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EAST-WEST CENTER
PROGRAM ON RESOURCES:
ENERGY AND MINERALS

LATIN AMERICA
OIL & GAS MONITOR

A Quarterly Analysis of Oil and Gas Developments in Latin America

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EAST-WEST CENTER

The U.S. Congress established the East-West Center in 1960 to foster mutual understanding and cooperation among the governments and peoples of the Asia-Pacific region, including the United States. Officially known as the Center for Cultural and Technical Interchange Between East and West, it is a public, non-profit institution with an international board of governors. Principal funding for the Center comes from the U.S. government, with additional support provided by private agencies, individuals and corporations and more than 20 Asian and Pacific governments.

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The Program on Resources: Energy and Minerals conducts research on energy and mineral resources, addressing critical issues such as supply security, strategies for efficient resource development and utilization, and the mitigation of social and environmental impacts. A primary goal is to assist governments and industry in formulating effective programs that coordinate national policies, e.g., economic development and growth, security of energy (oil, coal, gas, electricity) and mineral supplies, and maintenance of the environment.

LATIN AMERICA ENERGY PROJECT

The *Latin America Energy Project* examines the development of the Latin American energy sector in order to: assess its interactions with the Western Hemisphere energy market and links to other markets; facilitate dialogue between the U.S., regional industry executives and private sector companies to further market stability, energy security and investment opportunities; promote policies which provide for sustainable development of the hydrocarbons industry in the region. In addition to this quarterly report, researchers on the *Latin American Energy Project* frequently publish their findings in articles and energy advisories. While focusing primarily on the oil and gas sectors, the project also covers issues related to coal, hydroelectricity and nuclear power.

As this is the first edition of the Latin America Oil & Gas Monitor, *the information contained within covers the third and fourth quarters of 1994 (June-December), and where possible, through January 1995. Subsequent issues will concentrate on the preceding quarter, whilst including as recent information as is available.*

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I. ISSUE FOCUS

Downstream Issues in the Latin American Oil and Gas Sector

1. Rising Oil Demand and Declining Product Export Availability

• Latin America, defined here as including Mexico, Central and South Americas and the Caribbean but excluding Puerto Rico, the US Virgin Islands, and the Netherlands Antilles, has long been a net exporter of oil, with crude production well in excess of regional demand. In 1994, the crude oil production was estimated to be 7.64 million barrels per day (b/d), about 12.7% of the world total, and about 4% higher than the regional output in 1993. The regional output of natural gas liquids (NGLs), produced by Mexico, Venezuela, and Brazil, amounted to about 600 thousand b/d in 1994, about the same as in 1993.

• Total refinery capacity of Latin America stood at 6.3 million b/d in 1994, down from 6.4 million b/d in 1993 and 6.6 million b/d in 1991. Refinery intake was approximately 5 million b/d in 1993– 78% of distillation capacity.

• The region consumed approximately 5 million b/d of oil, and exported 2.9 million b/d of crude oil and 700 thousand b/d of products in 1993. Imports of oil to the region consisted of about 523 b/d of crude oil and 291 thousand b/d of products (Table 1).

• As Colombia, Argentina, Brazil, Venezuela and some of the small producers such as Bolivia, Guatemala, and Cuba are poised to increase their crude oil consumption for the rest of the 1990s, the region continues to do well upstream, while facing serious challenges downstream.

Table 1
Latin American Oil Balance, 1993
(000 b/d)

Crude Production	7,346
NGL Production /a	595
Refining Intake	4,980
Product Output /b	5,509
Net Crude Exports	2,377
Exports /c	2,900
Imports /c	523
Net Product Exports	409
Exports /c	700
Imports /c	291
Product Consumption /c	5,006
Crude Stock Change	-21
Product Stock Change	94

a. Feedstock for gas treatment plant.
b. Includes LPG from gas plants.
c. Extra-regional trade only, estimated.

• Latin oil demand during the remainder of the decade is expected to grow at an average annual rate of about 3%, raising total oil consumption to about 6.1 million b/d. The current refining capacity remains barely adequate for the oil demand increase, the region's export availability of product exports will be severely limited. Given that the Venezuelan products are largely targeting the US market, the product market in the Latin America will become tighter given the current pace of oil demand growth. A high case scenario of 5% average annual growth rate will increase the regional oil consumption to 7 million b/d in 2000, higher than the region's current refining capacity. Without corresponding increases in processing capacity, the region's volume

and composition of exportable oil products could well undergo dramatic changes.

2. The Changing Product Consumption Pattern

- Economic development in Latin America is creating a change in the consumption pattern, away from fuel oil and toward increased demand for transport fuels, especially gasoline. Between 1985 and 1993, demand for gasoline grew by an average annual rate of 2.9% and the consumption of middle distillates grew by an average of 2.5% a year. The demand for fuel oil, however, declined by 0.7% over this period, while the average annual growth rate of demand for all refined products was about 1.9%.

- A comparison of product composition for 1985 and 1993 shows increased shares of LPG and gasoline, with LPG's share rising from 7% to 10%, and gasoline increasing from 25% to 28%. The share of fuel oil was down from 24% in 1985 to 20% in 1993.

3. Latin Refineries due for Major Investment

- The majority of the refineries in Latin American countries today were built 15 or 20 years ago. Many of the aging refineries are outdated, inefficient and cause pollution. In 1991, Mexico shut down three such refineries near the Mexico City with a combined crude distillation capacity of 164 thousand b/d, for both political and environmental reasons. During the past two decades, the refining capacity in Trinidad and Tobago was reduced by nearly half. Without major investment, it has become increasingly difficult for these refineries to meet the growing demand for light products.

- Another problem encountered by the Latin refiners is the declining crude quality in some producing countries. In recent years, in Colombia, Ecuador, and Venezuela, new crudes found tend to be heavier than the existing crude slate, which create challenges for the existing refineries. Therefore, investment to improve the capability to process the new heavier indigenous crudes to meet changes in product demand and higher quality specifications for products, is critical for the region.

- Upgrading capacity, especially desulfurization and cracking units are needed. The ratio of cracking-to-distillation capacity, which is a very rough indication of refinery flexibility is about 28% on a regional basis. By comparison, the ratio for the United States is about 56%. A number of countries in the region have announced plans to build secondary facilities, subject to their success in securing capital.

- Until the beginning of the 1990s, the hydrocarbons sector in many Latin American countries was largely closed to private domestic and foreign investment under hydrocarbon laws, or in countries such as Mexico and Brazil, by national constitutions. Over the past few years, in their efforts to increase needed capital, reduce costs and increase efficiency, national oil companies in the region have been undergoing substantial reorganization, including downsizing, demonoloplization, and privatization. In the downstream sector, Argentina, Peru, and Chile open refineries in whole or part for domestic private and foreign investment. Guatemala already has

foreign oil companies that own and operate its refineries. Colombia and Trinidad and Tobago have just started to open their downstream sectors. Under the current petroleum law, foreign companies may not particiapte in Bolivia's downstream activities. However, these restrictions could be eased as YPFB is expected to be partially privatized. On the other hand, Brazil, Mexico, and Venezuela's refineries are still closed to foreign investment (Table 2)

Because of the lack of funding and the needs to revamp and renovate the existing refineries, massive construction of new refineries in Latin America has not been planned. The potential investment opportunities for foreign oil companies, especially for US companies, in this area is tremendous. However, unless the Latin American governments continue to work hard to improve the business climate, massive investment in the downstream sector may not be forthcoming in the near future. In that case, the region may become a net product importer by the end of the decade even though sufficient amounts of crude may still be exported.

Table 2
Where Direct Private/Foreign Investment is Permitted in the Downstream Sector

Country	Status
Argentina	Yes
Bolivia	No /a
Brazil	No
Chile	Yes
Colombia	Yes /b
Ecuador	Yes /c
Guatemala	Yes
Mexico	No
Peru	Yes /c
Trinidad and Tobago	Yes /c
Venezuela	No

a. YPFB is being partially privatized.
b. New refineries only.
c. Permitted but no investment.

II. RECENT DEVELOPMENTS IN LATIN AMERICA'S OIL & GAS SECTOR

A. UPSTREAM

Argentina

• Rincon is the latest export grade light sweet crude to be put on the market by Argentina. With a gravity of 36° API, and a sulfur content of 0.3%, Rincon will flow through the trans-Andean pipeline to Chile, making it ideal for US West Coast or Asian refiners, and will be priced at a discount to spot WTI.

• Cominco Fertilizers of Canada has agreed to spend US$4 million on a feasibility study for a new urea plant to be built in the Cutral Coplaza Huincul area. The government of the Neuquen province has agreed to guarantee up to 60% of the US$400 million needed to build the plant, and intends to transfer the El Mangrullo natural gas field to Cominco. The field could produce more than 80% of the 55 million cubic feet per day (MMcf/d) the plant would need, at a cost of about US70¢ per thousand cubic feet. According to the provincial government, additional supplies could be available at around US$1 per thousand cubic feet (cf). The price of free market natural gas in Argentina is expected to climb to around US$1.35 per thousand cf within two years.

• At more than 660 thousand barrels/day (b/d), total crude production in June 1994 reached new records. San Jorge, a local independent, accounted for 25 thousand b/d of the total increase between January and June 1994. The company was able to double its output from the Huantrico field following the commissioning of the 100 thousand b/d trans-Andean pipeline. San Jorge exports over 47 thousand b/d, more than half of which goes to Chile and Pacific markets.

Bolivia

• It is estimated that oil production would double once the gas pipeline to Brazil comes on stream in 1997. The gas project will boost crude and condensate production from its Boomerang, Catari, Carasco, and Bulo Bulo fields. Crude production would reach 55 thousand b/d in 1997, while demand would be only as much as 35 thousand b/d. By the end of 1995, production is expected to already reach 30 thousand b/d, of which 28 thousand b/d will be deducted to domestic supply, and the remaining will be kept in stock. New oil finds in the Madidi block may also boost exports. It is estimated that Bolivia flares or releases into the air an average of 100 MMcf/d of natural gas, due to lack of markets and infrastructure for exports. This flaring would be ceased once the pipeline to Brazil becomes operational. In addition, Yacimientos Petroliferos Fiscales (YPF) of Argentina, along with nine other foreign companies have undertaken new exploration activities for oil and gas in Chuquisaca, the second largest gas producing department in Bolivia. Production in Chuquisaca currently stands at 120 MMcf/d, about 40 MMcf/d of which is exported to Argentina. Acording to Yacimiento Petroliferos Fiscales Bolivianos (YPFB), Bolivia may also sign a letter of intent for supply of natural gas to Paraguay, which would require about a 10% increase in productions.

• Maxus which has a 55% share in the Bolivia's Surubi field has signed an agreement with YPFB for the purchase and transport of its oil. The field has a production of 2,700 b/d. Under the current

petroleum law, foreign companies are not allowed to dispose of the crudes they produce freely, and may not take part in any downstream activities. However, such restrictions may be eased, if partial privatization of YPFB proceeds as scheduled.

• French Total has signed an agreement whereby it will have a 32.5% share in the Madidi block, located in the northern Andes foothills. Total will also be the operator of this project. It will be conducting seismic studies at this stage, but plans to dig a deep well by the middle of 1995. Other shareholders in the project include Texaco with 32.25%, Elf Aquitaine with 20%, Shell with 14.25%, and Mobil with 10%.

• It appears that several upstream projects for a total investment of nearly US$80 million by US oil companies have been unsuccessful, and therefore abandoned. Exploration projects were located in five blocks which had been deemed to have good prospects, located in Carandaigua, Madre de Dios, Ito Villazon, Los Suris, and Caipipendi. Philipps Petroleum which had been conducting exploration projects in the high Andean plateau in the Curahuara block also seems to have stopped the exploration.

• A draft of a new hydrocarbon bill in Bolivia which is currently awaiting congressional approval, suggests new openings and opportunities in the upstream sector activities for foreign investors. The law would be designed in order to be competitive with the hydrocarbon laws of Bolivia's neighboring countries. One of the major changes that is proposed under the new law is to remove the restriction on the disposition of the crude produced by foreign companies. Currently, foreign producers are not allowed to sell their own crude freely. Under the current law, international companies are only permitted to take part in upstream activities, and under concessions or operations contracts with the state oil company, YPFB. The new law would also define the process under which the prices will be deregulated in the country. Since November 1990, when the current hydrocarbons law came into effect, fourteen international companies have signed agreements with YPFB, and begun activities in Bolivia' s upstream sector.

• The Secure block in Beni and Cochabamba is planned to be developed by a consortium composed of Elf, BHP, and Maxus, under an operation contract with YPFB. The first exploration field is located near the Surubi field, which is operated by Maxus, and YPFB's Catari field. The consortium is expected to spend around US$2 million by 1996, and will start drilling in 3 years time.

• The plans for capitalization of the state oil company, YPFB, are still quite vague. Under these plans, the government would select an investor which, according to the market value of YPFB, would buy half of the shares of the company, and would also take over the management. This would open up the energy industry in Bolivia substantially, however, one point that still remains unclear, is whether YPFB would be marketed as a whole, or split into downstream and upstream activities. Most government officials in Bolivia believe that by keeping the company whole, it will retain its market value. On the other hand, lending agencies and major oil companies, favor the splitting of the company. So far, as many as 22 U.S. and European banks have submitted their proposals for the selection process.

• On Nov. 9, 1994, the governments of Bolivia and Paraguay signed a letter of intent to carry out a feasibility study for Bolivia to supply natural gas to Paraguay. According to the agreement, it would take nine months to complete studies on the Paraguayan energy market, the Bolivian gas availability, the route of the pipeline, and financing and pricing for gas supplies. By August 1995, all relevant data should be available to draft a preliminary contract for gas exports to Paraguay. Bolivian state oil company YPFB and Enron of the U.S. are likely to be the partners in supplying the gas. The probable diameter of the pipeline is reportedly to be 10 inches as the volume of exports is likely to be less than 6 MMcf/d. Paraguay is planning to use the gas in industry and the development of gas-derived plastics plants.

• Those wishing to invest in the state oil company of Bolivia when it is privatized in 1995, may be forced to accept debts of almost US$400 million. Officials of YPFB say the debts of US$381 million, account for about 40% of the book value of the company. Most of the money—US$241 million—is owed to the Interamerican Development Bank, whilst the World Bank is owed US$30 million. A further US$101 million is owed in bilateral loans from the USA, Canada, Japan, Germany, Britain, France and Switzerland, most of which were for the development of oil and gas infrastructure.

Brazil

• Crude production at the Campos Basin, the principal oil producing field in Brazil, surpassed 500 thousand b/d in mid-September 1994, and boosted overall domestic production to a record level of more than 750 thousand b/d. Much of the increase was attributable to the coming onstream of the third well in Marlim Stage I, the deepest production system in the world, as well as greater efficiency on the Campos platforms. Moreover, the Brazilian state oil company, Petrobras plans to increase Campos Basin oil produciton to 975 thousand b/d by 2000.

• Three new discoveries may add up to 320 million barrels of oil to Brazil's reserves. The most important find of the three was the 1-RJS-499 well, which was tested at 2.6 thousand b/d in November 1994. Reserves are estimated at between 175 and 290 million barrels. The second discovery was 4-RJS-497. Reserves are estimated at 19 million barrels. Both of these wells are offshore. The third strike is onshore with estimated reserves of 9.1 million barrels.

Brazil and Venezuela

• PDVSA and Brazil's Petrobras have set up a working group in order to discuss possible joint ventures, in both upstream and downstream sectors. In upstream, it has offered Braspetro, Petrobras' foreign activities subsidiary, possibilities to explore for oil in the offshore basins of Venezuela. There has been hardly any exploration activities in these offshore basins. As for downstream, Petrobras has the opportunity to join PDVSA in some of its foreign refining ventures, in the United States, Europe, or the Carribean, or possibly its crude export terminal in Curacao.

Chile

• The declining volume of oil produced in Chile has become a major cause for concern for the Chilean government. Domestic production by Empresa Nacional de Petroleo (ENAP) has dropped from 19.5 thousand b/d in 1990, to only 15 thousand b/d in 1993, and about 12 thousand b/d in 1994. Today

domestic oil production is able to satisfy only 10% of the domestic demand compared with about 48% nine years ago. This sharp decline has coincided with a dramatic increase in demand of about 80% compared with 1985. Despite relatively good prospects for oil discovery in the Straits of Magellan, the decline in oil production in Chile is irreversible. Thus, the government is enticing domestic exploration efforts through improved contract terms, and possibly tax incentives. YPF of Argentia has also made a proposal to Chile for a production sharing contract, but no agreement has been reached at this point. In addition, The government has been encouraging Chilean companies to increase exploration outside Chile. A subsidiary of ENAP, Sipetrol, is currently actively exploring in offshore Argentina, in Ecuador, and in Colombia. The new Transandean crude pipeline has already improved the situation in Chile substantially by ensuring it a secure supply source. It currently transports some 106 thousand b/d of crude to Chile, thus meeting around 23% of oil demand in Chile since its coming into operation a few months ago.

Colombia

• The developers of the giant Cusiana and Cupiagua fields in Colombia met with representatives of more than 300 engineering, construction and service companies recently to discuss arrangements for awarding contracts for the more than US$2 billion in projects to be carried out between 1995 and 1998. The projects include the construction of a 420-mile pipeline system to carry crude from the two fields to the Caribbean port of Covenas as well as dozens of other infrastructure projects which will allow production to increase from 150 thousand b/d in 1995 to 500 thousand b/d by 1998.

• BP says that the giant Cusiana field in the Llanos Basin will be producing 185 thousand b/d by the end of 1995, 35 thousand b/d more than originally expected. BP operates the 1.5 billion barrel field, in cooperation with partners Total, Triton Energy and Ecopetrol. With the same partners, BP also operates the 500 million barrel Cupiagua field. Production there is scheduled to begin by 1996. During the period June 1993-December 1994, BP and its partners had drilled eight development wells, built a US$200 million production and processing center and drilled two wells for gas reinjection and two more for water injection. The partners also built a 23-mile pipeline linking Cusiana with the pumping station at Porvenir as well as a 60-mile pipeline connecting the La Belleza natural gas field with Vasconia. The storage terminal at Covenas was also expanded from 2 million to 2.5 million barrels in anticipation of increased production.

• The start-up of the first production unit at the Cusiana Central Processing Facilities in September 1994 led to some 50 thousand b/d of 36° API Cusiana crude being blended with 45 thousand b/d of 25°API, Shell-produced Vasconia grade and exported from Covenas port beginning at the end of October 1994. The crude is transported via a 20-mile, 20-inch diameter, pipeline to the E1 Porvenir station, where it joins a recently expanded pipeline to the export terminal at Covenas. This pipeline has the capacity to transport up to 75 thousand b/d of Cusiana crude. Three more production units of similar sizes are expected to come on stream in December 1994, March 1995, and early 1996. Since 1990s, a 10 thousand b/d test system has been in operation in the Cusiana field.

• British Petroleum estimated that a new Colombian gas field has the potential of holding 5 trillion cubic feet (tcf) of natural gas and 250 million barrels of condensate. The field, in Colombia's Llanos basin, was first discovered through a well drilled by Maxus Energy Corp. The well, Volcanera 1, is in Colombia's Recetor block. BP, which owned 10% of the Recetor concession, purchased Maxus' 53.33% stake for only US$10 million in a deal announced in November 1993.

• Besides BP, Amoco is also on the way to hold giant gas reserves in Colombia. Moreover, Amoco's find is closer to the major pipelines than BP's, which means easier maket access. The Opon-3 well of Amoco flowed 45 thousand cf of gas and 2 thousand b/d of condensate. It was drilled in the La Paz formation in the Middle Magdalena Valley, 125 miles north of Bogota, between Medellin and Barrancabermeja. Amoco owns a 60% working interest, the U.S. Hondo has 30%, and domestic private firm Opon Development holds 10% interest. Ecopetrol has the right to a 50% working interest upon development.

• French Total has signed a new exploration contract with the state Ecopetrol to operate the 492 square mile Block 9 in the Llanos Basin. The new acreage lies northeast of the Cusiana and Cupiagua fields which have so far registered 1.5 billion barrels of crude reserves. Total holds a 19% interest in the Cusiana-Cupiagua complex. Block 9 is located in the open plains like the Caño Limon field, which is operated by Occidental in partnership with Shell, Spain's Repsol and Ecopetrol. The fields currently produce 240 thousand b/d of 28° API crude.

• The state Ecopetrol has plans to develop Coporo, another giant Colombian oil field. Like Cusiana and Cupiagua, the Coporo field is also located in the Llanos basin. Seismic studies and other geological indications have made it a top candidate for another big field. According to Ecopetrol, the new field could contain as much as 1 billion barrels of oil. The company plans to develop the field with its own resources and will not invite foreign companies to participate. Drilling of an exploration well is expected to be completed by June 1995.

Ecuador

• Texaco has reached an agreement with the Ecuador Ministry of Energy for environmental cleanup in the Oriente region. The accord is awaiting formal approval from President Sixto Duran-Ballen. Texaco will meet the entire costs, but insists on sharing proportionate costs with Petroecuador, its former consortium partner, as it had previously demanded. Petroecuador controlled 62.5% and Texaco owned the remaining 37.5% stake in the consortium. Although Texaco agreed not to set a financial limit for the cleanup operations, it rejected a demand for the construction of a hospital in the former consortium area. However, the company will build schools and first aid stations, cover up crude draining pools, decontaminate polluted areas, and construct plant nursery and fish ponds to restock the rain-forest and the rivers.

• The Ecuadorian government disqualified a total of five bids on five blocks in the seventh round of international tenders for various reasons, as claimed by the Energy Ministry, in July 1994. The Amoco-Mobil consortium bids for Oriente blocks 19 and 21 were denied, so were Tripetrol for Oriente blocks 11 and 18, and Huffco-

Louisiana Lands for Gulf of Guayaquil Block 3. In the meantime, the Ministry negotiated with the following companies which presented the second best initial tender: Santa Fe Energy for Block 11; Amoco-Mobil for Block 18; Tripton Energy Corp. for 19; Oryx-Santa Fe Minerals for block 21; and Sipetrol-Clapsa for Block 3.

Mexico

• The already-tight international crude market will be even tighter next summer, as 150 thousand b/d of Mexican Maya crude is to be diverted from the open market to feed a new 50 thousand b/d coker at the 216 thousand b/d Deer Park Refinery in Texas, which Pemex owns jointly with Shell. For 1995, Mexico plans to maintain overall crude exports, including 1.3 million b/d shipments to the Deer Park refinery. The 1.3 million b/d includes 800 thousand b/d 22° API Maya crude, 330 thousand b/d 39° API Olmeca, and 170 thousand b/d 34° API Isthmus.

• Spending on exploration by state Pemex will increase by 20% in 1995, according to Pemex officials. Of Pemex's US$8.7 billion budget allocation for 1995, the Exploration-Production Division would account for more than 50%, subject to approval by Congress. Crude, rather than natural gas, will be the main focus of the exploration effort since the returns are bigger and more immediate. However, Pemex's 1995 budget may be problematic, given the precarious situation surrounding the peso and stock market crises in late 1994 and early 1995. Efforts would be made to divest the company of secondary petrochemicals plants or to seek strategic alliances to run these plants with private sector partners. Legislation opening secondary petrochemicals to private investment was passed during the 1988-1994 Mexican presidency of Carlos Salinas, but so far little interest has been shown in the Pemex plants.

Peru

• Murphy Oil Corp. has signed an E&P contract with state Perupetro that gives the Arkansas-based independent up to seven years to develop the 1.259 million hectare Block 71 in Peru's central jungle. The exploration contract, which calls for a minimum investment of US$36.5 million for aerial and seismic studies and the drilling of five exploratory wells, is the first to be struck between the state oil regulatory agency Perupetro and a foreign oil company since it took over contracting for the Peruvian government in November 1993. Perupetro officials said the contract will be the benchmark for future deals between foreign firms and the Peruvian government. It grants a 30 year term if oil is discovered, and 40 years in the event of gas discovery. A sliding scale royalty payment based on world prices and production totals is also part of the contract terms.

• Petroperu pledged in September 1994 not to impose any price and output controls on winning bidders in the upcoming privatization process of the state oil company. Petroperu president Emilio Zuniga, ruled out the formation of a regulatory commission to monitor private sector firms in the post-privatization petroleum industry. The privatization began in November 1994 with 60% of the state's interest in two key coastal refineries being offered. The same 60-40 ownership scheme will later be used for Petroperu's coast and jungle producing fields Blocks 10 and 8 respectively, while the Northern Peruvian pipeline is now scheduled to be offered as a 10 year concession.

• Encouraged by the foreign interest in Peru's rebounding exploration sector,

Perupetro is now preparing for an international bidding round with a clean slate. Perupetro has redesigned the country's oil map in preparation for the upcoming licensing rounds. The new oil maps, which erase numerous unclaimed blocks, identify those areas where contractors are currently operating. Contractors to be selected during upcoming bid rounds will be given wide leeway to draw up block boundaries for exploration packages. Perupetro also canceled contracts for four blocks with companies that have fallen behind on work programs or failed to reach agreement on terms under the new hydrocarbons law in September 1994. The reclaimed areas include: Block Z-1, Block 50, Block 16-A, and Block S-3.

Trinidad & Tobago

• A new gas discovery off the east coast of Trinidad by Amoco Trinidad Oil Co. brightens the horizons for the liquefied natural gas (LNG) project, backed by Amoco, British Gas, Cabot LNG, and the National Gas Company of Trinidad and Tobago. The new gas discovery was in the southwest Galeota area, about 40 miles off the southeastern coast of Trinidad, and is estimated to have reserves of up to 1 trillion cubic feet of natural gas. The final decision on the project is expected by mid-1995. The LNG plant, if approved, is planned to come on stream by 1999. Two engineering and design contracts for the project have already been awarded. A joint venture between Chiyoda from Japan, and the US Hudson Engineering (a subsidiary of McDermott) won the design contract of the 400 MMcf/d plant, and Air Products and Chemicals has won the contract for the design of the detailed liquefaction process.

Venezuela

• In a bid to achieve its aim of producing 3 million b/d or more, Petroleos de Venezuela (PDV) is signing turnkey drilling contracts. This is a short-term move and signals a softening in the tough opposition to foreign involvement—production sharing deals seem likely. PDV is currently attempting to draw-up terms for production-sharing contracts, and is peering over the shoulder of the likes of Colombia and China, for indications on how to go about it.

• As part of PDV's attempts to tender 20 thousand square kilometers in profit-sharing contracts, BP may invest up to US$ 1 billion in Venezuela over the next few years. Since 1984, Venezuela has made wildcat finds of 12.5 billion barrels, making it a worthy risk. However, with state profit share possibly running higher than 80%—the winning bids will be those which offer the thickest slice of their own profits, after having paid 67% in taxes, and 16.6% in royalties.

• By February or March 1995, PDV expects to be examining proposals from foreign parties wishing to invest in the Venezuelan oil industry. The next wave of foreign involvement will be under the profit-sharing model. Prequalification will cost US$50,000, and will be followed by a US$500,000 guarantee. Companies will be expected to invest in exploration programs to the tune of between US$40,000 and US$80,000. After prequalification, companies will be given 120 days to formulate proposals and participate in the bidding. Under current terms, the state would keep up to 90% of the profits of such ventures, including income taxes, royalties and the new profit tax.

• Corpoven, a subsidiary of PDV, signed a letter of intent to work with US Arco in producing and upgrading extra-heavy Orinoco crudes. The deal, details of which will be submitted to congress by the end of 1995, comes in hot pursuit of two others, one with PDV's Maraven and US Conoco for US$1.7 billion; and the other with Maraven, Total, Itochu, and Marubeni for US$3.1 billion. The Corpoven-Arco deal means both partners investing US$200 million initially, with early production expected to be 40 thousand b/d, reaching 200 thousand b/d in 2006. The project is part of Venezuela's plan to reach production capacity of 4 million bbls by 2002.

• By the end of 1995, PDV's production will reach 3.155 million b/d—its highest since the company was nationalized in 1976. Plans also include increasing the country's exports to more than the OPEC agreed quota. During 1995, Venezuela plans to export 2.387 million b/d, whilst the OPEC quota allows exports of up to 2.359 million b/d. At an average price of US$13.50/bbl, exports in 1995 should bring the country a hefty US$12.3 billion.

• All set to increase its strength in Venezuela, is Mobil Oil Corp. The company has plans for a joint venture in the Orinoco Oil Belt and has been closely studying the profit-sharing schemes of PDV. Mobil may take advantage of the PDV schemes which allow foreign exploration resulting in a joint venture with PDV if anything is found. Mobil has also been conducting a feasibility study on processing the extra heavy Orinoco crudes. This would entail a US$2.1 billion investment to process 100 thousand b/d of 9° API gravity crude to 31° API crude. Rates of return may be in the region of 13%-15%.

• As part of its plans to renovate its marginal fields through foreign involvement, PDV affiliate Maraven, struck a deal with a consortium led by Tecpetrol of Argentina. The deal for the Colon field also includes Nomeco Oil & Gas of the USA, Corexland of France, and Canada's Wascana, through its subsidiary in Venezuela; the exact shares of all the partners is not yet clear. The agreement could see production at the field rise from its present 5 thousand b/d to around 80 thousand b/d by the end of the century. This would be a significant boost to the production totals of PDV's marginal fields. Currently at 45 thousand b/d with seven of the 15 fields in the scheme in production, PDV aims to be producing 200 thousand b/d from its marginal fields by the year 2000. Tecpetrol will invest US$160 million in the 20-year contract which is effective immediately. In the first three years it aims to produce 23 thousand b/d excluding the current 5 thousand b/d. 70 abandoned wells will be re-opened, 15 exploratory wells will be drilled, and 45 advanced development wells using horizontal drilling techniques will also be drilled.

Venezuela and Mexico

• Venezuela and Mexico renewed the San Jose Accord under which they sell 160 thousand b/d of crude to a host of regional buyers. Sold at market prices, credit is extended when the price rises above US$15/bbl. Of the eleven potential buyers; supplies to Panama were halted due to non-payment; Honduras has not received anything for over a year following the privatization of its oil industry; and supplies to Haiti are under a UN embargo. Barbados, Belize, Costa Rica, the Dominican Republic, El Salvador, Guatemala, Jamaica, and Nicaragua are the eight current recipients.

B. DOWNSTREAM

Argentina

• EG3 is a name to look out for in the future. It is the name of a new consortium—Astra-32.5% share, Compania General de Combustibles-32.5% share, Isaura-32.5%, and small shareholders-2.5%—set to challenge YPF, Exxon, and Shell in Argentina's retail gasoline and diesel market. The companies of the new firm, which already controls 11% of the country's 450 thousand b/d products market and 650 retails outlets, were expected to merge their downstream operations by August 1 1994, and plan to increase its refinery capacity by 50% over the next three years.

• Refiners are making slow but steady moves toward producing cleaner fuel following news that congress was considering a law to mandate the use of lead-free gasoline. The use of unleaded gasoline in June 1994 was only a few hundred b/d behind that of leaded, marking an increase in the use of unleaded gasoline of 1,500%.

• YPF is striving to penetrate the very competitive Chilean gasoline retailing market by the end of March 1995. It appears that negotiations are ongoing between YPF and two of the Chilean distributors, Gazpesa and Comar. The competition will be very tight, particularly since 67% of the gasoline market is dominated by Esso, Shell, and the Chilean firm Copec

• YPF has announced plans to establish a subsidiary in Bolivia which would persue joint ventures with local firms in refining and distribution areas. Other smaller Argentine producers such as Astra are also considering entering the Bolivian market. Several months ago, YPF signed an agreement with Bolivia to pursue exploration and production activities in that country. This appears to be part of YPF's strategy to increase its presence in the Andean region.

• Argentine producers and refiners are experiencing a worrying start to 1995, as the Mercosur economic block, which joins Brazil, Argentina, Paraguay, and Uruguay, came into existence on January 1st. They are concerned that the relaxation in tariffs which is an integral part of it, will mean cheap refined products flowing in from Brazil. YPF, Esso, Shell, and the EG3 consortium, which between them control all but 5% of the Argentinian downstream market, are concerned that Petrobras, the Brazilian state oil company, will export naphtha and lubricants to Argentina at low prices, without allowing Argentina to make similar moves in Brazil. Petrobras has expressed a serious desire to increase its presence in Argentina.

• Esso Sapa, the Argentinian affiliate of Exxon Corp., will spend US$400 million over the next four years increasing its runs at its two refineries in Campana and Galvan. Their joint capacity at present is 106,500 b/d, and whilst it is as yet unclear what expansions are planned, officials say they will also improve product quality. In 1994, the company added two tankers to its Argentinian fleet, and in doing so increased its ability to import crude by around 20%.

Chile

• Canadian petrochemical company, Methanex, plans to more than double the capacity at its methanol plant in southern Chile, from the current 800 million tons per year. The US$275 million expansion project is expected to begin in early 1995,

and be completed by the middle of 1996. The project would provide a sizeable customer to the natural gas pipeline project from Argentina to Chile. Novacorp. of Canada which owns 24% of the shares in Methanex, is also a partner in the GasAndes pipeline project.

• Refiners in Chile have shown interest in additional volumes of the Rincon de Los Sauces crude currently flowing through the Transandean oil pipeline. The pipeline, which currently transports 85 thousand b/d of crude to Chile, will reach maximum capacity of 105 thousand b/d very soon. It appears however that Petrox, the refining arm of ENAP, which has an original contract for the delivery of 60 thousand b/d with YPF, would be interested in as much as 158 thousand b/d. This seems to be technologically impossible, without the construction of a parrallel pipeline to the Transandean, in order to transport the incremental supplies.

Colombia

• In 1993, Ecopetrol announced the opening of its refineries to foreign and private investment. Two groups of Colombian private investors have recently petitioned the Ministry of Mines and Energy for permission to build small refineries in the south and middle of the country. The proposed refineries by Petrosur SA, a regional consortium based in the southern provincial capital of Pasto, and by entrepreneur Salvador Otero would have crude distillation capacities of 10 to 20 thousand b/d and 15 thousand b/d each. The projects would cost approximately estimated US$60 million and US$75 million, respectively. In the meantime, the government has been drawing up plans to build a 100 thousand b/d, US$750 million refinery near Puerto Triunfo. However, it is reported that the goverment welcomes and encourages the private sector to build refining capacity, at least for the time being. Colombia's refineries in Bucaramanga and Cartagena produces a total of 110 thousand b/d of gasoline, but the country must still import an additional 37 thousand b/d, mostly from Venezuela and Argentina. Even so, Colombia subsidizes retail pump prices. Ecopetrol has proposed eliminating the subsidy in order to bring prices up to international levels and help make private refining projects more attractive to foreign investors.

Ecuador

• The tender offer to expand and upgrade the 90 thousand b/d Esmeraldas refinery is problematic due to poorly executed bidding criteria. Petroecuador, the Ecuadorian state oil company, was said not to be specific enough with the criteria it established for the project and did not take into account the expected changes in the composition of Ecuador's crude production, which becomes significantly heavier at around 26 ° API, down from an average of 30° API. In addition, the sulfur content of crudes from many of the new areas is greater. Petroecuador is seeking to expand the facility to 120 thousand b/d but officials said the bids they received varied in the size of the expansion. To make matters worse, the proposed expansion of the transecuadorian crude pipeline, remains mired in domestic politics, with the opposition insisting the expansion should be delayed at least until the results of exploration programs under last spring's seventh licensing round are completed. The government, however, foreseeing increases in crude output during the coming years, believes the expansion of the pipeline now is appropriate. Three energy ministers of President Sixto Duran Administration have been ousted due to

government disputes with the opposition-controlled Congress in various areas. The lastest impeachment of Mr. Francisco Acosta took place in October 1994 when he was replaced by Mr. Gustavo Galindo.

Mexico and Cuba

• A Mexican-Cuban refining venture sets an important precedent for the Mexican oil industry. For the first time, the state oil monopoly Pemex will be investing in a project jointly with the private sector. The project involves finishing the construction of the Soviet-built refinery at Cienfuegos, Cuba, 297 km southeast of Havana, and adapting it to process Mexican crude. The Cuban partner in the venture is the state-owned oil company Cuba Petroleo(Cupet). The Mexican partner is Mexpetrol, a technology transfer company in which Pemex has the largest single stake of 25%. Through the Mexican Petroleum Institute and the Mexican export bank, Bancomext, the Mexican government will have a majority holding in the Cuban refinery venture. The basis of the accord will be a debt-for-equity swap, but in addition Pemex and each of its private-sector partners will contribute fresh capital resources. It is reported that the initial overall investment would amount to US$200 million. Mexico would supply Cuba with 65 thousand b/d of crude. That would amount to about half of Cuba's 1993 consumption, far short of the island's needs.

Peru

• Peru delayed privatization of its oil industry until 1995. The auction of the company's refineries, exploration and production blocks, and pipeline concession, was postponed by Petroperu's privatization committee in late 1994. The committee plans to auction a 60% stake in Petroperu's Talara and La Pampilla refineries in late January 1995, to be followed in mid-year by a 10-year concession to the 200 thousand b/d North Peruvian Pipeline, north coast Block X, and northern jungle block 8 producing fields. The committee expects to put the North Peruvian Pipeline concession up for auction before the oil fields, in order to establish the tariffs for transporting oil. Petroperu's two production blocks produce an average 44 thousand b/d of crude oil, one third of Peru's 128 thousand b/d total production. About 20 companies from the United States, Canada, Europe and Argentina have expressed interest in the blocks, and the fact that the doors are still open to other companies. The companies that win the fields will operate under licensing contracts very similar to those that Petroperu signed in early 1994 with Perupetro, the state oil regulatory company.

Venezuela

• PDV's attempts to boost heavy crude sales were rewarded by the news that almost 70% (663 thousand b/d) of under-22-gravity went to third-party clients in 1993. The remainder, 220 thousand b/d, was taken by the US, where PDV's Citgo apparently has more than 40% of the East Coast asphalt market, and by the company's partnership with Swedish Nynas, which reputedly has more than 13% of the European market.

• Starting January 1st 1995, the sale of reformulated gasoline (RFG) became mandatory in nine US cities and 35 other cities, regions and states, amid denials from Venezuela that it will lose market share in the US as a result of a US Congressional vote to establish different standards for RFG produced domestically, and that of foreign refiners. Sources in Venezuela say it will refer the matter to the General Agreement on Tariffs and Trade. PDV claims the move will have cost the industry US$150 million

in lost sales by 1997. The dispute is over the decision to allow US refiners to use their own 1990 baseline averages for determining the level of pollutants such as benzene and other aromatics. Foreign refiners have been told they must apply the US industry average for 1990—which they claim is unfair. PDV has already sent a shipment of 1.1 million bbl of RFG, which will account for more than 32% of the gasoline market, to the US East Coast. It has been able to meet the requirements of the Clean Air Act only by importing additives such as oxygenates, in order to upgrade approximately one third of its RFG. PDV says, however, that it will only continue to do so if market conditions remain favorable. The company will probably export between 50 thousand b/d and 80 thousand b/d of RFG to the US, this would constitute most, if not all, of its RFG production.

• A proposal to build a refining facility in Venezuela's Orinoco Tar Belt to upgrade 100 thousand b/d of heavy Cerro Negro crude (9° API) into 31° API gravity crude has been agreed between Lagoven and Mobil. The project cost is estimated at US$2.1 billion, considerably lower than other similar projects proposed by Maraven-Conoco, Maraven-Itochu-Marubeni, and Corpoven-Arco, at estimated costs of US$3-4 billion. The key cost-cutting factor in the Mobil-Lagoven project seems to be the use of hydrotreating, instead of hydrocracking technology, proposed by competing projects, and also the reduction in the number of desulfurization units.

C. PIPELINES

Argentina

• A new natural gas pipeline to Chile, is to be built by a consortium of YPF, US Teneco and four other domestic companies. The 250-MMcf/d pipeline, which will cost US$600 million, will start flowing in 1996, and is Argentina's first gas-export project. British Gas will work with two Chilean firms on distribution around Santiago.

• The Brazilian government ended talks with Argentina over the planned natural gas pipeline, apparently since the Argentines have not yet proved that there are sufficient reserves to merit a pipeline. Argentinian officials believe that the discoveries can support the US$4 billion pipeline, and that this is a postponement of talks rather than an abandonment.

• There are talks about the construction of an underground natural gas storage facility in Uruguay for Argenina. The storage facility would then be connected by a 125-mile pipeline to Buenos Aires. The 1.7 billion cubic meter storage facility would be built by the Uruguay state Ancap, near Montevideo. Enron and Gaz de France appear to have already submitted proposals for the development and operation of both the site and the pipeline.

• Rising natural gas demand has brought Transportadora de Gas del Sur (TGS) to propose an expansion of the San Martin pipeline, which currenly runs at maximum capacity of 530 MMcf/d from the southern fields in Tirra del fuego to Buenos Aires. It appears that there is enough demand to warrant an expansion of the pipeline of an additional 45 MMcf/d of capacity. The currently 1,820 mile-long pipeline, has been built in sections between 1952 and 1978. It

appears that as much as 30% of the natural gas produced in the southern region is currently reinjected, due to the lack of infrastructure to transport the gas to the markets.

• Officials in Argentina say that the GasAndes consortium headed by Nova Corp. of Canada, is set to lose the deal to construct the transandean natural gas pipeline, to the Gasducto Transandino group led by British Gas and Tenneco Gas, who are working in partnership with Chilean oil company Enap, electric company Enersis, and the Argentinian companies YPF, Bridas, Pluspetrol, Astra and Petrolero San Jorge. The Nova group—Nova is working with Lone Star Gas and several Chilean companies—was expected to present its proposal to the Chilean and Argentinian governments in September 1994, but its proposal is dependent on existing Argentine pipelines, which is considered by the Chilean government to be disadvantageous. YPF and the other producers in Argentina have already obtained a permit allowing them to export up to 175 MMcf/d to Chile. Both groups are adamant that their projects will go ahead, despite wide agreement that there is not sufficient demand to support two pipelines, and there are even suggestions that the two projects might somehow be merged. Not surprisingly, the decisive factor in which project goes ahead, is likely to be which consortium can raise the necessary financial backing. The GasAndes project, at US$400 million, is US$270 million cheaper than that of its competitor. Add to that the US$230 million Gasducto Transandino will need to spend on its distribution system and the US$800 million investment in electricity. Both the Argentinian and Chilean governments appear to be in favor of the Gasducto Transandino project, but the official line is that the market will dictate which one becomes a reality.

Bolivia

• Skeptics believe that Bolivia may not have sufficient gas reserves to meet contractual obligations to Brazil. To deal with this, the Bolivian state oil company Yacimiento Petroliferos Fiscales de Bolivia (YPFB), has strengthened its E&P activities so as to boost its natural gas and crude reserves. In November 1994, YPFB planned to spend US$6.8 million on an exploration well in Chuquisaca, which is the second most important producing area in Bolivia after Santa Cruz. The current natural gas output is 120 MMcf/d, about 40% of which is exported to Argentina. YPFB, along with nine other foreign oil companies, is exploring the region of Chuquisaca. It is reported that Bolivia intends to export gas to Paraguay. In order to do that, domestic annual gas output has to increase by 10%.

• An agreement was finally reached between Brazil and Bolivia on the US$2 billion gas pipeline project. The deadline to prequalify for bids on the construction was November 24, 1994. The costruction bids are to take place on various segments of this pipeline, and the pipeline to Chile. This is expected to allow better participation of the the local construction companies in the pojects. The first segment due to be built is expected to start in Tarija, and run to Chuquisaca in Bolivia. The financial arrangements are expected to be completed by July 1995, and the construction will then begin in August 1995. The 2,115-mile pipeline would stretch from the reserves, which are located near the city of Santa Cruz, and would cross the Brazilian border at Puerto Suarez, finally reaching Sao Paulo in Brazil. YPFB, Petrobras, and their partners have been trying to negotiate an increase in the contract

volume with Brazilian power companies in the Sao Paulo area. The cost of construction for the Bolivian section is estimated at US$400 million. The pipeline is due for completion in 1997. The pipeline which will supply Brazil with 285 MMcf/d of Bolivian gas during the first seven years of the contract, will be 32 inches wide, with the option to be expanded depending on the size of the market. New contracts with Sao Paulo electricity companies would increase the likelihood of a pipeline diameter of about 36 inches. After the initial seven years the volume of gas is expected to be at least doubled. YPFB and Enron will own 85% of the Bolivian section of the pipeline, and the rest will belong to Petrobras, and the BTB Group, a consortium of Tenneco Gas, BHP Petroleum, and British Gas. On the Brazilian side, YPFB will have a 20% share, Petrobras will own 51% of the shares, Brazilian private companies will have 4% of the shares, and Tenneco Gas, BHP Petroleum and British gas will hold the remaining 25%. Availability of financing for these projects will depend heaviliy on the gas reserves and the additional gas found in the country. Discussions are ongoing as to whether the financing could become possible through foreign commercial banks, or international financial organizations, such as the Interamerican Development Bank.

• To encourage Bolivian energy integration with Brazil, the World Bank has agreed to provide US$700 thousand to Bolivia to carry out a program of certification of probable gas reserves. According to the World Bank report, some 70% of Bolivia's reserves currently fall into the category of proven or probable reserves. Since December 1993, 56 gas fields have been discovered of which ten are expected to contain in excess of 150 Bcf of gas. Fields owned by the state oil company require work in order to confirm their reserves. Work on existing fields combined with the confirmation of reserve levels in new fields, is expected to be complete by the end of the first quarter of 1995.

• The World Bank has decided to join the Interamercian Development Bank (IDB) and the Andean Development Corporation (CAF) in financing part of the Bolivia-Brazil gas pipeline. The Bank has agreed to provide US$300 million for the US$2 billion project to bring Bolivian gas to Brazilian markets. The IDB is chipping in US$400 million. Petrobras, YPFB, and their partners Enron, British Gas, Tenneco Gas, and BHP, are putting up a further US$700 million. CAF, together with Brazil's Social and Economic Development Bank, will contribute a further US$600 million for the pipeline.

• An agreement with a BHP led consortium to construct a natural gas pipeline from Bolivia to Northern Chile, are under serious threat following the admission that it would cost too much to be feasible. According to the agreement, BHP and YPFB will hold 45% of the stakes each, while Chile's state oil company, Empresa Nacional de Petroleo (ENAP) will hold the remaining 10%. The pipeline would supply natural gas for power generation to the industrial areas of northern Chile, near the city of Antofagasta. Depending on the volume of demand, this 500-750-mile long pipeline would supply 3.5 MMcf/d of gas in the first year (1996), increasing to a maximum of 6 MMcf/d. Following the discovery of major geological faults along the route, the consortium says the plans are now suspended until studies for an alternative route can be completed, which will take not less than a year. This now means that a rival plan, by CMS Energy and Williams International Pipeline, to build a

pipeline from Bolivia to Northern Chile is in the leading position. CMS and Williams plan to begin construction in early 1996 and complete by the year end. Initially carrying 165 MMcf/d, the pipeline will have potential capacity of more than 700 MMcf/d. CMS and Williams will invest US$500 million in Chile, of which US$300 million will go on the pipeline.

Bolivia also plans to build several natural gas fired power plants along the route of the pipeline to Chile in order to serve the towns and cities located nearby. There have also been talks of the possibility of constructing a liquefied natural gas (LNG) plant near the Chilean port of Tocopilla to serve the Asian LNG markets.

Bolivia and Brazil

- An addendum has been agreed since August 1994 between the Brazilian President Itamar Franco and Bovilian President Gonzalo Sanchez de Lozada on the 2,115-mile Bolivia/Brazil gas pipeline accord, extending the accord for one year while both sides renegotiate the amount and price of Bolivian gas to be exported. The original accord, signed in February 1993, established an initial volume of 282 MMCF/d, and the wellhead gas export price of US90¢/million BTU. Bolivia recently claimed that the volume and price were too low for the project to be economically viable. Bolivia was pushing for Brazil to take 424 MMcf/d and an immediate increase in price. At the insistance of Enron and other participants of the proposed pipeline project, Bolivia was pushing hard for an immediate renegotiation. In the meantime, Brazilian and Bolivian officials reassure themselves, as well as international investors, that the project will proceed and that construction will begin in August 1995.

- Beginning November 1994, YPFB, the Bolivian state oil company, and Petrobras have begun negotiations with Brazilian power companies around Sao Paulo regarding the possibility of increasing the volume of future gas exports from Bolivia to Brazil. Participating in the nogotiations are also YPFB, and Petrobras' strategic partners of the gas project such as Enron, BHP, Tenneco Gas and British Gas. According to the plan, completion of the economic and commercial structure of the project as well as invitations to tender by pre-qualified companies, were scheduled for November 1994. By March 1995, negotiations with lenders regarding funding for the project are scheduled to be completed, and by July 1995, final negotiations for funding should be concluded.

- Brazil has agreed to increase the size of the Bolivia/Brazil gas pipeline by raising the diameter of the main section of the trunkline from 28 inches to 32 inches. Petrobras has been convinced by its partners in the BTB consortium that a wider pipe made sense as it was standard, or more frequently manufactured than 28-inch pipe, and would therefore be not much more expensive and would be worthwhile in the future for its greater capacity. The 32-inch pipeline is reportedly capable of carrying almost 1 bcf/d of gas, which is almost double the planned peak flow from Bolivia of 565 MMcf/d and could therefore take extra gas from Peru or Argentina in the future.

Chile

- The competeing GasAndes project, including Novacorp. International, the U.S. Lone Star Gas, Australia's BHP, and Chilean firms, Chilgener, Copec and Gasco, has a proposal for the construction of a 220-mile pipeline from Mendoza to Santiago at a cost of US$880 million. The breakdown of the

investment costs is as follows: US$284 million for the transmission line, US$195 million for distribution systems, and US$400 million for the conversion of the Chilgener Renca power plant to gas, and the construction of at least one gas-fired power plant. This is much lower than the estimated US$1.6 billion for the competing Gasoducto Transandino project. In the longer term several other gas power generation facilities are planned by the consortium. The pipeline would initially transport 320 MMcf/d, increasing to 530 MMcf/d by 2016. The decision as to whether to go ahead with this project is expected by the end of 1994. One factor considered a major disadvantage by the Chilean government of the GasAndes project, is the fact the it would be dependent on existing Argentine pipeline systems.

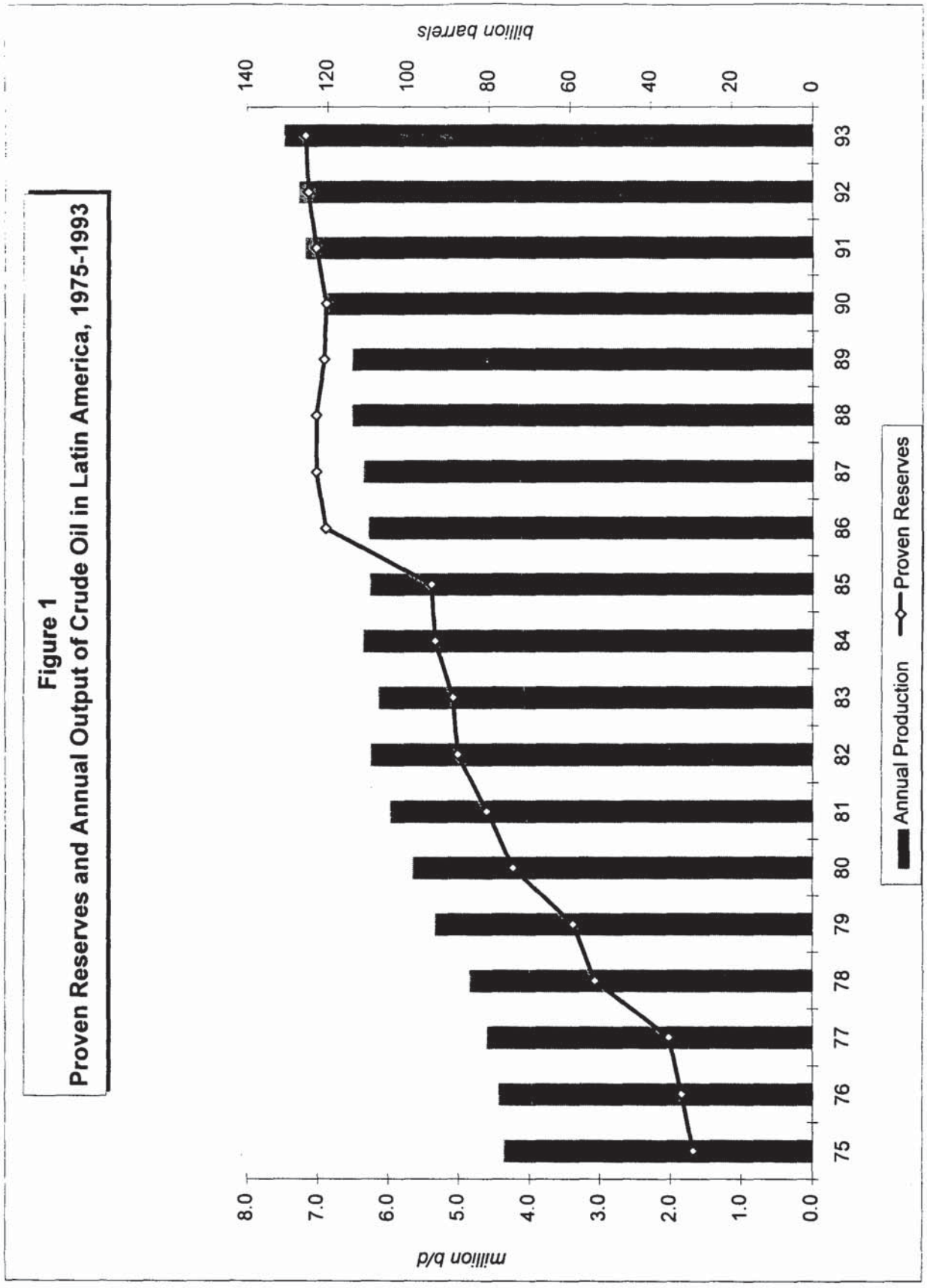
• Plans have been announced by Gas de Chile, a consortim of Enersis, and British Gas, to build a distribution network for the Gasoducto Transandino project. The network construction is scheduled to start in 1997, with a completion date in 2007. The distribution system is planned to cover the Central region of Chile a total of 1,830 miles, from Valparaiso (north of Santiago), to Los Angeles located further South of the capital. The project is estimeated to cost approximately US$400 million.

Mexico

• Plans to build two pipelines from the United States to northern Mexico continued to face delays as of November 1994. Because of skepticism by the U.S. parties about Pemex's ability to comply with its contractual obligations, the possible signing of a letter of intent between Pemex Gas y Petroquimica Basica, San Diego Gas & Electric, and Southern California Gas, is still up in the air. Once the accord is signed, both US companies are scheduled to begin work on a 16-inch pipeline that will run from the existing pipeline network in California's Imperial Valley to just outside of the Mexican city of Mexicali. The pipeline's planned capacity will be around 40 MMcf/d. The pipeline will serve the El Rosarito power station near Tiajuana and a planned desalination plant somewhere on the coast of Baja California. Another pipeline linking the Salamayuca power plant in Chihuahua state with El Paso Natural Gas' Texas system, has also run into delays. Sources say the companies involved in the Salamayuca project, General Electric, Bechtel, El Paso Natural Gas, Grupo ICA, and Coastal, are frustrated with the pace of progress.

III. STATISTICAL APPENDIX

Figure 1
Proven Reserves and Annual Output of Crude Oil in Latin America, 1975-1993



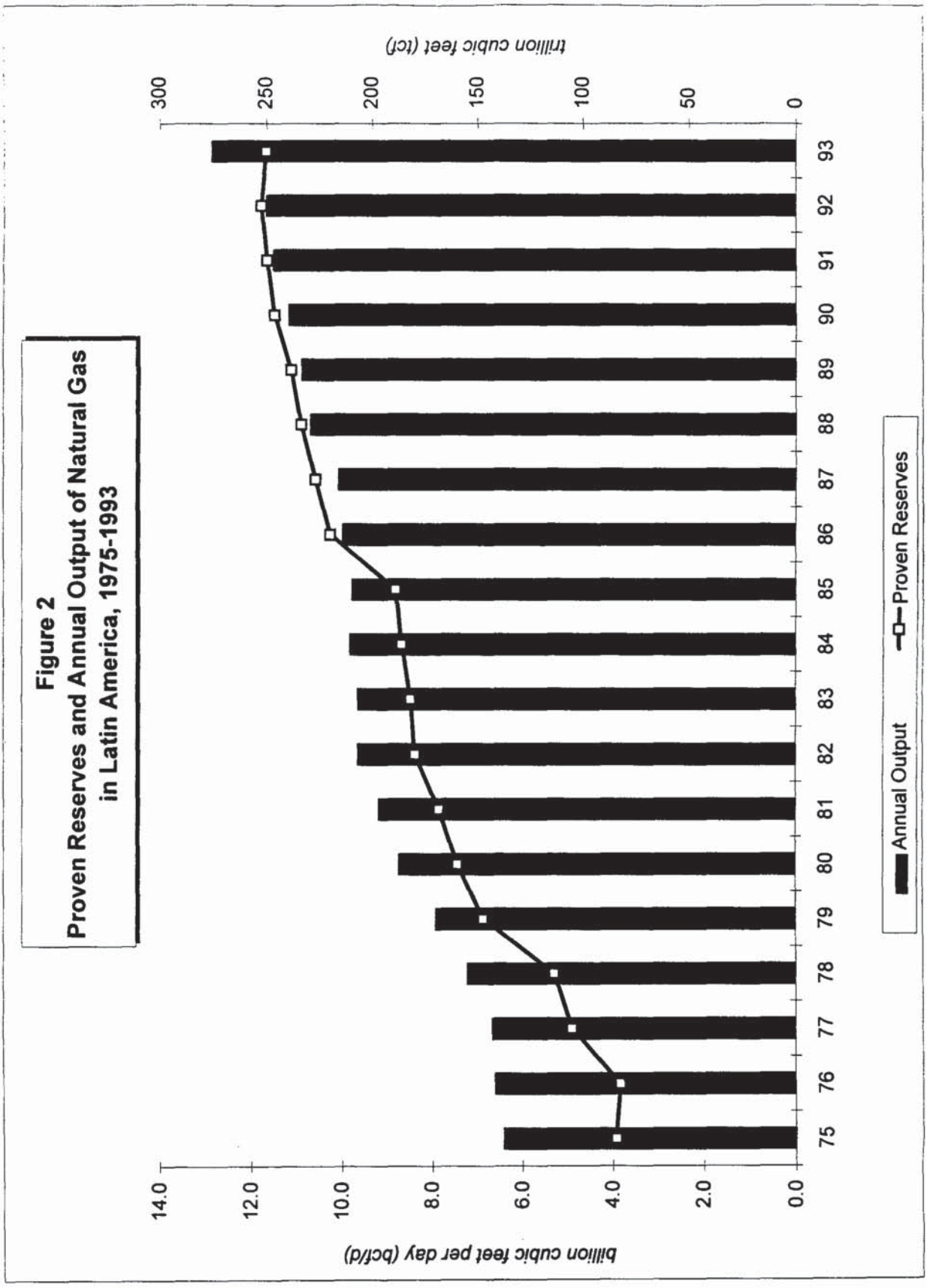
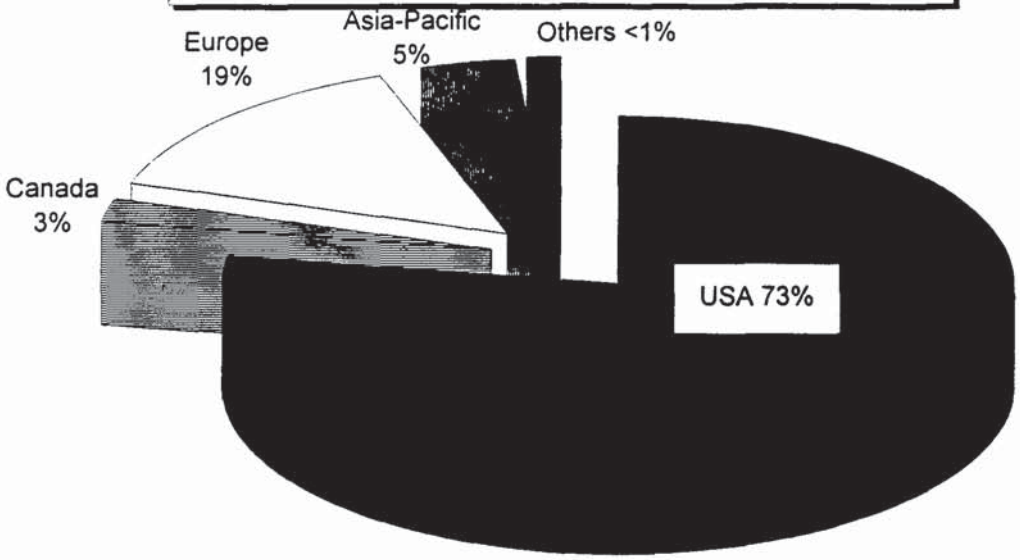


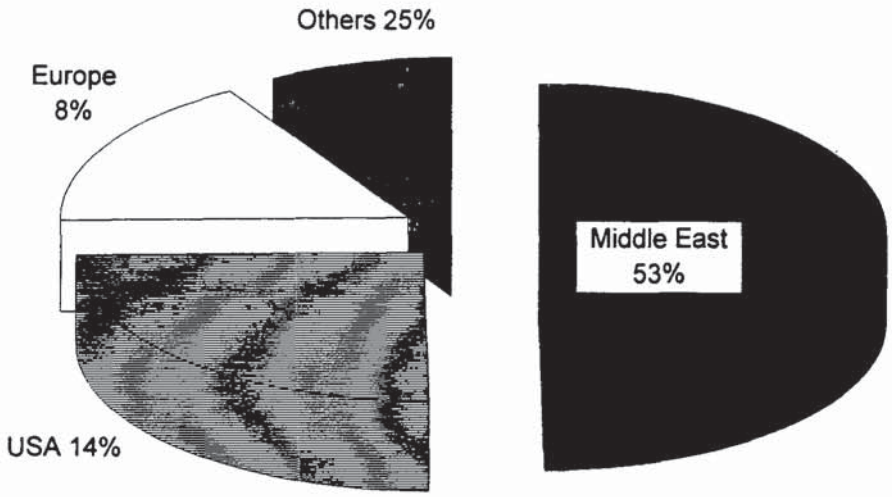
Figure 2
Proven Reserves and Annual Output of Natural Gas in Latin America, 1975-1993

Figure 3
Destinations of Latin America and the Caribbean's Extraregional Oil Exports, 1993



Note: Total oil (crude and products) exports: 3.83 million b/d; extraregional trade only.

Figure 4
Origins of Latin America and the Caribbean's Extraregional Oil Imports, 1993



Note: Total oil (crude and products) imports: 1.4 million b/d; extraregional trade only.

Table 1

Oil Reserves and Production in Latin American/Caribbean Countries

Country	Reserves in 1995*		Production in 1994**		RP Ratio (Years)
	Billion barrels	*Share in the region (%)*	*b/d (in thousands)*	*Share in the region (%)*	
Mexico	50.8	39.3	2,684	35.1	52
Venezuela	64.5	50.0	2,463	32.2	72
Brazil	3.8	2.9	673	8.8	15
Argentina	2.2	1.7	657	8.6	9
Colombia	3.4	2.6	456	6.0	20
Ecuador	2.0	1.6	377	4.9	15
Trinidad and Tobago	0.5	0.4	129	1.7	10
Peru	0.8	0.6	130	1.7	17
Bolivia	0.1	0.1	26	0.3	15
Chile	0.3	0.2	12	0.2	67
Others	0.7	0.5	36	0.5	51
Latin America	129.1	100.0	7,644	100.0	46
World Total	999.8		60,412		45
Share of Latin America in World Total		***12.9%***		***12.7%***	

* As of January 1, 1995.

** Production of NGLs (natural gas liquids) is excluded.

Sources: Oil & Gas Journal; EWC PREM Data File.

Table 2
Gas Reserves and Production in Latin American/Caribbean Countries

Country	Reserves in 1995*		Production in 1993**		RP Ratio (Years)
	bcf	*Share in the Region (%)*	*MMcf/d*	*Share in the Region (%)*	
Venezuela	130,400	50.4	4,098	31.8	87
Mexico	69,675	26.9	3,465	26.9	55
Argentina	18,246	7.0	2,575	20.0	19
Brazil	4,852	1.9	654	5.1	20
Trinidad and Tobago	8,458	3.3	630	4.9	37
Bolivia	4,460	1.7	571	4.4	21
Colombia	7,882	3.0	484	3.8	45
Chile	3,900	1.5	203	1.6	53
Ecuador	3,800	1.5	95	0.7	109
Peru	7,054	2.7	90	0.7	214
Others	115	0.0	3	0.0	121
Latin America	258,842	100.0	12,868	100.0	55
World Total	4,980,278		210,635		65
Share of Latin America in the World		***5.2%***		***6.1%***	

* As of January 1, 1995.

** Commercialized dry gas production only.

bcf=billion cubic feet; MMcf/d=million cubic feet per day.

Sources: Oil & Gas Journal, OLADE, EWC PREM Data File.

Table 3
Energy Balance of Latin America and the Caribbean, 1993
('000 boe/d)

	Petroleum	Gas	Coal	Hydro-electricity	Geothermal Power	Nuclear Power	Fire Wood	Cane Products	Others	Total Primary
Production	8,066	2,386	533	845	22	297	1,107	605	233	14,093
Importation	946	34	202	0	0	0	0	0	0	1,182
Exportation	3,732	34	257	0	0	0	0	0	3	4,026
Inventory Variation	20	0	-14	3	0	3	0	0	-1	10
Unused	0	278	2	80	3	0	0	1	61	426
Total Supply	5,300	2,108	462	768	19	299	1,107	603	167	10,833
Refinery	-5,239	-8							-1	-5,248
Power Plants	-12	-285	-121	-760	-19	-299	0	0	0	-1,496
Self-Producers	0	-59	-20	-15			-7	-34	-17	-153
Gas Treatment Plant	0	-704							-63	-768
Charcoal Plant	0	0					-265		0	-265
Coke/Blast Furnace	0	0	-230						0	-230
Distillery	0	0						-127	-1	-128
Other Centers	-3	-18	0				0	0	3	-18
Total Transformation	-5,255	-1,074	-371	-775	-19	-299	-273	-161	-79	-8,305
Own Consumption	3	237	0	0	0	0	0	135	1	375
Losses	12	128	3	0	0	0	0	0	0	143
Adjustment	6	0	5	-7	0	0	-8	1	8	6
Transportation	0	16	0			0	0		0	16
Industrial	21	468	78	0		0	152	283	71	1,073
Residential	0	110	4			0	638		8	760
Commercial, Pub. Serv.	0	28	0			0	2		0	30
Agric, Fishing, Mining	0	1	0	0		0	48	11	1	63
Construction/Others	2	0	1			0	0		0	4
Energy Consumption	24	624	83	0	0	0	841	294	80	1,946
Non Energy Consump.	0	45	0	0	0	0	0	12	0	57
Final Consumption	24	669	83	0	0	0	841	306	80	2,003

Table 3 (continued)
Energy Balance of Latin America and the Caribbean, 1993
('000 boe/d)

Electricity	Liquid Gas	Gasoline/ Alcohol	Kerojet	Diesel Oil	Fuel Oil	Coke	Charcoal	Gases	Others	Non Energy Products	Total Secondary	Total
1,133	457	1,597	329	1,381	1,441	38	128	610	53	269	7,436	14,093
54	81	199	27	185	262	16	0	0	1	5	830	2,012
56	40	246	101	276	541	3	0	0	16	42	1,321	5,347
0	-8	-13	-19	5	-57	0	0	0	0	6	-87	-77
0	0	0	0	0	0	0	0	3	0	0	3	429
1,132	490	1,536	235	1,295	1,106	51	128	606	37	238	6,855	10,252
0	163	1,391	329	1,379	1,438	1	0	99	33	196	5,030	-219
1,071	0	0	0	-53	-467	0	0	-79	0	0	1,071	-1,024
62	0	0	0	-21	-31	0	0	-15	-4	0	62	-162
0	290	94	0	0	0	0	0	470	8	66	928	160
0	0	0	0	0	0	0	128	0	0	0	128	-137
0	0	0	0	0	0	37	-1	39	-1	7	83	-150
0	0	112	0	0	0	0	0	0	0	0	112	-16
0	4	-17	0	2	3	-2	0	2	12	0	23	-15
0	0	-17	0	-74	-499	-2	-1	-93	-5	0	-692	-1,562
44	47	76	16	68	122	3	0	215	4	3	597	972
161	0	1	0	0	0	1	4	3	0	0	171	314
0	0	1	0	1	1	0	0	-45	1	0	-40	-35
6	10	1,259	143	833	33	0	0	0	0	0	2,284	2,300
455	30	2	9	112	378	41	90	261	27	0	1,406	2,478
276	384	5	61	11	17	0	30	22	0	0	805	1,566
140	10	3	3	16	8	0	2	1	0	0	184	214
45	1	2	3	175	47	4	1	0	0	0	277	339
4	2	9	1	4	1	0	0	0	0	0	20	24
926	437	1,280	218	1,151	484	45	123	285	27	0	4,976	6,922
0	6	161	1	0	0	1	0	55	1	234	459	517
926	443	1,441	219	1,151	484	45	123	340	28	234	5,435	7,438

Source: OLADE Database (1994).

LATIN AMERICAN ENERGY PROJECT

PREM has been engaged in research on energy and resource issues in Latin America (including the Caribbean) since 1989, a natural step in ongoing research on energy developments in the Pacific Basin. The *Latin American Energy Project* studies the development of the Latin American hydrocarbons sector in order to assess its interactions with the Western Hemisphere energy market and links to other markets; and to facilitate dialogue between the U.S., regional industry executives and private sector companies to further market stability, energy security and investment opportunities; and to promote policies which provide for sustainable development of the hydrocarbons industry in the region.

Latin America is relatively well endowed with energy resources and has tremendous potential to increase its energy production. The region has been a net energy exporter for over two decades and will continue to produce more energy than it consumes well into the next century. During the coming decade, restructuring the national oil and gas companies, improving investment climate, attracting foreign investment, and strengthening regional cooperation in the areas of energy security and environmental protection have become the major trends in Latin America's energy sector. The remainder of the 1990s therefore promises many opportunities for foreign investors all over the world—from the United States and Asia in particular—to invest in the hydrocarbons sectors in Latin America and the Caribbean.

Latin American Energy Project researchers have written numerous articles, technical papers, energy advisories, and project reports evaluating the most recent developments in the region's energy sector. The project also makes projections for future energy consumption, production, and balance.

While primarily focusing on the oil and gas sectors, the project also covers coal, hydroelectricity and nuclear power sectors. In addition, the financial issues and the foreign investment climate in the region, including trends in overall political and economic risk and hydrocarbon investment legislation, are analyzed. The *Latin American Energy Project* produces a newsletter entitled *Latin America Oil & Gas* which will be published quarterly, beginning in November 1994. The newsletter summarizes the latest economic and hydrocarbons developments, and critically evaluates the major policy issues related to oil and gas in the Latin American region.

It is hoped that the research products of the *Latin American Energy Project* in providing valuable information and in-depth analysis on recent trends and future outlook on the region's energy sector, may be used by energy economists, policy makers, corporate executives, and the public to to better understand of the region's energy issues. The East-West Center provides an objective forum for the exchange of views between industry, government and academia among nations across the Pacific Ocean. As such, its role as a catalyst is exemplified by the efforts of the **Program on Resources** to encourage and enhance U.S.-Latin American cooperation, as well as the cooperation between Latin America and the Asia-Pacific region.

The *Latin American Energy Project* is headed by **Dr. Kang Wu**. All research activities at PREM are supervised by its Director, **Dr. Fereidun Fesharaki**, who is also directly involved in the project.

LATIN AMERICAN ENERGY PROJECT

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