



Energy in Peru: Opportunities and Challenges

A Working Paper of the Americas Society/Council of the Americas
Energy Action Group



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Published by Americas Society and Council of the Americas
Washington DC
June 2010

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INTRODUCTION

Once an oil exporter, Peru became a net importer in the late 1980s/early 1990s. The combination of a state-dominated turn in Peru's energy sector in the 1960s and a lack of significant discoveries over the years set Peru on a path of dwindling reserves. Royal Dutch Shell's 1980s discovery of natural gas near the Camisea River in the Amazon eventually changed Peru's fortunes, but it would take about 20 years to bring this gas to market. In that time, Peru essentially reversed its approach to energy, implementing market friendly reforms that attracted the investors necessary to develop its resources. As a result of smarter energy management, Peru has now begun to diversify its energy use, reduce its dependence on imports, and

As a result of smarter energy management, Peru has now begun to diversify its energy use, reduce its dependence on imports, and position itself as an exporter of liquefied natural gas.

position itself as an exporter of liquefied natural gas (LNG). Still, challenges remain, particularly as exploration and development activities in environmentally and socially sensitive areas increase.

This working paper explores the transformation of Peru's oil and gas sector from an industry in decline to a major contributor to economic growth in Peru. It begins with a brief history of oil and gas in Peru, including the important hydrocarbon reforms of the early 1990s and the development of the Camisea natural gas fields. The paper then focuses on the benefits of natural gas to Peru and the need to balance oil and gas development with environmental and social protections. Finally, the paper makes several recommendations based on Peru's experience but intended for broader hemispheric consideration. These recommendations are drawn in part from a high-level meeting the Americas Society/Council of the Americas Energy Action Group held in Lima, Peru, on November 2, 2009. The meeting brought together senior representatives from the public and private sectors for a discussion of energy and climate issues in Peru and the Andean region.

Briefly, the recommendations are as follows:

1. Peru should ensure a long-term commitment to market friendly policies for energy development. Candidates for the 2011 presidential election should pledge to maintain a favorable investment climate as well as stringent environmental and social standards.
 2. The reforms that have made Peru attractive to oil and gas investors have also challenged Peru's ability to monitor and enforce environmental and social standards. Peru should use this as an opportunity to become a model for the region in environmental and social management.
 3. Peru should continue to ensure its domestic market benefits from natural gas produced locally, including using natural gas to provide electricity to people without access to modern energy services.
 4. Peru should seek to further regional energy cooperation as a means to strengthen political and economic relations with its neighbors.
 5. To the extent that proven reserves of natural gas and domestic consumption needs allow for exports of LNG, and barring the possibility of supplying other Latin American countries, Peru should take advantage of its location on the Pacific coast to target Asian markets.
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BRIEF HISTORY OF OIL AND GAS IN PERU

Oil dominated the hydrocarbon sector in Peru for most of the twentieth century.¹ Oil development in Peru dates back to the mid-nineteenth century, but it was not until the early 1900s that it began to take off. By 1929, oil made up 30 percent of Peru's export revenues. But beginning in the 1940s, failed exploration efforts and political interference (such as policies that changed from government to government, refusal by various governments to grant new concessions, and fixed petroleum prices) left Peru with a trend of diminishing reserves and production. In response to increasingly unfavorable policies governing the sector, private investment waned. In 1968, the military dictatorship expropriated the International Petroleum Company, a major presence in Peru at that time, and created state oil company Petroperu. For nearly

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25 years, Petroperu controlled all aspects of Peru's oil and gas industry. Even though Petroperu sought the participation of private companies in exploration and production, only a

few firms remained in Peru during this time. After years of industry decline, Peru became a net importer of oil in the late 1980s/early 1990s.

Heavy state intervention in the energy sector mirrored the role of the state in the rest of the economy during the latter part of the twentieth century. After decades of low economic growth, Peru's economy worsened in the second half of the 1980s. Real wages fell by almost half, accompanied by hyperinflation and huge deficits. In 1990, political outsider Alberto Fujimori won the presidency and used "shock" measures to stabilize the economy. In addition to implementing fiscal and monetary reforms, Fujimori greatly reduced the role of the state in the economy. His hard-line approach to combating the Shining Path insurgent movement also improved security.²

By the time Fujimori came to office, Petroperu was losing money, and reserves and production in Peru were declining as a result of low investment in the sector. Management recognized the need for a substantial restructuring of the company and embraced the goal of privatization. While full privatization was never achieved, Petroperu was able to streamline its operations by shutting down underperforming

¹ This section and others on Camisea draw from Carol Wise, "Peru," in *Energy Cooperation in the Western Hemisphere: Benefits and Impediments*, ed. Sidney Weintraub (Washington: Center for Strategic and International Studies, 2007), 302–335; Energy Sector Management Assistance Programme (ESMAP), *Peru: Reform and Privatization in the Hydrocarbon Sector* (Washington: The International Bank for Reconstruction and Development/The World Bank, 1999); and Rosemary Thorp and Geoffrey Bertram, *Peru 1891–1977: Growth and Policy in an Open Economy* (New York: Columbia University Press, 1977).

² It should be noted that Fujimori was convicted of human rights violations in 2009 for ordering murders and kidnappings while he was president.

businesses, shedding unnecessary staff, selling off business units, and limiting political interference in business decisions.

It was in this climate of market openness that a new hydrocarbons law was passed. Legislation approved in 1993 ended Petroperu's monopoly over oil and gas and allowed for the participation of private companies in all aspects of the sector. Improvements to exploration and production contract terms and recourse to international arbitration in case of dispute made Peru more competitive. As a result, from 1990 to 1997 investment in the sector increased from \$20 million to \$4.3 billion. Areas under operation went from 1 million to 23 million hectares in the same period.³ Prices were no longer set by the state but reflected the market. A new state company, Perupetro, was created. Perupetro is a non-operating company whose sole purpose is to administer oil and gas resources and to contract with private companies seeking exploration and production rights.

In addition to the oil and gas reforms, Peru strengthened its environmental and social laws and regulations. In 1990, the Environmental and Natural Resources Code created new standards for environmental protection. Under the code, oil and gas companies are required to submit an Environmental Impact Assessment (EIA) before a project can begin. The EIA must detail the expected environmental and social consequences of the proposed project and include a plan for managing the impact.

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In 1994, Peru ratified Convention 169 of the International Labor Organization, thereby committing to protect the rights and cultures of its indigenous peoples and to consult the indigenous on all matters affecting them. The following year, the Consejo Nacional del Ambiente (CONAM) was created to coordinate national environmental policy across sectors, although each ministry was responsible for

³ ESMAP, *Peru: Reform and Privatization*, 18.

overseeing environmental issues within its own purview. In 2008, CONAM was subsumed by the new Ministry of Environment.

After this series of hydrocarbon and environmental/social reforms, Peru focused on development of the Camisea natural gas fields. After discovering Camisea in the 1980s, Shell sought development rights but was unable to come to an agreement with the government. As a result, Shell left Peru in 1988. Following Shell's departure, Peru was unable to attract the necessary funds or find a substitute developer, and the Camisea project came to a halt. But, in 1994, Peru had a new approach to the sector and was eager to have Camisea under development. The government preferred to open up the project for bids, but major potential bidders wanted Peru to resolve its conflict with Shell first. Two years later, after renewed discussions, Peru granted a 40-year concession to a Shell-Mobil consortium. Nonetheless, the consortium terminated the project in 1998 because of still-irreconcilable differences between the companies and the Government of Peru.

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Following the breakdown of the Shell-Mobil contract, Peru passed legislation in 1999 that addressed some of the challenges in the natural gas market that had undone the Shell-Mobil agreement. The

next year, in the midst of a political crisis that saw Fujimori removed from office for corruption, the Camisea deal was completed. At the end of 2000, under interim President Valentín Paniagua, Peru signed contracts with two consortia—one led by Pluspetrol and the other headed by TecGas—for the development, transportation, and distribution of the Camisea natural gas.⁴ Approximately 20 years after its discovery, Camisea finally began commercial production in 2004.

OPPORTUNITIES AND CHALLENGES

Natural Gas

In Latin America, Peru has the sixth largest proven natural gas reserves, most of which are located in the Camisea region. While nowhere near the level of some of the region's energy powerhouses, Peru's natural gas is nonetheless a boon to its

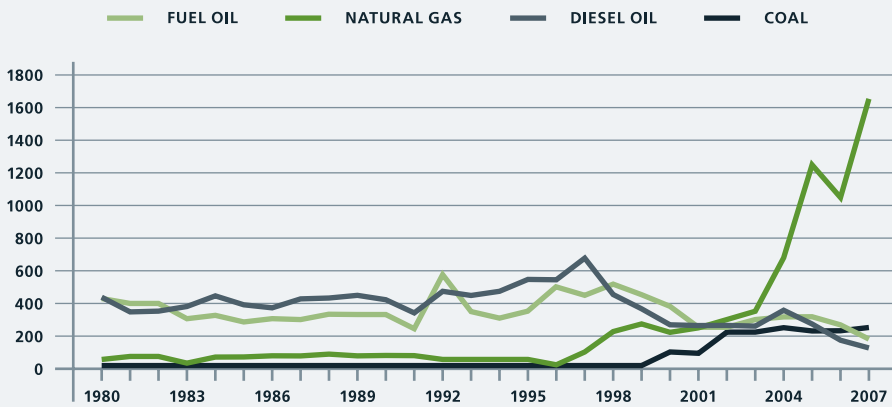
⁴ The consortium responsible for development of the natural gas is made up of Pluspetrol (36%) and TecPetrol (Techint) (10%) of Argentina, Hunt Oil (36%) from the United States, and SK (18%) of South Korea. The transportation and distribution contracts were awarded to a second consortium consisting of the members of the development group—TecGas (Techint) (31%), Pluspetrol (19%), Hunt Oil (19%), and SK (10%)—plus three additional companies: Sonatrach (11%) of Algeria, Tractebel (8%) from Belgium, and Peru's Grana y Montero (2%). The second consortium formed Transportadora de Gas del Perú (TGP). TGP hired Tractebel to manage distribution. See Wise, "Peru," 323 and Inter-American Development Bank, "Peru Camisea Project (PE-0222) Environmental and Social Impact Report," June 2003, Table 1-1 Development History of Camisea Reserves.

economy. A study commissioned by the Inter-American Development Bank (IDB) estimates that the Camisea project alone will bring about \$23 billion in benefits to Peru over its 33-year life.⁵ Before Camisea began commercial production, Peru's

electricity was generated primarily from hydropower and imported fuels. Since the advent of Camisea in 2004, cheaper natural gas has increasingly offset imports of more expensive fuels and domestic consumption has been rising, increasing more than sixfold from 2003 to 2008. Peru's demand for natural gas is expected to continue growing but at a slower pace. It is estimated that the substitution of natural gas for imported fuels could save Peru as much as \$1.5 billion in energy expenses through 2033.⁶

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Power Generation by Fuel (KTOE)



Source: APEC Energy Database

The Camisea project comprises the construction of wells, processing plants, and pipelines as well as the distribution of natural gas. It is estimated that over the life of the project, this activity will boost Peru's GDP an average of .08% per year.⁷ Besides contributing to GDP, Camisea will add to government revenue through taxes

⁵ APOYO Consultoría, "Proyecto Camisea: Impacto Sobre el Mercado del Gas Natural y Estimación de los Beneficios Económicos" (documento elaborado para el Banco Interamericano de Desarrollo, May 2007), 7. The Camisea project period is 2000–2033. The estimated \$23 billion in benefits from Camisea is based on energy cost savings and economic activity associated with the development of the fields.

⁶ APOYO Consultoría, "Proyecto Camisea," 54. Estimate period is 2004–2033.

⁷ APOYO Consultoría, "Proyecto Camisea," 64. Project period is 2000–2033.

and other fees. The development of new business initiatives related to Camisea will also contribute to Peru’s economic growth. In particular, the exportation of liquefied natural gas is expected to begin in the second quarter of 2010.⁸

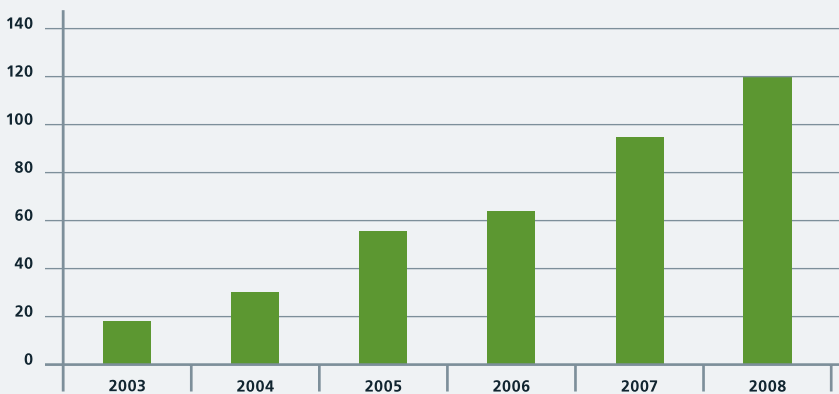
The LNG project is another landmark for Peru. It will make Peru home to the first LNG export facility in South America; and, at \$3.9 billion, it is the biggest foreign direct investment in Peru’s history. The Hunt Oil Company and SK Corporation of

Peru LNG could add as much as an average of 0.5% per year to Peru’s GDP from 2011 to 2028 and transform the country into a net hydrocarbons exporter.

the Camisea project joined with Spain’s Repsol YPF to form Peru LNG in 2003. Marubeni of Japan purchased a stake in Peru LNG in 2007.⁹ Construction of the operation, which includes a liquefaction plant, a pipeline to transport natural gas to the plant, and a marine loading terminal, was

begun in 2007. Like the Camisea project, the estimated economic gains to Peru are high. Peru LNG could add as much as an average of 0.5% per year to Peru’s GDP from 2011 to 2028 and transform the country into a net hydrocarbons exporter once again.¹⁰ But despite these promising predictions, the export project has also proved contentious. Some argue that Peru does not have enough natural gas reserves to supply the growing domestic market (including plans for several petrochemical

Natural Gas Consumption in Peru (billion cubic feet)



Source: US Energy Information Administration

⁸ *El Comercio*, “Repsol YPF se comprometió a no llevar el gas de Camisea a Chile,” May 19, 2010, <http://elcomercio.pe/impresa/notas/repsol-ypf-se-comprometio-no-llevar-gas-camisea-chile/20100519/480873>.

⁹ Hunt Oil Company (50%), SK Corporation (20%), Repsol YPF (20%), and Marubeni (10%). See Hunt Oil Company, “Operations Overview: South America,” <http://www.huntoil.com/>.

¹⁰ APOYO Consultoría, “Proyecto Camisea,” 72. This is in addition to the estimated economic gains from Camisea.

plants and a pipeline from Camisea to the south of Peru) and also to satisfy export commitments. President Alan García and Minister of Mines and Energy Pedro Sánchez have repeatedly affirmed that Peru's natural gas needs will be met.

Natural gas produces about 40 percent fewer carbon emissions than coal, and about 30 percent fewer emissions than oil. Because of its use of hydropower, Peru has long had low greenhouse gas emissions from energy. But the increased substitution of natural gas for higher-emitting fuels further reduces Peru's emissions. And, as the world seeks to transition to cleaner energy use, natural gas is emerging as an attractive option. This bodes well for Peru's LNG exports.

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But there are wrinkles. First, the global economic downturn—from which the world is only just starting to recover—reduced global demand for natural gas and resulted in a surplus. Although demand should rebound as the economy does, Peru LNG enters the market at a less than propitious time. Second, new drilling techniques have recently made natural gas reserves that were once costly and difficult to exploit, cost-effective and accessible, particularly in the United States. This unconventional gas is located in shale rock and extracted through a combination of horizontal drilling and hydraulic fracturing, known as “fracking,” a technique that uses a mixture of water, sand, and chemicals to shatter the shale and release the gas. Shale gas is actually cheaper to extract than most conventional gas, something that has put downward pressure on the outlook for natural gas prices. Natural gas was until recently thought to be in short supply in the United States and Canada, but with the addition of shale gas reserves some estimate these two countries have more than 100 years' worth.¹¹ Shale gas could be plentiful in other regions as well, but only drilling will tell.

Because shale gas is a very new phenomenon—commercialized only in the last several years—many questions remain, and it is not yet clear what all of these elements will mean for the long-term outlook of the global natural gas market or for Peru LNG. For now, Peru LNG has a 15-year contract to supply Mexico. With the remaining volumes, it may seek to target Asian markets.

¹¹ IHS Cambridge Energy Research Associates, *Fueling North American's Energy Future: The Unconventional Natural Gas Revolution and the Carbon Agenda Executive Summary* (Cambridge, MA: 2010), 3–4.

Environmental and Indigenous Issues

Peru is home to more than 60 different indigenous groups that together make up about 40 percent of the population. Many of these indigenous groups live in the Amazon regions. In addition to being rich in biodiversity and culture, the Amazon regions of Peru are rich in oil and gas. The success of Camisea, along with the hydrocarbon reforms and the efforts of President Alan García's administration to

promote investment, has significantly buoyed oil and gas activity in Peru. Many of these projects are in the Amazon. A recent study found that 41 percent of the Amazon was under concession for oil and gas exploration and development at the end of 2009. This is up from 7 percent in 2003.¹²

The success of Camisea, along with the hydrocarbon reforms and the efforts of President Alan García's administration to promote investment, has significantly buoyed oil and gas activity in Peru.

These figures bring into sharp relief the importance of balancing oil and gas activity with environmental and social protections. Peru has been strengthening its environmental and social regime since the 1990s, and the development of Camisea has become a kind of high-profile test case for Peru's environmental and social management. The Camisea fields fall partially within indigenous territory. A number of observers, including the Inter-American Development Bank, recognized the challenges posed by the project early on. Though providing a relatively small portion of the overall financing—\$75 million of the more than \$1 billion first phase—the IDB decided to play a big role.

Before they left the project, the Shell-Mobil consortium had carried out an environmental assessment and engaged in consultations and briefings with a broad range of stakeholders, including indigenous communities, nongovernmental organizations, and all levels of government. The IDB helped the new consortium take over this extensive process of engagement and planning and attached strict environmental and social requirements to its participation. The bank also worked to build the capacity of the Peruvian government to monitor the Camisea activities. A \$5 million loan from the IDB went to the Government of Peru to strengthen its ability to monitor and enforce environmental and social laws and regulations in the hydrocarbons sector.

¹² Matt Finer and Martí Orta-Martínez, "A Second Hydrocarbon Boom Threatens the Peruvian Amazon: Trends, Projections, and Policy Implications," *Environmental Research Letters* 5 (2010): 3–4.

As a result of these planning activities, two important decisions were made. To reduce the project's environmental impact, no roads would be built; boats and helicopters would be used to bring workers and materials to Camisea. In addition, contact with the indigenous populations would be restricted and stringent health policies enforced to avoid the spread of diseases to which the indigenous had no immunity (before Camisea, some of the indigenous groups had had little to no relations with the outside world).

These and many other measures reduced the impact of Camisea's development on the environment and indigenous communities. Yet, once operations began in 2004, some accidents occurred. Within the first two years of operation, the Camisea pipeline had five spills. This number of spills so early in the project called into question the structural integrity of the pipeline. A Peruvian congressional investigation determined the leaks were the result of rushed construction; an assessment by the IDB found that the unstable physical environment was largely the cause. An independent audit requested by the Government of Peru and performed by Germanischer Lloyd concluded that Transportadora de Gas del Perú (TGP), the pipeline operator, did not conduct thorough geological or social studies, an oversight that played a part in the spills. Peru fined TGP \$1 million for the spills. In addition, the consortium spent about \$50 million to fix the problems.

In 2008, under special power granted by Peru's Congress to facilitate the implementation of the trade agreement with the United States, President García issued a series of legislative decrees that gave the executive branch greater control over agriculture and forest management. These decrees, which were actually not necessary for compliance with the trade agreement, made it easier for investors to develop indigenous land in the Amazon. Contrary to Peru's

In 2008, President García issued a series of legislative decrees that gave the executive branch greater control over agriculture and forest management. These decrees, made it easier for investors to develop indigenous land in the Amazon. Contrary to Peru's policy, indigenous groups were not consulted about the changes and, in 2009, protests erupted, resulting in the deaths of 23 police officers and more than 30 civilians.

¹³ Robert Kozak and Matt Moffett, "Peru Struggles to Defuse Amazon Violence with 50 Dead," *Wall Street Journal*, June 8, 2009, <http://online.wsj.com/article/SB124442565236592983.html>.

policy, indigenous groups were not consulted about the changes and, in 2009, protests erupted, resulting in the deaths of 23 police officers and more than 30 civilians.¹³ In response, the Peruvian Congress repealed two of the decrees, and the government set up a process to formally consult with indigenous communities on the elaboration of new legislation on forest resource management.

RECOMMENDATIONS

Peru Should Ensure a Long-Term Commitment to a Market Friendly Investment Climate for Energy Development

To reduce risk to investors, Peru must demonstrate a long-term commitment to market friendly policies for energy development. Candidates for the 2011 presidential election should pledge to maintain a favorable investment climate. In addition, it is critical that presidential candidates commit to enforcing stringent environmental and social standards for energy development.

Peru Should Strive to Become a Model for Environmental and Social Management

Peru has vastly improved its environmental and social management in a short period of time, an achievement that should be recognized. Accidents happen and mistakes are made, but pipeline spills and violent protests are harsh reminders that bringing natural gas and other resources out of the Amazon is a delicate undertaking that requires constant vigilance and the continual engagement of all stakeholders. The recent increases in areas of the Amazon under exploration or development will further challenge Peru's ability to monitor and enforce environmental and social standards. Peru should use this as an opportunity to be more proactive and seek to become a model for the region in environmental and social management.

Peru Should Continue to Ensure Its Domestic Market Benefits from Natural Gas

The benefits of natural gas to the domestic economy are clear. Peru should continue to update its laws and regulations to encourage greater access to natural gas within Peru. In particular, as was highlighted in the Americas Society/Council of the Americas Energy Action Group meeting in Lima, using natural gas to provide

¹³ Robert Kozak and Matt Moffett, "Peru Struggles to Defuse Amazon Violence With 50 Dead," *Wall Street Journal*, June 8, 2009, <http://online.wsj.com/article/SB124442565236592983.html>.

electricity to people currently without access to modern energy services is critical. The Peruvian government should also continue to monitor reserves to ensure an appropriate balance between domestic consumption and exports.

Peru Should Seek to Further Regional Energy Cooperation as a Means to Strengthen Political and Economic Relations

Energy cooperation, if done right, can help meet the needs of the region by creating more efficient markets. In addition, collaboration on energy can be an entry point for closer political and economic ties between countries. Recognizing that there have been false starts and missteps in the past, Peru should nonetheless seek to further regional energy cooperation as a means to strengthen political and economic relations.

Peru Should Take Advantage of Its Location on the Pacific to Pursue Export Markets for LNG in Asia

To the extent that proven reserves of natural gas and domestic consumption needs allow for exports of LNG, and barring the possibility of supplying other Latin American countries, Peru should take advantage of its location on the Pacific coast to target Asian markets. Peru's links with Asia are growing. For example, China is Peru's second largest export market and trade relations between the two countries will continue to increase as a result of the Peru-China trade agreement that went into effect in March 2010. The opportunity for continued export-led growth, with energy as a strong contributing factor, should not be overlooked as a driver of long-term economic well-being in Peru.

CONCLUSION

Peru has made great strides toward a comprehensive approach to energy resource management. Remarkable changes in the oil and gas sector have resulted in the revival of the exploration and production industry. Maintaining market friendly policies and improving environmental and social management, as Peru is doing, will remain critical to long-term success.

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Americas Society/Council of the Americas is grateful to Chevron, Corporación Andina de Fomento, Edenor, Inter-American Development Bank, Semptra, and Shell for supporting the Energy Action Group.

The opinions expressed herein do not necessarily reflect the views of sponsoring companies and organizations.

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