

ENERGY INVESTMENT ADVISORY SERIES

No. 5

From Upstream to Downstream:
Megatrends and Latest Developments
in Latin America's Hydrocarbons Sector



Program on Resources: Energy and Minerals
East-West Center
Honolulu, Hawaii

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Megatrends in Latin America's Hydrocarbons Sector Development

In recent years, Latin America's hydrocarbons sector has been characterized by reorganization, revitalization, regional cooperation, environmental awakening, and steady expansion. The pattern of these changes, which appear to be the megatrends of the region's hydrocarbons sector development, will continue during the rest of the 1990s.

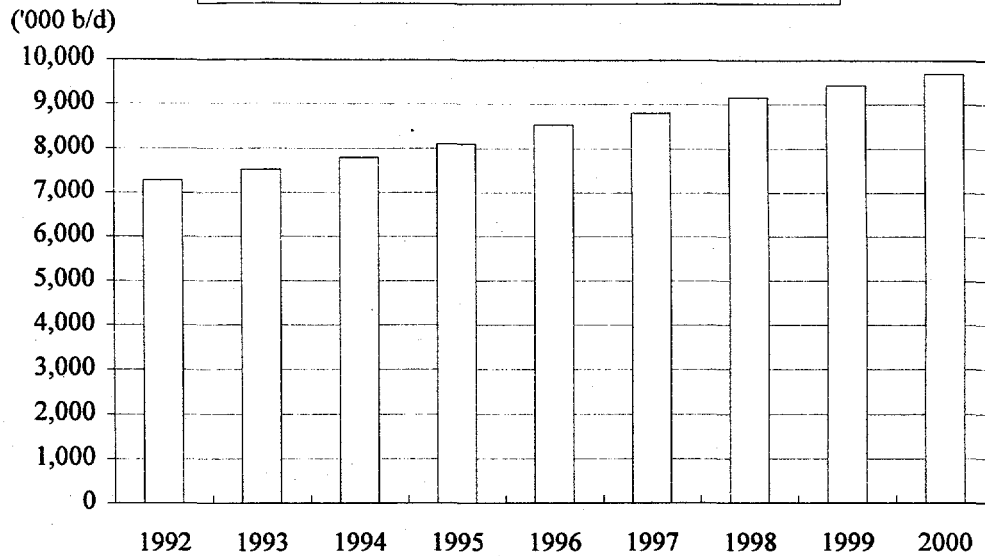
To further study the current situation and future prospects of Latin America's hydrocarbons sector, we critically summarize in this short article the key issues in the region's oil and gas development. These megatrends in Latin America's hydrocarbons sector development will impact not only the future energy demand and supply in the region, but also global oil flows in the North American market and across the Pacific Ocean.

The Upstream Oil Sector: From Big Bonanza to Small Blessings

Exploration and Production (E&P) activities have been strengthened in a number of countries, including Mexico, Venezuela, Colombia, Brazil, Ecuador, and Peru. While some countries continue to receive only small blessings in their search for oil, major new oil fields are reported to be found in Colombia and Brazil. The regional crude production is expected to increase to 9.7 million b/d in 2000 (Figure 1). The majority of these increases will come from Venezuela, Mexico, Colombia, and Brazil. In the meantime, oil exports are forecast by OLADE¹ to increase to 4.2 million b/d, while imports are set to decline slightly to 996 thousand b/d (Figure 2) as import requirements in Brazil are expected to drop by the end of the decade. Some of the highlights for future oil production in the region are found in the following countries.

¹ The Organización Latinoamericana de Energía (OLADE), also known as the Latin American Energy Organization, is the association of the energy ministers of Latin American governments.

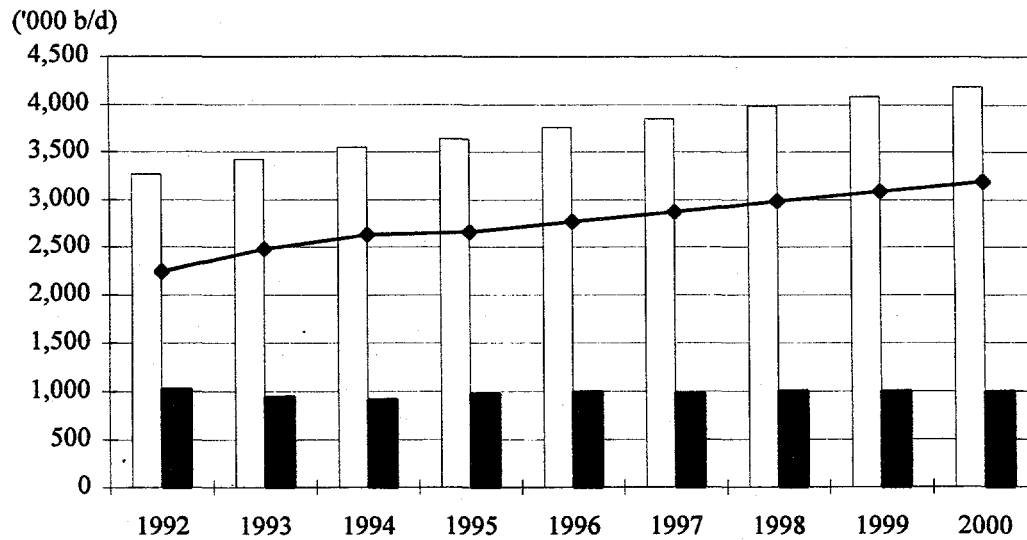
Figure 1
Latin America's Oil Production and Forecasts, 1992-2000



Sources: OLADE and PREM Data File.

Note: 1992-94 data are actual.

Figure 2
Latin America's Oil Exports and Imports, 1992-2000



Sources: OLADE and PREM Data File.

Note: 1992-94 data are actual.

Exports Imports Net Exports

Colombia. Ecopetrol, Colombia's national oil company, has recently announced the discovery of Coporo, which could have total reserves of 3.6 billion barrels. Even without Coporo, a long-awaited oil boom has emerged as crude flow begins from the Cupiagua and Cusiana fields. The crude output reached 476 thousand b/d in 1994, up 4 percent from 457 thousand b/d in 1993. Production is forecast to be anywhere between 900 thousand b/d and 1.2 million b/d by 2000. In this regard, the forecast of OLADE on Colombia crude production tends to be conservative. Ultimately, Colombia will become a giant oil exporter after Mexico and Venezuela.

Brazil. The Brazilian state oil company, Petrobras, relies on the Campus Basin to provide most of the country's domestic crude output. After surpassing the 500 thousand b/d mark early this year, crude production from the Campus Basin continues to increase. Total crude output was 653 thousand b/d in 1994 but could well exceed 700 thousand b/d in 1995. Some new discoveries in Brazil boost the country's oil reserves. Crude production is expected to reach between 900 thousand b/d and 1 million b/d by the year 2000, which will help reduce the oil import requirements of this country.

Mexico. Despite the recent Mexican peso crisis, Mexico is still resisting direct foreign investment in the upstream oil sector. Crude production has remained flat in the past three years, averaging 2.67 million b/d during the period 1992-94. According to OLADE, Mexico's crude production will increase during the rest of the decade, reaching 3.2 million b/d in 2000.

Venezuela. As the only OPEC member in Latin America, Venezuela is the second largest crude producer in the region, after Mexico. In 1994, the country's national oil company, PDVSA, produced a total of 2.62 million b/d of crude oil, up 6 percent from the 2.48 million b/d produced in 1993. The way leading to a partial opening of Venezuela's oil industry proves to be long and tortuous. The area that PDVSA is already opening for foreign participation is the reactivation of the country's marginal oil fields. Other proposals, such as allowing foreign investors to participate in profit sharing contracts and in heavy oil joint ventures, have been on the table for a long time, but are still being

debated by the Venezuelan Congress. Crude production from Venezuela is forecast to increase to 2.8 million b/d in 1997 and 3.3 million b/d in 2000, but PDVSA plans to produce more than this amount.

Argentina. In terms of percentage gain in crude, Argentina has had the highest growth rate in oil production, rising 11.5 percent from 594 thousand b/d in 1993 to 662 thousand b/d in 1994. However, the country has seen a drop in gas production from 2,484 million cubic feet per day (mmcf/d) in 1993 to 2,312 mmcf/d in 1994. For 1995, both oil and gas production are expected to be higher. The serious challenge for Argentina is that so far no giant discoveries have been made since the privatization of YPF, Venezuela's national oil company, began a few years ago. The proven oil reserves stand at only 2.4 billion barrels, giving the country just about 10 years worth of production at the current production level. Based on the current proven reserves, future production of Argentinean oil will be negatively impacted.

Ecuador. The E&P activities of foreign and private oil companies have given Ecuador's upstream oil sector a better picture. In the past three years, crude production in Ecuador increased steadily from 330 thousand b/d in 1992 to 354 thousand b/d in 1993 and 363 thousand b/d in 1994. Exploration in 1995 is expected to be strong. For the remaining years of the decade, in contrast to earlier expectations, production from the Oriente area is expected to continue to rise moderately and will reach its peak by the end of the decade. In the meantime, output from other sources, especially areas operated by foreign oil companies, will also increase.

Peru. After six consecutive years of decline, crude output in Peru began increasing in 1992 (when it reached 116 thousand b/d) and has increased moderately since then, rising to 129 thousand b/d in 1994. A full-scale opening of the Peruvian oil industry has been delayed in 1995 because of the elections, but is expected to proceed during the second half of the year. The potential oil and gas reserves in the Camisea fields are huge, but much of the future production depends on how successful the government is in mobilizing the needed funds and attracting foreign oil companies into the country.

Bolivia. Bolivia's hydrocarbons future relies on the country's gas rather than oil potential, although crude production has been increasing in the past few years. In 1994, Bolivia produced 28 thousand b/d of crude oil, up from 24 thousand b/d in 1993. Crude production in the near future will continue to be moderate. The likely privatization of YPFB (the national oil company) and the involvement by foreign oil companies in the upstream activities will hopefully impact the country's hydrocarbons development positively for a long period of time.

Chile. In 1992, the crude output of 12.9 thousand b/d in Chile was only 32 percent of its production in 1982. Since 1992 production has increased slightly to 13.5 thousand b/d in 1994; much of the increase was due to the coming on line of several relatively small fields in southern Chile and increased foreign exploration. While the country is a net oil and gas importer, Chile's ENAP (the national oil company) is active in foreign exploration in other Latin American countries, such as Argentina, Ecuador, and Venezuela.

The Downstream Oil and Gas Sector: Revamping the Refineries

Refineries were over-built in Latin America during the 1970s. As regional oil consumption declined during the first half of the 1980s, many refineries of various sizes across the region had to shut down in order to reduce the refining capacity. The situation started to change during the second half of the 1980s. As we entered the 1990s, many Latin American refineries became obsolete, and some additional plants have had to close in the past few years. In the meantime, oil consumption has started to increase in many countries since the late 1980s. These changes have led to the necessity to add new refining capacity and upgrade refineries. For the next few years, substantial investment is needed not only to increase total refining capacity, but also to revamp the existing plants to make them suitable for increasing demand for light products.

The current total refining capacity in Latin America and the Caribbean (excluding Puerto Rico, the U.S. Virgin Islands, and the Netherlands Antilles) is about 6.3 million b/d. For the next five years, based on OLADE forecasts, the crude distillation capacity in the region is likely to increase by 2 million b/d to 8.3 million b/d in 2000, requiring at least US\$70 billion to complete the expansion and related upgrading.

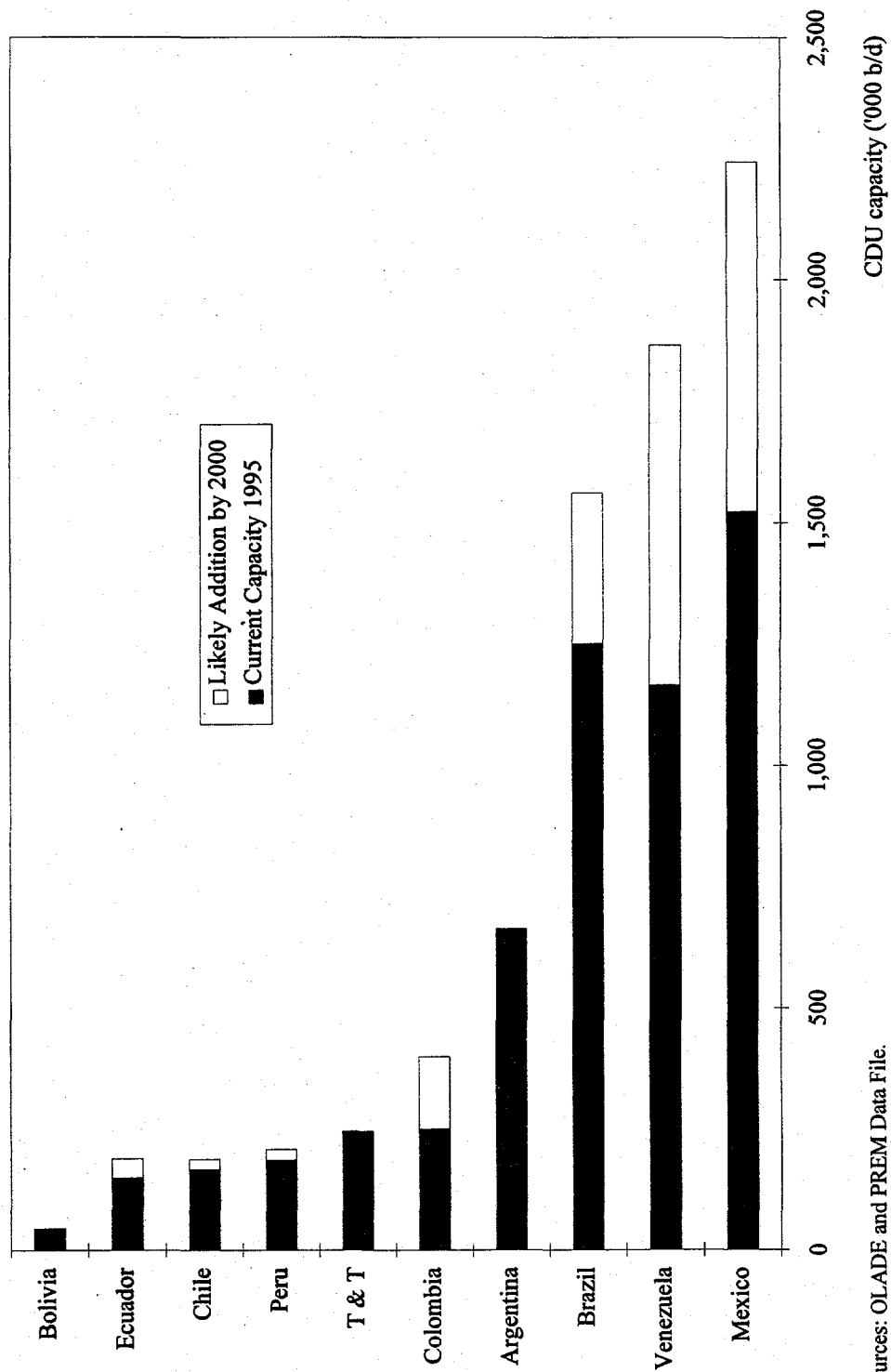
Of the 2 million b/d of new crude distillation capacity increase in Latin America, about 720 thousand b/d will be in Mexico, 700 thousand b/d in Venezuela, and 310 thousand b/d in Brazil (Figure 3). We believe that expansion of refining capacity in the region is necessary, but it is doubtful that Mexico and Venezuela can bring this many refineries on stream over the next five years. Other countries that will increase their crude distillation capacity include Colombia, Ecuador, Peru, and Chile. All these countries, plus Argentina and Trinidad and Tobago, will also upgrade their secondary refining capacity to various degrees during that period.

Reform of National Oil Companies

Until the beginning of this decade, the hydrocarbons sector in many Latin American and Caribbean countries was largely closed to private domestic and foreign investment. Over the past few years, in their efforts to reduce costs and increase efficiency, national oil companies in the region have been undergoing substantial reforms, which include reorganization, demonopolization, and partial and full privatization.

Argentina has so far been the strongest Latin American advocate for privatization of the state oil and gas sector. In 1991, Argentina began to privatize the assets of its national oil company, YPF, and its national gas company, Gas del Estado. In late 1992, the entire Gas del Estado was sold to private domestic and foreign investors. Also, YPF as a state oil company has been relegated to the history books, and the oil company is now largely owned by private shareholders. The success or failure of Argentina's bold push for privatization may offer important lessons for other Latin American and

Figure 3
Refining Capacity in 1995 and Likely Expansion
in Selected Latin American Countries to 2000



Sources: OLADE and PREM Data File.

Caribbean countries' national oil and gas companies. So far, YPF has performed well, both domestically and internationally. After acquiring the U.S. oil company Maxus Energy in April 1995, YPF is truly going international for hydrocarbons E&P. The purchase of Maxus Energy will enhance YPF's position in the rest of Latin America and in Southeast Asia as well.

In Peru, the Fujimori government is vigorously promoting the privatization of state-owned Petroperu. In 1991, Peru eliminated the monopoly of Petroperu by instituting policies that included offering small refineries for sale and granting more concessions to foreign and domestic private oil companies, especially for upstream oil development. Since 1994, the pace of privatizing Petroperu has been accelerated as the 102,000 b/d La Pampilla refinery and 62,000 b/d Talara refinery were offered for sale. The government established a new petroleum regulatory body, Perupetro, to regulate and oversee exploration contracts with foreign oil companies. However, the progress of Petroperu's privatization has been delayed in early 1995, owing to the presidential elections. While the government is determined to go ahead with the privatization plans, the timing of the plans' implementation remains unclear, and further delay is still possible.

Pemex, the giant Mexican state oil company, which ranked first among the world's national oil companies in number of employees and third in oil production in 1990, began its painful but necessary restructuring in 1991 in order to downsize its staff and become more efficient. In mid-1992, four new subsidiaries—Pemex Exploration and Production, Pemex Refining, Pemex Gas and Basic Petrochemicals, and Pemex Secondary Petrochemicals—were created, each with its own board of directors and responsibility for its own profits and losses. In addition to the organizational change, financial reforms have also been under way in Pemex aiming at making Pemex more independent. The bottom line is, however, that Pemex will not be privatized, despite pressures from all directions, including the recent financial and currency crisis facing Mexico. In any case, Pemex still has a long way to go to fully realize the government's

targets for dramatically improving the efficiency of the state oil company, which will have a profound impact on Mexico's oil and gas industry in the future.

The other two giant oil companies that are relatively tightly controlled by the state are PDVSA of Venezuela, and Petrobrás of Brazil. PDVSA is in the process of demonopolizing its upstream activities by opening up the development of marginal fields to private participation, and by offering profit sharing terms and joint ventures in heavy oil development. In Brazil, a constitutional amendment to demonopolize Petrobrás was originally scheduled for late 1993 but never brought to a vote. In mid-1995, however, constitutional amendments passed the Brazilian congress, which provide for opening up the oil and gas industry to the private sector. The new Brazilian government of Fernando Henrique Cardoso is still facing the crucial decision of implementing these amendments. The buzzword today in Brazil for the future of Petrobrás is "flexibilization". While the word "flexibilization" is not really properly defined, the consensus is that the role of Petrobrás has to be changed so that more capital can be attracted to the hydrocarbons sector.

Other state oil companies are also going through various kinds of reorganization and reforms. Petrotrin, the newly consolidated Trinidad and Tobago national oil company, has already started its gradual privatization. YPFB of Bolivia has offered to transfer half of its assets to international and domestic private investors but is still waiting for the final revision of the Hydrocarbons Law. Bolivia may use Petroperu as a model for YPFB privatization, but much depends on the success of Petroperu in its own efforts to sell the state assets. For Ecuador, the major reform of Petroecuador may take place in the downstream sector.

Investment Climate

As mentioned earlier, substantial investment in all areas of the Latin American and Caribbean hydrocarbons industry is needed. Large producers such as Mexico and

Venezuela need tremendous amounts of investment to maintain or increase their production levels. Brazil has the potential to substantially increase its oil reserves and thus needs sufficient funds for upstream exploration. Medium-size oil producers such as Argentina, Ecuador, Peru, and Trinidad and Tobago are striving to reverse the declining crude oil reserves in their countries and require various levels of investment in the search for new oil.

Private investment plays a crucial role in meeting the capital requirements for the development of the hydrocarbons sector in Latin America, and is estimated to account for about 40 percent of the total for the region during the remainder of the decade. Most of this share is expected to be provided by multinational oil companies, international banks, and foreign and domestic independent oil companies.

Given the importance of attracting private/foreign investment to meet the demand for funding, a favorable investment climate needs to be established in the region to realize this goal. The investment climate is a complex issue and varies from country to country in the region. Measured by the openness of the upstream sectors for risk investment, the countries with small-to-medium-size oil resources are more willing to open to foreign investment. This group is led by Colombia and Argentina, and followed by Peru, Ecuador, Bolivia, Trinidad and Tobago, Chile, and Guatemala. The giant producers such as Mexico, Venezuela, and Brazil are adopting alternative measures to attract foreign investment. The latest developments in these three countries are the possible opening of Mexico's natural gas transportation, likely profit sharing schemes in Venezuela, and further opening of the oil and gas industry in Brazil.

While the governments of many Latin American and Caribbean countries have revised their hydrocarbons policies in order to introduce more foreign capital into their hydrocarbons sectors, a number of pending issues are linked with broader political and economic developments in the region. The nationalistic constitutions of Mexico and Venezuela, the guerrilla activities in Colombia and Peru, the territorial dispute between Ecuador and Peru, the uncertainty of the reforms under the new administration in Brazil,

and the fuel price policy dispute in Ecuador are some of the many unresolved issues that may complicate the climate for foreign investment.

Regional Cooperation

Since the end of the Cold War, regional cooperation has become attractive as common interests and mutually beneficial trade and investment opportunities are developing throughout the Latin American region. In the hydrocarbons sector, organizations such as OLADE and ARPEL² are playing significant roles in promoting energy security and efficiency as centers of technical assistance and information. In addition, associations such as the Andean Pact, the San José Accord, and Mercosur are encouraging greater integration of Latin American and Caribbean energy markets.

The Andean Pact—between Venezuela, Colombia, Ecuador, Peru, and Bolivia—provides funding for oil and gas development projects in some of its member countries through the Andean Development Bank. The San José Accord is between the two oil giants, Venezuela and Mexico, and nine Central American and Caribbean countries: Costa Rica, El Salvador, Guatemala, Nicaragua, Panama, the Dominican Republic, Barbados, Belize, and Jamaica. Through this accord, the Central American countries will have a secure supply of a certain amount of oil from Mexico and Venezuela. Mercosur is an organization established to build a common market between Brazil, Argentina, Uruguay, and Paraguay. Energy integration, especially intraregional gas trade, is part of the organization's work.

In addition to the multinational organizations, bilateral energy links among Latin American and Caribbean countries are developing rapidly. Venezuela and Colombia

² The Asistencia Recíproca Petrolera Empresarial Latinoamericana (ARPEL), also known as the Association of Petroleum Enterprises of Latin America, was founded as an association of state oil companies. In May 1993, ARPEL's original name was modified by changing the word *estatal* (which implied state assistance) to *empresarial* (which implies a broader-based business orientation), thereby opening the way to future membership for private-sector companies and reflecting the rapid change in the region's hydrocarbons sector.

have strengthened their ties through the trade in electricity. The huge gas supply contract between Bolivia and Brazil, the implementation of which has already started, is a model for a natural gas network in the region. Similar gas supply agreements are expected to be reached among Peru, Argentina, and Chile. A number of countries in the region are jointly developing hydroenergy resources along their common borders.

It should be noted that regional cooperation can go both ways for the Latin American region: it can become more outward looking or inward looking, depending on how the region positions itself in its interaction with the rest of the world. Compared with most East and Southeast Asian economies, the Latin American countries were more closed to the outside world in the past in terms of economic development strategies, and therefore it will be challenging for the Latin American governments to promote regional cooperation based on the principles of the open market and free trade. The possible southward extension of the North American Free Trade Agreement (NAFTA), and further expansion of the agreement in the future may help promote the market integration in the Western Hemisphere. In the meantime, the active participation of Mexico and Chile in the Asia-Pacific Economic Cooperation (APEC) forum may open the way across the Pacific Ocean for global economic and energy integration.

Environmental Awakening

Alongside the hydrocarbons sector development, a wave of environmental awakening has emerged in Latin America. Concerns are mounting over the impact of upstream activities on the natural environment in sensitive jungle ecosystems and offshore areas, as well as the effects of pollution from sources ranging from motor vehicles to power plants, refineries, and petrochemical plants throughout the region. However, much has to be done to set up legal systems to protect the environment as well as develop the hydrocarbons resources properly. In recent years, some negotiations between environmentalists and oil companies have been confrontational in some countries.

Despite of the lack of well-established laws and legal systems, progress has still been made in the region in hydrocarbons-related environmental protection. Many countries are improving the quality of refined products to reduce pollution. In Mexico, for instance, the share of unleaded gasoline in total gasoline production increased from 4.8 percent to 50 percent in merely three years during the period 1991-94. Pemex has pledged to further reduce the lead level in the leaded gasoline in the next few years. Mexico also imports MTBE to improve the quality of gasoline and plans to build several new MTBE plants over the next five years. Other countries that are planning to build their own MTBE capacity include Brazil, Venezuela, and Argentina.

Another indication that the Latin American and Caribbean governments are making efforts to protect the environment is the projected increase of gas use in a number of countries. As regional trade expands, gas will become the fastest-growing energy product traded in Latin America.

Concluding Remarks

The possible future development of Latin America's hydrocarbons sector outlined in this report has created opportunities as well as challenges for the governments in the hydrocarbons-resource-rich countries and potential foreign and private domestic investors in the region. As the dynamic change continues, the success and failure of dealing with these challenges and utilizing the opportunities will, in turn, impact the future prospects of Latin America's hydrocarbons sector development.

The biggest challenge to many oil and gas producers in the region is to successfully achieve the multiple goals of meeting growing demand for energy, using scarce and limited capital more efficiently in the hydrocarbons sector, expand the oil export base, and keep the economy growing rapidly. To achieve all these simultaneously is not easy. Since the beginning of the 1990s, although the regional economy appears to

be moving in right direction, interruptions have happened in individual countries, where the prolonged financial, fiscal, and debt crises of the 1980s are not distant memories.

The opportunities for further development of the hydrocarbons sector are tremendous in the region. In the upstream area, new discoveries of oil have been scored in Colombia and Brazil. Moreover, Ecuador, Argentina, Peru, and Bolivia are further open to foreign investment in E&P. Various signs of relaxation of state control have appeared in Mexico, Venezuela, and Brazil, although the governments in different countries adopt different strategies in easing the state monopoly. In the downstream area, the needs of revamping the aging refineries and constructing new plants have given rise to the opportunities for foreign and private investment into the refining sector. For foreign investors, the good prospects of oil in the region and the continuous improvement of the investment climate will offset some of the political, economic, and financial risks that are associated with some Latin American countries.

Recent Developments in Latin America's Oil and Gas Sector

General

Argentina. As companies surge ahead with exploration, production, refining, and transportation efforts, the oil sector in Argentina will require US\$27 billion in capital spending between 1995 and 2004. US\$15 billion is expected to come directly from YPF. Exploration will require US\$6 billion; production will take a further US\$14 billion; transportation needs amount to US\$3.7 billion; US\$900 million will go to refining; another US\$900 million to sea and land storage and transportation; service station renovation and modernization will cost US\$1 billion; and environmental work will cost an estimated US\$500 million. By 2004, Argentina expects to double its 1994 oil production of 2.2 billion barrels of oil, and increase its annual natural gas production from 18.2 trillion cubic feet (Tcf) in 1994, to 19.5 Tcf in 2004.

Bolivia. The Bolivian government has affirmed its commitment to opening the oil industry to competition through the privatization of YPFB, the state oil company, due by the end of 1995 or the beginning of 1996. There have been concerns over the sale of YPFB and worried that the buyers may have a monopoly in the market. In response to the fears, however, government officials underlined that there will not be a monopoly in Bolivia, given that there are already six companies operating in Bolivia's upstream sector. Maxus, Occidental, Perez Companac, Tesoro, Pluspetrol, and Sopetrol are already involved in exploration activities in the country. In March 1995, nine investment houses were prequalified by the government to handle the capitalization, among which are Merrill Lynch, Lehman Brothers, and Goldman Sachs. One will be elected to implement the capitalization strategy, yet to be made public, and designed by the consulting firm Booz, Allen and Hamilton.

YPFB's 1995 budget is set at US\$93 million, 72 percent of which will come from the Bolivian Treasury and 22 percent from the Andean Development Corporation. The original proposal put the YPFB budget at US\$103 million, but the government reduced it to US\$65 million before finally compromising, in the face of complaints from YPFB officials, at US\$93 million. This amount, added to US\$80 million from the private sector, brings the total budgeted expenditure for the oil industry in Bolivia for 1995 to US\$173 million. YPFB intends to increase its oil production from the current 32 thousand b/d, to 35 thousand b/d, through improvement of its Chapare and Boomerang fields in Santa Cruz.

Following the deregulation terms in the Gas Sale Contract of March 1994, the Bolivian government agreed to cut the tariffs on lubricants imported from Argentina: by 50 percent beginning April 1, 1995, and totally beginning June 1, 1995. At the same time, the tariffs levied on natural gas exported to Argentina were also reduced by 50 percent beginning June 1, 1995. Natural gas tariffs will be completely lifted beginning October 1, 1995.

Brazil. The Brazilian government's proposal for demonopolizing one of the oldest state oil companies in South America, Petrobras, has been approved by the Congressional Justice Committee. Petrobras's monopoly power over the country's petroleum industry has existed for forty-two years. The current proposal calls for ending the company's monopoly power in the oil industry and distribution of natural gas. This has been delayed for two years, and it still remains unclear how long the demonopolization will take. It is very obvious that, at present, the complete privatization of Petrobras is being ruled out. Instead, the government intends to "flexibilize" the monopoly in areas such as refining and transportation and make them open to foreign joint ventures.

Colombia. The Colombian government has recently announced a series of policy measures, sending mixed signals to the oil industry. All of these measures involve changes in the legislation that governs investment in the oil sector. First, the government decided to sponsor legislation to keep the income tax rate at 37 percent, which has disappointed foreign investors who wish to see the rate reduced. Second, the 7.5 percent surtax, which was introduced in 1992 and levied only on oil companies, remains. Third, the government will seek to impose a 14 percent tax on imported heavy machinery for the oil sector, but it is deductible in the following year. Fourth, the government will ask Congress to reduce the profit remittance tax from the present 15 percent to 7 percent—a move that is welcomed by the industry. Finally, the government has vowed to exempt new investors from the controversial "war tax" of around \$1 per barrel.

Mexico. Following the currency and financial crises in late 1994, the Mexican Congress agreed to consider legislation that would allow Mexico to use oil as collateral for up to US\$40 billion U.S. guarantees. Mexico's annual exports have receipts of about US\$7 billion, and the United States intends to use that money as a guarantee. The country's currency crisis as well as change of top management have caused disturbances in Pemex, and the state oil company is trying to recover and move forward. To ensure the stability of future oil supply, Pemex began in early 1995 to add new clauses to contracts that are being and will be awarded to foreign and private investors. On the one hand, the new

clauses will request foreign suppliers to assume more responsibility during the implementation of the contracts. On the other hand, the new clauses will allow an automatic adjustment of the prices if the peso is devalued further.

A related question is the issuing of bonds by Pemex. An earlier issue proposed in December 1994 was delayed, apparently owing to the economic and political crisis in Mexico. In March 1995, however, Pemex successfully placed a US\$135 million Yankee Bond issue, which is backed by the U.S. Eximbank. The proceeds of the bond sales will be used to finance exploration projects and replace short-term credits issued by Pemex. Despite the successful issue, Pemex may still be facing a downgrade of its credit ratings because of the use of its oil export earnings as collateral for the U.S. bail out.

Peru. In 1995, Petroperu will continue to strengthen its activities in the upstream oil sector. The state oil company's budget for upgrading operations will increase by 50 percent to US\$89 million, of which approximately 60 percent will go to the upstream E&P. However, funds allocated for new projects were reduced by half. The year 1995 will continue to be a profitable year for Petroperu, but profits are forecast to decline from US\$184 million in 1994 to US\$75 million this year. The major cause of the profit decline is higher costs of operations, although Petroperu plans to maintain the same amount of sales in 1995 as in 1994. As for new projects, the small Chambira oil field is expected to be on stream and produce 3.9 thousand b/d this year.

Trinidad and Tobago. The new company Petrotrin, which was established through the merger of Trintopex and Trintoc, has reported a profit of US\$9.1 million for the fiscal year 1993-94. During the last year prior to the merger, 1992-93, the two companies reported a loss of about US\$37.5 million.

Venezuela. In 1995, PDVSA's operating budget has been raised to nearly US\$4 billion. An additional US\$5 billion has been earmarked for investment in new projects. Production this year is planned to reach 3.2 million b/d, which will be the record high

since the nationalization of the oil industry in 1976. For 1995, PDVSA plans to export as much as 2.4 million b/d of crude and products.

A special commission has been set up to investigate claims by Aquiles Fernandez, director general of the hydrocarbons sector of the Ministry of Energy and Mines, that domestic gas subsidies cost the country US\$35.3 million a year. According to Fernandez, the price of natural gas has not changed since 1993. He added that revision of the tariffs of LNG (liquefied natural gas) in both the industrial and domestic sectors was under consideration.

PDVSA increased its exports of RFG (reformulated gasoline) to the United States from 32,000 b/d in January, to 45,000 b/d in March. PDVSA claims it has agreements to sell virtually all of its RFG production, all of which it exports to the United States. PDVSA reportedly plans to increase its RFG production to 65,000-70,000 b/d in the coming months despite reduced demand in the United States.

Amid accusations that PDVSA bought seamless tubes at dumping prices, there are fears that the opening up of the country's oil industry will not bring local benefits. In 1994, PDVSA reputedly bought only 27,500 metric tons (tonnes) of seamless tubes—a quarter of its total requirements—from BPCA, the largest manufacturer in Venezuela. As a result, BPCA operated at a loss of US\$15 million last year. PDVSA denies the allegations, saying that it received no less than seven quotes, all of which were better than BPCA's prices, and that it saw no signs of dumping. There are fears that the situation will worsen when PDVSA's profit-sharing deals come into being, and foreign firms assign work to overseas firms. Some politicians are questioning the program and many are demanding that the government scale it back. Leaders of the country's largest political party, Acción Democrática (AD), have questioned PDVSA's intentions to allow Congress to consider the entire program as a whole, rather than by individual profit-sharing deal as has been the case with previous joint ventures.

PDVSA will pay back US\$856 million of debts this year according to company officials. It accrued such debts through its acquisition of Citgo, its terminal in the Bahamas, and normal company operations. PDVSA's debt repayment for 1996 will be around US\$997 million.

As part of an extensive program to put 80,000 natural-gas-powered vehicles on Venezuelan roads, PDVSA affiliate Corpoven has plans to construct or modify 200 service stations by 1997, so that they can sell compressed natural gas (CNG). Venezuela presently has only six CNG outlets.

U.S. Deputy Secretary of Energy Bill White allayed Venezuelan fears that the U.S. government would restrict crude oil imports. Exporting 65 percent of its crude production to the United States, Venezuela feared protectionist moves as a measure to reduce U.S. dependency on foreign oil. In a three day visit to Venezuela, White said that there would be no arbitrary legal quota or fee on the importation of crude oil. He added that the United States would attempt to stimulate domestic production and waste less energy in ways that would have a minimum impact on the U.S. economy and that are consistent with free trade.

Upstream

Argentina. The terms of the production sharing contract between AMOCO and YPF, for the Cerro Dragon-Anticlinal Grande area, in the Gulf of San Jorge Basin, have been modified. Under the new agreement, which will cost YPF US\$66 million, YPF will pay all provincial royalties on all production from that area, while retaining its 12.2 percent share of production.

Snamprogetti (ENI) of Italy has signed a joint-venture agreement with YPF, allowing it to take part in the development of the Lomo de La Lata gas field, the largest in Argentina. ENI will install 1.5 mmcf/d of gas production and treatment plants, which will produce methane and other liquid hydrocarbons. The accord also allows for the

construction of a recompression plant for treated gases, and for a 600-km pipeline which would transport 70,000 b/d of recovered liquids to the Bahia Blanca port on the Atlantic.

A US\$13 million exploration, 130 miles southeast of Rio Deseado, has produced no evidence of oil in the area. The 10,500-foot well, which was drilled by YPF and Pluspetrol of Argentina, Brazilian state oil company Petrobras, and Norcen Energy of Canada, has cast serious doubt over prospects in the offshore San Julian Basin. The project reportedly found no signs of oil and gas trapping sedimentary layers in the region. The results of this drilling have also raised questions about the possibility of major oil and gas finds offshore the Falkland Islands. The two areas apparently have a very similar geology, and the YPF-Petrobras well was considered by many as an indicator of potential findings in the Falkland Islands offshore area.

Although neither company confirms signing any deal, YPF and British Gas have reportedly reached a settlement to share oil and gas produced from the Falkland Islands offshore area. This agreement would mean that both countries share the royalties from production. The exploration zone between the offshore Rio Gallegos area and the north of the Falklands would include six offshore blocks that Argentina did not put up for bid in 1994; it opted to do so in order to encourage joint ventures using those blocks. Other companies may participate in the exploration, including Petrobras of Brazil, which is a leader in deep-water exploration, U.S. company Union Texas, and Perez Companac of Argentina. Although the recent project by YPF-Petrobras in the offshore San Julian Basin has cast serious doubt about whether or not oil will be found in this region, a 1993 study by Geko Prakla and British company Spectrum apparently confirmed a sedimentary basin. The 1993 study also concluded, though, that the area would require several wells under difficult conditions, and that costs would be high.

The government has recently agreed to a request by local producer Cadipsa to allow the company to sell its share in the Meseta Espinosa field to Shell. The acquisition of the final 35 percent of the field in the Santa Cruz province, means Shell now has a 100 percent stake in the field.

More than twenty-four months after the debate began, the government has finally submitted a bill to Congress that would change Argentina's twenty-six year old hydrocarbons law. The law, which was approved in July 1995, would create a commission to better regulate the hydrocarbons industry. It would permit states to impose taxes and royalties on the oil sector. Such taxes, however, would be deductible from federal tax bills. It is hoped that the result will be an increase in exploration in the country, through the creation of a stable environment. It is hoped that further incentives for exploration will arise from the fact that under the new law, states can negotiate with oil companies on royalty levels—currently 12 percent.

Argentina's YPF has successfully acquired Maxus Energy for the princely sum of US\$750 million—a move which the company says will strengthen its international position—despite the fact that Maxus is not a profitable company. YPF insists that by 1997, this situation will be reversed. The Maxus exploration budget will be eliminated, instead relying on YPF for exploration. In addition, the Maxus gas properties in the United States could be sold outright, or farmed out. The acquisition of Maxus brings YPF the technology, experience, organization, and assistance the company needs in order to work internationally. The move also means that YPF now has operations in almost every South American country, with the major exception of Brazil.

Bolivia. Work is scheduled to begin soon by Esso on a natural gas exploration project in the Oruro department, south of La Paz. The project will cost a total of US\$9.3 million, including US\$3.2 million for the installation of a distribution system to 3,000 households if the drilling is successful.

Brazil. The Petrobras contract for the turn-key conversion of a semi-submersible unit to the Petrobras XXVI floating production system has stimulated interest among domestic and foreign companies alike. Far Eastern Levingston Shipyard, Sembwang of Singapore, Lisnave of Portugal, and America's Reading and Bates, are the four overseas firms interested in the job, which has also attracted six domestic companies. The company that

is awarded the turn-key contract will have to provide a used semi-submersible unit and convert it to a system capable of producing 100 thousand b/d at 13,000 feet.

The new government apparently has aspirations to reintroduce oil exploration risk contracts seven years after abolishing them. It reputedly sees this as an intermediate step to ending the current monopoly—a move that is itself highly controversial—and plans to ask Congress to legalize the granting of risk contracts to overseas firms, and to permit the use of foreign capital in Brazil's natural gas sector. Risk contracts were first introduced twenty years ago, but at the time of their abolition only one company, Pecten (Shell-USA), had made a commercial strike. Thirty other foreign companies found nothing. The contracts were heavily criticized by the foreign participants, who claimed that Petrobras took no risks at all and simply stepped in to buy ready-to-produce fields at discount rates. No details are yet available about the form the risk contracts may take if and when they return.

Petrobras's deep-water production projects have run into various problems following a shortage of equipment and materials. Operations at the Marlim Field, which is at a depth greater than 3,000 feet, are particularly affected. In the short run at least, direct purchasing of equipment is expected to become more frequent than the awarding of procurement contracts. Petrobras recently awarded a contract to Stena's Offshore Apache pipe-laying vessel to work in the Campos Basin. The contract was awarded without a tender, and is expected to provoke international complaints from companies who argue that they already have, or expect to have in the near future, the capability to do the job.

Chile. Sipetrol started production from twenty-one wells in the Strait of Magellan with the initial output estimated at 12,600 b/d. Sipetrol is a consortium formed by the exploration arm of ENAP and Argentina's YPF.

Colombia. Abolition of the war tax, which brings Colombia almost US\$500,000 a day, is among incentives designed to increase exploration in the country. In a bid to make Colombia a more attractive possibility to foreign investors, the government will scrap the

tax that was supposed to pay for the protection of oil industry facilities. Instead of the US\$1 per barrel tax, companies will now have to pay the military directly for any protection they receive. By far the greatest incentive, however, is the government's promise to pay dry-hole costs, which will compensate about half of investors' costs.

Oil from Colombia's Cusiana field could satisfy up to a quarter of U.S. sweet crude requirements, according to Ecopetrol estimates. Oil from the Cusiana field, which will come on stream at a time when declining domestic production forces the United States to rely more heavily on imports, is ideal for refining into premium quality light products. In addition, the increased U.S. dependence on Colombia could improve Bogota's relations with Washington.

Sources say that Colombia could be exporting at least 1 million b/d of crude oil by the turn of the century, following recent the recent discovery of the Coporo field in the Andean foothills. Coporo is estimated to contain 3.9 billion barrels of crude oil, making it twice the size of Cusiana and Cupiagua combined. It, and other discoveries, will make Colombia one of Latin America's major oil exporters, along with Mexico and Venezuela. This year, the Cusiana field will add US\$1 billion to last year's oil export revenue of US\$1.4 billion, and by 2007, that total will be US\$6.2 billion. In addition to the Cusiana and Cupiagua fields, future output will come from a dozen contracts in the Llanos Basin.

Ecuador. The U.S.-based Santa Fe company has identified several high-quality prospects on Block 11 in the Oriente Basin. The company is now leading a four-company consortium, in which Santa Fe (Ecuador) is the operator and holds 35 percent interest, to further explore the block after a contract was signed. The other three partners are Nippon Oil Exploration (Ecuador) Inc. (30% stake), Yukong Ltd. (21%), and Korea Petroleum Development Corp. (14%). The total investment under this product sharing contract is estimated at US\$10 million. Before drilling in 1996, Santa Fe will conduct additional seismic activities on the block.

Mexico. Mexico's petrochemical sector may be sold off to help maintain a high level of investment in exploration and development by Pemex. Sources say that continued E&P is crucial to the nation, and to the worth of Pemex. Despite its cash crisis, however, Pemex maintains that it will not open its E&P to overseas investors. Pemex apparently does not need access to the technology foreign investors could bring, since it already has access to such technology through its many licensing and turn-key agreements. Pemex has repeatedly insisted that it has the financial capacity to weather the current economic storm, but exploration outside traditional areas has all but stopped. Convincing banks to come up with financing may not be easy at this time

Pemex has confirmed the existence of six fields in the Litoral de Tabasco coastal area. Five of the fields are said to be in shallow water and have a combined potential of 300 thousand b/d of extra light crude. The sixth field is in 580 feet of water and has deeper reserves than the others. Details of the exploratory work on these fields has been a closely guarded secret so as not to create unrealizable expectations at home or abroad.

Peru. State oil company Petroperu will soon be able to charge transportation fees to contractors who ship crude through the Northern Peruvian Pipeline. The pipeline transports some 75 thousand b/d of crude from jungle fields to refineries located on the coast; however, it is currently running at only half its installed capacity. The law that will allow the charge comes as a result of ongoing exploration in the jungle area, which will result in many new contractors beginning production soon.

Occidental Petroleum Corp. plans to invest US\$19 million in its Peruvian operations. The investment may cause its production to increase by 10 percent to 61.8 thousand b/d in 1995. The company, which operates Block 1-AB in the northern jungle, accounted for around half of Peru's production in 1994. The investment is going entirely into exploration: US\$9 million in Block 4 in the northern jungle and US\$10 million on Block 1-AB. Occidental is also discussing other promising blocks in the northern and central jungle with Perupetro.

Block 52 in the Peruvian central-southern jungle is the subject of bids called for by the oil regulatory body, Perupetro. The block, located south of the Camisea natural gas fields, covers an area of 1.7 million acres and holds estimated reserves of 10.8 Tcf of natural gas and 725 million barrels of natural gas liquids. A Shell feasibility study was due to be completed by May 31. A thirty-year contract is offered to those that find and develop petroleum, while a forty-year contract is on offer to those companies that find nonassociated natural gas and condensates. Exploration will take place over seven years—divided into five periods, at the end of any one of which the contractor may apply to terminate the contract. Fifteen companies are reportedly interested at present, but through the formation of consortiums, and given that some companies may discontinue their interest, this number is likely to drop.

Trinidad and Tobago. The Northern Basin consortium including Anderman/Smith, Shell, Petrotrin, and Krishna Persad has an initial three-year license to undertake onshore exploration activities in the Caroni Basin, northern Trinidad. Anderman/Smith is also the operator in the project.

Amoco's exploration and production license has been taken over by a local company, Mora Oil Ventures (Moraven). The license covers the offshore Mora block, approximately eight miles east of Trinidad.

Venezuela. Maraven (a subsidiary of PDVSA) and Chevron are concluding proposals for a joint venture in heavy oil production and refining. The Chevron proposal apparently includes three possibilities:

1. Maraven could increase production at its Boscan field, from its current 60 thousand b/d to 115 thousand b/d. Refining would take place both in the United States and at the Venezuelan Bajo Grande refinery, although the latter installation would require some expansion in order to cope with the additions.
2. Maraven could enter a partnership with Chevron in its U.S. West Coast asphalt refineries. Maraven reportedly would pay for its stake with crude supplies.

3. Maraven could sign a long-term deal with Chevron for the supply of 50-100 thousand b/d of heavy crude to Chevron's Pascagula refinery in Mississippi. Pascagula is currently supplied by Mexico, but the current economic problems, coupled with increasing domestic demand there, have reportedly caused concern at Chevron regarding the security of Mexican supplies.

Chevron is reported as being willing to go ahead with any or all of the proposals

Almost two years after receiving congressional approval, Conoco's agreement with PDVSA for the development of reserves in the Orinoco Oil Belt of Venezuela will be concluded soon. Construction work on the Conoco project will begin next year, with production set to reach 120 thousand b/d by 1998. In addition to this project, PDVSA is also in the process of working out a deal with a consortium led by Total of France. That project, also aimed at producing 120 thousand b/d, is almost a year behind the Conoco deal—because the Total project is even more complex than the Chevron one.

PDVSA subsidiary Lagoven, will spend US\$388 million drilling in the state of Monagas. In addition, it plans to partner several foreign oil companies in a bid to increase production in the region. The company expects to produce an extra 25 thousand b/d as a result of new operating contracts with overseas firms. Lagoven will drill the Chaguaramal, El Furrial, Las Piedritas, Boqueron, and Orocual oil fields. The company says that secondary recovery will be augmented through the injection of water and gas at these fields.

Mobil announced that it has signed an agreement with Veba Oel of Germany and Nippon Oil of Japan, to form a consortium to participate in Venezuela's profit-sharing program. This is the first consortium to formally announce a joint-venture agreement to participate in the program, which allows foreign companies to explore areas of high risk with a view to sharing production profits. Mobil has a 50 percent stake in the consortium, Veba 30 percent, and Nippon 20 percent.

After having dropped production to 2.45 million b/d, Venezuela brought output back to previous levels of 2.5 million b/d in March. In doing so, it contributed to the 105,000 b/d OPEC increase in output for March compared with February. Having consistently produced beyond its OPEC quota of 2.359 million b/d, this latest increase puts it 140 thousand b/d above quota.

Apparently, fewer areas than originally expected will be offered in the first round of the proposed Venezuelan profit-sharing program, and those that are included will be significantly smaller than expected. A joint Chamber of Deputies-Senate committee that has been studying the proposal enjoyed the support of most members, but there is considerable opposition to governmental plans to offer ten areas in a single round of bidding. The major concern is that if the contracts prove to be flawed, there will be no room for adjustment if all the contracts are already under way. It seems more likely now that bidding will take place in several rounds. A number of politicians are also demanding that the government cut the average size of the blocks to a mere 200 square miles from the current 680-800 square miles. In addition, there are concerns as to whether or not PDVSA will have enough control over the ventures. PDVSA will have a 35 percent share in all commercial fields discovered, but it will not participate in exploration and development.

A consortium headed by Total of France has agreed with Maraven to examine the possible expansion of an upgrading project in the Orinoco Tar Belt in Venezuela. The consortium, which also includes Itochu and Marubeni of Japan, has been considering with Maraven the construction of a 100 thousand b/d upgrader. Thus far, however, it has been decided to study the building of a 150 thousand b/d facility in an attempt to increase the profitability of the project. The original plans for the project were to upgrade 114 thousand b/d of 9° API crude to 100 thousand b/d of 31° API crude for sale to U.S., European, and Asian markets.

According to Lagoven, five reactivation areas are expected to produce about 37 thousand b/d of crude by the end of 1995. These areas are under development by

Benton/Vinccler, BP, Total, Shell, and a consortium formed by Maxus, Otepi, and BP. The companies are contracted by Lagoven for a period of twenty years. Lagoven estimates that the aggregate production from these five areas will reach 305 thousand b/d by the end of the decade.

During 1994, Lagoven is reported to have increased the proven oil reserve base of Venezuela by 100 million barrels. By the end of 1995, oil reserves are planned to be expanded by an additional 798 thousand barrels and to reach a total of 65 billion barrels. Secondary recovery projects in east and west Venezuela are expected to continue to add to the proven reserves. El Furrial reserves are expected to reach 3 billion barrels of medium crude through the water and gas lift projects. At the same time, the expansion of Venezuela's natural gas proven reserves to 141.7 billion cf is planned for the end of 1995.

Two new strategic association agreements are due to be submitted to the Venezuelan Congress during the 1995 session. One is between Corpoven and Arco for a development and upgrading project in the Orinoco Belt. The second is between Maraven and Chevron and covers the development of the Boscan oil field's heavy crude. Another strategic association between Lagoven and Mobil for the development of the Orinoco Belt field is also currently under review by PDVSA.

Downstream

Argentina. Residents of Avellaneda near Buenos Aires have filed a lawsuit against a US\$70 million coking plant built by Shell. After the plant was brought to Argentina from Holland, where it had been in operation for several years, residents grew suspicious that something is wrong with it. Shell says the plant meets all of Argentina's environmental standards and that half of the cost of the plant was spent on environmental safety. The Secretary of Human Resources and Environment will study the impact of the plant. Shell also pointed out two similar facilities run by YPF and Esso. Those plants, however, are

much older, and Shell alleges they therefore pose a greater threat to the environment than Shell's facility.

Bolivia. According to an agreement between the U.S. company Pennzoil and Industria de Lubricantes Bolivianos (Inlubol), Inlubol will be renamed Pennzoil Bolivia and will produce a full range of Pennzoil lubricants at its plant in Cochabamba. Around 90 percent of the raw material needed for the production will come from within Bolivia, and the rest will be imported from the United States. The products will be sold in the domestic market and will also be exported to Peru and Argentina.

Just as the deregulation of the Bolivian hydrocarbons market gathers speed, the recently privatized YPFB service stations will face new competition in the Bolivian retail gasoline market with the entrance of YPF of Argentina. In fact, YPF is planning to establish a service station network in La Paz, Cochabamba, and Santa Cruz.

Brazil. Petrobras has plans to spend US\$800 million over the next few years adding to, expanding, and upgrading the country's ten refineries. About one-third of the money will be used to expand and upgrade the following refineries: 19 thousand b/d in the Repar refinery; 3.2 thousand b/d in the Remand refinery; 38 thousand b/d in the Replan refinery; and 38 thousand b/d in the Regap refinery upgrading. Further additions to the Replan, Reduc, and Rpbrc refineries are likely by the end of the decade. Moreover, a vacuum atmospheric distillation plant will be built in the Rlam refinery, and the crude distillation capacity in the Reman refinery will be increased from 14.5 thousand b/d to 22 thousand b/d. Altogether, Petrobras has an ambitious plan to increase the country's refining capacity from 1.4 million b/d in 1994 to 2 million b/d by 2000.

Chile. The 66 thousand b/d Concon refinery, owned by ENAP, has been upgraded to meet the growth in gasoline and diesel demand expected in Chile in the coming years. The refinery will produce more unleaded gasoline, thus helping to phase out the use of leaded gasoline, and its diesel production will meet the new sulfur specifications. Leaded gasoline is expected to be completely phased out by 2000. In 1994, only 28.5 percent of

the total 48 thousand b/d of gasoline produced was unleaded. As for diesel's sulfur content, the switch to Argentinean crude is expected to improve diesel production both in quality and quantity. A reduction in the sulfur content in diesel (from the current 0.3 percent to 0.2 percent by 1998) has been planned. The country imported about 8 percent of its total diesel consumption of 64 thousand b/d in 1994. It is hoped that the import requirements will be reduced notably, after the upgrading of the Concon plant.

Colombia. The Colombian government will set up a new promoting company to boost the development of the country's petrochemical industry. Construction of an international-scale propylene and ethylene plant in the port city of Cartagena is part of the program. The required financial support for feasibility studies and promotional activities is expected to be provided by the Instituto de Fomento Industrial and state oil company Ecopetrol. According to government officials, the purpose of the government's emphasis on the development of the petrochemical sector is to diversify Colombia's petroleum industry.

To reduce the government subsidies and create a competitive climate for the gasoline market, Colombia has recently raised gasoline prices to 80 percent of international levels. In late February 1995, regular and premium gasoline prices were raised to 96¢/gallon and US\$1.19/gallon, respectively. By the end of 1995, further increase of these two prices is likely. The Colombian government has already announced the opening of the refining sector to foreign and private investment for the construction of new refineries in the country. The price hikes for gasoline are seen as part of the government's efforts to accomplish this goal.

Ecuador. Petroecuador plans to upgrade its 90 thousand b/d Esmeraldas refinery in 1995, which will result in a reduction of fuel oil supply in the region. Currently, Petroecuador exports nearly 30 thousand b/d fuel oil (1.6 % sulfur content) to Mexico and Guatemala. If completed, the expanded refinery will have 110 thousand b/d total capacity and will be able to refine heavier crudes. In the meantime, more light products are expected to be coming out of the refinery and going to domestic markets.

Mexico. Plans for the Mexico-Cuba joint venture refinery at Cienfuegos, Cuba, which may cost US\$200 million, are currently on hold. The project, which has not been canceled, will be a 50-50 joint venture between Mexpetrol and the Cuban state oil company, Cuba Petroleo (Cupet). Instead of building a new refinery, the existing refinery will be rebuilt, adapted, and operated by the joint venture. The current plant needs to be adapted because it was originally designed for running Russian crude. The project involves both state and private partners in Mexico, including Pemex, the National Petroleum Institute, the Foreign Trade Bank, the construction and oil industry firm ICA, Bufete Industrial, Equipos Petroleros Nacionales, and Protexa. One possible reason for the joint venture's slow progress is the impact of the objections of the U.S. Congress to countries that do business with Cuba. Other possibilities are, once again, the adverse effect of Mexico's recent currency and financial crisis on various partners in this deal.

It is reported that Pemex is building stock of heavy Maya crude for use in a coking plant that will be built in at Deer Park. The result was a decline in Pemex exports in December 1994 and January 1995. Others speculated that the drop could have been caused by the recent budget difficulties at Pemex, but company officials strongly denied that.

In recent years, Pemex has vigorously promoted the production of additives for unleaded gasoline, for both environmental reasons and savings of spending on imported additives. Three such additive units have just been opened. According to Pemex, the total savings on imports amount to US\$32.5 million per year. Two of the plants are at the Salina Cruz refinery in Oaxaca, with capacities to produce 30 thousand tonnes per year (t/y) of MTBE and 60 thousand t/y of TAME. The third plant will produce MBTE at the Cadereyta refinery in Nuevo Leon. The Eximbank of Japan is providing financial support for all three plants in the form of low-interest loans.

Venezuela. PDVSA's petrochemical unit, Pequiven, is considering bringing forward the scheduled completion dates for several projects following the recovery of international petrochemical prices. Among these are a US\$200 million, 700,000 t/y methanol plant

due on line in 1999, and a US\$453 million, 500,000 t/y olefins plant due for completion in 2000. Both of these projects could be brought forward if partners for them want to do so. The third project is a US\$150 million, 300,000 t/y ammonia plant. All three projects will be completed with the participation of domestic and foreign private investors.

The government has created new distribution points along its borders with countries to which it sells its gasoline. This move is part of efforts to eliminate the smuggling of the 3 million barrels a year of cheap Venezuelan gasoline that are reputedly smuggled across the Amazon jungle borders into Colombia and Brazil, where gasoline is much more expensive.

After losing almost US\$200 million a year as a result of contraband gasoline being smuggled over the border to Colombia, Leonardo Montiel Ortega, Vice President of the Chamber of Deputies' Energy and Mines Commission in Venezuela, has proposed selling gasoline to Colombia at reduced rates. In addition to other products, 30,000 b/d of gasoline is smuggled into Colombia from Venezuela. In a letter to Hugo Serrano Gomez, President of Commission V of the Colombian Senate, Mr. Montiel claims the smuggling began after Ecopetrol ceased dealing with PDVSA and allowed private oil companies to purchase gasoline at international prices.

America's Conoco, Norway's Statoil, and PDVSA subsidiary Bitor have come to an agreement to form a joint venture that will produce Orimulsion. The joint venture will build a plant capable of producing 100 thousand b/d of the boiler fuel substitute which is made from water, emulsifiers, and bitumen. Initial investment in the US\$700 million project is expected to be US\$320 million. Bitor is expected to hold no more than a 35 percent stake in the venture, but precise structural details are not yet available. Bitor has apparently been holding similar discussions with other companies, including Texaco and Mitsubishi.

Mobil Corp. has purchased 50 percent of CANGL (C.A. Nacional de Grasas Lubricantes), a Grupo Venoco subsidiary, to market lubricants in Venezuela. Lubricants

will be sold both domestically and internationally under both the Venoco and the Mobil names, while a new subsidiary, Mobil de Venezuela, will market automotive and industrial products.

The 571 thousand b/d Amuay refinery, owned by Lagoven, produced 416 thousand b/d of products in 1994, of which 227 thousand b/d were exported. About 100 thousand b/d of additional upgrading capacity will come on stream by November at this plant. Lagoven has the third largest refining capacity in the world with a total of 2.5 million b/d of CDU capacity.

Pipelines

Argentina. YPF plans to build a new US\$300 million pipeline from oil fields in Neuquen to the Atlantic Ocean, and it could be completed within two years according to company officials. The pipeline—340 miles long and 24 inches in diameter—would begin at Rinco de los Sauces, and terminate at the port of San Antonio Oeste in Rio Negro Province. That port can accommodate large tankers, and plans include 1.25 million barrels of new storage there. The pipeline will be owned by YPF, but open to third-party producers, and will have an initial capacity of 125 thousand b/d, with the possibility of expansion to 185 thousand b/d.

America's Panhandle Eastern and Canada's Alberta Energy have been asked to conduct a feasibility study on a natural gas pipeline in northern Argentina. The companies will investigate the required investment and also estimate demand in Formosa, Chaco, Corrientes, and Misiones Provinces, which currently do not have natural gas networks. Transportation systems in Santa Fe and Entre Rios Provinces would also be improved.

Argentina-Brazil. YPF has reached an agreement with Petrobras to begin feasibility studies on a proposed natural gas pipeline, which would link São Paulo in southern Brazil with northern Argentina. Developing reserves in Argentina and construction of the

required infrastructure may cost as much as US\$10 billion. It was this high cost that dampened Brazilian enthusiasm for the pipeline. Instead, Petrobras has pursued the development of the Bolivia to Brazil pipeline, which would cost only US\$2 billion. Sources at Petrobras put demand for natural gas at 3.8 mmcf/d within the next decade; this, however, is more than twice the capacity of the pipeline from Bolivia, unless the volume of Bolivian exports is increased by expanding the diameter of the pipe. Petrobras is evidently concerned about the amount of Bolivian reserves and is loathe to rely solely on them for supplies. Peru has also shown an interest in connecting its Camisea field at the Bolivian end.

Argentina-Chile. There have been reports that the protocol restricting natural gas imports from Argentina to Chile may be changed in the near future. If so, other projects, with Gasoducto GasAndes, the consortium formed by Nova Corp. of Canada, Chilgener, and Gasco, in the forefront, will become more possible. The GasAndes project would originate in Mendoza and then connect to Transportadora de Gas del Norte, which collects gas from other production areas in Argentina and transports about 1 billion cubic feet of gas per day to Buenos Aires. Currently the main concern for the Chilean government is to have a guarantee of supply security from Argentina. The Argentinean government, in turn, has suggested guarantees to ensure that, in case of gas shortages, the cut in Chilean supplies would only be to the same extent as the cut in the Argentine supplies. If the protocol does not change, the situation may appear in favor of the major competitor of GasAndes: Gasoducto Transandino, a project backed by a consortium including Tenneco Gas of the United States, Enersis, Chilectra, British Gas, and YPF. This project is the only feasible one under the current protocol, which allows the import of only 177 mmcf/d of gas from Neuquen, through Southern Chile, to Santiago. The new law would not only increase the import allowance, but would also permit imports from sources other than Neuquen. One major problem facing Gasoducto Transandino is the distribution of the gas, since Gasco, a partner in GasAndes, is the sole distributor of gas in Santiago. This situation aggravates the financing problems, given that without a distributor as a partner, the project may be too risky. Still, the Gasoducto Transandino

consortium officials maintain that their project is set to succeed, given that it serves a larger part of Chile. Bids have already been invited for the 502-mile pipeline, with a diameter of 24 to 30 inches. Work is planned to be completed by 1998. Other projects to supply gas to Chile are:

- A US\$300 million project backed by ENAP, YPFB, and Australia's BHP to supply gas from Bolivia to Chile's northern region of Atacama. The project faces many obstacles. A major problem is that the decision about its future is politically sensitive, given that the region used to belong to Bolivia, and the nationalist groups within the Bolivian military will agree to the project only if Chile provides sea access for Bolivia.
- Another project to supply Atacama from gas fields in northern Argentina. This project, backed by CMS Energy and Williams International Pipeline, is estimated to cost US\$500 million.
- A second project proposed by Nova Corp. This project would supply Chile with gas from Bariloche in Argentina.
- Finally, a third proposal by Nova Corp. to supply the incremental gas volumes needed at Chile's planned methanol plant, Methanex, near Punta Arena. Almost 70 percent of the gas needed for the plant has already been secured through contracts with Argentina's YPF and Bidas, and Canada's Chauvco Resources.

Bolivia. The construction of the Carrasco-Chillijchi export pipeline is contingent on new oil discoveries by Maxus. As of March 1995, crude production at the Surubi fields in the Chapare region reached only about 4 thousand b/d, insufficient to justify the pipeline. Maxus was hoping to produce as much as 10 thousand b/d by the end of 1995. However, it seems that the maximum production within reach by the end of 1995 would be about 8 thousand b/d. It is estimated that the minimum production required to make the pipeline viable is around 8-10 thousand b/d.

A contract signed between YPFB and the municipalities of La Paz and El Alto entails the construction by YPFB of a gas distribution system to serve around 250,000 households in those municipalities. The municipalities will be in charge of the administrative tasks and the running of the systems. YPFB will invest approximately US\$5 million in this project.

Bolivia-Brazil. Petrobras may be able to reduce its shareholdings—currently 51 percent, in accordance with the requirements of Brazilian law—in the Bolivia-Brazil pipeline project, as a result of the Congress's approval of the new modifications to the Constitution. The new changes would permit more foreign investment in the oil and gas industry. If the changes are implemented, Petrobras would be able to sell part of its shares in the pipeline project, in order to finance other upstream activities in Brazil.

It appears that Bolivia has finally conceded that it may not have enough natural gas reserve base to justify the huge US\$2 billion pipeline project to Brazil. The pipeline is planned to deliver 285 million cubic feet per day (mmcf/d) for the first seven years, increasing the volume then to 665 mmcf/d for the remaining thirteen years of the twenty-year contract. This represents about 3.7 trillion cubic feet (Tcf) of gas. If the current exports of 78 billion cubic feet (Bcf) per year to Argentina and the estimated domestic consumption of 29 Bcf per year are added in, the total would reach very close to the total proven reserves of Bolivia, currently standing at 4.5 Tcf. Official figures appear overly optimistic and put Bolivia's possible reserves at 22 Tcf.

For the time being, Bolivia has proposed two options for additional sources of natural gas. The first would be to connect the pipeline to the giant Camisea field in Peru. This proposal suggests the construction of a 30-inch in diameter pipeline connecting the 10 Tcf Camisea reserves to the Bolivian system at an estimated cost of US\$0.8-1.0 billion. The second option would be to connect to Argentinean reserves of about 8-10 Tcf. There are, however, many problems associated with this option, the major one being the fact that YPF has already proposed a separate pipeline from northern Argentina to southern Brazil. The Bolivian option does not seem very attractive to the Argentine

producers, who fear a cut in their export volumes and thus revenues if they take this route.

An alternative to building a new pipeline, which would cost between US\$4 billion and US\$6 billion, may be to reverse the flow of gas in the existing 212 mmcf/d pipe that currently delivers gas from Bolivia to Argentina, and connecting it to the system supplying the Brazilian market. This would provide Argentina with an export outlet for small volumes of its natural gas at a very low cost. The cost of reversing the flow is estimated at US\$150 million maximum. Bolivian officials have at the same time been lobbying for the expansion of the diameter of the pipeline from 28 to 32 inches in order to boost export volumes to 345 mmcf/d during the initial seven years, and then to 700 mmcf/d, but they have not been very successful thus far. The incremental demand comes from a planned gas-fired power plant, near São Paulo, estimated to require between 210 mmcf/d and 250 mmcf/d. The work on the pipeline is scheduled to begin in August 1995. Bidding for equipment contracts was expected in May 1995, while over 200 companies have already responded to a public invitation for pre-qualification of contractors for tasks ranging from design, engineering, and construction, to sale of goods and equipment.

Bolivia-Paraguay. It has been reported that at the request of the Paraguayan government, a joint technical commission may be set up with Bolivia, in order to examine the feasibility of the construction of a pipeline from Bolivia to serve the steel industry in Paraguay. At present, coal is used by the steel industry. The pipeline would be built by a joint venture between private sector companies of both countries.

Chile. In Santiago, around 30,000 additional customers every year are to be served by the expansion to the gas supply network, thanks to plans to invest US\$300 million by Gas Natural Metrogas. The company intends to increase the number of users linked to the distribution network to 400,000 by 2005.

Colombia. A new US\$2 billion pipeline, designed to be able to handle the peak output from the Cusiana and Cupiagua fields, is expected to be completed by 1997. Currently, the production from the two fields is around 90 thousand b/d, and the output is transported through a combination of the Central Llanos and Oleoducto de Colombia (ODC) pipelines for export. The new pipeline will be able to transport more than 500 thousand b/d of crude. The project is being developed by a consortium, namely Oleoducto Central S.A. (Ocensa). Partners in Ocensa are Colombia's state Ecopetrol (with 25% of the shares), the Colombian subsidiary of the Interprovincial Pipeline (17.5%), TCPL International Investment (an affiliate of Canada's Trans-Canada Pipeline, with 17.5%), BP Colombia Pipelines (15.2%), an affiliate of France's Total (Total Pipeline Colombie, with 15.2%), and finally Triton Energy (9.6%). BP and Total are at the same time shareholders in Cusiana and Cupiagua.

Ecuador. Two out of the six bidders for the US\$600 million Transecuadorian pipeline expansion project—TransCanada Pipelines (TCPL) and Sun Pipeline—have withdrawn from the bidding, owing to political uncertainties and doubts regarding the feasibility and profitability of the project. TCPL was member of a consortium with Occidental Services, Williams Brothers, and El Paso Natural Gas, which may still consider either bidding on its own or joining one of the four remaining groups still running for the project. The remaining four groups are:

- Constructura Norberto Odebrecht of Brazil, Interprovincial Pipelines of Canada, Technit of Argentina, and America's Enron;
- the Embramex Consortium (Brazil and Mexico);
- a consortium formed by Tripetrol of Ecuador, America's Williams Companies, the Mexican company ICA, and Entrecanales y Tavora, Abengoa, Sereland, and Cubiertas y MZOV of Spain; and

- finally a group including Interastra Engineering, the Swiss Clemessy, and Daqing Petroleum Import/Export of China.

The project entails expanding the capacity of the Transecuadorian pipeline from the current 350 thousand b/d to 450 thousand b/d, while ensuring that it can transport about 60 thousand b/d of heavier crude (27° API, as opposed to the current 29° API), as new discoveries are made in the area. One problem associated with the project is that the production in the Oriente area is expected to peak by 2000, but then decrease to about 200 thousand b/d before the end the next decade, which makes the project financially less attractive. There is also some serious political opposition to the project. However, foreign oil companies have said that they would stop exploration activities if the pipeline project is canceled. This is despite all government efforts to offer incentives to make the project more attractive. It has cut the share of Petroecuador's profit from the project from 40 percent to 30 percent. It has also agreed to supply the fuel needed for the operation of the pipeline. However, the cost of the fuel will be recovered through pipeline tariffs, and Petroecuador is itself paying a tariff of US\$2 per barrel. At the same time, however, it also cut the duration of the contract terms from fifteen to only twelve years.

Mexico. The 445-mile natural gas pipeline running from Ciudad Pemex in Tabasco to supply the planned 440-MW Merida III power plant in Yucatan is unlikely to be built through government financing. Owing to severe budget cutbacks planned for the coming years, and the current economic crisis, the government has withdrawn its plans to provide investment for this project. Other financing options will have to be sought if the project is to go ahead. It is possible that the government may look at private investment as a source of finance for the many natural gas projects that will have to be completed to keep up with growing demand. However, the constitutional ban on direct involvement of foreigners in the Mexican oil and gas industry make the prospects for any such move politically problematic.

Pemex is facing increasing difficulties in handling the maintenance and expansion costs of its natural gas pipeline systems. To that effect, it has been reported that the

government is seeking to allow more foreign participation in the expansion and operation of the pipelines. This appears highly optimistic, given the fierce opposition from the PRI ruling party and the labor unions toward all privatization moves. However, it is argued that given the planned privatization of the secondary petrochemical industry and parts of the power sector, an easing of restrictions on foreign involvement in the natural gas pipeline projects may prove imperative. One major problem associated with the sale of these assets from the point of view of the prospective investors remains the difficulty and insecurity of the supply of fuel and raw materials for the plants.