

# COUNTRY ANALYSIS BRIEFS

## Peru

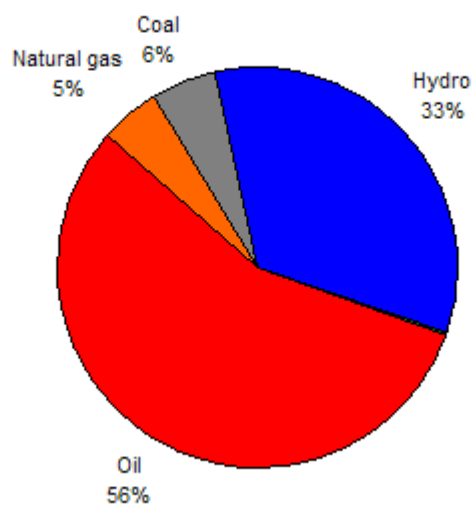
Last Updated: June 2007

### Background

***With its development of the Camisea project, Peru is developing into an important regional producer of natural gas.***

Oil is the dominant fuel source in Peru. In 2004, oil represented 56 percent of Peru's total energy consumption of 0.6 quadrillion Btus. Hydroelectricity is the second-largest component, representing 33 percent in 2004. However, the development of the Camisea natural gas project has led to increased use of natural gas in the residential, industrial, and power generation sectors. In addition, the development of an integrated liquefied natural gas (LNG) terminal will allow Peru to become an important regional exporter of natural gas in the near future.

Total Energy Consumption in Peru, by Type (2004)



Source: EIA International Energy Annual 2004

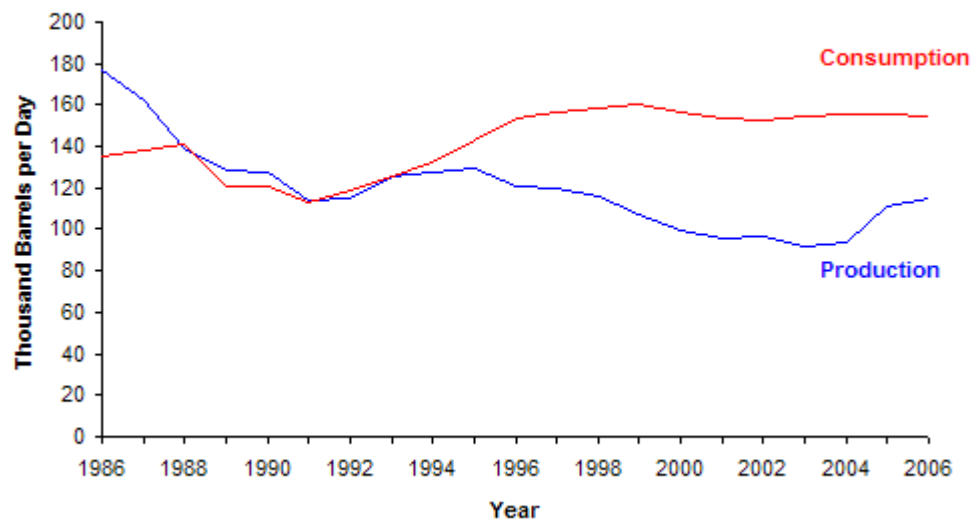


## Oil

***Peru's oil production has increased in the last two years as new projects have come online, but the country is still a net oil importer.***

Despite increased oil production in recent years, Peru relies upon imports for about one-third of its oil needs. According to *Oil and Gas Journal* (OGJ), Peru had 930 million barrels of proven oil reserves in 2007. The country produced 115,000 barrels per day (bbl/d) of total oil liquids in 2006, of which 67 percent was crude oil. This was slightly higher than 2005 levels, but much higher than 2003 production of 92,000 bbl/d: increasing natural gas liquids (NGL) production represents the bulk of the increased oil production in recent years, as crude oil production in Peru has been in long-term decline for the last decade. In 2006, Peru consumed an estimated 154,000 bbl/d and imported an estimated 39,000 bbl/d of oil. Most imports come from Ecuador and other South American countries.

**Peru's Oil Production and Consumption**



Source: EIA International Energy Annual; Short Term Energy Outlook

The largest oil producer in Peru is Argentina-based Pluspetrol, which controls over one-half of the

country's entire crude oil production. Other major producers include Occidental Petroleum, Petrobras, and Petro-Tech Peruana. Peru mostly privatized the former state-owned oil company, Petroperu, in 1993. Still, Petroperu continues to control the country's only crude oil pipeline, most of the refineries, and a majority of the retail oil products market.

### Exploration and Production

Peru's crude oil production is concentrated in the northern part of the country. In particular, the largest oil blocks are Block 1-AB (Pluspetrol) along the border with Ecuador, Block 8 (Pluspetrol) in the northeastern Amazon region, Block X (Petrobras) in the northwest, and Block Z-2B (Petro-Tech Peruana) off the northwest coast. Block 1-AB and 8 account for over 65 percent of Peru's total crude oil production. Most of crude oil produced in Peru is a heavy, sour variety known as "Lorento," with 20° API and 1.2 percent sulfur content.

In 2006, Barrett Resources announced that it would spend \$1 billion to develop Block 67, located in Peru's Amazon region. Exploration at Block 67 in the late 1990s first discovered commercial quantities of crude oil. At the time, there was no decision to proceed with the project, but rising world oil prices have caused a re-evaluation of the area. The project could begin production by 2010, eventually reaching 100,000 bbl/d. The project will necessitate the construction of a new pipeline between the area and the existing Norperuano system (see below).

In June 2005, Petro-Tech announced Peru's first offshore oil discovery, the San Pedro 1X well, which is located in Block Z-2B. The well had initial production of 1,200 bbl/d. Petro-Tech has plans to drill additional wells on Block Z-2B in order to increase production to 11,000 bbl/d. Petro-Tech also plans to expand its offshore exploration at Blocks 6, 33, 35 and 36. In 2004, Occidental Petroleum announced that it had discovered at least 100 million barrels of recoverable reserves in Block 64, located in the Amazon basin; the company also announced that it would increase its investments in Blocks 101 and 103 in the same area.

Peru held its latest oil licensing round in 2006. Perupetro signed exploration contracts for 16 blocks, including 116 (Hocol), 125 (Barrett Resources), and 128 (Gran Tierra). Peru plans to auction at least an additional 18 blocks in 2007.

### Pipelines

Petroperu operates the country's sole crude oil pipeline, Norperuano, which links the export terminal at Bayovar to oil fields in Peru's interior. Norperuano has two branches, one (190 miles) starting at San Jose de Saramuro in the Ucayali basin, the other (160 miles) starting at Andoas in the Marañon basin. Both branches meet at a central pumping station, where they join into a 35-inch system that carries crude oil 340 miles to the Pacific coast. Norperuano has a maximum capacity of 250,000 bbl/d.

### Downstream Activities

Peru has six major oil refineries, according to *OGJ*, with total capacity of 192,950 bbl/d. Repsol-YPF controls the largest facility in the country, La Pampilla, located in Lima, with a capacity of 102,000 bbl/d. The other privately-operated refinery in the country is the 3,250-bbl/d Purcallpa, operated by Maple Gas. Petroperu operates the remaining four refineries and the largest network of retail oil products distribution.

### Alternative Fuels

Increasing natural gas production in Peru has opened greater possibilities for automobiles powered by compressed natural gas (CNG) and liquefied petroleum gas (LPG). Lima, the capital, reportedly has at least three CNG refueling stations, with an additional ten in the planning stages. According to local industry sources, gasoline consumption in Peru in 2006 was 20 percent lower than recent years, owing to greater vehicular consumption of CNG and LPG. Besides increased local production, the favorable tax status of these alternative fuels has also popularized their use.

Biofuel consumption in Peru has also risen significantly in recent years. Pure Biofuels is reportedly building a biodiesel production facility near Lima that will have a production capacity of 52.5 million gallons per day (3,400 bbl/d). Energy firm Maple is planning an integrated sugarcane-ethanol facility outside of Lima that will produce 30 million gallons of ethanol per year (2,000 bbl/d), targeted towards the export market. The Peruvian government has established a goal of blending gasoline with at least 7.8 percent ethanol by 2010.

## Natural Gas

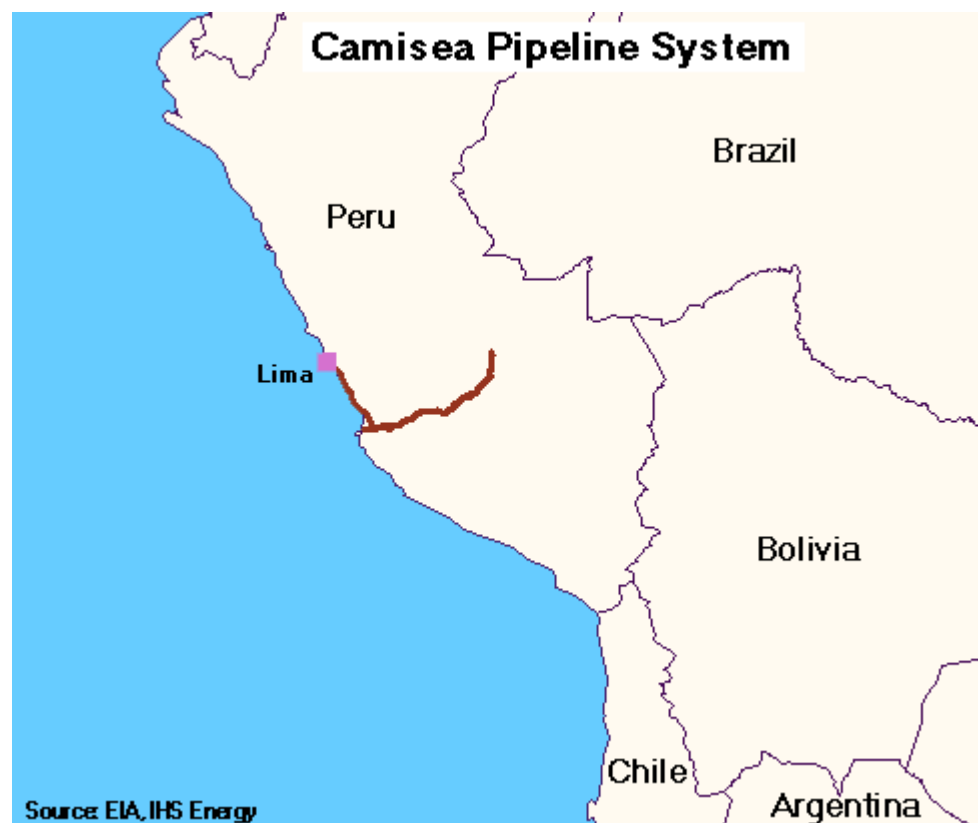
**Peru's development of the Camisea project has led to a rapid increase in the country's natural gas production.**

Peru hopes to increase natural gas use in its economy and reduce reliance upon oil and fluctuating hydroelectricity. In 2004, the country produced and consumed 30 billion cubic feet (Bcf) of natural gas, over 60 percent higher than the previous year. The startup of production at the Camisea project in August 2004 (see below) was the principle force behind this large increase, and the continued ramp-up of production there will likely cause Peru's natural gas production to increase further in coming years. According to OGJ, Peru had proven natural gas reserves of 8.7 trillion cubic feet (Tcf) in 2007, the fifth-largest amount in South America.

### Exploration and Production

#### Camisea

The Camisea project consists of several natural gas fields located in the Ucayali basin of southeastern Peru, principally in Block 88 along the Camisea River. Analysts estimated that Block 88 contains 11 Tcf of proven plus probable (P2) natural gas reserves and 482 million barrels of associated natural gas liquids (NGLs). An international consortium led by Hunt Oil has developed the upstream portion of Camisea, with production beginning in August 2004. The initial production capacity at Camisea was 450 million cubic feet per day (Mmcf/d) of natural gas and 34,000 bbl/d of NGL. However, output capacity is expected to increase steadily, as drilling continues on Camisea's Block 56, adjacent to Block 88.



Transportadora de Gas del Peru (TGP), a consortium led by Techint, constructed and now operates parallel natural gas and NGL pipelines that carry Camisea production to Lima and to a fractionation plant in Paracas. The pipeline system has suffered a series of high profile leaks since its inception: in March 2006, the Camisea pipeline ruptured for the fifth time since start-up and a week after E-Tech International issued a report warning of additional leaks and spills due to quality construction issues of the pipeline.

The Camisea project provides natural gas for domestic consumption; however, natural gas production from the Camisea project will eventually exceed domestic demand. Hunt Oil leads the Peru LNG consortium, which broke ground in January 2006 on a liquefied natural gas (LNG) export terminal at Pampa Melchorita, 105 miles south of Lima. The Peru LNG facility will have an operating capacity of 4.2 million tons per year, with first exports expected in 2009. Most of the production will likely go to the United States and Mexico, but Peru LNG has also held discussions with ENAP, Chile's state-owned oil company, about exporting LNG to that country.

### Other Developments

Besides Camisea, the largest concentrations of Peru's natural gas production includes the Aguaytia gas field (Maple Gas) in central Peru, Block X (Petrobras) in the northwest region, and Block Z-2B (Petro-Tech) located off the northwest coast. BPZ Energy is developing the Corvina natural gas project in the offshore Block Z-1 in northwest Peru. The project is an integrated gas-to-power facility that will include a subsea pipeline and onshore, 160-MW power plant. There have also been discussions of eventually exporting some natural gas to southern Ecuador.

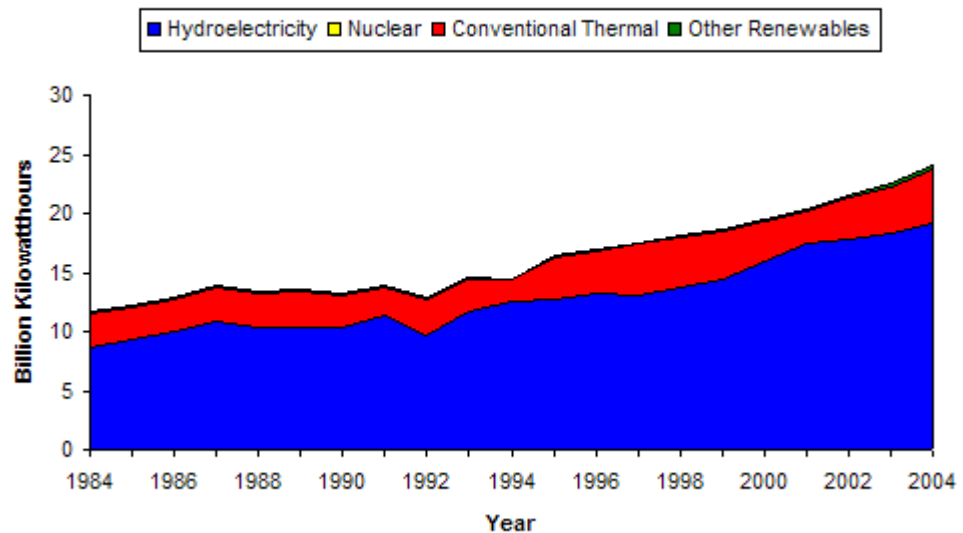
## Electricity

**The majority of electricity generated in Peru comes from hydroelectricity**

In 2004, Peru had 6.0 gigawatts (GW) of installed generating capacity. In that same year, the country generated 24.0 billion kilowatt-hours of electricity, while consuming 22.3 billion kilowatt-hours. Even though installed capacity is evenly divided between hydroelectricity and conventional thermal, 80 percent of Peru's total electricity generation in 2004 came from hydroelectric facilities: conventional thermal plants generally operate only during peak load periods or when weather factors dampen hydroelectric output.

The largest hydroelectric facility in the country is the Mantaro Complex in southern Peru, operated by state-owned Electroperu. Two hydroelectric plants at the complex generate over one-third of Peru's total electricity supply from 900 megawatts (MW) of installed capacity. In February 2006, Egecen S.A. completed construction of the 130-MW, Yuncán hydroelectric plant, located northeast of Lima. The Peruvian government awarded operation rights of the plant to EnerSur, a subsidiary of Brussels-based Suez Energy International. With the start of natural gas production from the Camisea project, the Peruvian government has encouraged greater investment in gas-fired power plants as a way to reduce reliance upon hydroelectricity. As mentioned above, BPZ Energy plans to bring online its 140-MW, gas-fired power plant in Tumbas by the end of 2007.

Peru's Electricity Generation, by Source



Source: EIA International Energy Annual

### Sector Organization

In 1992, the Peruvian government enacted the Electric Power Concession Law, which allowed for the privatization of the electricity sector and promoted competition and efficiency within the industry. Nevertheless, the Peruvian government still maintains an important position within the sector. The single largest generating company in Peru is Electroperu, majority-owned by the Peruvian government, which operates the Mantaro hydroelectricity complex. However, around four-fifths of Peru's electricity is generated by the private sector. The largest electricity distributor in Peru is Edelnor, a subsidiary of Endesa, which operates in Lima and the surrounding area.

Peru has two main power transmission grids, one covering the north and center parts of the country, the other serving the south. An interconnector runs between the two along the Pacific coast. The largest transmission company in Peru is the Colombia-based ISA Group, which controls over half of the transmission grid in the country through its subsidiaries Red de Energia

del Peru and Interconexion Electrica ISA Peruvian law ensures that all generating and distributing companies have fair, non-discriminatory access to the national transmission grid.

### Regional Integration

Peru has also been in the process of integrating its power grid with those of Ecuador, Chile and Bolivia. These efforts are part of a larger movement by the Andean Community to create a common electricity market. Once the integrated market is operating, the transmission lines will allow for a permanent flow of power between each one of the electric power systems, allowing each country to purchase power under the most favorable conditions. Construction of an interconnector between Peru and Ecuador began in 2003. The transmission line will provide a capacity of 100 MW between the two countries. The Peruvian and Chilean governments have begun negotiations for the construction of an interconnector between the two countries. The transmission line would allow gas-fired power plants in northern Chile to sell excess electricity supply to Peru, especially when a shortage of rainfall reduces the output of Peru's hydroelectric facilities. Finally, talks of an electricity connection between Peru and Bolivia are in the preliminary stages.

## Profile

### Country Overview

|                           |   |
|---------------------------|---|
| <b>President</b>          | President Alan Garcia Perez (since July 2006)                                       |
| <b>Location</b>           | Western South America, bordering the South Pacific Ocean, between Chile and Ecuador |
| <b>Independence</b>       | 28 July 1821 (from Spain)   |
| <b>Population (2007E)</b> | 28,674,757  |

### Economic Overview

|  |  |
|--|--|
| <b>Currency/Exchange Rate (5/25/2007)</b>          | 1 Nuevos Soles (PEN) = \$0.315   |
| <b>Inflation Rate (2006E)</b>                      | 2.0%   |
| <b>Nominal Gross Domestic Product (GDP, 2006E)</b> | \$93 billion   |
| <b>Real GDP Growth Rate (2006E)</b>                | 8.0%   |
| <b>Unemployment Rate (2006E)</b>                   | 7.2%   |
| <b>External Debt (2006E)</b>                       | \$27.9 billion   |
| <b>Exports (2006E)</b>                             | \$23.7 billion   |
| <b>Exports - Commodities</b>                       | copper, gold, zinc, crude petroleum and petroleum products, coffee, potatoes, asparagus, textiles, guinea pigs |
| <b>Exports - Partners (2005E)</b>                  | US 31.1%, China 10.8%, Chile 6.6%, Canada 5.9%, Switzerland 4.6%   |
| <b>Imports (2006E)</b>                             | \$14.9 billion   |
| <b>Imports - Commodities</b>                       | petroleum and petroleum products, plastics, machinery, vehicles, iron and steel, wheat, paper                  |
| <b>Imports - Partners (2005E)</b>                  | US 18.2%, China 8.5%, Brazil 8%, Ecuador 7.4%, Colombia 6.1%, Argentina 5.1%, Chile 5.1%, Venezuela 4.1%       |
| <b>Merchandise Trade Balance (2006E)</b>           | \$8.9 billion  |

### Energy Overview

|  |   |
|--|---|
| <b>Proven Oil Reserves (January 1, 2007E)</b>  | 0.9 billion barrels                                       |
| <b>Oil Production (2006E)</b>                  | 115 thousand barrels per day, of which 67% was crude oil. |
| <b>Oil Consumption (2006E)</b>                 | 154 thousand barrels per day                              |
| <b>Crude Oil Distillation Capacity (2007E)</b> | 193 thousand barrels per day                              |
| <b>Proven Natural Gas</b>                      | 8.7 trillion cubic feet                                   |

|  |   |
|--|---|
| <b>Reserves (January 1, 2007E)</b>                 |   |
| <b>Natural Gas Production (2004E)</b>              | 30 billion cubic feet   |
| <b>Natural Gas Consumption (2004E)</b>             | 30 billion cubic feet   |
| <b>Recoverable Coal Reserves (2004E)</b>           | 1,168 million short tons  |
| <b>Coal Production (2004E)</b>                     | 0.02 million short tons   |
| <b>Coal Consumption (2004E)</b>                    | 1.2 million short tons  |
| <b>Electricity Installed Capacity (2004E)</b>      | 6.0 gigawatts   |
| <b>Electricity Production (2004E)</b>              | 24.0 billion kilowatt hours   |
| <b>Electricity Consumption (2004E)</b>             | 22.3 billion kilowatt hours   |
| <b>Total Energy Consumption (2004E)</b>            | 0.6 quadrillion Btus*, of which Oil (56%), Hydroelectricity (33%), Coal (6%), Natural Gas (5%), Nuclear (0%), Other Renewables (0%) |
| <b>Total Per Capita Energy Consumption (2004E)</b> | 20.9 million Btus   |
| <b>Energy Intensity (2004E)</b>                    | 4,129 Btu per \$2000-PPP**  |

## Environmental Overview

|  |  |
|--|--|
| <b>Energy-Related Carbon Dioxide Emissions (2004E)</b>             | 27.3 million metric tons   |
| <b>Per-Capita, Energy-Related Carbon Dioxide Emissions (2004E)</b> | 1.0 metric tons  |
| <b>Carbon Dioxide Intensity (2004E)</b>                            | 0.2 Metric tons per thousand \$2000-PPP**  |
| <b>Environmental Issues</b>  | deforestation (some the result of illegal logging); overgrazing of the slopes of the costa and sierra leading to soil erosion; desertification; air pollution in Lima; pollution of rivers and coastal waters from municipal and mining wastes   |
| <b>Major Environmental Agreements</b>                              | party to: Antarctic-Environmental Protocol, Antarctic-Marine Living Resources, Antarctic Treaty, Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Marine Dumping, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands, Whaling signed, but not ratified: none of the selected agreements |

## Oil and Gas Industry

|   |   |
|---|---|
| <b>Organization</b>                       | Perupetro, which started operating in 1993, is the state company responsible for overall regulation and licensing of the country's oil and gas industries. Perupetro also negotiates oil and gas contracts with companies to explore and/or produce in Peru. Petroperu is the state oil company, and Electroperu is the state electric power company. Regional state-owned electric company Egesur (for the south), as well as state mining company Centromin, are also slated for privatization. |
| <b>Major Oil/Gas Ports</b>                | Callao, Chimbote, Ilo, Iquitos, Matarani, Paita, Pucallpa, Salaverry, San Martin, Talara, Yurimaguas  |
| <b>Foreign Company Involvement</b>        | Barrett Resources, Burlington Resources, Coastal, Duke Energy, Empresa de Energia de Bogota, ExxonMobil, hunt Oil, Hyundai, Interconexion Eletrica, Maple Production, Occidental Petroleum, Petrobas, Petro-Tech, Phillips Petroleum, Pluspetrol, Repsol-YPF, Sapet, Shell, SK Corp., Sonatrach, Technit, Tractebel, Transelca.   |
| <b>Major Natural Gas Fields</b>           | Camisea and Aguaytia  |
| <b>Major Pipelines</b>                    | Norperuano crude oil pipeline (250,000 bbl/d capacity)  |
| <b>Major Refineries (capacity, bbl/d)</b> | La Pampilla Lima (102,000); Talara (62,000); Iquitos Loreto (10,500); Conchan (13,500); Pucallpa (3,250); El Milagro (1,700)  |



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

## Links

### EIA Links

[EIA - Country Information on Peru](#)

### U.S. Government

[CIA World Factbook - Peru](#)

[U.S. Commercial Service: "Doing Business in Peru?"](#)

[U.S. Country Commercial Guide on Peru](#)

[U.S. Embassy](#)

[U.S. State Department Consular Information Sheet on Peru](#)

### Foreign Government Agencies

[Fonafe](#)

[Ministry of Energy and Mines](#)

### Oil and Natural Gas

[GNLC \(Natural Gas of Lima and Callao\)](#)

[Graña y Montero](#)

[Hunt Oil](#)

[Maple](#)

[PeruPetro](#)

### Electricity

[Edelnor](#)

[Egenor \(Duke Energy International\)](#)

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[Empresa de Generación Eléctrica de Arequipa \(Egasa\)](#)

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Peru 's Ministry of Energy and Mines  
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Petroleum Economist  
Petroperu  
Platts  
Reuters  
U.S. Energy Information Administration  
World Markets Analysis

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