities which own power generation plants; energy which is transmitted and distributed to final consumers. Generating operates within a competitive market, i.e., participating companies are powerless to fix the market price.

As of December 31, 2013, the Central Interconnected System (SIC) had an installed generation capacity of 14,080.2 MW, predominantly hydrothermal, of which 95% stems from conventional sources and 5% comes from Non-Conventional Renewable Energy (NCRE). Meanwhile, the Northern Interconnected System (SING) has 4603.0 MW and is almost 100% thermal, based on fossil fuels such as coal, gas and oil. Together, the two systems have 18,683.2 MW, which correspond to more than 99% of the national installed capacity (Aysen, Magallanes and other isolated systems are less than 1%).

For the generation park already installed, the instantaneous unit production cost increases with the increase in electricity demand. This is because the dispatch of the various plants is organized by increasing order of costs, which minimizes the total cost of instant production.

There are about 30 generators, but only three companies lead the power generation sector.

POWER PLANTS BY KEY PLAYER

Endesa

Currently, Endesa Chile and its subsidiaries operate 179 units in four countries in Latin America, with a total installed capacity of 13,455 MW. If you include the 50% of the power of the Power Plant Atacama, reaching a total of 182 units with an installed capacity of 13,846 MW.

The company also participates in the Brazilian market through its associated Endesa Brasil, in partnership with Enersis and Endesa (Spain). Endesa Brazil has 987 MW of installed capacity, through Endesa Cachoeira and Endesa Fortaleza. It was created during the government of Juan Antonio Ríos and Industrialization and Technological transformation plan as a subsidiary of the Chilean Development Corporation (CORFO) on December 1, 1943 and privatized in 1989.
### Hydroelectric Plants

<table>
<thead>
<tr>
<th>Plants</th>
<th>Location</th>
<th>Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Abanico</td>
<td>90 km, Bio Bio</td>
<td>136</td>
</tr>
<tr>
<td>Central Antuco</td>
<td>91 km, Angeles</td>
<td>320</td>
</tr>
<tr>
<td>Central Cipreses</td>
<td>105 km, Talca, Región del Maule</td>
<td>106</td>
</tr>
<tr>
<td>Central Curilinque</td>
<td>60 km, Talca</td>
<td>89</td>
</tr>
<tr>
<td>Central El Toro</td>
<td>90 km, Angeles</td>
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<tr>
<td>Central Isla</td>
<td>105 km, Talca</td>
<td>68</td>
</tr>
<tr>
<td>Central Loma Alta</td>
<td>105 km, Talca, Región del Maule</td>
<td>40</td>
</tr>
<tr>
<td>Central Los Molles</td>
<td>81 km, IV Región</td>
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<tr>
<td>Central Ojos de Agua</td>
<td>Rio Cipreses</td>
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<tr>
<td>Central Palmucho</td>
<td>120 km, Angeles</td>
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<tr>
<td>Central Pangu</td>
<td>100 km, Bio Bio</td>
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<tr>
<td>Central Pehuenche</td>
<td>60 km, Talca</td>
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<tr>
<td>Central Sauzalito</td>
<td>13 km, Rancagua, VI Región</td>
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<tr>
<td>Central Ralco</td>
<td>120 km, Bio Bio</td>
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<tr>
<td>Central Rapel</td>
<td>120 km, Santiago, VI Región</td>
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<td>Rancagua, VI Región</td>
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### Thermoelectric Plants

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<td>Central Bocamina II</td>
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<td>Central Diego de Almagro</td>
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<tr>
<td>Central Huasco TG</td>
<td>Puerto Guacolda</td>
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<tr>
<td>Central Huasco Vapor</td>
<td>Puerto Guacolda</td>
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<tr>
<td>Central Quintero</td>
<td>Quintero</td>
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<tr>
<td>Central San Isidro</td>
<td>Quillota</td>
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<td>Central San Isidro II</td>
<td>Quillota, V Región</td>
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<td>Central Taltal</td>
<td>Taltal</td>
<td>244.9</td>
</tr>
<tr>
<td>Central Tarapacá</td>
<td>Iquique, I Región</td>
<td>182</td>
</tr>
</tbody>
</table>

### AES Gener

AES Gener is a producer and distributor of electricity in Chile. Formerly known as Chilgener (1981-1998) and Gener (1998-2001). AES Gener is the result of the division in 1987, Chilgener into three independent companies, two distributors (Chilectra and Chilquinta) and a generator and distributor (Chilgener).

AES Gener in Chile generates 18,754 MW of coal, gas and hydro. 31.9% of this generation is hydro, the 66.5% corresponds to thermo and 1.6% to wind and solar generation. Is the largest thermal generator and second largest electricity generator in Chile.

The firm owns and operates a diverse portfolio of power plants in the country, including facilities operating on coal, gas, diesel, biomass and water. AES Gener serves the Chilean Central Interconnected System.
(SIC) through four run-of-the-river hydroelectric power plants, one coal-fired thermoelectric power plant, four diesel-fueled turbogas power plants, one cogeneration power plant and one gas turbine. At the same time, it serves the Chilean Great North Interconnected System (SING), through its subsidiaries Norgener S.A., Empresa Eléctrica Angamos S.A. and Termoandes S.A. The firm currently operates in Argentina and Colombia through its subsidiaries Termoandes S.A. and AES Chivov. AES Gener is controlled by US power company AES Corp, through its subsidiary Inversiones Cachagua SpA.

**Colbún**

Colbún is a Chilean generator which owns and operates 15 hydro power plants, 7 thermo plants, 17 substations, and 892km of transmission lines in four regions. The company contributes 2,962MW of capacity (48% hydro and 52% thermal) to Chile's central SIC grid -- in which it is the second largest power generator, according to central grid operator CDEC. Colbún is controlled by Grupo Matte through subsidiary Minera Valparaiso.

**Hydroelectric Plants**

<table>
<thead>
<tr>
<th>Plants</th>
<th>Location</th>
<th>Capacity (MW)</th>
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<tbody>
<tr>
<td>Colbun – 1985</td>
<td>Colbun, Maule Region</td>
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<tr>
<td>Angostura – 2014</td>
<td>Santa Barbara, Region del Biobio</td>
<td>316</td>
</tr>
<tr>
<td>Canutillar - 1990</td>
<td>Cocharmo, Los Lagos Region</td>
<td>172</td>
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<tr>
<td>Machicura – 1985</td>
<td>Colbun, Maule Region</td>
<td>95</td>
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<tr>
<td>Hornitos – 2008</td>
<td>Los Andes, Valparaiso Region</td>
<td>55</td>
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<td>Los Quilos – 1943</td>
<td>San Esteban, Valparaiso Region</td>
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<tr>
<td>San Ignacio – 1996</td>
<td>Colbun, Maule Region</td>
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<tr>
<td>Rucue – 1998</td>
<td>Quilleco, Bio Bio Region</td>
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<tr>
<td>Quilleco – 2007</td>
<td>Quilleco, Bio Bio Region</td>
<td>71</td>
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<tr>
<td>Blanco – 1993</td>
<td>Los Andes, Valparaiso Region</td>
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<td>Chacabuquito – 2002</td>
<td>Los Andes, Valparaiso Region</td>
<td>29</td>
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<td>Juncal – 1994</td>
<td>Los Andes, Valparaiso Region</td>
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<tr>
<td>Chiburgo – 2007</td>
<td>Colbun, Maule Region</td>
<td>19</td>
</tr>
<tr>
<td>Carena – 1937</td>
<td>Cuacavi, Metropolitan Region</td>
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<tr>
<td>San Clemente – 2010</td>
<td>Colbun, Maule Region</td>
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<td>Juncalito – 1994</td>
<td>Los Andes, Valparaiso Region</td>
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Thermoelectric Plants

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<tr>
<th>Plants</th>
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<tr>
<td>Nehuenco II – 2003</td>
<td>Quillota, Valparaiso Region</td>
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<tr>
<td>Nehuenco I – 1999</td>
<td>Quillota, Valparaiso Region</td>
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<tr>
<td>Santa Maria – 2012</td>
<td>Coronel, Region del Bio Bio</td>
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<td>Candelaria – 2005</td>
<td>Mostazal, Region Libertador Bernardo</td>
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<td>Nehuenco III – 2002</td>
<td>Quillota, Valparaiso Region</td>
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<tr>
<td>Antihue – 2005</td>
<td>Valdivia, Region de Los Ríos</td>
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</table>

SECTOR FORECAST

Chile faces the challenge of obtaining sufficient and competitive energy resources in order to achieve development forecasted for the coming decades. Growth should be supported with clean, secure and affordable energy.

Under this premise, the National Energy Strategy or ENE is born. The purpose of the ENE is to adopt a clear position on the future development of the energy matrix, together with the main guidelines and measures for their implementation.

The country currently has an installed capacity of approximately 17,000 MW: 74% in the Central Interconnected System, SIC; 25% in the Norte Grande Interconnected System, SING, and less than 1% in the mainframes of the Aysen and Magallanes regions. Considering the trend of economic growth by 2020, an increase in electricity consumption of around 100,000 GWh of total demand for electric energy is projected. This represents the challenge of incorporating 8,000 MW of installed capacity to the system.

This objective is rather critical, considering that Chile imports energy resources, with high prices that have increased the marginal costs of power generation and electricity prices. Currently, Chile has one of the highest electricity rates in Latin America, above the average of other OECD countries. The country needs energies that are clean and renewable, which are found in abundance in the country, such as water generation. However, it is not possible to dispense with the thermal energy that allows for stable and secure energy supply. In this context, it is essential to incorporate the highest environmental standards and encourage the entry of renewable energy to the matrix.

Additionally Chile has a portfolio of mining projects under execution in the amount of 20 billion dollars and other projects under evaluation equivalent to another 45 billion, placing the mining sector at the doors of a major upswing. In this regard, recent years have seen constraints in the competitiveness of Chilean mining in areas such as the fall of the Mineral Law, availability and cost of energy, water availability, productivity of human capital and legal certainty regarding authorizations. The challenge in this area is to overcome these limitations in order for mining to increase its contribution to the country and continue as the engine for national development.
OPPORTUNITIES FOR VIRGINIA COMPANIES

Within the energy and refining sector, and the general industry sector, there are issues pertaining to security and defense that need to be addressed. Foreign companies wishing to enter the Chilean market with goods and services may consider the following opportunities:

» IT Technical training for medium and small companies
» Environmental management and best practices
» Cyber security training for end-users
» Cyber security software for corporations
» Data recovery and data protection software for both industry and banking sectors
» Video surveillance for banking sectors
» Industrial safety training
» Personal protection elements

Based on our expertise and knowledge of the oil and energy sector in Chile, and in order to complement the general opportunities derived for general policies, we present a general analysis of business opportunities for security and defense companies in the abovementioned sectors. Given that Chile is a country with significantly less security issues than the other three countries analyzed in this study, the opportunities are slightly different.

1. Perimeter Security Systems
   » Surveillance by satellite
   » Local video surveillance
   » Aerial video surveillance
     » Drones
     » Micro-drones
     » Aircraft
   » Tactical training for security personnel
   » Equipment
     » Cameras
     » Monitors
     » Information centers

2. Secure communications
   » Industrial wireless applications
   » Data / Voice / Video
   » Data Acquisition
   » SCADA / Telemetry
   » Mobile Data for Field Force Automation
   » Control Process
   » Telecom & Campus Connections
   » Transaction / POS
   » Mobile Data for Public Safety

3. Information security
   » Implementation:
» Data encryption
» Confidentiality
» Protocols
» Risk analysis, impact, criticality and sensitivity
» Access controls
» Strategy
» Network architecture
» Contingency plans
» Information assurance
» Training for staff
» Firewall
» Administration of user accounts
» Detection and intrusion prevention
» Antivirus
» Public key infrastructure
» (SSL) Secure Socket Layers
» Single connection "Single Sign-on SSO"
» Biometrics
» Privacy compliance
» Remote access
» Digital signature
» Electronic data "EDI" and electronic transfer of funds "EFT"
» Virtual private network "VPNs"
» Secure electronic transfer "SET"
» Computer forensics
» Data recovery
» Monitoring Technologies

» Certifications in:
  » CISM: Certified Information Security Manager
  » CISSP: Certified Information Systems Security Professional Certification
  » GIAC: Global Information Assurance Certification
  » CPTE Certified Penetration Testing Engineer
  » CPTC Certified Penetration Testing Consultant
  » CPEH Certified Professional Ethical Hacker
  » CISSO Certified Information Systems Security Officer
  » CSLO Certified Security Leadership Officer
  » ISO/IEC 27000-series
  » ISO/IEC 27001
  » ISO/IEC 27002

4. Global positioning systems
  » Personnel tracking
    » For staff located in high risk areas
    » For services providers located in high risk areas
» Tracking of goods
  » Trucks
  » Containers
  » For personal vehicles
  » Specialized tools
  » Equipment and materials

5. Prevention and care of natural disasters
  » Implementation of prevention protocols
  » Training
  » Risk reduction
  » Equipment
  » Implementation of contingency plans

SAFETY CONSIDERATIONS

Chile is one of the safest countries in Latin America. Violent crime in Chile is very low in comparison to other counties in the region; the main safety concerns arise from pick-pocketing, telephone scams, and vehicular and residential burglaries. There has been a significant increase in the reported incidents involving credit card cloning and credit card fraud. Outside Santiago, the incidence of crime is reduced, with the exception of the Valparaiso, Antofagasta and Iquique.

Peaceful and authorized marches and demonstrations traditionally take place on September 11, which is the anniversary of the 1973 military overthrow of the Allende government, and again on March 29, known as the “Day of the Young Combatant.” Student marches also occur, with participation ranging between 10,000 to 100,000 people. Marches are generally peaceful, although some have escalated to participants throwing rocks and Molotov cocktails. The Police have countered with tear gas and water cannons.

Labor union strikes are also common, and although the Government usually authorizes them, they tend to turn confrontational. Indigenous groups actively protest, asking for the restitution of lands they claim as their own; they have been known to set fire to agricultural and residential properties in southern Chile that they consider their cultural heritage.

Located between two tectonic plates, Chile is considered one of the most seismically active countries in the world. In February 2010, an 8.8 earthquake was recorded, with its epicenter in Concepcion. The earthquake caused damages to buildings and infrastructure, and a subsequent tsunami caused even more destruction.

The Carabineros are the uniformed national police force and they are responsible for crime prevention, order, and traffic control. They are considered to be one of the most professional, well-trained, police force in Latin America, and they experience low levels of corruption. The Policía de Investigaciones (PDI) is a plain-clothed investigatory police branch, which is responsible for immigration matters and handles criminal investigations. The PDI responds to residential burglary investigations, cybercrime, narcotics investigations, and counterterrorism and immigration issues.
LEGAL CONSIDERATIONS

LABOR LAWS

The Labor Code and its subsequent regulations govern work relationships between employees and corporations. Due to significant changes in legislation, starting in the 1990s, workers currently play an active role in society, in particular regarding collective bargaining agreements and the right to strike. Conflict resolution is primarily achieved through negotiations between the parties.

Employment contracts must be presented in writing, and include at least, the parties identification numbers, the nature of the services rendered, the length of the contract, the place of works, salary and time/shift. Contracts may be terminated according to the provisions stipulated by law: mutual agreement, by decision of the employee, with 30 days’ notice, death of the employee, completion of the time period agreed, or service rendered, or lastly, due to force majeure. The employer may unilaterally terminate the contract due to a serious breach of his/her responsibilities by the employee, failure to uphold legal regulations, or the inability to perform the job due to technical, labor or financial reasons. These regulations do not apply to senior management as they may be removed without cause.

Foreigners wishing to work in Chile must obtain the corresponding workers visa from the immigration authorities. In companies with more than 25 employees, the number of foreign employees may not surpass 15% of total employees. The following foreigners are excluded from this calculation: foreigners married to Chilean nationals, widows of Chilean nationals, or those with Chilean children; foreigners who have lived in Chile for more than 5 years, and foreign experts who cannot be replaced by Chilean personnel. Foreign employees may be paid in other currencies with the prior authorization of the Central Bank.

Unions are subject to voluntary affiliation and individuals may choose from a multitude of unions. In 2013, the total number of individuals in the workforce that were affiliated to unions was 940,222.52 Unions may be organized as federations and confederations, of which the Workers Confederation (CUT) is the most important with approximately 80% of the labor force affiliated to it. Almost every matter can be brought to the collective bargaining table, with the exception of property of company management. Collective agreements are valid for two years, although they may be modified or cancelled per the agreement of the parties. By law, public utility employees are not allowed to strike, if their jobs jeopardize the health or supply of the population, the economy of the country or national security. Strikes are also invalid in cases where the conflict has escalated to an arbitration proceeding.

OPERATING REGULATIONS

The electricity sector in Chile is regulated by the General Electricity Services Law contained in Decree No. 1 of 1982, issued by the Ministry of Mining, and the text revised and coordinated in Decree No. 4 of 2006 the Ministry of Economy (“Electricity Act”) and its corresponding regulations. Three government entities have the responsibility for the implementation and enforcement of the Electricity Act: the National Energy Commission (CNE), which has the authority to propose the regulated tariffs and to prepare plans for the construction of new generating units; the Superintendence of Electricity and Fuels (SEC), which regulates and monitors legal compliance, regulations and technical standards for generation, transmission and distribution, liquid fuels and gas; and finally, the Ministry of Energy is responsible for proposing and conducting public policy on energy matters and groups under its authority the SEC, the CNE and the Chilean Nuclear Energy Commission (CChEN), thus strengthening coordination and providing a comprehensive view of the sector. In addition, the Agency for Energy Efficiency and the Center for Renewable Energy are also attached to the Ministry.
The law also establishes the appointment of a Panel of Experts whose primary function is to resolve discrepancies that occur between parties in the electricity market: utilities, system operators, regulators, etc.

From a physical standpoint, the Chilean electricity sector is divided into four electrical systems: the Central Interconnected System (SIC), the Northern Interconnected System (SING), and two isolated systems: Aysen and Magallanes. The SIC, is the principal system, given that about 93% of the Chilean population live along this central area which extends longitudinally for approximately 2,400 km., it joins Taltal in the north with Quellón, on Chiloé Island, to the south. The SING covers the north of the country, from Arica to Coloso, covering a length of about 700 km, where much of the mining industry is found.

According to the Electricity Act, companies involved in the generation and transmission operating through an interconnected power system must coordinate their operations in an efficient and centralized manner through an operating entity, which is known as the Economic Load Dispatch Center (CDEC). This is set up in order to operate the system at minimum cost while preserving the safety of the service. In order to achieve this, the CDEC plans and performs the operation of the system, including the calculation of marginal cost schedule, the price at which energy transfers between generators made in the CDEC are valued. The CDECs (CDEC-SIC and CDEC-SING) are autonomous entities that are made up of generating companies, transmitting stations, transmitting substations and major clients.

REGULATION FOR GENERATION COMPANIES

The generation segment is made up of companies that own power plants, and transmit and distribute energy to end users.

This segment is characterized as being a competitive market where electricity is sold: i) to distribution companies which supply regulated customers within its concession area; ii) to free or non-regulated customers, mainly industrial and mining companies; and iii) to other generators through the spot market through energy and power transactions carried out in the CDECs.

The operation of the generating companies in each electrical system is coordinated by the corresponding CDEC. As a result of this efficient and coordinated operation of electrical systems, any level of demand is adequately met, at the lowest possible production cost according to the alternatives available in the system. The marginal cost is used as the price at which generators trade energy on an hourly basis, including injections into the system such as withdrawals or purchases to supply customers.

Generators participate in energy procurement bids with terms of up to 15 years. The tenders are conducted according to demand requirements demands through distribution and are supervised by the National Energy Commission. This allows generators to receive a stable and predictable income, avoiding marginal cost volatility and encouraging investment in the sector.

Payment by capacity exists in Chile, and depends on an annual calculation made centrally by each CDEC, based on an amount that pays for the development of a gas turbine, as the marginal unit that provides the system’s demand. The charge capacity of each plant is independent of its delivery and pays the availability and contribution to the country’s reserve margin.

The Electricity Concessions Act (Act 20701), which was enacted on October 14, 2013, seeks to expedite the processing and deadlines associated with electric concessions, throughout the various stages of processing the power projects.

This regulation established measures that expedite procedures for granting concessions, thus reducing the construction time for transmission projects, delays which currently impede an economic and smooth operation of power supply between the country’s different areas. Act 20698 of October 22, 2013 amends
Act No. 20.257 regarding the Non-conventional Renewable Energy Sources (ERNCs for its acronym in Spanish). The main modification regards the new obligation for supply of ERNCs, which involves a 10% increase of the supply obligation of ERNC of the marketed energy, which was to be achieved, gradually by 2024, at a new value of 20% to be achieved, also gradually, by 2025. Furthermore, a mechanism for annual and public tenders exclusive to ERNCs is determined, in order to comply with the annual supply obligation to ERNCs. The Ministry of Energy is responsible for these annual tenders and ERNC participants compete by price (energy price) for the energy blocks offered, allowing them to sell at a stabilized price, and with ceiling defined in the same Act. This new legislation encourages the incorporation of generation technologies in a more competitive manner.

The “Carretera Electrica” or “Electric Highway” Bill is still under evaluation. It establishes measures for facilitating the development of the main and ancillary transmission system, including the design of greater output gaps and whose costs will be paid jointly among the different users. The main purpose of this project is to encourage the future development of centers for generation and demand in different areas of the country, mainly in terms of renewable energy, including hydroelectricity.

REGULATION FOR REFINING COMPANIES

The refining sector is comprised of 6 refineries, all owned and operated by the National Oil Company (ENAP). Operations are regulated by Act 9.618 of January 1950, and its subsequent amendments, which stipulate the manner in which hydrocarbons and the ENAP are to be managed. Article 1 stipulates that the State is the absolute, exclusive, inalienable and indefeasible owner of all hydrocarbon deposits found within the national territory. Article 2 stipulates the creation of the National Oil Company, an organization that is regulated by the abovementioned Act and the company bylaws, the latter, which are approved by Decree by the President of the Republic. The National Oil Company may perform exploration, exploitation or monetization activities pertaining to oil fields, inside or outside the country, either directly or through companies in which it participates or in association with others. In the pursuit of said activities within the national territory, through corporations in which it is a party or in association with others, it must do so through administrative concessions or special operating contracts subject to the requirements and conditions stipulated by Presidential Decree.

Act 9618 has been modified by various subsequent laws. The updated text was approved by Decree-Law No. 1, 1986, issued by the Ministry of Mining.

Senior management at ENAP is comprised by an eight member Board, presided by the Minister of Energy. The Vice Presidency is occupied by the Executive Vice President of CORFO, an organization that also appoints three directors. The other three board members represent the following private entities: the Society for Industrial Development, the National Mining Association and the Chilean Institute of Mining Engineers.

REGULATORY AUTHORITIES

Act 2,224 issued by the Ministry of Mining creates the National Energy Commission. The National Energy Commission is responsible for the development and coordination of plans, policies and standards for the proper functioning and development of the sector; guaranteeing compliance and advising the Government on all matters related to energy. For the purposes of competition, the energy sector includes all evaluation, exploration, exploitation, generation, transmission, transportation, storage, distribution, import and export, and any other activity that concerns electricity, coal, gas, oil and byproducts, nuclear energy, geothermal and solar energy, and other energy sources.

Act 18.410 creates the Superintendence of Electricity and Fuels, an entity responsible for monitoring and supervising compliance of legal provisions and regulations, as well as technical standards on generation, production, storage, transportation and distribution of liquid fuels, gas and electricity, and verify that the
quality of the services offered complies with the above, and finally that the operations and use of energy resources do not constitute a danger to people or things.

The Chilean Commission of Nuclear Energy (CCHEN) was created in 1965 by Act 16.319 and its mission and purpose are to address any issues regarding the production, acquisition, transfer, transportation, and pacific use of atomic energy, and all fertile, fissionable and radioactive material, and regulate, monitor and control nuclear and radioactive facilities, from a nuclear and radiological safety stand point.

Other organizations that impact the energy sector are the Chilean Agency for Energy Efficiency (ACHEE), which is a private foundation that promotes, strengthens and consolidates the efficient use of energy. The National Center for Innovation and Promotion of Sustainable Energies (CIFES), seeks to support CORFO in the design, implementation, follow-up, evaluation and promotion of programs and strategic projects for sustainable energies, through public funding.

ENVIRONMENTAL LEGISLATION

Chilean environmental legislation has a wide scope of action, both at the national and municipal levels. Legislation covers areas such as waste management, public safety regulations for the industrial sector and the protection of water for human consumption.

In terms of renewable energies, in April of 2008, Act 20.257 was enacted, by which the use of non-conventional renewable energy sources (ERNCs) is promoted. Originally, regulations stipulated that between 2010 and 2014 at least 5% of the energy marketed by generating companies should come from renewable sources, gradually increasing by 0.5% annually between 2015 and 2024. This Act was amended in 2013 (Act 20/25) by which a compulsory quota of 20% of ERNCs of the electrical matrix for energy generation companies is established, effective July 2013.

TAX LEGISLATION

The Internal Revenue Service (also known by its acronym SII) is responsible for implementing and overseeing all internal taxes in Chile, and other matters of interest for the Treasury and whose control is not especially entrusted to a separate body.

The SII is an entity under the Ministry of Finance. It has an office in each region and four in the Metropolitan Region of Santiago, of which the respective provincial offices depend. Tax legislation is encompassed in the Tax Code, issued in 1974 and its subsequent amendments.

A Company is considered as resident/ domiciled in Chile if it is incorporated in Chile. If this is the case, companies pay Chilean Income tax based on their worldwide income. Nonresident Companies pay income taxes based on their Chilean-source income only.

The following are the main taxes that affect companies doing business in Chile:

Profits distributed to individuals/ residents of Chile are subject to a complementary income tax at a rate that ranges between 0 and 40%. Profits distributed abroad to nonresident taxpayers are subject to an additional withholding income tax of 35%.

Capital gains are taxed as ordinary income; however, if certain requirements are met in the case of the disposal of certain assets, capital gains may be exempt or subject to corporate income tax at a rate of 22.5% as a single tax.

Tax losses may be carried back until all retained taxable profits are absorbed, and may be carried forward indefinitely.
First category income tax is imposed at a rate of 22.5%, and will increase to 25% by 2016 and 27% by 2018.

Income taxes paid abroad on foreign profits derived from a branch, royalty payment, technical service fee or other incomes of a similar nature are creditable against Chilean income taxes, capped at the corporate rate of 22.5%. The cap increases to 35% on foreign income for countries that have a standing tax agreement, and 32% for those that have not concluded a tax agreement with Chile.

A special regime exists for Chilean publicly traded stock corporations and closely held stock corporations that voluntarily submit to the supervision of the Chilean Stock Exchange Commission, and that meet certain requirements.

Profits repatriated to a parent company abroad are subject to a 35% additional withholding income tax, against which the first category income tax paid is creditable.

Interest is subject to a 35% additional withholding tax on the gross amount, a 4.4% reduced rate applies inter alia, to interests on loans granted by a foreign financial institution and insurance companies or pension funds that comply with certain requirements.

Royalty payments are subject to an additional withholding tax, which ranges between 0 and 30%, depending on the good.

Payments to nonresidents for technical and engineering works and professional or technical services are subject to an additional 15% withholding tax. The rate increases to 20% if the parties are related and/or the beneficiary is resident in a tax haven included in the Chilean Treasury list.

Branch remittances are subject to a 35% additional withholding income tax, against which the initial 22.5% tax paid at the branch level is creditable.

Services rendered abroad, other than technical services are subject to a 35% withholding tax.

Corporations must pay an annual municipal license fee, which ranges between 0.25% and 0.5% on tax equity, up to a maximum of approximately USD 565,000 (the cap varies according to the exchange rate and the inflation).

Self-employed individuals and employees are subject to a second category income tax that ranges between 0% and 40%. Payroll taxes are withheld for the employee by the employer.

Real property tax is imposed annually at a rate of 1% on rural property and 1.2% on developed non-rural property.

There are several contributions that corporations need to make to Social security: 1) monthly 0.95% premium on remuneration; 2) employment risk at a maximum rate of 3.4%; and 3) 2.4% compulsory unemployment insurance on remuneration.

Foreign loans are subject to Stamp duty. The monthly rate of fraction thereof is 0.033% between endorsement and maturity, capped at 0.4%. Loans payable on demand or without maturity are subject to a 0.166% tax.

Corporations in Chile must make monthly advance payments on taxes, and file the annual tax return in April of the following fiscal year, which in Chile corresponds to the calendar year. Penalties apply for late filing, failure to file, underpayment or tax evasion.
The current government has proposed a tax reform, which would increase corporation tax from 20 to 25%. This change, however, will not affect foreign companies, who already pay 35% tax, including a withholding tax on repatriation of funds. It will be just the composition of tax for foreign companies that will change (from 20% corporation tax, 15% withholding to 25% corporation, 10% withholding).

**FREE TRADE AGREEMENTS**

Chile has created a network of economic agreements and alliances that guarantee that Chilean products and services are available worldwide, and that foreign investment keeps flowing into the country. These two elements have significantly contributed to the country’s economic growth.

Current Free trade agreements and Economic Partnership Agreements are listed below by year: 53

1996
FTA with Canada
As of December 2013, Chile had a negative balance of trade amounting to 44 million dollars FOB.

1998
FTA with Mexico
As of December 2013, Chile had a negative balance of trade amounting to 1,111 million dollars FOB.

1999
FTA with Central America (Costa Rica in 1999; El Salvador in 2000, Honduras in 2005; Guatemala in 2007; and Nicaragua in 2011)
As of December 2013, Chile had a negative balance of trade amounting to 489 million dollars FOB including the Caribbean.

2002
EPA with European Union
As of December 2013, Chile had a negative balance of trade amounting to 1156 million dollars FOB.

2003
FTA with the United States
As of December 2013, Chile had a negative balance of trade amounting to 5386 million dollars FOB.

FTA with South Korea
As of December 2013, Chile had a positive balance of trade amounting to 1,660 million dollars FOB.

FTA with EFTA
As of December 2013, Chile had a positive balance of trade amounting to 691 million dollars FOB. (Traded only with Norway and Switzerland).

2005
FTA with China
As of December 2013, Chile had a positive balance of trade amounting to 4,328 million dollars FOB.

Trans-Pacific Partnership
As of December 2013, Chile had a negative balance of trade amounting to 21 million dollars FOB.

53 http://www.bcentral.cl/estadisticas-economicas/series-indicadores/index_se.htm
2006
FTA with Panama
(No data for 2013)

FTA with Colombia
As of December 2013, Chile had a negative balance of trade amounting to 688 million dollars FOB.

FTA with Peru
As of December 2013, Chile had a positive balance of trade amounting to 208 million dollars FOB.

2007
EPA with Japan
As of December 2013, Chile had a positive balance of trade amounting to 5,299 million dollars FOB.

2008
FTA with Australia
As of December 2013, Chile had a positive balance of trade amounting to 420 million dollars FOB.

2009
FTA with Turkey
As of December 2013, Chile had a positive balance of trade amounting to 128 million dollars FOB.

2010
FTA with Malaysia
As of December 2013, Chile had a negative balance of trade amounting to 17 million dollars FOB.

2011
FTA with Vietnam
As of December 2013, Chile had a positive balance of trade amounting to 58 million dollars FOB.

2012
FTA with Hong Kong
Total trade between Chile and Hong Kong for 2013 amounted to 988,986 dollars FOB (HK$7,669 million).\(^{54}\)

On February 4, 2010, the United States and Chile signed an income tax treaty known as the “Convention between the Government of the United States of America and the Government of the Republic of Chile for the Avoidance of Double Taxation and the Prevention of Fiscal Evasion with Respect to Taxes on Income and Capital”. This Treaty was submitted before the Senate in May of 2012 and is still pending ratification. Among other provisions, the treaty would reduce source-country withholding taxes on certain cross-border payments of dividends, interest, and royalties; establish rules to determine when an enterprise or individual of one country is subject to tax on business activities in the other; enhance the mobility of labor by coordinating the tax aspects of the U.S. and Chilean pension systems; foster collaboration to resolve tax disputes and relieve double taxation; and ensure the full exchange between the U.S. and Chilean tax authorities of information for tax purposes.\(^{55}\)

\(^{55}\) http://www.state.gov/s/l/treaty/pending/
POLITICAL OUTLOOK

Located in the Southern Cone of South America, Chile is a politically stable, upper-middle income, developing nation of 17.8 million people. Chile is a republic, which is comprised of 15 regions, Aysen, Antofagasta, Araucania, Arica and Parinacota, Atacama, Biobio, Coquimbo, Libertador General Bernardo O’Higgins, Los Lagos, Los Rios, Magallanes, and Chilean Antarctica, Metropolitan Region (Santiago), Tarapaca and Valparaiso.

Chile has a bicameral Congress, which consists of a 38 seat Senate, elected by popular vote for an eight-year term, and a 120 seat Chamber of Deputies elected for a four-year term. The last election for Congress was held in November of 2013, as well as the last presidential election.

The main political parties in Chile are: Alliance (Alianza), which is composed of National Renewal (Renovación Nacional) and the Independent Democratic Union (Unión Demócrata Independiente); If You Want It, Chile Changes (Si tú quieres, Chile cambia) which is composed of Liberal Party (Partido Liberal), the Progressive Party (Partido Progresista) and other minor movements; the New Constitution for Chile (Nueva Constitución para Chile) which is composed of the Equality Party (Partido Igualdad) and the Green Ecologist Party (Partido Ecologista Verde); the New Majority (Nueva Mayoría), which is composed of the Broad Social Movement (Movimiento Amplio Social), the Christian Democratic Party (Partido Demócrata Cristiano), the Citizen Left Party (Izquierda Ciudadana), the Communist Party (Partido Comunista de Chile), the Northern Force Party (Partido Fuerza del Norte), the Party for Democracy (Partido por la Democracia), the Social Democrat Radical Party (Partido Radical Socialdemócrata), and the Socialist Party (Partido Socialista de Chile); and Everyone to La Moneda (Todos a La Moneda) which is composed of the Humanist Party (Partido Humanista) and other left minority parties.

Michelle Bachelet, representing a left-wing coalition, began her second term as President in March 2014, taking over from the right-wing government of Sebastian Pinera, easily defeating the ruling Alianza coalition’s candidate, Evelyn Matthei, 62%-38% in a second round runoff election. Bachlelet’s campaign proposals focused on reducing inequality, improve social mobility and public services, which will be attained through an education reform, a fiscal reform and a constitutional reform.

Bachelet has proposed an increase in government revenues by 3% of the GDP over a four year period, as a strategy to provide the necessary funding for the education reform. This would be achieved through the increase of corporate tax rates from 20% to 25%, it also includes measures to reduce tax evasion, promote incentives for small and medium companies, and lastly a reduction of the top individual tax rate from 40% to 35%.

The current cabinet is comprised as follows:

| Ministry of the Interior and Public Security | Rodrigo Peñalillo |
| Ministry of Foreign Affairs | Heraldo Muñoz |
| Ministry of National Defense | Jorge Burgos |
| Ministry of Finance | Alberto Arenas |
| General Secretary to the President | Ximena Rincón |
| Secretary General to the Government | Alvaro Elizalde |
| Ministry of Economy, Development and Tourism | Luis Felpe Cespedes |
| Ministry of Social Development | Fernanda Villegas |
Given that the country’s binomial electoral system guarantees a relatively equal distribution of power between the main political coalitions, regardless of voter preference, elections are limited in their ability to channel general citizen concerns. Political leaders exercise considerable power and said power is concentrated in the central government. The Chilean government has adopted legislation that addresses some of the issues presented by demonstrators who seek more funding for education and, and a more equitable electoral system.

Chile’s human rights record has improved since the return to democracy in 1990, although there are still hundreds of open cases left over from the military dictatorship. Chile has ratified all the main international human rights treaties, and the eight core International Labour Organisation (ILO) conventions. After the rescue of 33 miners from the collapsed San Jose mine in 2010, Chile ratified the ILO conventions on health and safety. It has also ratified Convention 169, which includes a commitment to consult indigenous groups over projects affecting them. However, discrimination against women in the workplace, discrimination against minorities and poor conditions in prisons remain areas of concern. The government has indicated its intention to address these issues in the short to mid-term.
## ECONOMIC OUTLOOK

### CHILE ECONOMIC DATA

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
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<tbody>
<tr>
<td>Population (million)</td>
<td>17.4</td>
<td>17.6</td>
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<tr>
<td>GDP per capita (USD)</td>
<td>15,285</td>
<td>15,777</td>
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<td>GDP (USD bn)</td>
<td>266</td>
<td>277</td>
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<td>Economic Growth (GDP, annual variation in %)</td>
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<td>Consumption (annual variation in %)</td>
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<td>Investment (annual variation in %)</td>
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<td>Industrial Production (annual variation in %)</td>
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<td>Retail Sales (annual variation in %)</td>
<td>7.1</td>
<td>5.2</td>
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<tr>
<td>Unemployment Rate</td>
<td>6.5</td>
<td>6.0</td>
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<tr>
<td>Fiscal Balance (% of GDP)</td>
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<td>-0.6</td>
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<td>Public Debt (% of GDP)</td>
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<td>12.8</td>
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<tr>
<td>Money (annual variation in %)</td>
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<td>Inflation Rate (CPI, annual variation in %, eop)</td>
<td>1.5</td>
<td>3.0</td>
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<tr>
<td>Inflation Rate (CPI, annual variation in %)</td>
<td>3.0</td>
<td>1.8</td>
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<tr>
<td>Inflation (PPI, annual variation in %)</td>
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<td>Policy Interest Rate (%)</td>
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<td>Stock Market (annual variation in %)</td>
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<td>8.4</td>
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<td>Exchange Rate (vs USD)</td>
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<td>525.5</td>
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<td>Exchange Rate (vs USD, aop)</td>
<td>486.3</td>
<td>495.6</td>
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<td>Current Account (% of GDP)</td>
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<td>-3.4</td>
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<tr>
<td>Current Account Balance (USD bn)</td>
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<td>-9.5</td>
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<td>Trade Balance (USD billion)</td>
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<td>Exports (USD billion)</td>
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<td>Imports (USD billion)</td>
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<td>Exports (annual variation in %)</td>
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<tr>
<td>Imports (annual variation in %)</td>
<td>7.2</td>
<td>-1.2</td>
</tr>
<tr>
<td>International Reserves (USD)</td>
<td>41.6</td>
<td>41.1</td>
</tr>
<tr>
<td>External Debt (% of GDP)</td>
<td>44.2</td>
<td>47.2</td>
</tr>
</tbody>
</table>

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56 http://www.focus-economics.com/countries/chile
According to many analysts, Chile has the most competitive and fundamentally sound economy in Latin America. In 2014, Chile had a GDP of $277.2 billion and a per capita GDP of $9,728.57. Chile’s economic success is the result of market-oriented policies, which have generated constant foreign investment and exports. Chile has benefited from high copper prices in the past, a situation that allowed it to establish savings funds that were later used to help overcome the slowdown as a result of the global financial crisis in 2008. These funds were also used to finance the reconstruction required after the country was hit by an earthquake of magnitude 8.8 in February of 2010.

Economic growth rebounded after the crisis, reconstruction, combined with an increase in investment and private consumption, resulted in economic growths of 5.7% in 2010, 5.8% in 2011 and 5.6% in 2012, however, since 2013 the economy slowed down again with GDP growths of 4.2% in 2013, and 1.9% in 2014.58

Declining copper prices and lower demand from China have reduced the terms of trade, business confidence and investment. A moderate recovery is expected in 2015 and 2016, driven by supportive monetary policy, expansionary fiscal policy and stronger external demand.

Some of the favorable conditions for investing in Chile are its strong institutions; a high quality of governance and low levels of corruption. It also has low levels of both public deficit and public debt. However it is heavily dependent on commodity exports, in particular copper, which accounted for 53% of total exports in 2012 and other commodities for another 26%. It also has a relatively high level of inequality. In recent years, there have been rising social demands, particularly in the field of education.

Energy is a key concern for Chile, with no oil and little gas of its own the question is how will it meet the increased growth in energy demand. According to economic growth projections Chile will need 40% more energy capacity by 2024 and 100% more by 2030. Due to a lack of investment in energy generation, spare capacity is very low. Large-scale investment in the mining sector will even increase demand for energy.

Many of the projects in the energy business are just starting, due to operation costs and regulation concerns. The permit process is inefficient and bureaucratic, which adds to the concerns. There are frequent local protests throughout Chile about planned energy projects, and the government has launched a new energy strategy to help to address this, but it remains a significant challenge.

Land access is a major challenge to Chile’s proposals to develop controversial new hydroelectric projects in Patagonia and the requirement for transmission lines running 2200km to Santiago. The importance of mining to the Chilean economy can pose a threat to indigenous groups, though with most of the largest projects located in the under-populated desert regions of the north, this is not the issue it is in some other countries in the region. However with Chile likely to face acute shortages of water and energy in the future, tensions could further increase.

Strong economic growth and targeted social programs have produced considerable improvements in development indicators in Chile over the past two decades. The percentage of Chileans living in poverty fell from 38.8% in 1989 to 14.4% in 2011. Primary education is now almost universal and secondary and tertiary attainment rates have increased rapidly. Between 2007 and 2011, the percentage of Chileans aged 25-34 that had completed a tertiary degree increased from 32.5% to 41.3%. Health indicators have also improved. The child malnutrition rate (as measured by the percentage of children under five who are underweight) is now 1%, and life expectancy is 79 years. Despite these advances, several challenges remain. High levels of inequality have persisted over the past 20 years. The Gini coefficient, which is used to measure income concentration, has barely moved since the mid-1990s, declining from 0.54 to 0.53.

57 http://www.tradingeconomics.com/chile/gdp-per-capita
Although the Gini coefficient falls to 0.50 when taxes and government transfers are taken into account, it is well above the Organization for Economic Cooperation and Development (OECD) average of 0.31. Moreover, inter-generational social mobility is low by OECD standards, as the education system tends to replicate existing class disparities. Unemployment increased from 5.7% in November 2013 to 6.5% in June 2014. However, the increase in self-employment has partially dampened the effect over the unemployment rate.

In this context, it is expected that the economic growth will recover in 2015. The Central Bank reduced its growth projection to place it between 1.75% and 2.25% in September 2014 from and between 3.75% and 4.75% in December 2013. As a result of the ongoing expansive monetary and fiscal policies, the private investment recovery and the normalization of the current economic cycle, it is foreseen that the economic growth will rebound between 3.75% and 4.75% for next year.
BRAZIL

COUNTRY OVERVIEW

Key Facts:
» Capital: Brasilia
» Population: 202,656,788 (July 2014)
» President: Dilma Rousseff
» Land Area: 5,290,899 square miles
» Language: Portuguese
» Currency: Brazilian Real (BRL)

Brazil is the fifth largest country in the world geographically. It is the only Portuguese speaking country in the Americas and the largest Portuguese-speaking country in the world, in addition to being one of the most multicultural and ethnically diverse nations on the planet.

Furthermore, it is the sixth largest country in the world in terms of nominal GDP. Brazil also has a diversity of wildlife and natural environments and vast natural resources in a large variety of protected habitats. The country is a member of international organizations, such as the UN, the WTO, MERCOSUR, OAS, CPLP, LAIA, ACTO, UNASUR, CI-A, UL and OIE.

Brazil is currently divided politically and administratively into 27 federative units, with 26 states and one federal district. The federative units are autonomous sub-national entities (independently governing, legislating and taxing) with their own governments and constitutions that together make up the Federative Republic of Brazil. Governors hold the executive power in each state and are elected every four years. Trial and appellate courts that deal with general legal matters hold the judiciary power.

It is a relatively flat country, its highest mountain, “Pico da Neblina”, is located in the northern Amazon and has an altitude of 3,014m. Another important mountain range is the “Serra da Mantiqueira”, between Rio de Janeiro and São Paulo, and the “Planalto Catarinense” in the south.

The country shares borders with almost all countries in South America (except Chile and Ecuador). The Amazon Rainforest is located in the northwest region of Brazil and comprises almost 42% of the country’s total area.

Other important ecosystems are the flooded areas of the Pantanal, in the West, the green plains of Pampa, located in the South of the country, and the savannas of “Cerrado” in the mid-western plateau.

Despite its size, the population inhabits only a small part of the country. Much of the population is urban (over 80%) and is mostly settled on the southwest coast, where the largest cities in the country are located - São Paulo (17 million), Rio de Janeiro (10 million) and Belo Horizonte (3 million). Other major cities include Brasilia (the capital), Porto Alegre, Curitiba, Salvador, Fortaleza, Manaos and Belém.

Brazil is predominantly a tropical country; it is sunny with warm temperatures year round. Only the southern region experiences seasonal changes during the winter. The summer runs from December to February and coincides with the holiday season for the Brazilians. The weather during these months can be extremely hot, especially in the interior Northeast and near Rio de Janeiro. In general, temperatures vary between 25 °C (77 °F) and 35 °C (95 °F) in the summer. Rain occurs throughout the year and throughout the country, with tropical showers occurring predominantly between January and March.
June, July and August are the winter months; the cooler areas are located in the southern states, where average temperatures range between 13 °C (55 °F) and 18 °C (64 °F). Snow is extremely rare, but possible in the mountains of Santa Catarina.

The interior of the Northeastern region is dry, and the population poor due to the lack of rain. On the other hand, rain is definitely not the problem in the Amazon, where rain falls throughout the year; however, it is stronger and more frequent in January and February.

As of 2013, it had the seventh highest GDP in the world. Currently, Brazil’s economy is healthy, but the country went through difficulties in the 80s and the 90s with annual inflation equivalent to 8,000% and several changes in currency in less 10 years. In 1994, the “Plano Real”, stability plan managed by Finance Minister Cardoso, controlled inflation and set the bases for modern development. More recently, after the Asian and Russia crises, in 1997-98, the Central Bank had to devaluate the currency, which jumped from BRL $ 1 to US $ to a current level of BRL $ 2.4 / US $ (Aug / 05). This devaluation improved the competence of local products exported, and international tourism.

Services are the largest sector in terms of jobs. Agriculture is also very important. Brazil is the second country in the world in export of agricultural products, especially coffee, sugar, soybeans, orange juice and veal.

The industrial sector is strong and diversified, with products ranging from beverages to airplanes. The most important sectors are food, electrical goods, building materials, rubber, chemicals and vehicles. Its largest trading partners are the US, members of the Latin American trade bloc (MERCOSUR) and the European Union.

Brazil has extensive mineral resources; however a shortage of capital and inadequate transport infrastructure slowed its development until the 1970s. Coal is predominantly mined in Rio Grande do Sul and Santa Catarina. The gold rush, which began in 1979, and still continues in the Amazon jungle, has made of Brazil one of the world’s largest producers of gold. The iron ore deposits in the country, located in Itabira and other areas, are considered among the richest in the world. According to the US Geological Survey, iron ore production for 2013 was estimated at 398 million metric tons. Due to its rich tin deposits Brazil has become the fifth producer in the world (12,000 tons in 2011, US Geological Survey). It is also a major exporter of quartz crystals, monazite and beryllium, manganese, diamonds (300,000 carats), chromium, zirconium, crude oil, natural gas, silver, bauxite and mica are mined in large quantities. Valuable reserves of magnetite, graphite, titanium, copper, zinc, mercury and platinum are not exploited on a large scale.

Industries manufacture a wide range of articles. Large quantities of goods such as processed foods, iron and steel, cement, textiles, clothing, motor vehicles, chemicals, paper, boats and electrical equipment are produced. São Paulo is the main industrial state, with factories that produce about a third of total manufacturing in Brazil; the cities of Rio de Janeiro, Belo Horizonte, Porto Alegre and Fortaleza are also important manufacturing centers.

OIL IN BRAZIL

There are records that indicate that the oil industry in Brazil began in 1858, a year before the famous and what is considered the first drilling project in the country, of “Drake pit” in Pensilvania; these records state that under the authorization of the Marquis of Olinda, Jose Barros Pimentel carried out research activities regarding shale oil and coal near the Maraú riverbed in the state of Bahia. However, the first concessions that specifically include the term “oil” date from 1864, and were located in Ilhéus and Camamu, also in Bahia, with Thomas Denny Sargent, an Englishmen, appearing as the recipient.

Interestingly, the first “deep” drilling project designed to search for oil in Brazil did not occur in the above-mentioned region but in the town of Bofete, in the state of São Paulo, in 1897 under the responsibility of Eugenio Ferreira Camargo. The well reached a total depth of 488 m and produced sulfur water, together with about 300 liters of oil, according to the explorer.

Starting 1907, in parallel with private initiatives, government participation in oil exploration in the country began with the creation of Geological and Mineralogical Service of Brazil (SGMB), an agency attached to the Ministry of Agriculture, Industry and Commerce. In 1917, the SGMB created the Commission for the Investigation of Coal and Oil of the Amazon Valley and in 1919 drilled its first well in the town of Marechal Mallet, in the state of Paraná, reaching a depth of 84 m, although it quickly abandoned it.

In 1933 the National Department of Mineral Production (DNPM) was created, also attached to the Ministry of Agriculture, Industry and Commerce, which became the framework for oil activities in the country.

Throughout the 1930s fruitless research campaigns were conducted, not only by national and foreign private initiatives, but also by government entities in the states of Bahia, Sergipe, Alagoas and Amazonas.

In 1938, through the enactment of Decree- Law 395, all activities pertaining to the oil industry could only be performed by Brazilians. Decree-Law 395 of 29 April 1938 created the CNP, in replacement of the DNPM, an autonomous entity directly subordinate to the President, with powers to carry out, through a technical agency, the official investigation proceedings regarding oil and natural gas and, where appropriate, process the extraction and industrialization of the respective products.

Definitely one of the events that marked the history of oil in Brazil was the drilling of well DNPM-163 in Lobato, using a rotary probe, where on January 21, 1939 oil was found at a depth of 210 m. The cumulative production was only 1,000 liters, yet even at this sub-commercial level, the Lobato well is considered the first true commercial oil well in Brazil.

In 1941, the first commercial oil field was discovered, the Candeias field, in the region of Reconcavo Baiano. In the following years, the Aratú and Itaparica fields, also in Bahia, were also discovered. The country's first oil pipeline began operating in 1949 in this region and the first refinery, Mataripe, began operations in 1950.

On October 3, 1953, with the enactment of Law 2004, President Getúlio Vargas established a state monopoly on the investigation, extraction, refining and transportation of crude oil or its derivative. At that time the state owned oil company, known as Petroleo Brasileiro S.A.- Petrobras, was created. This measure was implemented in response to significant pressure by the community, which since the 40s, had been defending the nationalization of oil under the slogan “O petróleo é nosso.”

Petrobras began operations on May 10, 1954 with assets amounting to approximately US $ 165 million in facilities and equipment, with a production of approximately 2,700 barrels of oil equivalent (boe) per day and estimated reserves of 17 million boe. Domestic consumption was 170,000 barrels per day, almost all imported in the form of derivatives.
The 1950s were characterized by efforts in technical training for supporting the development of industry in the country. Objectives included increasing production, expanding the refining park, increasing research and improving the transport capacity. Thus, in 1955, the RPBC refinery in Cubatão, in the state of São Paulo begins its operations, and in 1956 so does the maritime terminal of Madre de Deus, in Bahia. By the late 50s, production had reached 65,000 bpd and reserves 507 million boe.

In the 60s, with the expansion of the refining park, Petrobras became self-sufficient in the production of major petroleum byproducts. The REDUCT, ASFOR, REGAP and REFAP refineries, date from this period. At this time exploration activities on the continental shelf also began, culminating in 1968 with the drilling of a subsea well in the Campos Basin and the first discovery of oil at sea, in the field of Guaricema, off the coast of Sergipe. By the end of the decade production has reached 172,000 bpd, and 3.3 million m3 of natural gas.

During the 70s discoveries in offshore fields continued, and in 1977 production starts at the Campos Basin, which, years later, would become the most prolific in the country. In 1976, oil was first discovered in the Amazon. During this decade four other refineries were built, mostly in the southeast of the country, where the highest consumption is found. The petrochemical complexes of São Paulo and Camaçari, in Bahia also date from this period.

The oil shocks of 1973 and 1979 were the main reason why the government decided to create the PROALCOOL program, which promoted the use of fuel alcohol as fuel. It also opened the possibility for Petrobras to enter into risk exploration contracts in collaboration with private companies, without infringing in the monopoly. A total of 243 contracts were signed, of which 156 were with international companies and 87 with national companies. By the end of the decade production had reached 165,000 bpd, of which 35% were produced offshore, and 65% onshore, and 5 million m3 / day of gas, of which 61% was produced onshore.

During the 80s great advances were made in maritime exploration. In 1984 and 1985 the giant Albacora and Marlim fields were discovered in the deep waters of the Campos Basin. And in 1986, Petrobras started an innovation program that would subsequently allow deep-water drilling in depths of up to 3,000 m. Back in 1988, a well in the Marimba set the depth record at 492 meters below sea level.

In December 1989, production reached 675,000 bpd and 16.3 million m3 / day of gas, of which 65% is at sea and 35% on land, inverting the traditional land-sea distribution which had hitherto prevailed in the country.

The 90s were characterized by technological developments that allowed the drilling of a well in the Roncador field at a depth of 1,853 m below sea level and exceeded the figure of 1 million bpd of production. Between 1954 and 1997, Petrobras invested US $ 94,000 million in its activities, of which US $ 57,000 million were allotted to exploration and production.

In November of 1995, Constitutional Amendment No. 9 is enacted, which promotes the relaxation of monopoly activities related to the oil segment in Brazil in order to allow that certain activities that were exclusively owned by the State and exclusive performed by Petrobras, be granted to other companies. Act No. 9478 of 1997,
known as the "Oil Act" establishes more flexible regulations and, among other things, created the National Petroleum Agency (ANP), a government agency attached to the Ministry of Mines and Energy, and the National Council Energy Policy (CNPE).

In 1998, in what is known as Round Zero, Petrobras received from the ANP 397 concessions, which consisted of 95 exploration blocks and 282 fields in production or under development for production. In June 1999, the ANP opened round one of the new legal framework, offering 27 blocks and receiving 21 bids from 14 companies from 6 different countries. Since then, there have been 13 rounds of bidding, with the last one scheduled for the first quarter of 2015. There have also been two rounds for fields with marginal accumulations, with the aim of encouraging small and medium enterprises to invest in mature basins using existing infrastructure.

Brazil is currently focused on the development of the pre-salt offshore fields projects, which are actual oil fields located beneath layers of rock and thick layers of salt. This development transformed the nature and approach of the oil sector in Brazil, in addition to generating an enormous impact on world markets.

ENERGY GENERATION IN BRAZIL

The electrification of the Brazilian nation, which began in the late nineteenth century, was based, as in most countries, on the momentum carried by the private sector, to obtain the rights to exploit power generation and distribution in the different municipalities. The rise of private enterprise lasted for several decades and it was not until the mid-fifties when the government began to take an active role in the Brazilian electricity sector. In 1952, the Brazilian government proceeds with the incorporation of the BNDES (National Bank for Economic and Social Development), which creates a shift in the role of the public sector in the energy field. The BNDES was created with the primary objective of financing projects for energy and transport infrastructure, which subsequently led to the emergence of the first state enterprises in the electricity sector. These companies were responsible for supplying electricity throughout the country, under the coordination of state-owned Eletrobras, which was created in 1963 with the mandate to implement government policy in the electricity sector.

The seventies were characterized by a significant rise in major public works in the sector. Substantial investments were made possible due to the long period of economic growth experienced by the Brazilian economy during that decade, and which resulted in an average annual GDP growth of 8.6 % (in terms of per capita, GDP growth was 6%), which in turn helped the State attain greater credit facilities in the international financial market. As an example of the rate of investment at the time, the construction of the world's largest hydroelectric plant began in 1973; the Itaipu power plant, that currently has an installed capacity of 12,600 MW, and of which only 50% belongs to Brazil, having shared ownership with Paraguay. In the late seventies, the government, controlled most of the generation assets of the sector and in 1979, through the nationalizing of the Light Serviços de Electricidade, S.A., it also obtained a dominant position in the power distribution market.

The crisis faced by the Brazilian economy in the eighties, and the consequent deterioration of public finances, generated the unavailability of sufficient resources to carry out the necessary investments in energy infrastructure that would ensure, the supply for an ever-increasing demand.
Despite the economic downturn, demand for electricity seemed not to be affected, and during the above-mentioned decade, an average 6% annual growth in electricity consumption was recorded, largely due to the steady decline in electricity prices and the maturation of industrial projects implemented in the late seventies. However, as noted above, the lack of investments made by the public sector in electricity infrastructure during the eighties, made its mark in later years. That is, the increases in demand were not accompanied by increases in capacity, and thus the surplus of installed power with which the Brazilian economy started in the early eighties, was drastically reduced.

The poor economic situation in which Brazil found itself at the end of the eighties, after a decade of low growth rates, uncontrolled inflation and a precarious situation in its public accounts, and serious difficulties with coping with debt repayment, resulted in the transformation of the Brazilian economic. This was achieved through the privatization of state assets, framed within what was known as the “Plan Real”. The energy sector was one of those that initiated the privatization process and in the early nineties several companies, then controlled by Eletrobras, were included in the National Privatization Program.

In 1995, ESCELSA was privatized; this company was the main distributor of electricity in the country, several more distribution companies and generators followed. However, the privatization process undertaken in the field of generation, suffered a setback, when the government met with an overwhelmingly negative public opinion regarding the sale of these assets. As a result of this, the current reality is that a large part of the generation park is in public hands, while the state controls more than 90% of the generation and only 30% of distribution.

Brazil currently has a total of 1526 plants in operation, which generate a total of 93,856,340 kW of power. The most remarkable feature of the Brazilian electricity sector is the high participation of hydraulic generation, both in installed power generating capacity, as well as produced energy. In terms of installed capacity, hydraulic power represents 82% of the total, ranking Brazil in third place in terms of installed power generation capacity by hydroelectric plants.
MARKET SEGMENTS

OIL REFINERIES

Until a few years ago, the history of oil in Brazil had hardly any significant events. After the nationalization of industry in 1938, the National Petroleum Council regulated the market without major advances in oil extraction in Brazilian soil. In 1953 the state-owned oil company, Petroleo Brasileiro SA (Petrobras), was founded by President Getulio Vargas. Its primary role was to refine and distribute the products obtained from imported oil, as Brazil had few reserves of its own and was far from self-sufficient.

Given the limited success of the first hydrocarbon searches made, Petrobras decided to explore offshore, and quickly finds oil. From that moment an aggressive policy of offshore exploration begins (especially on the coast of Rio de Janeiro), developing proprietary technology and achieving great progress. This is how in 1985, Brazil's proven oil reserves equal that of Argentina. However, given the high economic growth (known as the "Brazilian miracle"), it still had to import about 60% of the oil consumed.

Given the need to import a significant amount of oil, Petrobras adopted the strategy of investing in foreign reserves, in other countries that had oil available for export to Brazil, in order to guarantee reserves. This idea became particularly important in the 70s, with the increase in international prices and the geopolitical importance that implied access to reserves after nationalization and the emergence of OPEC countries as "global landowners". Thus, Petrobras was awarded concessions and made investments in countries such as Algeria, Colombia, Egypt, Iran and Iraq. In the 80s, foreign investments were made in regions such as the US Gulf of Mexico and the North Sea. Meanwhile, Petrobras continued to invest in exploration and exploitation in Brazil with the revenues obtained abroad.

Brazil has 15 refineries, which process 2074 bpd of oil and LNG (Liquefied Natural Gas) and produce 2,124 bpd of petroleum products. Of the total volume of processed oil, 82% came from Brazilian fields and according to the ANP / SPE, as of December 31, 2013 production of proved oil and natural gas reserves in Brazil amounted to 15.973 billion barrels of oil.

The country also has 126 offshore production units, of which 72 are fixed platforms and 54 are floating platforms. In 2013, five other units were incorporated into the production system.

In 2014 oil production in Brazil reached a record 2.358 million barrels per day, representing nearly a 13% increase compared to 2013. The production of natural gas increased nearly 14% over the same period, reaching 88.9 million cubic meters per day.

PLAYERS IN THE REFINING SECTOR

PETROBRAS

Petroleo Brasileiro, Petrobras, is a state-owned Brazilian company engaged in the exploration, production, refining, transportation and marketing of oil and gas, petrochemicals, biofuels and their byproducts. It also participates in the market for power generation and renewable energy sources. Some of its products are gasoline, ethanol, lubricants, oils, asphalt, fertilizer, LPG, LNG, and CNG, among others. In operates in 4 continents and in more than 25 countries. It has about 9,000 service stations, 15 refineries, plus 133 production platforms (86 fixed and 47 floating), 100 drilling rigs (48 off-shore), about 15,000 producing wells, around 26,000 km of pipelines, 5 biofuel plants, 2 fertilizer plants and a shipping fleet of 172 vessels of which they own 52. Through its 18 thermoelectric (owned and leased) it has a total installed
capacity of 6.136MW. Petrobras, which is considered the 4th largest energy company in the world, operates in 12 countries in Latin America, including Argentina, Chile, Mexico, Colombia and Bolivia.

The 15 refineries currently operating in the country are:

1. **Abreu e Lima Refinery**

   **Location:**
   Rodovia PE 60, Km 10 - Ipojuca

   **Technical Features:**
   Capacity: 230,000 bpd (36,600 m3/d) of 16º API oil

   **Production profile:**
   - LPG: 1,600 m3/d
   - Petrochemical Naphtha: 3,600 m3/d
   - Diesel fuel (10 ppm S): 26,000 m3/d
   - Gas oil (bunker): 1,800 t/d
   - Coke: 6,200 t/d

   **Basic refinery technical data:**
   - Two atmospheric distillation units (ADU)
   - 2 Delayed coking units (DCU)
   - Two diesel hydro-treatment units (DHT-D)
   - Two naphtha hydro-treatment units (NHT-D)
   - Two hydrogen generation units (HGU)
   - Two emissions abatement units (SNOX)

2. **Potiguar Clara Camarão Refinery**

   **Location:**
   Potiguar Clara Camarão Refinery (RPCC)
   Rodovia RN 221, KM 25 - Guamaré – RN

   **Technical Features:**
   6,000 m³/day

   **Basic refinery technical data:**
   - A caustic regeneration treatment unit, the U-280
   - A gasoline production unit - UGG - U-280-A

   **Main products:**
   Diesel, Gasoline and Jet Fuel

3. **Rio de Janeiro Petrochemical Complex**

   **Location:**
   Rodovia Estadual RJ-116 - Km 5.2 - Acesso A-1, s/n, Complemento
   Sambaetiba - Zona Urbana do 4º Distrito de Itaboraí – RJ
Technical Features:
Refining capacity of 165,000 barrels of oil per day.

It is located in the city of Itaboraí, in the eastern state of Rio de Janeiro, covering an area of 45 km², and its strategic objective is to expand Petrobras’ refining capacity to meet the growth in demand for oil products in Brazil, such as diesel fuel, petrochemical naphtha, jet fuel, coke and LPG (cooking gas). The first refinery is expected to go on stream in August 2016.

4. Landulpho Alves (RLAM)

Location:
Rodovia BA 523, KM 4 – Mataripe – São Francisco do Conde – BA

Technical Features:
- Total area: 6.5 km²
- 26 Process Units
- 31 Products
- 201 storage tanks
- 18 storage spheres

Installed capacity:
Capacity for 323,000 bbl/d (51,352 m³/d).

Main products:
- Diesel
- Gasoline
- Jet fuel
- Asphalt
- Petrochemical naphtha
- Petrochemical gases (propane, propylene and butane)
- Paraffin
- Lubricants
- LPG
- Fuel oils (industrial, thermal and bunker)

5. Lubrificantes e Derivados do Nordeste (Lubnor)

Location:
Refinaria Lubrificantes e Derivados do Nordeste - Lubnor
Av. Leite Barbosa, s/nº - Mucuripe
Fortaleza - Ceará

Technical Features:
- Total area: 0.4 Km²
- Lubricant Unit - ULUB
- Natural Gas Processing Unit - UPGN
- Vacuum Unit - UVAC
Installed capacity:
8,000 bbl/d.

Main products:
- Asphalts
- Lubricating Oils

6. Capuava (Recap)

Location:
São Paulo metro area

Technical Features:
- Total Area: 3.7 million square meters
- Atmospheric distillation
- URFCC
- Solvent dearomatization
- Specialty solvent
- Water treatment
- Steam generation
- Power
- Compressed air units

Installed capacity:
- 8,500 cubic meters of oil daily
- 53,000 barrels of oil per day.

7. Duque de Caxias (Reduc)

Location:
Rodovia Washington Luiz, km 113,7
Campos Elíseos – Duque de Caxias - RJ

Technical Features:
- Total area: 13 km²
- Built-up area: 9 km²
- 43 Process Units
- 55 Products

Installed capacity:
- Capacity for 239,000 bbl/d (38,000 m³/d)

8. Alberto Pascualini (Refap)

Location:
Avenida Getúlio Vargas, 11001 - Bairro Brigadeira
Canoas – RS

Technical Features:
- Total area: 5.8 km²
- Atmospheric Distillation Units
- Vacuum Distillation Unit
- Fluid Catalytic Cracking Unit
- Solvent Units
- Solvent Dearomatization Unit
- Waste Fluid Catalytic Cracking Unit
- Delayed Coking Unit
- Sulfur Recovery Units
- Tail Gas Unit
- Propane Unit
- Hydrogen Generating Unit
- Diesel Hydro-treatment Unit
- Naphtha Hydro-desulfurization Unit
- Steam Generation Boilers
- Steam Co-generation
- Power Co-generation
- Generators - Steam Topping Let-Down and Steam Extraction
- Turbo Expander
- Coke Yard

Installed capacity:
- 201,280 bbl/day or 32,000 m³/day

9. Gabriel Passos (Regap)

Location:
Av. Refinaria Gabriel Passos, 690
Distrito Industrial Paulo Camilo Sul - Betim –MG

Technical Features:
- Total area of 12,800,000 m²
- Industrial area 2,305,515 m²
- 50,000-m² ecological reserve
- Two atmospheric distillation and vacuum units
- Two catalytic cracking Units
- Kerosene Hydro-desulfurization Unit
- Two Diesel Hydro-desulfurization Units
- Delayed Coking Unit
- Diesel Hydro-treatment Unit
- Cracked naphtha hydro-desulfurization unit
- Light coke naphtha hydro-treatment unit
- Three hydrogen generation units (HGU)
- Co-generation unit

Installed capacity:
- Throughput of 24,000 m³/day or 150,000 bbl/day
10. Paulinia (Replan)

Location:
Rodovia SP 332 - Km. 130
Bonfim - Paulínia - SP
CEP: 13147-900

Technical Features:
- Total area: 9.1 km²
- 2 Distillation units
- 2 Catalytic Cracking units
- 2 Delayed Coking units
- 2 Diesel Hydro-treatment units
- 2 Cracked Naphtha
- 1 Hydrogen Recovery unit
- 1 Propene Separation unit

Installed capacity:
- 66,000 m³/day, equivalent to 415,000 barrels.

11. Isaac Sabbá (Replan)

Location:
Rua Rio Quixito, 1, Vila Buriti - Distrito Industrial
Manaus – AM

Technical Features:
- Naphtha hydro-desulfurization (HDS)
- Fractionation Unit
- Catalytic Reform Unit
- Thermal Cracking Unit Brando
- Diesel Hydro-treatment Unit
- Sulfuric Acid production unit
- Unit for Treatment with Diethanolamine
- Acidic Water Treatment Unit
- Direct Distillation Unit
- Catalytic Cracking Unit

Installed capacity:
- 7,300,000 liters of oil per day, or 46,000 barrels per day.

12. Presidente Vargas (Repar)

Location:
Rodovia do Xisto, BR 476, km 16 - Araucária - PR

Technical Features:
- Distillation
- Catalytic cracking
- Propane deasphalting
- Diesel and unstable product hydro-treatment
- Coking
- Catalytic reform
- Solvent fractionation
- Propene
- Hydrogenation solvent
- Sulfur recovery
- MTBE units

**Installed capacity:**
- Throughput is 33,000 m³/d or 207,563 bbl/d.

**13. Presidente Bernardes (RPBC)**

**Location:**
Av. 9 de abril, 777 - Jardim das Indústrias - Cubatão – SP

**Technical Features:**
- Jet Fuel
- Petroleum Coke
- Atmospheric Distillation
- Diesel Treatment
- Aromatic Recovery
- Catalytic Reform
- Hexane Separation and LPG Treatment
- Ethylation
- Natural Gas
- Gasoline Treatment

**Installed capacity:**
- Throughput is 178,000 barrels per day (28,300 m³/d).

**14. Shale Industrialization Unit (SIX)**

**Location:**
Rodovia do Xisto, BR 476, km 153
São Mateus do Sul – PR

**Technical Features:**
SIX also functions as an advanced research center in refining, an area in which several projects are developed together with our research center (Cenpes) and universities. SIX’S technology park is the largest in Latin America and one of the worlds biggest in pilot plants, consisting of 15 units designed to meet the needs of various refining processes. We use this input to expand our technological efficiency and yields.

**Installed capacity:**
- 5,880 t/d
15. Henrique Lage (Revap)

Location:
Rodovia Presidente Dutra, KM 143, S/N
Bairro Jardim Diamante - São José dos Campos – SP

Technical Features:
- Atmospheric and Vacuum Distillation
- Catalytic Cracking
- Propene
- Diesel Hydro-treatment
- Kerosene
- Naphtha
- Unstable Currents for Diesel
- Coke Naphtha (HDTs)
- Hydrogen Generation (HGU)
- Deasphalting
- Sulfur Recovery
- Delayed Coking
- Coke Storage and Handling Yard
- Sulfur Lining
- Light Refinery Hydrocarbon Treatment Unit
- Transfer and Storage
- Oil Product Distribution Terminal
- Oil Product Unloading Stations (C5 + and LPG)
- Acid Water Treatment
- Industrial Waste Treatment Station (ETDI)
- Utilities System (steam and power generation and water treatment)
- Cracked Naphtha Catalytic Reform and Hydro-desulfurization.

Installed capacity:
- 40,000 m³/d (252,000 bbl/day), equivalent to 14% of the domestic oil production. It is currently is the third largest refinery in Brazil.

POWER GENERATION

In 2013, Brazil had an installed generating capacity of 127,000 megawatts (MW). Hydroelectricity accounted for 86 MW of generating capacity, fossil-fuel sources contributed 37 MW, and small amounts from wind, solar, and nuclear made up the rest.

Brazil generated 570 billion kilowatt-hours (kWh) of electricity in 2013. Public service power plants accounted for 484 billion kWh, self-producers accounted for 86 billion kWh, and the remainder was either traded or accounted for as losses. Final end-use consumption of electricity in 2013 was 516 billion kWh, with the industrial sector accounting for 210 billion kWh and the residential sector generating 125 billion kWh. The energy sector generated 30 billion kWh in 2013. At least 71% of electricity generated in 2013 came from hydroelectric plants. Natural gas and oil represented 11% and 4%, respectively, and biomass accounted for 8%.
Energy sector reforms were implemented in the mid-1990s, and a new regulatory framework in 2004. In 2004, Brazil had 86.5 GW of installed generating capacity and produced 387 TWh of electricity. Currently, 66% of distribution and 28% of power generation is owned by private companies. In 2004, 59 companies operated in the power generation space and 64 in distribution. The largest energy generation and transmission company is Centrais Elétricas Brasileiras (Eletrobras), which together with its subsidiaries generates and transmits about 60% of electric power in Brazil. The largest privately owned power company is Tractebel Energy. An independent system operator (National Operator do Elétrico System - ONS), is responsible for the technical coordination for the delivery of electricity and management of transmission services. During the electricity crisis in 2001, the government launched a program to build 55 gas power plants with a total capacity of 22 GW, but only 19 were built, with a total capacity of 4,012 MW.

**Hydroelectric Generation**

Brazil is planning new hydroelectric power projects, such as the Belo Monte plant, which upon completion will be the third-largest hydroelectric power plant in the world.

Brazil is the world's third largest hydropower producer after China and Canada. In 2012, hydropower accounted for 83% of electricity production in Brazil.

The world's largest hydroelectric plant by generation is the 14,000 MW Itaipu hydroelectric dam on the Parana River, which Brazil operates in conjunction with Paraguay. According to Itaipu Binacional, the facility generated 98.6 billion kWh of electricity in 2013.

**Nuclear Energy**

Nuclear power accounts for approximately 4% of the electricity in Brazil. The nuclear power generation is owned by Eletronuclear (Eletrobrás Thermonuclear S / A), a wholly owned subsidiary of Eletrobras. Nuclear power is produced by two reactors at Angra. Angra is located in the Central Nuclear Almirante Álvaro Alberto (CNAAA) in Praia de Itaorna in Angra dos Reis, Rio de Janeiro. It consists of two pressurized water reactors, Angra I, with a capacity of 657 MW connected to the grid in 1982, and Angra II, with a capacity of 1,350 MW, connected in 2000. A third reactor, Angra III, with a projected 1,350 MW, production was expected to be completed in 2014, however the work has stalled due to environmental concerns. In 2025 Brazil plans to build seven reactors more. In February 2008, President Lula da Silva signed a nuclear cooperation agreement with Argentina.

**Solar Energy**

Total installed PV capacity in Brazil is estimated between 12 and 15 MW, of which 50% is assigned to for telecommunications systems and 50% for rural energy systems.

**Wind Energy**

The gross wind resource potential in Brazil is estimated around 140 GW, of which 30 GW could be effectively transformed into wind energy projects. Currently, it generates around 54 GWh per year. According to an award obtained in November 2007, granted to the Brazilian Proinfa program, the current capacity is 237 MW, of which 208 were added in 2006.

<table>
<thead>
<tr>
<th>Company</th>
<th>Hydraulic MW</th>
<th>Thermo MW</th>
<th>Eolic MW</th>
<th>Total</th>
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<td>AES TIETE</td>
<td>2.651</td>
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<tr>
<td>ENDESA CACHOEIRA</td>
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<td>658</td>
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<tr>
<td>CEMIG</td>
<td>6.272</td>
<td>131</td>
<td>-</td>
<td>6.403</td>
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AES Brazil

AES Brazil operates in the Brazilian electricity sector through the generation, commercialization and distribution of energy. In order to serve 7.97 million customers, in 142 municipalities in the South and Southeast regions, it has a workforce of approximately 8 thousand employees.

In addition, through AES Serviços, it operates throughout the domestic territory providing technical and operational services to the electricity sector, with high added value solutions for its customers.

Headquartered in Barueri (SP), the group has been in Brazil since 1997 and is part of AES Corp., a global company that operates in the energy sector through generation and distribution companies, and a diversified portfolio.

AES Tietê

The third largest private energy generation company in the Country, with an installed capacity of 2,658 MW, and 12,196.3 TWh of energy produced in 2012, which corresponds to 18% of the total generated by the state of São Paulo.

AES Uruguaiana

Natural gas thermal electric power plant with an installed capacity of 639.9 MW headquartered in Uruguaiana (RS). It began operations in 2000. In February 2014, it resumed its activities, for two months, after a period of hibernation.

Endesa Brasil

Endesa Brasil is a holding company active in distribution, generation, transmission and energy trading. Present in four Brazilian states -Rio de Janeiro, Ceará, Goiás and Rio Grande do Sul, Endesa Brasil serves about 5.1 million customers in 240 Brazilian municipalities.

Controlled by the Enel Group, the Endesa Brasil holding company is a publicly listed limited liability company created in 2005 which now has three thousand direct employees, 14,000 service providers, 330 interns and 80 young apprentices. Generation assets for the company amount to an installed capacity of 1004.6 MW.

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Located in Niterói, in the state of Rio de Janeiro, Endesa Brasil has a very diverse asset portfolio:

- **Ampla**: Electricity distributor operating in 66 municipalities of Rio de Janeiro, serving 2.4 million customers. It serves an area of 32,188 square kilometers, accounting for 73% of the territory of the state.
- **Coelce**: Distributes electricity to the entire state of Ceará, which corresponds to a region of 148,825 square kilometers with a population of about 7.5 million people in 184 municipalities. The distributor serves 2.7 million customers.
- **Endesa Cachoeira**: Hydroelectric power station located in the town of Cachoeira Dourada, in the State of Goiás, it has ten generating units with total installed capacity of 658 MW.
- **Endesa Fortaleza**: Thermoelectric capable of generating a third of the electricity needs of the State of Ceará. Located in the municipality of Caucaia, it has an installed capacity of 326.6 MW.
- **Endesa Cien**: It is located in the town of Garruchos, in the State of Rio Grande do Sul, near the border with Argentina, and imports and exports energy between Brazil and Argentina. It also trades in energy.

**Eletrobras**

Eletrobras is the largest company in the electric power industry in Latin America, leading a system composed of six subsidiary companies, six distribution companies, the Research Center for Electric Power (Eletrobras Cepel) and Eletrobras Participações S.A. (Eletrobras Eletropar). It also owns half the capital of Itaipu Binacional.

Eletrobras has an installed capacity of 42,333 MW, including half the power of the Itaipu plant that belongs to Brasil, and 55,118 km of transmission lines.

It controls much of the power generation and transmission of electricity in Brazil through its six subsidiaries: Eletrobras Chesf, Eletrobras Furnas, Eletrobras Eletrosul, Eletrobras Eletronorte, Eletrobras CGTEE and Eletrobras Eletronuclear. Besides major shareholder of these companies, Eletrobras, on behalf of the Brazilian government, owns half of the capital of Itaipu Binacional.

It is responsible for 42,987 MW of the installed power generation capacity in the country, which represents 34% of total national capacity. It has 45 hydroelectric and 125 thermoelectric plants, eight wind farms and two thermonuclear plants. Among the largest and most important are: Tucurui (8,370 MW), the Brazilian part of Itaipu (7,000 MW), Paulo Afonso Complex (3,984 MW), Xingó (3,162 MW), Angra 1 and Angra 2 (2,007 MW), Serra da Mesa (1,275 MW), Furnas (1,226 MW) and Sobradinho (1,050 MW).

The participation of Eletrobras and its companies in new power generation projects is also significant. In partnership with the private sector it obtained the concession, for the hydroelectric Foz do Chapecó (RS / SC), with 855 MW, which became operational in 2010. Of the new hydroelectric sold at auction in December 2005, Eletrobras is building Simplicio (RJ / MG), with 333.7 MW; Paulistas (GO / MG), with 52.5 MW; Passo São João (RS), with 77 MW; and the Baguari plant (MG), with 140 MW, in conjunction with Neoenergia and Cemig, and the Retiro Baixo plant (MG), with 82 MW, with Orteng.

**Duke Energy – Brasil**

The Paranapanema and Sapucai-Mirim Rivers are two sources of life and biodiversity that feed Duke Energy's hydroelectric plants in Brazil that, for more than a decade, have contributed to the growth of the communities where they operate as well as the economic development of the country.
Duke Energy began operating in Brazil in 1999, following the acquisition of Paranapanema Electricity Generation Company (CESP), and is now responsible for generating 2.3% of the energy in the country.

Duke Energy Brazil has two hydro power generating companies: Geração Paranapanema, consisting of eight plants distributed along the Paranapanema River; and DEB (Small Hydro Powers), which manages two power plants located on the Sapucai-Mirim River, between the cities of Sao Joaquim da Barra and Guara (Sao Paulo State). Together, the two operations generate 2,274 MW.

Currently, 100% of the electricity generated by Duke Energy Brazil comes from hydroelectric sources. In recent years, the company produced an average of 880,000 MWh/month, enough energy to sustain a city of more than 3 million people for a complete month.

**SECTOR FORECAST**

Brazil is the largest economy in Latin America and one of the largest in the world. Investment opportunities offered by this country are broad and profitable. Beyond the challenges that every investment project implies, Brazil attracts an increasing amount of foreign capital thanks to the strength and diversification of its economy.

The Brazilian economy has achieved remarkable stability and has left behind the cycles that marked its production history. Brazil is no longer dependent on a single product for economic growth, but rather its development is based on several strong development sectors, from agriculture to tourism. Stability is also reflected in financial aspects: since 2003 Brazil has reduced its debt and has included foreign exchange reserves. Similarly, the instability of international markets in recent years has places the focus of investors on emerging economies with great prospects. One of the countries with significant expected growth is Brazil, which offers assurance of successful investments in the medium and long term.

The economic predominance of Brazil in the region and its business alliances with other southern countries (Argentina, Uruguay and Paraguay) provides privileged access to other growth markets through investments in the Brazilian market.

While raw materials remain the main export from Brazil, various sectors that diversify the economy are expanding. Green technologies, innovation projects and services are being offered with good reception in Brazil. Another item already established but still under expansion is the automotive industry: Brazil has overtaken France as the sixth automobile manufacturer in the world.

The Brazilian electricity sector offers great potential for future growth. However, the high degree of dependence on hydropower generation, insufficient investments for increasing supply and diversifying the production mix, and the lack of a stable regulatory framework, create challenges that affect the future of a key sector for the development of economy. Therefore, the adaptation of the electrical model to the new social and economic reality of Brazil is considered a priority. Oil and gas is projected as one of the more attractive business opportunities, especially for companies that wish to become Petrobras suppliers. The state company gives preference to local factories, however, new technologies that help generate greater efficiency in optimizing processes and resources are quite prized.

As a result of the Pre-Salt discoveries, efforts for the development of the industry intensified. The need for technological advancements, the development of the supply chain, and training of personnel has become essential.
OPPORTUNITIES FOR VIRGINIA COMPANIES

The Rousseff Administration, in an ongoing effort to consistently develop the Growth Acceleration Plan begun in 2007 under the Lula Da Silva administration has identifies the following areas as business opportunities for foreign companies wishing to enter the Brazilian market.

» Cyber security technologies for government services and public sites
» Border control technologies
» Technical training
» Surveillance technologies for environmental management

Based on our expertise and knowledge of the oil and energy sector in Brazil, and in order to complement the general opportunities derived for governmental policies, we present a general analysis of business opportunities for security and defense companies in the abovementioned sectors.

1. Perimeter Security Systems
   » Surveillance by satellite
   » Local video surveillance
   » Aerial video surveillance
      » Drones
      » Micro-drones
      » Aircraft
   » Tactical training for security personnel
   » Equipment
      » Cameras
      » Monitors
      » Information centers

2. Secure communications
   » Industrial wireless applications
   » Data / Voice / Video
   » Data Acquisition
   » SCADA / Telemetry
   » Mobile Data for Field Force Automation
   » Control Process
   » Telecom & Campus Connections
   » Transaction / POS
   » Mobile Data for Public Safety

3. Information security
   » Implementation:
      » Data encryption
      » Confidentiality
      » Protocols
      » Risk analysis, impact, criticality and sensitivity
      » Access controls
      » Strategy
Network architecture
Contingency plans
Information assurance
Training for staff
Firewall
Administration of user accounts
Detection and intrusion prevention
Antivirus
Public key infrastructure
(SSL) Secure Sockets Layer
Single connection "Single Sign-on SSO"
Biometrics
Privacy compliance
Remote access
Digital signature
Electronic data "EDI" and electronic transfer of funds "EFT"
Virtual private network "VPNs"
Secure electronic transfer "SET"
Computer forensics
Data recovery
Monitoring Technologies
Certifications in:
CISM: Certified Information Security Manager
CISSP: Certified Information Systems Security Professional Certification
GIAC: Global Information Assurance Certification
CPTE Certified Penetration Testing Engineer
CPTC Certified Penetration Testing Consultant
CPEH Certified Professional Ethical Hacker
CISSO Certified Information Systems Security Officer
CSLO Certified Security Leadership Officer
ISO/IEC 27000-series
ISO/IEC 27001
ISO/IEC 27002

4. Global positioning systems
Personnel tracking
For staff located in high risk areas
For services providers located in high risk areas
Tracking of goods
Trucks
Containers
For personal vehicles
Specialized tools
Equipment and materials
5. Transport
   » Armored vehicles
   » Helicopters
   » Trucks

6. Staff:
   » Services for
     » Remote Management for Physical Security
     » Bodyguards
     » Assessment

7. Prevention and care of natural disasters
   » Implementation of prevention protocols
   » Training
   » Risk reduction
   » Equipment
   » Implementation of contingency plans
SECURITY ISSUES

Brazil is not one of the most important producers of narcotics in the world, however it is the second largest consumer of cocaine hydrochloride and the largest consumer of cocaine based products. It also acts as a transit country for narcotics destined for Europe. Organized crime in Brazil has increased significantly over the last decade due to the expansion of the business. Some of the country’s largest criminal groups, such as Comando Vermelho and Primeiro Comando da Capital have allegedly begun operating at a transnational level. In order to address these issues, Brazil has implemented several antinarcotic programs: in 2004 it implemented and air bridge denial program, which authorizes lethal force for air interdiction, and in 2006 the government passed an anti-drug law that prohibits and penalizes the cultivation and trafficking of illegal drugs. It has also made efforts to improve border security, with special emphasis in the borders with Bolivia, Colombia and Peru. In 2011, it introduced the Strategic Border Plan, which includes the deployment of unmanned aerial vehicles (UAVs) in high risk and remote locations to monitor illicit activities.

The Tri-Border Area (TBA), which comprises Argentina, Brazil and Paraguay has a history of smuggling, money laundering and other illicit activities. Counterterrorism Programs have been developed in conjunction with other countries, including the US, in order to help strengthen the capabilities of the armed forces in addressing these issues.

In April 2010, the U.S. and Brazilian governments signed a Defense Cooperation Agreement designed to promote cooperation in areas such as research and development, technology security, and acquisition of defense products and services. This was followed by a General Security of Military Information Agreement, signed in November 2010, which is designed to facilitate the sharing of classified defense and military information. Both agreements still need to be approved by the Brazilian Congress.

Cyber-security has become an issue in recent years, after the NSA scandal in 2013, after which Petrobras alone, assigned $9.5 billion of its five year budget to strengthen its data protection. The government is preparing a cyber-security federal policy, including measures such as the creation of a National School of Cyber-defense. However, this has evolved without much cohesion between the different government agencies, and the police.

Brazil is undergoing a digital revolution which is without parallel in the developing world, in the last decade internet access and mobile phone subscriptions increased by ten, with more than 100 million of its inhabitants obtaining internet access. Three types of cyber threats have been identified in Brazil: economic-related and content-related, commercial espionage and hacktivism, and interpersonal and organized violence related to gangs and drug trafficking organizations.
LEGAL CONSIDERATIONS

LABOR LAWS

Labor regulations in Brazil are governed by the 1988 Federal Constitution, the Labor Code, Administrative Ruling No. 3.214 of 1978, issued by the Ministry of Labor, which regulates health and safety matters, and specific laws and rulings that apply to specific cases. The Labor Code establishes two types of employment contracts: for a definite and for an indefinite term, and in Brazil generally indefinite term contracts prevail. According to Article 3 of the Labor Code, an employee is an individual who provides continuous services to an employer, under the orders of the latter, for compensation. If these conditions are present, an employment relationship is likely to be recognized. In Brazil, the employment relationship still results from the factual circumstances and not from a written agreement between the parties.

Both the Constitution and the Labor Code stipulate certain minimum benefits that the employer must grant its employees. These minimum benefits are the following: Minimum Wage, Maximum Hours/Compensation for Overtime (working hours are limited to eight hours per day and 44 hours per week), Vacation Days and Vacation Premium, Paid Holidays and a Christmas Bonus.

In Brazil, employers usually provide healthcare plans and life insurance policies to their employees.

In Brazil all employees must be covered by the Instituto Nacional do Seguro Social (“INSS”) or the national social security system. Both employers and employees must pay social security contributions. The employee’s contributions range from 8 to 11% depending on his/her salary range, while the employer’s social security contributions paid over payroll are divided as follows:

1. Social Security Contribution – INSS 20%
2. Labor Accident Contribution – SAT from 1% to 3% (*)
3. Third parties contribution:
   - Education 2.50%
   - INCRA 0.2%
   - SENAI 1.20%
   - SESI 1.50%
   - SEBRAE 0.60%

(*) Note that according to Decrees No.6, 042 of 2007 and 6,957 of 2009, the SAT rate shall be multiplied by the so-called Accident Prevention Factor (“FAP”), which varies from 0.5 to 2.00 depending on the risk involved in the company’s activities.

Employers must withhold the employees’ contribution and pay it to the social security authorities along with their contribution as employers. In Brazil, all employees are entitled to a Severance Fund. The employer deposits 8 percent of the employee’s monthly compensation in a special bank account for the employee at the Federal Savings Bank. This fund constitutes the Severance Fund (“FGTS”).

Employment agreements are generally stipulated for an indefinite term. Employees can only be hired for a fixed term in very few special circumstances. The execution of a written employment agreement is not required by Brazilian law; the admission of a new employee requires completing the information in the employee’s Employment Booklet (Carteira de Trabalho), regarding the employer, the date of admission, salary, and function to be performed by the employee. This information should also be included in the company’s books.
Either the employee or the company may terminate the contract at any time, and for any reason, with or without cause. Termination is only considered with cause in case of severe fault by the employee. In case of termination of an employee, without cause, written prior notice must be given. A 30-day prior notice term is required whenever the termination is carried out within the first year of employment. After the first year, the employee will be entitled to three additional days per completed year worked, up to a cap of 60 days (i.e., the prior notice may add up to 90 days). Failure by the employer to give said notice will entail the payment of an indemnity corresponding to one month’s compensation to the employee.  

Termination is considered with cause in the following cases: 

a. Performance of a dishonest act 
b. Lack of self-restraint and improper conduct 
c. Performance of regular business transactions, without permission of the employer, when such transactions are in competition with the employer’s business and are detrimental to the employee’s activities  
d. Criminal conviction of the employee, upon a final and a non-appealable decision, provided that the enforcement of the penalty has not been suspended  
e. Sloth by the employee in the performance of his or her duties  
f. Usual drunkenness or drunkenness during working hours  
g. Violation of the company’s secrets  
h. Act of insubordination  
i. Abandonment of employment  
j. Act injurious to the honor or reputation of any person, performed during the working hours, and any physical violence performed under the same conditions, except in case of legitimate defense  
k. Act injurious to the honor or reputation of the employer or the employee’s superiors, as well as any physical violence to them, except in case of legitimate defense  
l. Constant gambling  
m. Acts against the national security duly evidenced by administrative investigation.

According to the Labor Code, there is a special type of employee known as “an employee occupying a position of trust.” This type of employee generally performs managerial duties and has more authority compared to other employees. This condition of “trust” depends on the actual duties performed by the employee, not on the employee’s position or title. The Labor Code defines “employee occupying a position of trust” as an employee who has sufficient powers to bind the company, as well as the officer or chief of the department in all cases, and receives higher compensation than other employees in the department. The “employee occupying a position of trust” is not required to record his working hours, and consequently is not entitled to receive overtime payment.

In Brazil, employers and employees are represented by their respective unions on matters of collective employment relations. Employees are free to organize professional and union associations but they cannot organize more than one association representing the same professionals in the same territorial base (i.e., the municipality).

The creation and activities of the unions for both employers and employees are consigned in the Constitution. No specific number of workers is required to form a union. In Brazil, unions are organized according to business activities, such as commerce, metallurgy, chemicals, and others. The association representing a given company shall be that of the main activity of the company. Both employers and employees must pay annual contributions to their respective unions.

The employers’ association and the employees’ union annually negotiate the terms of a collective agreement including issues such as salary increases due to inflation, for a term of one year. If no agreement is reached, the parties can escalate the issue to mediation by the labor department or the labor courts. All parties must observe collective bargaining agreements between employees and employers’ unions. Bargaining agreements generally set forth rights that are more beneficial to the employees than those set forth in the Labor Code.

Once all the parties agree to the collective bargaining agreement, only the labor court may suspend or declare it null and void. This may be requested by any of the parties or by the Public Labor District Attorney.

The right to strike is guaranteed by the Constitution. The workers must decide on the advisability of exercising it and on the interests to be defended. It is worth noting that a union meeting is always required to vest the strike with legal effects, and that a “lockout or suspension of the company’s activities at the employer’s request is forbidden. According to the Labor Law, the union is considered a competent authority to declare the beginning of a strike, after holding the appropriate union meeting and complying with the other statutory requirements.

Upon receiving the strike notice, the Labor Court must schedule a meeting to try to reach an agreement between the parties. The Labor Court may not rule on whether the strike is legal or not, but may only act as a mediator. If the parties fail to reach a settlement agreement, the Labor Court will rule. If the employees refuse to go back to work, they will not be paid their salary, and in case of damages, the responsible parties will be subject to the corresponding penalties.

The CUT or Central Unica dos Trabalhadores is the main trade union in Brazil, and in the last decade it has actively participated in sustainable development and green economy debates. In 2007 it created the Workers’ Agenda for Development, which establishes the fundamentals for the development model in Brazil; its main priority is the promotion of economic growth with social inclusion.

POWER GENERATION LEGISLATION

The Brazilian power industry is organized under a large interconnected power system, the Sistema Interligado Nacional, which comprises most of the country’s regions, and other remote minor systems. Generation, transmission, distribution and marketing are activities that are legally separate.

The industry is regulated by the Federal Government through the Ministry of Mines and Energy (MME) and the National Electric Power Agency (ANEEL).

Law No. 10,848 of 2004 changed the rules for the commercialization of energy in Brazil by establishing two distinct business frameworks, the Regulated Contracting Environment (RCE) and the Free Contracting Environment (FCE). Under this scheme distribution companies are only allowed to buy energy from regulated environment companies (RCEs) and must supply 100% of their markets. On the other hand, generators must guarantee 100% of electricity, with their own production or buying contracts. Therefore all distribution utilities have to sign a power purchase agreement (PPA) with all sellers (generators), through Brazilian Electric Power Commercialization Chamber (CCEE) supervising.

Given that distribution companies can only purchase energy through public auctions, except for bilateral contracts that were celebrated before Law No. 10,848 of 2004, and the compulsory annual acquisition of Binational Itaipu’s energy for the South, Southeast and Center-West regions, ANEEL promotes three types of auctions that are executed by the CCEE:

1. Energy from Existing Power Plants;
2. Energy from New Power Plants
3. Energy Adjustment (only for existing power plants).

The Free Contracting Environment concentrates energy purchase and selling through bilateral contracts, among generators, energy retailers, free consumers, with the freedom to negotiate their prices and contracts period, but without distribution utilities participation. In Brazil, free consumers must have at least 3 MW of demand, and since 1995, new ones can be attended by any tension level and choose other energy suppliers, different from the local distribution company. In addition, consumers with installed
power between 500 kW and 3000 kW can also be included in the FCE, although they have to buy energy directly from renewable sources, like SHPs, biomass, wind power and solar or buy it from a retailer, which has to guarantee that this energy is obtained from renewable sources. Generators can sell their assured energies in the FCE through the following options: exclusive selling auctions for free consumers or purchasing auctions organized by consumers or auctions or public calls for others sellers (to cover their contracts).

Transmission operates under monopoly conditions. The tariffs for transmission companies are set by the Brazilian government. The transfer fee is fixed and transmission revenues do not depend on the amount of transmitted electricity.

Distribution is a public service that also operates under conditions of monopoly and provided by companies that in turn have received concessions. Distributors in the Brazilian system are not entitled to: (i) develop activities related to the generation or transmission of electricity; (ii) sell electricity to non-regulated customers except those within its concession area and under the same conditions and rates applicable to its captive customers in the Regulated Market; (iii) hold proprietary interest in any company, corporation or partnership, directly or indirectly; or (iv) develop activities that are unrelated to their respective concessions, except those permitted by law or in the relevant concession agreement. Generators are not allowed to have proprietary interest in distribution companies in excess of 10%.

The regulated market does not include the sale of electricity between generation concessionaires, independent producers, self-producers, electricity brokers, electricity importers, non-regulated consumers and special clients. It also includes existing contracts between generators and distributors under the old regulatory framework, until they expire, at which time the new contracts must conform to the new regulatory framework. According to provisions stipulated in Law 9,427 of 1996, non-regulated consumers in Brazil are those that: (i) demand a capacity of at least 3,000 kW and choose to contract the energy supply directly with generators or brokers; or (ii) demand a capacity in the range of 500-3000 kW and choose to contract the energy supply directly with generators or brokers.

The Brazilian system is coordinated by the Brazilian Electric System Operator (ONS) and is divided into four sub-systems: Southeast, Central-West, South, Northeast and North.

There are also some isolated systems, i.e., systems that are not part of the ONS system and are usually located in the north and northeast of Brazil, and have coal or oil plants as their sole source of thermal power.

Bids for new energy contemplate long-term contracts (15 years thermal plants and 30 for hydro plants) in which new generation projects should cover increases in demand anticipated by distributors. Bids for old energy have shorter terms periods.

Decree 5.163 of 2004 stipulates that the selling agents must ensure 100% coverage of the energy and power contracts. This coverage may consist of physical collateral in the form of their power plants or any other plant, and in the latter case, through a power purchase agreement. Among other things, the ANEEL Resolution 109 of 2004 specifies that when these limits are not met agents are subject to financial penalties.

Finally, regarding generation activities, in January 2013, the Government approved Law No. 12,783, which establishes the conditions under which power sector concessions that expire between 2015 and 2017 can be renewed and the reduction of taxes on the electricity tariff.
REFINING LEGISLATION

According to Articles 20 and 176 of the Brazilian Federal Constitution, oil and gas reserves located in the Brazilian territory, including continental shelf, territorial sea and exclusive economic areas are considered property of the Federal Union.

Until 1995, activities pertaining to the oil and gas sector were subject to the monopoly of the Federal Union and were performed by state-owned Petróleo Brasileiro SA (Petrobras). Constitutional Amendment No. 9 of 1995 eliminated the monopolistic conditions by allowing the government to contract the following activities with both state-owned and private companies: prospection and exploitation of deposits of oil, natural gas and other hydrocarbons; oil refining; importation and exportation of products or basic by-products resulting from the activities of prospection and exploitation of oil, natural gas and other hydrocarbons, as well as oil refining activities; and, maritime transportation of crude oil or basic oil by-products produced in Brazil, as well as pipeline transportation of crude oil, oil by-products and natural gas from any source.

Petrobras was created in 1954, a state company whose primary objective was the exploration production, transportation and refining of oil, making all activity in an exclusive state monopoly.

In parallel to the activities performed by Petrobras, and in order to raise funds and reduce exposure to exploration risk, starting 1976 the risk contract regime is instituted, whereby foreign companies entered into a partnership with Petrobras during the exploratory stage, with consequent benefits in the event of a discovery. This type of contract involved an outlay of 100% of exploration expenditures and in case of discovery, the formation of a consortium in which Petrobras and the contractor entered 50/50 regarding development costs and potential earnings. This regime is eliminated in 1987 with the enactment of the new Brazilian constitution, returning the oil monopoly to Petrobras.

Act 9,478 is enacted in 1997, also called "Lei do Petróleo," which marked a definite change in the sector. The exploration, mining and marketing of hydrocarbons and their derivatives is no longer the monopoly of Petrobras, allowing free concurrence and competition between domestic and international companies. The National Petroleum Agency (ANP) is created as a governmental regulatory body for all activities both upstream and downstream. It has the power to grant concessions as well as monitor the operations pertaining to them. Within this framework, crude was made freely available, although in practice Petrobras continues to maintain an absolute monopoly on the production and sale of oil and derivatives. Like most countries, mineral resources belong to the State, which not only grants the licenses for exploration but also collects from them royalties and taxes resulting from the legislation. In this sense, the ANP regulates all activities in the Brazilian oil sector.

The path towards deregulation began with Act 9.478 of 1997, which opened up the upstream portion of the business, and some downstream activities of downstream subject to the monopoly were liberalized, such as the import of crude oil imports in 1999, import of products in 2003 and logistics in 2002, and lastly the liberalization in the refining prices. It is worth noting that retail sales were already open.

Main actions and objectives of this Act:

» Creation of the National Energy Policy Council (CNPE): Government entity attached to the Presidency of the Republic and chaired by the Minister of Mines and Energy, which is responsible for formulating public policies in the energy sector.

» Creation of the National Petroleum Agency (ANP): Governmental regulatory entity, attached to the Ministry of Mines and Energy. It is responsible for the regulation, supervision and contracting of all activities in the sector, both upstream, and downstream. Its main objective is to create a competitive environment for oil and gas markets in Brazil, to ensure lower prices and better services for consumers.
Until the enactment of the Petroleum Law, the Brazilian government fully regulated prices for crude oil and oil byproducts from the cost of the crude imported for use in our refineries to the retail price of refined oil products. As of January 2, 2002 and in accordance with previous laws, state control over prices of oil, oil byproducts and natural gas ends, except for the natural gas sold to combined cycle plants. As a result, competition increased and prices were adjusted, as other companies were allowed to participate in the Brazilian market, and export and import crude, oil byproducts and natural gas from and to Brazil.

Exploration, development and production activities pertaining to oil and natural gas are exercised through concession contracts, allocated through "bidding rounds" where companies interested in participating in the sector, bid to get concessions to the different areas or fields. The tenders organized by the ANP allow for the participation of Brazilian and foreign companies with offices in Brazil.

Bid Contracts are signed with the ANP for terms of up to 34 years including the explorations stage (3 to 7 years) and the production stage (23 to 27 years). In case of success, the company agrees to pay 5% to 10% royalties, and in fields with large production volumes, a 10% to 40% special participation rate still applies to the net production revenues. Concessionaries for large oil fields are required to assume a research and development cost equivalent to 1% of gross income.

Under the concession scheme, companies granted with concession interests are entitled to the property of their production and run all the risks of their undertaking. As in any typical concession or license regime, the government’s compensation is based on the "tax and royalties" system. Concessionaires pay certain government taxes as compensation for their activities.

Since the opening of the market, the ANP has conducted twelve bidding rounds to grant onshore and offshore blocks to concessionaries with the thirteenth one expected to take place in early 2015.

After two years of analysis by the federal government and Congress on the suitability and applicability of the concession regime to exploration and production activities within the pre-salt layer, Act No. 12,351 (the PSA Law) was enacted at the end of December 2010. The PSA Law amended the Petroleum Law and introduced the PSA as an additional legal-regulatory regime for the exploration and production of hydrocarbons, applicable to the pre-salt layer and to strategic areas, defined as such by the Federal Union.

The Federal Union does not bear any of the risks associated to exploration and production activities, although any exploited hydrocarbons remain its property. However, once a commercially feasible discovery is made, the Federal Union assumes some risks associated with these activities, by assigning part of its production as reimbursement for the exploration, development and production costs incurred by those oil companies that are party to the agreement (cost oil). The Federal Union then shares in the rest of the production with these companies at a rate established in the agreement (profit oil).

In February 2013, the National Energy Policy Council (CNPE) issued Resolution No. 01 of 2013, regarding incentives for the involvement of small and medium players in oil and gas exploration, development and production. Pursuant to this Resolution, the ANP must hold annual rounds focused in blocks located at mature basins and inactive areas with marginal fields. Those blocks and areas must be assessed for their environmental feasibility by both the ANP and competent environmental authorities.

The general attorney of Brazil (AGU) issued Legal Opinion No. 061/2011/PF-ANP/PGF/AGU, which states that the ANP is the competent authority for regulating the activity of shale exploration and production and the compensation due upon the production of shale oil and gas.

On December 2010, Congress approved and the president sanctioned three separate bills already in force regarding the exploration and production of the pre-salt reservoirs and of strategic areas. These laws introduced a production sharing contract (PSC) regime which will be applied for future licensing of
the pre-salt area and certain other areas considered strategic by the government, and the implementation of an oil fund which is expected to support social and economic development in Brazil.

Together with the Pre-Salt Act, a new company was created, Empresa Brasileira de Administração de Petróleo e Gás Natural SA – Pré-sal Petróleo SA (the PPSA). One hundred percent state owned, PPSA was created to represent the federal government in the consortium, which will be awarded the right to explore and develop a block within the pre-salt area (Act No. 12,304 of 2010).

Petrobras must be the sole operator within this consortium, with a minimum of 30 per cent participating interest, to be awarded with the production-sharing contract. PPSA will not perform upstream oil and gas activities and will not invest, however it will be responsible for the following, among others:

» Management, audit and supervision of oil and gas activities performed under the PSC regime;
» Management and control of costs arising from the production sharing contracts;
» Participation in the operating committees, electing half of its members, including its chair, having voting rights and veto power over operations; and
» Negotiation of unitization involving unlicensed acreage.

Brazil had its first pre-salt bidding round under the PSC regime in October 2013. The winning consortium is comprised of Petrobras, Shell, Total, CNOOC and CNPC. They shall be joined by PPSA in the exploration and production of Libra area. Impacts of the new regime are still being assessed.

ENVIRONMENTAL LEGISLATION

The Brazilian Constitution stipulates that both the federal government and state and local governments have the power to enact laws for the protection of the environment, most environmental regulations in Brazil are held at the level of state and local government. According to Article 225, all individuals have the right to enjoy an ecologically balances environment, considered as a common use asset and essential to a healthy quality of life, while both the government and society are responsible for its protection and preservation for the present and future generations.62

The main environmental regulations are as follows:

» Act 6.938 of 1981 sets forth the National Environmental Policy which expressly established the Environmental Licensing Process and the Civil Liability for environmental damages;
» Act 9.433 of 1997, which states the National Policy on Water Resources and regulates the regime for water use;
» Act 9.605 of 1998 is sets forth environmental criminal and administrative liabilities, and establishes sanctions applicable to over 60 different crimes against the environment.
» Federal Decree 6,514 of 2008, which regulates the abovementioned Act, provides more than 100 legal rules, violations of which are administratively punishable with warnings, fines, right restrictions, and eventual crime prevision and civil damages;
» Act 9,966 of 2000 governs the prevention, control, oversight of oil pollution and others hazardous substances in Brazilian waters;
» Act 9,985 of 2000 establishes the Protected Areas National System for the protection of biodiversity and represents the main statute on the subject;

62 http://www.constitution.org/cons/brazil.htm
Provisional Measure 2,186-16 of 2001 regulates the access of genetic heritage and its protection for associated traditional knowledge, regulating benefit share conditions and technologic compensation for its use and conservation;

Act 11,105 of 2005 regulates biosafety of genetically modified organisms (GMOs) Decree 8,124/2013 establish the National Contingency Program by oil pollution in Brazilian waters;

Act 12,187 of 2009 represents Brazil’s commitment to addressing greenhouse gas emissions and states the National Program of Climate Change;

Act 12,305 of 2010 establishes the National Policy for Solid Waste, and is the main legal framework regulating obligations on the generation, transport, management and destination of solid waste;

Complementary Act 140 of 2011 disciplines the hypotheses of shared assignments among the environmental agencies of all federative levels for permitting and enforcement of pollutant activities; and

Act 12,651 of 2012, also known as the New Brazilian Forestry Code, which regulates the protection of Legal Forestry Reserves and the Permanent Protected Areas, especially playing a key role in rural areas.

The key regulatory authorities at a federal level are as follows:

1. IBAMA (Brazilian Institute for Environment and Renewable Resources), which is in charge of applying environmental statutes and regulations, executing the environmental permitting of activities located in strategic areas for the country and those with regional impacts, besides nuclear related activities;

2. ICMBio (Chico Mendes Institute for Preservation of the Environment and Biodiversity), which is in charge of management and enforcement of environmental policies in federal protected areas;

3. CONAMA (National Environmental Council) which has the power to pass regulations applicable nationwide in several matters environmentally important, working as a body of technical specialists;

4. CGEN (Genetic Heritage Management National Council) is responsible for regulating, monitoring and running policies for genetic heritage management, such as analysis and special permits to access genetic heritage components and associated traditional knowledge for purposes of science research, technological development and bio-prospecting; and

5. CNBS (Biosafety National Commission) is responsible for the approval of GMOs’ market-use, considering CTNBio (Biosafety National Technical Committee) indication.

TAX LEGISLATION

In Brazil, the main tax regulations are set forth in the 1988 Constitution, and the National Tax Code of 1966 and the Federal Income tax. The regulating authority in fiscal matters is the Brazilian Revenue Service.

A company is considered a resident in Brazil if it is incorporated in Brazil; all others are considered non-resident or foreign companies. Resident companies are taxed on a worldwide income, while foreign companies are taxed only if it performs certain activities through an agent or representative that is domiciled in the country and who has the power to legally bind the foreign seller, or through the domestic branch of the above-mentioned. A representative acting as an agent is not subject to taxation if the final transaction is concluded abroad by the foreign company.

Taxable income is stipulated as operating profits, defined as gross operating receipts, less the costs of goods sold or services rendered, administrative and operating expenses, and other charges, reserves
and losses authorized by law. Companies may choose to be taxed annually based on an actual or a presumed income (“lucro real” vs “lucro presumido”). Dividends received from other Brazilian companies, and income received from premiums received on the issuance of new shares, are not considered taxable income.

The following are the main taxes that affect companies doing business in Brazil:

Capital gains are treated as ordinary income. Those derived by a nonresident registered with the Central Bank are subject to a 15% withholding tax (25% if derived by a tax haven resident).

Losses must be divided into operating and non-operating. Non-operating losses may be offset against non-operating gains. Tax losses incurred in one fiscal year (calendar year) may be carried forward indefinitely; however, the carry-forward amount that can be used may not exceed 30% of taxable income in each corresponding year. Carryback of losses is not allowed.

Corporate income tax (IRJP) is levied on the taxable profits of a corporation at a rate of 15%.

In addition to the 15% income tax, a 10% surtax is applied on annual income in excess of BRL 240,000, as well as a 9% social contribution tax (CSLL) levied on the adjusted net income. The CSLL for financial institutions is 15%.

Interest paid to a nonresident is generally subject to a 15% withholding tax, unless the rate is reduced under a tax treaty. The rate increases to 25% if the recipient is a tax haven resident.

The withholding tax on royalties is 15%, unless the rate is reduced under a tax treaty. A 10% tax corresponding to the Contribution for the Intervention in the Economic Domain (CIDE) also applies.

The withholding tax rate on technical services and assistance fees is generally 15%, unless the rate is reduced under a tax treaty. Payments for technical services that do not include the transfer of technology may be subject to a 25% rate. The 10% CIDE also applies.

Real property tax is collected by the municipality where the property is located and is calculated on the sales price of the property. The rate varies by municipality, but is generally in the range of 0.3% to 1.5%.

Rural property is taxed at rates of 0.03% to 20% depending on the region and the use of the property.

A real estate transfer tax is applied to any transfer of title of real property, at rates that range from 2% to 6%, according to the sales price. The buyer is responsible for paying this tax.

Although these are not considered corporate taxes, the PIS (Social integration program) and the CONFIS, are levied at 0.65% and 3% respectively, where a Brazilian corporation pays income taxes under the taxable income regime, and 1.65% and 7.6% where a Brazilian corporation pays taxes based on actual income. Imports are subject to a combined rate of 9.25% or 10.25%

A financial transaction tax (IOF) is imposed on foreign exchange, credit and security transactions.

Brazil operates on a multiple rate system, with taxes levied at the federal, state and municipal levels. The IPI is a federal excise tax levied on the import of goods into Brazil and the manufacturing of goods. Exports are exempt of IPI. The average rate of IPI is 20%. ICMS is a VAT levied on the circulation and import of goods and interstate and inter-municipal transportation and communication services, and the rates range between 4% and 25%. IPI and ICMS are paid monthly.
Income tax returns are paid annually, and must be filed by the last business day of June. Late payments are subject to penalties and interest.

TRADE AGREEMENTS

Brazil’s current trade policy is grounded on the concept of seeking opportunities and creating conditions for international trade to underpin its development scheme, based on sustainable and socially inclusive economic growth. Brazil attaches particular importance to its participation in the multilateral trading system. The Brasil Maior Plan includes and develops a number of industrial, technological, and foreign trade policies to underpin its development objectives, which are the increase the competitiveness of the local industries, under the slogan “Innovation for Competition, Competition for Growth”.

One of Brazil's aims is to strengthen regional economic integration. Brazil is a founding member of the Southern Common Market (MERCOSUR), and as such it has subscribed to preferential trade agreements with Bolivia, Chile, Colombia, Cuba, Ecuador, Mexico, Peru, and Venezuela. Together with its MERCOSUR partners, Brazil also has preferential trade agreements currently in force with India and Israel, and three further agreements pending entry into force. Additionally, it has bilateral preferential agreements under LAIA with Guyana and Suriname. The European Union and MERCOSUR have re-launched negotiations in order to create a Bi-regional Free Trade Agreement.

According to the World Bank, in 2013 Brazil ranked as the seventh largest economy in the world, with a GDP of 2246 trillion dollars, with foreign trade amounting to 27,6% of the GDP for that same year.  

Its main trade partners for 2014 were China, with exports amounting to 40,616 million dollars, the US with $27.144 million dollars in exports, the European Union with 42,047 million dollars in exports, and MERCOSUR with 25,054 million dollars in exports, with total exports amounting to 225,101 million dollars.  

63 https://es.santandertrade.com/analizar-mercados/brasil/cifras-comercio-exterior?&actualiser_id_banque=oui&id_banque=12&memoriser_choix=memoriser
64 http://www.mdic.gov.br/arquivos
POLITICAL OUTLOOK

Brazil is a presidential federal republic which is comprised of 26 states and 1 federal district*: Acre, Alagoas, Amapa, Amazonas, Bahia, Ceara, Distrito Federal*, Espirito Santo, Goias, Maranhao, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Para, Paraiba, Parana, Pernambuco, Piaui, Rio de Janeiro, Rio Grande do Norte, Rio Grande do Sul, Rondonia, Roraima, Santa Catarina, Sao Paulo, Sergipe, and Tocantin.65

Brazil has a bicameral National Congress or Congresso Nacional which consists of a 81 seat Federal Senate or Senado Federal (3 members from each state and federal district elected according to the principle of majority to serve eight-year terms; one-third and two-thirds of members elected every four years, alternately) and a 513 seat Chamber of Deputies or Camara dos Deputados (members are elected by proportional representation to serve four-year terms).

The president and vice president are elected on the same ticket by popular vote for a single four-year term; election last held on October 5th, 2014 and, because none of the candidates achieved absolute majority, a runoff election was held on October 26, 2014, after which Dilma Rousseff, of the center-left Workers Party, was reelected President with a 51.64% vote. Her vice president is once again her former vice president Michel Temer.

President Rousseff took office on January 1, 2011, and is now in the first year of her second term. She inherited a country that had benefited from 16 years of capable governance under Presidents Fernando Henrique Cardoso (1995-2002) and Luis Inácio Lula da Silva (2003-2010), during whose terms Brazil made significant advances in economic stabilization and social inclusion.

Given the fragmented nature of Brazil’s political system, presidents have traditionally distributed control of ministries and state enterprises to coalition partners in order to construct governing majorities. Rousseff’s distribution of appointments, which heavily favors the PT over the other seven parties with representation in the 39-member cabinet, has upset some sectors of the coalition. Her dismissal of six cabinet ministers accused of corruption during her first year in office and periodic efforts to more tightly control government expenditures have exacerbated these intra-coalition divisions. While Rousseff has been able to win legislative support for portions of her policy agenda, she has lost key congressional votes on issues such as the distribution of oil royalties and reforms to Brazil’s forest conservation law. The main political parties in Brazil are: the Workers Party (PT), the Brazilian Democratic Movement Party (PMDB), the Brazilian Social Democratic Party (PDS) and the Democrats (DEM).

The current cabinet is comprised as follows:

<table>
<thead>
<tr>
<th>Ministry</th>
<th>Appointee</th>
<th>Political Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief of Staff</td>
<td>Aloizio Mercadante</td>
<td>PT</td>
</tr>
<tr>
<td>Agrarian Development</td>
<td>Patrus Ananias</td>
<td>PT</td>
</tr>
<tr>
<td>Agriculture, Livestock and Supply</td>
<td>Katia Abreu</td>
<td>PMDB</td>
</tr>
<tr>
<td>Cities</td>
<td>Gilberto Kassab</td>
<td>PSD</td>
</tr>
<tr>
<td>Communications</td>
<td>Ricardo Berzoini</td>
<td>PT</td>
</tr>
<tr>
<td>Culture</td>
<td>Juca Ferreira</td>
<td>PT</td>
</tr>
</tbody>
</table>

Brazil has experienced significant improvements in economic and social conditions over the past decade; however, there are still significant socioeconomic disparities between races. While Afro-Brazilians comprise about half of the Brazilian population, they account for less than 25% of Brazilians with college degrees, and 17% of Brazilians that have completed graduate degrees. In 2010, the median income of Afro-Brazilians was 64% of the median income of white Brazilians. Even after controls for education, occupation, and location are enforced, white Brazilians reportedly receive higher wages than Afro-Brazilians. Moreover, Afro-Brazilians are disproportionately the victims of Brazil’s high levels of crime and violence. In an effort to reduce racial disparities, the Brazilian government has enacted a series of antidiscrimination and affirmative action measures. Brazil became the first Latin American country to endorse racial quotas in government service in 2002, and in 2003 became the first country in the world to establish a special secretariat for racial equity promotion. In 2010, Brazil enacted the Statute of Racial Equality. Among other provisions, the law offers tax incentives for businesses that practice racial inclusion, promotes government affirmative action programs, and reaffirms that African and Afro-Brazilian history be taught in all elementary and middle schools. In 2012, Brazil adopted a law that requires federal universities to reserve half of their admissions spots for students who are Afro-Brazilian, indigenous, or graduates of public high schools. The law gradually increases the admissions spots reserved from 12.5% in 2013 to 50% in 2016, with half of the reserved spots set aside for low income students of all races with the highest grades and the other half divided in accordance with share per race in each state. More recently, Rousseff has proposed reserving 20% of jobs in the federal government for Afro-Brazilians.
Although race-based affirmative action policies have generated diverse reactions among the Brazilian population, they have been upheld as constitutional by the Brazilian Supreme Court.

If inequality is the first mayor challenge for Rousseff administration, the second is deforestation and its environmental impact. Recognizing that continued destruction of the Amazon Rainforest is damaging to Brazil’s global image and could threaten energy generation and agricultural production in the future, the Brazilian government has implemented a series of policies designed to slow deforestation. To meet this target, the Brazilian government is increasing surveillance, replanting forest, and financing sustainable development projects.

In 2011, President Rousseff signed a law transferring responsibility for environmental oversight of nonfederal lands from Brazil’s federal environmental protection agency to local officials. While the federal government maintains that local officials are better placed to manage such resources, critics argue that local authorities lack the necessary finances and are more susceptible to intimidation and corruption.

**ECONOMIC OUTLOOK**

**BRAZIL ECONOMIC DATA**

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (million)</td>
<td>196.5</td>
<td>198.3</td>
</tr>
<tr>
<td>GDP per capita (USD)</td>
<td>11,435</td>
<td>11,312</td>
</tr>
<tr>
<td>GDP (USD bn)</td>
<td>2,247</td>
<td>2,243</td>
</tr>
<tr>
<td>Economic Growth (GDP, annual variation in %)</td>
<td>1.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Domestic Demand (annual variation in %)</td>
<td>0.6</td>
<td>3.3</td>
</tr>
<tr>
<td>Consumption (annual variation in %)</td>
<td>3.2</td>
<td>2.6</td>
</tr>
<tr>
<td>Investment (annual variation in %)</td>
<td>-4.0</td>
<td>5.2</td>
</tr>
<tr>
<td>Industrial Production (annual variation in %)</td>
<td>-2.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Retail Sales (annual variation in %)</td>
<td>8.4</td>
<td>4.3</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>5.5</td>
<td>5.4</td>
</tr>
<tr>
<td>Fiscal Balance (% of GDP)</td>
<td>-2.5</td>
<td>-3.3</td>
</tr>
<tr>
<td>Public Debt (% of GDP)</td>
<td>36.0</td>
<td>34.3</td>
</tr>
<tr>
<td>Money (annual variation in %)</td>
<td>9.1</td>
<td>10.9</td>
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<tr>
<td>Inflation Rate (CPI, annual variation in %, eop)</td>
<td>5.8</td>
<td>5.9</td>
</tr>
<tr>
<td>Inflation Rate (CPI, annual variation in %)</td>
<td>5.4</td>
<td>6.2</td>
</tr>
<tr>
<td>Inflation (PPI, annual variation in %)</td>
<td>9.1</td>
<td>5.1</td>
</tr>
<tr>
<td>Policy Interest Rate (%)</td>
<td>7.25</td>
<td>10.0</td>
</tr>
<tr>
<td>Stock Market (annual variation in %)</td>
<td>7.4</td>
<td>-15.5</td>
</tr>
</tbody>
</table>

[66] www.focus-economics.com
Brazil is the largest country in area and population in Latin America and the Caribbean. The country experienced rapid economic growth between 2004 and 2010, driven mostly by an increase in international demand—particularly from China—for Brazilian commodities such as meat, sugar, soybeans, iron ore, and crude oil. The initial expansion was reinforced by domestic consumption from Brazil’s fast-growing middle class, which now accounts for a majority of the population. As international commodity prices began to fall, however, economic growth slowed. The Rousseff Administration has sought to alleviate the weaker international economic situation by boosting domestic consumption and protecting domestic industry. The Administration has pursued an expansionary fiscal policy, implementing a series of short-term stimulus packages. It has also adopted a new industrial policy, known as Brasil Maior (“Bigger Brazil”), which has included targeted tax cuts and financing through the Brazilian Development Bank (BNDES) for domestic manufacturing, stronger preferences for locally produced goods in government procurement, and restrictions on imports. These measures have also helped maintain a low unemployment rate, 5.1% in February 2014. However, economic policies have pushed inflation to the upper edge of the government’s targeted boundary (4.5% with a 2-point tolerance band), reducing the population’s purchasing power and affecting national competitiveness. In order to keep inflation under control, the Brazilian Central Bank, which previously had reduced interest rates to record lows, was forced to reverse these measures and adopt a tighter monetary policy.

Among some of the measures implemented by the government in an attempt to remedy structural deficiencies, it has cut taxes and encouraged private investment in the country’s overburdened infrastructure by tendering concessions to build and operate roads, railways, ports, and airports.

Brazil’s strong domestic market is less vulnerable to external crisis, and Brazilians are benefiting from stable economic growth, relatively low inflation rates and improvements in social well-being.

The Brazilian economy slowed significantly between 2011 and 2012, reflected in a deceleration of the GDP from 7.5% in 2010 to 2.7% in 2011 and 0.9% in 2012. Brazil’s economy continues to expand at a very moderate rate of 1.7 per cent in 2014, with little prospects for investment demand and increasing pressure for fiscal consolidation. For 2015, WB panelists see growth at 0.7%.

| Exchange Rate (vs USD) | 2.05 | 2.36 |
| Exchange Rate (vs USD, aop) | 1.95 | 2.16 |
| Current Account (% of GDP) | -2.4 | -3.6 |
| Current Account Balance (USD bn) | -54.3 | -81.1 |
| Trade Balance (USD billion) | 19.4 | 2.6 |
| Exports (USD billion) | 242.6 | 242.2 |
| Imports (USD billion) | 223.2 | 239.6 |
| Exports (annual variation in %) | -5.3 | -0.2 |
| Imports (annual variation in %) | -1.4 | 7.4 |
| International Reserves (USD) | 373.2 | 358.8 |
| External Debt (% of GDP) | 13.9 | 13.8 |

69 World Economic Situation and Prospects 2014, update as of mid-2014, United Nations Publication, pg. 15
In an effort to bolster confidence, President Dilma Rousseff appointed Joaquim Levy, an orthodox economist who has vowed to cut spending, as Finance Minister. Levy announced that he would target a 1.2% surplus in 2015, which would increase to above 2.0% in 2016 and 2017. However, Levy faces significant rigidity in the budget since the vast majority of spending is attached to constitutionally mandated expenditure. In order to host the 2014 World Cup and the 2016 Olympic Games significant investments were required in areas such as urban and social development and transport infrastructure.

So far, the financial sector has not been as affected as it could have been. The banking system has remained sound, and despite rapid credit growth, lower interest rates have helped contain delinquencies and generally allowed asset quality to stabilize. Foreign direct investment remains more than sufficient to cover the current account deficit, which is approximately 2.2% of GDP. Brazil’s general macroeconomic framework is solid and sustainable in the medium term. The main risks to the economic outlook relate to the external environment, regardless of the high foreign reserve levels, favorable external debt composition, a current account fully covered by foreign direct investment and an overall low degree of trade openness.

The Growth Acceleration Plan (PAC) was launched in 2007 by the Lula Da Silva administration in an effort to increase investment in infrastructure and provide incentives for a more robust and accelerated growth. The Rousseff administration has continued with the initiative under the name of PAC-2. In 2012, the Government launched a range of initiatives to reduce energy costs, restructure oil royalty payments, strengthen investment in infrastructure through foreign participation, and reform the subnational value-added tax.

Energy has become an important area of U.S.-Brazilian cooperation in recent years. Brazil is widely regarded as a world leader in energy policy for successfully reducing its reliance on foreign oil through the development of alternative energy resources and increased domestic production. In addition to being the world’s second-largest producer of ethanol (after the United States), Brazil generates 80% of its electricity through hydropower. Brazil also has discovered large offshore oil deposits that have the potential to turn the country into a major oil and gas producer and an important source of energy for the United States. To facilitate greater cooperation in the development of safe, secure, and affordable energy, President Obama and President Rousseff launched a Strategic Energy Dialogue in March 2011.
CONCLUSION

2014 ended with a cloud of uncertainty regarding the future of oil, and although 2015 has evolved on a more positive note, there are still many players in the field - both private and public - who have yet to completely implement cut backs, and restructure budgets and operations due to the financial shortages they have been faced with. The drop in oil prices has not seen the last of its effect.

However, oil and energy are resources that humanity cannot yet do without. They will continue to pull or drag economies, they will continue trading in world stock exchanges, and will continue to be drivers of technological innovation and economic growth.

These sectors are incredibly dynamic; they represent a considerable portion of GDPs in all four of the countries analyzed, and they are also the main tax contributors in the country.

Colombia and Brazil have major exploitation projects underway, Brazil with its Pre-Salt discoveries, and Colombia with its non-conventional energy and offshore projects offer interesting business perspectives for the future. Mexico continues to be an oil giant, with innumerable offshore projects in the Gulf of Mexico, and an Energy Reform that opens up the market to private enterprise. Chile has the need to increase its energy resources for the near future, in order to face the ever-increasing demand for energy.

The energy and oil sectors offer significant opportunities for investment and business development. Non-renewable energy sources are at the base of many of the government policies for the current and next presidential periods, with both Santos and Bachelet focusing on their development. Peña Nieto and Rousseff have many issues on their plate, yet they also consider renewable energy sources as part of the future mix of their country’s economies.
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