

Appendix and Companion to
**Chapter 16—Hydrocarbon Sector Regulation and
Cross-border Trade in the Western Hemisphere¹**

Individual Country Summaries

UPSTREAM SECTOR

Argentina

The Ministry of Economy, Public Works and Services is responsible for the energy (hydrocarbons and electricity) sector. It is charged with establishing a national policy for development of Argentina's hydrocarbon reserves and has the principal purpose of satisfying domestic demand. Within this ministry, energy issues are dealt with by the Secretaría de Energía (SE), which is further divided into two under secretariats: one for electricity and one for hydrocarbons.² The National Regulatory Entity for Gas (Enargas) is the regulatory agency for the gas transmission and distribution sector.

The 1967 Hydrocarbons Law (HL) establishes the basic legal framework for the regulation of oil and gas exploration and production in Argentina. The regulatory framework of the HL was established on the assumption that hydrocarbon resources are state property and the state's rights would be exercised through 100 percent state-owned Yacimientos Petroliferos Fiscales Sociedad del Estado (YPF). For many years YPF's hydrocarbons production declined and the company was considered inefficient. Lack of capital investment resulted in declining hydrocarbon reserves.

As a result, Argentina removed the state from participation in the upstream hydrocarbons sector when it privatized YPF in 1992 pursuant to the privatization law. First, some of the company's assets were sold to the private sector for more than US\$2 billion.³ YPF was granted 24 exploration permits and 50 production concessions in four extremely productive regions. Marginal properties were returned to the state, which then granted concessions to private investors.⁴ An international public offering of the "core" YPF was made in 1993. This facilitated a takeover by Spanish Repsol and by 2000 Repsol owned 99 percent of Repsol-YPF's shares.

Since that time, the Secretaría de Energía (SE) has granted exploration permits and production concessions to any qualified public or private company, domestic or foreign, after submission of

¹ As published in *Energy Cooperation in the Western Hemisphere*, (ed. by Sidney Weintraub, with Annette Hester and Veronica Prado), Center for Strategic and International Studies, 2007.

² International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

³ International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

⁴ Tawil, Guido S. and Constanza Turner, "Relevant Aspects of the Gas and Oil Industries in Argentina," *The Bomchil Group Newsletter*, Volume 6, March, 1999. www.bomchilgroup.org/argmar99html.

competitive bids. Management separation between policymaking and commercial activities was achieved. A competitive fiscal regime for upstream sector participants was clearly defined.

Despite the introduction of competition into the upstream sector, Repsol-YPF dominates oil exploration and production and controls at least 60 percent of natural gas production and 80 percent of natural gas sales. There are several reasons for this dominance. When YPF was privatized it retained its best “core” assets. In addition, Argentine competition law, like that of European countries, puts the burden of proof on third parties to prove abuse of a dominant position.⁵

Argentina’s upstream oil and gas sector has suffered setbacks since 2000. Oil production has been declining since 1998 due to a lack of upstream investment. The investment decline is attributed to the Argentine recession and financial crisis in the early 2000s as well as the implementation of an export retention tax on oil and gas exports in 2002.

The decline in natural gas production from 2000 to 2002 illustrates the impact that policies in one segment of the natural gas value chain (downstream wholesale and retail pricing) can have on another segment (upstream exploration and production). In April 2004, gas producers and the SE signed an agreement to implement a scheme for the normalization of natural gas prices.

As a result of the 2004 shortages, the government continues to modify the organization and regulation of the upstream hydrocarbon with the purpose of increasing production. To fill the investment gap left by private companies, the government created the 65 percent state-owned company Enarsa which will control offshore exploration and production. In May 2005 the government submitted a bill to congress proposing fiscal incentives to encourage oil and gas production. However, these incentives are available only to companies that partner with Enarsa.

Bolivia

Prior to 1996, the 100 percent state-owned oil and gas company, Yacimientos Petrolíferos Fiscales Bolivianos (YPFB) exercised the state’s right to explore, develop and produce the country’s hydrocarbon resources. Hydrocarbons Law No. 1689 was enacted in 1996 requiring YPFB to withdraw from any productive activities and to become the state agency responsible for the negotiation and administration of exploration and production contracts with private investors, domestic and foreign. YPFB’s oil and gas reserve assets were “capitalized” in 1996 and 1997 into two mixed capital corporations, Empresa Petrolera Andina S.A. (Andina) and Empresa Petrolera Chaco S.A. (Chaco).⁶ Andina is owned 50 percent by Repsol-YPF, Perez Companac (now Petrobrás) and Pluspetrol and 50 percent by YPFB employees and private Bolivian pension funds. At the end of 2002, Andina owned about 25 percent of Bolivia’s hydrocarbon reserves.

⁵ International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

⁶ In a capitalization scheme (as differentiated from privatization), the government does not sell the state-owned company but sets up “mixed capital corporations” to which a 50 percent private partner contributes a 50 percent capital investment. The private capital investment is used in the corporation. The other 50 percent of the company is owned by YPFB employees and Bolivian pension funds. International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

Chaco is 50 percent owned by BP and Bridas Corp. and owned about 4 percent of Bolivia's hydrocarbon reserves at the end of 2002.

Today all upstream hydrocarbon activities are in the hands of private companies which have risk-sharing contracts negotiated with YPFB. The contractor has property rights to the hydrocarbons at the wellhead.

Clear management separation was achieved among oil and gas policymakers (Ministry of Hydrocarbons and Energy), the upstream regulator (YPFB) and commercial operators (foreign and domestic private and public entities). YPFB became the state agency responsible for the negotiation and administration of exploration and production contracts with commercial participants in the upstream sector. The fiscal regime was clearly defined for all participants. Consequently, as detailed in the Bolivia chapter, foreign direct investment (FDI) in the upstream hydrocarbon sector expanded greatly. Significant growth was achieved in crude oil production and proved oil reserves and exceptional growth was achieved in natural gas production and proved natural gas reserves.

Despite this impressive performance, however, the organization and regulation of Bolivia's hydrocarbon sector has been a subject of intense political controversy since 2001 as discussed in more detail in the Bolivia chapter. On July 18, 2004 a binding national referendum was held on issues relating to hydrocarbon sector policies. A new hydrocarbons law passed by the Bolivian Congress went into effect automatically on May 17, 2005 when then-President Carlos Mesa let a deadline pass for him to veto or modify the legislation. Under the new 2005 hydrocarbons law, YPFB is "re-founded, recovering the State's ownership of the shares in capitalized oil companies so that the state company may be able to participate in all the productive chain of hydrocarbons" even though YPFB has not participated in commercial activities since 1996 and its resources and expertise are doubtful.⁷ YPFB would continue negotiating and administering all contracts with private companies. All 76 existing risk-sharing contracts with YPFB would migrate within six months to one of three contract types established in the new law. The three contract categories are operation, association and shared-risk or joint venture contracts. The MHE and YPFB have been developing the contract models which must then be approved by the government's executive branch and likely also by congress.⁸ Property rights to the hydrocarbons at the wellhead would be returned to YPFB, which will control commercialization.

The fiscal regime for upstream participants was tightened considerably. Prior to 2005, risk-sharing contractors paid a royalty of 18 percent based on the value of production and an income tax rate of 25 percent. The new hydrocarbons law maintains the 18 percent royalty but increases the income tax rate to 32 percent while lowering deductions. Promoters say the new law would quadruple government income from the oil and gas sector from \$200 million/year to about \$780 million/year.

⁷ To fill YPFB's gap in expertise, the Bolivian hydrocarbons minister said he would "be counting on foreign support," which many observers take to mean advisors from PdVSA. Hal Weitzman, "The Americas: La Paz Intent on Reversing Unconstitutional Privatisation of Gas Sector," *Financial Times*, London, England, 5/3/06.

⁸ See www.slb.com July 22, 2005.

Most recently, politics continued to trump economics when on May 1, 2006 President Evo Morales issued a decree “nationalizing” the hydrocarbon sector and characterizing the policies of the 1990s as “treason.”⁹ Private participants in the sector have been given six months to comply with the “new conditions” or leave. Specifically the policy gave the 21 foreign oil companies operating in Bolivia 180 days to hand over to YPF responsibility for determining all aspects of production and commercialization of reserves, including output volumes and pricing. Operators of fields that produce more than 100 MMCF/D were to pay 82 percent of the value of production in taxes and royalties, retaining 18 percent.¹⁰ (Only two fields are affected, both operated by Petrobrás, but they account for 70 percent of Bolivia’s gas exports to Brazil).

With respect to the reestablishment of YPF in commercial activities, the state would buy enough shares to give it control of YPF upstream companies capitalized in 1996: Andina, controlled by Repsol-YPF; Chaco, partially owned by BP, and Transredes, a pipeline company controlled by Shell. A special government auditor would determine the value of any compensation.

The reasons for this renewed state intervention in the hydrocarbon sector are discussed more fully in the chapter on Bolivia. Generally speaking these reasons revolve around lack of public education on oil and gas issues as well as uneven distribution of hydrocarbon rents among federal, regional and municipal entities.¹¹ Given the fact that recent policies in Bolivia have reversed those which gave rise to increased hydrocarbon production and reserves in the 1990s, it is difficult to be optimistic about future oil and gas production levels and exports of natural gas.

The impact of Bolivia’s actions on neighboring countries, particularly Brazil, Argentina and Chile, are negative. All three rely in varying degrees on Bolivia gas exports. (Chile’s reliance is indirect. To the extent that Bolivia can supply gas-short Argentina, it is more likely that Argentina gas exports to Chile will continue). Petrobrás announced on May 3, 2006 that it was suspending all new investments in Bolivia, including expansion of the Gasbol pipeline. Similar to its quest for oil self-sufficiency over the past decade, Petrobrás can be expected to accelerate the development of its own gas reserves in Brazil by investing \$18 billion through 2015. Near term exports to Argentina are expected to continue but the longer-term implications of Bolivia’s actions are problematic for that country, especially in light of its own constrained domestic natural gas supply situation.

⁹ The Presidential Decree states that the contracts under which foreign investors are currently operating “expressly violate” the constitution as they were never individually approved by congress. It calls the capitalization process of 1996-1997 “an act of treason against the country that put into foreign hands control and direction of a strategic sector, damaging our sovereignty and national dignity.” Hal Weitzman, “The Americas: La Paz Intent on Reversing Unconstitutional Privatisation of Gas Sector,” *Financial Times*, London, England, 5/3/06.

¹⁰ This fiscal regime approaches that of the most resource-rich country in the hemisphere, Venezuela, even though Bolivia’s resource endowment is inferior. (This is author comment).

¹¹ As of 2002, the federal government’s share of hydrocarbon rents was 68 percent. To the extent that these rents are not equitably distributed, certain communities will not experience the benefits of hydrocarbon development, leading to hostile political attitudes toward the sector. World Bank Energy Sector Management Assistance Program, *Comparative Study on the Distribution of Oil Rents in Bolivia, Colombia, Ecuador and Peru*, Draft, Washington D.C., January 2005.

Brazil

By the mid-1990s chronic underinvestment in the hydrocarbon sector in Brazil led to fears of critical shortages. As a result, Brazil implemented significant reforms in the hydrocarbon sector, beginning with a constitutional amendment (No. 9) in 1995 that allowed private participation in the electricity and hydrocarbon sectors. Specifically, the Brazilian Congress authorized the Brazilian government to contract with any state or privately-owned company to carry out the activities related to the upstream and downstream segments of the Brazilian oil and gas sector. In 1997, a new petroleum law (Law 9478) was enacted and created the new regulatory agency for the oil and gas sector: Agencia Nacional do Petróleo-ANP. The ANP is an autonomous agency of the federal public administration and is linked to the Ministry of Mines and Energy (MME).¹² The ANP is responsible for overseeing the transition from a vertically-integrated, state-controlled hydrocarbons sector to a competitive sector capable of attracting private investment. In the non-competitive segments of the sector, the ANP is responsible for supervision, regulation and the protection of consumers.

Established in 1960, the MME is the federal government body responsible for the energy sector policy. Within the MME, the Secretariat of Energy deals with energy issues and consists of two departments: the National Department for Energy Policy and the National Department for Energy Development. In 1997 the Conselho Nacional de Política Energética (CNPE) was established. CNPE is headed by the Minister of Energy and Mines and reports to the President. The CNPE is expected to issue national energy policy directives which the MME would then refine and implement. However, it did not play a major role in the sector until the 2001 electricity crisis.¹³ It is responsible for selecting the exploration blocks to be auctioned by ANP. Brazil's main focus is attaining oil self-sufficiency.

The state's national oil company (NOC), Petrobrás, was permitted to retain all of its productive upstream assets and a considerable portion of its exploration acreage. However Petrobrás was not guaranteed a participation in future exploration and production concessions. Management separation was achieved among oil policymaking (energy ministry), regulation (ANP) and commercial operations (Petrobrás and other foreign and domestic public and private entities). The fiscal regime was clearly defined for all sector participants.

Since that time, \$15 billion has been invested in Brazil's hydrocarbons sector. Oil production increased 38 percent from 1997 to 2003 and gas production increased 67 percent.

Brazil is an interesting case because the increases in production and proved reserves did not come from the new private participants but from Petrobrás. The 1997 reforms did not make the upstream sector truly competitive; rather the threat of competition led to improvements in Petrobrás performance. One reason for this phenomenon is that Petrobrás was permitted to retain all of its upstream production assets and the right to continue to explore and develop those areas where significant investment had already taken place. Other reasons for Petrobrás' continued dominance of the upstream sector include:

¹² International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

¹³ International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

- Petrobrás has amassed an unparalleled data bank on the geology and geophysics of Brazil's sedimentary basins, as pointed out in the chapter by Georges D. Landau.¹⁴ This has allowed the company to bid successfully for the most promising exploration blocks and has incentivized private entities to partner with Petrobrás. Until very recent times, Petrobrás has been the only company to make commercially viable discoveries in Brazil suggesting that the ANP has not fulfilled its role of assuring market transparency, especially the availability of good quality, unbiased data and information.¹⁵ More recently the ANP's funding has been diverted to the general treasury impairing its ability to undertake geological and geophysical studies. As a result, the data asymmetry between Petrobrás and ANP could continue.
- The 1997 petroleum law does not restrict the vertical integration and cross-ownership of companies in the hydrocarbons sector thus allowing Petrobrás to have significant participation in all segments of the energy value chain. Petrobrás has preferential access to the Bolivia-to-Brazil (Gasbol) pipeline and owns virtually 100 percent of all national pipelines through Transpetro.¹⁶ This could deter third-party investments in the upstream sector, especially if the third-party access regime is not effectively implemented (see midstream section of Chapter 16).
- The Minister of Mines and Energy is the chairman of the board of Petrobrás and also supervises ANP. As a result, management separation between policymaking and regulation is blurred. There is an inherent conflict of interest when the same entity, the energy ministry, can influence the actions of the regulator (ANP) and the regulated (Petrobrás and other commercial entities). This could undermine the independence of ANP and impede its ability to keep an effective check on Petrobrás' market power.

Interestingly, the introduction of competition, however limited, into the Brazilian hydrocarbon sector as well as international expansion have led Petrobrás to become a stronger company operationally and financially. One of the main reasons for the hydrocarbon reforms of the mid-1990s was a concern that Petrobrás would not have the capital or expertise to meet Brazil's growing oil and gas demand. Since then Petrobrás has reorganized to become a more efficient competitor and is looking outside Brazil for growth opportunities. Merit and performance have guided manpower recruitment, placement and development: Petrobrás says that all but two of its top executives have made their career with the company.¹⁷ Although Petrobrás' capital budget must be approved by the Brazilian congress, thus far the fiscal and tax regimes have allowed Petrobrás to retain net cash flow sufficient to meet its oil self-sufficiency objectives over a reasonable time horizon. Non-commercial objectives (such as price subsidies) are disclosed. Financial results and proved reserves are audited by independent firms.

Aegis Energy Advisors, using data from 2000-2003, report that Petrobrás is already competitive with "super majors" like BP, ExxonMobil, Royal Dutch Shell; the "integrated majors" like

¹⁴ See Footnote 1.

¹⁵ As a result, participation in rounds four and five was disappointing to the ANP. The ANP appears to be addressing some of those concerns: there was strong participation in rounds six and seven. (Author comment).

¹⁶ International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

¹⁷ Samor, Geraldo, "Brazil's Petrobrás: Self-Reliant or Pliant?" *Wall Street Journal*, New York, New York, April 21, 2006.

Chevron Texaco, ConocoPhillips, Repsol-YPF and TotalFinaElf, and the other privatizing, integrated oil and gas companies, including Eni, Statoil, Petrocanada, Petrochina, Sinopec and CNOOC.¹⁸ Other companies in the region view Petrobrás as a model for their own transformation (Ecopetrol) or as a successful example of corporatization/commercialization (Pemex).

When the hydrocarbon reforms were made in 1997, the natural gas sector was not a focus of public policy. As a result, despite production increases, Brazil continues to be a net importer of gas. As mentioned in the Brazil chapter, the political uncertainty in Bolivia, rapidly increasing domestic gas demand, the Santos basin gas discoveries and their capital requirements, and Petrobrás control of the gas transportation and distribution networks make a specific regulatory framework for the gas sector imperative.

Going forward, there is some concern that President Lula da Silva will manipulate Petrobrás for political purposes and interfere in the company's management processes thereby losing the performance momentum it has gained since the reforms of 1997.¹⁹

Canada

Like the United States, commercial activities in the upstream hydrocarbon sector are carried out by private companies; the state does not participate in these activities. The Canadian government formed PetroCanada in 1975 in an effort to reduce the dominance of U.S. companies in Canada's oil industry.²⁰ Critics accused the company of inefficiently deploying its resources and interfering with the operations of private companies. In 1991, the Canadian government began to privatize the company and sold its remaining stake in 2004.

In Canada, federal, provincial, and territorial governments are all involved in upstream oil and gas sector policy and regulation. Oil and gas producing provinces impose and collect royalties and taxes and grant construction and operating permits and licenses. The federal government is responsible for interprovincial and international trade, and the conservation and management of oil and gas production on federal lands.²¹

The National Energy Board (NEB) regulates frontier lands and offshore areas that are not covered by provincial/federal management agreements. Responsibilities include the regulation of oil and gas exploration, development and production, enhancing worker safety, and protecting the environment.

¹⁸ Lewis, Steven W., "Critical Issues in Brazil's Energy Sector," Baker Institute for Public Policy, Rice University, Houston, Texas, March 2004.

¹⁹ Samor, Geraldo, "Brazil's Petrobrás: Self-Reliant or Pliant?" *Wall Street Journal*, New York, New York, April 21, 2006.

²⁰ Energy Information Administration, U.S. Department of Energy, "Canada Country Analysis Brief," April 2006.

²¹ North American Energy Working Group, *North America: The Energy Picture*, available at www2.nrcan.gc.ca.

Offshore regulation in Atlantic Canada comes under joint federal and provincial responsibility through the Canada-Nova Scotia Offshore Petroleum Board (C-NSOPB) in Nova Scotia, and the Canada-Newfoundland Offshore Petroleum Board (C-NOPB) in Newfoundland. These Boards issue licenses for offshore exploration, development, and production.²²

Canada's upstream oil and gas sector has performed well. Both oil and gas production have been increasing since 1985, although oil production has flattened in recent years. The development of Canada's oil sands, as discussed in the Canada chapter, is a testament to cooperation among private companies, provincial energy agencies and the federal government. Canada is expected to continue to be the principal oil and gas exporter to the United States.

Colombia

All hydrocarbon reserves in Colombia are state-owned. The Ministry of Energy and Mines (MEM) is responsible for the country's oil and gas policies. Historically, hydrocarbon exploration and production in Colombia was carried out in two ways: through 100 percent state-owned Ecopetrol and (2) through joint ventures between Ecopetrol and foreign private companies, with Ecopetrol participation ranging from 30-50 percent. The direct share of Ecopetrol in total oil production is around 17 percent but increases to about 50 percent after adding its share in joint ventures. Private investors control most natural gas production. Texas Petroleum Company, a Chevron subsidiary, produces more than 80 percent of the country's natural gas under an association contract with Ecopetrol through 2019. Despite the participation of private investors in the upstream sector, most of Colombia's 18 sedimentary basins remain unexplored.²³ Colombia's longstanding civil conflict and its associated safety and security issues have impeded upstream hydrocarbon sector development, although less so today than earlier.

Colombia's oil reserves and production have been declining since 2000, and this threatens the country's continued self-sufficiency in oil. Natural gas reserves and production have remained fairly flat over the same period. In response to this unsatisfactory performance of the upstream sector, the board of directors of Ecopetrol, in July 2000, improved the fiscal terms offered to third-party investors in the hope of attracting new investment. According to the World Bank, ESMAP, despite the execution of a record number of new joint venture agreements (64) in the 2000-2002 time period, no major success was achieved with the new investments. The bank estimates that investments of US\$310 million per year are required in exploration during the next 10 years in order to replace existing reserves.²⁴ Current levels of public and private investment in exploration are around US\$122 million per year.

In 2002 and 2003, Colombia, through new legislation, granted additional incentives in new contracts to achieve the necessary level of investment in exploration. The new incentives

²² North American Energy Working Group, *North America: The Energy Picture*, available at www.nrcan.gc.ca.

²³ Zamora Reyes, Armando, Director General, National Hydrocarbon Agency, "A New Era in the Colombian Oil and Gas Industry," Presentation in Houston, Texas, May 5, 2005.

²⁴ World Bank Energy Sector Management Assistance Program, *Comparative Study on the Distribution of Oil Rents in Bolivia, Colombia, Ecuador and Peru*, Draft, Washington D.C., January 2005.

included: (1) allowing private investors to own 100 percent of oil and gas exploration and production ventures; (2) establishing a lower, sliding-scale royalty rate on upstream projects, and (3) extending the exploration license term. Based on these changes, the ANH asserts that the fiscal terms of the Colombia exploration and production contracts are the best in Latin America.²⁵

On January 1, 2004, a new agency, the Agencia Nacional de Hidrocarburos (ANH), began operations with its main function being “the integrated management of hydrocarbon reserves owned by the nation”.²⁶ ANH is responsible for issuing licenses to private and public companies for oil and gas exploration, development, and production. The licensing process is one of direct negotiation on a “first come first served” basis with the ANH. It is also responsible for acquisition of geological information in frontier areas, selecting acreage to be offered to investors, and maintaining and providing data on Colombia’s hydrocarbon resources. ANH reports to the MEM. As in Brazil, the minister of Mines and Energy sits on the board of directors of Ecopetrol (the regulated) and oversees the operation of ANH (the regulator). This is a conflict of interest that could undermine the independence of the ANH and its ability to keep an effective check on Ecopetrol’s market power.

The role of Ecopetrol is evolving in Colombia. With the creation of the ANH, Ecopetrol was removed from licensing, monitoring and otherwise administering agreements with private investors and clear separation was established between hydrocarbon policymaking and commercial operations.²⁷ Ecopetrol has a single role as commercial entrepreneur and operator, just like any other integrated oil and gas company. The company retained its staff, assets, rights to production and existing joint venture agreements. As in Brazil, Ecopetrol will now compete with other companies to subscribe to new exploration and production contracts awarded by ANH, or will partner with other companies for these contracts. Investors can partner with Ecopetrol for its skills and local knowledge, but are no longer required to do so. Ecopetrol’s goal is to be the preferred business partner of international oil companies in Colombia, leveraging its knowledge of local basins, its operational expertise, and its assets and infrastructure.²⁸

Colombia has explicitly stated that it is following the Brazilian hydrocarbon sector model and hopes that competition and international expansion will result in operational and financial improvements in Ecopetrol’s commercial performance as it did with Petrobrás. Ecopetrol is neither increasing reserves nor production and its finding and development costs are quite high, raising serious issues of sustainability. Operating cash flow has not been sufficient to cover capital expenditures when the company contributes 45 percent of all public funds spent in

²⁵ Zamora Reyes, Armando, Director General, National Hydrocarbon Agency, “A New Era in the Colombian Oil and Gas Industry,” Presentation at Baker Institute for Public Policy, Rice University, Houston, Texas, May 5, 2005.

²⁶ World Bank Energy Sector Management Assistance Program, *Comparative Study on the Distribution of Oil Rents in Bolivia, Colombia, Ecuador and Peru*, Draft, Washington D.C., January 2005.

²⁷ Both the ANP and ANH report to their respective energy ministries. (Author comment).

²⁸ Embassy of Colombia Washington D.C. Briefing Paper, “Colombia’s Energy Industry: Recent Developments and Opportunities,” www.coltrade.org/Energy.pdf

Colombia on education, health, services, economic development, institutional strengthening, environmental management, and recreation and culture.²⁹

Ecopetrol is also responsible for the collection and distribution of oil rents, a non-commercial function that may be better managed by an independent agency. However, the company is undergoing significant reorganization. Non-commercial objectives, such as price subsidies, are publicly disclosed and are being phased out. The company's financial position is audited. It is beginning to look outside of Colombia for growth opportunities, stating that it wishes to pursue joint ventures in South America and the Gulf of Mexico with first-rate global, regional and niche players.

Finally, the government boosted its security efforts in order to attract new investment and the security situation has improved dramatically according to the EIA. Kidnappings in the country fell by 60 percent in 2004 and attacks against hydrocarbon infrastructure declined.³⁰

The international investor community has reacted positively to these reforms and the country is beginning to see a reactivation of exploratory activity. From 2004 through July 2005, the ANH has executed a record 58 exploration and production agreements with private investors and has approved six others.³¹ Onshore, the Llanos and Magdalena basins are thought to have great oil potential. There is renewed interest in Colombia's offshore oil potential. In 2005, BHP Billiton signed an agreement to explore offshore the country's Caribbean coast. ANH is began seismic studies of blocks offshore its Pacific coast.

On the gas side, 2004 saw the return of Exxon Mobil to exploring in Colombia after 11 years of absence when it joined a consortium including Petrobrás and Ecopetrol to explore for natural gas in the offshore Caribbean.³²

Ecuador

The executive branch, headed by the president of Ecuador, is in charge of the regulation and formulation of hydrocarbon policies. The Ministry of Energy and Mining (MEM) submits national hydrocarbons policies for the consideration and approval of the president. An internal unit of the MEM, the National Hydrocarbons Office (DNH), is in charge of controlling and monitoring hydrocarbon operations and compliance with regulations concerning the quality, quantity, reliability and safety of the hydrocarbon activities. Another internal unit of the MEM, the National Environmental Protection Office (DINAPA), approves environmental impact studies and management plans. The Ministry of the Environment also has some jurisdiction over

²⁹ Ecopetrol, 2003 Company Annual Report, www.ecopetrol.com.co.

³⁰ Energy Information Administration, U.S. Department of Energy, "Colombia Country Analysis Brief", June 2006.

³¹ See www.anh.gov.co.

³² Energy Information Administration, U.S. Department of Energy, "Colombia Country Analysis Brief," June 2006.

hydrocarbon activities.³³ Management separation of the hydrocarbon sector policy function and regulatory function has not been achieved; both functions are subsumed in the MEM.

Private participants are allowed in Ecuador's upstream sector. The awarding of exploration and production contracts must be made through a special bidding system. A Special Bidding Committee (CEL) carries out this process and is composed of the MEM (Chairman); Minister of National Defense; Minister of Economy and Finance; General State Controller, and the Executive President of Petroecuador. Petroecuador is guaranteed a participation in all upstream exploration and production activities and this can never be below the state's royalty percentage.

Oil activity is carried out predominantly by 100 percent state-owned Petroecuador, which controls the bulk of the country's hydrocarbon reserves and accounts for about 38 percent of oil production.³⁴ Many different government entities are involved in establishing and approving Petroecuador's policies, plans and budgets. The board of directors is chaired by the Minister of Energy and Mining and other members include one delegate of the President of the Republic, the Minister of Economy and Finance, the Minister of Foreign Trade, the Head of the Joint Command of the Armed Forces, the Secretary General of Planning of CONADE,³⁵ and one representative of the workers.³⁶ The executive president of the company is appointed by the board of directors selected from a threesome proposed by the Minister of Energy and Mining. The functions of policymaking, regulation, and commercial operations in Ecuador's hydrocarbon sector are overlapping and there is no clear management separation. The multiplicity of entities and interests involved in the governance of Petroecuador and the hydrocarbon sector could impair the establishment of clear goals as well as performance accountability.

Despite its dysfunctional upstream organization and regulation, crude oil production in Ecuador has risen considerably in recent years, although 2005 production was mostly flat compared to 2004.³⁷ Proved oil reserves have increased 46 percent since 1994, although they have not grown in recent years. Unlike Brazil, where the oil and gas production and proved reserve increases over a similar time period have come from its NOC, Petrobrás, Ecuador's production and reserve increases have come from the operations of the private participants in the sector, largely foreign, as opposed to those of Petroecuador. While Ecuador's crude oil production increased 31 percent from 2001 to 2005, Petroecuador's share of oil production fell from 56 percent to 38 percent.³⁸

³³ Lamanna, Dario Gerardo, "Legal Regime for Hydrocarbons Operations in Ecuador," *Oil, Gas, Energy Law (OGEL)*, Volume 2, Issue 1, February 2004.

³⁴ Ecuador has relatively small proven natural gas reserves and production; support infrastructure for natural gas and domestic consumption is negligible. (Author comment).

³⁵ Chaired by Ecuador's Vice President, the eleven-member CONADE is responsible for the state's general economic and social policies. (Author comment).

³⁶ Lamanna, Dario Gerardo, "Legal Regime for Hydrocarbons Operations in Ecuador," *Oil, Gas, Energy Law (OGEL)*, Volume 2, Issue 1, February 2004.

³⁷ Energy Information Administration, U.S. Department of Energy, "Ecuador Country Analysis Brief", March 2006.

³⁸ Energy Information Administration, U.S. Department of Energy, "Ecuador Country Analysis Brief", March 2006.

Petroecuador's upstream investments decreased from an average of \$150 million per year in the first half of the 1990s to less than \$90 million per year during the last five years.³⁹

Unlike Petrobrás, Petroecuador has not been incentivized to improve its performance. Petroecuador is guaranteed a participation in all upstream investments. The company participates in the awarding and administration of licenses and contracts with private companies as opposed to having that function reside in a regulatory body like the ANP in Brazil. Reforms proposed to dilute Petroecuador's participation in the hydrocarbons sector have met strong political opposition.

Petroecuador is also charged with public policy/ non-commercial functions, such as the provision of domestic price subsidies and collecting and distributing oil rents. In Ecuador, oil rents are collected by Petroecuador and the Central Bank, and are distributed to the General Treasury, the National Defense Council and the Petroleum Fund (FEP). The General Treasury allocates collected revenues to other participants according to law. Currently about 81 percent of the distributed oil rents go to federal government agencies and two percent to the provinces.⁴⁰

In a January, 2005 study the World Bank ESMAP commented that oil rent flows in Ecuador are less transparent than those in some other Andean countries and that the management of resources from the oil industry is subject to "faulty administration." For example, Petroecuador collects the oil rents from private companies, merges them with its own oil production, and further obscures the accounting picture by integrating them with the subsidies it provides for domestic prices. This study goes on to say that the collection and allocation of oil resources in Ecuador is essentially a political process in which federal agencies compete for funding with multiple earmarking frequently employed. As a result, communities in producing provinces see little direct benefit from the hydrocarbon activities carried out in their provinces. Inequities in oil rent distribution appear to be at least one cause of recent violence against the oil sector in Ecuador as protestors from the producing provinces are asking for a greater share of the oil rents and for changes in the processes of their collection and distribution.⁴¹

The importance of private, primarily foreign, participants in the hydrocarbon sector in Ecuador has increased over time as Petroecuador's production declines. The largest private investor in Ecuador is Occidental Petroleum representing 14 percent of total oil production in the first half of 2005. Other important foreign oil producers include Repsol-YPF and Agip. In September 2005, EnCana, a large Canadian oil company, sold its Ecuadorian production and pipeline assets to a consortium headed by the Chinese National Petroleum Corporation. According to the World Bank,⁴² foreign companies in 2005 were delaying new investments due to:

³⁹ World Bank Energy Sector Management Assistance Program, *Comparative Study on the Distribution of Oil Rents in Bolivia, Colombia, Ecuador and Peru*, Draft, Washington D.C., January 2005.

⁴⁰ World Bank Energy Sector Management Assistance Program, *Comparative Study on the Distribution of Oil Rents in Bolivia, Colombia, Ecuador and Peru*, Draft, Washington D.C., January 2005.

⁴¹ www.latinpetroleum.com, "Amazon protest leaders start talks in Ecuador," August 22, 2005.

⁴² World Bank Energy Sector Management Assistance Program, *Comparative Study on the Distribution of Oil Rents in Bolivia, Colombia, Ecuador and Peru*, Draft, Washington D.C., January 2005.

- Uncertainty about the “rules of the game” as the Ecuadorian congress debated a new access framework;
- Controversy over the refunding of the value added tax;
- Base production levels set by the state;
- The obligation to assume the large environmental liabilities of Petroecuador, and
- Conflicts with indigenous communities.

The environment for foreign oil investors worsened when the government announced in September 2005 that it would renegotiate all contracts with foreign oil producers. President Alfred Palacio stated that he wants the state’s share of production in private projects to increase to 50 percent from the current 13 percent to 19 percent minimums. Negotiations with the private producers are ongoing.

The outlook for oil production in Ecuador going forward is not optimistic given the sector’s current organization and regulation. Private investments are being delayed as the state strives to increase its participation in the sector and clashes with investors over rebates of the value added taxes paid by oil exporters. Significant opposition to oil development by indigenous groups has obstructed upstream activities in eastern Ecuador. Production has been stopped several times over the past year as a result of protests and attacks on the oil infrastructure stemming from oil rent collection and distribution inequities. This is not good news for Ecuador’s Western Hemisphere trading partners: the United States (50 percent of Ecuador’s oil exports) and other Latin American countries (25 percent of Ecuador’s oil exports).

Mexico

The Mexican state owns all hydrocarbon reserves and Pemex is the only entity permitted to engage in oil and gas exploration and production in Mexico. The Secretaría de Energía (SENER) is responsible for Mexico’s energy policies. Appointed by the president of Mexico, the SENER minister is also the chairman of the board of Pemex; as a result, there is not a clear separation between policymaking (SENER) and upstream commercial operations (Pemex).

With respect to the corporate governance of Pemex, leadership at the top is uncertain and authority is diffuse. According to a 2006 report by Baker & Associates, the executive powers of the director general of Pemex are limited and second level executives may be appointed and dismissed by the Mexican President, “creating the potential for conflicts of priority, loyalty and personality in the senior management team.”⁴³ Many members of Pemex’s board of directors lack hydrocarbon industry technical and commercial expertise: six members come from different government ministries and five members come from the oil union.⁴⁴

⁴³ Baker & Associates, “*Oil and Gas Policies in Mexico*,” Report No. 10015, Houston, Texas, May 1, 2006.

⁴⁴ Baker & Associates, “*Oil and Gas Policies in Mexico*,” Report No. 10015, Houston, Texas, May 1, 2006.

Multiple government entities have an impact on Pemex. The company's annual budget and capital investment program must be approved by the Mexican congress. Specific project financings must be approved by the Finance Ministry, or Hacienda. The Economy Ministry administers domestic oil and gas prices. There is no independent agency like ANP in Brazil or ANH in Colombia that is responsible for oversight over the exploration and production of the country's hydrocarbon resources.

Competition for scarce budget funds has and could continue to limit the company's ability to make the necessary level of capital investments in the upstream sector. In addition, Pemex pays approximately 67 percent of its oil and gas sales revenues as taxes which represents about 35 percent of the government's revenues. This level of government revenue reliance on taxes paid by its NOC is second only to Venezuela in the Western Hemisphere. Pemex has had to turn to the debt markets for capital resulting in an extremely high debt/debt+equity ratio: 87 percent in 2003 compared to 50 percent for Petrobrás. This high debt level could impair Pemex's access to additional capital, further exacerbating the production and reserve replacement problems discussed below.

As a result of this onerous tax burden, coupled with the prohibition of private investment, it is not surprising that Pemex's oil reserves have been steadily declining since 1998 and that oil production has been declining since 2003. Similarly, natural gas reserves declined almost 50 percent between 1998 and 2002, although they have remained relatively flat since 2002. On the other hand, gas production has increased each year since 2002, possibly as a result of the Multiple Services Contracts (MSC) scheme. However, the gas production increases have been insufficient to meet growing domestic demand and the country is a growing net gas importer.

In recognition of the problems in its upstream reserve and production performance, Pemex announced on December 2001 that a scheme of Multiple Services Contracts designed to attract private companies to develop non-associated natural gas fields pursuant to a contractual arrangement with Pemex. Under a competitive bidding process, contractors perform work for Pemex at their expense and are paid a cash fee based on the prices for the work performed and services rendered. Examples of work performed by contractors include seismic reservoir characterization, implementation of new well logging technologies, seismic processing and interpretation, geological modeling, production and drilling engineering, and facility design and construction. Pemex retains the rights to all extracted hydrocarbons.

The MSC scheme was implemented for two reasons: (1) To relieve a heavily debt-laden Pemex from the initial investment burden, and (2) To increase natural gas production in order to reduce imports from the United States. Investor interest in the MSCs has been muted and it is generally expected that the production from the awarded blocks will not eliminate Mexico's need to import natural gas.

The Mexican Congress, in the fall of 2005, approved a proposal to reduce, albeit modestly, the tax burden on Pemex. The approximately \$2 billion in tax savings represents 20-25 percent of Pemex's annual capital budget. Modifications proposed by President Fox to ease the impact on state and municipal governments were largely accepted. It was a positive step, but does not resolve Pemex's capital dilemma.

Improved performance in Mexico's upstream sector will require a restructuring of the sector's organization and fiscal burden.⁴⁵ As currently organized and regulated, sustainable growth in Mexico's hydrocarbon sector is extremely difficult to achieve, placing its economic growth and energy security at risk.

Peru

Peru's hydrocarbon policies have focused on attracting and increasing private investment in oil exploration and production; the development of the Camisea natural gas project, including pipelines, distribution and LNG, and encouraging greater investment in gas-fired power plants to reduce reliance on hydropower.

The Ministry of Energy and Mines (MEM) is responsible for hydrocarbon sector policies. Through its Hydrocarbons Office (DGH), the MEM is responsible for sector regulation and licensing.

Prior to 1991, the government granted to 100 percent state-owned Petroperu the ownership rights to extracted hydrocarbons. Petroperu was responsible for negotiating and entering into contracts with third parties. In 1993 Petroperu was removed from participating in the upstream hydrocarbons sector. The government granted to 100 percent state-owned Perupetro the ownership rights to extracted hydrocarbons so that it could enter into contracts with private investors for hydrocarbon exploration and production. As in Argentina and Bolivia, the state removed itself from participation in upstream hydrocarbon productive activities and transferred that function to private entities via contracts negotiated and administered by Perupetro. Under the 1993 hydrocarbons law, Perupetro's rights to extracted hydrocarbons are transferred to the private entities via contracts and licenses. Contracts with Perupetro can be obtained through direct negotiation or through a call for bids. Contracts and any subsequent amendments must be approved by the MEM and the Minister of Economy and Finance.

Perupetro S.A. is an administrative agency to negotiate, execute and oversee upstream exploration and production contracts and technical evaluation agreements. It represents the state in dealings with upstream investors. Perupetro is a financially and administratively independent entity under the supervision of MEM and Peru's comptroller general.

Under the 1993 hydrocarbons law, the private entity obtains a license that authorizes it to explore and extract hydrocarbons in the area stipulated in the contract for a specified period of time. All extracted hydrocarbons become the property of the contractor in exchange for royalties and income taxes paid to the state.

Contractors can market the hydrocarbons domestically or export them tax-free. The previous requirement to sell the hydrocarbons to Petroperu in order to supply the domestic market was abolished in the 1993 law and is only enforceable in the event of a national emergency.

⁴⁵ See chapter on Mexico by Dr. Sidney Weintraub, Footnote 1.

Also in 1993 the Supervisory Body for Investment in Energy (OSINERG) was created to “oversee the legal and technical aspects of the hydrocarbon activities.”⁴⁶ OSINERG is also involved in dispute resolution and price regulation.

The largest oil producer in Peru is Argentina-based Pluspetrol, which controls over 50 percent of total crude oil production in the country. Other major producers include Occidental Petroleum, Petrobrás and Petro-Tech Peruana. An international consortium led by Hunt Oil has developed the upstream portion of the large Camisea natural gas project.⁴⁷

Management separation was achieved between policymaking and commercial operations: the former is the purview of the Ministry of Energy and Mines (MEM) and its regulatory and licensing arm, the Hydrocarbons Office (DGH); and the latter is the purview of private participants. A fiscal regime for all upstream participants was clearly defined.

Under this framework, foreign companies invested close to \$900 million in exploration and \$1 billion in development in Peru’s upstream sector.⁴⁸ By 2003 there had been no major oil discoveries in Peru in spite of these expenditures.⁴⁹ Proved oil reserves have not grown and oil production actually declined 31 percent from 1993 to 2003 and Peru became a net oil importer in 2002. With respect to natural gas, Camisea, discovered in 1984, remained the only significant gas discovery. The delay in Camisea’s development resulted in fairly flat gas production until 2004. However, the government succeeded in awarding the contracts for the upstream development of Camisea in 1998-1999 to an international consortium led by Hunt Oil. In 1999, a Gas Industry Promotion Law was enacted that addressed midstream and downstream issues in the gas sector that were delaying Camisea development. The first full month of Camisea production was September 2004. Peru is currently self-sufficient in gas and has the potential to become an exporter to North America through development of LNG projects.

The lack of exploratory success in Peru resulted in a decline in exploration investments from a high of \$228 million in 1998 to \$12 million in 2003.⁵⁰ In order to compensate for the geological risk, Peru introduced a new royalty regime in 2003 that is sensitive to production or project profitability depending on the choice of the investor. The minimum applicable royalty has been lowered from 13.8 percent to 5 percent. Compared to the previous royalty regime, it is also more transparent and results in speedier negotiations.⁵¹ In addition, the time frames for exploration and production activities have been extended.

⁴⁶ Law No. 26221, *Peru Organic Law for Hydrocarbons*, www.perupetro.com.pe/Library.

⁴⁷ The consortium includes Hunt Oil-40 percent; Pluspetrol-40 percent and SK Corporation (South Korea)-20 percent. (Author comment).

⁴⁸ World Bank Energy Sector Management Assistance Program, *Comparative Study on the Distribution of Oil Rents in Bolivia, Colombia, Ecuador and Peru*, Draft, Washington D.C., January 2005.

⁴⁹ See chapter on Peru by Carol Wise, Footnote 1.

⁵⁰ World Bank Energy Sector Management Assistance Program, *Comparative Study on the Distribution of Oil Rents in Bolivia, Colombia, Ecuador and Peru*, Draft, Washington D.C., January 2005.

⁵¹ Quiroz, Carlos Velasquez, “Will the New Peruvian Royalty Regime Foster New Investment in Petroleum Exploration?,” *Oil, Gas, Energy Law (OGEL)*, Volume 2, Issue 3, July 2004.

There has been a noticeable increase in investor interest following these changes. New exploration contracts under the revised fiscal regime were signed with Harken Energy, Burlington Resources, Nuevo Energy and a partnership between Repsol-YPF and Burlington Resources. In 2004, Occidental Petroleum announced a 100 million barrels discovery in the Amazon basin.⁵² In June, 2005, Petro-Tech Peruana announced what the company said was the biggest crude oil discovery in Peru in the last 30 years off the northern coast of Peru. Petro-Tech Peruana's San Pedro discovery could be as large as 400 million barrels. Finally BPZ Energy made a gas discovery in the Corvina field offshore that was estimated to be as large as 4 TCF.⁵³

Trinidad and Tobago (TT)

Despite the dependence of the TT economy on the natural gas sector, TT has kept state participation in the sector through Petrotrin to minority, non-operating interests in the upstream sector. A relatively favorable fiscal regime, coupled with the ability of private entities to own mineral rights, has attracted significant foreign direct investment (FDI). During the period 1995-2003, more than \$6 billion in FDI flowed into the natural gas sector. As a result, natural gas production more than quadrupled over the period 1990 to 2003 and proved gas reserves more than doubled.⁵⁴ TT's natural gas strategy has made it the most industrialized country in the Caribbean.⁵⁵

The performance of the upstream oil sector presents a contrast to that of the upstream natural gas sector. TT's NOC, Petrotrin, continues to control about 50 percent of the country's oil production. Oil production declined 10 percent over the period 1990 to 2003 despite a modest increase in proven oil reserves. The oil sector's largest private investor, BP Trinidad and Tobago (BPTT), has begun to slightly scale-back its involvement in the sector.⁵⁶ However, a significant oil discovery in the Angostura field by a BHP Billiton-led consortium may reverse this downward production trend in the future.

TT revised its fiscal regime for the upstream natural gas sector to increase the fiscal contribution from gas resources. Requirements to increase "local content," such as local fabrication of drilling platforms, were adopted. Limitations were set on the use of foreign technical expertise even though alternative expertise may not be available locally.

⁵² Energy Information Administration, U.S. Department of Energy, "Peru Country Analysis Brief", May 2006.

⁵³ Presentation by Perupetro officials to potential investors at the Petroleum Club, Houston, Texas, May 2006. www.perupetro.com.pe.

⁵⁴ BP, *Statistical Review of World Energy* 2006. www.bp.com.

⁵⁵ See chapter by As Anthony Bryan, Footnote 1.

⁵⁶ Energy Information Administration, U.S. Department of Energy, "Caribbean Fact Sheet", July 2005.

United States

In the United States, hydrocarbon resources are owned by private land and mineral rights owner, with the exception of federal lands. Exploration and production operations are carried out by private companies pursuant to terms negotiated with the resource owners. States can regulate oil and gas production rates. Only as steward for federal lands does the federal government become involved in contract negotiations with exploration and production companies.⁵⁷

On federal lands, the Department of the Interior's (DOI) Minerals Management Service (MMS) holds public offshore lease sales while the DOI's Bureau of Land Management (BLM) administers onshore leasing. Revenues payable to the federal government from federal lands offshore and onshore exploration and production activities are managed by the MMS.⁵⁸

U.S. federal and state governments set environmental performance standards regarding onshore and offshore oil and gas operations. There are federal statutes governing air emissions, discharges to surface water, and solid waste disposal (hazardous and non-hazardous) solid wastes. Although the Environmental Protection Agency (EPA) is involved in the management of these statutes at the federal level, policy enforcement is generally the responsibility of the states. States must develop regulatory programs that meet or exceed the minimum requirements under the federal statutes. Due to variation in environment, geology and production economics, there is considerable variation among state programs.⁵⁹

The U.S. upstream sector has generally performed well. Although oil production has been declining, this is due more to the relative maturity of oil development in the country than to sector organization and regulation. Gas production has been challenged in recent years although the EIA expects it to continue to grow in the near term. This growth is fueled by development of the deepwater Gulf of Mexico, which has been an upstream success story, and emerging unconventional gas plays in the Lower 48 states.

Venezuela

With the nationalization of the Venezuelan oil industry in 1975, the rights to all hydrocarbons were reserved to the state. The Ministry of Energy and Mines, now known as the Ministry of Energy and Petroleum (MEP), was given responsibility for oil policy. The 100-percent state-owned company, Petroleos de Venezuela, S.A. (PdVSA), was established to develop the hydrocarbon resources on the state's behalf.

Under the Chávez administration, which took power in 1999 the laws governing the hydrocarbons sector were amended. In September 1999 the Organic Law of Gaseous Hydrocarbons (Gas Law) became effective and was followed by the enactment of the Organic

⁵⁷ North American Energy Working Group, *North America: The Energy Picture*, available at www.eia.doe.gov.

⁵⁸ North American Energy Working Group, *North America: The Energy Picture*, available at www.eia.doe.gov.

⁵⁹ North American Energy Working Group, *North America: The Energy Picture*, available at www.eia.doe.gov.

Hydrocarbons Law (Oil Law) in 2001. With the enactment of these laws, there are now two distinct Venezuelan hydrocarbon regimes: the petroleum regime (liquid hydrocarbons and associated natural gas) will remain dominated by PdVSA and reserved to the state; the non-associated gas regime, including both upstream and downstream sectors, will be open to 100 percent participation by private investors.

Table 1. *Apertura Petrolera*: Chávez Framework

| Fiscal Terms | Conventional Oil & Gas | Heavy Oil & LNG | Petroleum* | Natural Gas** |
|------------------------------|--|--|-------------------|----------------------|
| <i>Royalty Rates:</i> | | | | |
| • Conventional Oil | 1-16.67% | | 30% | |
| • Heavy Oil | | 1% | 20% | |
| • Bitumen | | | 16.67% | |
| • Natural Gas | | | | 20% |
| Income Tax Rate | 67.7% | 30% | 50% | 30% |
| Private Ownership | Could obtain controlling equity interest | Could obtain controlling equity interest | Up to 49% | Up to 100% |
| Required State Participation | PdVSA operational control/veto | PdVSA operational control/veto | 51% | None |

* Includes associated gas. ** Non-associated gas. *Source: CEE-UT, Case Studies.*⁶⁰

Interestingly, Venezuela's non-associated gas law is much more favorable to private domestic and foreign investment. The royalties are lower and state participation in non-associated gas projects is not required. There are two reasons for this seeming paradox. First, Chávez wants to jump-start the development of Venezuela's natural gas reserves in order to decrease its dependence on oil revenues, substitute for oil in the domestic economy, provide gas lift necessary for oil production, and establish downstream industries linked to the natural gas sector. Foreign investment will be necessary to achieve these goals. Second, there are no OPEC quotas or other producer production coordination mechanisms in the natural gas industry as yet.

The MEP is responsible for licensing of upstream operations as well as contract negotiations with private investors. It also regulates the sales price of oil and gas, establishes transmission and distribution tariffs, and settles conflicts relating to the open access transportation regime. The gas law also established a new regulatory entity, the Ente Nacional de Gas (Enagas). The purpose of the Enagas is to promote the development and coordination of the gas sector, especially midstream and downstream activities. Its functions are largely of an advisory and watchdog nature.

⁶⁰ Center for Energy Economics, BEG/JSG/UT-Austin, "From *Apertura Petrolera* to *Apertura Gas Natural*? The Case of Venezuela," Case Studies, *New Era for Oil, Gas & Power Creation*. Available at http://www.beg.utexas.edu/energyecon/publications.php#case_studies.

Management separation between the policymaking, regulatory and commercial operations in the hydrocarbon sector is blurred in Venezuela. The energy minister is the chairman of the board of the commercial operation, PdVSA, and the energy ministry also supervises Enagas and actually performs regulatory functions such as tariff setting for transportation and distribution.

Licenses must be obtained from the MEP for any upstream activities in Venezuela through public bidding or direct award when considered to be in the public interest. Licenses are for a maximum period of 35 years, extendable for another 30 years. Provision is made for arbitration, including international arbitration, as a means for dispute settlement but the outcome of the arbitration will only be binding if the parties so agree. Otherwise the venue of last resort is the Venezuelan courts.

A maximum period of five years will be granted for the exploration phase; the minimum development period is established on a case-by-case basis.

Oil and Associated Natural Gas

The state, through PdVSA, will have a minimum 51 percent participation in any new upstream contracts with private investors. PdVSA will have operational control over contract activities. Private investors operating under “apertura petrolera” contracts executed in the 1990s must migrate to new contracts which are governed by the provisions, including the fiscal regime, of the new law.

There are 32 “apertura petrolera” oil field operating agreements in Venezuela currently. The government began to tighten the fiscal regime for these agreements when it raised the royalty rate in the fall of 2004 for the heavy oil upgraders. In April 2005 the energy ministry announced that all foreign operators had to convert their operating service agreements (OSAs) to new joint venture agreements by the end of the year. Almost all companies, not including ExxonMobil, agreed to move to the new joint venture structure by year end. ExxonMobil subsequently sold its stake in one field to partner Repsol YPF. In the spring of 2006, PdVSA took control of two fields operated by ENI and Total after the two companies refused to turn operations over to a PdVSA-controlled joint venture. In March 2006, the energy ministry said that royalties for the companies that form new joint ventures with PdVSA would be raised to 33 percent from 30 percent. Venezuela also began a campaign to collect “unpaid back taxes” from foreign operators.

Given current high oil prices and the “size of the prize” in Venezuela, many companies continue to make money in the country despite these changes and plan to remain investors in the country. However, if oil prices sustain a prolonged drop, as they did in the 1980s and 1990s, negotiating leverage will return to the private investors.

Non-Associated Natural Gas

As noted above, exploration and production of non-associated natural gas reserves is open to 100-percent participation by private investors, domestic and foreign, and the fiscal regime for natural gas is more favorable than that for oil. The MEP has granted seven onshore gas licenses and three offshore gas licenses pursuant to the new gas law representing new investment

commitments of close to US\$5 billion.⁶¹ PdVSA has a right to back in for a 35 percent interest if there are commercial discoveries in the offshore areas.

MIDSTREAM

Argentina

The Secretaría de Energia (SE) awards 35-year concessions for the transportation of oil, natural gas and petroleum products following submission of competitive bids. The holder of a transportation concession may construct and operate oil, gas and product pipelines, storage facilities, pump stations, compressor plants, railways and other necessary facilities.

The privatization law granted YPF a 35-year transportation concession with respect to the pipelines operated by YPF at that time. Producers are not obligated to offer third-party access to upstream gathering lines which they own. Transportation tariffs are approved and regulated by the SE for oil and petroleum products pipelines and by Enargas for gas pipelines.

Gas pipelines sold in connection with the privatization of Gas del Estado (GdE)⁶² are subject to the 1992 natural gas bill. These pipelines include Transportadora Gas del Norte (TGN) and Transportadora Gas del Sur (TGS). TGS is an Enron/Petrobrás joint venture that delivers about 60 percent of Argentina's total natural gas consumption, mainly in the Buenos Aires area. TGN is owned and operated by TecGas N.V., Compañía General de Combustibles, SA and TotalFinaElf. At the end of the 35-45 year license period, a competitive tender must be held for a license. The incumbent will have the option of matching the best bid.

The 1992 natural gas bill established a clear separation of production, transmission and distribution activities and prohibits vertical integration in the gas sector. Transportation tariffs are set by Enargas on a cost-of-service basis plus a reasonable return on assets. Enargas sets maximum tariffs (price caps) and the transporter is free to offer lower tariffs to its clients. Transporters must publish their tariffs for different services and customer categories. The price caps are adjusted every six months for inflation. Enargas reviews the tariffs every five years; efficiency improvements and additional investment are factored in and fixed for five years as a way for companies and consumers to share efficiency gains.

With the exception of producer-owned gathering lines, transporters must offer non-discriminatory third-party access to their facilities for a fee, subject to available excess capacity. In addition, transporters do not have a monopoly for developing the network in their

⁶¹ Awards of the onshore licenses went to consortia led by Repsol YPF, Petrobras, Pluspetrol, and Total. The offshore licenses for the Deltana project went to Chevron, ConocoPhillips, Statoil and Total. International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

⁶² GdE had a monopoly on gas transportation and distribution in Argentina prior to 1992. In 1992 GdE was split into two transmission companies, TGN and TGS, and eight distribution companies. The government then sold controlling stakes in these companies to consortia that had an international operator as well as a local partner. International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

geographical areas. A new market entrant may build a new high-pressure line anywhere in the country. Finally, transporters are not allowed to trade in gas.

In 1997, Enargas issued a resolution aimed at creating a secondary market for gas transportation. Holders of firm transmission capacity can sell any unused reserved transmission capacity. Released capacity prices are established by market forces.

Before the 2001-2002 financial crisis in Argentina, gas transmission tariffs were fixed in U.S. dollars but applied in pesos, using the 1:1 exchange rate. In early 2002, the government imposed a freeze on transport tariffs at their peso-denominated value as part of its public emergency law. Gas transporters were forced to absorb the cost of the peso devaluation. Between 2002 and 2004, the government made three attempts to introduce small tariff increases which were blocked by court-issued injunctions at the behest of consumers. According to the public emergency law, tariff increases can be granted only after the license contracts have been renegotiated. Thus, despite a midstream regulatory system that fostered competition and was considered relatively independent and transparent, most gas transporters stopped all new investment in network expansion, contributing to the gas crisis in 2004.

The natural gas supply shortages of 2004 also caused generation problems in the electric sector. Power generation accounts for about 30 percent of total gas demand and shortages in natural gas supplies led to shortages in electricity supplies. The government had to implement electricity rationing measures and power exports to Uruguay were suspended temporarily. The country imported emergency power from Brazil and fuel oil from Venezuela.

In February 2004, the government enacted decree 180 which created an investment trust fund in an attempt to boost investments in natural gas infrastructure. In May 2004 the Kirchner government released its *National Energy Plan for 2004-2008*.⁶³ The NEP is a \$3.85 billion investment program in gas transportation, power transmission and generation. About 50 percent or \$1.93 billion of the investment program will be allocated to new gas pipelines. The NEP also proposed new hydro and nuclear generation projects in order to lower the demand for natural gas. Financing for these investments remains uncertain.

With respect to cross-border hydrocarbons trade, the midstream's sector organization and regulatory structure prior to the 2001-2002 financial crisis promoted the construction of new pipelines that expanded the export of natural gas from Argentina to Chile and Brazil. However, further expansion of cross-border trade among these countries will be impaired until the downstream pricing issues are resolved and the midstream tariffs permit a reasonable return on investment. The Argentine gas transportation sector experience demonstrates that effective organization and regulatory systems are not immune to negative impacts from unilateral state intervention in any part of hydrocarbons value chain (upstream, midstream, downstream).

⁶³ Argentina Republic, Presidency of the Nation, "Three Years of Government 2003-2006," www.minplan.gov.ar. Honore, Anouk, "Argentina 2004: A Gas Crisis?," Oxford Institute for Energy Studies Seminar June 29, 2004.

Bolivia

In 1996-1997, the oil and natural gas pipelines owned and operated by YPFB were transferred to Transredes S.A. which was subsequently capitalized. Transredes was owned by Enron (25 percent), Shell (25 percent), Bolivian pension funds (34 percent) and workers at Transredes and YPFB (16 percent). Transredes also has a majority participation in and operates the Bolivian portion of the Gasbol pipeline and the Gas Oriental Boliviano pipeline, an Enron/Shell joint venture.

The Superintendencia de Hidrocarburos (SH) regulates the oil and gas transportation sector, including storage. The SH is an autonomous body financed by taxes on operators in the sector. It is part of the Sectorial Regulatory System (SIRESE) and is one of the five independent agencies created to oversee sectors privatized since 1994. The Superintendent General of SIRESE acts as a “regulators’ regulator,” controlling and supervising the five agencies and acting as a first agent of appeal against any individual agency decision.⁶⁴

The SH sets oil and gas transportation tariffs and grants concessions and licenses to operate. Any company may request a transportation concession. Transportation companies must grant third-party access to their facilities if capacity is available. Under the 1996 hydrocarbons law, transportation companies must assign a minimum of 15 percent of capacity to third parties using gas “for industrialization projects in the national territory.”⁶⁵

Stamps or tariffs differentiated by distance apply to domestic and export pipelines according to the interests of the country. The 1996 law states that “the economy of scale generated by export pipelines shall benefit domestic tariffs for transportation through pipelines.”⁶⁶ With respect to new pipelines and expansions, “care shall be exercised for tariffs not to be more expensive” than those for existing pipelines.⁶⁷ Incremental tariffs may be applied in projects of “national interest.”⁶⁸ Maximum margins for storage are based on technical and economic efficiency criteria.

The SH enforces the separation rules pertaining to transportation, distribution and power generation. Transportation companies are not allowed to trade in commodities and cannot directly engage in distribution activities or in power generation. Hydrocarbon producers can build, own and operate transportation assets for their own and third parties’ products, but must keep separate accounts for their transportation and production activities.⁶⁹ Companies industrializing hydrocarbons can build, own and operate pipelines dedicated to the transportation of hydrocarbons that will be used for raw materials in production of other products. These pipelines will not have tariffs and do not have to allow third-party access. These companies

⁶⁴ International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

⁶⁵ Ley de Hidrocarburos Nro. 3058, www.ypfb.gov.bo.

⁶⁶ Ley de Hidrocarburos Nro. 3058, www.ypfb.gov.bo.

⁶⁷ Ley de Hidrocarburos Nro. 3058, www.ypfb.gov.bo.

⁶⁸ Ley de Hidrocarburos Nro. 3058, www.ypfb.gov.bo.

⁶⁹ International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

cannot use these pipelines for co-generation of electricity except when specifically authorized by the MHE for isolated systems with a “social content.”⁷⁰

Brazil

The ANP is responsible for issuing special authorizations to build and operate oil or gas pipelines, marine terminals, storage facilities, processing plants, and ships and barges. Third parties are allowed access to all new and existing pipelines, port facilities, and terminals under market conditions. The ANP regulates priority rights and establishes tariffs if terms cannot be agreed upon.

To comply with the 1997 petroleum law, which requires the separation of production and transportation activities into different legal entities⁷¹, Petrobrás created subsidiary Petrobrás Transporte S.A. (Transpetro) in 1998 to take over the operation of Petrobrás’ offshore and onshore oil and gas pipelines and the management of oil, by-product and natural gas terminals.⁷² Transpetro is subject to open access rules.

Three other transportation companies operate the Brazilian segments of the existing gas import pipelines and are described in more detail in the section on cross-border trade below: Transportadora Brasileira Gasoducto Bolivia Brasil (TBG), Gasocidente do Mato Grosso, and Transportadora Sulbrasileira (TSB). Petrobrás has an interest in TBG and TSB.

The transport tariff on the Bolivia to Brazil (Gasbol) natural gas pipeline rate does not vary with distance. It is subdivided into a capacity charge and a volume charge.

Despite the 1997 reforms and the establishment of the ANP, Petrobrás continues to dominate the midstream hydrocarbon sector as it does in the upstream hydrocarbon sector. Petrobrás is the dominant gas importer with preferential access to the Gasbol pipeline and is the largest supplier to local gas distributors. It owns virtually 100 percent of all national pipelines through Transpetro, has interests in two import pipelines, and has stakes in 17 of the 22 existing gas distribution companies. It owns most of the storage tanks, marine terminals, ships and barges.

There are several reasons for Petrobrás’ continued dominance of the midstream hydrocarbon sector. As in the upstream sector, Petrobrás was permitted to retain almost all of its midstream assets. Further exacerbating the situation, the existing third-party access regime needs more effective implementation according to the International Energy Agency. The IEA has said that processes involving third-party requests for pipeline transportation access and dispute resolution are currently too time-consuming to permit proper competition.⁷³ As mentioned previously, there is a conflict of interest with the MME being involved with both Petrobrás and the ANP. This

⁷⁰ Ley de Hidrocarburos Nro. 3058, www.ypfb.gov.bo.

⁷¹ There is, however, no restriction on cross-ownership of these entities. Energy Information Administration, U.S. Department of Energy, “Brazil Country Analysis Brief,” 2003.

⁷² International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

⁷³ International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

could undermine the independence of the ANP and impede its ability to keep an effective check on Petrobrás' market power.

The problems associated with Petrobrás' dominance of the midstream hydrocarbons sector could impede the development of the country's natural gas sector by discouraging third-party investment in transportation infrastructure. It is not certain that Petrobrás will have sufficient capital to develop both the upstream and midstream portions of the natural gas sector. Similarly, it could also impede the development of additional gas import pipelines and the expansion of existing lines. For example, Petrobrás and ANP have had conflicts over third-party access to the Gasbol pipeline. The ANP tried to allow British Gas (BG) to obtain firm transport services on the Gasbol pipeline but failed because it could not impose regulations on the Bolivian side (because Bolivia determined that Petrobrás had priority access).

Canada

The National Energy Board (NEB) must approve new build construction and expansions of interprovincial and international oil and gas pipelines. The NEB also ensures that companies comply with regulations concerning the safety of employees, the public, and the environment, as they may be affected by the design, construction, operation, maintenance, and abandonment of a pipeline.⁷⁴ The NEB regulates pipeline tariffs and requires third party open access to pipeline systems. It authorizes the export and import of natural gas and the export of oil, propane, butanes and ethane.

Provincial regulation of pipelines is administered by provincial utility boards (EUBs). The EUBs grant permits, approvals and licenses to construct and operate pipeline facilities and regulate intrastate transportation tariffs.⁷⁵

The Canada midstream sector has performed well. It added about 4,500 miles of pipeline per year on a constant basis between 1996 and 2001, including new gas interconnections with the United States.⁷⁶ Canada is the principal oil and gas exporter to the United States and there is almost seamless integration in the infrastructure network.

Colombia

Ecopetrol owns and is responsible for Colombia's oil pipelines. It operates the Cano-Limon Covenas oil pipeline in partnership with Occidental Petroleum and runs the Ocesa pipeline with BP.

⁷⁴ North American Energy Working Group, *North America: The Energy Picture*, available at www.eia.doe.gov.

⁷⁵ North American Energy Working Group, *North America: The Energy Picture*, available at www.eia.doe.gov.

⁷⁶ Biannual Pipeline Construction Survey, *Oil and Gas Journal*, November 25, 2002.

The Energy and Gas Regulatory Commission (CREG) is the principal government agency charged with oversight of the non-upstream natural gas sector. CREG regulates access to the natural gas pipelines as well as transportation tariffs.

Two natural gas transmission companies operate the domestic natural gas transmission system: Ecogás, a subsidiary of Ecopetrol, and privately-owned Promigas. The Colombian government has announced that it intends to privatize Ecogás. The Colombian government has held discussions with Venezuela about a proposed oil pipeline to export that country's crude oil to Colombia's deepwater Pacific ports. In 2004, Brazil's Synergy Group announced that it would build an oil pipeline connecting its Rubiales field to Colombia's Orensa oil pipeline.

In April 2003, Colombia and Venezuela agreed to build a natural gas pipeline linking Colombia's Guajira Basin to Venezuela's Maracaibo region. Colombia has also held discussions with Panama and Ecuador about extending the pipeline into those countries. Initially gas would flow from Colombia to Venezuela but would eventually reverse.

Ecuador

Hydrocarbon transportation services may be provided by Petroecuador, directly or in association with private companies, and by qualified national or foreign private companies upon direct authorization by the president of the republic, by means of an executive decree based on a report issued by MEM.⁷⁷ If a pipeline is built by a private company on the basis of an executive decree, it must provide third party access to its facilities pursuant to negotiated terms.

If companies cannot agree with new users on transportation rates, the MEM shall establish the rate based on "just and reasonable" criteria. Excess capacity must be offered to third parties on similar terms and conditions. However, the state has a preferential right to this excess capacity.

Ecuador has two major oil pipelines: SOTE owned by Petroecuador and Oleducto de Crudos Pesados (OCP). The OCP is owned and operated by a consortium of foreign companies led by EnCana; the consortium's members will supply oil to fill the majority of the pipeline's capacity. The pipeline reverts to the state 20 years after commercial operation began in 2003.

Mexico

Pemex controls crude oil and petroleum products transportation and storage in Mexico. Private participation is not permitted in these activities.

In 1995, the Mexican government passed an amendment to permit public and private companies to transport, store and distribute natural gas with government approval. Participants, including

⁷⁷ Lamanna, Dario Gerardo, "Legal Regime for Hydrocarbons Operations in Ecuador," *Oil, Gas, Energy Law (OGEL)*, Volume 2, Issue 1, February 2004.

Pemex, are required to provide open access to the transportation and storage systems to third parties when capacity is available.

Hydrocarbon transportation is regulated by the Comisión Reguladora de Energía (CRE). Established in 1994, the CRE regulates the activities of both public and private operators in the electricity and midstream and downstream natural gas industries. The CRE's primary goals focus on the development of gas and electric infrastructure; the regulation of market power, and the promotion of competition in the gas and electric sectors. It grants permits, approves terms and conditions for the provision of services, issues directives, resolves disputes, and imposes sanctions. The CRE also regulates first-hand gas sales. SENER coordinates with and supports the CRE.

As in the upstream sector, there is not management separation in the midstream sector among policymaking (SENER), regulation (CRE) and commercial activities (Pemex). Unlike the midstream regulatory agencies in other industrialized countries, CRE does not set transportation tariffs; it advises Treasury (Hacienda) in that function. The multiple roles of the SENER minister which involve interaction with the regulatory body (CRE) and those it regulates (Pemex, CFE) could lead to conflicts of interest and could undermine transparency and objectivity in the regulatory process; and this contributes to Pemex's continued dominance of the midstream sector, as discussed in more detail below.

In addition, there does not appear to be a clear set of rules or procedures for appointment of CRE members. It appears that commissioners are selected by the SENER minister and approved by the president without public scrutiny or the approval of congress.⁷⁸ Commissioners hold their posts for five years, which can be renewed for another five years. Two commissioners are not permitted to leave in the same year.

Both Pemex and private companies are required to obtain permits from the CRE. Transportation and storage permits are issued for 30 years and are renewable. These permits require the investor to assume the market risk for there is no exclusivity with respect to specific capacities or defined routes. Permits are assigned to technically sound proposals and the market decides which permitted project is finally carried out. For transportation projects promoted by the government, permits are issued through public bidding. For example, the CFE takes bids for independent power projects together with the pipeline that connects the generation plant to the natural gas system. Fifty percent of investment is for private sector open access pipeline projects and the other 50 percent is for Pemex's expenditures on its own trunkline. Permits are also granted for "self use" pipelines for spur lines to connect large industrial users and electric generators to gas fields or to the main trunkline.

Producers, transporters, distributors and operators of storage facilities can buy and sell natural gas, but they have to unbundle their services, with separate accounting systems for each service and without cross subsidies among services.

⁷⁸ Foss, Michelle Michot, *Democracy and Energy in Mexico*, prepared for USAID, 2003.

Despite the introduction of competition into the gas transportation sector, Pemex still controls about 85 percent of installed capacity. It has retained most of the pipeline assets in Mexico. Also, even though Pemex is required to provide access to its pipeline assets (if capacity is available) to third parties, this regime has not been effectively implemented due to lack of separation between policymaking, regulation, and commercial activities.

In addition, Pemex has continued to market natural gas even though vertical integration between transportation and distribution is prohibited. In 2000, the CRE recognized that the vertical integration of Pemex in natural gas production, transportation, and marketing was hindering competition in gas marketing. The CRE issued a directive requiring Pemex to unbundle its production, transportation, and marketing activities. Pemex may negotiate long-term contracts at prices below the maximum allowed by regulation provided there are no cross-subsidies between marketing and first hand gas sales. However, regulation of Pemex's discretionary discounts on domestic gas and transport services is difficult given the company's monopoly in gas production, its dominant position in gas transportation, and its greater access to information than the CRE.

Progress in establishing competitive and transparent markets in the midstream and downstream hydrocarbon sectors is often compromised if there is not a comparable restructuring of the upstream sector.⁷⁹ This problem is further exacerbated if the dominant incumbent, i.e., Pemex, is permitted to retain a large portion of the assets in the midstream sector. The Mexican experience in the development of gas-fired electric generation clearly illustrates the validity of these statements.

In 1992, the Mexican government implemented reforms to permit private sector participation in the following electric generation activities: co-generation, self-use production, build, lease and transfer generation plants, and independent power production (IPPs). The CRE permits and regulates these activities. The natural gas reforms which followed in 1995 were associated with these changes in the electric sector. Between 1995 and August 2000, the CRE issued new generation permits for IPPs, self and co-generation covering almost 12,000 MW in new capacity, much of which was to be gas-fired. However, about one-third of this capacity remained unconstructed as of December 31, 2002. Issues include implementation of an open access tariff on Pemex's gas transportation system as well as competitive terms for gas purchase contracts from Pemex. The open access terms remain a bone of contention between Pemex and CRE.

The slow progress in developing Mexico's natural gas sector, both upstream and midstream has resulted in increased reliance on imports from the United States via pipeline and eventually other countries via imports of LNG. The CRE grants permits required for the installation of regasification terminals in Mexico. These permits along with other guidelines regulate the operating, technical and safety standards of the facility. LNG storage and regasification facilities may be 100 percent privately owned and operated. Plant owners have a five-year grace period from start-up before open access to the plant is required. The price of gas at the tailgate of the plant is set by market forces. Regasification tariff rates are regulated and approved by the CRE.

⁷⁹ Foss, Michelle Michot and Gurcan Gülen, "Commercial Frameworks for Gas-Power Value Chain Development," 2001. Funded by Texaco Natural Gas International.

The reliance on imports from the United States is problematic for Mexico given the constrained U.S. supply outlook; current and projected high gas prices, and the negative impact on Mexico's foreign currency reserves. Imports of LNG will have their own supply security issues as well as being costly.

Peru

The MEM awards transport and storage concession contracts. Any local or foreign individual or corporation may build, operate and maintain hydrocarbon pipelines and storage facilities subject to the concession contract. Transportation and storage fees are approved by MEM.

In 1999, Peru passed a detailed set of natural gas regulations under its law for the promotion and development of the natural gas industry that essentially set the rules for the development of Camisea. The Energy Tariffs Commission (CTE) will regulate tariffs for the sale of the gas as well as transmission and distribution. CTE also regulates electricity tariffs. All gas sales are made at the wellhead or the "production inspecting point." The regulations guarantee that firms obtaining transportation and distribution concessions "have a real annual profitability of 12 percent".⁸⁰

Consumers in Cuzco will pay a special price of \$1.00/MMBtu for gas delivered to low volume customers. In other areas, the price is \$1.00/MMBtu for electric generators; it is higher for other users (\$1.90 delivered in Lima).⁸¹

The country's sole crude oil pipeline is owned and operated by Petroperu. Transportation for Camisea natural gas is provided by the consortium Transportadora de Gas del Perú (TGP). The consortium is composed of Techint (Argentina)-30 percent; Sonatrach-10 percent; Graña y Montero (Peru)-12 percent; SK Corp.-9.6 percent; Hunt Oil-19.2 percent and Pluspetrol-19.2 percent.

The 1999 gas law enabled the development of the Camisea gas field and the first consumption of natural gas in Peru. The development of Camisea has created the platform for Peru to become a natural gas exporter either by pipeline or development of natural gas liquefaction facilities. If progress along these lines is not derailed by politics or environmental obstacles, the country is on the threshold of developing a robust cross-border gas trade in the Western Hemisphere.

To promote the development of Camisea natural gas, Peru promoted the development of natural gas-fired power plants in Lima and north-central Peru. A selective tax was imposed on coal used in electric generation and in 1999 congress suspended construction of new hydro plants for five years. However, in December 2002, MEM announced that restrictions on new hydro plant construction would be lifted. MEM has full discretionary power to grant or deny a hydro concession.

⁸⁰Center for Energy Economics, BEG/JSG/UT-Austin, "Gas and Power in Peru," Case Studies, *New Era for Oil, Gas & Power Creation*. Available at http://www.beg.utexas.edu/energyecon/publications.php#case_studies.

⁸¹ See Footnote 80.

Despite the government's efforts, electricity demand for natural gas remains questionable. Electricity generators want more flexibility in the base load take-or-pay contracts offered by the Camisea consortium. Currently only two new gas-fired power plants are going forward.⁸² Plans for expanding the Aguaytia plant have been shelved due to the increased supply of hydro- and coal-fired power in the Peruvian system. As a result, Aguaytia has been reinjecting most of the gas and dispatching electricity only during peak hours.⁸³ These uncertainties surrounding electricity demand for natural gas in Peru has led to the increased interest in LNG export projects.

Trinidad & Tobago

TT has an extensive gas pipeline network linking offshore oil and gas fields to onshore landing points. Many of the pipelines directly connect production to the Atlantic LNG liquefaction facility. TT is also building the Cross Island pipeline linking the east coast of Trinidad with Atlantic LNG; it will have a capacity of 2.4 Bcf/d.

All midstream sector commercial activities and oversight are in the hands of 100-percent state-owned National Gas Company (NGC). NGC buys, compresses and transports all gas in TT, extracts natural gas liquids and sells to all end-use customers.

United States

There is management separation among policymakers in the United States (Department of Energy, Department of Transportation, and State and Defense departments), regulators (Federal Energy Regulatory Commission or FERC, U.S. Environmental Protection Agency or EPA, state agencies) and commercial activities (private companies) in the midstream sector. However, the sheer multiplicity of frequently conflicting entities in the policymaking and regulatory functions frequently impedes midstream infrastructure development.

The FERC regulates oil and petroleum products pipeline companies engaged in interstate commerce; it has no authority over the siting of new oil pipelines nor does it oversee oil pipeline construction. Rather, the FERC helps shippers obtain access to oil pipeline transportation, equal service conditions, and reasonable rates. The Department of Transportation's Office of Pipeline Safety assures the safe and environmentally sound transportation of oil and petroleum liquids. The State Department issues permits for most cross-border petroleum products pipelines. In evaluating permit applications, the State Department must comply with requirements imposed by the National Environmental Policy Act (NEPA).⁸⁴

The FERC regulates the construction of interstate natural gas pipelines and facilities needed by pipelines at U.S. points of entry or exit to import or export natural gas. Rates are subject to

⁸² Energy Information Administration, U.S. Department of Energy, "Peru Country Analysis Brief," 2005.

⁸³ See Footnote 80.

⁸⁴ North American Energy Working Group, *North America: The Energy Picture*, available at www.eia.doe.gov.

FERC approval and generally pipelines must provide third party access to their facilities in a fair and unbiased manner. FERC approval is required to abandon facility use and services. The FERC also regulates natural gas storage.

Pipeline companies that propose to construct, operate, maintain, or connect facilities to import or export natural gas at the international land and maritime borders of the U.S. must obtain presidential permit which is processed by FERC, in consultation with the State and Defense departments. In addition, the import and export of natural gas requires authorization from the Department of Energy.⁸⁵

The OPS ensures the safe and environmentally sound transportation of natural gas, LNG, and petroleum liquids and its authority applies to all interstate pipeline facilities in the United States. States regulate intrastate pipelines. In these cases, the states have responsibility for enforcement of OPS statutes. The OPS reimburses up to 50 percent of a state's enforcement expenses. This collaborative relationship between the federal government and the states forms the cornerstone of the U.S. pipeline safety program.⁸⁶

With LNG likely to become an even more important source of natural gas, the energy policy act of 2005 sought to simplify both the siting and permitting of LNG facilities to facilitate their construction. The FERC possesses sole authority to approve the construction, expansion, or operation of any facility that imports or exports natural gas, including LNG, although it must still consult with the states on safety issues related to these facilities. The energy policy act of 2005 also codified a FERC policy which said that LNG facilities need not offer open access.

Overall the midstream sector in the United States has performed well. With respect to natural gas, the interstate pipeline network has increased substantially. There has been constant investment in expanding the gas pipeline network at an average rate of almost 5,000 miles per year between 1996 and 2001.⁸⁷ This constant investment in the United States stands in contrast to gas pipeline investments in Latin America, which declined steadily from 1996 (over 8,000 miles added) to 2001 (about 1,400 miles added). In its 2006 "Annual Energy Outlook" the EIA reference case forecast that there would be sufficient transportation infrastructure constructed to accommodate the forecast growth in natural gas usage. There has also been constant activity in crude oil and product pipelines as well, albeit on a much smaller scale.

LNG progress has been slower. The first new LNG regasification terminal in 20 years will begin operation in 2007.⁸⁸

The most significant issues in the midstream hydrocarbons sector in the United States revolve around the permitting processes for infrastructure development and access to midstream infrastructure. Given the multiplicity of state and federal organizations involved in the

⁸⁵ North American Energy Working Group, *North America: The Energy Picture*, available at www.eia.doe.gov.

⁸⁶ North American Energy Working Group, *North America: The Energy Picture*, available at www.eia.doe.gov.

⁸⁷ Biannual Pipeline Construction Survey, *Oil and Gas Journal*, November 25, 2002.

⁸⁸ See CEE-UT's online *Guide to LNG in North America*, www.beg.utexas.edu/lng.

permitting of midstream infrastructure, the process is cumbersome, resulting in lengthy delays in project development. Requirements to provide “open access” to midstream facilities diminish any competitive advantage a potential investor might have, thereby discouraging the investment. This “open access” issue has been resolved for LNG regasification terminals, but not for natural gas pipelines.

Venezuela

Oil gathering, initial transportation, and storage remain a monopoly controlled by PdVSA. Private investment, domestic and foreign, is permitted up to 49 percent with PdVSA holding a controlling 51 percent of equity.

Private investors can own and operate 100 percent of gas transportation and storage facilities. Licenses must be obtained from MEP. Projects aimed at expanding the domestic use of natural gas will be given priority over export projects. The gas law prohibits vertical integration in the gas sector: companies cannot own or control entities that engage in two or more activities in production, transportation, or distribution within the same region. The MEP can waive this prohibition if a project’s viability requires it.

The gas law requires third party open access to gas transportation and storage facilities if there is capacity available. Conditions are to be negotiated by the parties; MEP will intervene if the parties cannot agree. The MEP sets the maximum prices at which gas can be sold to different categories of customers. It also sets maximum tariffs for the transportation and distribution of gas. Officials have stated that a 15 percent internal rate of return will be allowed in the gas transportation sector.

PdVSA currently has a controlling position in all segments of the natural gas value chain. It is the dominant gas producer, representing over 95 percent of current production, and it controls all current gas transportation facilities and a significant percentage of gas distribution facilities.

DOWNSTREAM SECTOR

Argentina

Registration in the registry of oil companies maintained by SE is required to operate a refinery in Argentina. Registration is granted on the basis of general financial and technical standards. Repsol-YPF accounts for about 50 percent of the country’s total crude oil refining capacity; other companies with significant capacity include Shell and Esso.⁸⁹

As the dominant player in the domestic petroleum products market, Repsol-YPF exercises considerable influence over the prices of fuels that compete with natural gas.⁹⁰

⁸⁹ Energy Information Administration, U.S. Department of Energy, “Argentina Country Analysis Brief,” January 2007.

⁹⁰ International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

Argentina is an oil exporter with most exports going to Chile and Brazil.⁹¹ However, the hydrocarbons law permits the government to prohibit the export of crude oil during any period in which domestic production is insufficient to meet domestic demand. If crude oil and petroleum products exports are curtailed, producers, refiners and exporters receive a price:

- Not lower than that of similar imported crude oil and petroleum products, and
- In the case of natural gas, not less than 35 percent of the international price per cubic meter of Arabian light oil, 34 API.

Holders of production concessions have the right to market their oil without restriction. However, as part of the public emergency law, the Ministry of Economy in May 2004 established custom duties on the export of crude oil (25 percent); butane, methane and LPG (20 percent) and gasoline and diesel (five percent). In August 2004, the Ministry of Economy issued a resolution establishing a progressive scheme of export duties for crude oil, with rates ranging from 25 percent to 45 percent depending on the level of the WTI reference price at the time of exportation.⁹² These export duties will discourage investment in all sectors—upstream, midstream and downstream—of the hydrocarbon industry.

At various times in the past, crude oil producers and refineries have entered into agreements with SE to “stabilize” prices in rapidly increasing oil price environments. In other words, these oil producers and refiners have not passed through the entire market price to consumers, absorbing the difference. Oil producers also provide a price subsidy to public bus transportation companies.⁹³ If hydrocarbon sector participants are unable to realize market prices for their products or services, future investments in the sector will not be forthcoming.

Bolivia

Crude Oil Refining and Marketing

There are five privately-owned refineries operating in Bolivia. Petrobrás acquired the two largest from YPFB in 1998. YPFB transferred the third largest refinery to the plant’s workers who created the company Refisur S.A. The fate of the Petrobrás refineries going forward is not clear.

Crude oil refining and marketing is regulated by the SH which grants licenses and concessions; controls imports and exports, and ensures the supply of hydrocarbon products to satisfy local consumption while protecting consumer interests. The SH determines the margins for refined products based on the following considerations: (1) A continuous supply is ensured; (2) allows prudent and efficient refiners to earn a “just and reasonable” return; and (3) provides incentives

⁹¹ Energy Information Administration, U.S. Department of Energy, “Argentina Country Analysis Brief,” January 2007.

⁹² Repsol-YPF, 2004 Company Annual Report, Form 10K as filed with the US Securities and Exchange Commission.

⁹³ Repsol-YPF, 2004 Company Annual Report, Form 10K as filed with the US Securities and Exchange Commission.

for expansion. The SH determines domestic oil and oil products prices taking into account import and export prices as well as the prices of raw materials.

The SH grants permits for exports of oil and oil products based on a certification of surplus products in excess of the national demand.

Natural Gas Distribution and Marketing

There are currently five gas distribution companies in Bolivia, four of which are operated by private interests; the future of those operated by private interests is uncertain. The private companies include Emcogas, Emtagas, Emdigas and Sergas. YPFB still operates the distribution network in La Paz, Ouro and Potosí.⁹⁴

SH regulates the gas distribution sector. It issues distribution concessions which are required to distribute gas in a particular area. Any company, except gas transportation companies, may request a distribution concession. Companies must participate in a bidding process to obtain concessions. The Ministry of Hydrocarbons and Energy (MHE) establishes the policy for commodity prices in the domestic market. The SH sets distribution tariffs. In the domestic market, natural gas competes with LPGs whose prices are subsidized.

The MHE establishes the policies for the exportation of gas; export permits are issued by the SH on the same basis as the export permits for oil. YPFB aggregates and sells all natural gas exports, assigning the volumes to producing companies. The MHE establishes gas export prices based on competitive prices for LPGs and/or other natural gas production. Prices for natural gas in the domestic market cannot exceed 50 percent of the lowest price in an export contract and takes into account competition with LPGs.

Argentine producer Pluspetrol exports small quantities of gas to Argentina from its fields close to the Argentine border. Gas exports to Brazil began in July 1999 under a 20-year take-or-pay contract between YPFB and Petrobrás. Petrobrás pays YPFB for the gas and transportation on the Bolivian portion of Gasbol. The commodity gas price is set in U.S. dollars and indexed to a basket of international fuel oil prices. Currently city-gate gas prices in São Paulo and other Brazilian cities along the Gasbol pipeline are well above prices for Brazilian gas, fuel oil or coal.

It is not clear what recent events in Bolivia mean for domestic and export pricing of oil and natural gas. The current gas export price is already uncompetitive in Brazil. It is difficult to be optimistic about future expansion of the export trade, with possibly negative implications for Brazil, Argentina and Chile as discussed in the upstream section.

⁹⁴ International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

Brazil

Crude Oil Refining and Marketing

The ANP is responsible for issuing special authorizations to build and operate refineries. Nevertheless, Petrobrás continues to control approximately 98 percent of Brazil's crude oil refining capacity.

On January 2, 2002, the Brazilian government deregulated sales prices for crude oil and oil products. Other companies were allowed to participate in the Brazilian market and import and export crude oil and oil products to and from Brazil. At the same time, the government established an excise tax on the sale and import of crude oil and oil products. Petrobrás states that it currently faces more competition in the crude oil and crude product distribution segment of its business than any other business segment; in particular, Petrobrás references competition from small distributors, many of which have been able to avoid paying sales taxes and mix their gasoline with inexpensive solvents which are then sold at prices below Petrobrás.⁹⁵

Despite the elimination of all price controls on crude oil and oil products in 2002, in times of high international prices and/or sharp devaluations of the *reais* Petrobrás has not been able to charge market prices for these products. In order to ensure adequate supplies of oil products in Brazil, Petrobrás from time to time has to sell its products below prevailing international prices.⁹⁶

Natural Gas Distribution and Marketing

The ANP regulates transportation of natural gas to the city-gates. State governments are responsible for natural gas distribution activities through the state energy secretariats; 14 states have regulatory agencies that deal with natural gas including Sao Paulo (CSPE), Rio de Janeiro (ASEP), Rio Grande do Sul (AGERGS), Bahia (AGERBA), Ceará (ARCE), Pará (ARCON) and Rio Grande do Norte (ARSEP). Apart from the CSPE, state regulatory agencies are responsible for electricity, telecommunications, transport, sanitation and water. According to the International Energy Agency, the state regulators lack personnel and expertise and have thus far played a limited role in the natural gas sector.⁹⁷

Pursuant to a constitutional amendment in 1995, both private and public companies can obtain licenses for natural gas distribution from the appropriate state agencies. There are currently 22 gas distribution companies operating in 18 states. The five distribution companies serving the states of São Paulo and Rio de Janeiro are privately owned. The other companies typically have mixed ownership with the state government owning 51 percent of the shares, Petrobrás (through Gaspetro) 24.5 percent and private companies the remaining 24.5 percent.⁹⁸ At present, only companies in the states of São Paulo, Rio de Janeiro and Bahia have significant distribution infrastructure in place.

⁹⁵ Petrobras, 2003 Company Annual Report, Form 20F as filed with the U.S. Securities and Exchange Commission.

⁹⁶ Petrobras, 2003 Company Annual Report, Form 20F as filed with the U.S. Securities and Exchange Commission.

⁹⁷ International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

⁹⁸ International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

Different states have different regulatory regimes for gas distribution and marketing. In some, but not all, states, large gas consumers are allowed to buy their gas directly from producers and may physically and/or commercially bypass the distribution company.

Domestically produced gas is priced differently than imported gas. Since February 2000, the price of domestic natural gas has two clearly different components: the commodity price and the transport tariff. The ANP establishes “reference transport tariffs” on a cost-plus basis which are distance and volume sensitive. Readjusted annually, these tariffs are used to calculate the ceiling for the prices paid by distribution companies. MME, in cooperation with the Ministry of Finance, regulates the commodity price.

The price of imported gas is not regulated except for imported gas used by power stations in the Thermoelectric Priority Program. For qualifying power generation plants, the MME and Ministry of Finance establishes a fixed price in Reais based on a U.S. reference price (initially U.S.\$2.58 per MMBTU converted into Reais based on the exchange rate in effect on June 1, 2001 and adjusted annually for changes in the U.S. producer price index and the U.S. dollar exchange rate).⁹⁹ Qualifying power plants can pass on to their customers any increases in pricing resulting from these adjustments.

Brazil has implemented policies in the natural gas sector in order to solve problems in the electric sector. Brazil is heavily dependent on hydropower which represents around 83 percent of all generation. Concerned about the lack of diversification in Brazil’s generation, the government in 1997 set a goal of having at least 12 percent gas-fired power generation on the grid by 2010. Investors initially rushed to bid on the electricity distribution franchises being privatized. The government provided incentives (eventually translated into law as the Programa Prioritário de Termoelectricidade –PPT) for gas-fired generation including: a regulated, favorable price for gas supply which was less than the price payable by Petrobrás for Bolivian gas; availability of long-term power purchase contracts from state-owned Electrobrás; and favorable development loans from the state-owned national development bank, BNDES . Petrobrás was also called upon to finance the projects, and later to assume the foreign exchange risk embedded in the different gas price adjustments in the Bolivian gas supply contract and the gas sales contracts with the power plants.

In 2001, Brazil experienced a critical electricity shortage due to drought conditions. Not a single PPT gas-fired power plant was ready, and work had started on just five. The government had to implement power rationing measures which eventually resulted in a permanent electricity demand reduction of about seven percent and this, combined with above-average rainfall in 2002, caused overcapacity of electricity supply. This in turn led to an oversupply of gas, especially with a gradual increase in domestic gas production, and exacerbated Petrobrás’ take-or-pay problems with Bolivia. The policies implemented by Brazil in the natural gas sector in order to address problems in the electric sector unfortunately did not address the electric sector problems and created new problems in the gas sector with respect to Bolivian gas imports.

⁹⁹ Petrobras, 2003 Company Annual Report, Form 20F as filed with the U.S. Securities and Exchange Commission.

The role of natural gas in Brazil's electric generation mix remains unclear: permanent base-load diversification or back-up for low hydropower years? New power sector legislation enacted in 2004 requires that cheaper hydroelectric generation be pooled with more expensive thermoelectric plants to determine a single national electricity price. By pooling the various sources, the government hopes to reduce electricity tariffs and to ensure that power is purchased from the newly constructed thermal plants. However, with the new rules only recently issued and not yet tested in practice, it remains unclear whether investors will build new gas-fired power plants in Brazil.

Canada

In 1985, the government of Canada and the provincial governments in Alberta, British Columbia, and Saskatchewan, agreed to deregulate the prices of crude oil and natural gas. At the same time, changes in the regulation of the natural gas market permitted end-users to purchase gas directly from producers at negotiated prices. Larger end-users, such as industrial customers, have been buying their gas directly from suppliers since 1985, while few residential and small commercial gas users take this option. In general, smaller users who are able to buy under direct purchases utilize the services of a broker or a marketer or continue to obtain the gas from a regulated distribution company.

Natural gas utilities, to varying degrees, have undergone restructuring from integrated monopolies into separate marketing, transmission, and distribution service companies in British Columbia, Alberta, Manitoba, Ontario, and Quebec. This separation, often called unbundling, was influenced by the deregulation of natural gas prices. Local distribution costs are regulated by the provincial utility boards or provincial governments. The provinces also oversee the retail cost of natural gas to consumers who purchase gas directly from the regulated distribution company.

Colombia

Crude Oil Refining and Marketing

All refineries are 100 percent owned and operated by Ecopetrol, although private firms are permitted to participate. The government has stated that it will not construct new refineries and any new construction must be undertaken by the private sector.¹⁰⁰ Colombia exports about 50 percent of its oil production with the bulk of the exports going to the United States in 2004).¹⁰¹ Although Colombia is a net oil exporter, gasoline and diesel fuel are imported to meet domestic product demand. Ecopetrol is responsible for the import and export of crude oil and crude oil products.

¹⁰⁰ Embassy of Colombia Washington D.C. Briefing Paper, "Colombia's Energy Industry: Recent Developments and Opportunities," www.coltrade.org/Energy.pdf.

¹⁰¹ Energy Information Administration, U.S. Department of Energy, "Colombia Country Analysis Brief", June 2006.

The government regulates motor gasoline and diesel prices. Since the end of 2002, the Colombian government has begun a gradual dismantling of crude oil product price subsidies supplied by Ecopetrol. The goal was to eliminate the subsidies to motor gasoline by December 2004 and the subsidy to diesel by December 2006.¹⁰²

Natural Gas Distribution and Marketing

The public utilities law of 1994 opened Colombia's gas distribution sector to private investment. Nevertheless, Ecopetrol/Ecogás controls a significant portion of the gas distribution and marketing activities in Colombia. CREG regulates the commodity price of gas as well as the transportation and distribution tariffs.

In early 2005, Ecopetrol announced its intention to divest its 52 percent stake in Invercolsa (Inversiones de Gases de Colombia). Invercolsa has majority stakes in three natural gas distributors and minority stakes in three more, as well as stakes in other companies related to gas distribution. Under Colombian privatization law, the stake will first be offered to the country's pension funds, unions and cooperatives. Remaining shares will be sold in a secondary offering.

In 2004 Ecopetrol sold its 2.25 percent stake in natural gas distributor Gases de la Guajira to company workers for U.S.\$112 million. These sales are part of Ecopetrol's plan to divest non-core businesses in order to finance core projects in exploration and production.

Ecuador

Crude Oil Refining and Marketing

Petroecuador owns the country's three existing refineries. It appears that private company participation could be permitted in refinery expansions, particularly those that would increase capacity to process petroleum residues.

Private companies as well as Petroecuador can import and export crude oil and crude oil products. More than 50 percent of Ecuador's oil exports go to the United States with the remainder split evenly between Latin America and Asia.

Ecuador is a net importer of refined oil products, particularly LPGs. Prices for LPGs are heavily subsidized.¹⁰³ The MEM sets domestic reference prices for crude oil and crude oil products. The domestic reference price of hydrocarbons is the weighted average price of the last month of foreign sales of hydrocarbons made by Petroecuador.

Natural Gas Distribution and Marketing

Ecuador has negligible domestic natural gas distribution and marketing infrastructure. Heating and cooking needs are met by domestic and imported LPGs at a heavily subsidized price. The MEM sets domestic reference prices for natural gas which take into account substitute energy

¹⁰² Ecopetrol, 2003 Company Annual Report, www.ecopetrol.com.co.

¹⁰³ Energy Information Administration, U.S. Department of Energy, "Ecuador Country Analysis Brief," 2004 .

sources. However, given the lack of gas infrastructure and the subsidized LPG competition, the natural gas consuming sector is undeveloped.

A subsidiary of Noble Affiliates has the only large-scale natural gas project in Ecuador which supplies gas from the Gulf of Guayaquil to an onshore power plant, also owned by Noble.

Mexico

Crude Oil Refining and Marketing

Pemex has exclusive rights to crude oil production, refining and marketing and to basic petrochemicals production.¹⁰⁴

90 percent of Mexico's crude oil exports are to the United States. Mexico also participates in the San José Agreement with Venezuela which allows participating Caribbean and Central American countries to purchase up to 160,000 bpd of oil on preferential terms. Refinery upgrades begun in 2001 changed Mexico from being a net importer of gasoline and distillate to being a net exporter of these products in 2004. Mexico remains a net importer of petroleum products due to insufficient domestic supplies of LPGs.

Mexico is not a member of OPEC, although since 1998 it has entered into agreements with OPEC and non-OPEC members to reduce its oil exports in order to stabilize international oil prices.

NAFTA has phased in lower tariffs on certain petroleum products and petrochemicals imported into Mexico from Canada and the United States as well as lower tariffs on crude oil and petroleum products exported from Mexico to the other two countries.

Crude oil export prices are based on a basket of international reference prices as well as specific market conditions. Export prices for petroleum products are determined by reference to market conditions and direct negotiations with clients.

Domestic consumption of crude oil takes up 45 percent of Pemex's production. Committees composed of officials of Pemex, the Ministry of Finance and Public Credit, SENER, and the Ministry of Economy set the formulas that are used to determine domestic prices for crude oil and petroleum products. The Ministry of Finance determines the retail price of gasoline and diesel so that they are consistent with the government's macroeconomic targets. Recently gasoline prices have remained nearly unchanged because changes are linked to increases in the consumer price index. When Pemex sells gasoline to retailers, it collects an amount based on an estimate of its production cost, assuming efficient refinery operation. The difference between the retail price paid by the consumer and Pemex's production cost is the IEPS tax, which is transferred to the government. When the international crude oil price is high, thereby raising

¹⁰⁴ Basic petrochemicals include ethane, propane, butane, pentanes, hexane, heptane, carbon black, naphthas and methane. (Author comment).

Pemex's production cost, IEPS decreases. The converse is true when international oil prices are low.

Natural Gas Distribution and Marketing

In 1995, private and public companies were permitted to own and operate natural gas distribution facilities in Mexico subject to government approval and regulation by the CRE. Pemex had to divest its distribution assets and provide open access to its transportation system for distributors. In 1997, the CRE granted 21 permits to nine private companies to operate gas distribution systems including Gas Natural, Tracetebel, Gaz de France, Sempra Energy, Kinder Morgan, TXU Energy, Grupo Diavaz and Grupo Imperial.

The CRE awards distribution permits through an open bidding process that establish temporary regional monopolies in defined geographic zones. The CRE also establishes a minimum consumer coverage target. There is a 12 year initial period of physical geographic exclusivity. Commercial bypass was acceptable from the start, but physical bypass is implemented gradually. Physical bypass in Mexico is limited to self-consumption rather than to provide service to other consumers inside the exclusive distribution area.

The CRE regulates the price of "first hand" gas sales according to a formula that relates the domestic price of gas in Mexico to prices in South Texas after adjustments for transportation.

Pemex provides hedging mechanisms for certain industrial customers who want to stabilize their natural gas price. In 2001, Pemex offered a three-year fixed price sales contract at US\$4.00/MMBtu to those customers. After these contracts expired in 2003, Pemex offered two options to these customers for the period January 1, 2004-December 31, 2006:

- Up to 10 MMCF/d: US\$4.50 fixed for the period, or US\$4.55 fixed for the period for volumes up to 20 MMCF/d;
- A price of US\$4.425/MMBtu fixed for the year 2004 provided that the reference price linked to South Texas prices did not exceed US\$6.00/MMBtu. If the reference price exceeds US\$6.00/MMBtu, the customer pays the difference between US\$6.00/MMBtu and the average spot price. In June 2004, all customers in this program renewed their contracts for 2005 and 2006.

These options applied to approximately 20 percent of Pemex's total domestic sales of natural gas to third parties in Mexico.

Residential consumption of natural gas in Mexico is low. LPG is used instead and is fairly well distributed in large cities. LPG prices are regulated by the CRE because Pemex has a statutory monopoly in LPG trade and protection. The LPG regulatory price formula links the price of LPG in Mexico to that in Mont Belvieu, Texas.

Distribution tariffs are set by the CRE based on a combination of price cap and cost-of-service regulation. At the beginning of every five year period, a price cap is determined on a cost-of-

service basis. This initial cap remains fixed and is adjusted during the period for inflation and efficiency.

Mexico imports natural gas from the United States. Because the price of domestic natural gas is regulated, import licenses are not required. The import tariff on natural gas was eliminated in 1999.

Peru

Crude Oil Refining and Marketing

Subject to the stipulations of MEM, any local or foreign individual or corporation may build, operate and maintain oil refineries, plants to process natural gas and condensates, natural asphalt, greases, lubricants and petrochemicals, as well as import hydrocarbons.

Peru has six major oil refineries. Repsol-YPF controls the largest facility in the country representing 53 percent of capacity. Maple Gas controls a small refinery. Petroperu controls the remaining four refineries representing 45 percent of total capacity. Petroperu has the largest network of retail oil products distribution. The Peruvian government planned to further privatize downstream facilities, but opposition from labor unions and legislators has delayed these efforts. Peru has been a net importer of oil since 1992, with most imports coming from Ecuador and other Latin American countries.

Price controls on hydrocarbon products exercised by Petroperu prior to 1993 have been eliminated and prices are now market-based.

Natural Gas Distribution and Marketing

The MEM grants concessions for the distribution of natural gas to local or foreign companies. In addition, the MEM provides guidelines for the determination of maximum prices for the consumer. OSINERG is the concession contract supervising entity.

Peru is currently self-sufficient in gas, but there is little infrastructure and consumption is low. There is one concession for natural gas distribution in Peru for the cities of Lima and Callao, which was awarded to Tractebel in 2002. Gas supply will come from the Camisea fields. Tariffs were established in the concession contract and will be regulated by the CTE. Large consumers have the right to purchase gas directly from non-distribution company sources and to use the distribution system for transport. This concession is exclusive for 12 years, after which time any third party may apply for concessions in the Tractebel areas. Tractebel does have the right of first refusal to serve any unserved areas in its concession.

Aguaytia is an integrated natural gas and electric power project where natural gas fuels a 160 MW power plant owned by AEP. Members of the Aguaytia upstream project include Maple Gas Corporation, Duke Energy International, El Paso International, Illinova Generating Company, Power Markets Development Company and Scudder Latin America Power Fund.

Trinidad and Tobago

TT has significant state participation in the downstream oil and gas sectors. Its 100 percent state-owned National Gas Company (NGC) holds interests in all four trains of the Atlantic LNG liquefaction project. NGC is currently exploring investment opportunities along the entire LNG value chain (liquefaction, shipping, regasification, and commercialization) and may well expand outside Trinidad and Tobago. The state also participates in industries utilizing natural gas as a feedstock through La Brea Industrial Development Corporation. Its National Energy Corporation (NEC) is developing all sectors of the domestic natural gas market (residential, commercial, and industrial). The NGC completed the Cross-Island pipeline in 2006 to supply gas to Atlantic LNG as well as an industrial estate in southwest Trinidad.

The Ministry of Energy and Energy Industries (MEEI) is the agency of central government in Trinidad and Tobago which is charged with managing and developing the petroleum and mineral resources of the country. The scope of the ministry's operations in the downstream hydrocarbons sector embraces a range of activities, which include the following¹⁰⁵:

- regulation and management of oil refining activities;
- administering domestic marketing of petroleum products, natural gas transmission/sales, petrochemical manufacture, and other natural gas-based industries;
- formulation and implementation of legal instruments for the petroleum industry;
- acquisition, analysis, and dissemination of both local and international petroleum information;
- sharing responsibility with the Ministry of Finance for the collection of petroleum revenues accruing to the representation of the interests of Trinidad and Tobago at international petroleum fora and institutions;
- long-term planning, development, and implementation of policy initiatives in the petroleum sector;
- sharing of the management of the state's interests and assets in the oil and gas industry.

To date the “Trinidad Model” has been successful, even though policymaking and regulation are combined in one entity and state companies are involved in commercial activities. This success could be attributable to the dominant position of private companies in the natural gas sector with minority participation by the state.

United States

Refining, distribution, and marketing activities are carried out by private companies. States can regulate oil and gas production rates but cannot interfere with market prices for these commodities.

¹⁰⁵ Ministry of Energy and Energy Industries, Trinidad and Tobago, www.energy.gov.tt.

State regulatory bodies regulate local natural gas distribution including intrastate pipelines, local distribution companies. These bodies also regulate natural gas prices to end-users: industrial, commercial, residential, and electric utilities. They also regulate environmental impacts of gas use at the local level.

Many states are in the process of deregulating retail gas distribution. Such programs allow residential natural gas users to select their gas suppliers. The availability, characteristics, and participation rates of these retail choice programs vary widely across states. State regulators and lawmakers who are responsible for designing and implementing retail restructuring programs, have moved more slowly in implementing choice programs for residential and small-volume commercial customers, traditionally known as “core” consumers, until they can ensure reliable service.¹⁰⁶

Although commercial operations in the downstream hydrocarbon sector are in the purview of private entities, the federal government establishes and enforces performance standards for industry and also acts to protect consumers, workers, and the environment. In this respect, the federal government is involved in environmental standards; pipeline safety; interstate pipeline commerce regulation; occupational health and safety; and financial reporting requirements.¹⁰⁷

Venezuela

Crude Oil Refining and Marketing

Private investors, foreign and domestic, may own up to 100 percent in oil refining and marketing activities in Venezuela. Nonetheless, PdVSA currently controls all refining capacity in Venezuela. In addition, PdVSA owns refining capacity in the United States through wholly-owned CITGO, as well as the Caribbean and Europe.

The MEP controls crude oil and petroleum product prices. Domestic prices are controlled at levels significantly below international prices. Export prices for crude oil reflect international price levels. The MEP is in the process of revising its formula for export pricing to one similar to those used by Mexico and Saudi Arabia. Saudi Arabia and Mexico price their crude oil against regional benchmarks and adjust the differentials each month.

Venezuela is a member of OPEC and as such is subject to that organization’s quotas on crude oil production. Most experts believe that Venezuela has been producing less than its current OPEC production quota of 2.934 million barrels per day. Industry observers have stated that, under the new crude oil contracts being negotiated with private investors, the latter would have to absorb OPEC production cuts in the future. In some of the “apertura petrolera” contracts, PdVSA agreed to absorb OPEC production cuts, thereby protecting the production levels of the private investors.

Venezuela is a net exporter of crude oil to the United States, Cuba, Central America and the Caribbean. About 65 percent of total oil exports go to the United States. Of the exports to the

¹⁰⁶ North American Energy Working Group, *North America: The Energy Picture*, available at www.eia.doe.gov.

¹⁰⁷ North American Energy Working Group, *North America: The Energy Picture*, available at www.eia.doe.gov.

United States, 91 percent went to the U.S. Gulf Coast in 2003 where CITGO operates two large refineries.¹⁰⁸ PdVSA is obligated to supply minimum volumes of crude oil to Citgo through 2012. CITGO states in its annual report that the price paid to PdVSA for crude oil under these contracts is not directly related to the market price of any other crude oil but is intended to reflect market pricing for crude oil over long periods of time. The Venezuelan government claims that the contract terms favor CITGO and cause losses to PdVSA.¹⁰⁹

On August 20, 2005, President Chávez announced that PdVSA would build three new crude oil refineries in coming years: two at a capacity of 50,000 bpd and one with a capacity of 400,000 bpd. PdVSA subsidiary Pequiven is still in discussion with ExxonMobil for the joint development of new \$3 billion petrochemical plant in the eastern city of Jose.

Natural Gas Distribution and Marketing

Private investors, foreign and domestic, may own 100 percent in natural gas distribution and marketing operations. PdVSA owns significant interests in distribution assets and accounts for 100 percent of gas sold in the industrial market and 47 percent of gas sold in the commercial and residential markets.¹¹⁰ Third party open access to distribution facilities is required. Conditions are to be negotiated by the parties; if they cannot agree, the MEP will intervene.

The MEP controls the commodity price of gas and sets the distribution tariffs. The government's stated objective is to maintain end-user prices low enough to stimulate domestic demand. In March 2001 the MEP set the maximum prices at which gas can be sold to different categories of customers. Maximum tariffs were also set for distribution and transportation through 2007. Currently commodity gas prices in Venezuela range between \$.50/mmBtu and \$1.50/mmBtu depending on location and customer class. Gas sold to fuel domestic power plants receives prices around \$2.50/mmBtu. After 2007, MEP officials have said the gas prices will remain controlled at the marginal cost of production. Other than gas-fired electric generation, which is currently not significant in Venezuela, the relatively low domestic gas prices will not attract a great deal of investor interest in any segment of the natural gas value chain (upstream, midstream, downstream), at least on the part of private companies. Thus far foreign investor interest has focused on projects such as Plataforma Deltana with potential export markets in the Atlantic Basin.

Enagas is responsible for the promotion of competition in transportation and distribution. It is charged with ensuring open access to the systems and monitoring anti-competitive and discriminatory behavior. It "advises" the MEP on the setting of distribution and transportation tariffs "while no true competition exists in the sector".¹¹¹ Enagas is governed by a five-member board, all appointed by MEP after consultation with the president of Venezuela. Board members

¹⁰⁸Energy Information Administration, U.S. Department of Energy, "Venezuela Country Analysis Brief", 2004.

¹⁰⁹ In a progress review of PdVSA's international affiliates dated 10/30/02, McKinsey & Co. stated that the affiliates crude supply agreements were generally priced below international opportunity costs and overstate affiliate contribution by about 10 percent (www.soberania.info/Informes/Informe_McKinsey.htm).

¹¹⁰ International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

¹¹¹ International Energy Agency, *South American Gas: Daring to Tap the Bounty*, OECD/IEA, Paris, France, 2003.

have three-year terms which can be renewed. As in the upstream and midstream hydrocarbon sectors in Venezuela, there is not clear separation of the policymaking and regulatory functions.

LNG

In 2002 PdVSA, Royal Dutch Shell, ExxonMobil and Mitsubishi signed a preliminary joint venture agreement for the development of a 672 MMCF/d liquefaction terminal called Mariscal Sucre. In August 2005, Royal Dutch Shell and ExxonMobil announced their withdrawal from the project. Industry sources say that Mitsubishi has withdrawn as well and that PdVSA intends to go forward with the project on its own. Conflicts over the volume of gas destined for the price-controlled domestic markets, among other issues, derailed the joint venture.

RESOURCES

Working Groups, Forums, and Other Energy Cooperation Agreements

- **North American Energy Working Group (NAEWG):** Formed in 2001 and led by three Energy Ministers in U.S., Canada, and Mexico. Produces reports (3 so far) on and attempts to foster increased energy cooperation in North America.
- **Hemispheric Energy Steering Committee and the Energy Coordination Secretariat:** Formed at the Summit of the Americas in 1995. Founded by energy ministers to increase regional cooperation and integration; aimed at guiding implementation of action plans.
- **The Western Hemisphere Oil and Gas Environmental Forum:** A cooperative effort between the private and state-owned oil and gas companies in the U.S. and Latin America. Focused on fostering industry cooperation to improve health, safety, and environmental performance of oil and gas activities. Originally dependent on the U.S. Department of Energy for its financial and institutional support, the Forum became self-supporting in 1996.
- **ARPEL:** Regional association of oil and natural gas companies in Latin America and the Caribbean. Formed by 25 oil and natural gas companies. An interactive forum for the exchange of ideas, experiences and knowledge.
- **Regional Integration Energy Commission (CIER):** Founded in 1964. Comprises electric utilities and organizations linked with the national electric sectors of the ten South American countries of Iberian roots. Objective-to promote and encourage integration of the regional electrical sectors.
- **World Energy Council (WEC):** A global multi-energy organization. WEC has member committees in over 90 countries, including most of the largest energy-producing and energy consuming countries. The 80-year-old organization covers all types of energy, including coal, oil, natural gas, nuclear, hydro, and renewables, and is UN-accredited, non-governmental, non-commercial and non-aligned. Published a report on Latin American and Caribbean energy markets.

- **International Energy Agency (IEA):** Formed in 1974, the IEA is the energy forum for the 26 OECD member countries. An autonomous agency linked with the OECD, the IEA's objectives include improving the world energy supply and demand structure, more efficient use of energy, and developing alternative energy sources to reduce dependence on any one source.
- **International Energy Forum (IEF):** A multilateral effort to enhance relationships between oil producing and consuming nations. The first Ministerial meeting took place in 1991, since which nine other conferences/forums have taken place to address issues relevant both to net producers and net consumers of energy.
- **Organización Latino Americana de Energía (OLADE):** Established in 1973. Promotes integration and development of the energy sector in Latin America. Has representatives from government and private sector.
- **Inter-American Development Bank–Energy and Mining Sector Board:** Promotes various energy projects in the region, especially Plan Puebla-Panama.
- **The World Bank–Energy and Mining Sector of the Finance, Private Sector, and Infrastructure Group of the Latin American and Caribbean Region (LCSFP):** The Group provides financial assistance for energy projects, in addition to technical and policy assistance, particularly in promoting institutional reforms.
- **Energy Charter Treaty :** Canada, the United States, and Venezuela are observers to this 1994 international agreement governing and guiding energy investment, trade, and transit practices of member countries and. More generally, the Charter seeks to promote cooperation on energy issues, broadly defined, in a multilateral setting.

Region-Specific

- **South American Regional Infrastructure Integration Initiative (IIRSA):** In cooperation with IDB and the Andean Development Corporation (CAF)— This initiative, begun at the Summit of South American Presidents in 2001, aims to modernize, develop and integrate the regional infrastructure in South America, including the energy sector.
- **Plan Puebla-Panama Initiative for Energy Integration (PPP):** Agreement between six Central American countries and the southern states of Mexico to promote regional development and integration of Central American countries with Mexico. Large project is the Electrical Interconnection System of the Countries of Central America (SIEPAC).
- **Council of Andean Community Ministers of Energy, Electricity, Hydrocarbon and Mines:** Met for the first time in early 2004. Has identified three major areas for action— integration of energy markets, the subregion's position in international hydrocarbon markets, and energy services and energy clusters.

- **Mexico-Canada Energy Bilateral Technical Mechanism:** In accordance with a 2002 Memorandum of Understanding between the two countries, this working group holds annual meetings to discuss work plans for various cooperation activities. Its initial term of operation is 5 years and may be renewed at the end of that term.
- **Energy Working Group (EWG) under the U.S.-Mexico Binational Commission:** Incorporated into the Binational Commission in 1996, this working group strives to strengthen bilateral energy trade and promote scientific and technological cooperation in the sector
- **Organization of American States–Renewable Energy in the Americas (REIA) Initiative of the Unit for Sustainable Development and Environment (USDE/OAS):** Offers government officials access to information on renewable energy and energy efficient technologies, and serves as a point of contact for the private sector into the energy sector in the Americas. REIA carries out institutional and technical capacity building programs, and sponsors periodic conferences and workshops on sustainable energy technologies.
- **Comisión Económica para América Latina y el Caribe (CEPAL) – Division of Natural Resources and Infrastructure:** Works with the Division of Sustainable Development and Environment to promote the efficiency and competitiveness of the energy sector while ensuring protection of the environment.
- **Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (OPANAL):** Encourages the peaceful uses of atomic energy and denounces nuclear weapons as a threat to all peoples and nations. Created as part of the Treaty of Tlatelolco, which entered into force in 1969.
- **Southern Cone Common Market (MERCOSUR):** Formed in 1991, Mercosur attempts to promote economic cooperation among the four member (Argentina, Brazil, Paraguay, and Uruguay) and six associate member (Bolivia, Chile, Colombia, Ecuador, Peru, and Venezuela) states, including the area of energy.
- **Andean Community of Nations (CAN):** Established in 1969, this organization seeks to achieve mutual economic development and integration among its member states (Bolivia, Colombia, Ecuador, and Peru; Venezuela withdrew in April 2006) in many sectors, including energy.
- **Iniciativa Energética Hemisférica (IEH):** Established at the First Summit of the Americas in Miami in 1994, this program seeks to promote regional energy integration, develop secure energy markets, ensure sustainable development, and encourage sound and sufficient investment in regional energy projects.
- **PetroAmerica:** This program, aimed at consolidation of Latin America’s oil production, began with the signing of a Protocol between Venezuela and Brazil in 1999.

- **PetroSur:** Formed in 2004, this organization is designed to be a conglomeration of the state oil companies of Argentina, Bolivia, Brazil, and Venezuela; the state oil companies of Ecuador and Colombia may also be included in the agreement. It has been established to work toward regional energy integration and may expand to facilitate regional integration more broadly.
- **PetroCaribe:** Initiated in 2005, this agreement provides favorable pricing arrangements to states in the Caribbean for Venezuelan petroleum products. It also attempts to establish an integrated regional energy market that is independent of the influence of advanced wealthy states, such as the United States.

Bilateral Agreements/Energy Cooperation Agreements

(Note: not comprehensive)

- Canada-Mexico-U.S. (NAFTA): Chapter Six of the NAFTA Agreement discusses cooperation in the areas of energy and basic petrochemicals
- U.S.-Mexico: In 2004, the U.S. Federal Energy Regulatory Commission and Mexico's Comisión Reguladora de Energía signed an agreement to promote enhanced interagency cooperation on projects affecting both countries' energy sectors. It also aims to bring about greater information sharing and closer regulatory frameworks for the two agencies.
- U.S.-Peru Trade Promotion Agreement: Signed in 2006, this agreement attempts to promote trade and investment between the two countries. Contains specific provisions for energy sector market operations.
- U.S.-Brazil: Signed in 2003, this agreement seeks to advance energy dialogue and coordination between these two countries. It has led to joint cooperation on such initiatives as the Carbon Sequestration Leadership Forum and the International Partnership for the Hydrogen Economy.
- U.S.-Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama (CONCAUSA)
- U.S.-Colombia: Concluded in 2006, this agreement will lower a number of trade barriers on goods and services and increase total trade levels between the two countries.
- Caracas Energy Agreement: Venezuela–Central America and the Caribbean: Signed in 2000, this accord expands the coverage of the San Jose Accord, ensuring that the pool of Latin American and Caribbean states having preferential access to petroleum resources will further expand.
- San Jose Accord: Mexico and Venezuela–Barbados, Belize, Costa Rica, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Panama, and the Dominican Republic - Formed in 1980 and managed jointly by Mexico and Venezuela, the agreement allows participating countries in the Caribbean and Central America to purchase crude oil from Mexico and Venezuela at reduced prices and on preferential financing terms.
- Bolivia-Argentina
- Bolivia-Brazil
- Bolivia-Peru
- Venezuela-Ecuador: This agreement was entered into in May 2006 by the two countries and provides for the refinement of Ecuadorian crude oil in Venezuela.

- Venezuela-Colombia: This 2006 pact laid the groundwork for the construction of a natural gas pipeline connecting the two countries and further cooperative actions in the energy sphere. Initially, Venezuela will import gas from Colombia until its domestic production meets its consumption needs, at which point it will begin exporting gas to regional and global markets.
- Venezuela-Cuba: The two governments signed this agreement in 2004, which provides for energy technology transfers and scholarships from Venezuela to Cuba, among many other preferential trade and investment provisions.
- Venezuela-Argentina: This accord represents an oil-for-food exchange program between the two signatories.
- Colombia-Panama
- Colombia-Ecuador
- Ecuador-Peru
- Argentina-Uruguay
- Argentina-Brazil

Working Paper