

**Proceedings of the
1993 InterAmerican
Petroleum and Gas Conference
September 27-28, 1993
Dallas, Texas**



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

**Proceedings of the
1993 InterAmerican
Petroleum and Gas Conference
September 27-28, 1993
Dallas, Texas**

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.



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

MASTER

ds
DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

DISCLAIMER

**Portions of this document may be illegible
in electronic image products. Images are
produced from the best available original
document.**

PREFACE

The Program on Resources: Energy and Minerals (PREM) of the East-West Center is pleased to present the proceedings of the 1993 InterAmerican Petroleum and Gas Conference (IPGC) which took place September 27-28, 1993, in Dallas Texas. The IPGC was sponsored by the U.S. Department of Energy, organized by the East-West Center and hosted by the Institute for the Study of Earth and Man at Southern Methodist University.

The IPGC brought together senior oil industry and government representatives from the United States and Latin America to discuss energy security and more efficient resource utilization through improved cooperation and integration of upstream and downstream activities in the United States and Latin America with an emphasis on technology investments and complementary trade strategies. Special attention was given to the growing opportunities for private and foreign investment, trade and joint commercial ventures between U.S. and Latin American companies.

The papers included in these proceedings include most of the presentations offered at the conference that addressed a number of key issues including financial challenges of the hydrocarbon sector, regional and national outlook on the world oil market, upstream and downstream outlook, role of natural gas, and environment and infrastructure requirements. These unedited papers provide the reader with the most comprehensive information available on these issues.

The IPGC is one of the activities of PREM's **Latin America Energy Project** which studies the development of Latin America's hydrocarbon sector in order to monitor its effect on the Western Hemisphere market and linkages to other markets; to promote dialogue between the U.S. and Latin American 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 hydrocarbon industry in Latin America.

We hope that the information included in these proceedings will prove useful to industry executives, government officials and academics interested in enhancing U.S.-Latin America cooperation.

Fereidun Fesharaki.
Director
Program on Resources: Energy
and Minerals
East-West Center
December 1994

Conference Program

CONFERENCE PROGRAM



The Second Inter-American Petroleum and Gas Conference

September 27-28, 1993, Fairmont Hotel, Dallas, Texas

Conference Organizer



Program on Resources
East-West Center

Conference Host

ISEM Institute for the Study of Earth & Man
at Southern Methodist University

Sponsors Include

U.S. Department of Energy
International Association for Energy Economics
Latin American Energy Organization (OLADE)
Association of Latin American
Petroleum Enterprises (ARPEL)
The Energy Council
The Dallas Energy Council

Corporate Sponsors Include

International Petroleum Exchange of London
Maxus Energy Corporation
Hunt Oil
ARCO International Oil and Gas Company
Gaffney, Cline, & Associates
Mobil New Business Development (E&P)
and Mobil Latin America (M&R)
Axis Gas Corporation
Amoco Corporation
Exxon Exploration Company
Petroleos de Venezuela, S.A.
Akin, Gump, Strauss, Hauer & Feld
Artesia Data Systems, Inc.
Booz, Allen & Hamilton
The M. W. Kellogg Company
Muse, Stancil & Company
New York Mercantile Exchange

Conference Chairman

Fereidun Fesharaki
Director, Program on Resources, East-West Center, Hawaii
President, International Association for Energy Economics

Advisory Council

James E. Brooks, Chairman
President & Director, Institute for the Study of Earth & Man

Dennis O'Brien
President, U.S. Association for Energy Economics

Gabriel Sanchez-Sierra
Executive Secretary, OLADE

David Pumphrey
Director, Office of Energy Assessments,
U.S. Department of Energy

Adrian Bustillo
Secretary General, ARPEL

Alvaro Teixeira
Past Secretary General, ARPEL

Lori Cameron
Executive Director, The Energy Council and
President, Dallas Energy Council

Rafael Quijano
Director, The Petroleum Finance Company

Hugh Idstein
International Research Consultants and
Representative for Latin American Newsletters

Richard Kruizenga
Senior Fellow, Institute for the Study of Earth & Man

Official Publication
Oil & Gas Journal

Official Airline
American Airlines

A g e n d a

Sunday, 26 September 1993

10:00-8:00 PM Early registration at the Fairmont Hotel

Monday, 27 September 1993

7:00-8:30 AM Registration

8:30-8:45 AM Opening of the Conference

Welcoming Remarks

Fereidun Fesharaki, Director, Program on Resources, East-West Center, and President, International Association for Energy Economics

James E. Brooks, President and Director, Institute for the Study of Earth and Man at Southern Methodist University

8:45-9:00 AM Welcome to Dallas by Mayor Annette Strauss, Cultural Ambassador, City of Dallas

9:00-9:40 AM Keynote Address

The Honorable William White, U.S. Deputy Secretary of Energy

9:40-10:00 AM Coffee break

10:00-11:00 AM World Oil Market: The Regional and National Organizations

Moderator: Fereidun Fesharaki

Gabriel Sanchez-Sierra, Secretary General, Latin American Energy Organization (OLADE):

Highlights of the Hydrocarbons Industry in Latin America and the Caribbean

Aldo H. Brussoni, Under Secretary General, Association of Latin American Petroleum Enterprises (ARPEL): *ARPEL: A Regional Petroleum Association Serving the Latin American Oil Industry since 1965*

John E. Treat, Vice President, Booz, Allen and Hamilton: *Evolution of the National Oil Companies in Latin America*

1:00-12:00 AM Ministerial Panel I

Moderator: Fereidun Fesharaki

Daniel Hokama Tokashiki, Minister of Energy and Mines, Peru: *Peru: Investment Opportunities in the Oil Industry*

Orlando Morales Matamoros, Minister of Natural Resources, Energy and Mines, Costa Rica

Raúl Agüero, Vice Minister, Ministry of Energy, Argentina

Federico Renjifo, Vice Minister, Ministry of Mines and Energy, Colombia

12:00-1:30 PM Luncheon address by Boone Pickens, Chairman and Chief Executive Officer, MESA

1:30-2:45 PM **Financial Challenges for the Hydrocarbons Sector**
Moderator: David Pumphrey, Director, Office of Energy Assessments, U.S. Department of Energy
Hossein Razavi, Chief, Oil and Gas Division, The World Bank: *Oil and Gas Activities of the World Bank*
Luis O. Del Cerro, Chief, Financial Analysis Section, Inter-American Development Bank: *The Inter-American Development Bank and Latin America's Energy Industry: A Partnership of 30 Years*
Albert Angulo, Regional Director, Latin America & Caribbean, U.S. Trade and Development Agency
Antonio Cajueiro Costa, Commercial Coordinator, Brazil-Bolivia Gas Project, Petrobras, Brazil

2:45-3:15 PM Special address by Luis Giusti, Vice-President, Maraven: *The New Environment in the Venezuelan Oil Business*

3:15-3:30 PM Coffee break

3:30-5:30 PM **Ministerial Panel II**
Moderator: Gabriel Sanchez-Sierra
Francisco Acosta Coloma, Minister of Energy and Mines, Ecuador: *Investment Possibilities in the Ecuadorian Energy Activities*
Eduardo Juan, Minister of Natural Resources, Belize
William Penido Valle, Executive Secretary of Energy, Brazil
Carlos Miranda, Minister of Energy and Mines, Bolivia
Juan Carlos Rivera Montes, Director, Investment Promotion Program, Ministry of Natural Resources, Honduras: *Structural Policies for the Development of the Energy Sector of the Republic of Honduras*

6:00-8:00 PM Reception hosted by the Mayor of the City of Dallas and the International Petroleum Exchange

Tuesday, 28 September 1993

8:30-10:10 AM **Upstream Oil Industry Partnerships and Privatization Outlook**
Moderator: Peter Gaffney, President, Gaffney, Cline and Associates
Federico Veintimilla, Executive President, Petroecuador
Charles Blackburn, Chairman, President and Chief Executive Officer, Maxus Energy Corporation: *Exploration and Development Opportunities in Latin America*
Emilio Zúñiga Castillo, Chairman of the Board, Petroperu: *The Privatization of Petroperu*
Trevor Boopsingh, Chairman, Petroleum Company of Trinidad and Tobago, Ltd.: *Private-Sector Participation in Trinidad and Tobago in the Petroleum Industry*
Ronald I. Wilson, Vice President, Mobil New Business Development Group America—Exploration and Production Division

10:10-10:30 AM Coffee break

10:30-12:00 AM **Role of Natural Gas in an Integrated Americas**

Moderator: Rafael Quijano, Director, The Petroleum Finance Company

Nick Kangles, Vice President, Novacorp International Consulting, Inc.: *Building Alliances for Natural Gas Development*

Ismael Arenas, Vice President for Operations, ECOPETROL, Colombia: *Natural Gas Massification Plan in Colombia, within the National Oil Framework*

Phillip Ribbeck, Marketing Adviser, Amoco Production Company: *Trinidad: Island of Opportunity*
Ayrton Bassani, Vice President, Sociedade Privada de Gás S/C Ltda., Brazil: *Bolivia-Brazil*

Natural Gas Project: Challenges and Solutions

Agustin Barcena, Manager, Marketing and Business Development, PEMEX International, Mexico: *The Natural Gas Industry in Mexico*

12:00-1:30 PM **Lunch and luncheon panel**

Oil Market Outlook

Moderator: Dennis J. O'Brien, Chief Economist, Caltex Petroleum Corporation

Cyrus Tahmassebi, Chief Economist, Ashland Oil, Inc.: *Downstream Outlook: Refining and Market Realities*

Guy Caruso, Director, Office of Non-Member Countries, International Energy Agency: *The World Energy Outlook: Latin America's Role*

1:30-2:15 PM **Downstream Outlook: Oil Prices, Refining and Market Realities**

Moderator: Allen Mesch, President, Petrostrategies, Inc.

Peter Wildblood, Chief Executive, International Petroleum Exchange: *The Role of Benchmark Crudes in Crude Oil Pricing*

David Sloan, Senior Product Technology Consultant, The M.W. Kellogg Company: *Refinery Expansion and Upgrading: Trends and Needs*

2:15-3:00 PM **Energy, the Environment and Infrastructural Requirements**

Moderator: Carter Montgomery, President, Axis Gas Corporation

Marlan Downey, President, Arco International Oil and Gas Company: *Minimizing Impact during Oil and Gas Development in Rain Forests*

Thomas Mack, Vice President, Bechtel Corporation: *Infrastructure Development to Support the Hydrocarbon Industry*

3:00-3:15 PM **Coffee break**

3:15-5:15 PM **Perspectives from Latin America**

Moderator: Fereidun Fesharaki

Mauricio Gonzalez, Executive President, Yacimientos Petroliferos Bolivianos, Bolivia

Raúl García, President, National Regulatory Gas Agency, Argentina

5:15-5:30 PM **Concluding Remarks and Closing of the Conference**

Fereidun Fesharaki and IPGC '93 Advisory Council

List of Participants



LIST OF PARTICIPANTS
1993 INTERAMERICAN PETROLEUM AND GAS CONFERENCE
September 27-28, 1993
Dallas, Texas

Soraya Abachi
Program on Resources
East-West Center
1777 East-West Road
Honolulu, HI 96848
Tel: 808-944-7534
Fax: 808-944-7559

H.E. Francisco Acosta Coloma
Minister of Energy & Mines
Ministerio de Energía y Minas
Santa Prisca 215, Cuarto Piso
Quito, Ecuador
Tel: 593-2-502-677 or 570-034
Fax: 593-2-580-724 or 570-350

Hamish Adam
General Manager
BOVAR Corporation
10200 Richmond Ave., #150
Houston, TX 77042
Tel: 713-789-1084
Fax: 713-784-1015

Ing. Raul Aguero
Vice Minister
Department of Energy
Av. Paseo Colon 171
6 Piso, #603
Buenos Aires 1063, Argentina
Tel: 541-343-1761
Fax: 541-343-2939

S.W. Akers
International Negotiator
New Business Development - Americas
Mobil E&P Division
12450 Greenspoint Drive
Houston, TX 77060-1991
Tel: 713-775-2664
Fax: 713-775-4187

Roger Alderson
General Manager
Great Western Ltd.
German Schreiber 246
San Isidro, Lima 27, Peru
Tel: 55-14-422-719
Fax: 55-14-421-591

Antenro Aleman
Geologist
Amoco Production Company
501 Westlake Park Blvd.
P.O. Box 3092
Houston, TX 77252
Tel: 713-556-3606
Fax: 713-584-7574

Nasser Al-Rashed
Petroleum Attaché
Petronal
9 West 57 St., #4950
New York, NY 10019
Tel: 212-319-6600
Fax: 212-319-6678

Eberto "Tiko" Amador
Project Engineer
Sound Environment Solutions, Inc.
11111 Katy Freeway, #810
Houston, TX 77079
Tel: 713-973-6085
Fax: 713-973-6087

Michael Amini
Exec. V.P. and Secretary
Sage Energy Company
10101 Reunion Place, #800
San Antonio, TX 78216
Tel: 210-340-2288
Fax: 214-340-3182

Paul Beenen
Gulf Coast Coordinator
New York Mercantile Exchange
P.O. Box 20167
Houston, TX 77225-0167
Tel: 713-661-0545
Fax: 713-661-0607

Greg Beilstein
Director, New Business Development
AMOCO Production Company
P.O. Box 3092
Houston, TX 77253-3092
Tel: 713-556-2053
Fax: 713-588-5027

Sully Bengharsa
Marketing Representative
Maxus Energy Company
717 North Harwood
Dallas, TX 75201
Tel: 214-953-2000

Carl Bergman
Maxus Energy Corporation
717 N. Harwood
Dallas, TX 75201
Tel: 214-952-2000

L. Fernando Bermudez
Sales Manager, Latin Am Projects
Sulzer Bingham Pumps, Inc.
P.O. Box 10247
Portland, OR 97210
Tel: 503-226-5359
Fax: 503-721-5803

Francisco Berninzon Ponce
Estudio Martinez
Berninzon y Lavelle
Marconi 451, San Isidro
Lima 27, Peru
Tel: 51-14-706-565
Fax: 51-14-702-573

Anne B. Bertolet
Senior Marketing Representative
ARCO Pipeline Company
15600 JFK Blvd., #300
Houston, TX 77032
Tel: 713-986-5223
Fax: 713-986-5426

Katsumi Biyajima
Vice President
Idemitsu Oil Development Co., Ltd.
5075 Westheimer, #1075
Houston, TX 77506
Tel: 713-850-0781
Fax: 713-850-1937

Charles Blackburn
Chairman & Chief Executive Officer
Maxus Energy Corporation
717 North Harwood Street
Dallas, TX 75201
Tel: 214-953-2713
Fax: 214-979-1911

Jerry W. Blankenship
Vice President
Hydrocarbon Marketing
Maxus Energy Corporation
717 N. Harwood
Dallas, TX 75201
Tel: 214-952-2000

A.J. Bol
Exploration Manager
SIPM B.V.
Oostduinlaan 75
The Hague, The Netherlands
Tel: 31-70-377-1448
Fax: 31-70-377-3494

Kenneth O. Booi
Director of Latin America
Muse, Stancil & Company
3131 McKinney Ave.
Dallas, TX 75204
Tel: 214-954-4455
Fax: 214-954-1521

Trevor Boopsingh
Chairman
Petroleum Company of
Trinidad and Tobago, Ltd.
Administration Bldg.
Point-à-Pierre
Port of Spain, Trinidad and Tobago
Tel: 809-658-4200
Fax: 809-658-1315

James L. Bryan
Vice President-Operations
Dresser Ind.
P.O. Box 6504
Houston, TX 77265
Tel: 713-297-2548
Fax: 713-297-2599

William Buckley
Mann, Schorsch & Buckley, P.C.
400 Fountain Place
1445 Ross Avenue
Dallas, TX 75202
Tel: 214-871-0991
Fax: 214-871-8764

Louise M. Burke
Marketing Director
Crude Oil and Petroleum Products
New York Mercantile Exchange
Four World Trade Center
New York, NY 10048
Tel: 212-938-2218
Fax: 212-432-6286

Carl Burgman
Maxus Energy Corporation
717 N. Harwood
Dallas, TX 75201
Tel: 214-953-2000

Peter Burrows
Reporter
Businessweek Magazine
1201 Main Street, #1680
Dallas, TX 75202
Tel: 214-748-7263
Fax: 214-748-3990

John R. Butler, Jr.
Senior Chairman
Petroleum Information Corp.
5333 Westheimer, #100
Houston, TX 77056
Tel: 713-840-8282
Fax: 713-599-9101

George Buzan
Input/Output
Houston, TX

Lori Cameron
Executive Director
The Energy Council
222 West Las Colinas Blvd., #1913
Dallas, TX 75039
Tel: 214-402-4222
Fax: 214-402-4211

Rex W. Canon
Executive Vice President
The Maple Gas Corporation del Peru
2626 Cole Avenue, #950
Dallas, TX 75204
Tel: 214-880-0400
Fax: 214-880-0005

Brian Cantor
Oil Products Reporter
Petroleum Argus
4801 Woodway, #270W
Houston, TX 77056
Tel: 713-622-3996
Fax: 713-622-2991

Ronald Carpenter
Engineer
AMOCO Production Company
P.O. Box 3092
Houston, TX 77253
Tel: 713-556-7719
Fax: 713-556-3484

Margaret M. Carson
Director, Competitive Analysis
Enron Corporation
P.O. Box 1188, Room 4325
Houston, TX 77251
Tel: 713-853-7088
Fax: 713-646-2369

Guy Caruso
Director, Office of Non-Member Countries
International Energy Agency
5 rue André Pascal
Paris Cedex 16, France 75775
Tel: 33-1-4524-9450
Fax: 33-1-4524-9988

Frank Cascio, Jr.
2701 Talbott St.
Houston, TX 77005

Julia Culver-Hopper
Consultant
East-West Center
1777 East-West Road
Honolulu, HI 96848
Tel: 808-944-7560
Fax: 808-944-7559

John W. Czarnik
Exploration Manager
Texaco
4800 Fournace Place, E-705
Bellaire, TX 77401
Tel: 713-432-6804
Fax: 713-661-7463

William W. Daily
Vice President
International Operations
Hondo Oil & Gas
410 E. College
Roswell, NM 88201
Tel: 505-625-6802
Fax: 505-625-6825

Julia Davies
Chief Geologist
Premier Consolidated Oilfields, PLC
23 Lower Belgrave Stret
London SW1W 0NR
United Kingdom
Tel: 44-71-730-1111
Fax: 44-71-730-4696

Carlos de la Guerra
President
The Maple Gas Corporation del Peru
2626 Cole Avenue, #950
Dallas, TX 75204
Tel: 214-880-0400
Fax: 214-880-0005

Luis O. Del Cerro
Principal Financial Analyst
InterAmerican Development Bank
1300 New York Avenue N.W.
Washington, D.C. 20577
Tel: 202-623-1956
Fax: 202-623-1304

Carlos E. Delius
President
Occidental Petroleum Corporation of Peru
P.O. Box 11174
Bakersfield, CA 93389-1179
Tel: 51-14-428-140
Fax: 51-14-428-110

Carlos Dengo
Coordinator
Americas/Frontier Special Studies
Exxon Exploration Company
P.O. Box 4279
Houston, TX 77210-4279

Susan Derryberry
ISEM at SMU
P.O. Box 274
Dallas, TX 75275-0274
Tel: 214-768-2001
Fax: 214-768-4289

Gary De Smith
Operations Supervisor
Veritas Geophysical, Ltd.
3301 W. Airport Freeway, #126
Bedford, TX 76021
Tel: 817-267-9910
Fax: 817-355-0996

Julio E. Diaz
BD Manager
Brown & Root Petroleum and Chemicals
4100 Clinton Drive
Houston, TX 77020
Tel: 713-676-3873
Fax: 713-676-8665

Peter C. Dillingham
Vice President
Suits Drilling Company
310 South 42nd Street
Enid, OK 73701
Tel: 405-237-7447
Fax: 405-237-1560

Gary J. Fedor
Senior Vice President
Saladin, Inc.
136-230 Main Street
Princeton, NJ 08450
Tel: 609-520-9099
Fax: 609-520-8457

Don B. Filio
Vice President
AMOCO Overseas Exploration Co.
501 WestLake Park Blvd.
Houston, TX 77079
Tel: 713-556-2520
Fax: 713-584-7574

Fereidun Fesharaki
Director
Program on Resources
East-West Center
1777 East-West Road
Honolulu, HI 96848
Tel: 808-944-7527
Fax: 808-944-7559

Tim Fitzgerald
U.S. Department of Energy
1000 Independence Ave., SW
Washington, D.C. 20585

Christine Fletcher
International Affairs Specialist
U.S. Department of Energy
1000 Independence Ave., SW
Washington, D.C. 20585

Richard Fletcher
Manager, Information Systems Intl
Gaffney, Cline & Associates, Inc.
16775 Addison Road, #400
Dallas, TX 75248
Tel: 214-733-1183
Fax: 214-380-0180

Greg Floerke
Project Leader
Williams Energy Ventures
P.O. Box 70
Tulsa, OK 74101
Tel: 918-588-3372
Fax: 918-588-3864

Robert G. Font
President
R.G. Font, Ph.D., Inc.
Geoscience Data Management, Inc.
P.O. Box 795151
Dallas, TX 75379-5151
Tel: 214-715-8034
Fax: 214-715-8079

Jim Ford
Manager
Contract Negotiations
Santa Fe Energy Resources, Inc.
1200 Smith Street, #160
Houston, TX 77002
Tel: 713-646-1132
Fax: 713-646-1157

Kam Foroohar
International Petroleum Reports
A-P Dow Jones News Service
World Financial Center
200 Liberty Street, 12th Floor
New York, NY 10281
Tel: 212-416-2320
Fax: 212-416-2324

Joseph T. Forrest
Coordinator of Int'l Projects
Petroleum Information Corporation
5333 Westheimer Road
Houston, TX 77056
Tel: 713-840-8282
Fax: 713-599-9100

Michael C. Forrest
Vice Chairman & COO
Maxus Energy Corporation
717 N. Harwood Street
Dallas, TX 75201
Tel: 214-953-2725
Fax: 214-953-2239

Dan R. Foster
KDNT AM Radio News
1440 Wheeler Drive
Denton, TX 76208
Tel: 817-382-2552
Fax: 817-566-1973

John L. Garrison
General Manager
Enron Development Corp.
P.O. Box 1188
Houston, TX 77251-1188
Tel: 713-646-6058
Fax: 713-646-6222

Kent Gestring
Vice President
WWS Log Services
12600 W. Colefax Ave., #A270
Lakewood, CO 80215
Tel: 303-237-2823
Fax: 303-237-3589

George F. Getten
Vice President
Acquisitions & Product Marketing
Santa Fe International Corporation
Two Lincoln Center, #1100
5420 LBJ Freeway
Dallas, TX 75240
Tel: 214-701-7313
Fax: 214-701-7737

Mike Giglio
Senior Vice President
Samson International Ltd.
Two West Second Street
Tulsa, OK 74103
Tel: 918-583-1791
Fax: 918-587-5287

G.C. Chip Gill
Director
State Government Relations
ARCO Oil & Gas Company
1601 Bryan Street
Dallas, TX 75201
Tel: 214-880-4512

Luis E. Giusti
Vice President
Maraven, SA
A. La Estancia No. 10, Chuao
Edificio Maraven; Apartado 829
Caracas 1010 A, Venezuela
Tel: 58-2-908-2111
Fax: 58-2-908-2885

Terry Glasgow
Vice President
Occidental Crude Sales, Inc.
P.O. Box 3466
Houston, TX 77253-3466
Tel: 713-840-3774
Fax: 713-840-2834

F. Davis "Dave" Golson
Engineer
Amoco Production Company
P.O. Box 3092
Houston, TX 77253
Tel: 713-556-4189
Fax: 713-556-7097

Mauricio Gonzalez
Executive President
Yacimientos Petrolíferos Fiscales
Bolivianos
Calle Bueno 185
La Paz, Bolivia
Tel: 591-2-374-469
Fax: 591-2374-468

Enrique Gonzalez-Gerth
Vice President, Engineering
Forrest A. Garb & Associates, Inc.
5310 Harvest Hill Road, #160; LB 152
Dallas, TX 75230-5805
Tel: 214-788-1110
Fax: 214-991-3160

William R. Goode
Regional Manager
Econology and Enviorment
1999 Bryan Street, #2000
Dallas, TX 75201
Tel: 214-220-0318
Fax: 214-855-1422

John D. Gordon
Sr. Geologist South America
ORYX Energy Company
P.O. Box 2880
Dallas, TX 75221
Tel: 214-715-8681
Fax: 214-715-8330

Alberto Hernandez
Senior Counsel, International
Atlantic Richfield Company
2300 West Plano Parkway
Plano, TX 75075
Tel: 214-754-4046
Fax: 214-754-4058

L.C. Hicks, III
Director, Int'l Negotiations
ARCO International Oil & Gas Company
P.O. Box 260888
Plano, TX 75026-0888
Tel: 214-754-4015
Fax: 214-754-3090

Steven R. Hill
Director, Project Development
Worldwide Oil & Gas Bus. Seg.
ABB Lummus Crest, Inc.
12141 Wickchester
Houston, TX 77079
Tel: 713-531-2630
Fax: 713-589-3299

Kathy Hiter
Marketing Representative
Artesia Data Systems
5420 LBJ Freeway
Two Lincoln Centre, #1200
Dallas, TX 75240
Tel: 214-788-0400
Fax: 214-788-0502

Keven Hofner
Muse, Stancil & Company
3131 McKinney Ave.
Dallas, TX 75204
Tel: 214-954-4455
Fax: 214-954-1521

H.E. Daniel Hokama
Minister of Energy and Mines
Ministerio de Energia y Minas
Av. Las Artes Sur 260
Urb. San Borja
Lima 41, Peru
Tel: 51-14-754-320
Fax: 51-14-750-689 or 755-368

Jerrell A. Holder
Hunt Oil Company
1445 Ross at Field
Dallas, TX 75202
Tel: 214-978-8630
Fax: 214-978-8675

Douglas W. Hollett
Exploration Supervisor
Northern Latin America
Marathon Oil Company
P.O. Box 3128
Houston, TX 77253
Tel: 713-296-2600
Fax: 713-296-2168

Andrew J. Hooks
General Manager-U.S. Operations
Magnetic Pulse, Inc.
11933 Windfern
Houston TX 77063
Tel: 713-894-9185
Fax: 713-894-4415

Karen S. Hooper
Business Development Latin America
Fluor Daniel, Inc.
3333 Michelson Drive
Irvine, CA 92730
Tel: 714-975-7346
Fax: 714-975-5782

O. Frank Huffman
President
Discovery Technologies
820 Gessner, #284
Houston, TX 77204
Tel: 713-467-5317

L.E. Buck Humphreys
General Counsel
The Orion Companies, Ltd.
13345 N. Central Expressway, #202
Dallas, TX 75243
Tel: 214-644-2151
Fax: 214-644-2196

Paul Jones
ARCO Pipe Line Company
15600 JFK Blvd., #300
Houston, TX 77032
Tel: 713-986-5337
Fax: 713-986-5426

Ira Joseph
Staff Editor
Petroleum Intelligence Weekly
515 Broadway, 4th floor
New York, NY 100512
Tel: 212-941-5500
Fax: 212-941-5508

Andrew Jupiter
Petrotin
Trinidad and Tobago

The Hon. Eduardo Juan
Minister
Ministry of Natural Resources
Government Center
Belmopan, Belize
Tel: 501-8-22-630
Fax: 501-8-22-333

Penelope Justice
U.S. Department of Energy
Washington, D.C.

William M. Kallop
Petro-Tech Peruana
P.O. Box 2666
Houma, LA 70361
Tel: 504-868-5950
Fax: 504-851-7452

Nick Kangles
Vice President
Novacorp International Consulting, Inc.
801 Seventh Avenue, S.W., 35th floor
P.O. Box 2535, Station M
Calgary, Alberta T2P 2N6, Canada
Tel: 403-290-7321
Fax: 403-237-6102

Carlton W. Karlik
Senior Staff Cost Estimator
ARCO International Oil & Gas Company
P.O. Box 260888
Office #PAI-J3625
Plano, TX 75026-0888
Tel: 214-754-3416
Fax: 214-754-4318

Lawrence Kaufman
Energy Analyst
U.S. Government
6211 Kersey Court
Burke, VA 22015
Tel: 703-482-9104
Fax: 703-790-5736

John A. Keenan
President
Great Western Limited
1111 Bagby Street, #1700
Houston, TX 77002
Tel: 713-739-8400
Fax: 713-739-8734

John Kennedy
Editor
The Oil and Gas Journal
3050 Post Oak Blvd., #200
Houston, TX 77056
Tel: 713-621-9720
Fax: 713-963-6285

Willa Black Kennedy
Staff, Energy Committee
Arkansas Legislative Council
Room 315, State Capitol Bldg.
Little Rock, AR 77204
Tel: 501-682-1937
Fax: 501-682-1936

Sung Min Kim
Manager
Yukong Ltd., USA
110 E. 55th Street, 14th floor
New York, NY 10022
Tel: 212-906-8142
Fax: 212-906-8149

Fabiano Lobato
Professor
Kingwood College
2114 Thousand Pines Drive
Kingwood, TX 77339
Tel: 713-358-3579

Gary Long
Petroleum Engineer
U.S. Department of Energy
915 Blewitt Drive
Cedar Hill, TX 75104

Deborah Louison
Vice President
APCO Associates
1155 21st Street, NW, 10th Floor
Washington, D.C. 20036
Tel: 202-778-6333
Fax: 202-466-6006

Steve Lowden
New Ventures Manager
Premier Consolidated Oilfields, PLC
23 Lower Belgrave Street
London SW1W 0NR, United Kingdom
Tel: 44-71-730-1111
Fax: 44-71-730-4696

Rey Macedo
Mobil New Business Development
Group Americas, E&P Division
P.O. Box 650232
Dallas, TX 75265-0232
Tel: 214-951-2000
Fax: 214-951-3688

Jorge Machnizh

Thomas L. Mack
Vice President and Manager
of Marketing & Bus Dev
Bechtel Corporation - Civil Co.
50 Beale Street
San Francisco, CA 94119
Fax: 415-768-5561

Robert Malaise
Manager, Technical Services
ARCO International Oil & Gas Co.
P.O. Box 26088
Plano, TX 75026-0088
Tel: 214-754-4110
Fax: 214-754-3882

W.V. Maloney
Latin American Area Manager
Pecten International Company
200 N. Dairy Ashford
Houston, TX 22079
Tel: 713-544-4171
Fax: 713-544-4859

E.V. Manalac
Expl. Manager
Asia/Latin Am/ME
Philipps Petroleum Company
1430 Plaza Office Building
Bartlesville, OK 74004
Tel: 918-661-3962
Fax: 918-662-2551

Jay C. Manning
Director of Int'l Sales
Stewart & Stevenson Services
P.O. Box 1637
Houston, TX 77251-1633
Tel: 713-868-7700
Fax: 713-868-0205

Mike Marfleet
The Louisiana Land & Exploration Co.
909 Poydras Street
New Orleans, LA 70112
Tel: 504-566-6317
Fax: 504-566-2242

Kent Marple

Mario Marquez
Contracting Engineer
CBI Company Ltd.
8900 Fairbanks North Houston Road
Houston, TX 77241-1146
Tel: 713-896-3783
Fax: 713-466-8218

The Hon. Billy A. Mickle
State Senator
The State of Oklahoma
P.O. Box 207
Durant, OK 74702
Tel: 405-924-1151

Fernando Mirotti
Department of Energy
Av. Paseo Colon 171; 6 Piso, #603
Buenos Aires 1063, Argentina
Tel: 54-1-343-1761
Fax: 54-1-343-2939

Mike Mitchell
Economic Coordinator
Phillips Petroleum Company
1490 Plaza Office Building
Bartlesville, OK 74003
Tel: 918-661-8691
Fax: 918-661-8107

Jorge Aramayo Montes
YPFB Representative in USA
Petroleum Advisor
Yacimientos Petroliferos
Fiscales Bolivianos
5251 Westheimer, #390
Houston, TX 77056
Tel: 713-622-0294
Fax: 713-622-0299

Carter R. Montgomery
President
Axis Gas Corporation
1801 N. Lamar, #100
Dallas, TX 75202
Tel: 214-220-1080
Fax: 214-720-1048

David L. Moore
Partner
Arthur Andersen & Co.
711 Louisiana, #1300
Houston, TX 77002
Tel: 713-237-5071
Fax: 713-237-5749

H.E. Orlando Morales Matamoros
Minister
Ministry of Natural Resources,
Energy and Mines
Calle 25, Avenidas 8-10, Edificio
Vista Palace, Apartado 10027
San Jose 1000, Costa Rica

Susan Morrice
S. Morrice & Associate, Ltd.
535 16th Street, #820
Denver, CO 80202
Tel: 303-573-3909
Fax: 303-573-7340

Robert K. Morse
Project Coordinator
ARCO International Oil and Gas
2300 West Plano Parkway
Plano, TX 75075
Tel: 214-754-6692
Fax: 214-754-4336

Steve R. Mutt
Senior Vice President
Operations & New Business Development
Austral-Asia, Americas
ARCO International Oil & Gas Company
P.O. Box 260888
Plano, TX 75028-0888
Tel: 214-754-3000
Fax: 214-754-4030

Saeid Najari
Senior Staff Engineer
ARCO International Oil & Gas
2300 W. Plano Parkway
Plano, TX 75075
Tel: 214-754-4112
Fax: 214-754-3284

Masahisa Nakatani
General Manager
Idemitsu Int'l America
Latina Ind. E Com. Ltda.
Av. Rio Branco, 01-Sala 1510-Centro
Rio de Janeiro, Brasil 20090-003
Tel: 55-21-518-1534
Fax: 55-21-518-1523

Robert W. Oliver
Vice President
Bridge Oil (U.S.A.) Inc.
12404 Park Central Dr., #400
Dallas, TX 75251
Tel: 214-788-3358
Fax: 214-788-5901

Kenji Ono
Assistant General Manager
Japan National Oil Corporation
One Riverway, #1050
Houston, TX 77056
Tel: 713-622-0204
Fax: 713-622-1330

Ted W. Oppel
Vice President
International New Ventures
Total Minatome Corporation
P.O. Box 4326
Houston, TX 77210-4326
Tel: 713-739-3202
Fax: 713-739-3282

John Orban

Robert E. Orth
Manager, Contract Negotiations
Santa Fe Energy Resources, Inc.
1200 Smith Street, #1600
Houston, TX 77002
Tel: 713-646-1180
Fax: 713-646-1157

Edgar Ortiz
Vice President
South America Region
Halliburton Co.
5151 San Felipe
Houston, TX 77056
Tel: 713-624-3301
Fax: 713-624-3320

Richard Ortiz

Manuel Paredes
OOC, Inc.
654 North Belt East, #400
Houston, TX 77060
Tel: 713-847-8176
Fax: 713-847-8051

Thomas C. Parvis
Manager
International Feedstock Supply
Occidental Chemical Corporation
P.O. Box 809050
Dallas, TX 75380
Tel: 214-404-4143
Fax: 214-404-4185

George W. Pasley
Senior Vice President
Operations
Maxus Energy Corporation
717 N. Harwood Street
Dallas, TX 75201
Tel: 214-953-2725
Fax: 214-953-2239

Neyeska G. Pedersen
Technical Coordinator
ARCO International Oil and Gas
2300 West Plano Parkway
Plano, TX 75075
Tel: 214-754-3998

Erica Penarrieta
Business Analyst
Conoco, Inc.
P.O. Box 2197, HU 2038
Houston, TX 77252
Tel: 713-293-4606
Fax: 713-293-5387

William Penido Valle
Vice Minister
Ministerio da Infra-Estrutura
Esplanada dos Ministerios
Bloco RR, 3 Andar, S/306
Brasilia 70044, Brazil
Tel: 55-61-224-3269 or 218-6430
Fax: 55-61-322-3615

Dale J. Pennington
General Manager
Westrn. Hemisphere
Petroconsultants Sales Corps
6600 Sands Point Drive
Houston, TX 77274
Tel: 713-995-1764
Fax: 713-995-8593

Scott Randall
Director of Strategy Development
M.L. Payton Consulting Group
2000 Dairy Ashford, #370
Houston, TX 77077
Tel: 713-589-9496
Fax: 713-589-0558

Emilio Rappaccioli
Ministro Director
Instituto Nicaraguense de Energia
Apartado Postal No. 55
Managua, Nicaragua
Tel: 505-2-785-484
Fax: 505-2-674-377

Hossein Razavi
Chief of Oil and Gas Division
The World Bank
1818 H St., N.W., #S-4029
Washington, DC 20433
Tel: 202-458-5300
Fax: 202-477-0542

Scott Rees
Vice President
Netherland, Sewell & Assoc., Inc.
4500 Thanksgiving Tower
Dallas TX 75201
Tel: 214-969-5401
Fax: 214-969-5411

David Reilly
Business Analyst
British Gas
1100 Louisiana, #2500
Houston, TX 77042
Tel: 713-754-7783
Fax: 713-756-7918

Luis A.N. Reis
President
Petrobras America Inc.
10777 Westheimer, #625
Houston, TX 77042
Tel: 713-781-9799
Fax: 713-781-9790

Federico Renjifo
Vice Minister
Ministry of Mines and Energy
Colombia
Tel: 571-222-3847
Fax: 571-222-3651

Philip B. Ribbeck
Marketing Advisor
Natural Gas Bus Unit (Int'l)
AMOCO Production Company
501 Westlake Park Blvd
P.O. Box 3092
Houston, TX 77253-3092
Tel: 713-556-4080
Fax: 713-556-3285

Roberto Rimbau
Senior Project Engineer
Enron Corporation
P.O. Box 1188
Houston, TX 77251-1188
Tel: 713-646-7620
Fax: 713-646-7688

Edgar Rincon
Corp. Planning and General Manager
Petroleos de Venezuela, SA
Edificio Petroleos de Ven, Torre Oeste
Piso 12, La Campina
Caracas, Venezuela
Tel: 58-2-708-1949
Fax: 58-2-708-1147

Gilberto Rincon
Manager, Business Development
Bechtel Corporation
50 Beale Street
San Francisco, CA 94119-3965
Tel: 415-768-6228
Fax: 415-768-9227

David Ritchie
Assistant Marketing Manager
International Petroleum Exchange
11 West 42nd Street
New York, NY 10036
Tel: 212-764-1748
Fax: 212-921-1298

Antonio Sanclemente Velasquez
Lawyer
Sanclemente, Fernandez & Hernandez
Abogados S.A.
Carrera 9 No. 69 - 70
Santafé de Bogotá
Cundinamarca, Colombia
Tel: 571-310-555
Fax: 571-255-9372

Bill A. Schaefer, Jr.
Exploration Manager, International
Santa Fe Energy Resources, Inc.
1200 Smith Street, #1600
Houston, TX 77002
Tel: 713-646-1131
Fax: 713-646-1157

Aart G. Schenau
Vice President
Mokveld Valves, Inc.
4900 Woodway Drive, #805
Houston, TX 77056
Tel: 713-622-5600
Fax: 713-622-5665

Kenneth R. Schmitz
Business Development Manager
Electronic Data Systems
1800 Jay Ell Drive
Dallas, TX 75281
Tel: 214-301-4690
Fax: 214-301-4631

Martin Schuepbach
Senior Vice President, Exploration
Maxus Energy Corporation
717 N. Harwood
Dallas, TX 75201
Tel: 214-953-2725
Fax: 214-952-2239

Len Schuman
Director of Marketing &
Development (Western Hemisphere)
International Petroleum Exchange
11 West 42nd Street
New York, NY 10036
Tel: 212-764-1748
Fax: 212-921-1298

Chris Seal
Mobil New Business Development
P.O. Box 650232
Dallas, TX 75265-0232
Tel: 214-951-3742
Fax: 214-951-2104

Mark Seetin
Vice President
Governmental Affairs
New York Mercantile Exchange
919 18th Street, NW, #800
Washington, D.C. 20006
Tel: 202-785-6975
Fax: 202-785-3716

Atsushi Seki
Assistant General Manager
Japan National Oil Corporation
One Riverway, ##1050
Houston, TX 77056
Tel: 713-622-0204
Fax: 713-622-1330

Jose L. Serra
BD Manager
Brown & Root Petroleum and Chemical
Calle Veracruz, Edificio Torreon
Caracas, Venezuela
Tel: 58-2-926-516
Fax: 58-2-927-324

John P. Servello
Director, International Negotiations
AMOCO Production Co.
P.O. Box 3092
Hosuton, TX 77253
Tel: 713-588-5458
Fax: 713-588-5717

Matthew Shaw
South America Oil & Gas Analyst
Wood Mackenzie
Kintore House
74-77 Queen Street
Edinburgh, Scotland, EH2 4NS
United Kingdom
Tel: 44-31-243-4210
Fax: 44-31-243-4435

Walter Smith

Jane Smith-Martin

Assistant Program Officer
Program on Resources
East-West Center
1777 East-West Road
Honolulu, HI 96848
Tel: 808-944-7526
Fax: 808-944-7559

Kathy Sockwell

Triton Energy Corporation
6688 N. Central Expressway, #1400
Dallas, TX 75206
Tel: 214-691-5200
Fax: 214-691-0597

Hendratmo Soedarso

Head of Econ. & Tech Department
Pertamina
2121 Avenue of the Stars, #2000
Los Angeles, CA 90067
Tel: 310-277-3721
Fax: 310-553-9550

Lou C. Soileau IV

Development Manager
ARCO Oriente Inc.
2300 West Plano Parkway
Plano, TX 75075
Tel: 214-754-4138
Fax: 214-754-4058

David M. Soley

Manager, Marketing & Sales
Dresser MFG Division
5619 W. Caruth Blvd.
Dallas, TX 75209
Tel: 214-956-9048
Fax: 214-956-9058

David Soo

Reporter
Business Horizon Magazine
550 Westlake Park Blvd., #400
Houston, TX 77079
Tel: 713-596-4427
Fax: 713-531-6013

James C. Spalding
Director, Commercial Affairs
Glitsch Inc.
4900 Singleton Blvd.
Dallas, TX 75212
Tel: 214-631-3841
Fax: 214-630-0062

W. E. Sparks, Jr.

Vice President
Americas Business Unit
Exxon Exploration Company
P.O. Box 4279
Houston, TX 77210-4279

William Raymond Stancil

President
Muse Stancil & Company
3131 McKinney Avenue
Dallas, TX 75204
Tel: 214-954-4455
Fax: 214-954-1521

Richard P. Stapleton

Edelman, Percival & Associates
134 Jason Drive
Red Oak, TX 75154
Tel: 214-617-7631
Fax: 214-617-2692

Wayne Stedman

Technical Manager
Mobil International Marketing
& Refining
Fairfax, VA

John F. Stephens, Jr.

Senior Attorney
ENSERCH Corporation
300 S. St. Paul, #450EC
Dallas, TX 75201
Tel: 214-670-2534
Fax: 214-573-3923

Michael Strauss

Knight-Ridder Financial News
1331 Lamar Street, #1459
Houston, TX 77010
Tel: 713-659-5431
Fax: 713-659-5433

Thomas R. Thompson
Geophysicist
Amoco Production Co.
501 WestLake Park Blvd.
Houston, TX 77253-3092
Tel: 713-596-7612
Fax: 713-584-7574

Felipe A. Thorndike
Petro-Tech Peruana
P.O. Box 2666
Nouma, LA 70361
Tel: 504-868-1438
Fax: 504-851-7452

Bob Tippee
Managing Editor
Economics & Exploration
Oil & Gas Journal
3050 Post Oak Blvd., #200
Houston, TX 77056
Tel: 713-963-6242
Fax: 713-963-6285

Steven B. Todaro
Market Research Manager
Dresser-Rand Company
1200 W. Sam Houston Pkwy N.
Houston, TX 77043
Tel: 713-973-5345
Fax: 713-973-5323

Esther E. Tonge
Market Analysis Analyst
Amoco Corporation
200 East Randolph Drive
Chicago, IL 60601
Tel: 312-856-5107
Fax: 312-856-6593

Belle Toren
Triton Energy Corporation
6688 N. Central Expressway, #1400
Dallas, TX 75206
Tel: 214-691-5200
Fax: 214-691-0597

Alvaro Torres-Pena
Colombia Consultant
Amoco Corporation
501 Westlake Park Blvd.
Houston, TX 77079
Tel: 713-565-3515

Lisa Totto
Editor
Oil Market Listener
1114 Punahou Street, No. 5A
Honolulu, HI 96826
Tel: 808-947-6234
Fax: 808-947-6234

John Elting Treat
Senior Vice President
Booz, Allen and Hamilton, Inc.
555 Montgomery Street, #1700
San Francisco, CA 94111
Tel: 415-627-4213
Fax: 415-627-4283

Ernesto Tribino
Vice President
J. Aron & Company
85 Broad Street
New York, NY 10004
Tel: 212-902-7361
Fax: 212-344-3457

James K. Trigger
Regional Manager, Exploration
Mobil New Business Development
P.O. Box 650232
Dallas, TX 75265-0232
Tel: 214-951-2677
Fax: 214-951-3688

Terrance G. Tschatschula
Commercial Applications Network
1109 Brissette Beach
Kawkawlin, MI 48631
Tel: 517-686-8585
Fax: 517-686-3511

David L. Turnbull
Chief Operating Officer
Contract Compressions, Inc.
14005 West Highway, 90A
East Bernard, TX 77435
Tel: 800-226-1224
Fax: 409-335-6559

Jack E. Uselton II
District Contracts Manager
Pecten International Company
200 N. Dairy Ashford
Houston, TX 77079
Tel: 713-544-2214
Fax: 713-544-4602

Leonard West
Mobil New Business Development
P.O. Box 659232
Dallas, TX 75265-0232
Tel: 214-951-2000
Fax: 214-951-3688

Dale F. Wetherbee
1808 Poinciana Lane
Plano, TX 75075
Tel: 214-422-0828
Fax: 214-783-6694

Otto Wetzel Jr.
Secretary/Treasurer
Axis Gas Corp.
1801 N. Lamar, #100
Dallas, TX 75202
Tel: 214-220-1080
Fax: 214-720-1048

Horacio Weyler
ABB Sveca Sade
Torre Britanica P.H.
Av. Jose Felix Sosa - Altamira Sur
Apartado Postal 61-327 Chacao
Caracas 1060, Venezuela
Tel: 58-2-263-4262
Fax: 58-2-263-3006

Paulette Whitcomb
Editor & Associate Publisher
Natural Gas Focus
Hart Publications Inc.
1900 Grant Street, #400
Denver, CO 80203
Tel: 303-832-1917
Fax: 303-837-8585

William H. White
Deputy Secretary of Energy
U.S. Department of Energy
1000 Independence Ave., SW
Washington, D.C. 20585

Peter Wildblood
Chief Executive
International Petroleum Exchange
International House,
1 St. Katharine's Way
London E1 9UN, UK
Tel: 44-71-481-0643
Fax: 44-71-481-8485

Joe T. Williams
President & CEO
PG&E Resources Company
6688 N. Central Expressway #1000
Dallas, TX 75206-3922
Tel: 214-750-3801
Fax: 214-750-3803

Jeremy Wills-Wilcox
Editor
Energy Risk Magazine
104/122 Marylebone Lane
London W1M 5FU, UK
Tel: 44-71-487-5326
Fax: 44-71-487-0879

The Hon. Robert T. Wilson, Jr.
State Senator
The State of Alabama
P.O. Box 2088
Jasper, AL 35501
Tel: 205-221-4640
Fax: 205-252-8484

Ronald Wilson
Vice President
New Business Development Americas
Mobil Exploration & Producing
12450 Greenspoint Drive
Houston, TX 77060-1991
Tel: 713-775-2569
Fax: 713-775-4187

J. Otis Winters
Chairman
Pate, Winters & Stone, Inc.
5956 Sherry Lane, #2001
Dallas, TX 75225
Tel: 214-696-4500
Fax: 214-696-4695

Don Wiruth
Director, Liquids Ventures
Williams Energy Ventures, Inc.
P.O. Box 70 (46-6)
Tulsa, OK 74101-0070
Tel: 918-588-3278
Fax: 918-588-4827

Sponsors

Amoco Corporation is a worldwide integrated petroleum and chemical company. We find and develop petroleum resources and provide quality products and services for our customers.

Major Operating Companies

Amoco Production Company finds and produces crude oil and natural gas worldwide. During 1992, Amoco was the seventh-largest producer of crude oil and natural gas liquids in the United States. Amoco is the largest producer of natural gas as well as the largest private holder of natural gas reserves in North America.

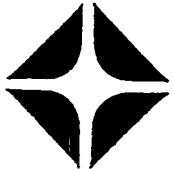
Amoco Oil Company is a refining, marketing, and transportation company that provides high-quality petroleum products and related services. Amoco in 1992, ranked third-largest in volume of crude oil refined in U.S. refineries. We marketed about six percent of the nation's refined petroleum products.

Amoco Chemical Company invests and operates responsibly worldwide for long-term, profitable growth in the chemical and related industries by identifying needs and providing products and services. We are among the largest U.S. chemical companies in terms of sales.

Amoco is focusing on the core business of its three major operating companies to build on our leadership:

- In North American natural gas reserves.
- As a low-cost producer among major U.S.-based oil and gas companies.
- As a U.S. gasoline retailer.
- In refining capabilities.
- As a producer of purified terephthalic acid (PTA, the preferred raw material for polyester), polypropylene, olefins, and industrial chemicals.

In addition to these, Amoco is investigating broadening its participation in downstream core businesses where new products and services complement existing strengths. A corporate-led drive is taking maximum advantage of our operating companies' integrated capabilities and combined strengths in new emerging markets throughout the world. These core-business efforts will be centered in areas of the world where we can be a winning player, often allied with partners who have major strengths to complement ours.



ARCO INTERNATIONAL OIL AND GAS COMPANY

ARCO International Oil and Gas Company, a Division of Atlantic Richfield Company, is responsible for the exploration and production of oil and gas outside of North America.

Established as a separate operating group in 1966, ARCO International Oil and Gas is one of Atlantic Richfield Company's eight operating companies. It is active in the North Sea and Northwestern Europe, North Africa, Asia, the Middle East, South America, Australia, and New Zealand.

As part of ARCO International's planning for future growth; the company relocated its world headquarters from Los Angeles to Plano, Texas, in January, 1989. AIOGC employs about 2,671 people worldwide and some 401 of these are located at the headquarters in Plano.



Axis Gas Corporation

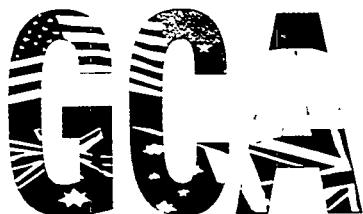
Axis Gas Corporation was founded in March of 1990. The Company initially purchased a 75 percent interest in a gas gathering system in Eddy County, New Mexico. (Feagan Gathering Company, the seller, retained a 25 interest.) This system was gathering approximately 3 million cubic feet of gas per day (MMCFD).

The Corporation owned its interest in the Dagger Draw system from March 1990 until September 1, 1992. The throughput of the system went from 3 MMCFD to 12 MMCFD during this period. The Corporation then sold its interest in the system to GPM (a subsidiary of Phillips Petroleum) for \$3,000,000 cash and a 40-month compressor contract valued at the time of sale at approximately \$750,000.

The proceeds from this sale were used to purchase a 37-1/2 percent interest in the Hulldale gas gathering system and processing plant. (Concurrently, Feagan Gathering Company acquired a 12-1/2 percent interest.) This gas gathering system and plant are operated by Texaco, who owns the remaining 50 percent interest.

At the time of purchase the Hulldale plant was processing 11.7 MMCFD (million cubic feet of gas per day). Currently the plant is processing 13.5 MMCFD. The plant's capacity is 20 MMCFD.

Axis is continuing to work on projects that will enhance its existing investment in the Hulldale plant as well as other projects that offer significant growth potential to its shareholders. It is still the policy of the Corporation to have an outside operating partner who has expertise that fits the specific project. This policy permits the Corporation to maintain a small number of personnel and allows more cash flow to be directed towards project investment and/or reinvestment and, therefore, increased value of Axis Gas stock.



GAFFNEY, CLINE & ASSOCIATES

Energy Advisers

Gaffney, Cline & Associates boasts an impressive 31-year history of international energy consulting experience. From its initial founding in Venezuela by Peter Gaffney and Ben Cline, to its position today as an eminent member of the international energy community with offices in seven countries, GCA enjoys a reputation as a thorough, impartial expert on upstream and downstream energy issues. Its co-founders actively continue to set the pace for a talented multinational staff of petroleum and chemical engineers, geologists, geophysicists, energy economists, financial analysts and systems specialists.

GCA's client list includes, among others, major and independent oil companies, international organizations such as the World Bank and its affiliated institutions, the United Nations, the U.S. Agency for International Development and national oil companies in Eastern and Western Europe, Asia, the Middle East, Africa and Latin America.

Since the company's inception, Latin America has remained a focus area of GCA's activity and expertise. GCA has played a key role in one of the largest and most successful privatization processes of any state company (oil or otherwise) in its capacity as technical adviser to Argentina's YPF S.A. on a wide range of issues, including oil and gas reserves certification and asset valuation.

In Venezuela, GCA was retained by PDVSA in a technical, economic and strategic advisory role with respect to the planning, design and implementation of the country's initial program to attract risk capital and operating participation from the international industry to further develop and reactivate certain mature oil production areas. This "Reactivation de Campos" program, now in its second round, has been most successful in attracting the full spectrum of the international oil industry.

Gaffney, Cline & Associates se enorgullece de sus 31 años de experiencia en la consultoría internacional en energía. Desde su fundación en Venezuela por Peter Gaffney y Ben Cline hasta su posición actual como miembro eminente de la comunidad energética, con oficinas en siete países, GCA ostenta una reputación de experto cabal e imparcial en temas de energía "upstream" y "downstream". Sus cofundadores participan activamente liderando un grupo multinacional de talentosos ingenieros en petróleo y química, geólogos, geofísicos, economistas en energía, analistas financieros y especialistas en sistemas.

La lista de clientes de GCA incluye, entre otros, a importantes compañías petroleras independientes, organismos internacionales, tales como el Banco Mundial y sus instituciones afiliadas, Naciones Unidas, la Agencia para el Desarrollo Internacional (USAID) y compañías petroleras nacionales en Europa oriental y occidental, Asia, Oriente Medio, África y América Latina.

Desde los comienzos de GCA, América Latina constituye un área clave para sus actividades. En Argentina, GCA desempeñó un papel preponderante en uno de los más grandes y exitosos procesos de privatización de una empresa estatal (petrolera u otra) como asesor técnico de YPF S.A. Su participación abarcó una gran variedad de temas, incluyendo la certificación de reservas de gas y petróleo y la evaluación de activos.

En Venezuela, GCA fue contratada por PDVSA como asesor técnico, económico y estratégico en lo que respecta al planeamiento, diseño e implementación del programa inicial de la compañía para atraer capital de riesgo y participación operativa por parte de la industria internacional para desarrollar y reactivar ciertas áreas petroleras desarrolladas. Este programa de "Reactivación de Campos" ha tenido mucho éxito al atraer el espectro total de la industria petrolera internacional.

THE INTERNATIONAL PETROLEUM EXCHANGE OF LONDON

The International Petroleum Exchange of London (IPE) is Europe's only energy futures and options exchange and the world's second largest energy futures market. Trading volume on the IPE, which has been growing spectacularly during the past few years, now averages around one million contracts a month—a 20-fold increase over the past decade. Daily volume of the Exchange's premier contract for North Sea Brent oil currently averages 30-40,000 contracts, while daily volume for its second major contract in gas oil ranges between 15 and 20,000 contracts.

Industry observers attribute this robust growth to such critical factors as the IPE's broad range of participants; strong liquidity, allowing participants to buy and sell with relative ease and without the risk of triggering radical price swings; resulting narrow bid and ask price ranges; and excellent open interest. The Brent contract is truly international, traded globally 11 hours a day, 9 months into the future, by clients from around the world.

Membership seats on the IPE now trade for about £100,000 (approximately \$150,000), more than triple the 1988 price. A recent profile of the IPE membership shows that about 80% of the daily volume is traded by those who are involved in the physical or "wet barrel" market. Commodity funds, local traders, and other speculators comprise about 20%.

The IPE was incorporated on November 17, 1980, in response to the increased volatility of energy prices witnessed at the turn of the decade and the need for the oil industry to more efficiently manage price risk. A gas oil futures contract, with physical delivery by warrant, was the first contract to be launched on the Exchange, early in 1981. In response to demands from the trade, this contract was subsequently changed to an FOB physical delivery contract in 1984.

In June 1988, a new Brent crude oil contract, utilizing cash settlement, was launched on the Exchange. This contract, which is based on the 15-day Brent crude oil forward market—one of the most widely traded forward crude oil markets in the world—has seen progressive success, particularly over the last three years. Recent developments, especially in the co-mingling of the Brent and Ninian crude oil production streams, have meant that the physical base for this contract has expanded, and this should further improve its long-term prospects. Indeed, Brent crude oil is now the price benchmark for about 50% of the world's traded crude oils.

The concept of cash settlement in energy futures, most notably for IPE's Brent crude oil, has now been recognized by the industry as a flexible and effective means of settlement, eliminating the complexities associated with physical delivery. This is substantiated by the significantly higher number of contracts settled in Brent—more than 2% of the overall volume—compared to about 1% of contracts going to delivery in other similar physical delivery contracts such as gas oil.

The design of contracts based on cash settlement does not exclude users who require the

**MUSE, STANCIL & CO.
ENERGY CONSULTANTS, GLOBAL EXPERIENCE**

Muse, Stancil & Co. is a professional energy consulting firm of chemical engineers specializing in the economic and technical analysis of energy-related issues. Our services are tailored for quick and concise problem resolution and encompass every aspect of transportation, refining, processing, and marketing of energy, raw materials and products. We often help clients to define their specific goals and needs before undertaking a project. Our capacity to focus on a client's needs while taking an objective, outsider's viewpoint, has achieved proven results. This has earned us a worldwide reputation. Members of the firm have undertaken assignments on the spot in many major oil and gas centers around the world, including Latin America, Europe, and the Far East. We have been especially active assisting clients interested in energy investments in the emerging democracies of eastern Europe and in the Soviet Union. We have offices in Dallas, Los Angeles, and London.

Among those we serve and typical assignments are:

INDUSTRIES SERVED

Accounting	Investment Banking	Petroleum Refining
Brokerage Houses	Legal	Petroleum Trading
Commercial Banking	Major Hydrocarbon Users	Pipelines/Transportation
Gas Processing	Petrochemicals	Private Investors
Governments	Petroleum Marketing	Public Utilities
Insurance		

TYPICAL ASSIGNMENTS

Cash Flow Projection	Design and Cost Review	Profitability Projection
Refinery Performance Improvement	Feedstock Optimization	Rate-of-Return Calculation
Training Seminars	Legal Brief	Replacement Cost of Assets
Environmental Audits	Management Restructure	Fair Market Value Assessment
Construction Supervision and Start-Up	Market Studies	Risk Assessment
Contract Negotiation	Marketing Strategy	Strategic Planning
	Physical Asset Valuation	
	Plant Certification	

Muse, Stancil & Co. Offices

100 McKinney Place 3131 McKinney Avenue Dallas, TX 75204	211 East Ocean Blvd. Second Floor Long Beach, CA 90802	No. 3 Berkeley Square London W1X 5HG ENGLAND
--	--	--

Plant Performance Improvement

Our technical and economics expertise, combined with "hands-on" operational and management experience, enables us to assist refiners to develop and implement plant performance improvement programs without capital investment to increase profits. These programs frequently entail review of operative practices and procedures, organizational structure and personnel requirements, information systems, operating cost reductions through efficiency improvements, and process and product blending optimization and opportunities. The programs are monitored against specific goals and targets that must be achieved within a designated time period.

Operations Optimization

The energy industry is seldom in equilibrium. To remain competitive, every company must constantly review its operations to ensure that optimum results are being achieved. Muse Stancil consultants are experienced in dealing with operational problems and assisting clients in operations reviews.



Engineers of Quality

THE M.W. KELLOGG COMPANY
P.O. BOX 4557
HOUSTON, TX 77210-4557
PHONE: (713) 753-2000
FAX: (713) 753-5353
TELEX: 166385 MWKHOC

The M.W. Kellogg Company, one of the world's leading technology-oriented engineering and construction contractors, is a subsidiary of Dresser Industries, Inc., and is the key component of Dresser's engineering services sector. Dresser, based in Dallas, is a major supplier of highly engineered products and services primarily used in hydrocarbon energy-related activities.

In addition to its Houston headquarters, M.W. Kellogg maintains sales and project offices worldwide. The company offers its proprietary technologies and advanced technologies of others that enable the environmentally sound conversion of hydrocarbons and other chemicals and petrochemicals into petroleum, petrochemical and energy end-products. M.W. Kellogg provides the full spectrum of engineering and construction services, from the development of energy-efficient, cost-effective processes in its laboratories to the successful commercial application of those processes.

M.W. Kellogg has completed more than 3,000 major projects in approximately 100 countries, ranging from single units and revamps to major grassroots facilities. The company is recognized globally for application of its technologies in areas such as fluid catalytic cracking, an environmentally sound, workhorse petroleum refining process; ethylene, the building block for all plastic products; and ammonia, the key ingredient in nitrogenous fertilizer manufacturing.

In 1989, M.W. Kellogg acquired a minority interest in Grupo Bufete Industrial, Mexico's leading engineering contractor in the process industry, with which M.W. Kellogg has worked closely for more than two decades.



Founded in 1902, Oil & Gas Journal is considered the leading source of petroleum news and information in exploration, drilling, production, gas processing, pipelines, and refining. The Journal is published 52 times a year. It is the industry's most widely read publication.

Oil & Gas Journal is the flagship magazine of PennWell Publishing Company, a diversified business information and marketing services company, with products that include trade publications, directories, software, maps, technical and scientific books, newsletters, conferences and exhibitions, and more.

The Journal's worldwide editorial scope includes extensive, in-depth coverage of the Latin American oil and gas industry. Following is a partial list of articles concerning Latin America the Journal published in 1992:

ARGENTINA

- Argentine drilling equipment to go on auction block 4-27 32
- Brazil to help develop oil, gas in Argentina's Northeast basin 9-28 37
- Argentina to cooperate with U.K. plans for Falklands exploration 10-5 46
- Argentina to fully privatize state owned YPF 10-5 46
- Argentina's exploration licensing round covers 145 tracts in 15 basins—Martin Keeley, Malcolm Light, Stanley Hogg, and Carlos Urien 10-12 85
- Argentina's YPF outlines plan for sale of rigs 11-16 32
- Privatizing Argentina's YPF—David Knott 12-7 27
- Geophysical work due north, south of Falkland Islands 12-28 34

BOLIVIA

- Maxus tests Bolivia gas/condensate find 3-9 41
- Bolivia-Brazil gas line route detailed 5-11 30
- Maxus drills confirmation well in Bolivia 6-22 36

BRAZIL

- Gas infrastructure eyed for southern Brazil 1-6 32
- Petrobras steps up efforts to curb natural gas flaring 1-6 32
- Brazil logs record oil reserves level 3-23 40
- Bolivia-Brazil gas line route detailed 5-11 30
- Petrobras plans big LPG storage project in Brazil 5-25 28

- Brazil's Petrobras chops 1992 capital budget 7-6 38
- LATIN AMERICA REPORT. Privatization of Brazil's petroleum sector on track despite scandal 7-6 52
- Brazil to help develop oil, gas in Argentina's Northeast basin 9-28 37
- Petrobras caught in fiscal crunch 10-26 31
- China buys Brazilian ethylene process 10-26 32

BRAZIL (Offshore)

- Royal Dutch/Shell unit to start gas flow off Brazil 7-20 32
- Floating production unit to work off Brazil 10-19 36

CHILE

- Chile refinery revamp/cogen plant scheduled 12-21 29

COLOMBIA

- BP plans to speed Colombian appraisal 1-20 68
- Six land rigs destined for Colombia 1-27 32
- Colombia awards group three Llanos basin blocks 2-10 40
- BP tests oil, gas at Cusiana wells in Colombia 3-2 20
- Coplex has possible Rubiales extensions 7-20 128
- Delineation on track in Cusiana field 10-26 24
- BP: Cusiana reserves as much as 1.5 billion bbl 11-2 40

Speakers

FRANCISCO ACOSTA

Dr Francisco Acosta was appointed as Minister of Energy and Mines of Ecuador by the Constitutional President Sixto Duran on August 12, 1993. Previously he had served as Under-Secretary of Mines and Under-Secretary of Hydrocarbons since August 1992.

A law graduate from the Central University of Ecuador, Acosta is 38. Fluent in English, he began his career in the Ecuadorian Foreign Affairs Ministry, Specializing in International Economic Policy. Following a stint as a Manager with a U.S. insurance company, the American International Group, he practiced as a lawyer at the firm Acosta and Acosta. He then moved into the energy field, working for the Legal Department of the Latin American Energy Organization (OLADE). Returning to Ecuador, he became Under-Secretary of Mines, working on the modernization of the energy and mines sectors. Dr. Acosta worked on reform of the hydrocarbons laws and the law on electrification. He has been Legal Advisor to the National Chamber on Mining since 1990 and was a member of the commission that prepared the regulations of the new mining law.

VICENTE AGUSTIN BARCENA

Mr. Bárcena has served as Manager of Business Development for Pemex Gas and Basic Petrochemicals since the inception of this company in early 1993. He joined Pemex in 1990, as Treasurer Manager for the then newly created PMI (Pemex International), where he was later appointed Director for Market Analysis and Business Development.

Mr. Bárcena has served in various capacities in the Mexican industry, in issues related to financing and marketing, particularly of oil, gas and electricity.

He has worked for "Arthur D. Little" and for "Industrias Resistol" as market analyst and for "Cementos Tolteca" as technical assistant in energy conservation issues. In 1978 he joined the Ministry of Energy as Energy Advisor, and in 1979 was appointed Deputy Director for Energy Operations. From 1983 to 1988 he served as Deputy Manager of Budget and Financing at the Electricity Utility of Mexico (C.F.E.). In 1989 he served as Investments Director for the Somex Banking Group, until he joined Pemex in early 1990.

Mr. Bárcena received his Chemical Engineering degree (cum laude) from the National University of Mexico in 1970. He received a UNESCO Fellowship at Manchester University, England (M.Sc. in Marketing 1973), and received a Fulbright/H. Humphrey Fellowship at the Fletcher School, Boston (M.A. in International Business, 1988).

He has also been a part time lecturer in Energy Planning at the Graduate School of Engineering of the National University of Mexico. He has participated in various seminars and conferences in the U.S. related with Energy Policy issues and has published various articles on energy and marketing issues in Mexico and the United Kingdom.

CHARLES L. BLACKBURN

Business Background

Charles L. Blackburn was elected President and Chief Executive Officer of Maxus Energy Corporation (formerly Diamond Shamrock Corporation) in February, 1987. In April, 1987, he assumed the additional title of Chairman of the Board of Directors of Maxus Energy Corporation.

Blackburn joined Diamond Shamrock in August, 1966, when he was elected president of Diamond Shamrock Exploration Company and executive vice president of Diamond Shamrock Corporation. At that time, he was also elected to the Board of Directors.

He has been twice named recipient of the Gold Medal Award by *Wall Street Transcript*.

Prior to joining Maxus Energy Corporation, Blackburn was a director and executive vice president responsible for worldwide exploration and production at Shell Oil Company. He was with Shell since 1952 and held a number of exploration and management positions before being named executive vice president of exploration and production in 1976. At that time he was also elected to the Shell Board of Directors.

Organizations

Blackburn is a member of the Society of Petroleum Engineers, the National Petroleum Council and the American Association of Petroleum Geologists. He serves on the board of the American Petroleum Institute and on the executive and budget committees of the National Mid-Continent Oil and Gas Association. Blackburn also serves on the board of directors of Lone Star Technologies, Inc., Landmark Graphics Corporation and the George Miksch Sutton Avian Research Center, Inc. He also serves on the executive board of the Circle Ten Council, Boy Scouts of America and is a member of the Dallas Citizens Council.

Education

Blackburn is a graduate of the University of Oklahoma with a bachelor's degree in engineering physics.

ALDO H. BRUSSONI

Aldo H. Brussoni [REDACTED] and has been in the oil business 31 years, 15 of which have been with PETRO-CANADA in Calgary, Alberta. He is since July 1990 one of the two elected officers of ARPEL Under-Secretary General of the organization for ending his term in mid 1994.

Mr. Brussoni holds degrees from the School of Engineering of the University of Montevideo, Uruguay and Buenos Aires, Argentina which he attended as a graduate student. Later on as a Fullbright Fellow, he obtained a Masters in Marine Affairs at the University of Rhode Island.

Mr. Brussoni began his international activities in the mid sixties with ANCAP where he participated in petroleum policy making, definition of international boundaries, and played an important role in the early exploration stages of upgrading the local offshore.

He has been a Member of the National Board of Oceanography of Uruguay, a national representative to the Inter-American Institute of Geography and History, a Professor of Geophysics at the University of Montevideo, and Director of Cultural Affairs at the Ministry of Education.

Shortly after joining PETRO-CANADA in 1978, Mr. Brussoni became an advisor to the Corporate Office of Environmental and Social Affairs facilitated the company's association with ARPEL in 1980.

Mr. Brussoni in addition to this exploration background has had extensive worldwide technology transfer and technical training experience through his work with PETRO-CANADA International Assistance Corporation. He has been involved in initiating several bilateral projects in Latin America such as the ones with ECOPETROL, RECOPE, ANCAP, PETROPERU, and the multilateral Sub Andrean Basin Hydrocarbon Studies Project.

During his function as PETRO-CANADA's ARPEL Coordinator, directly reporting to the Chairman's office, Mr. Brussoni was very active in establishing constructive relationships with all the Latin American state oil companies.

As ARPEL's Under-Secretary General Period 1990-94 Mr. Brussoni has participated in the implementation of the Secretariat's Main Objectives such as the Environmental Project. The search for an increased use of natural gas and future models for Latin American State Oil Companies.

ANTONIO C. COSTA

Antonio C. Costa is the Commercial Coordinator and also the Deputy Project Manager of the Brazil-Bolivia Natural Gas Project. Previously, during the period 1990/1992, he was the Commercial Manager of PETROBRAS AMERICA in New York. Since 1970, he has been working for PETROBRAS and held some management positions, at its Commercial Department, such as Deputy General Manager and Natural Gas Division Manager.

Mr. Costa holds an MBA degree from the Catholic University of Rio de Janeiro.

MARLAN W. DOWNEY

Marlan W. Downey was appointed President of ARCO International Oil and Gas Company, a division of ARCO, on June 22, 1992. He is also a Senior Vice President of ARCO. His responsibilities are overseeing oil and gas exploration and production for ARCO in foreign countries.

Prior to being appointed AIOGC President, Mr. Downey was Senior Vice President of Exploration for ARCO International Oil and Gas Company. In that assignment, he was responsible for developing and executing an aggressive world-wide exploration program which included both new venture exploration, as well as functional responsibility for the exploration efforts in subsidiary companies in Indonesia, the U.K. and Dubai.

Mr. Downey worked for Shell Oil Company from 1957 to 1987. He spent four years in Shell's Research Center charged with the responsibility of making Shell's theoretical work in organic geochemistry useful in finding oil. In 1969, Mr. Downey became Shell's youngest Chief Geologist, in 1973 became Shell's first Alaska Division Exploration Manager. Mr. Downey moved to Shell Oil's International Exploration & Production business in 1977 and became Vice President of Shell, and then President of Shell Oil's newly-formed international subsidiary, Pecten International. Mr. Downey retired from Shell in 1987 after 30 years of service.

Mr. Downey is married to Marea F. Downey, has three young sons (Justin, Alex and Nicholas) and has three older children active in the oil business (Donald, Julie, and Karen).

RAÚL EDUARDO GARCÍA

1. Personal Data

Company: National Gas Regulatory Agency
Position Title: President
Business Address: Av, Julio A. Roca 651 2º Piso
Buenos Aires, Argentina
Phone: (54-1) 349-4333/4332
Fax: (54-1) 334-5138
Nationality: Argentine
Marital Status: Married - three children
[REDACTED]

2. Education

Department of Economic, University of Washington, Seattle, United States, 1980-1985.
Degrees awarded: Doctor of Philosophy (1985); Master of Arts (1982)

Facultad de Ciencias Económicas, Universidad Nacional de Córdoba, Córdoba, 1972-1978.
Degree awarded: Licenciado en Economía.

3. Professional Record

a. Executive

- President, National Regulatory Gas Agency Argentina (March 1983-present)
- Undersecretary of Fuola, Ministry of Economics and Public Services Works, Argentina (February 1991 - March 1993)
- Advisor, to the Ministry of Foreign Affairs (1990-1991)

b. Research

- Chief Researcher of the Instituto de Estudios Económicos sobre la Realidad Argentina y Latinoamericana, IEERAL, Fundación Mediterránea, Córdoba, 1985-1989 (on leave of absence)
- Associate Professor of the Instituto de Economía of the Facultad de Ciencias Económicas, Universidad Nacional de Córdoba, 1985-1989 (on leave of absence)

DANIEL HOKAMA

Daniel Hokama is the Minister of Energy and Mines of Peru and President of the Commission for the Promotion of Private Investment (CORPI). Between 1964 and 1991 he held various positions, including Division Head for Electrical Development Projects at the head office of the Ministry of Energy and Mines; General Manager of the Department of Electricity and Telecommunications of Centromin Peru, S.A.; Director of Yuncan Electricity Company; Director of Electrocentro; and Director of Centromin Peru, S.A. He has also been a consultant in the fields of mining and electromechanics. From October 1991 to September 1992, prior to becoming minister, he was Deputy Minister of Energy and Mines and Director of Electrolima and Petroperu. He is a graduate in Electrical Mechanical Engineering of the National University of Engineering.

THOMAS L. MACK

Thomas L. Mack, Vice President and Manager of Marketing and Business Development, Bechtel Corporation, is responsible for all infrastructure marketing and business development activities in North and South America. Mr. Mack assumed these responsibilities in May of 1993. Prior to this assignment, he had similar responsibilities as Vice President and Manager of Fossil Marketing and Business Development for Bechtel Power Corporation. From 1988 until mid 1991, he was Vice President and Manager Government Affairs & Programs, Bechtel Group Inc. in Washington, D.C., where he was responsible for all federal program interfaces in Washington, D.C., as well as serving the company's chief lobbyist.

In his current role, Mr. Mack reports to the Manager of the Americas, Walter Bell. Mr. Mack has all marketing, sales and support activities for surface and aviation transportation plus water resources and buildings reporting directly to him.

Mr. Mack has been with Bechtel organization since his original engineer specialist assignment in the Los Angeles office in January 1970. Tom has worked on a broad spectrum of assignments which include field engineering, cost and schedule engineering, design engineering, business development, program management, lobbying and program management.

Mr. Mack has a Bachelor of Science degree in mechanical engineering from the University of Michigan. He was also a member of the Los Angeles Rams professional football team from 1966 until 1979 where he served as both captain and players representative.

Boone was asked by Dr. Cooper to serve on the board of the renowned Cooper Institute for Aerobics Research. *"I'm a firm believer in the benefits of fitness, and our experience with MESA's fitness program has confirmed my belief. Physically fit employees are more alert, more productive and more creative, and they exhibit more team spirit."*

In more than 40 years as an oilman, Boone has become known as a pioneer advocate for shareholders rights. In 1986 he founded the United Shareholders Association, a grass-roots organization headquartered in Washington, D.C. Soon after its creation, USA's membership grew to more than 64,000 with representation in all 50 states. MESA was the first company to allow shareholders to vote by confidential ballot. More than 30 companies since have followed the lead, including Exxon, IBM and Unocal. Boone has often said, *"Shareholders own companies, and managements are employees. We needed a shareholders' association because corporate America drifted away from the principles on which it was founded. Owners, and that means shareholders, were not organized and were treated like second-class citizens. Corporate America is the backbone of the nation's economy. It supplies the jobs and fuels economic growth. Shareholders must take a more active role."*

In 1989, Boone became the largest stockholder in Koito Manufacturing Co., a Tokyo-based manufacturer of automobile parts. Boone's efforts for board representation, which were unrelated to MESA, were vigorously resisted by Koito management. Boone is widely credited with exposing Japan's corporate cartels, known as *keiretsus*, as the chief obstacle to U.S. investment in Japan. *"I believe in free trade, but I also believe in fair trade. I'm not worried about America's ability to compete -- and win -- in the global marketplace. Properly led, the American worker is the best in the world. But we must have a level playing field, which Japan refuses to allow."*

Boone has been active in politics throughout his life, and served as chairman of the President's Dinner in 1987 and the President's Inaugural Anniversary Gala in 1992.

Boone's career has been marked by a commitment to higher education. Over the last 10 years, he has spoken to more than 100,000 students on college campuses nationwide and he is constantly asked how to succeed. *"My formula for success is fairly simple: Come early. Stay late. Work hard. Play by the rules, never cheating to win. Stay physically fit. I promise you, you'll beat the competition, and you'll have fun doing it."*

Boone Pickens

July 1993 -- Boone is given the Natural Gas Vehicle Coalition's Achievement Award in recognition of his accomplishments during his two years as chairman of the 250-member company coalition leading the development of a natural gas vehicle market in the United States.

June 1993 -- The Texas General Land Office presents Boone with the Clean Air Texas Environmental Award in recognition of his campaign to develop a market for clean-burning natural gas vehicles.

December 1989 -- Cited for his longtime commitment to physical fitness, Boone joined the board of the Cooper Institute for Aerobics Research in Dallas.

February 1989 -- Oklahoma State University, Boone's alma mater, dedicated the T. Boone Pickens School of Geology in Stillwater, Oklahoma.

January 1989 -- Boone became an adviser to the National Campaign for A Drug Free America.

May 1988 -- Francis Marion College awarded Boone the honorary degree of Doctor of Humanities during commencement ceremonies in which he spoke to 3,500 students and faculty members on the Florence, South Carolina, campus.

January 1988 -- Texas A&M University, College Station, Texas, named Boone "Distinguished Entrepreneur for 1987." The award was given in recognition of Boone's achievements and international visibility.

October 1987 -- Boone received the fourth annual Outstanding Financial Executive Award from the Financial Management Association, an international group of over 4,400 academicians and financial executives. The award was given to Boone in recognition of his contributions to the finance profession, and in particular, his active role in making corporate America more competitive and his activism for shareholder rights.

1987 -- The Washington Institute for Policy Studies awarded Boone the "Columbia Free Enterprise Award." Boone received the award in Seattle at the annual Washington Institute Awards Banquet. The institute, a private nonpartisan public policy think-tank, is dedicated to free enterprise and limited government.

May 1986 -- Barry University awarded Boone the honorary degree of Doctor of Laws during special ceremonies held on the Miami Shores, Florida, campus.

1985 -- The Future Business Leaders of America voted Boone the 1985 "Giant in Industry." FBLA was established in 1942 and is the largest organization for business students in the world. It includes more than 250,000 members from high schools, community colleges, junior colleges and universities nationwide.

1984 - 1985 -- Boone served as chairman of the Texas Research League, a private, non-profit corporation that studies state and local government issues.

May 1983 -- Boone received the Henry G. Bennett Distinguished Service Award from Oklahoma State University.

April 1982 -- Boone was named Distinguished Fellow of the College of Arts & Sciences at Oklahoma State University.

1982 - 1984 -- Boone served as chairman of the Board of Visitors - M.D. Anderson Hospital and Tumor Institute, Houston, Texas.

RAFAEL G. QUIJANO

Rafael Quijano is a Director at the Petroleum Finance Company. He is an expert on the petroleum industry of Latin America.

Prior to joining The Petroleum Finance Company, Mr. Quijano was Deputy Representative of Petroleos de Mexicanos (PEMEX) in Washington, D.C. During his tenure with PEMEX, he was also part of the Mexican team negotiating government-to-government sales of crude oil to the U.S. Strategic Petroleum Reserve.

Before joining PEMEX, Mr. Quijano served as an Energy Engineer at the Synergic Resources Corporation in Philadelphia, Pennsylvania and as an Energy Conservation Engineer in charge of energy conservation projects in a Nylon and Polyester complex at Celanese Mexicana in Toluca, Mexico.

Mr. Quijano received his M.S. in Energy Management and Policy from the University of Pennsylvania and a B.S. in Chemical Engineering from the Universidad Autonoma de Nuevo Leon in Monterrey, Mexico.

GABRIEL SANCHEZ-SIERRA
Executive Secretary
Latin American Energy Organization (OLADE)

Academic Background

- Degree in Power Engineering from the National University of Colombia, 1971.
- M.S. in Power Systems Analysis, Rensselaer Polytechnic Institute, Troy, New York, U.S.A., 1975.

Professional Experience

- Executive Secretary of OLADE, January 1988 to date.
- Energy Planner, Energy Department of the World Bank, 1982-1987.
- Head of the Energy Balances Program, OLADE, 1980-1982.
- Head of the Energy Division, National Planning Department of Colombia, 1979-1980.
- Professor at both the National University of Colombia (1971-1980) and the Javeriana University (1971-1976). Director of the Department of Power Engineering (1976) and Director of the Engineering Research Institute (1978) of the National University of Colombia.
- Consultant on energy economics, power systems analysis and project evaluation.

Membership on Boards and Committees

Among others:

- Energy Issues for Developing Countries Committee, World Energy Council (WEC).
- Consultative Group, Energy Sector Management Assistance Program (ESMAP).
- Editorial Advisory Board, Hydro Review Worldwide, HCI Publications.

Publications

- Directed more than 50 OLADE articles, studies and position papers on technical, economic and environmental issues during the 1987-1993 period.
- Wrote and published numerous technical articles in the areas of energy and energy economics during the 1971-1986 period.

Special Distinctions

- Outstanding Alumnus Award from the National University of Colombia, May 1993.

CYRUS H. TAHMASSEBI

Dr. Cyrus Tahmassebi is the Chief Economist and Director of Market Research for Ashland Oil, Inc. Before joining Ashland Oil in 1981, he was a Visiting Fellow at Harvard University. Dr. Tahmassebi worked for the National Iranian Oil Company and the National Iranian Gas Company in senior management positions prior to the change in that country's government in 1979. During his years with the National Iranian Gas Company, Dr. Tahmassebi was responsible for the economic study of multi-billion dollar LNG and pipeline gas export projects and actively participate in the negotiations concerning these projects.

Dr. Tahmassebi received his B.S. and M.S. from Brigham Young University and his Ph.D. from Indiana University in Bloomington, Indiana. He has written extensively on oil, gas and energy markets, and has given talks at various seminars worldwide. He has served as a member of the National Academy of Science's Workshop on the Strategic Petroleum Reserve, and the U.S. Congress' Office of Technology Assessments Workshop on the U.S. Oil Production -- The Effect of Low Oil Prices.

**PETER WILDBLOOD - CHIEF EXECUTIVE
INTERNATIONAL PETROLEUM EXCHANGE**

PETER WILDBLOOD has been involved with the International Petroleum Exchange (IPE) since its inception, becoming its Chief Executive in April 1986.

From the futures side of the business, his involvement in the development of the IPE at all stages, including the drafting of all its contracts, has given him a unique insight into both the physical and futures side of oil trading and their relationship.

He is a frequent lecturer on the subject at international oil and futures conferences worldwide, and a regular contributor at the Institute of Petroleum in London and the College of Petroleum Studies in Oxford.

He has represented the industry on various Bank of England committees, the British Invisible Export Council and the International Chamber of Commerce.

EMILIO ZUNIGA

EDUCATION

Mining Engineer - Engineering National University, Lima - Perú.
Master of Science - Mineral Economics - Cambridge Univ., England.
Master of Philosophy - Economics - Cambridge Univ., England.
Ph. D. Candidate - Economics - Cambridge Univ. England.

EXECUTIVE POSITIONS

Chairman of the Boards - HIERRO PERU.
President - BANCO Central de Reserva Transference Commission.
Chairman of the Board - MULTIEXPORT S.A.
Director - Wolfram Fortuna S.A. Mining Co.
Investment Director - Instituto Nacional de Planificación.

CONSULTING

Mr. Zuniga has 20 years of experience in various areas of investment. He was Investment Executive Director, in the evaluation, development and investment program in different economic areas. Consultant in the feasibility projects development, its finance and management in BIRF and IDB projects participation. He is highly experienced in international finance, commercialization and international trading with multilateral private banks and enterprises, in Latin America as well as in Asia and Europe.

OTHER

Professor at the Engineering National University, Management School (ESAN), and Lima University.

International Exponent at the 7th, Iron World Conference in France and at the Fourth Iron Experts Conference in the UNCTAD, Switzerland.

**“ARPEL: A Regional Petroleum Association
Serving the Latin American Oil Industry since 1965”**

ALDO BRUSSONI
Under Secretary-General
Association of Latin American Petroleum Enterprises
(ARPEL)

ARPEL: A Regional Petroleum Association
Serving the Latin American Oil Industry since 1965

Aldo Brussoni
Under Secretary-General
Association of Latin American Petroleum Enterprises
Asistencia Reciproca Petrolera Empresarial Latinoamericana (ARPEL)

ARPEL A REGIONAL PETROLEUM ASSOCIATION SERVING THE LATIN AMERICAN OIL INDUSTRY SINCE 1965

Established in 1965 as a non governmental international organization aimed to foster the information exchange, cooperation and mutual assistance among its member companies, as well as to promote the economic integration of the Latin American Petroleum Sector.

Its original name standing for "Association for Reciprocal Assistance of Latin American State Oil Companies" was modified in May 1993 simultaneously with its by-laws for "Association for Reciprocal Assistance of Latin American Oil Companies", responding to the sweeping changes of the oil sector in the region. Since May the membership has been opened to the private regional companies.

BACKGROUND

Headquartered in Montevideo, Uruguay since 1968, ARPEL started to operate as an eight member state oil companies association, and then expanded to a total of 21 full members, today representative of South, Central and North America, the Caribbean and Spain. In addition to full members, about thirty regional and extraregional organizations, qualified as Observers in the Association, enhance its links and the interaction with the world petroleum industry.

ARPEL daily operations are managed from the General Secretariat directed by two elected officers each from a different member company, assisted by a total staff of 15 professionals, technicians and support personnel, expanded when necessary with the expertise of human resources from its members. As originally established headquarters provides direct, reliable and quick communication channels between members.

The Secretariat following the mandates of the yearly Presidents Assemblies, gathers regional oil industry information conforming the necessary statistical data from different areas, acts as a catalitic agent in activities such us Environmental Protection, Upper Management Seminars, Exploration Regional Studies, Marketing, Corporative Planning, Oil Risk, etc.

ARPEL's office organizes an average of 20 yearly events hosted by member companies in locations all around the region attended by representatives of its constituency, observers and special guests. These meetings are the natural forums to share experiences, communicate and allow to integrate technically and economically the regional oil sector.

Three operational levels of participants attend of ARPEL'S meetings: Chief executive officers and presidents (ASOR), Managers from areas such us Environmental, Marketing, Human Resources, Exploration etc, and Professionals and Specialists from the same areas just mentioned.

THE REGIONAL INDUSTRY IN NUMBERS

In 1992 the aggregate gross annual sales of ARPEL's member companies amounted to about 85 billion U.S dollars, representing about 10 % of total Latin American Gross National Product. As a whole our present members are still responsible for more than 80 % of the investment and direct operations of exploration, production, transport and refining of the region. They account for most of the 7.9 million b/d of oil and 360 million m3/d (12700 million cubic feet) of natural gas produced by the region.

Reserves amount roughly to 126 billion barrels of crude oil and 7.1 billion m3 of gas, which represent 12% and 5% respectively of the worldwide total.

I would now offer an overview of the conditions that led to the creation of ARPEL to its present role and will then follow with a prognosis of the future role of the organization in a deregulated and fully competitive regional oil industry.

AN OVERVIEW OF THE EVOLUTION OF THE LATIN AMERICAN OIL INDUSTRY

In most of Latin American countries the State Oil Company is still the major player and it is as well the largest company by far.

As such it has the major concentration of oil industry know-how in each country, in some cases the only one. The reasons for this could be traced back in the past and strongly related to the strategic role of oil for most governments in the world.

It was Argentina who pioneered the state oil concept in 1922 by creating YPF. This trend was followed by other Latin American countries, such as Uruguay in 1931, Bolivia 1936, Mexico 1938, Chile 1950, Colombia 1951, Brazil in 1953.

Since its inception the state oil company was concentrating in itself the activities of an integrated oil company and in the absence of local oil services, it had to create its own services structures - i.e. seismic crews, drilling rigs, logging units, seismic processing, etc. Only in some countries and in latter years a services infrastructure was developed sometimes not very efficient and initially with the sole client of the state monopoly.

During the sixties the political climate influenced towards further government participation and led to the continuation and expansion of these policies in most of the Latin American countries. As a consequence state oil companies were established in Venezuela, Trinidad and Tobago, Costa Rica, Nicaragua, Paraguay.

Growing under a nationalistic climate, protected economies and operating in regulated markets, led the state oil companies to an important development and growth during the 60 and 70 decades, soon turning them into the most powerful industrial enterprises of their respective countries.

The necessity of improving the industry performance with reliable services and technology transfer, and the real need for a permanent international dialogue among peers with no competition barriers, guaranteed by the nature of the national oil industry, led to the creation and growth of ARPEL since 1965.

It was natural to share experiences, to learn from each other and to communicate with no legal restrictions through the specialized network of ARPEL. This was the period of expansion for the Latin American State Oil Industry and ARPEL's role was to efficiently perform as the International Connection among its members.

The 80's opened a period of difficulties to state companies the regional debt burdening the economy of Latin American Countries affected the companies curtailing their investment capability when cash strapped governments demanded higher takes to balance the National Budget.

From the thirties on to the mideighties the governments had played a major role in the economy of Latin American countries, where ownership of important enterprises including the oil industry was the general rule.

As a response to the economic trends governments tried to correct unemployment by turning to job creation policies through their own companies and the private industries which artificially also grew up on the premises of government protectionism, resulting in generalized overstaffing and inefficiency.

This increased inefficiency of the industrial capacity of the region superimposed to the cost of servicing the high interests of the foreign debt, contributed to create high inflation rates and unsustainable economic conditions in most countries of the region.

The eighties was a period when the region started to move out of military dictatorships and reinstating civil governments. Their major burden being to correct the faltering economies, bringing back democracies and soothing the pains of civil wars.

THE REGION NOW AND IN THE FUTURE

Latin America is today one of the fastest growing economies of the world, with an increased maturity towards democratic versus military solutions all across the region, where the recent examples from Brazil and Venezuela are illustrative.

The region has a vibrant population with a powerful drive towards change. Clear signals of economical success coming from Chile and Argentina are likely to be followed soon by several other countries.

Economies are favourably reacting to recently deregulated business environment in several countries of Latin America.

An important amount of private capital from local investors is returning to the region forced by low overseas interest rates and attractive investment opportunities including those in the oil sector.

State owned and private oil companies are working together joint venturing to develop the Latin American oil industry, which is undergoing a period of growth and expansion triggered by the infusion of fresh venture capital and substitution from state to private ownership.

The Latin American Oil Industry is the world's last major frontier for new hydrocarbon discoveries, second to the former Soviet Union. As in the early twenties

Argentina is again the trendsetter for the regional oil industry with Y.P.F's successful stock sale in the world markets and Gas del Estado's smooth transition into ten privately owned new companies managing the natural gas distribution.

In Chile a profitable Enap succeeds with no tariff imports of product since ten years ago. Enap's wholly owned international subsidiary Sipetrol, is now participating in several upstream joint ventures in Latin America. Opened for free competition are the concessions for natural gas import and distribution as well.

Private investors are partners with ENAP in the construction of a 55K barrels of oil pipeline across the Andes from Argentina scheduled to be commissioned in 1994. Construction of a gas pipeline from Neuquen in Argentina, to the central area of Chile will likely follow soon.

Peru after the abolishment of PetroPeru's state monopoly and the establishment of a free petroleum market in the country, is in a fast privatization mood. Marginal areas have already been transferred to private investors as well as other non core assets of the company.

In other oil producing countries of the region, namely Colombia, Bolivia, Ecuador and Trinidad & Tobago, risk contracts result in substantial part of their exploration and production investments being financed by international companies.

Creative solutions are also being used in countries where the state oil monopoly is established in the constitution, to attract private investors.

Venezuela's PDVSA is resorting to Congressional approval to proceed with multimillion dollars joint-ventures with international companies to put on stream light and medium crudes from inactive oil fields, natural gas from the liquefaction Cristobal Colon project and heavy oils from the Orinoco belt.

ARPEL'S PRESENT AND FUTURE

State oil companies whether privatized, partially sold or remain under total government control, will have to be fully competitive acting as one more player with no privileges and no politically induced limitations should affect their professional management decisions. The abolition of monopolies will induce the governments to create regulatory bodies such as the Texas Railroad Commission or Alberta's Energy Resources Conservation Board. The new and old players of the Latin American Oil Industry will be faced with a demanding business environment where performance will be measured under the global competition rules.

New investors will require more than before the professional business forum provided by ARPEL. Corporations will need to be more proactive in order to maintain a business environment favourable for their growth and mutual interaction as it is now fostered by ARPEL and will also be favoured by using the information from ARPEL databanks such as:

- Economical situation of the region and of each country
- Regulatory frame- Environmental requirements
- Fiscal terms - Profits repatriation -Currency Conversion
- Investments opportunities
- Market conditions
- Export and Import Facilities and its users regulations- Duties, customs etc.

More specific information related to:

- Specialized Services
- Petroleum Infrastructure : Refineries, pipelines, storage facilities, terminals
- Facilities: Physical Infrastructure such as roads, railroads, airlines and other transportation networks.

- *Human Resources available skilled labour, professionals experts and support personnel as well as labor legislation.*
- *Communication*
- *Transportation*
- *Health Services*
- *Accomodations*

ETC.

The efficiency of ARPEL as an Organization serving its present and future expanded membership to attain their objectives is directly linked to its flexibility to adapt to changes and incorporate innovative solutions.

The operation of the Secretariat is now in constant evolution to serve the membership under the Association's new goals.

ARPEL strengthened by its past experience, is now well positioned to help the Latin American Oil Industry to cope with the challenges posed by the major political and economic changes occurring in the world.

The recent change of its by-laws followed by future adjustments will allow ARPEL to adapt to the new context. Its future role could be defined as a business professional and comercial forum favouring interchange between its members and acting as proactive representative of the industry in numerous areas of common concern (i.e. Environmental Affairs). Perhaps an organization with some elements in common with the American Petroleum Institute. The Canadian Association of Petroleum Producers and Europa retaining its Latin American identity will evolve from our past format.

ARPEL an organization always serving the Latin American Oil Industry since 1965 is confident of its continued success in the future deregulated business environment of the region.

Thank you very much.

“Peru: Investment Opportunities in the Oil Industry”

DANIEL HOKAMA TOKASHIKI

Minister of Energy and Mines
Peru

PERU: OPPORTUNITIES FOR INVESTMENT IN THE PETROLEUM INDUSTRY

Ladies and Gentlemen:

I consider it an honor to be here and to have the opportunity to address such a select audience. As Minister of Energy and Mining of Peru, I would like to provide you with a brief outline of the government's policy, the legal framework and the plans to be followed with regard to Peru's petroleum industry in the coming years.

When President Alberto FUJIMORI took office on July 28, 1990, there began a silent but radical revolution to change the erroneous policies applied in Peru during the last thirty (30) years with such disastrous consequences for the country.

The government of President FUJIMORI therefore proposed to rebuild the national economy, incorporating the country into the new world economy, and to guarantee peace and respect for human rights, all as a solid foundation for healthy, sustained development.

For this purpose, the government of Peru has been applying a strict economic stabilization plan that includes deregulation of prices, wages, the exchange rate and interest rates, elimination of subsidies, simplification of tariffs and the elimination of all restrictions on the flow of capital and foreign trade.

This plan, hard but necessary, has been applied with the approval of all social sectors and thanks to the consensus concerning its program, the government has been able to control the hyperinflation it inherited, to reduce the fiscal deficit and to increase foreign currency reserves.

At the same time, Peru was reincorporated into the international economic community, thanks to the support of a group of friendly governments to whom we are deeply grateful.

Within this context, the purpose of the policies applied by the government of President Fujimori is to ensure that the private sector plays a vital role in economic development, above all in the electrical and hydrocarbon sectors, which we consider fundamental to any economic upturn.

We are taking for granted that a greater dynamism and growth in the energy producing sectors will develop new sources of employment and greater production levels and will notably stimulate national and foreign investment.

Today Peru offers very interesting opportunities for investment in various productive sectors. At this time I would like to tell you about the current opportunities in the hydrocarbon sector and I will first outline the general context of the sector.

GENERAL CONTEXT

There have been two main factors in the reduction of private investment, mostly foreign, in Peru: on the one hand, the attacks of terrorist groups, and on the other, the political, legal and contractual instability.

But now the government has made significant progress in resolving both problems. I can assure you that terrorist attacks have diminished substantially as a consequence of the government's firm decision to establish peace in the country.

One of the areas most affected by these insane acts of terrorism was the country's power supply, in which so many

transmission line towers were damaged that power could not be provided on a continuous basis and this had a tremendous impact on the country's development. It is in this area that the government's decisive action to put an end to these acts of vandalism is most evident.

As regards the political, legal and contractual instability, I am pleased to tell you that all the necessary steps and actions are being taken to create in Peru the stability required by investors in order to carry out projects within the realm of possibilities that our country has to offer.

I know that the best way to demonstrate stability is to establish permanent standards, regulations and working conditions for prospective projects, and if these remain unchanged with the passage of time, then the necessary sense of permanence and stability will have been proved.

In addition to stability, Peru is establishing a new legal framework for the different sectors in order to reactivate them. This new legal framework not only respects and ensures the validity of existing contracts in effect before the new legal regulations were passed, but it also permits such contracts to take advantage of the new incentives. Such is the case of Law 26221 — the Organic Law of Hydrocarbons — which legally entitles, the "old contractors", to such benefits of the new law as:

- The free availability of hydrocarbons
- Making tax payments in cash
- International or national arbitration
- Guaranteed free availability and disposal of foreign currency.

In addition, without prejudice to the aforementioned

benefits, these "old contractors" may request that their contracts be up-dated under the provisions of Law 26221, for which they would have to negotiate new conditions and enter into an amended agreement.

The new legal framework provided by the Organic Law of Hydrocarbons (Law 26221) has the following promotional features:

- The contractor in a licensed agreement is the owner of the hydrocarbons produced.
- He has free disposal of the hydrocarbons
- Ensures tax stability
- Recognizes international or national arbitration
- Guarantees free availability and disposal of foreign currency
- Creates a competitive market
- Deregulates fuel prices, and
- Unifies and simplifies the former legal framework.

The environment is another important aspect considered in Law 26221. The Peruvian government is well aware of the fact that the development, growth and investment in the country must be in harmony with preservation of the environment. In other words, the main purpose of the environmental policies for the energy and mining sector is to make economic growth compatible with social equity and environmental preservation. Another of their aims is to gradually incorporate environmental considerations, as well as their costs, into energy and mining activities and processes.

THE PRESENT OIL SITUATION

As I have mentioned, the newly approved legal framework of Law 26221 confirms and extends the availability of hydrocarbon activities to private capital. This action has increased the interest of foreign companies in investing in the country, which has been confirmed by the visits of representatives of various international companies, who have come to Peru requesting information in some cases, or to gather their own information in others, on details of the areas suitable for oil exploration contracts.

It can generally be said that, between 1992 and 1993, oil activity has experienced a recovery in comparison to previous years and this recovery has triggered increased oil production, increased demand for petroleum by-products and an economic recovery evident in the reduced deficit in the balance of trade in hydrocarbons and the economic equilibrium that PETROPERU S.A. is achieving in its current operations. The increase in oil production which has occurred in the last two (2) years is significant, above all in this year to date, in which the average number of barrels per day has reached 125 000. What is significant about this increase is that it has been maintained over the last eleven (11) months, which definitely confirms a reversal of the declining trend of the last six (6) years.

Furthermore, the domestic demand for fuels increased by 5,2% in 1992 and has remained stable during 1993, mainly due to increased fuel consumption by thermo-electric generating plants.

The balance of trade in hydrocarbons had a deficit of US\$187 million in 1991 and in 1992 this deficit was reduced to

US\$150 million as a consequence of improved management of refinancing operations and foreign trade as well as a reduction in world fuel prices.

This deficit reduction trend is continuing in 1993 as oil production increases.

Between 1991 and August of 1993 ten (10) contracts for hydrocarbon operations were signed: Five (5) were with foreign companies to carry out exploration and exploitation activities in the Peruvian jungle and off shore and the other five (5) were with local companies to explore deposits in Northwestern Peru and in the Southeast sierra region around Puno.

Including these contracts, there is a total of fifteen (15) contracts currently in force.

PRIVATIZATION

Privatization is an important component of the structural reform programs undertaken by the government. Within this context, the process of privatizing State companies is not considered a goal, but rather a means of reformulating the roles of the State and the private sector and of achieving a more efficient allocation of resources and production of goods and services. More than the simple sale and transfer of companies to the private sector, privatization is a concept much more extensive, more ambitious and includes ensuring the viability of the companies, promoting new investment in the privatized companies, encouraging productive employment, improving the efficiency of the production of goods and services, encouraging competition, strengthening the State in its role as the basic provider of education, health and safety. In other words,

privatization seeks to ensure the wellbeing of society as a whole.

It is essential that the State be a regulator, rather than an executor, of production activities.

In line with its policy to reorganize the State's business activities to encourage a larger participation of private capital, the government of Peru is carrying out privatization processes in the different sectors under public administration. Included in this process is the hydrocarbon sector and principally PETROLEOS DEL PERU S.A., whose service stations and total shares in the SOLGAS company have already been placed in private hands, producing an income of US\$ 50 million for the State.

This process will continue with the sale of companies affiliated with PETROLEOS DEL PERU S.A., such as Transoceánica, Serpetro, its land and water fleets and its inland sales plants.

In the case of PETROMAR (formerly BELCO), once the pending problem with AIG is resolved, an oil operations contract will be signed with the Petrotech company. The special committee appointed to oversee the privatization of PETROPERU S.A. is preparing an integrated privatization plan and is currently analyzing the privatization proposals submitted by Booz, Allen & Hamilton, the company contracted for the purpose.

MEDIUM TERM PERSPECTIVES

Increased fuel production will depend on two factors: 1) Exploration work that includes the discovery of new hydrocarbon reserves, and 2) Exploitation of the natural gas deposits of Camisea.

The new legal framework governing the hydrocarbon sector promotes private participation in hydrocarbon activities, principally those of exploration and exploitation. Therefore, the possibility of discovering "new oil fields" has increased significantly. But it must be remembered that if such new discoveries occur, production could only commence in three (3) to seven (7) years, depending on the need to build a new pipeline if the discoveries are in the jungle.

The natural gas in Camisea represents an energy source that would be a tremendous boost to Peru's development in the coming years. The market required to stimulate natural gas development would be produced mainly by the construction of thermo-electric generating plants.

The hydrocarbons in the deposits of San Martín and Cashiriari could be utilized three (3) to five (5) years after a contract is signed for their exploitation, depending upon whether it is the regional or the national market that is to be supplied.

The important reserves of non-associated natural gas could yield a final recovery of 10,8 trillion cubic feet of gas with 725 million barrels of liquid natural gas.

Given the size of these volumes, technical and economic studies have been made of the potential gas market, the costs of

exploiting the deposits and the construction of pipelines, all of which demonstrate the feasibility of exploitation based on the sale of the natural gas in its gaseous and liquid form.

The plans outlined for the exploitation of the Camisea gas deposits have estimated a production of up to 1,2 billion cubic feet of gas per day and between 65 000 and 100 000 barrels of liquid natural gas per day.

OTHER INVESTMENT OPTIONS

Another of the opportunities that Peru is offering investors is the free market that it has established in the various oil industry activities. This free market will encourage the establishment of companies to supply and sell imported or locally produced fuel on the domestic market.

The processing of hydrocarbons, including refineries and fractioning and separating plants, is another important area that the government of Peru is eager to transfer to the private sector.

I would like to remind you that Peru has been an oil producing nation since 1863. Oil has become a significant part of our economy. Production has declined in recent years but that trend has been reversed and we expect a rapid increase that will contribute to the country's economic recovery.

Peru has considerable potential reserves to be discovered and developed. Consider that it was only a few years ago that the important gas deposits of Camisea were discovered. Their potential yield of 2,2 billion barrels reveal that Peru has a great potential, yet to be discovered, in its different sedimentary basins, some virtually unexplored.

Our challenge is to show the international oil companies,

which you represent, the opportunities Peru offers for investment. We are aware that Peru has not been worthy of your attention in recent years and that there have been problems that have obstructed continued investment in the country. However, today we can say that the situation has changed considerably. Some present perceptions about Peru have been inherited, but today they do not conform to reality.

We feel it is important that you have precise, up-to-date information and that you are aware of the efforts that the government is making, with the approval of the Peruvian people, to resolve the problems of the past, with a view towards creating a climate more favorable to investment.

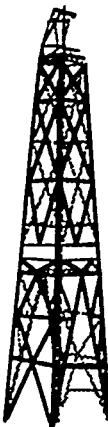
Ladies and Gentlemen: These are the terms of our policy changes for the hydrocarbon sector. Let me stress once again that the Peruvian people look toward the 21st Century with hope and confidence.

Again, I thank you for your attention. I trust that this presentation confirms the initiatives that the Peruvian government has taken to help lay the foundations for confident investment in our country.

Thank you very much.

“Oil and Gas Activities of the World Bank”

HOSSEIN RAZAVI
Chief, Oil and Gas Division
The World Bank



OIL AND GAS ACTIVITIES OF THE WORLD BANK

September 1993

About the World Bank . . .

The International Bank for Reconstruction and Development, frequently called the World Bank, was founded in 1944 at the United Nations Monetary and Financial Conference in Bretton Woods, New Hampshire, and opened for business in June 1946. It is owned by the governments of its 173 member countries, and its capital is subscribed by those countries. Together with the International Development Association (IDA), the International Finance Corporation (IFC), and the Multilateral Investment Guarantee Agency (MIGA), it provides loans to developing countries to help reduce poverty and to finance investments that contribute to economic growth. Its central purpose is to serve as a channel of resources from developed nations to the developing countries to promote economic and social progress.

The World Bank finances its lending operations from its own capital market borrowings, retained earnings, and the flow of repayments on its loans. The first loans approved by the World Bank helped finance the reconstruction of Western Europe after World War II. Today, the World Bank lends to the developing countries of Africa, Asia, Latin America and the Caribbean, and Europe, promoting global economic prosperity.

Presentation by

*Hossein Razavi, Chief
Oil and Gas Division
Industry and Energy Department
The World Bank
Washington, DC 20433*

*to the
Interamerican Petroleum and Gas Conference*

The World Bank and the Hydrocarbon Sector

The oil crisis of the 1970s profoundly challenged the economies of most developing countries. The crisis hit the oil-importing countries severely, and many suffered deteriorating balances of payments and increasingly unmanageable import bills. It was in this context, in July 1977, that the World Bank's Executive Directors approved an expanded program of lending to assist the Bank's client countries in developing their own energy resources. In 1978, the Bonn Summit and the Secretary General of the United Nations endorsed the initiation of new approaches in the energy sector by the World Bank, particularly in financing oil exploration in countries that were significant oil importers. The new initiative led to a rapid expansion of the World Bank's lending for oil and gas projects, which reached about \$1 billion in 1983 (see Figure 1 on page 2).

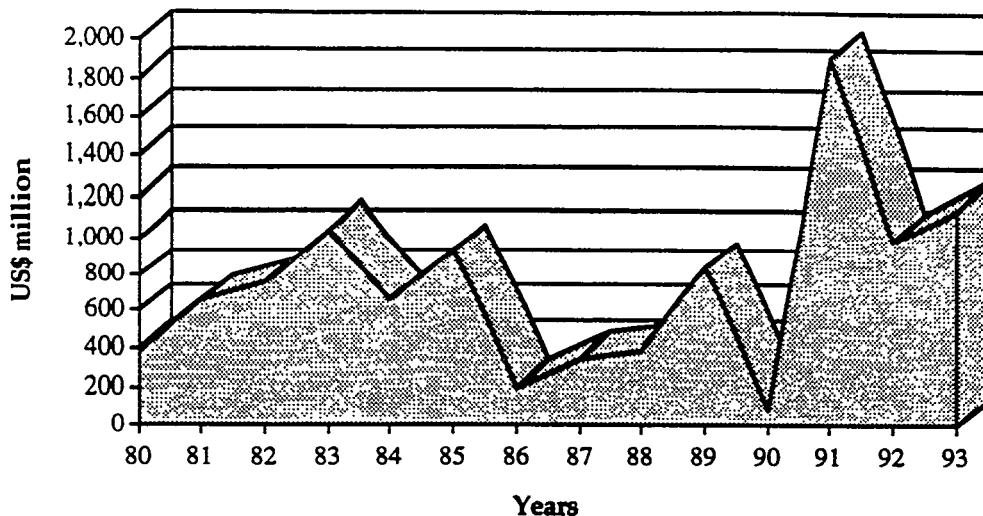


Figure 1
World Bank Oil and Gas Lending, 1980-1993

The Bank adopted new lending guidelines for oil and gas in November 1984. The new rules distinguished between types of petroleum lending and carefully set out criteria for each category. In particular, the guidelines limited the Bank's involvement in promoting exploration to countries where no significant exploration was ongoing or where no exploration company maintained rights or was negotiating a contract. The purpose was to meet concerns that the Bank might preempt activities by the private sector.

By 1986-88, the level of Bank lending to the hydrocarbon sector had dropped to between \$300 and \$400 million. The sharp fall-off resulted both from the Bank's new policy of limiting its involvement in the sector and from an increasing general

perception that demand would be weak in the future.

New Directions

By 1989-90, a new emphasis had emerged, as the World Bank moved toward a more proactive role designed to promote private sector development and limit the environmental consequences of energy production and consumption. In this new context, the Bank's involvement in the oil and gas sector now aims at the following goals:

- Assisting developing countries in preparing and implementing appropriate legal and regulatory frameworks to facilitate private sector investments in upstream oil and gas, and transmis-

sion and distribution of natural gas, as well as privatization of public utilities.

- Identifying situations in which substitution of gas for coal and oil would impart significant global and local environmental benefits.
- Facilitating international gas trade by identifying feasible trade schemes and assistance to the participating countries in setting up the appropriate institutions and contractual arrangements to attract private sector investors and mobilize multilateral and bilateral financing.
- Financing projects in petroleum exploration, development, processing, and transmission/distribution. Financing is aimed at providing funds when private sector resources cannot be attracted or where World Bank lending can catalyze private sector and bilateral financing.

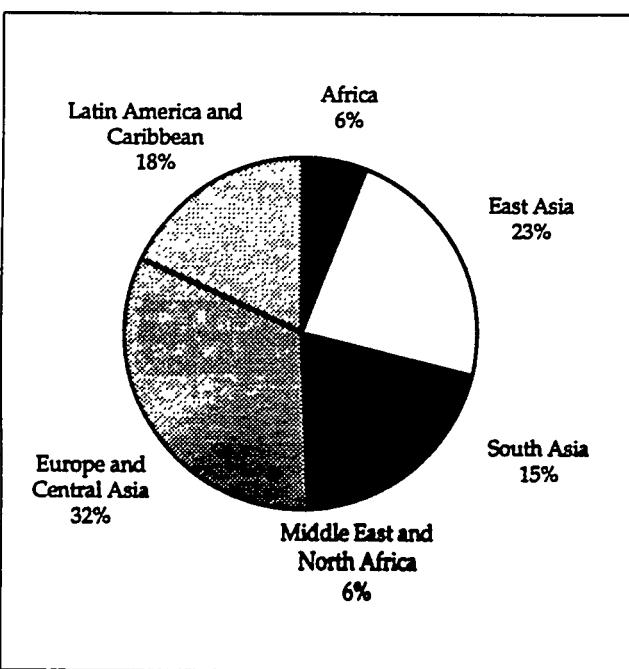


Figure 2
World Bank Oil and Gas Lending by Region,
Fiscal 1993-98

Table 1
Projects in 5-Year Lending Program,
Fiscal 1993-98

Fuel/region	Bank lending (US\$ million)	Number of projects
Oil		
Africa	105	4
East Asia	332	3
South Asia	90	1
Middle East and North Africa		
Europe and Central Asia	950	6
Latin America & Caribbean	905	5
Subtotal Oil	2,382	19
Gas		
Africa	288	6
East Asia	1,065	6
South Asia	818	4
Middle East and North Africa	350	2
Europe and Central Asia	1,070	10
Latin America & Caribbean	199	2
Subtotal Gas	3,789	30
Oil and gas		
Africa	393	10
East Asia	1,397	9
South Asia	908	5
Middle East and North Africa	350	2
Europe and Central Asia	2,020	16
Latin America & Caribbean	1,104	7
TOTAL OIL AND GAS	6,171	49

Note: Totals may not be exact because of rounding.

Forthcoming Projects

The World Bank currently has some 49 oil and gas projects in preparation, with projected lending of almost \$6.2 billion (see Table 1 above). Table 1 also shows the distribution of lending in monetary terms, distinguishes between oil and gas lending, and indicates that 30 of the projects (about 60 percent) are for gas development. Figure 2, at left, shows the percentage breakdown of this lending by Region.



How the World Bank Works in the Oil and Gas Sector

Responsibility for the operational work of the World Bank lies with six regional Vice Presidencies covering Africa, Europe and Central Asia, the Middle East and North Africa, Latin America and the Caribbean, East Asia and the Pacific, and South Asia. Within each Vice Presidency, country departments are responsible for one or a set of countries, and, within each department, divisions are in charge of activities in various sectors. The responsibility for the World Bank's energy lending is with divisions entitled either Industry and Energy or Infrastructure. This brochure uses the Bank's terminology for these divisions—Sector Operation Divisions (SODs). The Bank has a total of 22 SODs that deal with energy lending within its six Regional Vice Presidencies. The energy sector operations of each Region are shown in Table 2, opposite.

Ultimate responsibility for lending to the oil and gas sectors of developing countries lies with the SODs. However, because the SODs cannot encompass full technical expertise in each economic sector, they rely on the expertise of specialized divisions such as the Industry and Energy Department's Oil and Gas Division (IENOG) in carrying out their operational activities. The working relationship between the SODs and IENOG is flexible. When the SODs have resources to manage project appraisal and supervision, the SOD manages the task, and IENOG primarily provides technical expertise. When the SODs do not have the personnel to carry out the management, or when projects are technically complex, IENOG assumes the responsibility for task management.

The Project Cycle

A six-step process governs the World Bank's approach to investment lending. Formally known as the "project cycle," it is the Bank's way of making sure that all projects receiving financial backing meet the same set of rigorous standards. The steps in the cycle are as follows:

1. **Identification.** The task of identifying and proposing projects for World Bank financing lies mainly with borrowing governments, but sometimes stems from work carried out by Bank staff.
2. **Preparation.** The borrowing country is primarily responsible for examining the technical, economic, social, and environmental feasibility of the project.
3. **Appraisal.** Appraisal is the Bank's independent assessment of the project and comprises a review and analysis of the proposed project's merits and effects.
4. **Negotiations and Board Presentation.** Negotiations bring World Bank staff and borrowers together to discuss the proposed project. The appraisal report (including any changes made during the negotiations phase), the report of the Bank's president, and the loan documents are then presented to the board of executive directors—representing the Bank's member countries—for approval.
5. **Implementation and Supervision.** Supervision through site visits enables the Bank to provide technical assistance and to ensure that strict and competitive procurement rules are applied.
6. **Evaluation.** The World Bank's Operations Evaluation Department (OED) is responsible for evaluating project costs, benefits, timetables, and efficiency and comparing them with projections made at the time of appraisal. OED's evaluation also suggests how to improve project performance in the future.

Table 2
Energy Sector Operations of the World Bank's Regional Vice Presidencies

<i>Region/ Department/ Countries</i>		<i>Division</i>	<i>Chief</i>	<i>Phone</i>
Africa				
AF1	Benin, Cameroon, Central African Republic, Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Guinea, Togo	Industry and Energy Operations	Iain Christie	473-4530
AF2	Ethiopia, Kenya, Somalia, Sudan, Tanzania, Uganda	Infrastructure Operations	Stephen Weissman	473-4076
AF3	Angola, Burundi, Comoros, Djibouti, Madagascar, Mauritius, Rwanda, Seychelles, Zaire	Industry and Energy Operations	Michael Sarris	473-4009
AF4	Ghana, Guinea-Bissau, Liberia, Nigeria, São Tomé and Príncipe, Sierra Leone	Industry and Energy Operations	Mary Oakes Smith	473-4976
AF5	Burkina Faso, Cape Verde, Chad, Gambia, Mali, Mauritania, Niger, Senegal	Industry and Energy Operations	Silvia Sagari	473-5017
AF6	Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zimbabwe	Industry and Energy Operations	David Cook	473-3321
East Asia and Pacific				
EA1	Cambodia, Korea, Lao PDR, Malaysia, Mekong Committee, Myanmar, Philippines, Thailand, Vietnam	Industry and Energy Operations	Vineet Nayyar	458-0479
EA2	China, Mongolia	Industry and Energy Operations	Richard Newfarmer	473-1978
EA3	Fiji, Indonesia, Kiribati, Maldives, Marshall Islands, Micronesia, Papua New Guinea, Solomon Islands, Tonga, Vanuatu, Western Samoa	Industry and Energy Operations	Peter Scherer	458-2498
South Asia				
SA1	Bangladesh, Bhutan, Nepal	Energy and Infrastructure Operations	Frederick Temple	458-0403
SA2	India	Energy Operations	Jean-François Bauer	458-1470
SA3	Afghanistan, Pakistan, Sri Lanka	Energy and Infrastructure Operations	Per Ljung	458-1933
Middle East and North Africa				
MN1	Algeria, Iran, Libya, Malta, Morocco, Tunisia	Industry and Energy Operations	François Ettori	473-2340
MN2	Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates, Yemen Republic	Industry and Energy Operations	Vinay Bhargava	473-2600
Europe and Central Asia				
EC1	Bulgaria, Cyprus, Portugal, Romania, Turkey	Industry and Energy Operations	Franco Batzella	473-2300
EC2	Albania, Croatia, Czech Republic, Hungary, Poland, Slovenia	Energy and Environment Operations	Bernard Montfort	473-2700
EC3	Azerbaijan, Kazakhstan, Kyrgyzstan, Russian Federation, Tajikistan, Turkmenistan, Uzbekistan	Infrastructure, Energy and Environment Operations	Jonathan Brown	473-2469
EC4	Armenia, Belarus, Estonia, Georgia, Latvia, Lithuania, Moldova, Ukraine	Infrastructure	Dominique Lallement	458-2849
Latin America and the Caribbean				
LA1	Brazil, Peru, Venezuela	Energy and Industry Operations	Stephen Ettinger	473-9320
LA2	Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama	Infrastructure and Energy Operations	Martin Staab	458-2564
LA3	Bahamas, Barbados, Belize, Bolivia, Caribbean Development Bank, Colombia, Dominican Republic, Guyana, Haiti, Jamaica, OECS Member States, Suriname, Trinidad and Tobago	Infrastructure Operations	Peter Ludwig	458-2929
LA4	Argentina, Chile, Ecuador, Paraguay, Uruguay	Infrastructure and Energy Operations	Alfonso Sanchez	473-0001

Mandate and Organization of the Oil and Gas Division

The Oil and Gas Division (IENOG) was formed in January 1993 by bringing together oil and gas experts from the Regional Vice Presidencies to a central department. Presently, IENOG has a staff of 25 technical experts. In addition, it utilizes a large number of short-term consultants in carrying out various activities. The division provides a "cluster" of services, including the following:

- Provision of a full range of operational activities (project appraisal, project supervision and sector studies).
- Coordination of the World Bank policy in the oil and gas sector.
- Functioning as the main point of contact between the Bank and the international petroleum industry, professional organizations, and other entities concerned with global and regional oil and gas issues.
- Dissemination of best practices through cross-country transfer of experience and based on dialogue with the international petroleum industry.

Internally, IENOG is divided into three thematic groups:

- **Petroleum Group.** Deals with upstream oil and gas and downstream oil activities.
- **Gas Transmission and Distribution Group.** Deals with activities in the infrastructures of natural gas.
- **Economics and Restructuring Group.**

Each group is coordinated by a group leader. Although the grouping is organized on a thematic basis, each group leader is also responsible for

About ESMAP . . .

When the energy crisis of 1973 and then the second oil crisis in 1979 threatened the supply of energy, the international community sought to respond more systematically to the problems posed by drastic increases in energy prices. In 1980, the World Bank, together with the United Nations Development Programme (UNDP), set up an Energy Assessment Program within the Energy Department of the World Bank, and in 1983 the same two sponsors established the Energy Sector Management Assistance Programme (ESMAP). This latter program, now entering its second decade with a renewed mandate from its funding and governing bodies, helps countries analyze their energy needs, identifies the most efficient ways of meeting them, and prepares the highest priority projects for consideration for financing through multilateral institutions, bilateral aid, and the private sector. The Oil and Gas Division will continue to implement the oil- and gas-related activities of ESMAP. Presently, IENOG is carrying out six country and regional studies of gas sector development and trade under financing from ESMAP.

overall coordination of the division's support to two or three regions in the World Bank.

An organizational chart of the Oil and Gas Division appears on the opposite page. The division's involvement in oil and gas activities is likely to be quite extensive over the next few years. Projected lending for oil projects, Fiscal 1993-97, and for gas projects, Fiscal 1993-97, are shown in Tables 3 and 4, respectively (pages 8 and 9). Brief profiles of the division's professional technical staff are also presented (pages 10-16).



The Oil and Gas Division

Hossein Razavi, Chief
Phone 202-458-5300

Petroleum Group

Chakib Khelil	Group Leader and Coordinator for Latin America and South Asia	202-473-8660
Homayoon J. Ansari	Senior Petroleum Specialist	458-1128
Moiffak Hassan	Petroleum Specialist	458-1128
Hannachi Morsli	Senior Petroleum Engineer	458-2873
Thuvara S. Nayar	Principal Chemical Engineer	458-4300
Thomas E. O'Connor	Principal Petroleum Engineer	473-4928
Kariyawasam Wijetilleke	Principal Chemical Engineer	458-2867
Jack Warren	Consultant	473-4292
Hari Bhat	Consultant	473-4175

Gas Transmission and Distribution Group

Eric Daffern	Group Leader and Coordinator for Africa and East Asia	202-473-3047
Blaine Dalby	Gas Specialist	473-6993
Salahuddin Khwaja	Senior Gas Specialist	458-2869
Peter Law	Gas Specialist	473-6977
Hiroki Okimi	Gas Specialist	473-6975
Mohsen Shirazi	Senior Gas Specialist	473-2415
Shigeru Kubota	Gas Specialist	473-2806

Economics and Restructuring Group

Vacant	Group Leader and Coordinator for Europe and Central Asia and Middle East and North Africa	202-473-6978
Jakob Althuis	Gas Specialist	473-2722
Henri Beaussant	Energy Economist	473-0361
Bjorn Hamso	Gas Specialist	458-9036
Bent Svensson	Energy Economist	473-6976
Eleodoro Mayorga Alba	Petroleum Economist	473-4295
Patrick Wright	Energy Specialist	473-xxxx
Ted Gorton	Consultant	473-4290
Chris Brierley	Consultant	

Table 3
Oil Lending Projects "in the Pipeline," Fiscal 1993-1997

Region/ Country	Project name	FY	Board approval	Loan amount US\$ Million
Africa				
Chad	Petroleum	95	7/5/94	30.0
Madagascar	Petroleum Sector Adjustment	*	5/1/93	*
Madagascar	Petroleum Sector Reform	95	7/12/94	55.0
Zambia	Petroleum Rehabilitation	94	12/1/93	20.0
Subtotal Africa				105.0
East Asia and Pacific (EAP)				
Korea	Petroleum Distribution and Sectoral Management Imp.	93	6/3/93	120.0
Papua New Guinea	Petroleum Development Technical Assistance	94	9/14/93	11.5
Thailand	Petroleum Production Reformulation	94	5/17/94	200.0
Subtotal EAP				331.5
South Asia				
Bangladesh	Petroleum Sector Development	97	7/11/96	90.0
Subtotal South Asia				90.0
Middle East and North Africa (MNA)†				
Europe and Central Asia (ECA)				
Azerbaijan	Energy Technical Assistance	*	*	40.0
Kazakhstan	Energy Sector	*	*	100.0
Russia	Oil Sector	94	4/27/93	500.0
Romania	Petroleum Sector Rehabilitation	93	6/17/93	150.0
Turkmenistan	Energy Sector	*	*	60.0
Uzbekistan	Oil and Gas	*	*	100.0
Subtotal ECA				950.0
Latin America and the Caribbean (LAC)				
Argentina	Yacyreta II	93	9/2/92	300.0
Argentina	Oil Industry Environment Mitigation	94	12/14/93	150.0
Peru	TSP Rehabilitation II	96	7/15/94	150.0
Peru	Power Sector Investment	97	6/13/97	225.0
Uruguay	Development of Gas Infrastructure	96	6/15/96	80.0
Subtotal LAC				905.0
TOTAL OIL LENDING				2,381.5

* Not yet determined.

† No oil lending currently envisioned.

Table 4
Gas Lending Projects "in the Pipeline," Fiscal 1993-1997

Region/ Country	Project name	FY	Expected Board approval	Loan amount US\$ Million
Africa				
Côte d'Ivoire	Private Sector Energy	94	8/31/93	20.0
Ethiopia	Calub Gas Development	93	4/27/93	82.5
Ghana	Regional Gas Pipeline	96	7/4/95	10.0
Nigeria	Natural Gas Liquid	95	7/5/94	100.0
Nigeria	Regulatory Gas Pipeline	95	7/5/94	25.0
Tanzania	Songo Songo Gas Development	96	8/1/95	50.0
Mozambique	Gas Engineering	95	7/19/94	25.0
Subtotal Africa				312.5
East Asia and Pacific (EAP)				
China	Sichuan Gas Development and Conservation	94	12/28/93	250.0
Indonesia	Gas Development	*	12/14/93	250.0
Indonesia	Gas Utilization III	98	6/2/98	200.0
Myanmar	Energy Rehabilitation	97	7/9/96	80.0
Thailand	Gas Transmission	93	7/7/92	105.0
Thailand	Second Gas Transmission	94	9/21/93	180.0
Subtotal EAP				1,065.0
South Asia				
Bangladesh	Gas Infrastructure	95	12/13/94	165.7
India	Gas-Based Power Generation	98	3/26/98	200.0
India	Oil and Gas II	94	5/17/94	350.0
Pakistan	Rural Electrification II	97	7/1/96	101.8
Subtotal South Asia				817.5
Middle East and North Africa (MNA)				
Iran	Gas Flaring Reduction	94	1/25/94	250.0
Morocco	Gas Development Network	96	5/10/96	100.0
Subtotal MNA				350.0
Europe and Central Asia (ECA)				
Hungary	Energy/Environment	94	7/6/93	*
Poland	Polpipe	*	*	*
Poland	Gas Conversion Grant	*	*	20.0
Russia	Gas Flaring Environmental	94	3/1/94	300.0
Russia	Gas Rehabilitation I	97	11/30/93	*
Russia	Environment	94	12/14/93	100.0
Russia	Gas Distribution and Rehabilitation	96	*	300.0
Russia	Gas Distribution and Rehabilitation II	97	7/5/94	*
Slovak Republic	Gas	*	*	150.0
Turkey	Gas Transmission II	97	7/2/96	200.0
Subtotal ECA				1,070.0
Latin America and the Caribbean (LAC)				
Bolivia	Bolivia Natural Gas Export	96	7/15/95	49.0
Brazil	Rio Natural Gas Distribution	96	7/15/97	150.0
Subtotal LAC				199.0
TOTAL GAS LENDING				3,814.0

* Not yet determined.



IENOG Staff Profiles

Razavi, Hossein. Chief of the Oil and Gas Division. M.S., Engineering; Ph.D., Economics. Mr. Razavi has worked for the Bank for 9 years, most recently as chief of the Operations Division of ESMAP. During earlier work in World Bank Operations, he led project appraisals in power and gas and carried out energy sector studies for the Philippines, Malaysia, and Thailand. From 1976 to 1981, he served as bureau director at Iran's Plan and Budget Organization. Also before joining the Bank, he worked as a senior consultant at Ernst & Whinney in Washington, D.C. He has published extensively in energy economics. His most recent book, *Fundamentals of Petroleum Trading*, appeared in 1991. His papers have appeared recently in the *Energy Journal*, *Energy Policy*, *Energy Economics*, *Annual Review of Energy*, *Energy and Resources*, and the *Southern Economic Journal*. He serves on the board of editors of the *Energy Journal*.

Althuis, Jaap G. Gas Specialist. M.Sc., Econometrics, 1971. Mr. Althuis joined the Bank in January 1993 from Dutch Gasunie, where he held the positions of project manager, Technical Planning Department (1979-85) and area manager, Gas Export Department (1986-92). From 1979 to 1983 he was responsible for Gasunie's Technical Five-Year Plan process, in which required modifications of the transportation infrastructure are assessed, and functional specifications for individual projects are produced. From 1979 through 1985 he also worked on technical/economical feasibility studies of large pipeline projects, not only on Dutch territory but also in Malaysia and Argentina. In the latter project, he was

responsible for gas exports to Belgium, France, Switzerland, and Italy. He also represented Gasunie in a joint venture of Dutch gas transmission and distributing interests exploring prospective investment opportunities in Eastern Europe.

Ansari, Homayoon J. Senior Petroleum Specialist. M.Sc., Petroleum Geology. Mr. Ansari has 25 years of public sector experience in Iran, where he held senior governmental positions, including cabinet minister (4 years); chairman of a joint venture between the National Iranian Oil Company (NIOC) and Amoco (3 years); chairman of the Board of Managing Directors of the Telecommunication Company of Iran (7 years); director general of petroleum, Ministry of Petroleum (3 years); governor of Iran to OPEC; chief of the exploration department of NIOC (4 years); and member of the Board of Banks, Public Enterprises, and Universities. He joined the World Bank in 1982 and has conducted policy dialogues on energy sector development issues with senior government officials in Bangladesh, Bulgaria, the Central Asian Republics, Malawi, Pakistan, Romania, Somalia, Sudan, Turkey, Yemen, and Zambia. He provided direct operational support to numbers of ministers and senior officials and carried out appraisal and supervision of oil and gas projects. He has also worked on energy sector institutional restructuring; participated in country economic missions and energy sector reviews; and prepared the relevant chapters for the papers documenting those activities. He is fluent in English and Farsi and has some knowledge of Azeri, French, and Arabic. He has written for the *Bulletin of American*

Association of Petroleum Geologists as well as the publications of the World Petroleum Congress, ECAFE Petroleum Congress, and Iranian Petroleum Institute.

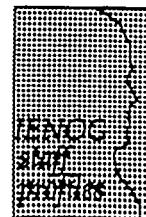
Beaussant, Henri. Energy Economist. M.B.A., H.E.C., Paris; M.A., Political Science, I.E.P., Paris. Mr. Beaussant joined the World Bank in 1990 as an energy economist in the Gas Group of the ESMAP Operations Division and moved to the Oil and Gas Division of the Industry and Energy Department in the reorganization of January 1993. As a specialist in the economic and technical aspects of downstream gas activities (market survey, gas distribution, and gas uses), he has participated in several studies, in particular, in China and Russia (cross-support to the Region within the framework of loan preparation); Southern Africa; and Morocco (feasibility studies for the introduction of natural gas); Bolivia (gas strategy); and Colombia (economics of gas distribution). Before joining the Bank, he worked for 15 years within the Gaz de France (GdF) group, first as a young economist at the Economic and Commercial Vice Presidency (market and promotion studies for the household sector) and then as project manager with GdF's engineering and consultancy subsidiary, Sofregaz (market surveys, distribution studies, etc.). He has worked extensively in Latin America (Ecuador, Peru, Bolivia); Asia (Korea, India); Europe (Greece, Portugal, Turkey); and Africa (Algeria, Morocco, Tunisia, Cameroon). A native speaker of French, he is also fluent in English, with good knowledge of Spanish.

Bhat, Hari. Consultant. Graduated in Geophysics, University of Strasbourg, France; and Geology, University of Bordeaux, France. Mr. Bhat

joined the World Bank in September 1985. He has participated in project identification, preparation, presentation of projects to the Board, and supervision and has written numerous completion reports for projects in Latin American and Sub-Saharan Africa. Before joining the Bank, he worked with contracting companies in mining, public works, and seismic exploration. He began employment with the Société Nationale des Pétroles d'Aquitaine in July 1955 and spent 30 years on assignments in France, Tunisia, Libya, Brazil, and Guatemala. His responsibilities spanned exploration of new sources to export of processed petroleum products.

Daffern, Eric. Leader of the Gas Transmission and Distribution Group of the Oil and Gas Division. B.Sc., Economics, FCIS, IFPA; British. Mr. Daffern has worked for the World Bank for 16 years, most recently as Principal Energy and Industry Specialist in the Southern Africa Department. He has extensive experience in the World Bank's oil and gas operations worldwide and in the privatization of state enterprises in developing countries. He was the deputy chief of the Bank's Petroleum Division and from 1985 to 1987 headed the Bank's first formal efforts to cooperate with the international oil companies. Before joining the Bank, he held a variety of positions in British Gas (1965-74) and later served as assistant director of the Severn-Trent Water Authority (U.K.). He has spoken extensively at public meetings on the oil and gas industry in developing countries.

Gorton, Theodore J. Consultant. Ph.D., Oxford University. Mr. Gorton is a petroleum contracts and negotiations specialist with a background in the petroleum industry (Royal Dutch/





Shell and Amoco), where he worked on new ventures and led negotiation teams in the acquisition of exploration concessions in Qatar, Spain, Congo, and other countries. He been a consultant with the World Bank for more than 6 years, contributing to operations in the energy sector, producing reports, and advising governments on enabling environments, legal/fiscal/contractual frameworks, promotion strategy, and negotiations for petroleum investments. He has lived and worked in a variety of countries and speaks, reads, and writes fluent French, Spanish, and Arabic.

Hamso, Bjorn. Gas Specialist. M.Sc., Economics and Business Administration. Mr. Hamso joined the Bank in 1992 and has worked as an adviser to the Bolivian government, mainly concerning exports of natural gas to Brazil. He also has advised the gas company of Turkmenistan on European gas industry practices and the gas company of Poland on gas import strategies. His work has also included participation as the energy economist on the Bank's team for Lithuania, where he also contributed to an assessment for the G-7 group on the economic consequences of retirement of nuclear reactors that are considered unsafe. Before joining the Bank, he spent 11 years with Statoil, the Norwegian oil company, where he was the manager for gas market analysis and economic evaluation of gas projects. He was involved in the negotiations of most major Norwegian gas export contracts over the last decade. Before entering the oil industry, he was a product manager with the Norwegian Unilever company. His languages include Norwegian, English, and German, and a growing knowledge of Spanish.

Hassan, Moiffak. Petroleum Specialist. B.Sc., M.Sc., Petroleum Engineering, Imperial College, London; D.Sc., Sedimentology, University of Paris. Mr. Hassan has worked for the Bank since 1990. His activities have focused on technical and economic evaluations of oil, gas, and geothermal projects within the framework of sector studies and project appraisal in Myanmar, Vietnam, Philippines, India, Pakistan, Trinidad and Tobago, and Côte d'Ivoire. Before joining the Bank, he spent 24 years in the oil industry, first with TOTAL as a senior reservoir engineer and project manager and then with Schlumberger and several French petroleum service companies as a technical and project adviser. He has worked extensively on India (as leader of TOTAL's advisory group for the development of the Indian offshore); North Sea; Abu Dhabi; Indonesia; Australia; the United States; and the former Soviet Union. He participated in the creation of the European School for Reservoir Management and is a senior visiting lecturer at Imperial College and Delft University. He has published extensively in the fields of reservoir engineering, nuclear logging, and geochemistry. He is fluent in English, French, and Arabic.

Khelil, Chakib. Leader of the Petroleum Group in the Oil and Gas Division. Ph.D., Petroleum Engineering. Mr. Khelil's World Bank experience includes 13 years as petroleum engineer and deputy and Energy Unit chief, with exploratory and oil and gas field development projects in countries including Côte d'Ivoire, Equatorial Guinea, Peru, Ecuador, and Brazil. He has experience in restructuring, divestiture, and privatization in Argentina, Ecuador, Peru, and Bolivia. He has been involved in many

sector reviews and assessments with sector and country operations. Before joining the Bank, he worked for Shell Oil Company and Phillips Petroleum in oil and gas field evaluations and development (United States) and with D.R. McCord & Associates, International Consultants (United States) in oil and gas reservation and production engineering and economics. He was president of a joint venture company of Sonatrach (Algeria National Company) and Core Lab International (consultants in exploration monitoring, field development, and evaluation). He served as president of VALHYD group (Algeria) in charge of Algeria's gas master plan and was responsible for a multi-disciplinary group of local and foreign experts on technical, legal, and financing matters. He also served as adviser to the president of Algeria on hydrocarbon policy issues.

Khwaja, Salahuddin. Senior Gas Specialist. B.Sc. (Hons), Engineering, London; A.C.G.I., London. Since joining the World Bank in 1985, Mr. Khwaja has designed and supervised gas and petroleum development projects in Bangladesh, Brazil, Burma, Indonesia, Korea, Papua New Guinea, and Turkey. He participated in the gas sector studies for Indonesia and Korea, the country economic reports for Papua New Guinea, the energy assessment of the Pacific Island countries, and the gas sector survey for China. He was also the task manager for the project, Indonesia: Gas Development Planning Study. Before joining the Bank, he had 20 years experience in natural gas development in Pakistan, having joined Sui Northern Gas Pipelines, Pakistan's principal gas utility, at its inception in 1964 as an engineer and regional manager and later becoming its marketing manager,

managing director, and chairman of the Board of Directors. He has been a member of the Board of Directors of the Petroleum Institute of Pakistan, Sui Gas Transmission Company, and the Hydrocarbon Institute of Pakistan, and has also been a council member of the International Gas Union.

Kubota, Shigeru. Oil and Gas Specialist (Engineer). Mr. Kubota joined the World Bank in 1991 and has contributed to preparation of the country economic memorandum for Bahrain and the energy sector review for Lithuania. He is acting task manager for Egypt and is involved in project preparation for oil and gas projects in Ukraine, Azerbaijan, and Kazakhstan. He recently completed an assignment as task manager for the Bank's Former Soviet Union/East Europe Energy Trade study. Before joining the Bank, Mr. Kubota worked for Mitsubishi Heavy Industries, Ltd., initially as an engineer and later as a manager of various international oil and gas development projects. He has obtained several technical patents in Japan.

Law, Peter. Gas Specialist. Ph.D., Chemical Engineering, Cambridge University. Mr. Law joined the World Bank in 1990 to work with the ESMAP Gas Group. His World Bank work has focused on the technical, economic, and regulatory aspects of natural-gas-related projects, mainly in Eastern Europe, the former Soviet Union, South and South east Asia, and South America. He has also produced several publications on natural gas development and pricing. Before joining the Bank, he worked for 20 years in the natural gas and chemicals industries; among his experiences were management roles for British Gas in the design of U.K. and offshore natural gas processing and





infrastructure facilities, and participation in various international technoeconomic consultancy studies at the country level spanning the full range of natural gas activities, mainly in the Middle East and Turkey. Earlier, he was employed by Imperial Chemical Industries and worked on the design, construction, and operation of large-scale petrochemicals production facilities (including methanol, ammonia, and polymers) both in U.K. and continental Europe. Languages in addition to English include Spanish and Portuguese.

Mayorga-Alba, Eleodoro. Petroleum Engineer, Energy Specialist. M.Sc., Business Administration, Ph.D., Economics. Mr. Mayorga-Alba joined the Africa Technical Department of the World Bank two years ago and has conducted regional studies and participated in project evaluations. Before joining the Bank, he accumulated 15 years of experience in the oil and gas industry, mainly in corporate planning, project evaluation, negotiation of contracts, and policy advice and formulation. Past jobs include CEO-general manager of PetroPeru; energy economist at the U.N. Economic Committee for Europe; and consultant to UNCTAD, ILO, UNDP, and the World Bank. He is fluent in Spanish, English, and French and has recently published articles in *Energy Policy* and *Natural Resources Forum*.

Morsli, Hannachi. Senior Petroleum Engineer. Degree in Mining and Engineering. Mr. Morsli joined the World Bank in 1981. His experience includes design and supervision of oil and gas projects in India, Bangladesh, China, Poland, the Philippines, Turkey, Egypt, and Morocco. He participated in gas sector studies focusing on upstream aspects. He

also carried out procurement activities associated with project implementation supervision. Before joining the Bank, he worked as an operations manager (upstream) for the Algerian oil company Sonatrach for about 8 years. Earlier, he worked as an engineer in field services with an international contractor (Schlumberger Group) for about 3 years.

Nayar, T. S. Principal Chemical Engineer. M.Sc., Chemical Engineering, University of Birmingham, U.K. Mr. Nayar joined the World Bank in November 1981 and worked in the Industry and Energy Division of the Africa Technical Department and the Oil and Gas Division. His Bank working experience is extensive and includes activities in Bolivia, Chad, Colombia, Costa Rica, Ecuador, Egypt, Ethiopia, Ghana, Guinea Bissau, Jamaica, Kazakhstan, Kenya, Madagascar, Mozambique, Nigeria, Pakistan, Romania, Sierra Leone, Somalia, Tanzania, Trinidad, Tunisia, Turkey, Uganda, Ukraine, Uruguay, Uzbekistan, Yemen, Zaire, Zambia, and Zimbabwe. Before joining the Bank, he worked for 15 years in refinery operations, project planning, process design, preparation of feasibility reports, cost estimation, crude and product procurement, project management, technology selection, and procurement and negotiations for technical assistance. He also worked for 6 years as a government adviser on all petroleum refining and related matters and as a member of the Board of Directors of two joint-venture refining companies, one joint-venture lube-oil-additive manufacturing company, and one engineering consulting company. His earlier working experience includes activities in Abu Dhabi, France, Germany, India, Indonesia, Iran, Iraq, Italy, Japan, Libya, Russia,

Singapore, the United States, and the United Kingdom..

O'Connor, Thomas E. Principal Petroleum Engineer. M.Sc., Geology, 1961. Mr. O'Connor joined the World Bank Petroleum Projects Division in 1985. His Bank experience focuses on the upstream petroleum components of the national and regional energy sectors, including their technical evaluations and the related governmental policy issues required for effective implementation. Currently, he provides support in Azerbaijan, Bangladesh, Ethiopia, and Kazakhstan and serves as the point of external oil industry contact for Eritrea/Ethiopia and Somalia. He has completed energy assessments for the upstream petroleum subsector in Ghana and for the entire petroleum component of the energy sector in Namibia. Before joining the Bank, he worked for Amoco Domestic and International Exploration, 1963-80, and for Amoil International, 1980-84.

Okimi, Hiroki. Gas Specialist. M.Sc., Fuel and Chemical Engineering, University of Tokyo and Northwestern University. Mr. Okimi joined the World Bank in March 1992. He had worked for Osaka Gas, Japan, for more than 25 years, most recently as director of its International Business Department. His extensive experience in the Japanese gas industry includes LNG terminal planning, construction, and operation; LNG contracts and related research; gas utilization and appliances; energy analyses; long-term corporate planning for the gas utility; international transfer of gas distribution and utilization technologies; business diversification planning and operation; and corporate acquisition. He was vice chairman of the Technical Program

Committee of the International Gas Research Conference in its 1987-89 triennial. He has worked in Japan, the United States, and the republics of the former Soviet Union.

Shirazi, Mohsen. Senior Gas Specialist. Mr. Shirazi has worked for the World Bank since 1983 in projects involving 15 developing countries and has participated in many gas projects, energy sector reviews, and energy sector adjustment loans. He organized a four-part roundtable and workshop series for senior representatives of developing countries and executives of oil and gas industries and related institutions to discuss problems and propose solutions relating to gas development. He helped to prepare a comprehensive World Bank paper on gas industry development in developing countries. Mr. Shirazi began his career in the energy industry as a chemical engineer in 1956. Before joining the Bank, he worked for Phillips Petroleum Company as Director of Frontier Projects and for the National Iranian Oil Company and National Iranian Gas Company (NIGC) in technical managerial positions and in positions involving organization, methods, and system planning. He helped form NIGC in 1965, the catalyst for development of gas industry in Iran, and worked for this company from its inception until he became a member of the Board in 1974, and deputy chairman and managing director in 1978. Throughout his career in the oil and gas industries he has been involved in the development of large gas projects such as Iranian Gas Trunklines (IGAT I and IGAT II), projects developed to meet domestic requirements as well as to export natural gas from Iran to the former Soviet Union and Western Europe on swap basis. He has also held leadership



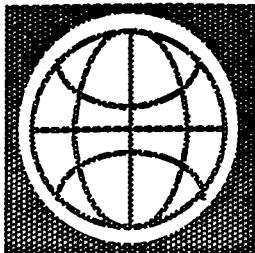


roles in numerous domestic and international gas, LPG, and LNG negotiations. He was chairman of the Gas Committee of OPEC from 1975 to 1977 and represented Iran at the Council of International Gas Union (IGU) from 1969 to 1979. In 1983 he helped to establish the ongoing cooperation between the Bank and IGU. He also represented the Bank at the Council of IGU from 1983 to 1987.

Svensson, Bent R. Energy Economist. M.Sc., Economics. Mr. Svensson has worked for the World Bank since 1991. His main areas of activity have included restructuring, institutional, and regulatory issues (in China, Indonesia, and Russia); economic analyses and pricing (in Egypt,

Iran, and Russia); and gas trade options (in Eastern Europe). Before joining the Bank he was a gas policy expert at the International Energy Agency of the OECD (1987-91); head of a division of KOMGAS (the Finance and Economics Division in the Natural Gas Distribution Companies in Denmark, 1983-87); and a senior researcher (1980-83), project manager (1976-80), and associate professor at the Copenhagen School of Economics and Business Administration (1976-87). Among his publication credits are main authorship of *Natural Gas Prospects and Policies* (OECD 1991). Languages spoken include English, French, German, and some Spanish.





OIL AND GAS ACTIVITIES OF THE WORLD BANK

September 1993

About the World Bank

The International Bank for Reconstruction and Development, frequently called the World Bank, was founded in 1944 by the United Nations Monetary and Financial Conference at Bretton Woods, New Hampshire. It opened for business in June 1946, owned by the governments of its member countries, and its capital is subscribed by those countries. Together with the International Development Association (IDA), the International Finance Corporation (IFC), and the Multilateral Investment Guarantee Agency (MIGA), it provides loans to developing countries to help reduce poverty and to finance investments that contribute to economic growth. Its central purpose is to serve as a channel of resources from developed nations to the developing countries to promote economic and social progress.

The World Bank finances its lending operations from its own capital market borrowings, retained earnings, and the flow of repayments on its loans. The first loans approved by the World Bank helped finance the reconstruction of Western Europe after World War II. Today, the World Bank lends to the developing countries of Africa, Asia, Latin America and the Caribbean, and Europe, promoting global economic prosperity.

Duplicate paper

Jim

Initiation by

Razavi, Chief
Gas Division
Energy Department
World Bank
DC 20433

Oil and Gas Conference

Oil and Gas in the Energy Sector

The oil crisis of the 1970s profoundly challenged the economies of most developing countries. The crisis hit the oil-importing countries severely, and many suffered deteriorating balances of payments and increasingly unmanageable import bills. It was in this context, in July 1977, that the World Bank's Executive Directors approved an expanded program of lending to assist the Bank's client countries in developing their own energy resources. In 1978, the Bonn Summit and the Secretary General of the United Nations endorsed the initiation of new approaches in the energy sector by the World Bank, particularly in financing oil exploration in countries that were significant oil importers. The new initiative led to a rapid expansion of the World Bank's lending for oil and gas projects, which reached about \$1 billion in 1983 (see Figure 1 on page 2).

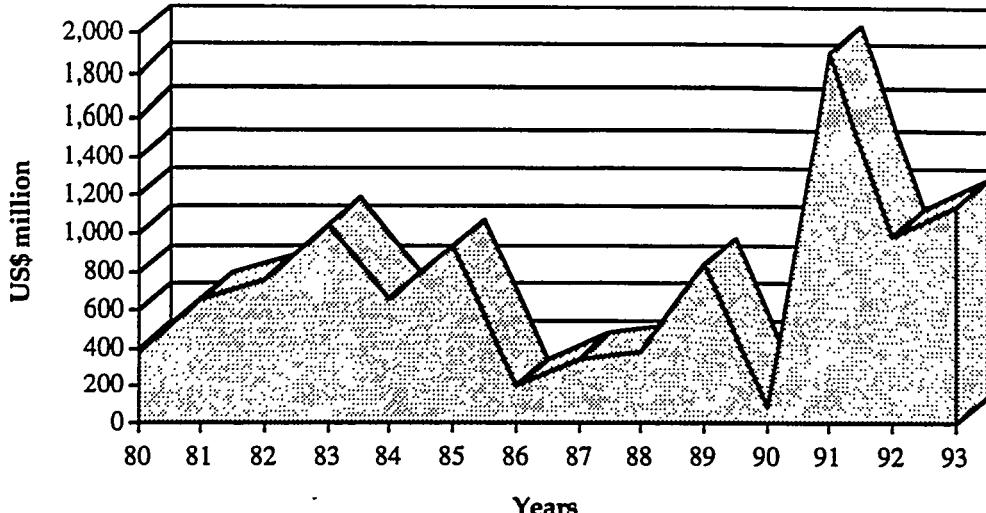


Figure 1
World Bank Oil and Gas Lending, 1980-1993

The Bank adopted new lending guidelines for oil and gas in November 1984. The new rules distinguished between types of petroleum lending and carefully set out criteria for each category. In particular, the guidelines limited the Bank's involvement in promoting exploration to countries where no significant exploration was ongoing or where no exploration company maintained rights or was negotiating a contract. The purpose was to meet concerns that the Bank might preempt activities by the private sector.

By 1986-88, the level of Bank lending to the hydrocarbon sector had dropped to between \$300 and \$400 million. The sharp fall-off resulted both from the Bank's new policy of limiting its involvement in the sector and from an increasing general

perception that demand would be weak in the future.

New Directions

By 1989-90, a new emphasis had emerged, as the World Bank moved toward a more proactive role designed to promote private sector development and limit the environmental consequences of energy production and consumption. In this new context, the Bank's involvement in the oil and gas sector now aims at the following goals:

- Assisting developing countries in preparing and implementing appropriate legal and regulatory frameworks to facilitate private sector investments in upstream oil and gas, and transmis-

sion and distribution of natural gas, as well as privatization of public utilities.

- Identifying situations in which substitution of gas for coal and oil would impart significant global and local environmental benefits.
- Facilitating international gas trade by identifying feasible trade schemes and assistance to the participating countries in setting up the appropriate institutions and contractual arrangements to attract private sector investors and mobilize multilateral and bilateral financing.
- Financing projects in petroleum exploration, development, processing, and transmission/distribution. Financing is aimed at providing funds when private sector resources cannot be attracted or where World Bank lending can catalyze private sector and bilateral financing.

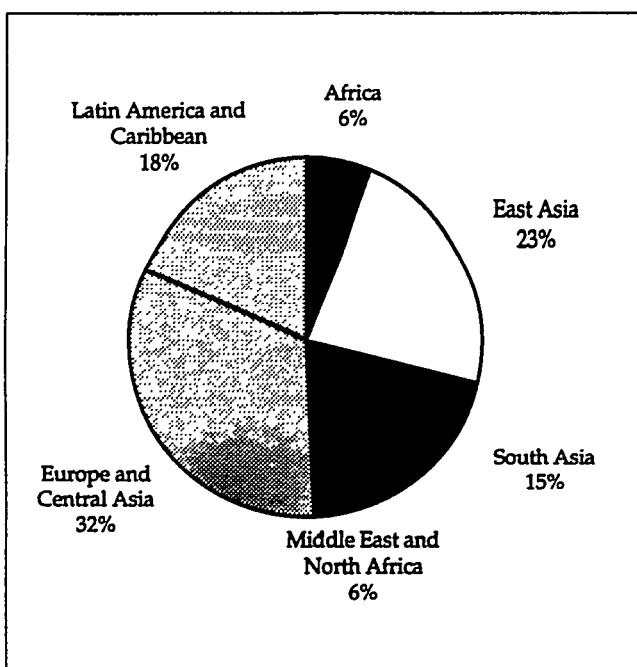


Figure 2

World Bank Oil and Gas Lending by Region,
Fiscal 1993-98

Table 1
Projects in 5-Year Lending Program,
Fiscal 1993-98

Fuel/region	Bank lending (US\$ million)	Number of projects
Oil		
Africa	105	4
East Asia	332	3
South Asia	90	1
Middle East and North Africa		
Europe and Central Asia	950	6
Latin America & Caribbean	905	5
Subtotal Oil	2,382	19
Gas		
Africa	288	6
East Asia	1,065	6
South Asia	818	4
Middle East and North Africa	350	2
Europe and Central Asia	1,070	10
Latin America & Caribbean	199	2
Subtotal Gas	3,789	30
Oil and gas		
Africa	393	10
East Asia	1,397	9
South Asia	908	5
Middle East and North Africa	350	2
Europe and Central Asia	2,020	16
Latin America & Caribbean	1,104	7
TOTAL OIL AND GAS	6,171	49

Note: Totals may not be exact because of rounding.

Forthcoming Projects

The World Bank currently has some 49 oil and gas projects in preparation, with projected lending of almost \$6.2 billion (see Table 1 above). Table 1 also shows the distribution of lending in monetary terms, distinguishes between oil and gas lending, and indicates that 30 of the projects (about 60 percent) are for gas development. Figure 2, at left, shows the percentage breakdown of this lending by Region.

How the World Bank Works in the Oil and Gas Sector

Responsibility for the operational work of the World Bank lies with six regional Vice Presidencies covering Africa, Europe and Central Asia, the Middle East and North Africa, Latin America and the Caribbean, East Asia and the Pacific, and South Asia. Within each Vice Presidency, country departments are responsible for one or a set of countries, and, within each department, divisions are in charge of activities in various sectors. The responsibility for the World Bank's energy lending is with divisions entitled either Industry and Energy or Infrastructure. This brochure uses the Bank's terminology for these divisions—Sector Operation Divisions (SODs). The Bank has a total of 22 SODs that deal with energy lending within its six Regional Vice Presidencies. The energy sector operations of each Region are shown in Table 2, opposite.

Ultimate responsibility for lending to the oil and gas sectors of developing countries lies with the SODs. However, because the SODs cannot encompass full technical expertise in each economic sector, they rely on the expertise of specialized divisions such as the Industry and Energy Department's Oil and Gas Division (IENOG) in carrying out their operational activities. The working relationship between the SODs and IENOG is flexible. When the SODs have resources to manage project appraisal and supervision, the SOD manages the task, and IENOG primarily provides technical expertise. When the SODs do not have the personnel to carry out the management, or when projects are technically complex, IENOG assumes the responsibility for task management.

The Project Cycle

A six-step process governs the World Bank's approach to investment lending. Formally known as the "project cycle," it is the Bank's way of making sure that all projects receiving financial backing meet the same set of rigorous standards. The steps in the cycle are as follows:

1. **Identification.** The task of identifying and proposing projects for World Bank financing lies mainly with borrowing governments, but sometimes stems from work carried out by Bank staff.
2. **Preparation.** The borrowing country is primarily responsible for examining the technical, economic, social, and environmental feasibility of the project.
3. **Appraisal.** Appraisal is the Bank's independent assessment of the project and comprises a review and analysis of the proposed project's merits and effects.
4. **Negotiations and Board Presentation.** Negotiations bring World Bank staff and borrowers together to discuss the proposed project. The appraisal report (including any changes made during the negotiations phase), the report of the Bank's president, and the loan documents are then presented to the board of executive directors—representing the Bank's member countries—for approval.
5. **Implementation and Supervision.** Supervision through site visits enables the Bank to provide technical assistance and to ensure that strict and competitive procurement rules are applied.
6. **Evaluation.** The World Bank's Operations Evaluation Department (OED) is responsible for evaluating project costs, benefits, timetables, and efficiency and comparing them with projections made at the time of appraisal. OED's evaluation also suggests how to improve project performance in the future.

Table 2
Energy Sector Operations of the World Bank's Regional Vice Presidencies

<i>Region/ Department/ Countries</i>		<i>Division</i>	<i>Chief</i>	<i>Phone</i>
Africa				
AF1	Benin, Cameroon, Central African Republic, Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Guinea, Togo	Industry and Energy Operations	Iain Christie	473-4530
AF2	Ethiopia, Kenya, Somalia, Sudan, Tanzania, Uganda	Infrastructure Operations	Stephen Weissman	473-4076
AF3	Angola, Burundi, Comoros, Djibouti, Madagascar, Mauritius, Rwanda, Seychelles, Zaire	Industry and Energy Operations	Michael Sarris	473-4009
AF4	Ghana, Guinea-Bissau, Liberia, Nigeria, São Tomé and Príncipe, Sierra Leone	Industry and Energy Operations	Mary Oakes Smith	473-4976
AF5	Burkina Faso, Cape Verde, Chad, Gambia, Mali, Mauritania, Niger, Senegal	Industry and Energy Operations	Silvia Sagari	473-5017
AF6	Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zimbabwe	Industry and Energy Operations	David Cook	473-3321
East Asia and Pacific				
EA1	Cambodia, Korea, Lao PDR, Malaysia, Mekong Committee, Myanmar, Philippines, Thailand, Vietnam	Industry and Energy Operations	Vineet Nayyar	458-0479
EA2	China, Mongolia	Industry and Energy Operations	Richard Newfarmer	473-1978
EA3	Fiji, Indonesia, Kiribati, Maldives, Marshall Islands, Micronesia, Papua New Guinea, Solomon Islands, Tonga, Vanuatu, Western Samoa	Industry and Energy Operations	Peter Scherer	458-2498
South Asia				
SA1	Bangladesh, Bhutan, Nepal	Energy and Infrastructure Operations	Frederick Temple	458-0403
SA2	India	Energy Operations	Jean-François Bauer	458-1470
SA3	Afghanistan, Pakistan, Sri Lanka	Energy and Infrastructure Operations	Per Ljung	458-1933
Middle East and North Africa				
MN1	Algeria, Iran, Libya, Malta, Morocco, Tunisia	Industry and Energy Operations	François Ettori	473-2340
MN2	Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates, Yemen Republic	Industry and Energy Operations	Vinay Bhargava	473-2600
Europe and Central Asia				
EC1	Bulgaria, Cyprus, Portugal, Romania, Turkey	Industry and Energy Operations	Franco Batzella	473-2300
EC2	Albania, Croatia, Czech Republic, Hungary, Poland, Slovenia	Energy and Environment Operations	Bernard Montfort	473-2700
EC3	Azerbaijan, Kazakhstan, Kyrgyzstan, Russian Federation, Tajikistan, Turkmenistan, Uzbekistan	Infrastructure, Energy and Environment Operations	Jonathan Brown	473-2469
EC4	Armenia, Belarus, Estonia, Georgia, Latvia, Lithuania, Moldova, Ukraine	Infrastructure	Dominique Lallement	458-2849
Latin America and the Caribbean				
LA1	Brazil, Peru, Venezuela	Energy and Industry Operations	Stephen Ettinger	473-9320
LA2	Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama	Infrastructure and Energy Operations	Martin Staab	458-2564
LA3	Bahamas, Barbados, Belize, Bolivia, Caribbean Development Bank, Colombia, Dominican Republic, Guyana, Haiti, Jamaica, OECS Member States, Suriname, Trinidad and Tobago	Infrastructure Operations	Peter Ludwig	458-2929
LA4	Argentina, Chile, Ecuador, Paraguay, Uruguay	Infrastructure and Energy Operations	Alfonso Sanchez	473-0001

Mandate and Organization of the Oil and Gas Division

The Oil and Gas Division (IENOG) was formed in January 1993 by bringing together oil and gas experts from the Regional Vice Presidencies to a central department. Presently, IENOG has a staff of 25 technical experts. In addition, it utilizes a large number of short-term consultants in carrying out various activities. The division provides a "cluster" of services, including the following:

- Provision of a full range of operational activities (project appraisal, project supervision and sector studies).
- Coordination of the World Bank policy in the oil and gas sector.
- Functioning as the main point of contact between the Bank and the international petroleum industry, professional organizations, and other entities concerned with global and regional oil and gas issues.
- Dissemination of best practices through cross-country transfer of experience and based on dialogue with the international petroleum industry.

Internally, IENOG is divided into three thematic groups:

- **Petroleum Group.** Deals with upstream oil and gas and downstream oil activities.
- **Gas Transmission and Distribution Group.** Deals with activities in the infrastructures of natural gas.
- **Economics and Restructuring Group.**

Each group is coordinated by a group leader. Although the grouping is organized on a thematic basis, each group leader is also responsible for

About ESMAP . . .

When the energy crisis of 1973 and then the second oil crisis in 1979 threatened the supply of energy, the international community sought to respond more systematically to the problems posed by drastic increases in energy prices. In 1980, the World Bank, together with the United Nations Development Programme (UNDP), set up an Energy Assessment Program within the Energy Department of the World Bank, and in 1983 the same two sponsors established the Energy Sector Management Assistance Programme (ESMAP). This latter program, now entering its second decade with a renewed mandate from its funding and governing bodies, helps countries analyze their energy needs, identifies the most efficient ways of meeting them, and prepares the highest priority projects for consideration for financing through multilateral institutions, bilateral aid, and the private sector. The Oil and Gas Division will continue to implement the oil- and gas-related activities of ESMAP. Presently, IENOG is carrying out six country and regional studies of gas sector development and trade under financing from ESMAP.

overall coordination of the division's support to two or three regions in the World Bank.

An organizational chart of the Oil and Gas Division appears on the opposite page. The division's involvement in oil and gas activities is likely to be quite extensive over the next few years. Projected lending for oil projects, Fiscal 1993-97, and for gas projects, Fiscal 1993-97, are shown in Tables 3 and 4, respectively (pages 8 and 9). Brief profiles of the division's professional technical staff are also presented (pages 10-16).



The Oil and Gas Division

Hossein Razavi, Chief
Phone 202-458-5300

Petroleum Group

Chakib Khelil	Group Leader and Coordinator for Latin America and South Asia	202-473-8660
Homayoon J. Ansari	Senior Petroleum Specialist	458-1128
Moiffak Hassan	Petroleum Specialist	458-1128
Hannachi Morsli	Senior Petroleum Engineer	458-2873
Thuvara S. Nayar	Principal Chemical Engineer	458-4300
Thomas E. O'Connor	Principal Petroleum Engineer	473-4928
Kariyawasam Wijetilleke	Principal Chemical Engineer	458-2867
Jack Warren	Consultant	473-4292
Hari Bhat	Consultant	473-4175

Gas Transmission and Distribution Group

Eric Daffern	Group Leader and Coordinator for Africa and East Asia	202-473-3047
Blaine Dalby	Gas Specialist	473-6993
Salahuddin Khwaja	Senior Gas Specialist	458-2869
Peter Law	Gas Specialist	473-6977
Hiroki Okimi	Gas Specialist	473-6975
Mohsen Shirazi	Senior Gas Specialist	473-2415
Shigeru Kubota	Gas Specialist	473-2806

Economics and Restructuring Group

Vacant	Group Leader and Coordinator for Europe and Central Asia and Middle East and North Africa	202-473-6978
Jakob Althuis	Gas Specialist	473-2722
Henri Beaussant	Energy Economist	473-0361
Bjorn Hamso	Gas Specialist	458-9036
Bent Svensson	Energy Economist	473-6976
Eleodoro Mayorga Alba	Petroleum Economist	473-4295
Patrick Wright	Energy Specialist	473-xxxx
Ted Gorton	Consultant	473-4290
Chris Brierley	Consultant	

Table 3
Oil Lending Projects "in the Pipeline," Fiscal 1993-1997

Region/ Country	Project name	FY	Board approval	Loan amount US\$ Million
Africa				
Chad	Petroleum	95	7/5/94	30.0
Madagascar	Petroleum Sector Adjustment	*	5/1/93	*
Madagascar	Petroleum Sector Reform	95	7/12/94	55.0
Zambia	Petroleum Rehabilitation	94	12/1/93	20.0
Subtotal Africa				105.0
East Asia and Pacific (EAP)				
Korea	Petroleum Distribution and Sectoral Management Imp.	93	6/3/93	120.0
Papua New Guinea	Petroleum Development Technical Assistance	94	9/14/93	11.5
Thailand	Petroleum Production Reformulation	94	5/17/94	200.0
Subtotal EAP				331.5
South Asia				
Bangladesh	Petroleum Sector Development	97	7/11/96	90.0
Subtotal South Asia				90.0
Middle East and North Africa (MNA)†				
Europe and Central Asia (ECA)				
Azerbaijan	Energy Technical Assistance	*	*	40.0
Kazakhstan	Energy Sector	*	*	100.0
Russia	Oil Sector	94	4/27/93	500.0
Romania	Petroleum Sector Rehabilitation	93	6/17/93	150.0
Turkmenistan	Energy Sector	*	*	60.0
Uzbekistan	Oil and Gas	*	*	100.0
Subtotal ECA				950.0
Latin America and the Caribbean (LAC)				
Argentina	Yacyreta II	93	9/2/92	300.0
Argentina	Oil Industry Environment Mitigation	94	12/14/93	150.0
Peru	TSP Rehabilitation II	96	7/15/94	150.0
Peru	Power Sector Investment	97	6/13/97	225.0
Uruguay	Development of Gas Infrastructure	96	6/15/96	80.0
Subtotal LAC				905.0
TOTAL OIL LENDING				2,381.5

* Not yet determined.

† No oil lending currently envisioned.

Table 4
Gas Lending Projects "in the Pipeline," Fiscal 1993-1997

<i>Region/ Country</i>	<i>Project name</i>	<i>FY</i>	<i>Expected Board approval</i>	<i>Loan amount US\$ Million</i>
Africa				
Côte d'Ivoire	Private Sector Energy	94	8/31/93	20.0
Ethiopia	Calub Gas Development	93	4/27/93	82.5
Ghana	Regional Gas Pipeline	96	7/4/95	10.0
Nigeria	Natural Gas Liquid	95	7/5/94	100.0
Nigeria	Regulatory Gas Pipeline	95	7/5/94	25.0
Tanzania	Songo Songo Gas Development	96	8/1/95	50.0
Mozambique	Gas Engineering	95	7/19/94	25.0
Subtotal Africa				312.5
East Asia and Pacific (EAP)				
China	Sichuan Gas Development and Conservation	94	12/28/93	250.0
Indonesia	Gas Development	*	12/14/93	250.0
Indonesia	Gas Utilization III	98	6/2/98	200.0
Myanmar	Energy Rehabilitation	97	7/9/96	80.0
Thailand	Gas Transmission	93	7/7/92	105.0
Thailand	Second Gas Transmission	94	9/21/93	180.0
Subtotal EAP				1,065.0
South Asia				
Bangladesh	Gas Infrastructure	95	12/13/94	165.7
India	Gas-Based Power Generation	98	3/26/98	200.0
India	Oil and Gas II	94	5/17/94	350.0
Pakistan	Rural Electrification II	97	7/1/96	101.8
Subtotal South Asia				817.5
Middle East and North Africa (MNA)				
Iran	Gas Flaring Reduction	94	1/25/94	250.0
Morocco	Gas Development Network	96	5/10/96	100.0
Subtotal MNA				350.0
Europe and Central Asia (ECA)				
Hungary	Energy/Environment	94	7/6/93	*
Poland	Polpipe	*	*	*
Poland	Gas Conversion Grant	*	*	20.0
Russia	Gas Flaring Environmental	94	3/1/94	300.0
Russia	Gas Rehabilitation I	97	11/30/93	*
Russia	Environment	94	12/14/93	100.0
Russia	Gas Distribution and Rehabilitation	96	*	300.0
Russia	Gas Distribution and Rehabilitation II	97	7/5/94	*
Slovak Republic	Gas	*	*	150.0
Turkey	Gas Transmission II	97	7/2/96	200.0
Subtotal ECA				1,070.0
Latin America and the Caribbean (LAC)				
Bolivia	Bolivia Natural Gas Export	96	7/15/95	49.0
Brazil	Rio Natural Gas Distribution	96	7/15/97	150.0
Subtotal LAC				199.0
TOTAL GAS LENDING				3,814.0

* Not yet determined.



IENOG Staff Profiles

Razavi, Hossein. Chief of the Oil and Gas Division. M.S., Engineering; Ph.D., Economics. Mr. Razavi has worked for the Bank for 9 years, most recently as chief of the Operations Division of ESMAP. During earlier work in World Bank Operations, he led project appraisals in power and gas and carried out energy sector studies for the Philippines, Malaysia, and Thailand. From 1976 to 1981, he served as bureau director at Iran's Plan and Budget Organization. Also before joining the Bank, he worked as a senior consultant at Ernst & Whinney in Washington, D.C. He has published extensively in energy economics. His most recent book, *Fundamentals of Petroleum Trading*, appeared in 1991. His papers have appeared recently in the *Energy Journal*, *Energy Policy*, *Energy Economics*, *Annual Review of Energy*, *Energy and Resources*, and the *Southern Economic Journal*. He serves on the board of editors of the *Energy Journal*.

Althuis, Jaap G. Gas Specialist. M.Sc., Econometrics, 1971. Mr. Althuis joined the Bank in January 1993 from Dutch Gasunie, where he held the positions of project manager, Technical Planning Department (1979-85) and area manager, Gas Export Department (1986-92). From 1979 to 1983 he was responsible for Gasunie's Technical Five-Year Plan process, in which required modifications of the transportation infrastructure are assessed, and functional specifications for individual projects are produced. From 1979 through 1985 he also worked on technical/economical feasibility studies of large pipeline projects, not only on Dutch territory but also in Malaysia and Argentina. In the latter project, he was

responsible for gas exports to Belgium, France, Switzerland, and Italy. He also represented Gasunie in a joint venture of Dutch gas transmission and distributing interests exploring prospective investment opportunities in Eastern Europe.

Ansari, Homayoon J. Senior Petroleum Specialist. M.Sc., Petroleum Geology. Mr. Ansari has 25 years of public sector experience in Iran, where he held senior governmental positions, including cabinet minister (4 years); chairman of a joint venture between the National Iranian Oil Company (NIOC) and Amoco (3 years); chairman of the Board of Managing Directors of the Telecommunication Company of Iran (7 years); director general of petroleum, Ministry of Petroleum (3 years); governor of Iran to OPEC; chief of the exploration department of NIOC (4 years); and member of the Board of Banks, Public Enterprises, and Universities. He joined the World Bank in 1982 and has conducted policy dialogues on energy sector development issues with senior government officials in Bangladesh, Bulgaria, the Central Asian Republics, Malawi, Pakistan, Romania, Somalia, Sudan, Turkey, Yemen, and Zambia. He provided direct operational support to numbers of ministers and senior officials and carried out appraisal and supervision of oil and gas projects. He has also worked on energy sector institutional restructuring; participated in country economic missions and energy sector reviews; and prepared the relevant chapters for the papers documenting those activities. He is fluent in English and Farsi and has some knowledge of Azeri, French, and Arabic. He has written for the *Bulletin of American*

Association of Petroleum Geologists as well as the publications of the World Petroleum Congress, ECAFE Petroleum Congress, and Iranian Petroleum Institute.

Beaussant, Henri. Energy Economist. M.B.A., H.E.C., Paris; M.A., Political Science, I.E.P., Paris. Mr. Beaussant joined the World Bank in 1990 as an energy economist in the Gas Group of the ESMAP Operations Division and moved to the Oil and Gas Division of the Industry and Energy Department in the reorganization of January 1993. As a specialist in the economic and technical aspects of downstream gas activities (market survey, gas distribution, and gas uses), he has participated in several studies, in particular, in China and Russia (cross-support to the Region within the framework of loan preparation); Southern Africa; and Morocco (feasibility studies for the introduction of natural gas); Bolivia (gas strategy); and Colombia (economics of gas distribution). Before joining the Bank, he worked for 15 years within the Gaz de France (GdF) group, first as a young economist at the Economic and Commercial Vice Presidency (market and promotion studies for the household sector) and then as project manager with GdF's engineering and consultancy subsidiary, Sofregaz (market surveys, distribution studies, etc.). He has worked extensively in Latin America (Ecuador, Peru, Bolivia); Asia (Korea, India); Europe (Greece, Portugal, Turkey); and Africa (Algeria, Morocco, Tunisia, Cameroon). A native speaker of French, he is also fluent in English, with good knowledge of Spanish.

Bhat, Hari. Consultant. Graduated in Geophysics, University of Strasbourg, France; and Geology, University of Bordeaux, France. Mr. Bhat

joined the World Bank in September 1985. He has participated in project identification, preparation, presentation of projects to the Board, and supervision and has written numerous completion reports for projects in Latin American and Sub-Saharan Africa. Before joining the Bank, he worked with contracting companies in mining, public works, and seismic exploration. He began employment with the Société Nationale des Pétroles d'Aquitaine in July 1955 and spent 30 years on assignments in France, Tunisia, Libya, Brazil, and Guatemala. His responsibilities spanned exploration of new sources to export of processed petroleum products.

Daffern, Eric. Leader of the Gas Transmission and Distribution Group of the Oil and Gas Division. B.Sc., Economics, FCIS, IFPA; British. Mr. Daffern has worked for the World Bank for 16 years, most recently as Principal Energy and Industry Specialist in the Southern Africa Department. He has extensive experience in the World Bank's oil and gas operations worldwide and in the privatization of state enterprises in developing countries. He was the deputy chief of the Bank's Petroleum Division and from 1985 to 1987 headed the Bank's first formal efforts to cooperate with the international oil companies. Before joining the Bank, he held a variety of positions in British Gas (1965-74) and later served as assistant director of the Severn-Trent Water Authority (U.K.). He has spoken extensively at public meetings on the oil and gas industry in developing countries.

Gorton, Theodore J. Consultant. Ph.D., Oxford University. Mr. Gorton is a petroleum contracts and negotiations specialist with a background in the petroleum industry (Royal Dutch/





Shell and Amoco), where he worked on new ventures and led negotiation teams in the acquisition of exploration concessions in Qatar, Spain, Congo, and other countries. He been a consultant with the World Bank for more than 6 years, contributing to operations in the energy sector, producing reports, and advising governments on enabling environments, legal/fiscal/contractual frameworks, promotion strategy, and negotiations for petroleum investments. He has lived and worked in a variety of countries and speaks, reads, and writes fluent French, Spanish, and Arabic.

Hamso, Bjorn. Gas Specialist. M.Sc., Economics and Business Administration. Mr. Hamso joined the Bank in 1992 and has worked as an adviser to the Bolivian government, mainly concerning exports of natural gas to Brazil. He also has advised the gas company of Turkmenistan on European gas industry practices and the gas company of Poland on gas import strategies. His work has also included participation as the energy economist on the Bank's team for Lithuania, where he also contributed to an assessment for the G-7 group on the economic consequences of retirement of nuclear reactors that are considered unsafe. Before joining the Bank, he spent 11 years with Statoil, the Norwegian oil company, where he was the manager for gas market analysis and economic evaluation of gas projects. He was involved in the negotiations of most major Norwegian gas export contracts over the last decade. Before entering the oil industry, he was a product manager with the Norwegian Unilever company. His languages include Norwegian, English, and German, and a growing knowledge of Spanish.

Hassan, Moiffak. Petroleum Specialist. B.Sc., M.Sc., Petroleum Engineering, Imperial College, London; D.Sc., Sedimentology, University of Paris. Mr. Hassan has worked for the Bank since 1990. His activities have focused on technical and economic evaluations of oil, gas, and geothermal projects within the framework of sector studies and project appraisal in Myanmar, Vietnam, Philippines, India, Pakistan, Trinidad and Tobago, and Côte d'Ivoire. Before joining the Bank, he spent 24 years in the oil industry, first with TOTAL as a senior reservoir engineer and project manager and then with Schlumberger and several French petroleum service companies as a technical and project adviser. He has worked extensively on India (as leader of TOTAL's advisory group for the development of the Indian offshore); North Sea; Abu Dhabi; Indonesia; Australia; the United States; and the former Soviet Union. He participated in the creation of the European School for Reservoir Management and is a senior visiting lecturer at Imperial College and Delft University. He has published extensively in the fields of reservoir engineering, nuclear logging, and geochemistry. He is fluent in English, French, and Arabic.

Khelil, Chakib. Leader of the Petroleum Group in the Oil and Gas Division. Ph.D., Petroleum Engineering. Mr. Khelil's World Bank experience includes 13 years as petroleum engineer and deputy and Energy Unit chief, with exploratory and oil and gas field development projects in countries including Côte d'Ivoire, Equatorial Guinea, Peru, Ecuador, and Brazil. He has experience in restructuring, divestiture, and privatization in Argentina, Ecuador, Peru, and Bolivia. He has been involved in many

sector reviews and assessments with sector and country operations. Before joining the Bank, he worked for Shell Oil Company and Phillips Petroleum in oil and gas field evaluations and development (United States) and with D.R. McCord & Associates, International Consultants (United States) in oil and gas reservation and production engineering and economics. He was president of a joint venture company of Sonatrach (Algeria National Company) and Core Lab International (consultants in exploration monitoring, field development, and evaluation). He served as president of VALHYD group (Algeria) in charge of Algeria's gas master plan and was responsible for a multi-disciplinary group of local and foreign experts on technical, legal, and financing matters. He also served as adviser to the president of Algeria on hydrocarbon policy issues.

Khwaja, Salahuddin. Senior Gas Specialist. B.Sc. (Hons), Engineering, London; A.C.G.I., London. Since joining the World Bank in 1985, Mr. Khwaja has designed and supervised gas and petroleum development projects in Bangladesh, Brazil, Burma, Indonesia, Korea, Papua New Guinea, and Turkey. He participated in the gas sector studies for Indonesia and Korea, the country economic reports for Papua New Guinea, the energy assessment of the Pacific Island countries, and the gas sector survey for China. He was also the task manager for the project, Indonesia: Gas Development Planning Study. Before joining the Bank, he had 20 years experience in natural gas development in Pakistan, having joined Sui Northern Gas Pipelines, Pakistan's principal gas utility, at its inception in 1964 as an engineer and regional manager and later becoming its marketing manager,

managing director, and chairman of the Board of Directors. He has been a member of the Board of Directors of the Petroleum Institute of Pakistan, Sui Gas Transmission Company, and the Hydrocarbon Institute of Pakistan, and has also been a council member of the International Gas Union.

Kubota, Shigeru. Oil and Gas Specialist (Engineer). Mr. Kubota joined the World Bank in 1991 and has contributed to preparation of the country economic memorandum for Bahrain and the energy sector review for Lithuania. He is acting task manager for Egypt and is involved in project preparation for oil and gas projects in Ukraine, Azerbaijan, and Kazakhstan. He recently completed an assignment as task manager for the Bank's Former Soviet Union/East Europe Energy Trade study. Before joining the Bank, Mr. Kubota worked for Mitsubishi Heavy Industries, Ltd., initially as an engineer and later as a manager of various international oil and gas development projects. He has obtained several technical patents in Japan.

Law, Peter. Gas Specialist. Ph.D., Chemical Engineering, Cambridge University. Mr. Law joined the World Bank in 1990 to work with the ESMAP Gas Group. His World Bank work has focused on the technical, economic, and regulatory aspects of natural-gas-related projects, mainly in Eastern Europe, the former Soviet Union, South and South east Asia, and South America. He has also produced several publications on natural gas development and pricing. Before joining the Bank, he worked for 20 years in the natural gas and chemicals industries; among his experiences were management roles for British Gas in the design of U.K. and offshore natural gas processing and





infrastructure facilities, and participation in various international technoeconomic consultancy studies at the country level spanning the full range of natural gas activities, mainly in the Middle East and Turkey. Earlier, he was employed by Imperial Chemical Industries and worked on the design, construction, and operation of large-scale petrochemicals production facilities (including methanol, ammonia, and polymers) both in U.K. and continental Europe. Languages in addition to English include Spanish and Portuguese.

Mayorga-Alba, Eleodoro. Petroleum Engineer, Energy Specialist. M.Sc., Business Administration, Ph.D., Economics. Mr. Mayorga-Alba joined the Africa Technical Department of the World Bank two years ago and has conducted regional studies and participated in project evaluations. Before joining the Bank, he accumulated 15 years of experience in the oil and gas industry, mainly in corporate planning, project evaluation, negotiation of contracts, and policy advice and formulation. Past jobs include CEO-general manager of PetroPeru; energy economist at the U.N. Economic Committee for Europe; and consultant to UNCTAD, ILO, UNDP, and the World Bank. He is fluent in Spanish, English, and French and has recently published articles in *Energy Policy* and *Natural Resources Forum*.

Morsli, Hannachi. Senior Petroleum Engineer. Degree in Mining and Engineering. Mr. Morsli joined the World Bank in 1981. His experience includes design and supervision of oil and gas projects in India, Bangladesh, China, Poland, the Philippines, Turkey, Egypt, and Morocco. He participated in gas sector studies focusing on upstream aspects. He

also carried out procurement activities associated with project implementation supervision. Before joining the Bank, he worked as an operations manager (upstream) for the Algerian oil company Sonatrach for about 8 years. Earlier, he worked as an engineer in field services with an international contractor (Schlumberger Group) for about 3 years.

Nayar, T. S. Principal Chemical Engineer. M.Sc., Chemical Engineering, University of Birmingham, U.K. Mr. Nayar joined the World Bank in November 1981 and worked in the Industry and Energy Division of the Africa Technical Department and the Oil and Gas Division. His Bank working experience is extensive and includes activities in Bolivia, Chad, Colombia, Costa Rica, Ecuador, Egypt, Ethiopia, Ghana, Guinea Bissau, Jamaica, Kazakhstan, Kenya, Madagascar, Mozambique, Nigeria, Pakistan, Romania, Sierra Leone, Somalia, Tanzania, Trinidad, Tunisia, Turkey, Uganda, Ukraine, Uruguay, Uzbekistan, Yemen, Zaire, Zambia, and Zimbabwe. Before joining the Bank, he worked for 15 years in refinery operations, project planning, process design, preparation of feasibility reports, cost estimation, crude and product procurement, project management, technology selection, and procurement and negotiations for technical assistance. He also worked for 6 years as a government adviser on all petroleum refining and related matters and as a member of the Board of Directors of two joint-venture refining companies, one joint-venture lube-oil-additive manufacturing company, and one engineering consulting company. His earlier working experience includes activities in Abu Dhabi, France, Germany, India, Indonesia, Iran, Iraq, Italy, Japan, Libya, Russia,

Singapore, the United States, and the United Kingdom..

O'Connor, Thomas E. Principal Petroleum Engineer. M.Sc., Geology, 1961. Mr. O'Connor joined the World Bank Petroleum Projects Division in 1985. His Bank experience focuses on the upstream petroleum components of the national and regional energy sectors, including their technical evaluations and the related governmental policy issues required for effective implementation. Currently, he provides support in Azerbaijan, Bangladesh, Ethiopia, and Kazakhstan and serves as the point of external oil industry contact for Eritrea/Ethiopia and Somalia. He has completed energy assessments for the upstream petroleum subsector in Ghana and for the entire petroleum component of the energy sector in Namibia. Before joining the Bank, he worked for Amoco Domestic and International Exploration, 1963-80, and for Amoil International, 1980-84.

Okimi, Hiroki. Gas Specialist. M.Sc., Fuel and Chemical Engineering, University of Tokyo and Northwestern University. Mr. Okimi joined the World Bank in March 1992. He had worked for Osaka Gas, Japan, for more than 25 years, most recently as director of its International Business Department. His extensive experience in the Japanese gas industry includes LNG terminal planning, construction, and operation; LNG contracts and related research; gas utilization and appliances; energy analyses; long-term corporate planning for the gas utility; international transfer of gas distribution and utilization technologies; business diversification planning and operation; and corporate acquisition. He was vice chairman of the Technical Program

Committee of the International Gas Research Conference in its 1987-89 triennial. He has worked in Japan, the United States, and the republics of the former Soviet Union.



Shirazi, Mohsen. Senior Gas Specialist. Mr. Shirazi has worked for the World Bank since 1983 in projects involving 15 developing countries and has participated in many gas projects, energy sector reviews, and energy sector adjustment loans. He organized a four-part roundtable and workshop series for senior representatives of developing countries and executives of oil and gas industries and related institutions to discuss problems and propose solutions relating to gas development. He helped to prepare a comprehensive World Bank paper on gas industry development in developing countries. Mr. Shirazi began his career in the energy industry as a chemical engineer in 1956. Before joining the Bank, he worked for Phillips Petroleum Company as Director of Frontier Projects and for the National Iranian Oil Company and National Iranian Gas Company (NIGC) in technical managerial positions and in positions involving organization, methods, and system planning. He helped form NIGC in 1965, the catalyst for development of gas industry in Iran, and worked for this company from its inception until he became a member of the Board in 1974, and deputy chairman and managing director in 1978. Throughout his career in the oil and gas industries he has been involved in the development of large gas projects such as Iranian Gas Trunklines (IGAT I and IGAT II), projects developed to meet domestic requirements as well as to export natural gas from Iran to the former Soviet Union and Western Europe on swap basis. He has also held leadership



roles in numerous domestic and international gas, LPG, and LNG negotiations. He was chairman of the Gas Committee of OPEC from 1975 to 1977 and represented Iran at the Council of International Gas Union (IGU) from 1969 to 1979. In 1983 he helped to establish the ongoing cooperation between the Bank and IGU. He also represented the Bank at the Council of IGU from 1983 to 1987.

Svensson, Bent R. Energy Economist. M.Sc., Economics. Mr. Svensson has worked for the World Bank since 1991. His main areas of activity have included restructuring, institutional, and regulatory issues (in China, Indonesia, and Russia); economic analyses and pricing (in Egypt,

Iran, and Russia); and gas trade options (in Eastern Europe). Before joining the Bank he was a gas policy expert at the International Energy Agency of the OECD (1987-91); head of a division of KOMGAS (the Finance and Economics Division in the Natural Gas Distribution Companies in Denmark, 1983-87); and a senior researcher (1980-83), project manager (1976-80), and associate professor at the Copenhagen School of Economics and Business Administration (1976-87). Among his publication credits are main authorship of *Natural Gas Prospects and Policies* (OECD 1991). Languages spoken include English, French, German, and some Spanish.



“Brazil-Bolivia Gas Project”

ANTONIO CAJUEIRO COSTA
Commercial Coordinator
Petrobras, Brazil

-BRAZIL-BOLIVIA NATURAL GAS PROJECT-

Challenges and Solutions

by Antonio S. Cajueiro Costa, PETROBRÁS

This paper was prepared for presentation at the Second InterAmerican Petroleum and Gas Conference (IPGC '93), Dallas, Texas, 27-28 September, 1993.

Summary

PETROBRÁS, the Brazilian/International Integrated Oil and Gas Company, is leading a US\$ 4 billion natural gas project

The goal of this paper is to identify Project challenges and propose solutions.

It starts with fundamentals. Natural gas' share in Brazilian primary energy demand is only 2%. Economic aspects and environmental concerns, however, are changing this picture. For the Bolivian economy to be linked to a relatively huge market, in the long term, is certainly a suitable decision. Besides, this Project will promote regional integration, within and outside Marcosur economies.

Reserves, market data and economics give support to a feasible Project. Financial structure is the main challenge. INTERGAS, a new subsidiary of PETROBRÁS is opened for 49% stock to private sector participation.

As an integrated Project, many opportunities will be generated during construction and operation. E & P, pipeline and downstream investments could bring different investors to different sectors.

-BRAZIL-BOLIVIA NATURAL GAS PROJECT-

Challenges and Solutions

A US\$ 4 billion Project, including investments in upstream, a network of integrated pipelines and a virgin market development will certainly start to change two or more South American economies. That's the real meaning of the Brazil / Bolivia natural gas Project.

The goal is to identify Project challenges and propose solutions. It starts with Project fundamentals for both sides - Brazil and Bolivia, - besides promoting a regional integration. It also presents the Basic Project Data, Economics, Financial Structure, Political Mobilization, and next steps.

1. FUNDAMENTALS

1.1 BRAZILIAN SIDE

Natural gas' share in Brazilian primary energy demand is only 2% of the total energy consumption. This modest share can be explained by three factors. First, the high level of hydropower potential used to generate electricity, so thermal plants only turn on in the peaks, or during dry seasons. Second, low domestic prices of LPG and lack of cold weather in almost the whole territory (except in the Southern Region, where no gas was available) didn't stimulate the residential gas canalization projects. There are gas residential distribution systems, only in Rio de Janeiro city and in a few areas of Sao Paulo city. Third, Brazilian hydrocarbon reserves are mainly oil reserves with a low gas / oil rate.

Economic aspects and environmental concerns, however are changing this picture. Industrial segments that need gas for competitive reasons claim for this superior fuel. For example, gas is essential for the decorative ceramics industry in Santa Catarina State, which is responsible for 60% of Brazilian production - the third in the world ranking.

Besides, environmental concerns, mainly in metropolitan areas, recommend gas for the industrial sector, to replace fuel oil, in order to reduce sulfur emissions. Special programs using gas as a fuel in cabs and buses are being implemented to reduce smoke and CO emissions. Also, in order to preserve the Atlantic Forest, gas will replace wood, a fuel used in a lot of Southern region industries.

A short term complementary source for electrical generation will be gas thermal plants, instead of hydro. They have competitive costs, lower investments and faster implementation than hydro.

Moreover, Brazil as a net importer of hydrocarbons - 1.2 MM barrels/day of oil products consumption and 650 thousand barrels/day of crude oil domestic production - is diversifying its energy sources. In other words, this Project means for Brazil one reliable energy source in the neighborhood.

1.2 BOLIVIAN SIDE

For the Bolivian economy, natural gas represents its most important merchandise to export. The old contract with Argentina expired and has been renewed, on a temporary basis, because Argentina is a natural gas net exporter. So, to be linked to a relatively huge market, in the long term, is certainly a suitable decision, from both economic and strategic points of view.

Also, by the take-or-pay Contract (YPFB - PETROBRÁS-Feb. 1993), gas sale revenues will be more than double current revenues. In other words, Bolivia will be able, soon, to have a great jump, using its natural gas reserves in order to develop its economy.

1.3 REGIONAL INTEGRATION

The network of pipelines from Bolivia to Brazil will be integrated to the existing pipelines from the Campos and Santos Basins to the Rio and São Paulo markets. PETROBRÁS will start soon to build another pipeline from Rio to Minas Gerais, in order to link domestic and imported natural gas sources to another important market

Bolivian natural gas will penetrate into Brazilian territory, using the western frontier, at Mato Grosso do Sul State. The pipeline will run to São Paulo, where it will be integrated to existing pipelines. It will also run to the Southern Region of Brazil to Paraná, Santa Catarina and Rio Grande do Sul States.

Rio Grande do Sul, with a border to Argentina, could be, in the future, the entrance to Argentinean natural gas availabilities. Another possible route could be using the existing infrastructure between Argentina and Bolivia.

Another important natural gas source is Peru, in the Camisea region, with a 10 T of reserve. Anyway, the mentioned YPFB - PETROBRÁS Contract allows PETROBRÁS the right to transfer natural gas from other sources through Bolivian territory pipelines.

In short, the natural gas Brazil - Bolivia Project will be the start of a great network of pipelines to a relatively big market. It will increase trade, will develop exchange opportunities and will promote regional integration in South America, within and outside Marcosur economies.

2. BASIC PROJECT DATA

2.1 RESERVES

Proven, probable and possible Bolivian reserves are as follows:

	Tcf	Bl. cum	% Existing fields	% Existing fields + New discoveries
Proven	4.2	117	72%	39%
Probable	1.7	45	28%	16%
Possible	4.8	134		45%

The take-or-pay Contract (YPFB - PETROBRÁS) volumes are 282 MMcf/d (8 MMcmd) in the first year of delivery, increasing during 8 years up to 565 MMcf/d (16 MMcmd) or 100 Mboed.

Proven reserves added to the 50% from probable reserves are sufficient to support the Contract to Brazil, plus the next 4 years supply to Argentina, as well as Bolivian internal consumption during the Project period.

2.2 MARKET

The Southern and Southeastern regions have the most important economic activities in Brazil. They represent together: 82% of the Industrial Product or US\$ 137 bi; 75% of the Gross Product or US\$ 315 bi; and 70% of overall energy consumption or 2.5 MMboed.

Potential demand in these regions is estimated to be 1,586 MMcf/d (45 Mcum/d) in the year 2000 and 2,333 MMcf/d (66 MMcum/d) in the year 2005. The domestic availability of 318 MMcf/d plus the importation from Bolivia in the year 2000 will result in a room to another source.

The Industrial sector was selected as the main workable demand. So, 90% of natural gas workable demand was considered in replacement of residual fuel oil and only 10% in replacement of biomass in the industrial sector and gas in other sectors (residential, commercial and urban transport utilizations). Nowadays, it is under consideration to use gas in thermal plants in order to generate electricity, on a complementary basis. Gas thermal plants will be an essential alternative, in order for Project start-up and for financial purposes.

2.3 PIPELINE

The Bolivia - Brazil pipeline has a whole 2,200 miles (3,400 km), 28" diameter in the frontier and 14" in Rio Grande do Sul terminal section (55 compressors - in 14 sites), with 155,000 hp.

The Conceptual Project is to minimize investments, in order to pump up the contractual volumes and to get a competitive transport tariff.

The current situation is: the Engineering Basic Project is ready. It is under discussion with the communities, by public audiences, the details about the right of way where the main pipeline is going on, and the environmental aspects. Comprehensive studies, based on international and domestic construction and operations standards, are under conclusion for areas of special ecological interest, including Mato Grosso do Sul flood areas, Atlantic forest in the Southern Region.

3. ECONOMICS

3.1 INVESTMENTS AND COSTS

Upstream investments are about 880 US\$, in order for the production development of the existing fields. Pipeline investment is about 2.0 bi US\$ 400 MM on the Bolivian side and 1.6 MM US\$ on the Brazilian side. Taxes on equipment expenses represent 14% of the total investment.

A breakdown of pipeline investment is:

pipes - 78%
compression facilities - 15%
auxiliary systems - 2.5%
land rights - 0.5%
engineering and supervision - 4%

Average transport tariff is estimated by US\$ 1.8 / MMBTU, using:

IRR = 12%;
no taxes on equipment purchases;
volume starts-up: 1st year = 50% contract volumes;
2nd year = 75% contract volumes;
volumes 3rd to 20th year = 95% contract volumes;
The whole picture for pipeline construction: 30 months.

3.2 PRICING

Reference gas price FOB at the entrance to the pipeline in Bolivia is US\$ 0.90 / MMBTU. This reference price changes according to a formula price, related to a fuel oil no. 6 basket quotation (US and European market, 50% high sulfur and 50 % low sulfur).

The city-gate price to sell to the Distributor Companies will be at least the importation cost or product FOB from Bolivia plus a transportation tariff. This price level is competitive with the same fuel oil basket imported direct to the market to the final consumers. For example, in 1992,

imported fuel oil average price from the same sources was 3.47 US\$ / MMBTU. Gas city-gate prices of US\$2.70 / MMBTU give a 0.77 US\$ / MMBTU margin for the Distribution Companies, for 1:1 consumers fuel oil/gas prices. Project city-gate prices compare to a 1992 average US city gate (US\$ 2.70/MMBTU), or a 1992 average European border price (US\$ 3.15) MMBTU.

The basic idea is that the final consumers could receive natural gas at a competitive price to the same basket of fuel oil no. 6 imported into Brazilian territory .

As city-gate natural gas prices and Distributors fuel oil prices are established by the Federal Government, a regulatory framework must be implemented in order to have, for all players involved in the Project, a transparent pricing policy, on a permanent basis.

4. FINANCIAL STRUCTURE

4.1 FINANCIAL ADVISOR

The Project size, by itself, defines the complexity of its financial structure. A contract with a Financial Advisor was mandatory. So, PETROBRÁS chose C. S. First Boston to be the Project Financial Advisor, on the Brazilian side.

The Financial Advisor's scope of work can be summarized by the 5 following phases:

Phase I - Evaluate information the Project

Upstream, pipeline and downstream information can give the Advisor the basic elements to study the integrated Project feasibility. They review major Project structuring issues. They have meetings with major prospective participants in the Project. Then, they present a Go-no-Go Report to PETROBRÁS.

Phase II - Propose ways to mitigate the risks

First, the Advisor will develop Project risk mitigation / allocation alternatives. Second, the Advisor will propose the Security Package. They will help PETROBRÁS in negotiations with prospective participants in the Project.

Phase III - Structure financial plan.

The objective is to structure a general financing plan for the project. Potential investors and lenders will be identified by the Advisor.

Phase IV - Promotion.

The phase of the Project marketing to investors (equity and debt) in Brazil, Bolivia and internationally.

Phase V - Execution of financing plan, including final negotiations, documentation and closing Contracts.

4.2 DEBT FINANCING ENVIRONMENT

The financial market's view is undergoing significant changes. Commercial banks are awaiting agreement on the Brady plan. Export Credit Agencies are contingent on the Paris Club rescheduling agreement, mainly for public sector exposure.

Given the high level of funds required, multi-source financing is key. Multi-lateral Agencies (the World Bank, Inter American Development Bank (IDB) and various Eximbanks) have expressed interest in the project.

4.3 PROJECT INCORPORATION

PETROBRÁS is going to establish a subsidiary, INTERGAS (51% PETROBRÁS and 49% stocks to private investors). PETROBRÁS has under study the sharing of management control between the partners, accordingly with the Brazilian legislation for the gas sector.

A possible structure is the Project Company (INTERGAS) could be the responsible for gas purchase from YPFB (on the border of Bolivia - Brazil), for sales to the Distributors, and for the transportation and construction of the pipeline on Brazilian territory. On the Bolivian side, PETROBRÁS and strategic partners would have an Operation and Maintenance (O & M) Contract to YPFD. On the Brazilian side, PETROBRÁS would have a Construction Contract and an O & M Contract to the Project Company.

5. POLITICAL MOBILIZATION

Both the Brazilian and Bolivian Governments are showing political mobilization to comply with the Project.

After the February 1993 Contract, two important actions were taken by the Brazilian Government. Firstly, in March, 1993, signing of a Protocol of Understanding among PETROBRÁS, the Energy Secretaries of the 7 States involved in the Project, and the Federal Government. It defines a Contractual basis for natural gas sales to the State Distributors, like pricing conception, the role of each part, fiscal incentives for equipment purchases for pipeline construction, and others. Second, also

in March, 1993, four Ministers sent the President of Brazil a memorandum, recommending a pricing policy for natural gas and fuel oil no. 6 related to international levels. The implementation of this policy can be proved by the 28% real increase in domestic prices (above the inflation rate) of fuel oil and natural gas city-gate since April to September, 1993. Domestic city-gate price is now US\$ 2.66 / MMBTU.

PETROBRÁS is also operating a Protocol of Intentions with SPG - Sociedade Privada do Gás - a Private Sector Representative, firmed by April, 1993.

The new Bolivian Government, inaugurated in August, 1993, is publicly expressing the firm decision to go ahead with the project. In a recent speech, at the September 13-15th Natural Gas Seminar in Rio de Janeiro, the Bolivian Energy Secretary expressed the Bolivian Government's commitment to undertake the contractual obligations.

6. NEXT STEPS

The next phase of the Financial Advisor's work is to structure the security package. As part of this package, natural gas sale and purchase contracts between PETROBRÁS and the 7 States are under negotiations. Currently, there is an agreement on 80% of the contracts.

The pricing policy regulatory framework for natural gas and fuel oil no. 6 in the domestic market is under discussion with the Federal Government, the Distributors and representatives of final users. Fiscal incentives are under discussion with Federal and State Governments.

PETROBRÁS is looking for partners for this Project. Given the amount of funding, the main challenge is the Financial Structure. INTERGAS, with 49% stock opened to the private sector, will incorporate the Project.

As an integrated Project, many opportunities will be generated, during the construction and during operations. E & P, pipeline and downstream investments could bring different investors to different sectors.

-BRAZIL-BOLIVIA NATURAL GAS PROJECT-

Challenges and Solutions

by Antonio S. Cajueiro Costa, PETROBRÁS

This paper was prepared for presentation at the Second InterAmerican Petroleum and Gas Conference (IPGC "93), Dallas, Texas, 27-28 September, 1993.

Summary

PETROBRÁS, the Brazilian/International Integrated Oil and Gas Company, is leading a US\$ 4 billion natural gas project

The goal of this paper is to identify Project challenges and propose solutions.

It starts with fundamentals. Natural gas' share in Brazilian primary energy demand is only 2%. Economic aspects and environmental concerns, however, are changing this picture. For the Bolivian economy to be linked to a relatively huge market, in the long term, is certainly a suitable decision. Besides, this Project will promote regional integration, within and outside Marcosur economies.

Reserves, market data and economics give support to a feasible Project. Financial structure is the main challenge. INTERGAS, a new subsidiary of PETROBRÁS is opened for 49% stock to private sector participation.

As an integrated Project, many opportunities will be generated during construction and operation. E & P, pipeline and downstream investments could bring different investors to different sectors.

-BRAZIL-BOLIVIA NATURAL GAS PROJECT-

Challenges and Solutions

A US\$ 4 billion Project, including investments in upstream, a network of integrated pipelines and a virgin market development will certainly start to change two or more South American economies. That's the real meaning of the Brazil / Bolivia natural gas Project.

The goal is to identify Project challenges and propose solutions. It starts with Project fundamentals for both sides - Brazil and Bolivia, - besides promoting a regional integration. It also presents the Basic Project Data, Economics, Financial Structure, Political Mobilization, and next steps.

1. FUNDAMENTALS

1.1 BRAZILIAN SIDE

Natural gas' share in Brazilian primary energy demand is only 2% of the total energy consumption. This modest share can be explained by three factors. First, the high level of hydropower potential used to generate electricity, so thermal plants only turn on in the peaks, or during dry seasons. Second, low domestic prices of LPG and lack of cold weather in almost the whole territory (except in the Southern Region, where no gas was available) didn't stimulate the residential gas canalization projects. There are gas residential distribution systems, only in Rio de Janeiro city and in a few areas of Sao Paulo city. Third, Brazilian hydrocarbon reserves are mainly oil reserves with a low gas / oil rate.

Economic aspects and environmental concerns, however are changing this picture. Industrial segments that need gas for competitive reasons claim for this superior fuel. For example, gas is essential for the decorative ceramics industry in Santa Catarina State, which is responsible for 60% of Brazilian production - the third in the world ranking.

Besides, environmental concerns, mainly in metropolitan areas, recommend gas for the industrial sector, to replace fuel oil, in order to reduce sulfur emissions. Special programs using gas as a fuel in cabs and buses are being implemented to reduce smoke and CO emissions. Also, in order to preserve the Atlantic Forest, gas will replace wood, a fuel used in a lot of Southern region industries.

A short term complementary source for electrical generation will be gas thermal plants, instead of hydro. They have competitive costs, lower investments and faster implementation than hydro.

Moreover, Brazil as a net importer of hydrocarbons - 1.2 MM barrels/day of oil products consumption and 650 thousand barrels/day of crude oil domestic production - is diversifying its energy sources. In other words, this Project means for Brazil one reliable energy source in the neighborhood.

1.2 BOLIVIAN SIDE

For the Bolivian economy, natural gas represents its most important merchandise to export. The old contract with Argentina expired and has been renewed, on a temporary basis, because Argentina is a natural gas net exporter. So, to be linked to a relatively huge market, in the long term, is certainly a suitable decision, from both economic and strategic points of view.

Also, by the take-or-pay Contract (YPFB - PETROBRÁS-Feb. 1993), gas sale revenues will be more than double current revenues. In other words, Bolivia will be able, soon, to have a great jump, using its natural gas reserves in order to develop its economy.

1.3 REGIONAL INTEGRATION

The network of pipelines from Bolivia to Brazil will be integrated to the existing pipelines from the Campos and Santos Basins to the Rio and São Paulo markets. PETROBRÁS will start soon to build another pipeline from Rio to Minas Gerais, in order to link domestic and imported natural gas sources to another important market

Bolivian natural gas will penetrate into Brazilian territory, using the western frontier, at Mato Grosso do Sul State. The pipeline will run to São Paulo, where it will be integrated to existing pipelines. It will also run to the Southern Region of Brazil to Paraná, Santa Catarina and Rio Grande do Sul States.

Rio Grande do Sul, with a border to Argentina, could be, in the future, the entrance to Argentinean natural gas availabilities. Another possible route could be using the existing infrastructure between Argentina and Bolivia.

Another important natural gas source is Peru, in the Camisea region, with a 10 T of reserve. Anyway, the mentioned YPFB - PETROBRÁS Contract allows PETROBRÁS the right to transfer natural gas from other sources through Bolivian territory pipelines.

In short, the natural gas Brazil - Bolivia Project will be the start of a great network of pipelines to a relatively big market. It will increase trade, will develop exchange opportunities and will promote regional integration in South America, within and outside Marcosur economies.

2. BASIC PROJECT DATA

2.1 RESERVES

Proven, probable and possible Bolivian reserves are as follows:

	Tcf	Bil. bbl	% Existing fields	% Existing fields + New discoveries
Proven	4.2	117	72%	39%
Probable	1.7	45	28%	16%
Possible	4.8	134		45%

The take-or-pay Contract (YPFB - PETROBRÁS) volumes are 282 MMcf/d (8 MMcmd) in the first year of delivery, increasing during 8 years up to 565 MMcf/d (16 MMcmd) or 100 Mboed.

Proven reserves added to the 50% from probable reserves are sufficient to support the Contract to Brazil, plus the next 4 years supply to Argentina, as well as Bolivian internal consumption during the Project period.

2.2 MARKET

The Southern and Southeastern regions have the most important economic activities in Brazil. They represent together: 82% of the Industrial Product or US\$ 137 bi; 75% of the Gross Product or US\$ 315 bi; and 70% of overall energy consumption or 2.5 MMboed.

Potential demand in these regions is estimated to be 1,586 MMcf/d (45 Mcmd) in the year 2000 and 2,333 MMcf/d (66 MMcmd) in the year 2005. The domestic availability of 318 MMcf/d plus the importation from Bolivia in the year 2000 will result in a room to another source.

The Industrial sector was selected as the main workable demand. So, 90% of natural gas workable demand was considered in replacement of residual fuel oil and only 10% in replacement of biomass in the industrial sector and gas in other sectors (residential, commercial and urban transport utilizations). Nowadays, it is under consideration to use gas in thermal plants in order to generate electricity, on a complementary basis. Gas thermal plants will be an essential alternative, in order for Project start-up and for financial purposes.

2.3 PIPELINE

The Bolivia - Brazil pipeline has a whole 2,200 miles (3,400 km), 28" diameter in the frontier and 14" in Rio Grande do Sul terminal section (55 compressors - in 14 sites), with 155,000 hp.

The Conceptual Project is to minimize investments, in order to pump up the contractual volumes and to get a competitive transport tariff.

The current situation is: the Engineering Basic Project is ready. It is under discussion with the communities, by public audiences, the details about the right of way where the main pipeline is going on, and the environmental aspects. Comprehensive studies, based on international and domestic construction and operations standards, are under conclusion for areas of special ecological interest, including Mato Grosso do Sul flood areas, Atlantic forest in the Southern Region.

3. ECONOMICS

3.1 INVESTMENTS AND COSTS

Upstream investments are about 880 US\$, in order for the production development of the existing fields. Pipeline investment is about 2.0 bi US\$ 400 MM on the Bolivian side and 1.6 MM US\$ on the Brazilian side. Taxes on equipment expenses represent 14% of the total investment.

A breakdown of pipeline investment is:

pipes - 78%
compression facilities - 15%
auxiliary systems - 2.5%
land rights - 0.5%
engineering and supervision - 4%

Average transport tariff is estimated by US\$ 1.8 / MMBTU, using:

IRR = 12%;
no taxes on equipment purchases;
volume starts-up: 1st year = 50% contract volumes;
2nd year = 75% contract volumes;
volumes 3rd to 20th year = 95% contract volumes;
The whole picture for pipeline construction: 30 months.

3.2 PRICING

Reference gas price FOB at the entrance to the pipeline in Bolivia is US\$ 0.90 / MMBTU. This reference price changes according to a formula price, related to a fuel oil no. 6 basket quotation (US and European market, 50% high sulfur and 50 % low sulfur).

The city-gate price to sell to the Distributor Companies will be at least the importation cost or product FOB from Bolivia plus a transportation tariff. This price level is competitive with the same fuel oil basket imported direct to the market to the final consumers. For example, in 1992,

imported fuel oil average price from the same sources was 3.47 US\$ / MMBTU. Gas city-gate prices of US\$2.70 / MMBTU give a 0.77 US\$ / MMBTU margin for the Distribution Companies, for 1:1 consumers fuel oil/gas prices. Project city-gate prices compare to a 1992 average US city gate (US\$ 2.70/MMBTU), or a 1992 average European border price (US\$ 3.15) MMBTU.

The basic idea is that the final consumers could receive natural gas at a competitive price to the same basket of fuel oil no. 6 imported into Brazilian territory .

As city-gate natural gas prices and Distributors fuel oil prices are established by the Federal Government, a regulatory framework must be implemented in order to have, for all players involved in the Project, a transparent pricing policy, on a permanent basis.

4. FINANCIAL STRUCTURE

4.1 FINANCIAL ADVISOR

The Project size, by itself, defines the complexity of its financial structure. A contract with a Financial Advisor was mandatory. So, PETROBRÁS chose C. S. First Boston to be the Project Financial Advisor, on the Brazilian side.

The Financial Advisor's scope of work can be summarized by the 5 following phases:

Phase I - Evaluate information the Project

Upstream, pipeline and downstream information can give the Advisor the basic elements to study the integrated Project feasibility. They review major Project structuring issues. They have meetings with major prospective participants in the Project. Then, they present a Go-no-Go Report to PETROBRÁS.

Phase II - Propose ways to mitigate the risks

First, the Advisor will develop Project risk mitigation / allocation alternatives. Second, the Advisor will propose the Security Package. They will help PETROBRÁS in negotiations with prospective participants in the Project.

Phase III - Structure financial plan.

The objective is to structure a general financing plan for the project. Potential investors and lenders will be identified by the Advisor.

Phase IV - Promotion.

The phase of the Project marketing to investors (equity and debt) in Brazil, Bolivia and internationally.

Phase V - Execution of financing plan, including final negotiations, documentation and closing Contracts.

4.2 DEBT FINANCING ENVIRONMENT

The financial market's view is undergoing significant changes. Commercial banks are awaiting agreement on the Brady plan. Export Credit Agencies are contingent on the Paris Club rescheduling agreement, mainly for public sector exposure.

Given the high level of funds required, multi-source financing is key. Multi-lateral Agencies (the World Bank, Inter American Development Bank (IDB) and various Eximbanks) have expressed interest in the project.

4.3 PROJECT INCORPORATION

PETROBRÁS is going to establish a subsidiary, INTERGAS (51% PETROBRÁS and 49% stocks to private investors). PETROBRÁS has under study the sharing of management control between the partners, accordingly with the Brazilian legislation for the gas sector.

A possible structure is the Project Company (INTERGAS) could be the responsible for gas purchase from YPFB (on the border of Bolivia - Brazil), for sales to the Distributors, and for the transportation and construction of the pipeline on Brazilian territory. On the Bolivian side, PETROBRÁS and strategic partners would have an Operation and Maintenance (O & M) Contract to YPFD. On the Brazilian side, PETROBRÁS would have a Construction Contract and an O & M Contract to the Project Company.

5. POLITICAL MOBILIZATION

Both the Brazilian and Bolivian Governments are showing political mobilization to comply with the Project.

After the February 1993 Contract, two important actions were taken by the Brazilian Government. Firstly, in March, 1993, signing of a Protocol of Understanding among PETROBRÁS, the Energy Secretaries of the 7 States involved in the Project, and the Federal Government. It defines a Contractual basis for natural gas sales to the State Distributors, like pricing conception, the role of each part, fiscal incentives for equipment purchases for pipeline construction, and others. Second, also

in March, 1993, four Ministers sent the President of Brazil a memorandum, recommending a pricing policy for natural gas and fuel oil no. 6 related to international levels. The implementation of this policy can be proved by the 28% real increase in domestic prices (above the inflation rate) of fuel oil and natural gas city-gate since April to September, 1993. Domestic city-gate price is now US\$ 2.66 / MMBTU.

PETROBRÁS is also operating a Protocol of Intentions with SPG - Sociedade Privada do Gás - a Private Sector Representative, firmed by April, 1993.

The new Bolivian Government, inaugurated in August, 1993, is publicly expressing the firm decision to go ahead with the project. In a recent speech, at the September 13-15th Natural Gas Seminar in Rio de Janeiro, the Bolivian Energy Secretary expressed the Bolivian Government's commitment to undertake the contractual obligations.

6. NEXT STEPS

The next phase of the Financial Advisor's work is to structure the security package. As part of this package, natural gas sale and purchase contracts between PETROBRÁS and the 7 States are under negotiations. Currently, there is an agreement on 80% of the contracts.

The pricing policy regulatory framework for natural gas and fuel oil no. 6 in the domestic market is under discussion with the Federal Government, the Distributors and representatives of final users. Fiscal incentives are under discussion with Federal and State Governments.

PETROBRÁS is looking for partners for this Project. Given the amount of funding, the main challenge is the Financial Structure. INTERGAS, with 49% stock opened to the private sector, will incorporate the Project.

As an integrated Project, many opportunities will be generated, during the construction and during operations. E & P, pipeline and downstream investments could bring different investors to different sectors.

**“Evolution of the National Oil Companies
In Latin America”**

JOHN E. TREAT
Vice President
Booz, Allen and Hamilton

National Oil Companies in Latin America: Challenges for the Future



**Inter American
Petroleum and
Gas Conference**

Dallas, Texas
September 1993

John Elting Treat

BOOZ•ALLEN & HAMILTON INC.

IN THE ELECTRIC UTILITY SECTOR, PRIVATIZATION HAS ALSO BEEN AN ACTIVE ISSUE, CREATING OPPORTUNITIES FOR THOSE PRIVATE COMPANIES WITH GAS RESERVES TO ENTER INTO POWER GENERATION

SELECTED ELECTRIC UTILITIES: PRIVATIZATION STATUS		OBJECTIVES	CURRENT STATUS
Complete Privatization	● Segba		● UK Regionals ● Japanese Electric Companies ● Power Gen ● National Power ● Alaska Power Authority
Partial Privatization	● NSW Electricity ● MVMT	● Electricorp ● Manila Electric ● Turkish Electric Companies ● Jamaican Public Service Co. ● Czech Electric Company ● Norwegian Electric Company ● Portuguese Electric Company ● Singapore Electric Company	● Tenaga ● Thai Electricity Companies ● ENEL ● Korea Electric Companies
De-Monopolization		● NPC ● Indian Electric Companies ● Pakistan Electric Companies ● EGAT ● ENGL	
Commercialization		● Taipower ● PLN ● China Electric Companies ● India Electricity Boards ● Vietnamese Electric Company ● EdF	● Partial Privatization ● Complete Privatization

CONCLUSION...

IMPACT ON WORLD OIL MARKETS

- The changing role of NOCs may bring a closer link between regional markets as competition breaks down political barriers
- Strategic alliances between NOCs and International Oil Companies (majors and independents) on the model of the BP/Statoil Alliance or the recent Pemex/Shell J.V. at Deer Park will become more common
- The rate of information and technology diffusion will accelerate

WHILE MEXICO HAS TAKEN A MORE CAUTIOUS APPROACH

- Pemex will remain 100% state-owned
- Chemicals production has been opened to private investment
- Electricity has been opened up for independent power

VENZUELA IS TAKING A MIDDLE ROAD BETWEEN ARGENTINA AND MEXICO

WITHIN THE ASIA/PACIFIC REGION, JAPAN LED THE WAY IN PRIVATIZATION OVER A CENTURY AGO. MORE RECENTLY, NEW ZEALAND HAS PRIVATIZED A VARIETY OF COMPANIES, BUT MOVES BY OTHER COUNTRIES HAVE BEEN MORE CAUTIOUS, FOR EXAMPLE:

- **INDONESIA** – Has opened up the refining sector to foreign joint revenues
- **MALAYSIA** – Shares in Tenaga have been put on sale and the privatization of Petronas is under study
- **THAILAND** – Partial privatization of electric generation and PTT are being considered
- **PHILIPPINES** – Privatization of PNOC is under discussion
- **SINGAPORE** – Sale of government shares in SPC was completed in 1990

IN EUROPE, THE COMPLETE PRIVATIZATION OF BP HAS BEEN FOLLOWED BY SALES OF MAJOR SHARES IN BRITISH GAS, TOTAL AND REPSOL; ENI WILL BE THE NEXT MAJOR NOC ON THE AUCTION BLOCK; HOWEVER, THE LESSONS OF THE UK EXPERIENCE ARE NOT YET CLEAR

- BRITISH GAS – Creation of a private monopoly has been the source of continuing tension between BG and Ofgas
- BRITISH TELECOM – Competition is still very weak
- NATIONAL POWER/POWER GEN – Better situation than gas, but concerns about lack of true competition
- BP – Clearly a success, but Kuwait was penalized for helping out in a soft market

**IN THE WESTERN HEMISPHERE, ARGENTINA HAS TAKEN A VERY
AGGRESSIVE APPROACH, COMBINING PRIVATIZATION WITH
DIVESTITURE AND LIBERALIZATION OF ENERGY MARKETS:**

- YPF – Privatization is already underway in a free-market environment
- GAS DEL ESTADO – Has been privatized
- ELECTRICITY (Segba) – Is next on President Menem's agenda

MOREOVER, PRIVATIZATION OF A MONOPOLY CAN CREATE AS MANY PROBLEMS AS IT SOLVES...

- **Need for government regulation of the new, private monopoly**
- **Lack of competition fails to reduce costs**
- **Private monopoly resists government regulation — creating major tensions**

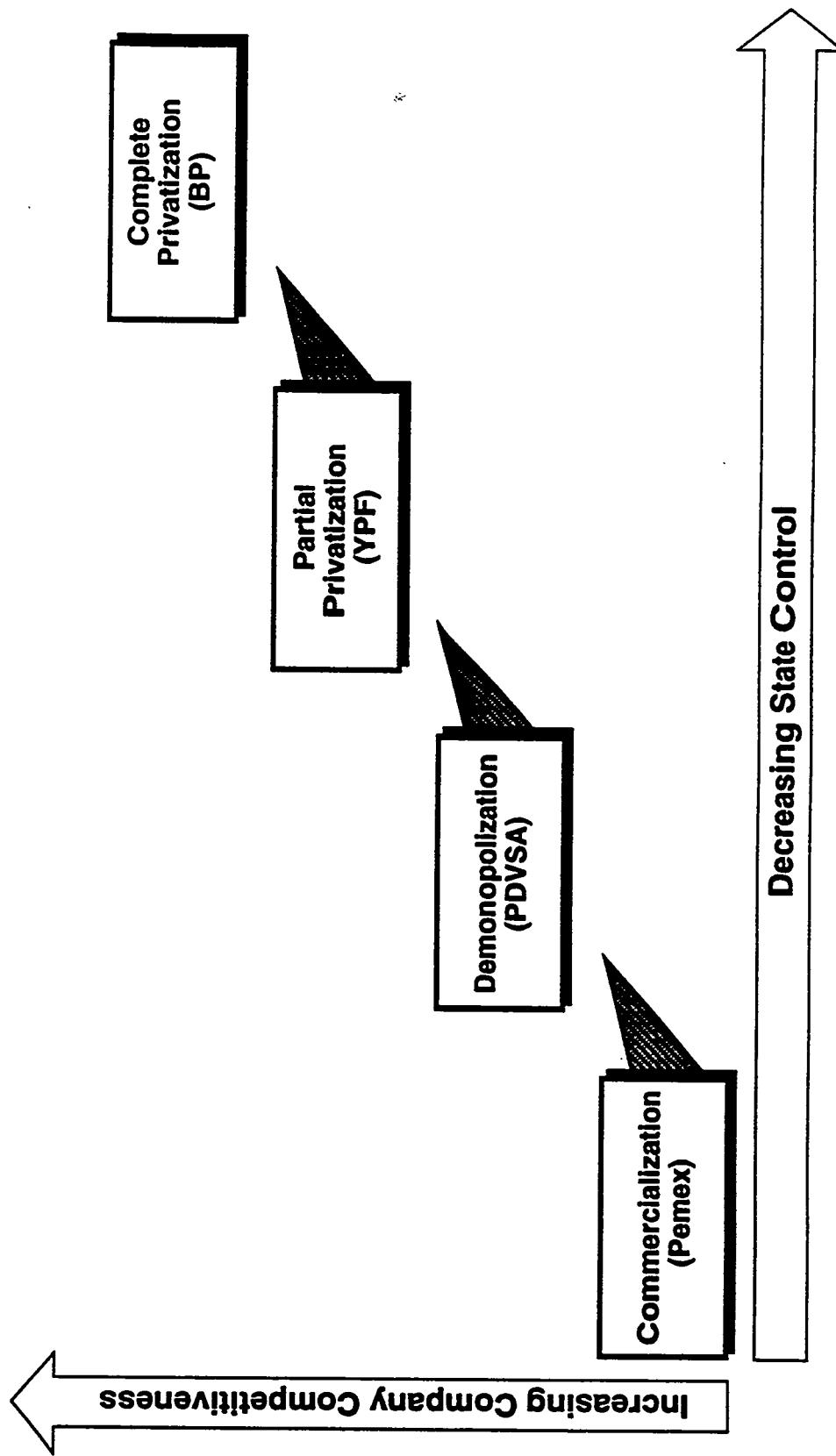
IN FACT, IN THE OIL AND GAS SECTOR, WHERE NATIONAL OIL COMPANIES (NOCS) CONTROL OVER 90% OF THE WORLD'S OIL AND GAS RESERVES, VERY FEW NOCs HAVE BEEN FULLY PRIVATIZED...

SELECTED INTERNATIONAL OIL AND GAS COMPANIES: PRIVATIZATION STATUS

		OBJECTIVES						CURRENT STATUS	
		Complete Privatization			Partial Privatization			Monopolization	
	● Petronas				● PetroCanada ● Repsol ● Total			● Gas del Estado	● Complete Privatization
● Rosneftegaz ● Gazprom		● YPF ● ENI ● NNPC ● MOL ● Greek Refineries		● Neste Oy ● YPF	● PNOC ● OMV ● OGDC ● PTT				
● QGPC				● Myanmar Oil ● Petroperu ● Sonatrach ● INOC ● Petrobangla ● NZOG ● NIOC ● Laos ● PNG ● Morocco	● Yonimco ● PDVSA ● Pertamina ● PetroVietnam ● CNOOC ● Statoil ● EGPC ● Norsk Hydro ● Cambodia				
● ADNOC ● Petrobras ● Saudi/Aramco ● Sinochem				● KPC ● CPC ● Pdco ● PEMEX			● Partial Privatization	● Complete Privatization	

OBJECTIVES

**HOWEVER, GOVERNMENTS ARE EMPLOYING A VARIETY OF OPTIONS
SHORT OF COMPLETE PRIVATIZATION TO CAPTURE THESE BENEFITS**



IN MANY CASES, COMPLETE PRIVATIZATION IS NOT FEASIBLE EITHER BECAUSE OF EXOGENOUS FACTORS OR BECAUSE THE COMPANY IS IN NEED OF MAJOR RESTRUCTURING

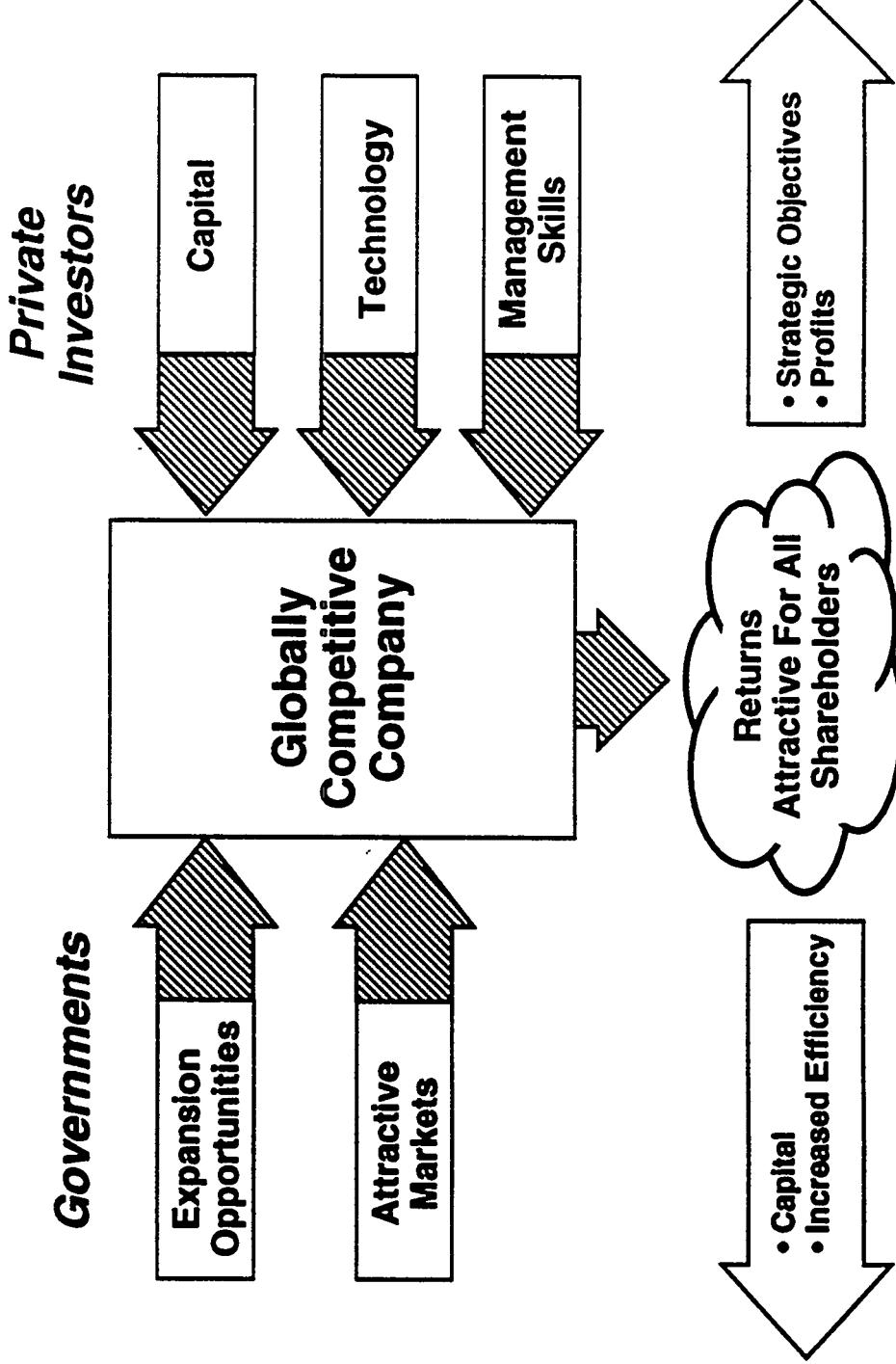
- **Company too large**
 - Not enough qualified local investors
 - Overly risky for other potential investors
- **Lack of management skills/governance**
- **Intractable labor disputes**
- **Massive environmental liabilities**
- **Lack of rational economic infrastructure**
- **Excessive tax burden as a private company**
- **Investor concerns about political risk**
- **Lack of legal/regulatory structure and/or track record
(especially in case of monopolies)**
 - “Lost link in a chain” risk

GOVERNMENT INTEREST IN PRIVATIZATION HAS BEEN DRIVEN PRIMARILY BY THE NEED TO REDUCE NATIONAL DEBTS (OR MEET FUTURE CAPITAL REQUIREMENTS) AND BY THE SUPERIOR PERFORMANCE OF MARKET-BASED ECONOMIES IN THE FACE OF THE COLLAPSE OF COMMUNIST AND SOCIALIST SYSTEMS

REASONS FOR PRIVATIZATION

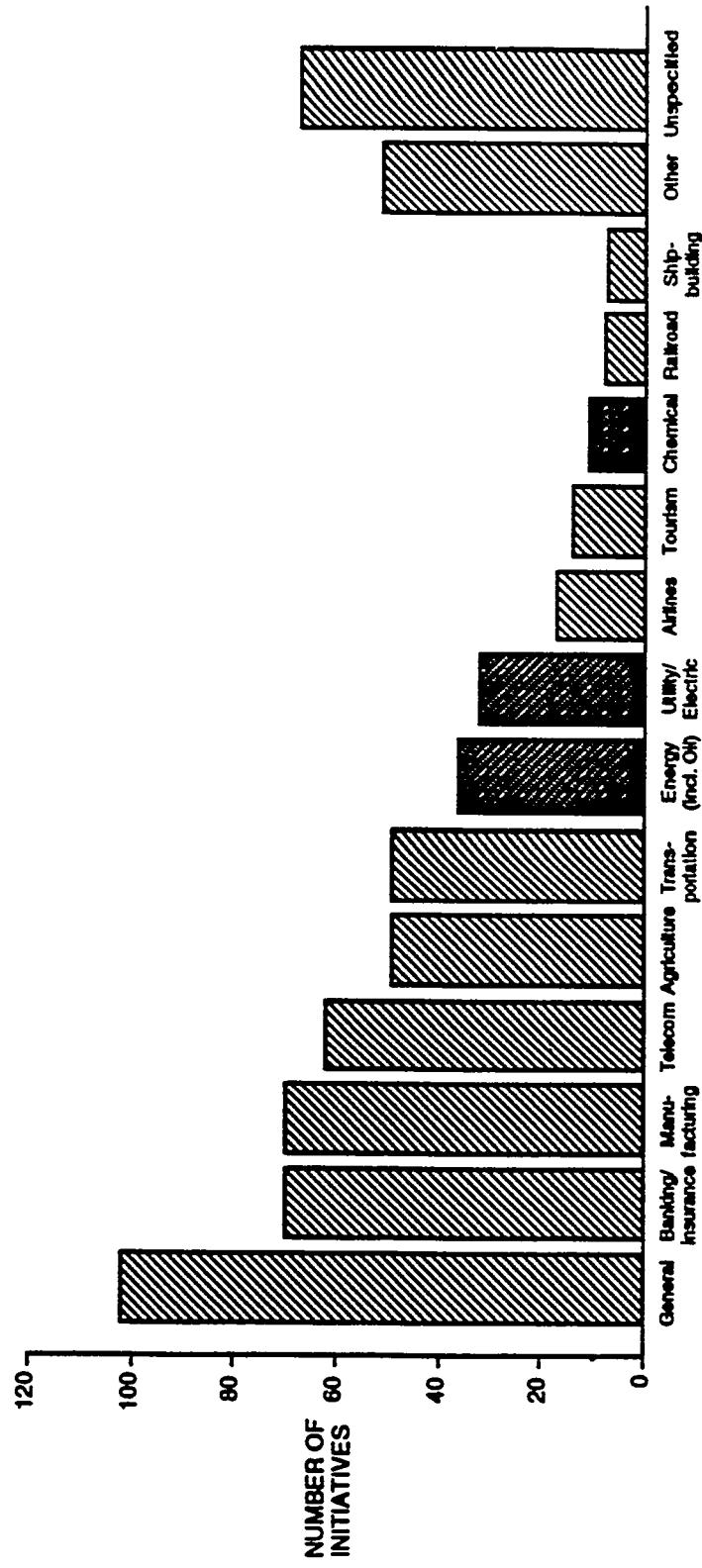
- Reduce national debts
- Lower future energy costs
- Raise future energy export earnings
- Increase domestic competition
- Improve national productivity
- Broaden pool of shareholders
- Stimulate local capital markets
- Improve management skills
- Attract international capital
- Reduce corruption
- Increase tax revenues
- Focus government on policy issues *versus* operations

IF PROPERLY PLANNED AND EXECUTED, PRIVATIZATION CAN
CREATE GLOBALLY COMPETITIVE COMPANIES AND PROVIDE
SUBSTANTIAL BENEFITS . . .



IN FACT, PRIVATIZATION OF OIL, CHEMICALS AND OTHER ENERGY COMPANIES LAGS WELL BEHIND THE PACE IN BANKING, MANUFACTURING, TELECOMMUNICATIONS AND SEVERAL OTHER SECTORS

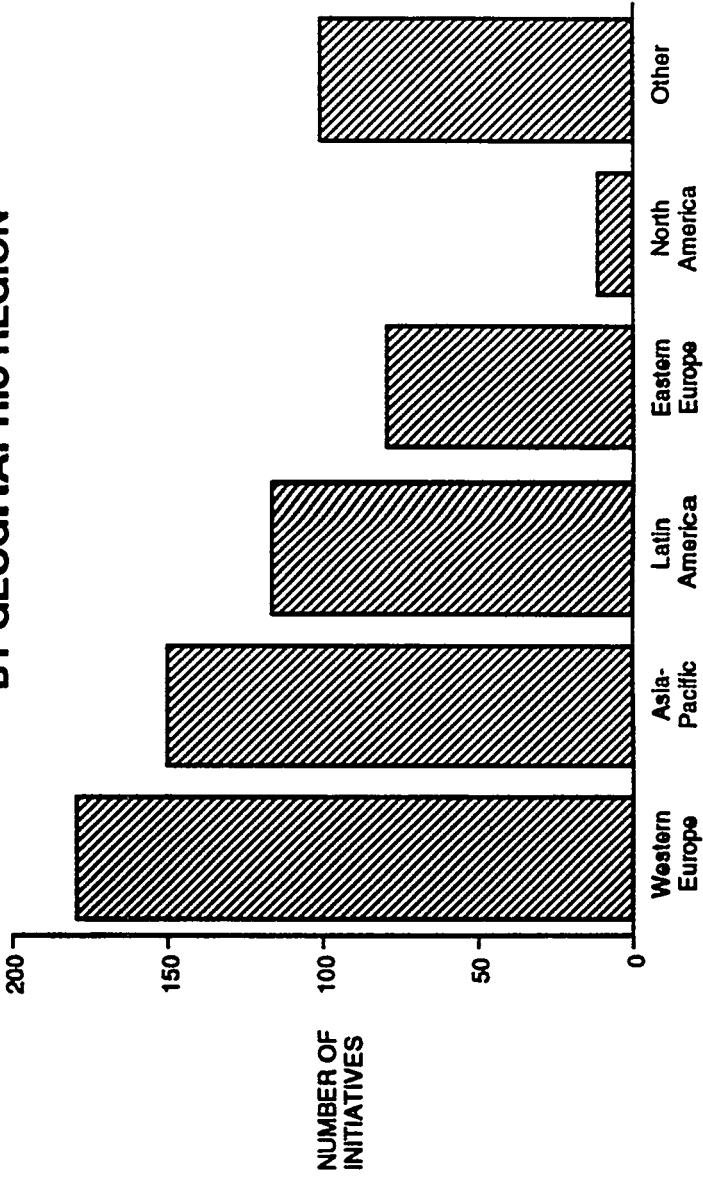
1990 PRIVATIZATION INITIATIVES BY INDUSTRY



Source: *Privatization International, B&H Privatization Database*

ON A REGIONAL BASIS EUROPE HAS LED THE WAY IN PRIVATIZATION, ALTHOUGH THE ACTION IS SHIFTING FROM WEST TO EAST AS THE CENTRAL EUROPEAN AND RUSSIAN PROGRAMS ARE BEING IMPLEMENTED; ASIA PACIFIC HAS BEEN THE SECOND MOST ACTIVE AREA, WHILE LATIN AMERICA IS PICKING UP STEAM, LED BY MEXICO AND ARGENTINA

PRIVATIZATION INITIATIVES BY GEOGRAPHIC REGION



Source: *Privatization International, B&H Privatization Database*

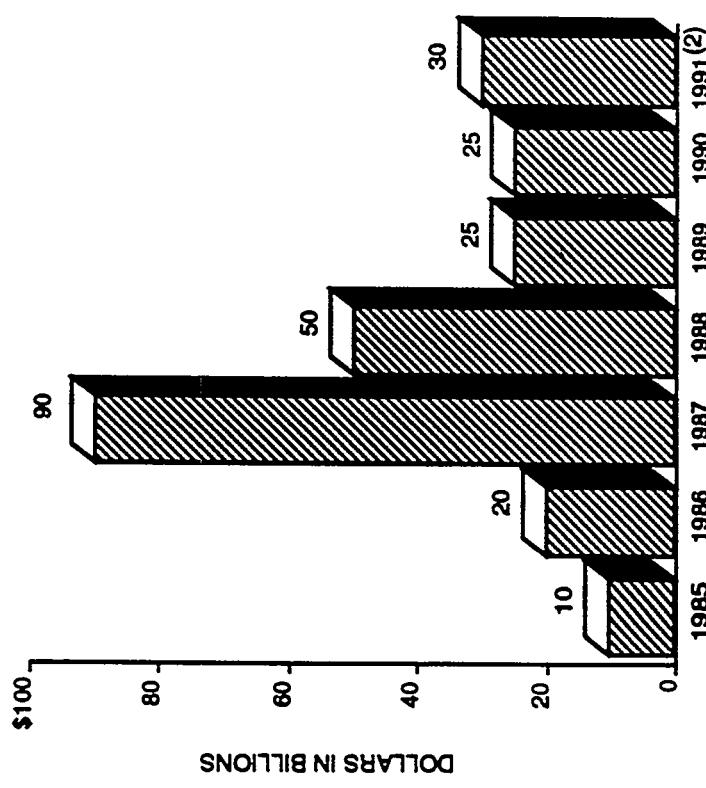
HOWEVER, GLOBALIZATION ALSO POSES SERIOUS MANAGEMENT CHALLENGES:

- Need to develop "local" managers
- Difficulty of integrating "foreigners" into home office management processes and structures
- Difficulties of communication across language, cultural, and time barriers
- Differences of management styles and procedures
- Other cultural conflicts

IN FACT, MOST OIL COMPANIES, WHETHER NOCS OR IOCS, HAVE BEEN SLOW TO ADAPT THEIR HUMAN RESOURCES POLICIES TO THE REALITIES OF GLOBALIZATION

PRIVATIZATION – THE PRIVATIZATION PHENOMENON IS NOT CONFINED TO OIL AND GAS AND THE TREND IS ACCELERATING, RISING FROM AN AVERAGE OF \$25 BILLION IN 1989 AND 1990 TO OVER \$30 BILLION IN 1991

ANNUAL TRANSACTION VALUE (1)

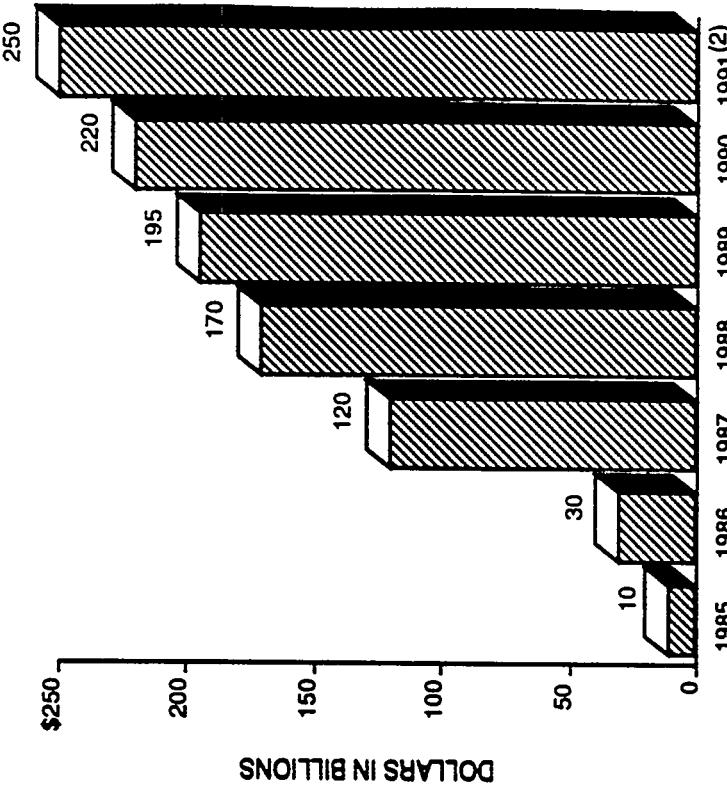


(1): Sales completed during calendar year

(2): Estimated

Source: Reason Foundation

CUMULATIVE TRANSACTION VALUE



**IF INTEGRATION CANNOT BE JUSTIFIED ON A RISK-REDUCTION BASIS,
IT CAN BE VALUABLE AS A FOCUSED STRATEGY DESIGNED TO
REDUCE COSTS OR TO OPEN NEW MARKETS; FOR EXAMPLE:**

- PDVSA's investments have been in large part designed to expand the outlets for heavy Venezuela crudes
- Pemex's recent conclusion of a joint venture with Shell has the same rationale for heavier Mexican crudes

GLOBALIZATION – MOVING OUTSIDE THE "HOME COUNTRY" HAS BEEN POPULAR WITH A WIDE VARIETY OF NOCS. IN MANY CASES, IT HAS OCCURRED AS PART OF AN INTEGRATION STRATEGY.

- **FOR MOST CONSUMER COUNTRY NOCs:**
The strategy has been driven by a desire to diversify E&P risk – in effect backward integration; This has been particularly true of those NOCs with poor and/or declining domestic resource bases
- **FOR MOST PRODUCER COUNTRY NOCs:**
The motivator has been downstream (forward) integration to secure market outlets

BACKWARD INTEGRATION—SEEKING TO ADD PRODUCTION TO FEED AN ESTABLISHED REFINING AND MARKETING NETWORK—APPEARS A MORE ATTRACTIVE PROPOSITION BECAUSE THE RETURNS ON UPSTREAM ASSETS HAVE TENDED TO BE HIGHER THAN THOSE ON DOWNSTREAM ASSETS. THIS STRATEGY HAS BEEN PURSUED BY A NUMBER OF NOCS.

EXAMPLE:

- PETROBRAS

WE BELIEVE THE CASE FOR DOWNSTREAM (OR FORWARD) INTEGRATION RESTS ON LESS SOLID GROUND; TRADITIONAL ARGUMENTS FOR DOWNSTREAM INTEGRATION INCLUDE:

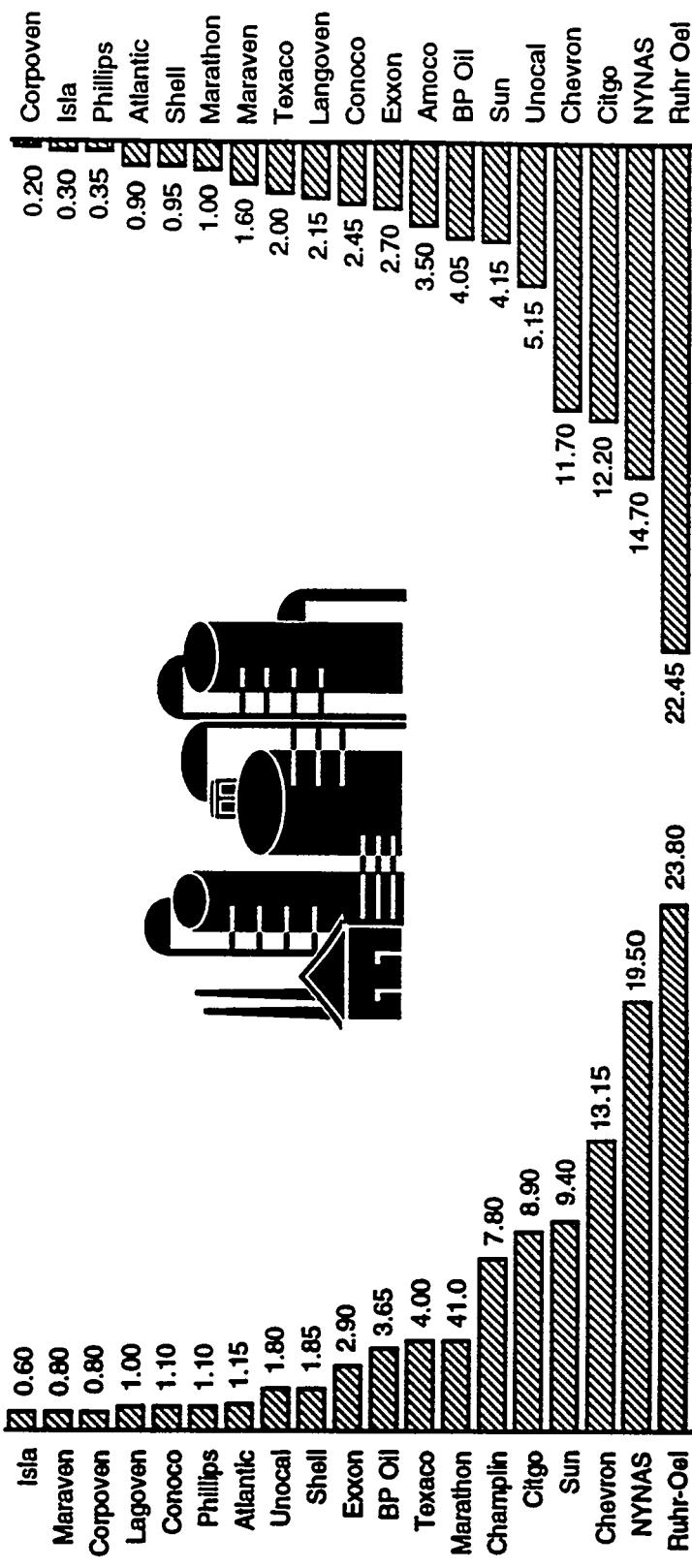
- Reduction in profit volatility
- Guaranteed throughput
- Improved timing of investments
- Better logistics
- Creation of new, captive market outlets

IN THEORY, FLUCTUATIONS IN UPSTREAM PROFITS ARE SUPPOSED TO OFFSET THE VARIABILITY OF DOWNSTREAM MARGINS; IN PRACTICE, THE RECORD IS NOT SO CLEAR

NOCS CAN BE WORLD CLASS PERFORMERS – FOR EXAMPLE, PDVSA HAS ACHIEVED AN ENVIALE RECORD IN REFINERY SAFETY

ACCIDENTS PER MILLION MAN-HOURS IN REFINING

1989



OTHER EXAMPLES INCLUDE REPSOL (TRADING), ELF (PRODUCTION TECHNOLOGY) AND PETROBRAS (DEEP WATER DRILLING/ PRODUCTION)

INTEGRATION – A NUMBER OF NOCS ARE ACTIVELY PURSUING INTEGRATION BOTH UPSTREAM AND DOWNSTREAM OF THEIR EXISTING BASE. SOME ARE DOING SO WHILE STAYING WITHIN THEIR HOME COUNTRY:

EXAMPLE:

- PDVSA – LNG

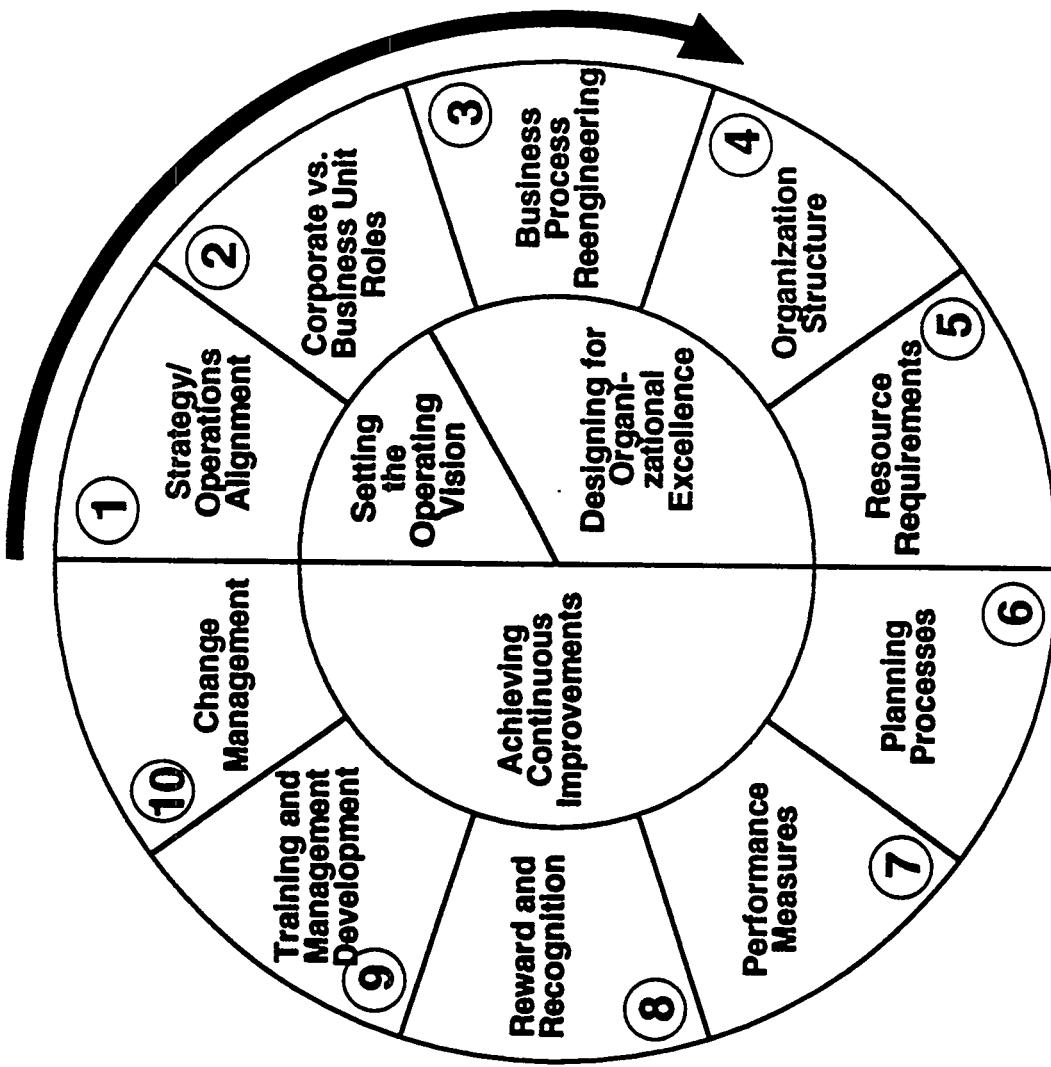
OTHERS HAVE GONE BEYOND THEIR OWN BORDERS...

RATIONALIZATION—ANOTHER KEY STRATEGY FOCUSES ON ELIMINATING INEFFICIENT AND INEFFECTIVE ACTIVITIES. THIS OBJECTIVE CAN BE MET BY ASSET SALES, OUTSOURCING, CONSOLIDATION, AND DOWNSIZING. EXAMPLES INCLUDE:

PDVSA Consolidation of Champlin and Citgo in North America

YPF Sale of marginal fields

OPTIMIZATION—ONCE THE CORE BUSINESS HAVE BEEN DEFINED, NOCS NEED TO OPTIMIZE THEM BY BUILDING AND ENHANCING THEIR CAPABILITIES IN THESE CORE AREAS.



METAMORPHOSIS INVOLVES MORE THAN A CHANGE IN ATTITUDES, IT ALSO REQUIRES SIGNIFICANT CHANGES IN MANAGEMENT STYLE

Existing Bureaucratic Attitudes/ Management Style

- Delegate work downward;
push decision upward
- No or low standards
- Lack of initiative and follow-through
- Undemanding of subordinates, and not responsible for their performance
- Unresourceful in solving problems
- Risk advance
- Focus on activities versus results
- Excessive structure, but little control

Desired Attitudes/ Management

- Delegate—but keep involved
- Take positions and responsibilities
- Strong quality control
- Set high standards;
Coach to help improve
- Take initiative; follow-through
- Confront problems; be creative
- Discipline at all levels

FOCUS:

"Follow Procedures"

"Achieve Results"

ATTITUDE:

"The System Can't Be Changed" → ***"We Can Make a Difference"***

...AND IN MANAGEMENT PROCESSES:

BUREAUCRATIC PROCESS CHARACTERISTICS	GOAL-ORIENTED BUSINESS PROCESS CHARACTERISTICS
<p>• Goals ambiguous; not focused or non-existent</p> <p>• Goals not well communicated throughout organization</p> <p>• Little relevance to actual decision-making</p> <p>• Strategy is informal and not linked to business planning</p> <p>• Responsibility fragmented throughout the organization with significant gaps and overlaps</p> <p>• MBO objectives set, but not planned for or measured</p> <p>• Planning is bottom-up versus top-down</p> <p>• Planning often equated with budgeting</p>	<ul style="list-style-type: none"> • GOAL SETTING – a well-defined and realistic mission and set of strategic goals for the government and NOC <p>• STRATEGIC PLANNING – specific strategies which guide development of the organization and provide a common base for responsibility center planning and achievement of company goals</p> <ul style="list-style-type: none"> • RESPONSIBILITY assignments for specific goals and strategies <ul style="list-style-type: none"> • PLANNING AND BUDGETTING tied to objectives of the responsibility center
<p>• Strategic and management control measures often absent; predominantly task control measures</p> <p>• Measures typically budget versus actual which only measures completeness, not success of plans</p> <p>• Performance evaluation is subjective</p> <p>• No accountability/lack of management control</p> <p>• Management reporting system typically financial or budget-oriented; lacks operational data</p>	<ul style="list-style-type: none"> • PERFORMANCE MEASUREMENT for each line of business and manager <ul style="list-style-type: none"> • COMPENSATION tied to performance <ul style="list-style-type: none"> • MANAGEMENT REPORTING for strategic and management decision-making, not just financial/budgets

COMMERCIALIZATION—NOCS SHOULD FIRST BE TRANSFORMED FROM BUREAUCRACIES TO BUSINESSES—COMMERCIALIZATION REQUIRES BOTH:

- **INSULATION** – Placing a buffer between NOC operations and the government
- **METAMORPHOSIS** – Transforming the culture of the NOC from a bureaucracy to a business

LET'S LOOK AT EACH OF THESE IN TURN...

IN THE ABSENCE OF PRIVATIZATION, INSULATION CAN BEST BE PLAYED BY THE CREATION OF A HOLDING COMPANY WHICH WILL EXERCISE THE STATE'S SHAREHOLDING RIGHTS WHILE PROTECTING THE OPERATING COMPANY FROM POLITICAL INTERFERENCE AND MICROMANAGEMENT

Government/Ministry Role

- National energy/industrial policy
- Long-range planning
- External Relations
 - Multilateral
 - Regional
 - Bilateral
- Intragovernmental coordination
- Oversight/control

Holding Company Role

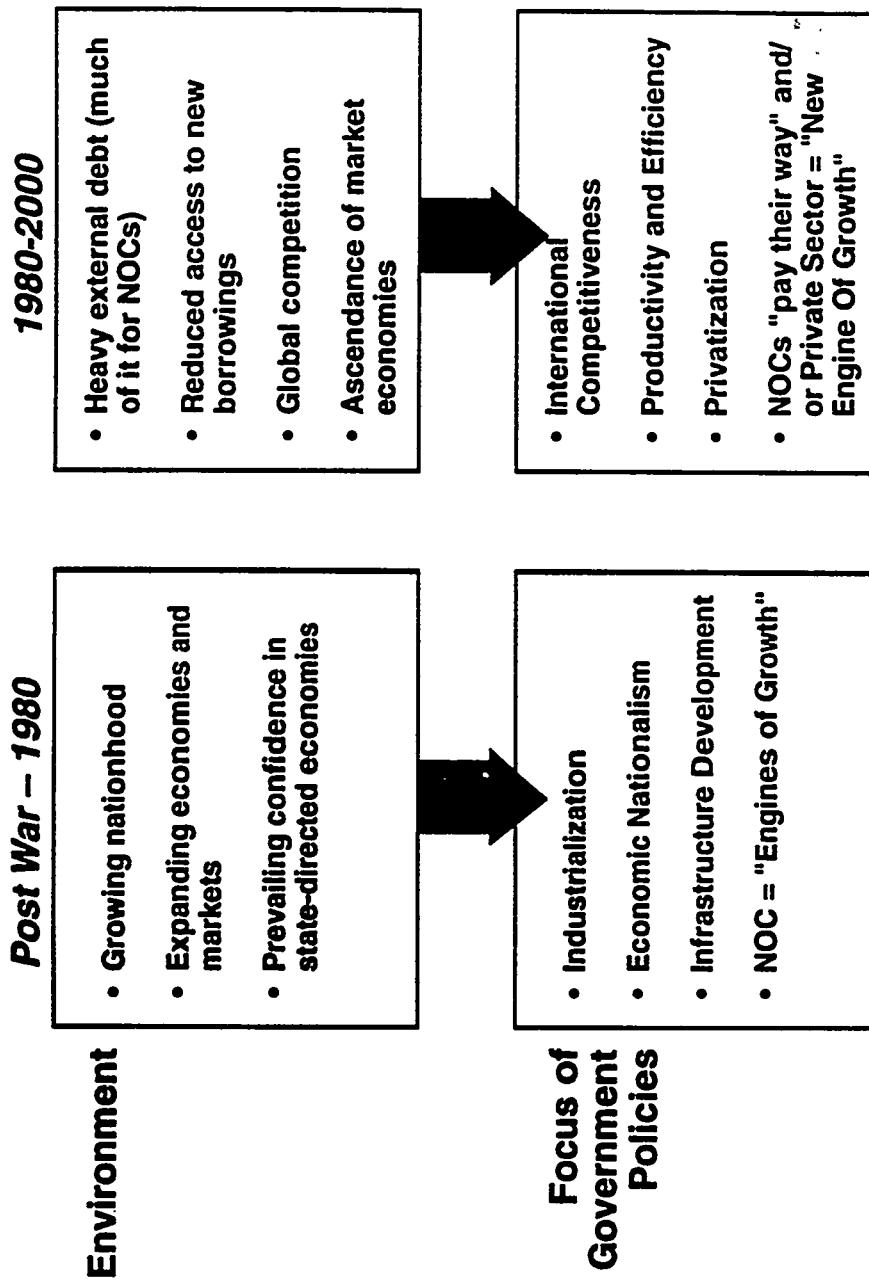
- Coordination among operating companies
- Finance and investment allocation
- Management development
- Audit
- Negotiation of new joint ventures
- Medium-term planning

Operating Company Role

- Profit and loss responsibility
- Company operations
- Administrative support functions
- Joint venture participation
- Short-term planning
- Budgeting

IT IS CRITICAL THAT THE ROLES BE CLEARLY DEFINED

NATIONAL OIL COMPANIES ARE FACING A WIDE RANGE OF STRATEGIC CHALLENGES OVER THE NEXT DECADE



NOCS WHICH FAIL TO ADAPT, RISK A LOSS OF MARKET SHARE AS THEIR MORE FLEXIBLE COLLEAGUES EQUIP THEMSELVES FOR PETROLEUM'S SECOND CENTURY...

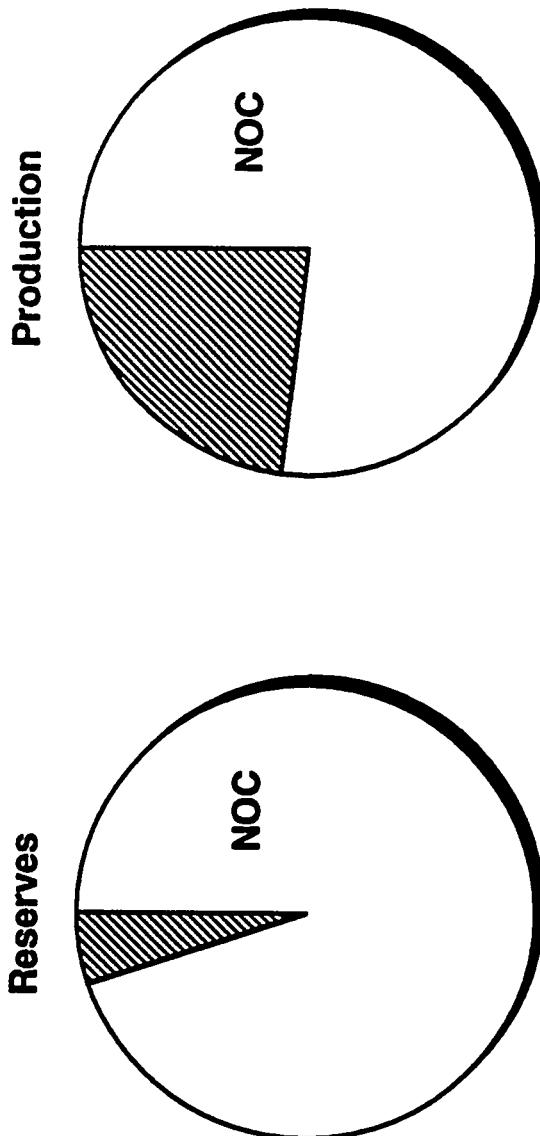
**IN RESPONSE TO THESE CHALLENGES, THERE ARE SIX STRATEGIES
WHICH NOCS SHOULD CONSIDER TO PROSPER IN THE 1990s:**

- Commercialization
- Rationalization
- Optimization
- Integration
- Globalization
- Privatization

LET'S DISCUSS EACH IN MORE DETAIL...

BUT, NOC CONTROL OF NATURAL GAS RESERVES AND PRODUCTION IS ALSO DOMINANT

NOC SHARE OF WORLD NATURAL GAS RESERVES & PRODUCTION

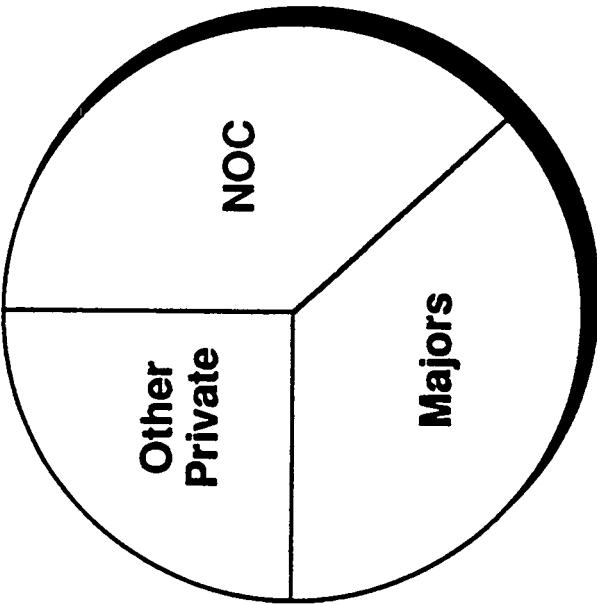


OVER THE PAST TWO DECADES, THE NOC ROLE HAS GROWN DRAMATICALLY; IN THE NEXT DECADE, THEY WILL BECOME EVER MORE IMPORTANT PLAYERS IN THE INTERNATIONAL PETROLEUM MARKET

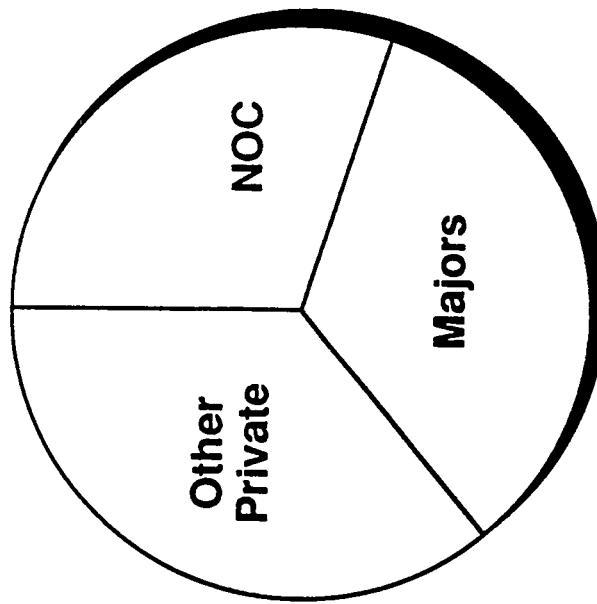
AND IN THE DOWNSTREAM, THEY ARE PLAYING AN INCREASING ROLE

NOC

REFINING CAPACITY



PRODUCT SALES



WITHIN LATIN AMERICA, NATIONAL OIL COMPANIES PLAY A DOMINANT ROLE

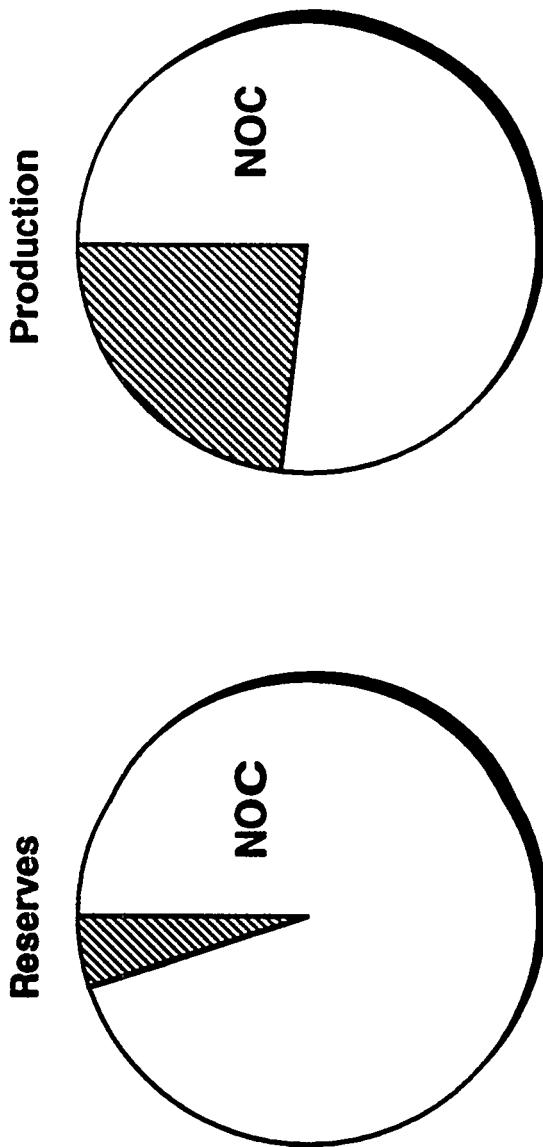
MAJOR LATIN AMERICAN NATIONAL OIL COMPANIES

World Rank

- PDVSA 3
- Pemex 4
- YPF 22
- Petrobras 36
- Ecopetrol 42
- Petroperu 48

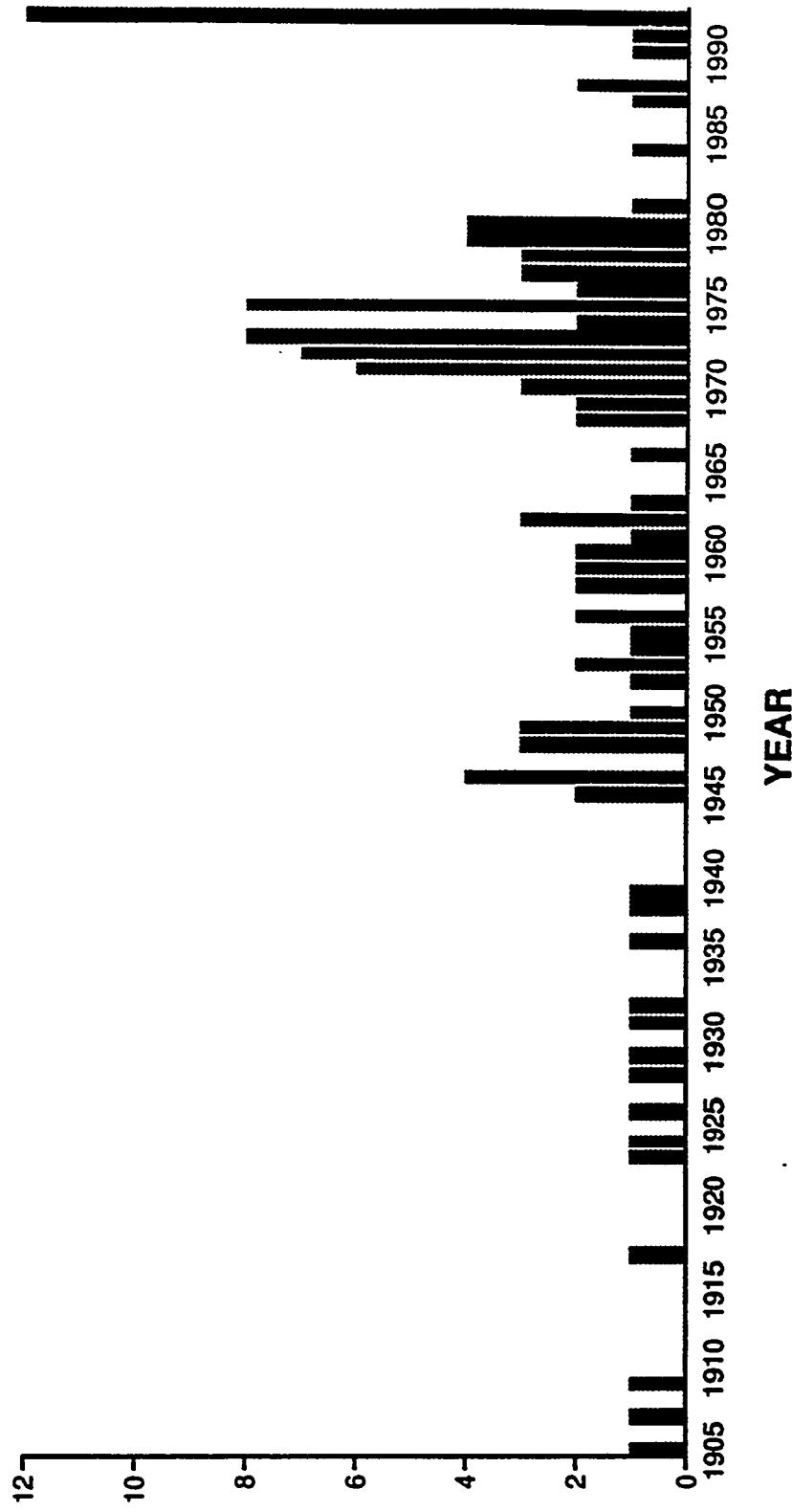
NOC DOMINANCE IS MOST PRONOUNCED IN THE OIL SECTOR, WHERE THEY HAVE 95 PERCENT OF THE RESERVES AND 77 PERCENT OF THE CURRENT PRODUCTION

NOC SHARE OF WORLD OIL RESERVES & PRODUCTION



WHILE THERE WAS AN 'EXPLOSION' OF NATIONAL OIL COMPANIES IN THE 1970s, MANY HAVE A LONG AND IMPORTANT HISTORY

CREATION OF NATIONAL OIL COMPANIES



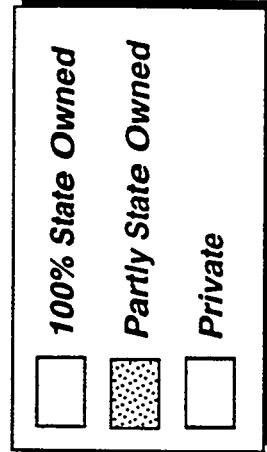
Source: BA&H analysis

70-69626, S/SF

BOOZ•ALLEN & HAMILTON INC.

OF THE 50 LARGEST PETROLEUM COMPANIES IN THE WORLD, 32 ARE
STATE-OWNED

1 Saudi Aramco	26 EGCP
2 NIOC	27 INOC
3 PVDSA	28 Total
4 Pemex	29 Gazprom
5 ADNOC	30 KPC
6 RD Shell	31 Rosneft
7 Sonatrach	32 Elf Aquitaine
8 Pertamina	33 Unocal
9 Sinopec	34 StatOil
10 Exxon	35 Dubai Petroleum
11 Libya NOC	36 Petrobras
12 Mobil	37 Phillips
13 Petronas	38 Conoco
14 NNPC	39 Syrian Petroleum
15 Amoco	40 Marathon
16 ONGC	41 Imperial Oil
17 Chevron	42 Ecopetrol
18 Arco	43 BHP
19 QGPC	44 Amerada Hess
20 Agip	45 Occidental
21 Texaco	46 Oryx
22 YPF	47 Petrofina
23 PDO	48 Petroleos del Peru
24 ENI	49 Norsk Hydro
25 BP	50 Banoco

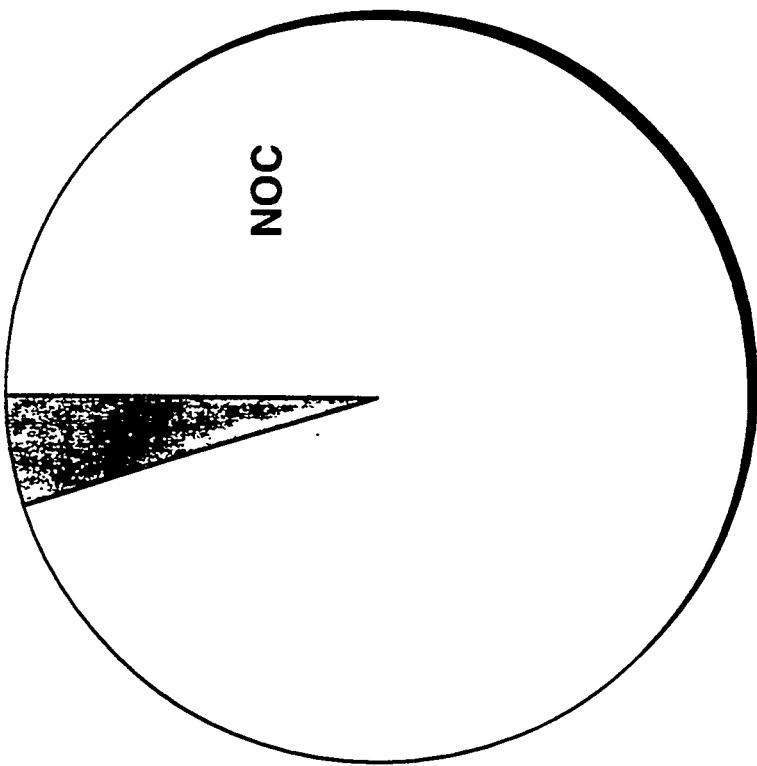


TODAY, I WOULD LIKE TO COVER:

- **THE CRITICAL ROLE OF NATIONAL OIL COMPANIES (NOCS) IN THE WORLD AND LATIN AMERICA**
- **SIX NOCs STRATEGIES FOR THE 1990's AND BEYOND:**
 - Commercialization
 - Rationalization
 - Optimization
 - Integration
 - Globalization
 - Privatization
- **CONCLUSION: STRATEGIC CHALLENGES FOR NOCs AND IMPACTS ON WORLD OIL MARKETS**

NATIONAL OIL COMPANIES HAVE ENTERED AN UNPRECEDENTED ERA OF CHANGE THAT WILL TRANSFORM THE PETROLEUM MARKET AS PROFOUNDLY AS THE NATIONALIZATIONS THAT CREATED MOST OF THEM TWO DECADES AGO. TODAY, NOCS CONTROL OVER 90 PERCENT OF THE WORLD'S OIL AND GAS RESERVES

NOC SHARE OF WORLD OIL AND GAS RESERVES



**“The InterAmerican Development Bank and Latin America’s Energy
Industry: A Partnership of 30 Years”**

LUIS O. DEL CERRO
Chief, Financial Analysis Section
Inter-American Development Bank

THE INTER-AMERICAN DEVELOPMENT BANK

OVERVIEW

**THE IDB AND LATIN AMERICA'S ENERGY INDUSTRY:
A PARTNERSHIP OF 30 YEARS**

INTER-AMERICAN PETROLEUM & GAS CONFERENCE

***September 27-28, 1993
Dallas, Texas***

Presentation by Luis del Cerro

INTER-AMERICAN DEVELOPMENT BANK

OVERVIEW



ORIGINS

- THE IDB WAS FOUNDED IN 1959 TO CHANNEL RESOURCES TO FOSTER SOCIAL AND ECONOMIC DEVELOPMENT IN LATIN AMERICA

OWNERSHIP

- THE IDB IS A MULTILATERAL DEVELOPMENT BANK OWNED BY THE GOVERNMENTS OF FORTY FOUR COUNTRIES.
- TWENTY FIVE OF THE MEMBERS FROM LATIN AMERICA BORROW FROM THE BANK.
- THE REMAINDER ARE INDUSTRIALIZED NON-BORROWING MEMBERS.

OWNERSHIP DISTRIBUTION

LATIN AMERICA & THE CARIBBEAN	53.8%
UNITED STATES	34.6%
CANADA	4.4%
EUROPE AND JAPAN	7.2%
	100.0%

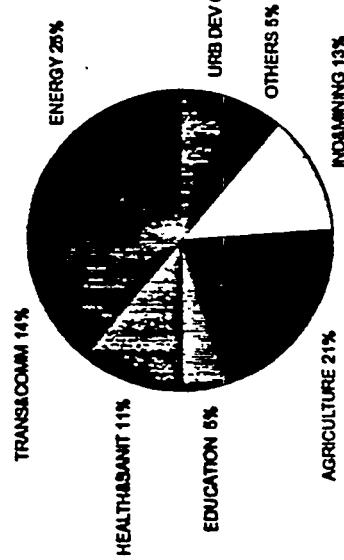
LENDING RESOURCES FOR THE PERIOD 1990-1993

CAPITAL	\$ US BILLION	20.674
FUND FOR SPECIAL OPERATIONS		1.826
		<hr/>
		22.500

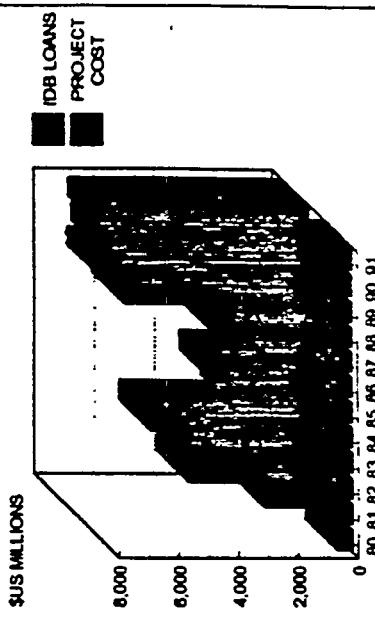
BANK GROWTH INDICATORS 1982-1991



LOAN DISTRIBUTION DISTRIBUTION BY SECTORS 1961-1991



IDB ENERGY LOANS 1980-1991



BANK ACTIVITIES

- LOANS
- TECHNICAL ASSISTANCE LOANS AND GRANTS
- COFINANCING ACTIVITIES WITH OTHER AGENCIES AND GOVERNMENTS
- ADMINISTRATOR OF SPECIAL FUNDS

CURRENT IDB PROGRAMS

- ECONOMIC TRANSFORMATION
- TRADITIONAL IDB PROGRAMS
- SECTOR ADJUSTMENT
- PRIVATE SECTOR DEVELOPMENT
- ENTERPRISE FOR THE AMERICAS
- POVERTY REDUCTION

TYPES OF LOANS

- PROJECT SPECIFIC LOANS
- MULTIPLE WORK LOANS
- GLOBAL CREDIT LOANS
- TIME SLICE LOANS
- SECTOR LOANS

SECTOR ADJUSTMENT

- PUBLIC SECTOR REFORM
- STATE ENTERPRISE REFORM
- TRADE AND FINANCE REFORM
- FINANCIAL SECTOR REFORM
- AGRICULTURAL SECTOR REFORM
- SOCIAL SECTOR REFORM

DIALOGUE BETWEEN BANK AND BORROWERS

- BANK MAINTAINS POLICY AND PROGRAMMING DIALOGUES WITH BORROWING COUNTRIES.
- ECONOMIC STUDY OF THE COUNTRY PREPARED BY BANK SUPPORTS THE DIALOGUE.
- DIALOGUE OFTEN LEADS TO A 3-5 YEAR ACTION PLAN. THE ACTION PLAN DETERMINES THE BANK'S WORK PROGRAM.
- STUDY→ DIALOGUE→ AGREEMENT ON NATIONAL PRIORITIES→ ACTION PLAN → WORK PROGRAM→ EXECUTION

I. MAIN OBJECTIVES TO BE ACHIEVED

- (1) TO ATTRACT LOANS AND RISK CAPITAL FROM OTHER SOURCES
- (2) TO ASSIST IN THE FORMULATION AND EXECUTION OF EFFICIENT SECTORIAL POLICIES
- (3) TO ASSIST IN THE AREA OF CORPORATE PLANNING AND IN THE DESIGN AND IMPLEMENTATION OF SOUND INVESTMENT PROGRAMS

II. MAIN OBJECTIVES TO BE ACHIEVED

- (4) TO IMPROVE TECHNICAL AND MANAGERIAL STANDARDS
- (5) TO SUPPORT EFFORTS OF COUNTRY TO ATTAIN SELF-SUFFICIENCY
- (6) TO PROMOTE REGIONAL ENERGY INTEGRATION

IN THE CASE OF SECTOR LOANS THERE ARE POLICY CONDITIONS WHICH MIGHT INCLUDE ONE OF THE FOLLOWING:

- * EXCHANGE RATE ADJUSTMENT
- * POSITIVE INTEREST RATES
- * ELIMINATION OF SUBSIDIES
- * PRICE ADJUSTMENT
- * PRIVATIZATION OF PUBLIC ENTERPRISES
- * PUBLIC SECTOR EFFICIENCY

II. LOAN CONDITIONS

LOAN DISBURSEMENTS DEPEND UPON LOAN CONDITIONS BEING MET. SPECIFIC PROJECT LENDING USUALLY CARRIES TECHNICAL, ECONOMIC AND FINANCIAL CONDITIONS AS WELL AS SOME OR ALL OF THE FOLLOWING:

- EFFICIENT USE OF LOAN FUNDS
- INSTITUTIONAL UPGRADING
- PROMOTION OF PRIVATE SECTOR
- GUARANTEES OF PROJECT SUSTAINABILITY
- REVISION OF DOMESTIC PRICES

I. GENERAL CRITERIA FOR HYDROCARBON LENDING

- (1) LOANS SHOULD BE THE RESULT OF PREVIOUS POLICY DIALOGUES AND AGREEMENT ON NATIONAL PRIORITIES
- (2) INVESTMENT STRATEGIES OF BORROWER ARE REVIEWED AND ALTERNATIVES EXAMINED
- (3) HYDROCARBONS PRODUCED ARE TO BE SOLD AT INTERNATIONAL MARKET PRICES SO THAT INCENTIVES FOR EXPLORATION AND PRODUCTION EXIST AND RESOURCES ARE USED EFFICIENTLY

II. GENERAL CRITERIA FOR HYDROCARBON LENDING

- (4) CLEAR DISTINCTIONS SHOULD EXIST BETWEEN THE ROLES OF THE GOVERNMENT AND OF THE OIL AGENCY
- (5) QUALITY OF MANAGEMENT AND TECHNICAL STAFF SHOULD BE A KEY FACTOR TO REVIEW
- (6) A CLEAR CONTRACTUAL AND TAXATION FRAMEWORK SHOULD EXIST IN THE COUNTRY

I. MAIN STRATEGIES SOUGHT IN OIL AND GAS

- TO ACT AS CATALYSTS TO MOBILIZE OTHER SOURCES OF FINANCING
- FUNDING:
 - EXPLORATION PROMOTION
 - GENERATION OF NEW DATA
 - EVALUATION REPORTS
 - NEGOTIATION OF LAIA SALL TO THE PRIVATE SECTOR
 - SEISMIC WORK
 - STRATEGIC/OFFICE EXPANSION ACTIVITIES

II. MAIN STRATEGIES SOUGHT IN OIL AND GAS

- SUPPORT OF DEVELOPMENT AND REFINING PROGRAMS
- PROMOTION OF THE UTILIZATION OF NATURAL GAS-VS-LIQUID
- ENERGY ASSESSMENTS IN MEMBER COUNTRIES
- ENERGY CONSERVATION IN PRODUCTION AND CONSUMPTION
- ENVIRONMENTAL UPGRADING OF PRODUCTION FACILITIES

I. MAIN STRATEGIES SOUGHT IN ELECTRIC POWER

- MOBILIZATION OF RESOURCES THROUGH COFINANCING WITH OTHER INSTITUTIONS
- INSTITUTIONAL REFORM SEEKING EFFICIENCY OR PRIVATIZATION
- ENERGY CONSERVATION THROUGH MARGINAL COST PRICING, INCENTIVES, AND DEMAND MANAGEMENT
- DEVELOPMENT OF NON-CONVENTIONAL ENERGY RESOURCES SUCH AS GEOTHERMAL, SOLAR AND WIND

II. MAIN STRATEGIES SOUGHT IN ELECTRIC POWER

- FUNDING OF GENERATION
 - " TRANSMISSION
 - " DISTRIBUTION
 - " SECTOR REFORM
- INCREASE EFFICIENCY OF UTILITY COMPANIES
- FUNDING OF STUDIES FOR SECTOR PLANNING AND DEVELOPMENT
- FUNDING OF STUDIES FOR PROJECT PREPARATION

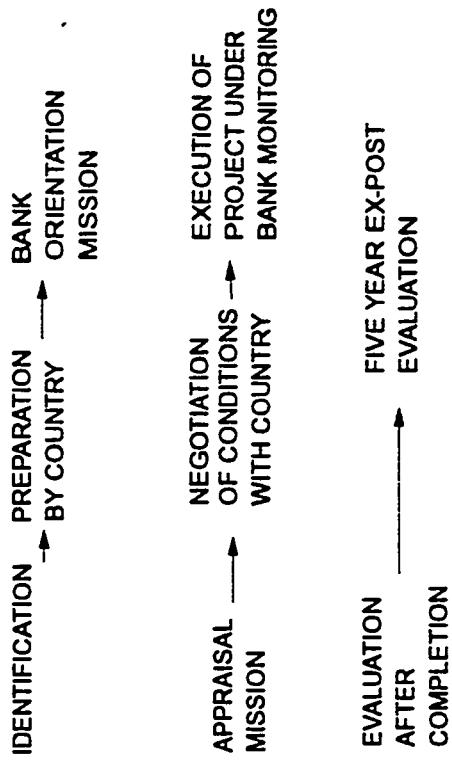
I. CHARACTERISTICS OF LOAN PROCESS

- IDENTIFICATION AND PREPARATION OF PROJECTS IS DONE BY THE BORROWER. IDB CAN PROVIDE FUNDS
- EXECUTION OF PROJECT IS RESPONSIBILITY OF BORROWER
- NEW PETROLEUM RESERVES REQUIRE INDEPENDENT CERTIFICATION
- IN POWER PROJECTS, AN OPTIMAL LONG TERM EXPANSION PLAN FOR THE NATIONAL SYSTEM IS REQUIRED
- GRACE PERIOD IS 3-5 YEARS
- LOAN TERMS BETTER THAN COMMERCIAL RATES

II. CHARACTERISTICS OF LOAN PROCESS

- PROCUREMENT WILL BE BY INTERNATIONAL COMPETITIVE BIDDING WHEN EXCEEDING \$200,000
- AN INTEGRAL ANALYSIS OF THE PROJECT REQUEST SHOULD ACCOMPANY THE LOAN
- AVERAGE TIME OF LOAN PROCESSING IS TEN MONTHS

LOAN MECHANICS



I. OBTAINING A LOAN

- IDENTIFY PROJECT AS NECESSARY
- IF IDB FINANCING IS REQUIRED
- PRESENT PROJECT TO CENTRAL GOVERNMENT AUTHORITIES TO INCLUDE PROJECT IN THE LIST OF HIGH PRIORITY PROJECTS TO BE FINANCED BY THE BANK

II. OBTAINING A LOAN

- PREPARE PROJECT PROPOSAL DEALING WITH SUBJECTS SUCH AS:
 - BACKGROUND CONSIDERATIONS
 - TECHNICAL DESCRIPTION
 - COST AND PROPOSED FINANCING
 - SECURITY PACKAGE
 - ANALYSIS OF ALTERNATIVES
 - MANNER OF EXECUTION
 - FINANCIAL / FINANCIAL ANALYSIS
 - INSTITUTIONAL ASPECTS
 - ENVIRONMENTAL IMPACT
- WORK WITH BANK TO APPRAISE PROJECT

THE INITIATIVE FOR THE AMERICAS

- TRADE
- INVESTMENT
- BILATERAL DEBT REDUCTION

TRADE

- DEBT REDUCTION IS SEEN AS A MAJOR TOOL FOR ENCOURAGING COUNTRIES IN THE REGION TO SUSTAIN THEIR REFORM EFFORTS
- TRADE AND FINACE REFORM
- PRIVATE INVESTMENT CLIMATE

TRADE REQUIREMENTS

- SIGNIFICANT PROGRESS IN MACRO-ECONOMIC REFORMS
- FINANCING PROGRAM WITH COMMERCIAL BANKS
- HAVE IN PLACE REFORMS TIED TO AN IDB LOAN

MULTILATERAL INVESTMENT FUND

- TECHNICAL ASSISTANCE FOR PRIVATIZATION
- BUILDING HUMAN CAPITAL, RETRAINING WORKERS
- ASSISTANCE TO MICRO AND SMALL SIZE FIRMS

TECHNICAL ASSISTANCE

- DIAGNOSTIC STUDIES
- INVESTMENT BANK SERVICES
- INVESTMENT POLICY REVISION

HUMAN CAPITAL DEVELOPMENT

- WORKER RETRAINING
- EDUCATION NEEDED TO ATTRACT INVESTMENT
- RELOCATION AND JOB MATCHING

ENTERPRISE DEVELOPMENT

- TARGET MICRO AND SMALL FIRMS
- SUPPORT PROJECT DEVELOPMENT
- PROVIDE EQUITY FINANCING

PRESTAMOS APROBADOS POR EL BID DESDE 1961 HASTA EL 31 DE DICIEMBRE DE 1992, SEPARADOS POR PAISES, COSTO TOTAL APROXIMADO, DOLARES PER CAPITA Y POR SUPERFICIE, SECTORES Y MONTOS DESDETADOS.

(Monto expresados en miles de U.S. dólares)

PAÍS	PRESTANOS POR SECTORES DE ACTIVIDAD				INFRAESTRUCTURA SOCIAL				OTROS			TOTAL
	SECTORES PRODUCTIVOS	IND/MIN	TUR/OTR	ENERGIA	INFRAESTR. FÍSICA	TRANS/CON	EDUC/CT	\$,PUB/AM8	DES.UB.	PLAN/REF.	FIN. EXP.	PREINV/OTRO
ARGENTINA	729,595	457,957	45,000	1,888,033	347,905	270,866	489,476	166,984	1,579,817	158,938	3,304	6,135,005
BAHAMAS	8,184	2,046	0	142,773	0	0	0	0	0	0	0	22,536
BARBADOS	16,836	6,307	7,847	0	36,280	47,549	78,091	0	0	17,896	11,710	222,516
BOLIVIA	239,922	182,473	18,197	503,615	570,814	11,928	157,999	11,428	143,930	29,476	78,208	1,947,994
BRASIL	956,002	1,507,699	0	1,887,441	1,615,614	500,701	1,429,316	487,232	0	266,477	76,103	8,724,577
CHILE	742,156	650,392	48,453	1,009,358	698,029	161,314	290,625	573,168	169,565	3,857	12,991	4,340,528
COLOMBIA	457,096	317,444	14,000	2,135,759	601,360	153,461	538,807	376,256	515,145	0	39,520	5,148,828
COSTA RICA	275,143	89,608	10,000	630,903	150,043	102,734	160,052	28,051	0	102,000	16,137	1,564,671
ECUADOR	815,547	307,839	18,311	502,308	338,189	167,335	199,348	131,508	0	0	16,204	2,576,789
EL SALVADOR	174,340	130,931	0	334,273	221,031	25,149	286,164	31,208	182,926	79,823	17,767	1,483,612
GUATEMALA	148,593	195,718	15,109	296,235	146,505	28,288	209,397	119,312	0	2,764	0	1,161,901
GUYANA	237,909	34,548	0	32,385	23,400	60,900	36,382	0	0	2,797	0	428,221
HAITI	65,300	15,328	0	0	119,717	17,311	115,474	0	12,400	3,117	7,698	356,345
HONDURAS	331,638	68,059	0	340,566	313,369	73,244	172,883	75,092	0	8,853	68,776	1,452,500
JAMAICA	129,551	180,303	11,546	123,221	55,304	77,378	92,172	103,543	75,951	158,999	5,947	1,021,915
MEXICO	3,295,589	1,056,290	348,970	328,191	712,638	148,759	1,0923,042	95,520	0	97,151	321,038	7,497,068
NICARAGUA	242,386	42,645	0	74,325	63,724	9,250	100,236	22,514	153,159	1,826	25,266	735,331
PANAMA	145,815	33,026	20,253	283,336	180,377	70,104	46,874	52,549	127,570	0	29,146	987,052
PARAGUAY	194,309	55,279	14,579	277,990	156,628	59,706	101,658	64,769	81,500	0	5,939	1,012,357
PERU	437,201	412,879	30,839	190,658	364,188	9,028	88,065	56,520	659,025	176,756	9,991	2,434,650
REP.DOMINIC.	359,477	85,571	41,796	267,552	169,795	69,705	53,080	3,479	0	11,967	60,593	1,123,015
SURINAME	0	5,555	0	0	0	8,094	7,731	0	0	0	0	21,370
TRIN.& TOBAGO	29,174	0	0	259,922	49,521	40,640	12,395	70,113	0	11,320	5,998	479,083
URUGUAY	170,611	34,530	8,692	62,114	194,885	39,516	134,912	125,031	256,357	8,940	112,161	1,147,749
VEINZUELA	654,546	299,414	75,000	394,243	391,648	81,608	258,951	31,871	698,259	1,404	21,901	2,908,845
REGIONAL	10,308	56,834	0	1,064,267	137,873	65,902	0	5,465	79,379	0	262,409	1,682,437
TOTALES:	10,864,226	6,316,657	726,492	13,029,516	7,658,917	2,301,152	6,151,132	2,629,613	4,714,983	1,144,363	1,230,843	56,769,898
	19.1%	11.1%	1.3%	23.0%	4.1%	4.1%	10.2%	4.6%	8.3%	2.0%	2.2%	100.0%
	17,909,377	17,909,377	31.5%	20,688,435	11,081,897	20,688,435	19.5%	11,081,897	12.5%	0	262,409	1,682,437
												100.0%

Cifras netas de cancelaciones con ajustes monetarios y recuperaciones en préstamos para fincamiento de exportaciones, al 31 de diciembre de 1992.

NO. DE COPIAS	CONSULTAS AI	NO. DE COPIAS
OPS/RO EXT. 1523	OPS/RO EXT. 1523	250

PROYECTOS SECTOR ENERGIA Y MINERIA – BID – Préstamos aprobados 1961–1991

Año	Número de Proyectos Aprobados					Monto Préstamos (US\$ millones)				Total Préstamos Energía y Minería	Total Préstamos BID	Préstamos En. y Min. (% sobre Total BID)	Costo Total de los Proyectos
	Petróleo	Gas	Minería	Energ. Eléctrica	Total	Petróleo	Gas	Minería	Energ. Eléctrica				
1961	—	—	1	6	7	—	—	4.5	20.5	25.0	293.7	8.5	67.2
1962	—	—	—	3	3	—	—	—	16.4	16.4	329.4	5.0	68.2
1963	—	—	1	4	5	—	—	4.9	33.0	37.9	258.9	14.6	451.0
1964	—	—	—	5	5	—	—	—	26.4	26.4	299.3	8.8	155.5
1965	—	—	—	4	4	—	—	—	31.6	31.6	373.5	8.5	128.4
1966	—	—	1	1	2	—	—	2.5	25.1	27.6	396.1	7.0	161.3
1967	—	—	—	4	4	—	—	—	72.2	72.2	496.4	14.5	1143.0
1968	—	—	—	5	5	—	—	—	134.5	134.5	430.9	31.2	414.0
1969	—	3	—	8	11	—	39.9	—	118.8	158.7	631.5	25.1	351.9
1970	—	1	—	5	6	—	15.0	—	107.7	122.7	644.4	19.0	460.1
1971	—	2	—	5	7	—	39.0	—	130.2	169.2	651.8	26.0	568.7
1972	—	—	1	5	6	—	—	32.0	189.9	221.9	807.2	27.5	1935.7
1973	—	—	2	5	7	—	—	10.4	212.5	222.9	884.0	25.2	2531.1
1974	1	—	—	8	9	1.2	—	—	547.7	548.9	1110.7	49.4	2202.3
1975	1	—	—	6	7	46.5	—	—	303.7	350.2	1375.0	25.5	1812.0
1976	2	2	2	7	13	38.6	93.5	41.4	220.8	394.3	1527.8	25.8	1966.8
1977	—	2	2	8	12	—	146.0	64.9	392.1	603.0	1808.8	33.3	3065.8
1978	—	—	2	9	11	—	—	165.0	764.8	929.8	1870.1	49.7	7546.8
1979	—	1	1	8	10	—	10.0	33.0	401.9	444.9	2050.9	21.7	1790.0
1980	3	1	2	9	15	39.9	48.4	95.0	374.1	557.4	2308.9	24.1	1672.2
1981	3	1	1	12	17	50.3	97.0	33.0	829.8	1010.1	2493.0	40.5	5076.8
1982	1	—	—	6	7	134.0	—	—	662.4	796.4	2744.3	29.0	1516.6
1983	1	—	3	7	11	20.0	—	299.3	939.6	1258.9	3045.0	41.3	2588.0
1984	3	—	1	4	8	79.0	—	25.0	724.6	828.6	3453.7	24.0	2396.8
1985	—	1	2	10	13	—	60.3	115.0	771.3	946.6	3061.1	30.9	2263.3
1986	—	—	—	6	6	—	—	—	676.7	676.7	3037.0	22.3	2016.5
1987	—	—	—	6	6	—	—	—	619.7	619.7	2361.0	26.2	560.1
1988	2	—	—	2	4	51.5	—	—	359.0	410.5	1602.0	25.6	255.8
1989	1	—	1	5	7	56.9	—	18.0	801.0	875.9	2618.0	33.5	6923.8
1990	—	—	—	4	4	—	—	—	627.0	627.0	3881.0	16.2	1736.7
1991	1	—	—	6	7	260.0	—	—	435.0	695.0	5320.0	13.1	1403.0
1992	—	—	—	4	4	0.0	—	—	714.9	714.9	6000.0	11.9	3496.8
Total	19	14	23	187	243	777.8	549.1	943.9	12284.9	14555.7	58165.4	25.0	58746.3
%	8%	6%	9%	77%	100%	5%	4%	6%	84%	100%			

This paper does
not have a
good paper.

Jui

ALBERT ANGULO
Regional Director
Latin America & Caribbean
U.S. Trade and Development Agency



**U.S. TRADE AND DEVELOPMENT AGENCY
Washington, D.C. 20523-1602**

**FOR DELIVERY BY ALBERT W. ANGULO, REGIONAL DIRECTOR
AT THE
SECOND INTERAMERICAN PETROLEUM AND GAS CONFERENCE
DALLAS, TEXAS ON SEPTEMBER 27-28, 1993**

THANK YOU VERY MUCH! IT IS INDEED A PLEASURE TO HAVE THE OPPORTUNITY OF TALKING ABOUT TDA AND HOW WE CAN BE OF SERVICE TO U.S. INDUSTRY AND OUR FOREIGN CLIENTS.

TDA IS A YOUNG AGENCY. IT WAS ORGANIZED IN 1980 AND FUNDED ITS FIRST PROJECT IN 1981. IT WAS AN EXPERIMENT WITHIN AID, ONE THAT WORKED SINCE WE WERE ABLE TO BECOME AN EFFECTIVE TOOL TO HELP U.S. INDUSTRY WIN MAJOR INTERNATIONAL CAPITAL PROJECTS IN DEVELOPING AND MIDDLE-INCOME COUNTRIES.

IN 1988 TDA, OR TDP AS IT WAS THEN KNOWN, BECAME AN INDEPENDENT AGENCY. IT REPORTS DIRECTLY TO THE WHITE HOUSE AND OPERATES AS A LEADING AGENCY IN ASSISTING U.S. EXPORTS FOR MAJOR CAPITAL PROJECTS. 1992 A NEW NAME WAS AUTHORIZED AND ITS AUTHORITY WAS EXPANDED.

A BRIEF TRIP THROUGH TDA HISTORY REVEALS THAT THROUGH SEPTEMBER 30, 1992:

TOTAL PROGRAM FUNDING WAS APPROXIMATELY \$200 MILLION.

TOTAL EXPORTS ASSISTED BY TDA REACHED \$4 BILLION, WITH ANOTHER \$20 BILLION IN THE PIPELINE.

**CURRENT STAFF IS 38 DIRECT EMPLOYEES.
CURRENT BUDGET AMOUNTS TO \$40 MILLION OF WHICH OVER 90% IS FOR PROGRAM ACTIVITIES.**

OUR NEW FISCAL YEAR BEGINS ON FRIDAY OCTOBER 1, AND WHILE CURRENT APPROPRIATIONS ARE AT THE SAME LEVEL, THE AUTHORIZED LEVEL OF EXPENDITURES IS AT \$65 MILLION.

WHILE THESE ARE MODEST AMOUNTS FOR AN INTERNATIONAL FEDERAL AGENCY, THE MONIES ARE CAREFULLY ALLOCATED TO HIGHLY COMPETITIVE PROJECTS, AND THE TAXPAYER GETS A GOOD RETURN ON EACH DOLLAR, WHEN MEASURED ON EXPORTS, AND THUS JOBS GENERATED.

OUR MISSION IS TO ASSIST U.S. COMPANIES TO WIN MAJOR CAPITAL PROJECT CONTRACT AWARDS IN THE FACE OF INTERNATIONAL COMPETITION. PROJECTS DIRECTLY SUPPORTED BY TDA MUST HAVE A LOCALLY DETERMINED HIGH PRIORITY AND A HIGH DEVELOPMENTAL IMPACT.

TDA'S MARKET INCLUDES DEVELOPING AND MIDDLE INCOME COUNTRIES. TDA CURRENTLY RESTRICTS SOME OF ITS ACTIVITIES IN CERTAIN COUNTRIES IN KEEPING IN HARMONY WITH THE FOREIGN POLICY OF THE UNITED STATES, AS ADMINISTERED BY THE STATE DEPARTMENT.

TO CARRY OUR OUR MISSION, WE HAVE SEVERAL TOOLS, OR PRODUCTS, WITH OTHERS CONTINUALLY UNDER REVIEW FOR IMPLEMENTATION AT SUCH TIME THAT THEIR PERCEIVED EFFECTIVENESS SO WARRANTS.

ORIENTATION VISITS:

TDA OFTEN INVITES FOREIGN GOVERNMENT OR PRIVATE SECTOR OFFICIALS TO THE UNITED STATES AND ARRANGES A TOUR TO REPRESENTATIVES OF PRIVATE INDUSTRY THAT HAVE PRODUCTS OR SERVICES THAT MAY HAVE AN APPLICATION FOR PROJECTS BEING CONSIDERED BY THE INVITED OFFICIALS. TDA MAY PAY FOR PART OR ALL OF THE COSTS OF SUCH VISITS.

CONFERENCES:

TDA SUPPORTS CONFERENCES, SUCH AS THIS CONFERENCE, BY ATTENDING THE CONFERENCE. THE COST ASSOCIATED WITH SUCH ATTENDANCE IS ABSORBED BY TDA. FROM TIME TO TIME, TDA MAY ALSO SUPPORT A CONFERENCE FINANCIALLY BY SPONSORING THE VISIT OF SELECTED FOREIGN OFFICIALS AND/OR BY COVERING A PORTION OF THE OVERHEAD COSTS OF PREPARING SUCH A CONFERENCE. FINANCIAL SUPPORT IS VERY LIMITED, DUE TO BUDGETARY CONSTRAINTS, AND RESTRICTED TO THOSE CONFERENCES WHERE THE FOCUS IS TOTALLY WITHIN THE SAME RANGE AS THAT OF TDA.

FEASIBILITY STUDIES:

THESE STUDIES REPRESENT THE BACKBONE OF THE TDA PROGRAM. IN CARRYING THESE OUT, TDA PROVIDES FINANCIAL GRANTS THAT PERMIT OUR GRANTEES, WHICH ARE PRIMARILY FOREIGN GOVERNMENT AGENCIES, TO SELECT AN AMERICAN FIRM TO CONDUCT A STUDY THAT IS INTENDED TO RESULT IN A "BANKABLE PROJECT". TDA GRANTEES SELECT AND MANAGE THE GRANT CONTRACTOR AND IN FACT, THE STUDY IS TRULY THE GRANTEE'S STUDY. TDA PAYS FOR IT, EITHER TOTALLY OR BY SHARING THE COST. COST SHARING MAY ALSO INCLUDE THE U.S. CONTRACTOR THAT CARRIES IT OUT. BEFORE TDA FUNDS A FEASIBILITY STUDY IT CONTRACTS WITH A SMALL BUSINESS CONTRACTOR TO CONDUCT A DEFINITIONAL MISSION OR DESK STUDY. THESE ARE INTENDED TO PROVIDE TDA WITH GUIDANCE

ON THE ANTICIPATED FEASIBILITY OF THE STUDY, THE EXPORT POTENTIAL AND INTERNATIONAL COMPETITIVE PICTURE, THE PREPARATION OF THE SCOPE OF WORK AND THE STUDY BUDGET, THE PROCESS OF SELECTING THE WINNING BIDDER, AND OTHER ISSUES AS MAY BE DEEMED APPROPRIATE FROM TIME TO TIME.

DE MINIMIS TRAINING GRANTS:

DE MINIMIS TRAINING GRANTS MAY BE APPROVED FROM TIME TO TIME WHEN A U.S. BIDDER OR BIDDERS INCLUDE TRAINING AS A CLEAR AND DISTINCT PART OF THE BID WITH SPECIFIC COST BREAKDOWNS. TDA CAN, AT SUCH TIMES, OFFER TO THE BID SOLICITOR, TO PAY FOR THE TRAINING COSTS IF THE CONTRACT AWARD IS GIVEN TO THE U.S. BIDDER OR BIDDERS.

TDA COORDINATES ITS ACTIVITIES WITH OTHER AGENCIES OF THE U.S. GOVERNMENT. TDA WORKS MOST CLOSELY WITH THE US & FOREIGN COMMERCIAL SERVICE OF THE DEPARTMENT OF COMMERCE. THEY DO AN OUTSTANDING JOB FOR YOU AND I ENCOURAGE ALL OF YOU TO ACCESS THEIR STAFF WHEN TRAVELING ABROAD. I ALSO URGE YOU TO UTILIZE THE ASSISTANCE AND GUIDANCE OF OTHER AGENCIES WHEN PURSUING OVERSEAS OPPORTUNITIES.

THOSE OF YOU THAT ARE INTERESTED IN FOLLOWING THE ACTIVITIES OF TDA MORE CLOSELY HAVE SEVERAL OPTIONS. THE MOST OBVIOUS ONE IS TO COME IN TO SEE US. IF THAT IS NOT CONVENIENT YOU MAY:

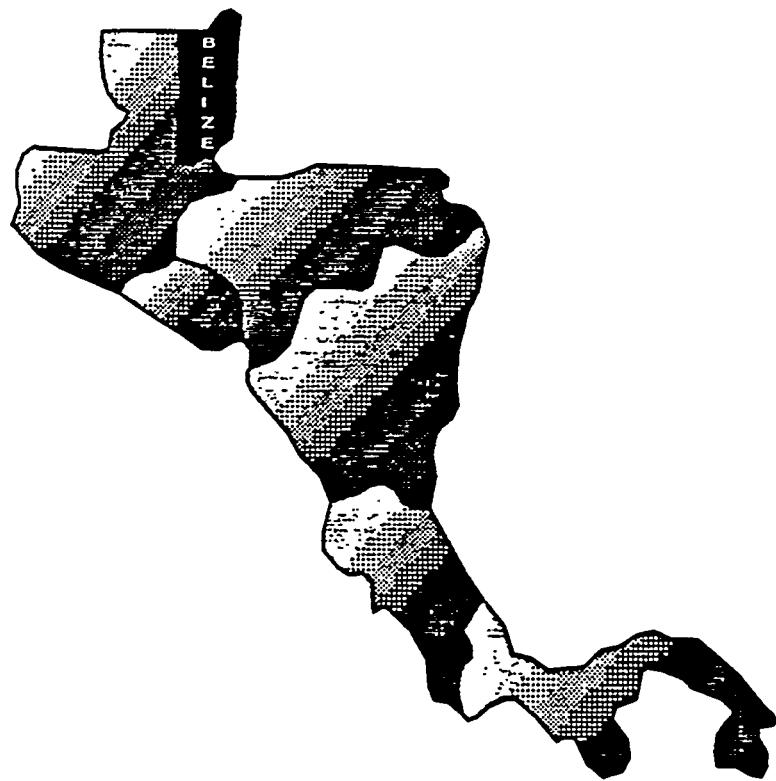
1. LOOK FOR TDA ADVERTISEMENTS IN THE COMMERCE BUSINESS DAILY.
2. SUBSCRIBE TO THE BI-WEEKLY AND EARLY BIRD. THE COST IS \$120/YEAR. CALL TDA AT 703-875-4357 AND ASK FOR TRACY BROWNE.
3. CALL THE DM HOTLINE WHERE DEFINITIONAL MISSION ASSIGNMENTS ARE ADVERTISED. CALL 703-875-7447
4. THE TDA ADDRESS IS SA-16, ROOM 309, WASHINGTON, D.C. 20523. TELEPHONE IS 703-875-4357 AND THE FAX IS 703-875-4009.

THANK YOU VERY MUCH! I'LL GLADLY TAKE QUESTIONS LATER AND I PLAN TO BE HERE UNTIL THE END OF THE CONFERENCE.

**“Petroleum Prospects, Exploration Activities
and Environmental Awareness in Belize”**

EDUARDO JUAN
Minister of Natural Resources
Belize

BELIZE



CENTRAL AMERICA

PRESENTED

BY

HONORABLE EDUARDO JUAN
MINISTER OF NATURAL RESOURCES
GOVERNMENT OF BELIZE
BELMOPAN, BELIZE, C.A.

27 September, 1993
Dallas, Texas
U.S.A.

PETROLEUM PROSPECTS, EXPLORATION ACTIVITIES AND ENVIRONMENTAL

AWARENESS IN BELIZE

by
Honourable Eduardo Juan
Minister of Natural Resources
Government of Belize

Belize, formerly known as British Honduras is an independent country, located in the heart of Central America and the Caribbean. Its proximity to the United States of America, especially to the oil state of Texas and its easy accessibility to all Central American, Western Caribbean countries and Yucatan states of Mexico make Belize attractive from business and tourism point of view (Fig.1).

Belize has the largest barrier reef complex in this western hemisphere and beautiful rain forests in the mountains. While environmental protection is one of the highest priorities, the present Government recognizes the need for a balanced and carefully planned approach especially in areas of exploration and exploitation of its natural resources for the growth and development of the country. The purpose of this presentation is to acquaint the audience of the InterAmerican Petroleum and Gas Conference with the political, fiscal and legal stability in Belize and to highlight the favourable factors and investment opportunities that exist for petroleum exploration and developmental activities in the country within the normal framework of environmental protection.

Belize has a parliamentary system of democracy based on the British model and the rights of the people are enshrined in the constitution. The present Government is dedicated to the cause of freedom, human rights and democratic process. We believe that the economic development of the country depends on the joint efforts of government and the people. While we insist that a strong,

aggressive and competitive private sector must be the bed rock of our economy, we also believe that Belize cannot go forward in this global economy without encouraging foreign investment and capital to fuel our economic development. Belize's present population is 199,000 and its G.D.P. is approximately \$768 million based on 1992 statistics. Its per capita income is \$3,850 per annum. The total import bill in 1992 was \$492.7 million with the refined petrolicum products bill alone amounting to \$65 million, which is about 13% of the total import. There is no refinery at present in Belize and commercial oil production is yet to come. Belize's export last year included mainly sugar, citrus, bananas, fish, timber and garments which amounted to \$231 million. Belize has been able to keep inflation at a manageable rate of 2.6% in 1992.

The economic well being of a sovereign nation like Belize cannot come about by unilateral planning or action. It is therefore of great importance that Belize seeks and encourages foreign investment for its ongoing projects, including all upstream activities of the petroleum sector. Any investor willing to put capital into Belize's economic and social development has a right to expect well defined and reliable terms and conditions. Traditionally, the Government of Belize has encouraged foreign investment and maintained a high level of hospitality to both foreign and local investors. Stability in the legal system, generous tax concessions and incentives, minimal exchange controls, liberal trade policy, guarantees against expropriation, continuing willingness to dialogue with the private sector etc., are clear manifestations showing the genuine interest of the present Government in attracting foreign capital for the developmental activities in the country.

Geologically, Belize falls on the southern edge of the North American plate which accounts for approximately 14 million barrels of oil production per day. Belize also forms part of a major oil and gas producing Cretaceous sedimentary basin of neighbouring

Mexico and Guatemala. This basin is known as the Peten Basin or the Southern Gulf of Mexico Basin. Nearer to Belize in the Peten Basin are the Campeche and Reforma giant oil and gas fields of Mexico and the Xan and Rubel Santo oil fields of Guatemala (Fig.2).

There are several locations in Belize having oil seeps in land and also in offshore near Grovers reef. This natural seep in the offshore obviously has not affected the marine life, especially the reef. Three wells drilled near Belmopan, the capital of the country had subcommercial quantities of good quality oil with about 38 degrees API and less than 1% sulphur content. In the southern part of the country, near Punta Gorda, dolomitic rocks of Cretaceous age were found to be impregnated with asphalt (Fig.3).

Many wells drilled for petroleum had live oil shows and they all correlate very well with the producing fields of Mexico and Guatemala (Fig.4). This figure shows that oil producing geological intervals of neighbouring Guatemala and Mexico tie up with the geological interval having the subcommercial oil and oil shows in Belize. Perhaps an aggressive exploration, as being encouraged by the present Government together with the application of modern technology in acquiring the field data may prove to be successful in establishing a commercial discovery in Belize.

A typical well prognosis shows that the reservoir rocks in Belize are the cavernous limestones and dolomites of Cretaceous age with porosities in the order of 20-30%. The cap rocks are the shales in southern and offshore Belize, whereas in northern Belize, it is anhydrite. The source rocks are believed to be fine grained clastic rocks of Jurassic to Cretaceous age (Fig.5).

Exploration for oil in Belize began as far back as 1938 when Gulf Oil Company had a concession and drilled their first well in 1956. Since then many international companies have shown interest in Belize and drilled 47 wells so far. The office of Geology and

Petroleum in Belmopan has the samples and logs of all the wells drilled so far and also other relevant information including gravity, magnetic and seismic data generated.

In spite of recent downward trends in the oil industry and also the fact that nearly five decades have lapsed since exploration started, currently 8 international companies are actively engaged in exploration in Belize. Over one million acres in northern Belize remain untested by drilling so far and the recent seismic surveys carried out in the same area show the presence of a deep basin with over 25,000 feet of sedimentary section, which was hitherto believed as only with less than 10,000 feet. Several promising structures have been mapped in the area and a deep exploratory well will be drilled during early 1994 by the operating company. At present a horizontal well, Eagle-2 is being drilled near Belmopan and one more exploratory well will be drilled before the end of this year in a location south of Georgeville village near the western border with Guatemala (Fig.6).

Currently 2.8 million acres are under lease in land and offshore. There are many vacant blocks available presently for concession (Fig.7). Some of the vacant blocks especially in the southern Belize and north of the Maya mountains seem to have promising petroleum potential. Also available in the office of Geology and Petroleum are the technical dockets giving further details on the geological, geochemical and geophysical data of all the blocks in the country. These dockets and digitized logs of all the wells are available for sale to interested companies. For further information, the Chief Technical Advisor, Office of Geology and Petroleum, Belmopan, Belize may be contacted.

The Petroleum laws of Belize have been revised recently with the assistance of Petroleum Legal Experts from the United Nations. The Act is known as the Petroleum Act of 1991, supplemented by Income Tax (Amendment) Act of 1991 and Petroleum Regulations of

1992. In the Petroleum law of Belize, the control over all petroleum in the country is vested exclusively in the Government. The Government reserves the right to carry out petroleum operations through leases or contracts issued to any qualified person or oil company. The selection of contractors or oil companies shall be either through public competitive bidding or with the approval of the cabinet.

Under the new law, the term of the petroleum exploration and production contract shall be divided into an exploration period and a production period. The exploration period is initially for two years with three possible renewals of two years each. Where a commercial discovery is made the production period relating to such discovery shall commence from the date of establishment of that discovery for a period of 25 years initially.

Fees payable by the contractor includes, an annual administrative fee of US\$ 10,000 per contract; rentals of US\$ 0.10 per acre for the exploration area and US\$ 5.00 per acre for the producing field; royalty of not less than 7.5% for oil and not less than 5% for natural gas; a negotiable production share on the petroleum profit and an Income tax of 35% on net petroleum.

Incentives to the Contractor includes, duty free importation of all equipments; duty free exportation of petroleum which he is entitled to export pursuant to his contract; rapid write off, of all capital expenditures (5 years on a straight line method); Immediate write off, of all operational expenditures including drilling in the year in which it occurred; well defined accounting procedures enabling the operating companies to be eligible for US tax credit against the income tax paid to the Government; liberal exchange and trade policy etc. Disputes if any between, the Contractor and the Government to be settled with rules issued and administered by well recognized international bodies.

From the environment point of view, the laws of Belize call for carrying out petroleum operations under environmentally safe and sound manner. The Government is fully aware of this highly sensitive issue associated with all exploration and developmental activities of petroleum operations. As Belize has the unique treasure of the barrier reef and a duty to mankind in saving its rain forests, the Government policy to require for environmental protection is a balanced approach which could be seen as very normal and internationally acceptable. The requirements include:

- (i) submitting an environmental impact assessment for the contract area, whether in land or offshore.
- (ii) using the most reliable, modern and efficient techniques.
- (iii) preventing the waste or escape of petroleum, water, drilling fluids or any mixture thereof;
- (iv) adopting all necessary measures for the protection of flora, fauna and other natural resources.
- (v) avoiding the pollution or contamination of water, atmospheric or terrestrial.
- (vi) carrying out of all clean-up operations and render the contract area safe on termination of the contract.

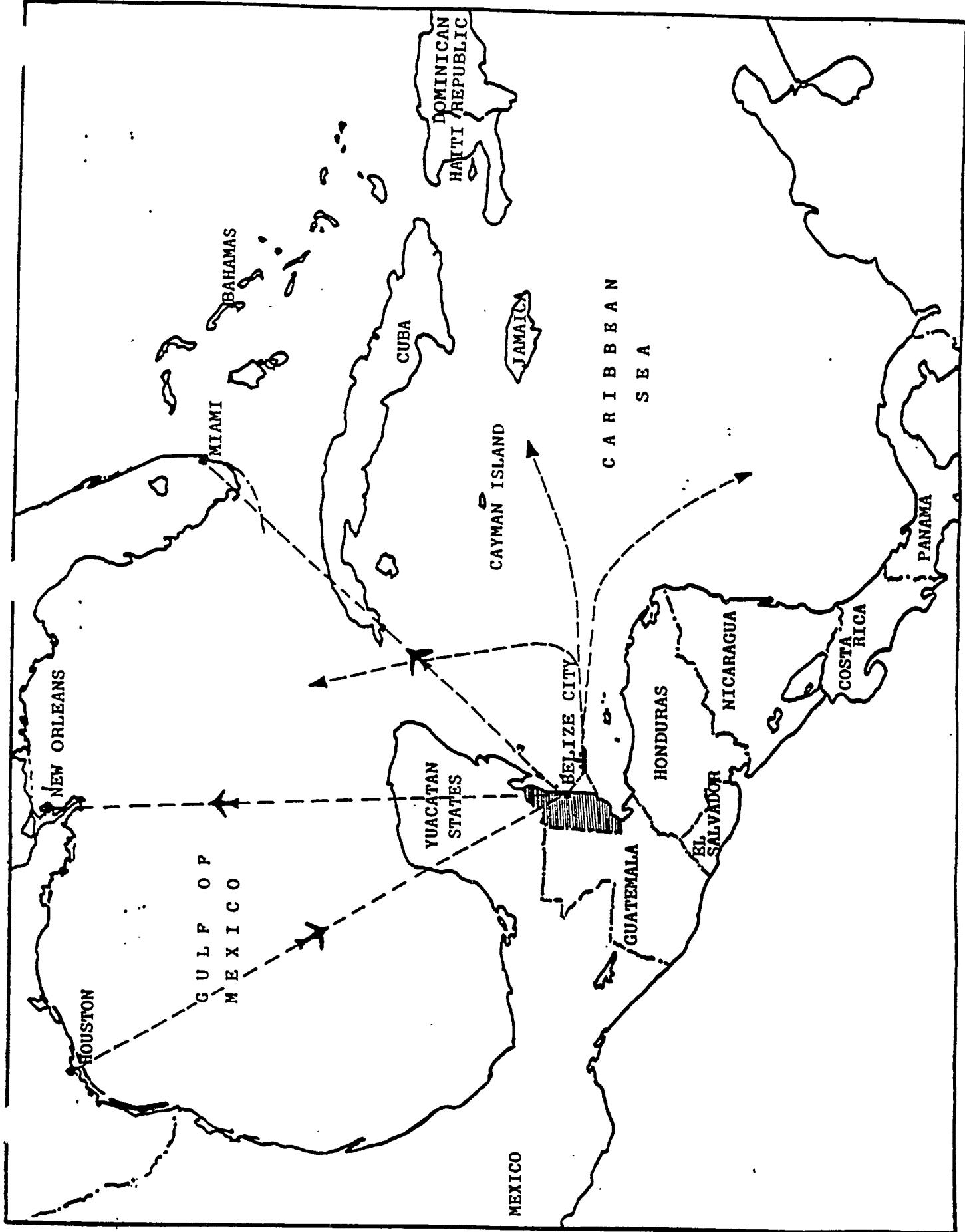
The Government of Belize is also aware of the fact that a single company, however placed it is, in its economic welfare, may find it difficult to remedy certain environmental disasters. Towards addressing this issue, provisions have been made in the petroleum exploration and development agreement between the Operating Company and the Government to have contributions from all oil and/or gas producing companies, irrespective of whether or not

they are responsible for any environmental accident towards a negotiable and nominal common fund, which would be set aside by the Government of Belize to meet any environmental emergencies.

From this presentation, it may be noted that Belize is a friendly and sovereign nation, centrally and strategically located in the Americas for either business or pleasure. The country has demonstrated political, economic and legal stability over the years and has attracted and continues to attract foreign investment in many areas including petroleum exploration. The geological factors in Belize appear to be highly favourable for generation and commercial accumulation of petroleum as its sedimentary basins form part of the producing Peten basin of southeastern Mexico and Guatemala. The present Government also has a very balanced policy to support petroleum exploration activities in the country and at the same time to require the operating companies to cooperate in protecting its environment to the maximum possible extent.

Finally, I wish to seize this opportunity to thank the organizers and all sponsors of this InterAmerican Petroleum and Gas Conference for giving me this opportunity to project the views of the Government of Belize in the area of oil exploration and development in the light of its environmental policy and also for bringing together various government ministers and representatives, executives of different oil companies and organizations such as OPEC and OLADE together, to discuss and exchange ideas on the petroleum energy situation in the Americas.

Thank you.



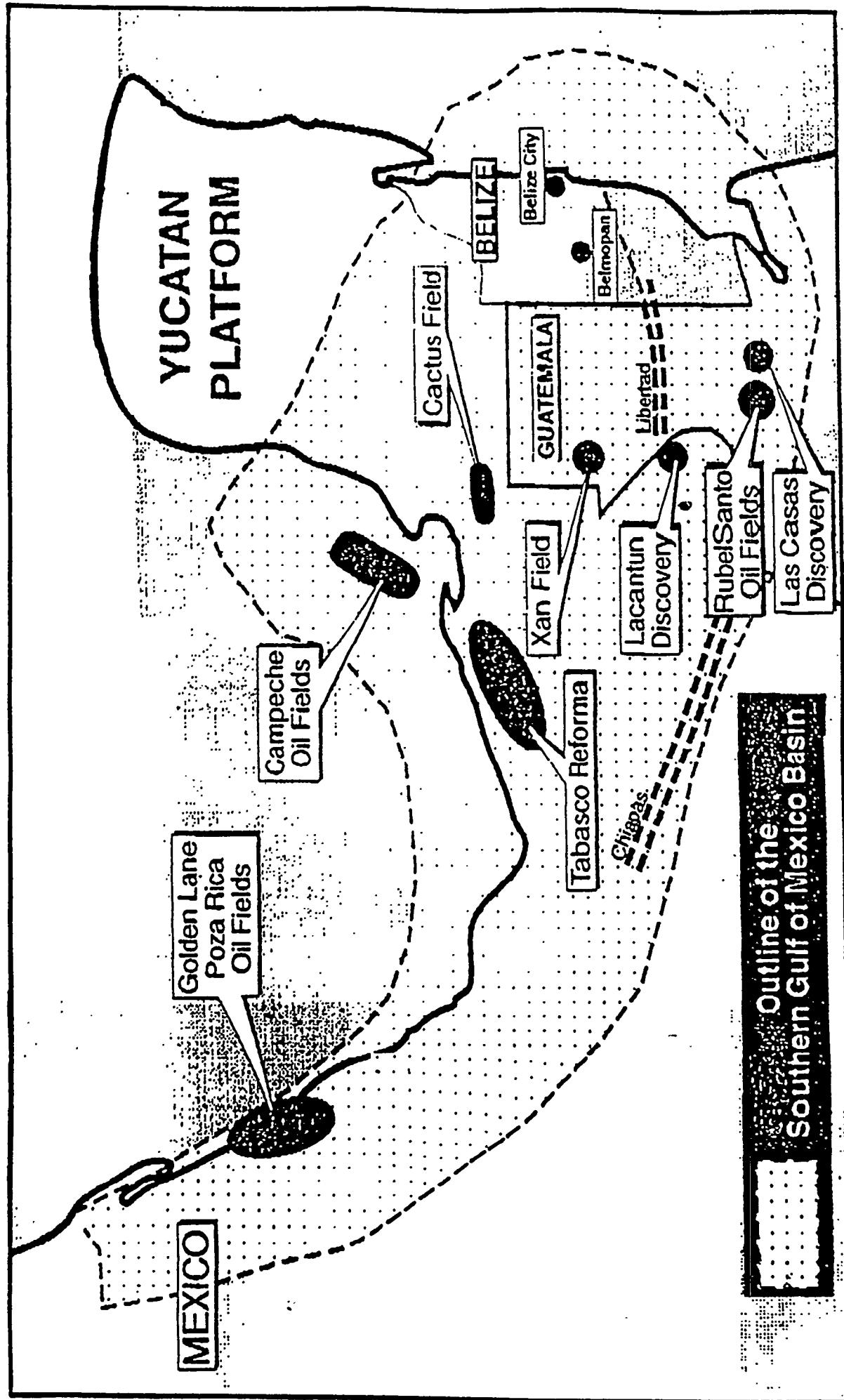


FIG 2



18°00'

17°30'

17°00'

16°30'

16°00'

GUATEMALA

LEGEND

- ★ SUBCOMMERCIAL OIL FROM 3 WELLS
- OIL SEEP
- ASPHALT

CARLOS MIRANDA PACHECO

Minister of Energy and Mines

Bolivia

OIL AND GAS IN BOLIVIA

Carlos Miranda Pacheco
Secretary of State for Energy
Bolivia

Bolivia has a peculiar position in South America. It is a country of about 386,000 square miles located in the center of the continent with no direct access to the oceans. It is closed on the Western flank by the Andes, on the North and West by the Amazonian Forest, and on the South by the Argentinian Pampas. Basically our country is divided lengthwise in three levels. A large plateau at about 12000 feet above sea level and finally a vast area of prairies and tropical forests within 2000 and 15000 feet above sea level (see map 1). Within this morphological area, broadly described, the Bolivian oil provinces are located (see map 2).

As can be seen, 5 sedimentary basins are located lengthwise (the Sub-Andean, Chaco-Beni, Madre de Dios, and Altiplano).

In this fashion, 53% of the 386,000 square miles of the national territory have an oil and gas potential. To this date, about 15% of that area has been explored and developed, and this is where our production is located.

Typically, the hydrocarbon production of the Bolivian fields is made up of very light oil and natural gas, both of very good quality and with no deleterious contaminants. About 80% of the production comes from gas-condensated fields.

Due to these conditions, Bolivia is basically considered a gas producing country.

Consequently, at present, our proven gas reserves reach more than 6 trillion cubic feet that have been available for the last 10 years, notwithstanding the fact that we export 200 million cubic feet per day.

The fundamental reason why we cannot show more proven reserves is the lack of markets that did not create conditions for more investment and exploration than those that have been done to the present.

Our internal market for natural gas and its rate of growth are very small compared to our reserves and production. On the other hand, the transformation of natural gas into petrochemicals is in a very difficult competitive position due to our high costs of transport to reach export markets.

These conditions--geographical limitations and an important availability of natural gas--unequivocally point to the fact that Bolivia should supply these important fuels to its neighbouring countries.

At this point it is convenient to stop talking about the Bolivian oil sector and start talking about the general economy of the country, so you could have an idea of the framework within which the oil industry has to develop.

I think it is safe to say that our political system is acquiring maturity. We have had ten years of democracy, and in the month of August we have started the fourth period of a constitutional government elected by popular vote. At the same time, our economy,

after deep crises, since 1985 has shown financial and monetary stability and has regained its growth. Bolivia, for the past 8 years, has consistently shown the lowest inflation rate in Latin America. This year our inflation rate will show only one digit. Likewise since 1987 our gross national product has a positive growth and for the last 8 years it has grown at the rate of about 4% a year.

We can also show substantial progress in the modernization of our institutions. We have clear and permanent rules of the game that no doubt are the best signals for national and foreign investment, with no discriminatory rules for either one of them. In spite of that progress, there is still a lot to do. In this context our present government is committed to implement "El Plan de Todos," A Plan for Everybody. An ambitious project that aims to consolidate the basis of a free economy market to create the conditions for Bolivia to enter the 21st century with a modern, competitive and open economy into the world markets.

Having said that, let us briefly glance into the past.

For the last 20 years my country has been exporting natural gas to Argentina.

The operation was contractually arranged in 1968, and deliveries started in 1972. A 24-inch gas line of 500 miles was constructed, and condensate fields were developed with their respective cycling plants.

Initially, 1.1 trillion cubic feet were to be delivered in 20 years at the rate of 150 MMCFD. As it happens everywhere, when a gas contract is satisfactory for seller and buyer, it was increased since 1980 to reach a volume of 220 MMCFD. In this fashion, 1.3

trillion cubic feet of gas have been exported to Argentina and continue to do so.

As a great summary of these 20 years of export of our natural gas, we can show as results:

a) Financially, the operation has been a great success. At no moment has it been necessary to refinance our obligations. They were all paid as originally agreed with the banks.

b) from the point of view of supply, it was also a great success. During those 20 years the supply of natural gas has been regular and continuous. With legitimate pride, we can declare that Bolivia is a country completely reliable as far as gas supply is concerned.

But now let us talk about the present.

Our original contract with Argentina concluded in May 1992 and we continue our exports with the same volumes on short term contracts in a deregulated market, and it is our intention to continue to be present in that market for the coming years.

At the same time, last February, after years of successive approximations, our national company, YPFB, and Petrobras signed a purchase and supply contract of natural gas.

It is a 20-year take-or-pay contract that starts with deliveries of 285 MMCFD that increase every year to reach 562 MMCFD at the seventh year and remain at that level for the rest of the contract.

A system of pipelines has to be built. A 20-inch line, 1125 miles long starts at the Rio Grande in Bolivia and reaches Paulinna in Brazil (see graph 3). From there it continues south with a 22-inch

line for another 270 miles to Contiba. From that location, the Brazilian authorities are considering to extend the system all the way to Porto Alegre, with another 410 miles of 18-inch and 12-inch pipe.

Recently, Petrobras has engaged CS-First Boston to raise the financing for the lines, which will have a substantial private component. The investment needed is estimated to reach 2 billion US dollars. Additionally, we estimate that in the next 10 years, we will need to invest approximately US\$ 800 million to put our existing fields into production to feed the gas line. Furthermore, it is also estimated that Brazil will have to invest about US\$ 2 billion to build the distribution networks. Thus, we are facing a US\$ 5 billion project with great upstream and downstream potential, plus the chain effect that these investments will produce in the Bolivian and Brazilian economies.

At present, as it was said before, we have 6 trillion CF of natural gas reserves and large areas of our country are subject to important exploratory work by our national company and more than a dozen important private oil companies. One of them, Maxus, has already developed commercial productions in an unproved area. Likewise, Mobil has also made a good find in a completely unexplored basin, in the Madre de Dios. These positive finds are giving us the signals that, in the near future, we will have more important discoveries.

What was said before allows us to face with confidence our commitments with Brasil. We are sure that in the near future

Bolivian gas will be delivered in that market for the benefit of the Brasilian consumers and the producing Bolivian oil companies.

But we are on the threshold of the 21 century, so I think it is convenient on this occasion to convey a vision of what lies in the future for Bolivian gas. Hence, let us talk briefly about the gas lines of the 21st century in the Southern Cone of South America.

As we all know, at least until the middle of the next century hydrocarbons will continue to be the predominant energy supply of the world. There are sufficient reserves, and consumption patterns are difficult and slow to change. Considering these realities, natural gas has a privileged position. It is the least polluting fossil fuel. On the other hand, commitments between suppliers and consumers are for a long time and very stable. No doubt natural gas is the fossil fuel of the 21st century.

In the world scenario, how is our regional position? On the basis of the existing information, we believe it is completely feasible that, in the next 10 years, 22 trillion CF of additional reserves of gas and about 2,000 MBBL of oil can be discovered in our country. With that premise, the Bolivian oil industry could comfortably produce 1,600 MMCFD for 20 years. Additionally, during that lapse of time, substantial amounts of reserves will be developed in the North Western part of Argentina and Camisea in Peru. Consequently, there will be great productions of gas in Bolivia and the surrounding areas.

On the other hand, looking at the markets, we are convinced that the Brasilian market, once we start with our contracted supply, will grow at an accelerated pace, to reach great dimensions. At the

same time, the Argentinian market will continue to grow. And let us not forget that presently there is also an important potential market in the northern part of Chile.

All that was said before, allows us to foresee a network of gas lines as shown in this map (see Map 4).

A reasonable conclusion of the previous scheme is that Bolivia could become the hub of a system of supply and transport of Bolivian gas and from other sources to the previously mentioned markets.

This brief outlook of the future of the oil industry would not be complete without mentioning the institutional changes that are taking place in my country.

Previously, I mentioned the Plan de Todos, a Plan for Everybody. The fundamental element of this plan, which is being executed by our government, rests on the capitalization of our public enterprises, including of course our national oil company.

It is not the standard privatization scheme. We are not reaching directly to the capital markets by placing shares in stock markets. We are looking for strategic investors. With independent and reputable consultants, we will assess the value of our company. With that value, we will issue 50% shares of the company and transfer to the strategic investors--in fact, doubling the capital of the company. The investor will have full control and management of the future company that will be delivered free of financial, labor and environmental liabilities.

The remaining 50% of the shares will be distributed among all Bolivian citizens at a given date. These shares will not have voting rights and will be traded only among Bolivian citizens.

As described, we intend to promote private investment in our oil industry, and bring technical and managerial skills. The investor will not have the government or state as its partner, but will have the Bolivian citizens as silent share holders. This figure will provide a stable climate ensuring against confiscation or nationalization.

To capitalize our oil company, we are updating our Hydrocarbon Law to eliminate all monopolistic features vested in our state oil company, deregulating our market, allowing free disposal of the production, and making our tax system competitive with other parts of the world to foster private investment.

Gentlemen, I will not demand your attention any longer. The bottom line is simple:

A vast, interesting oil-bearing territory is waiting in Bolivia, markets for gas and oil are within reach, and modern and competitive oil legislation is being put into place. So I guess all I can say is thank you for this opportunity to convey our thoughts and intentions, and hope to see you there in the near future.

Dallas, 27 September 1993

“Moderator”

Peter Gaffney
President
Cline and Associates

The Second InterAmerican Petroleum and Gas Conference

Latin American Production - Premium Barrels?

by

Peter D. Gaffney
Gaffney, Cline and Associates

The rapid increase in acceptability of various potential exploration and production venture opportunities throughout most of Latin America has created yet another watershed in our ever changing industry. Who would have believed a very short while ago that ventures in Latin America would compete successfully for risk funds against well established opportunities in such areas as the North Sea or Asia Pacific and even with the heady prospects continuing to appear in the CIS?

Is this competition real, or is it all another industry myth which sets sights too high and where we chase each others pot of gold before reality sets in? Let us try and examine some of the reasons why the current enthusiasms may be justified, particularly so in the case of North American investment.

The Prize

Few would argue that there are huge potential opportunities in some established basins in Latin America. Our frontier exploration elsewhere in the world has not been particularly successful - what has been successful is further exploration using old and new tools in well known hydrocarbon basins; Latin America is well endowed with such opportunities from Colombia and Venezuela to the north and as far south as Tierra del Fuego in Argentina. These opportunities include a spread of potential reserve sizes, a range of oil gravities, some significant gas potential, and an ability to go for good exploration prospects in established basins or work on significant rehabilitation projects which include exploration potential. While there are some offshore opportunities, the Latin American opportunity is basically a land play - and in many instances one where costs can be controlled and development carried out in more of a step by step way than is possible offshore, further enhancing potential returns.

The Deal

Like other major areas of the petroleum world, the deal varies from country to country. Like elsewhere, there is increasing recognition that adjusting the deal to provide reasonable returns at current costs and prices is necessary to attract capital. Unlike elsewhere, there is increasing evidence that governments in Latin America have come to grips or will shortly come to grips, with such adjustments where they are necessary. Relative to risk, returns look attractive in a number of regional basins when compared to European and/or Far East opportunities. It is still difficult to finance development programs in the region externally, as it is elsewhere, but there is an increasing evidence that financial institutions are prepared to listen and indeed the very successful YPF Argentina privatisation represented a benchmark change in international perceptions.

Time to Do a Deal and/or Get Production

The demand for investment and the evolving investment climate means that the time to do a deal is shortening. As significant industry infrastructure already exists in many areas, there are a number of opportunities where the time to get production will be shorter than elsewhere. Of course the frontier type exploration opportunities, especially in the internal basins, may well suffer the delays typical of major projects in other regions of the world or countries.

Costs

Because many of the opportunities are in benign environments in established basins, it is and should remain, possible to control costs effectively. Virtually all the producing countries have a long history of production and the existing infrastructure in many is sophisticated and extensive. In several of the countries there already exists major capacity for local manufacture of a high proportion of material and supplies further aiding cost and logistical controls.

Indeed the challenge in virtually all parts of Latin America is with the operator.

Operating Ethos

When compared to operating areas like the CIS a key aspect is that the operating environment is fundamentally one with which we are familiar. Several countries are already able to supply significant proportions of material and services from local sources to industry specifications.

Market

Latin America competes well against Gulf crude delivered to the US market and even to the Rotterdam market. Its closeness to the USA means that in low oil price times, like the current ones, the additional margin can be very significant. There are also significant regional opportunities for gas sales and some well developed gas markets with growing domestic requirements.

Communications

While it takes longer from Texas to get to Argentina than to Europe, we remain more or less in the same time zone for most of the region and communications overall are very good. With similar cultural backgrounds, both technically and socially there is little doubt that going south has a significantly less 'foreign feel' than moving to Africa, the Middle or Far East or the CIS.

Hassle Factors

Virtually the full suite of hassle factors exists in the region as they mostly do elsewhere. These range from the serious problems of personal and equipment security in one or two countries in the region to the paperwork and approval delays almost endemic in all parts of our world. However, there is a noticeable improvement in many parts of the region. There will need to be further significant improvement in some of these areas if significant risk funds are to continue to be available almost regardless of the size of the prize.

Perceptions

There is little doubt that there is an increasing perception that the Region is one of the current places to be. It competes well with the CIS, in that deals can be done, they can be done now and there is a prospect of early and significant production. Tax regimes are relatively stable and some are especially attractive. Indeed it is possible to choose your own opportunity to suite your risk reward profile in this region today probably more easily than anywhere else.

Taking all these factors together there would seem little doubt that Latin Barrels are indeed premium barrels especially so if we recognise that the challenge is primarily now with the operator to develop realistic and imaginative approaches.

“The Privatization of Petroperu”

EMILIO ZUNIGA CASTILLO

Chairman of the Board
Petroperu

INVESTMENT OPPORTUNITIES IN THE
PERUVIAN OIL INDUSTRY

By Emilio Zúñiga C.
Chairman of Petróleos del Perú

I. HISTORICAL HIGHLIGHTS

Peru's oil history dates back to the 19th century, when the first oil well was drilled on the northwestern coast of Peru, in 1893. This was the first oil well ever drilled in South America. Thus, by the year 1905, the oil industry was well established in the country.

It is true, however, that the oil history has showed an uneven development, partially because of the uneven economic development in most Latin American countries.

A brief glimpse of the oil history reveals three major periods to which I will now refer:

- * From 1920 to 1968, Standard Oil carried out petroleum operations in the Talara Basin. After being a net oil-exporting country, with exports reaching a peak of 44 MB/D in the mid-30's, we became a net oil-importing country in 1962. This period ended with the expropriation of International Petroleum Company (IPC) in 1969.
- * From 1970 to 1976, a renewed exploration effort was centered on the Jungle, particularly in the Marañon Basin, where state and private investment reached its peak. In 1978, Peru became again a net oil-exporting country, with exports reaching a peak of 79 MB/D in 1985. At present, we are net oil exporters, with exports on the order of 18 MB/D.
- * From 1979 to 1992, after the changes introduced to the so-called Peruvian Model Contract, investment in the oil industry improved for a short period of time, but this improvement was followed by a long-lasting declining trend, from 1980 to 1992.

Charts 1 and 2 clearly show the decline in both investment and proven oil reserves, respectively.

However, if we take into account gas reserves, the finding of the Camisea Gas deposit in the Ucayali Basin in 1987 marks a sharp upturn that resulted in additional reserves estimated at 2 billion barrels of oil equivalent.

In regard to the development of the hydrocarbon sector as a whole, three major characteristics should be stressed:

- a) Crude production showed a declining trend since 1980, as shown in Chart 3.
- b) Domestic consumption remained stagnant from 1980 to 1992, but in 1993 we can see strong signs of recovery, as shown in Chart 4.
- c) In terms of value, the crude export trade balance vs. imported refined products shifted from a surplus to a deficit position, as more residual oil was produced and more diesel oil was required locally, as shown in Chart 5.

II. SEDIMENTARY BASINS CURRENTLY AVAILABLE

In Peru, up to 18 basins have been identified, covering 174.3 million acres with an attractive exploration potential, as shown in the past.

These basins, that have been grouped together in three major areas according to their geological characteristics, have already proved a promising potential for oil discoveries, as shown in Figure No. 1.

Western Basins: These are mainly associated basins located along the Peruvian Coast, from Tumbes on the north to Mollendo on the south, covering a total of 53.8 million acres. The Talara basin, which is next to the Tumbes basin, is located in this area. Production from the Talara basin dates back to the 19th century, and accumulated production to date stands at 1.3 billion barrels.

Due to the outcome of offshore operations on the Peruvian northern coast, there is a renewed interest in conducting exploration operations further south, in the Trujillo and Salaverry basins.

Central Basins.- They comprise some 23 million acres of mostly unexplored areas, located on the eastern side of the Andes mountain range, where favorable geological structures offer opportunities for further exploration, particularly in the Titicaca basin, in the southern region of Peru.

Eastern Basins.- They include the Marañon, Ucayali and Madre de Dios basins, comprising 97.5 acres. Intensive exploration has been conducted in these areas, but they still offer an attractive potential. From these areas, Occidental and PETROPERU have produced 800 MMBO.

In the aggregate, some 138.7 million acres are still available for exploration.

◦

III. RENEWED INVESTMENT CLIMATE

In mid 1990, with the installation of the new administration, Peru started a long-awaited economic reorganization process that included the oil industry. Consistent with its good oil potential, a number of legal reforms were passed by the current government with the aim of improving private investment stability and granting a series of economic guarantees. This process resulted in the drafting of the new Hydrocarbon Law, passed by Congress on August 13, 1993.

The latest legal reforms have been grouped together in a single and quite simple legal text: the new Hydrocarbon Law. In this law, the State ratifies its commitment to grant the required flexibility to investors, deregulates prices, opens the hydrocarbon sector to the private sector subject to no restrictions whatsoever, assures a sound economic policy for the development of the hydrocarbon sector, and separates the government role as promotor and contractor of oil contracts with private interests, through the creation of PERUPETRO S.A., from the entrepreneurial role assigned to PETROPERU S.A.

As part of this process, PETROPERU implemented a promotion effort with the aim of encouraging private investment in oil exploration and exploitation. As a result, Chart 6 shows an increased activity in this area with a number of contracts already signed.

The interest shown in new exploration areas has rapidly increased during the last few months, and 15 oil companies have already expressed their desire to invest in exploration in Peru, as shown in Table No. 1. In addition, we have entered into three interesting agreements, one for the Salaverry Basin (an offshore area), another one for the Ene Basin, and the other one for the Madre de Dios Basin, where compilation of new data and reprocessing should give rise to updated data for potential investors.

IV. NEED FOR OIL EXPLORATION INVESTMENT

Although domestic demand has remained rather flat during the last 10 years, the constant drop in proven oil reserves and oil production could make us become again a net oil-importing country. In order to stop this downward trend and recover our position, the country's oil replenishment rate should stand at over 100% per year. If we take the average investment in Jungle exploration work and the discovery of oil reserves over the same span of time, we will obtain the average cost of additional oil reserves.

Thus, in order to replenish the country's oil reserves to make up for the annual oil consumption rate, a US\$95-million investment is required on an annual basis. The current investment commitment under the new oil contracts stands at some US\$35 million per year, there being a gap of US\$60 million.

We can clearly see that in view that domestic demand has remained flat during the last decade, there will probably be a higher investment target if there is an increase in domestic demand. The new policies have been precisely devised to meet this challenge.

V. PETROPERU'S PRIVATIZATION: MAIN GOALS

PETROPERU's privatization process is included within the economic reorganization program and should be considered as part of a global process that will tackle a highly protected system, heavy state intervention, severe divestment, financial bankruptcy, overstaffing and obsolete management tools.

Within this context, state companies began in mid 1990 a readjustment process, enjoying an increasing autonomy with respect to central government entities, mainly based on an evaluation of the past experience, of the pros and cons of our resources, and of the dynamic foreign trends. In this process, we have identified our main goals and an overall strategy, to which I will refer now:

Sectorial Goals:

- * Promote the creation of a new and competitive business environment in the oil industry.
- * Offer strategic positions for the Sector's development.
- * Allow for the participation in every stage of the business private interests.

It is necessary to promote a competitive business environment in the oil sector because PETROPERU still has a monopoly on most petroleum activities and, given that the new Hydrocarbon Law is free-market oriented, it is necessary to dispose of PETROPERU's assets in order to accelerate and strengthen this process.

On the other hand, the disposal of PETROPERU's assets should be made in such a way so as to offer attractive opportunities in the sector, mainly from the market's growth potential.

It is clear that both goals entail some drawbacks. The priority of a free-market oriented policy, aware of the limits imposed by the current market development, will be stressed.

The reorganization process opened by this privatization opportunity should result in the creation of new corporate entities, according to a modern pattern. Thus, the privatization process entails not only the disposal of assets, but also the transfer of efficient economic units.

By the same token, the above goals make us identify desirable investors, like, for instance, those with a corporate strategy consistent with the current privatization process, geared to a strong desire for growth and excellent reputation in the industry.

A careful restructuring process, coupled with attractive purchasing opportunities and an adequate work environment in the oil industry, should result in successful competitive bidding.

Finally, confidence in the overall process through a number of factors, such as consistent policies, good organization, extensive information and an appropriate sale mechanisms, should assure the transparency of the privatization process.

VI. GLOBAL STRATEGY FOR THE SALE OF PETROPERU

PETROPERU's overall privatization strategy can be defined as a strategy to privatize the oil sector in Peru. Accordingly, assets are seen as part of an integral system and, therefore, the assets' disposal should not jeopardize PETROPERU's functions. But due to the various assets involved in this process, it is necessary to apply different privatization mechanisms, taking advantage of the opportunities currently available in the market, and finally the timing of this process should be dictated by technical rather than short term political interests.

I will now refer to the main steps required to implement this global strategy:

- * Privatization should start with non-strategic assets.

- * A corporate rationalization program should be implemented by closing down inefficient operations, curtailing program costs, and improving profitable opportunities.
- * The company's operations should be organized to operate in a deregulated market.
- * Petroperu's strategic economic units should be evaluated and defined under the new regulatory framework.
- * The market's interest in Petroperu's assets should be defined.
- * Political approval of the preferred sale modality must be obtained.
- * The political sale option should be implemented.

VII. PETROPERU'S MAIN ASSETS

PETROPERU's main assets should be particularly attractive, as they offer great opportunities for improvement, and a high rate of return. A growth potential can be identified for both upstream and downstream opportunities, as I will now describe:

Upstream Opportunities:

PETROPERU operates two oil fields, one of them on the northwestern coast of Peru and the other one in the Amazon Jungle, with the following characteristics:

- * Talara Operation.- Production currently stands at 19 MB/D and proven and probable reserves add up to 147 MMB.

- * Jungle Operation.- Production currently stands at 26 MB/D and proven and probable reserves add up to 92 MMB.
- * Oil Pipeline.- Its current capacity is 200,000 BPD and it currently transports 80,000 BPD.

Downstream Opportunities

- * Refineries.-

There are four refineries in the country, with a total capacity of 180,000 BPD. The two major ones are located on the coast, one in Talara, with a capacity of 62,000 BPD, and the other one in Lima, with a capacity of 102,000 BPD.

The Iquitos refinery, with a capacity of 10,000 BPD, is located in the Jungle and satisfies most of the region's fuel demand. Finally, the Conchan refinery is close to Lima, and is used to produce asphalt for the local market.

In terms of domestic consumption, the refineries have an idle capacity that is now used under a trade deal. However, it is evident that after a long economic stagnation, the market has potential for growth and profitability.

- * Terminals and Plants.-

There are 8 Terminals on the coast and 8 Plants in the interior of the country. These terminals and plants were designed to cover the distribution of fuel and other petroleum products all over the country under monopoly conditions.

The above assets continue being managed under the current restructuring process, with special emphasis on the company's capacity to reduce operating costs and introduce more efficient management tools.

VIII. FINANCIAL PROFILE

PETROPERU, as most of the state oil companies, has been subject to price control policies that resulted in massive subsidies. Furthermore, the erroneous sectorial policies applied to the company also resulted in a large operating deficit and heavy losses.

The introduction of realistic policies under the current economic program resulted in a gradual price adjustment. Moreover, the implementation of a program to cut down operating costs through the rationalization of activities brought about dramatic changes in the company's financial position during the last few years, as can be seen from Chart 7.

The company's income has substantially increased due to the gradual increase in domestic prices in order to reduce the gap existing with respect to equivalent import prices. At the same time, with the support of the reorganization plan, the company's P&L has shifted from heavy losses in 1989, on the order of US\$427 million, to a profit of US\$5.8 million in 1992 and US\$21 million in the first semester of 1993.

The complete liberalization of oil and byproduct prices approved by the new Hydrocarbon Law is expected to fully become effective in December this year, representing a step forward in the company's financial position for 1994.

PETROPERU is long under way to become truly competitive an profitable operation. The recent results shows the strong committment from the government as well as from the company to become an efficient operation in the oil industry. In this task, the Peruvian Government is looking for the right alliances with the private sector, and we invite you to participate in the privatization of the company, so as to achieve our goals and share the benefits of this policy.

INVESTMENTS IN EXPLORATION

INVESTMENTS (Million US\$ 1992).

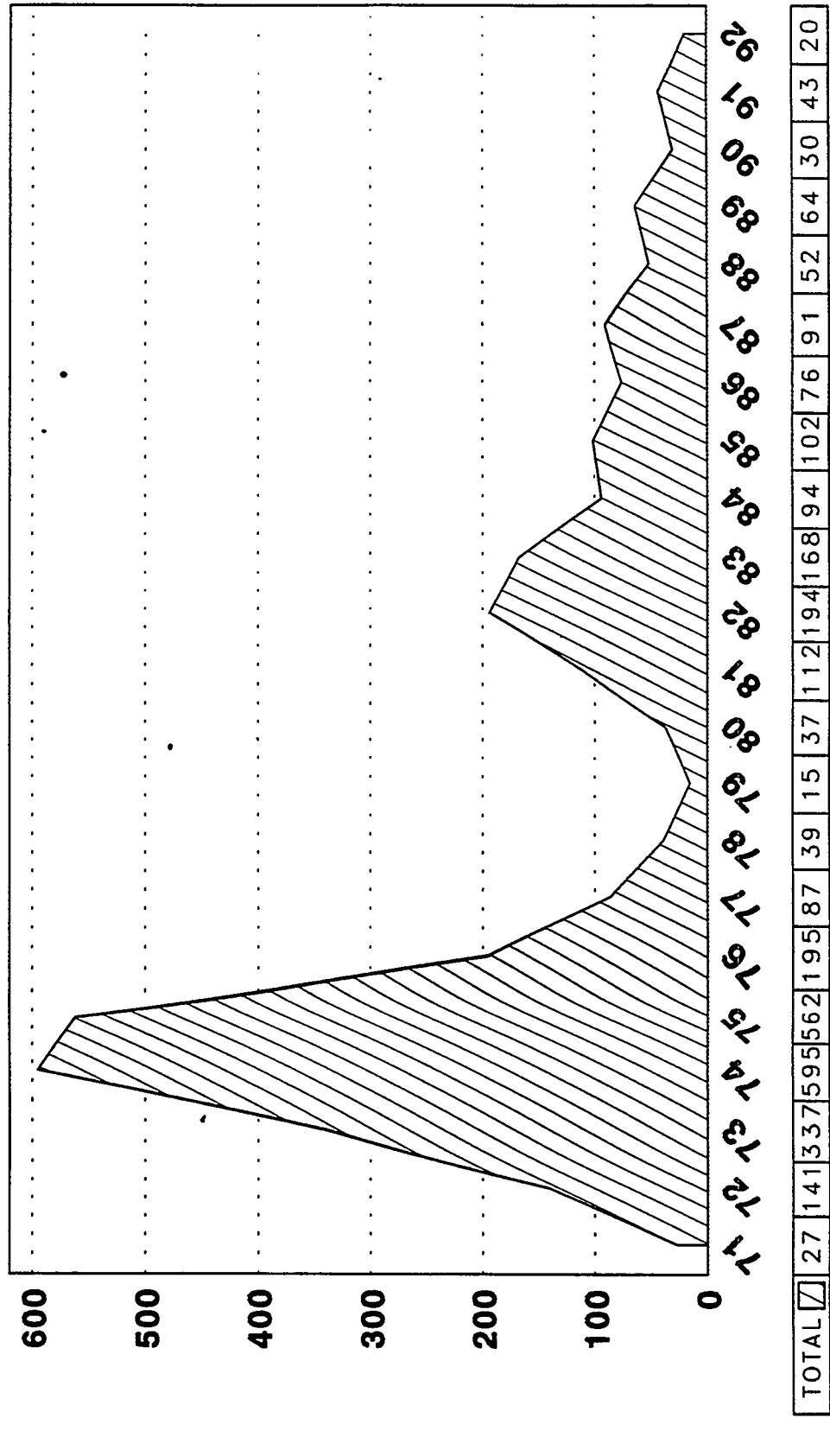


CHART 1

TOTAL PROVEN HYDROCARBON RESERVE

Thousand Million Bls-Eq (Oil, Gas & NGL)

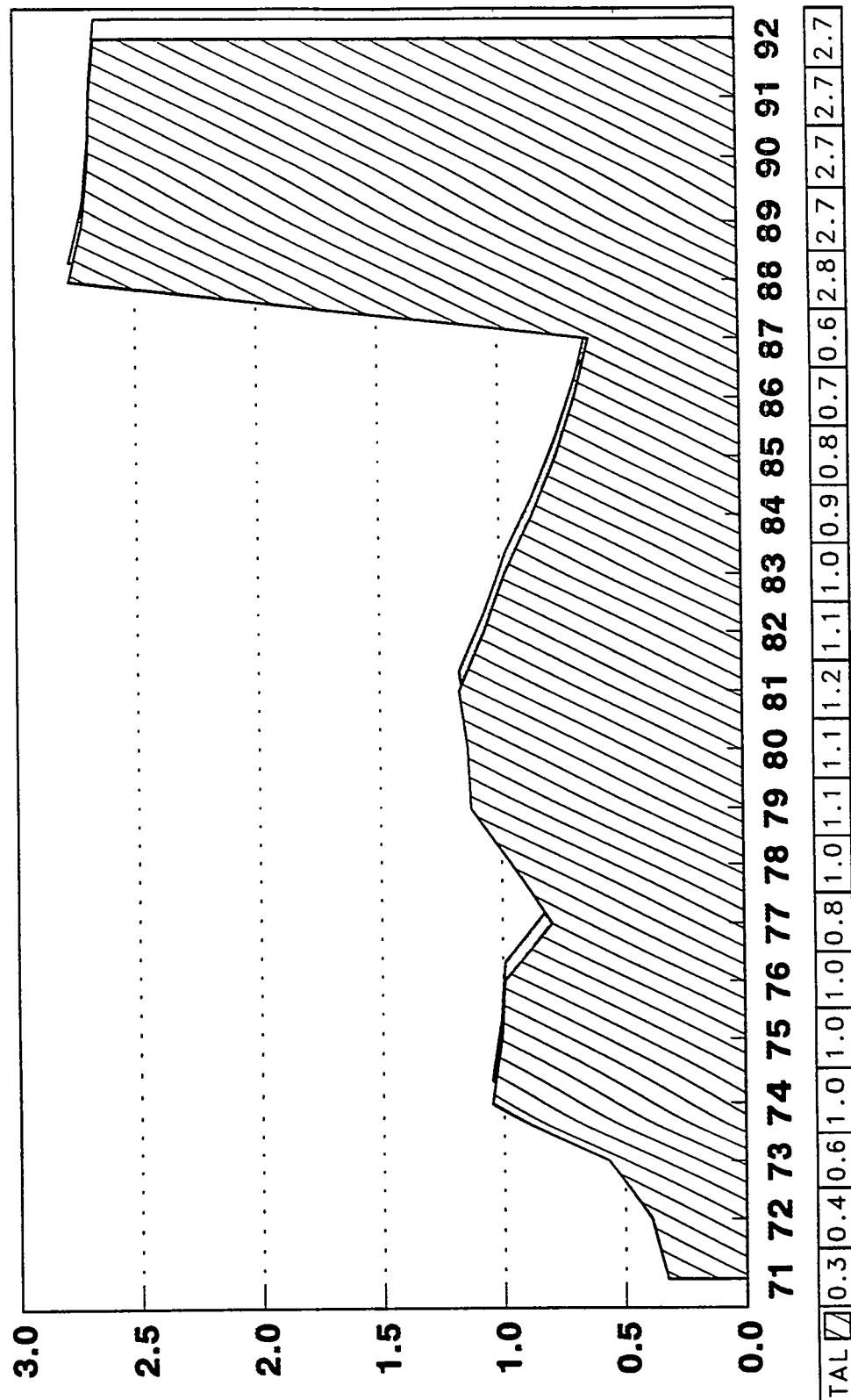
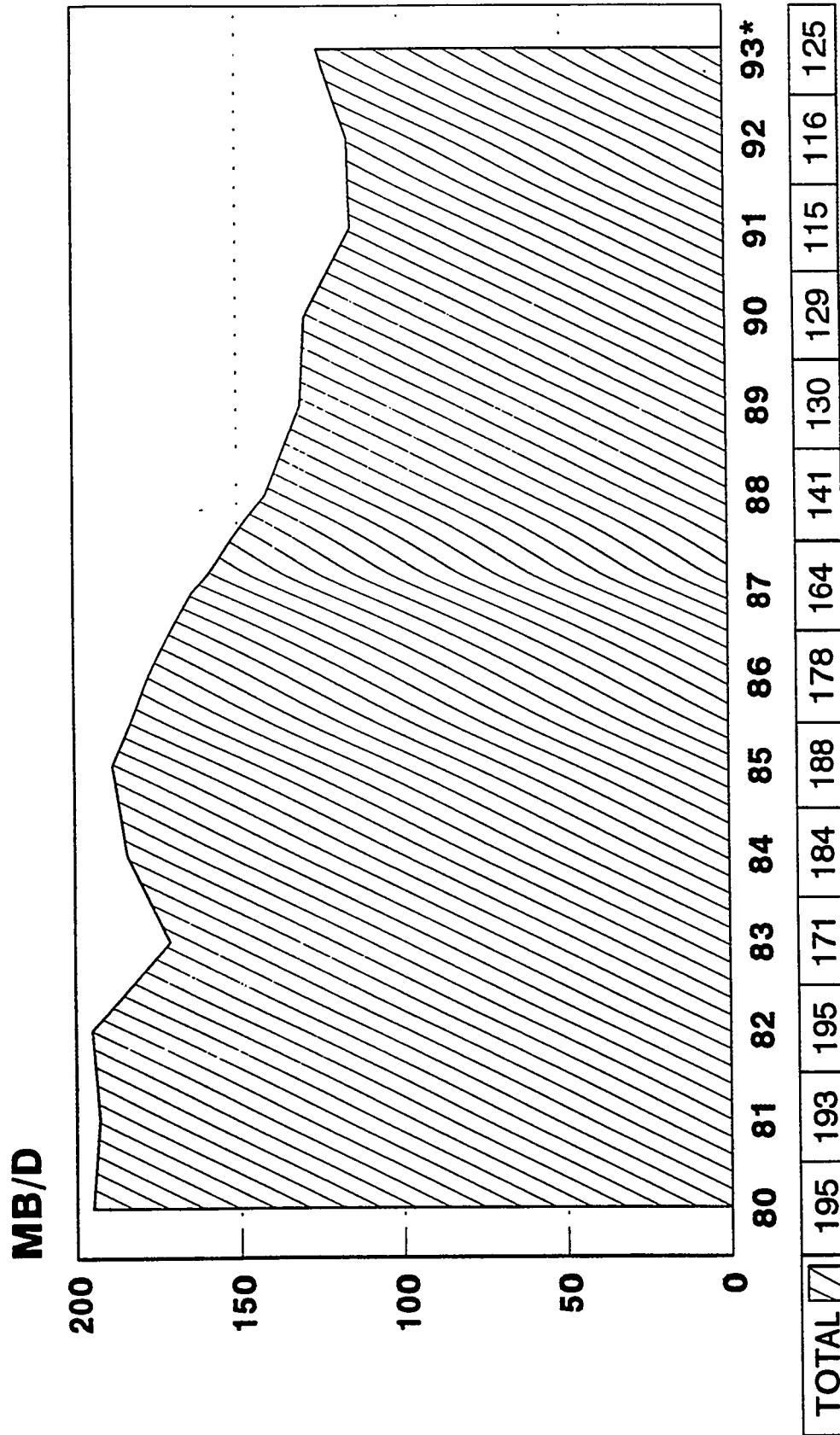
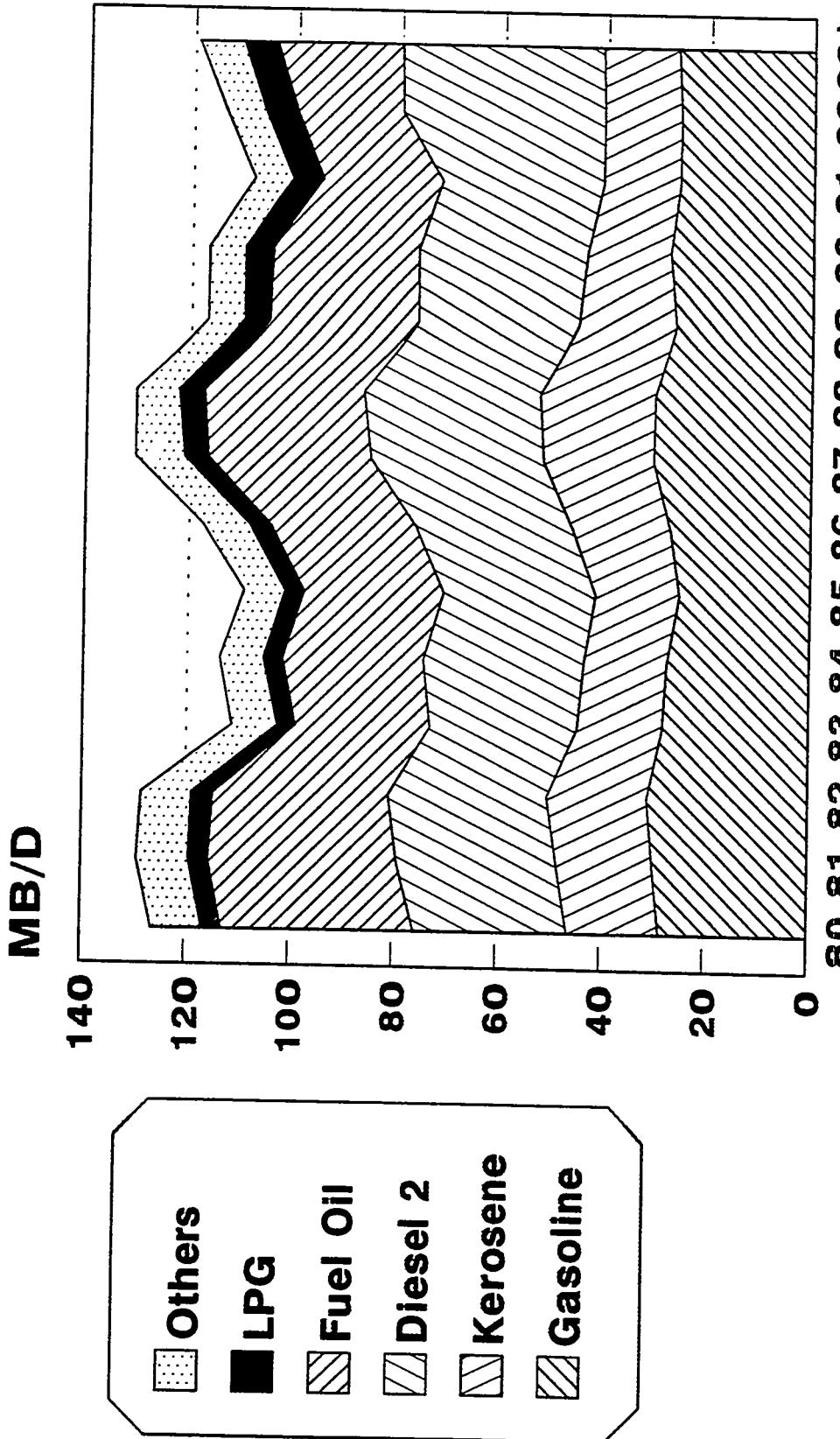


CHART 2

CRUDE OIL PRODUCTION - ANNUAL



PRODUCT SALES IN THE DOMESTIC MARKET



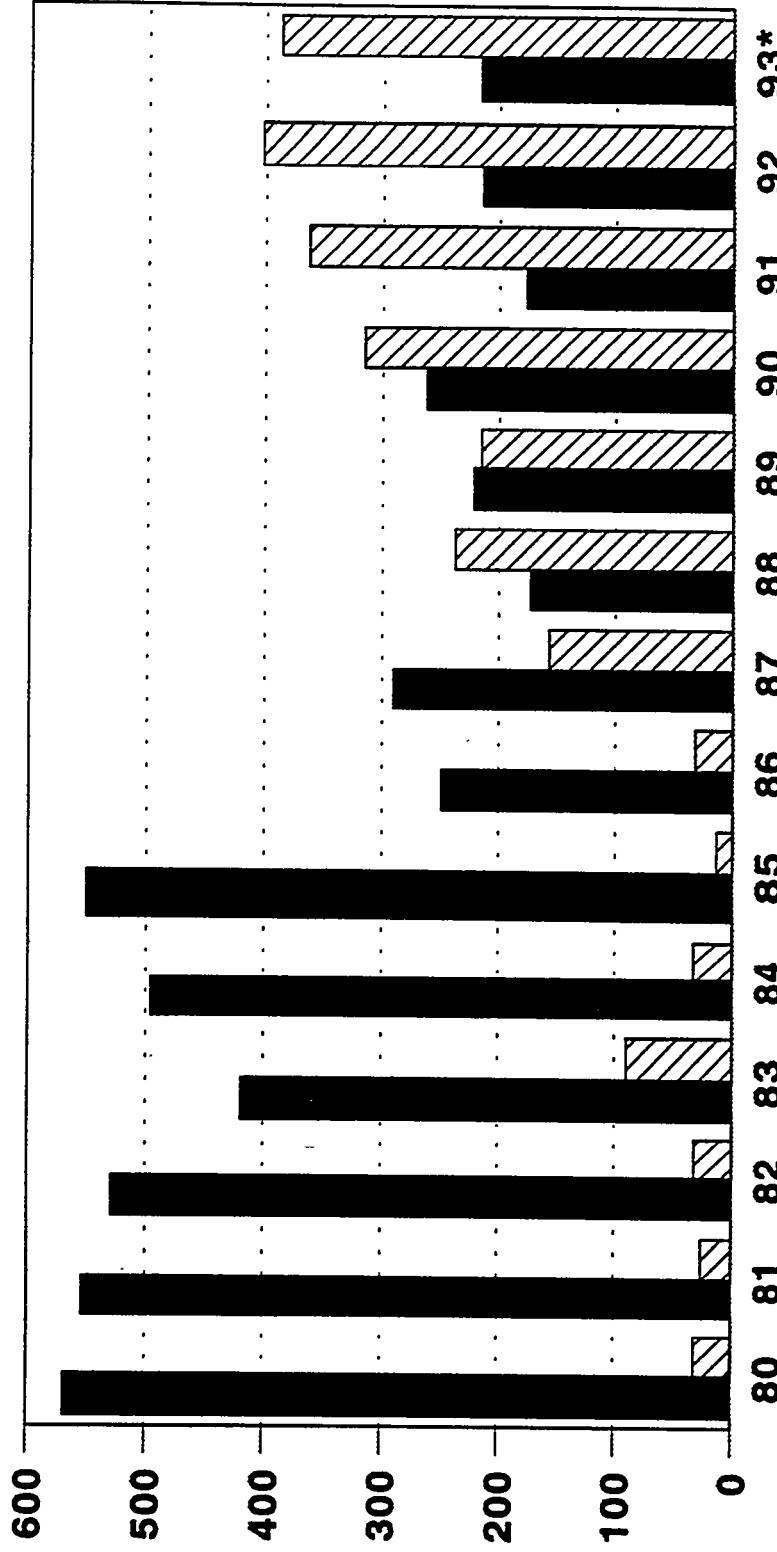
TOTAL LOCAL SALES 126 129 129 111 114 109 117 130 130 117 117 108 114 119

(*) Forecast 1993

CHART 4

COMMERCIAL BALANCE OIL & PRODUCTS

Million US \$



(*) Forecast 1993

CHART 5

SIGNED CONTRACTS PER YEAR

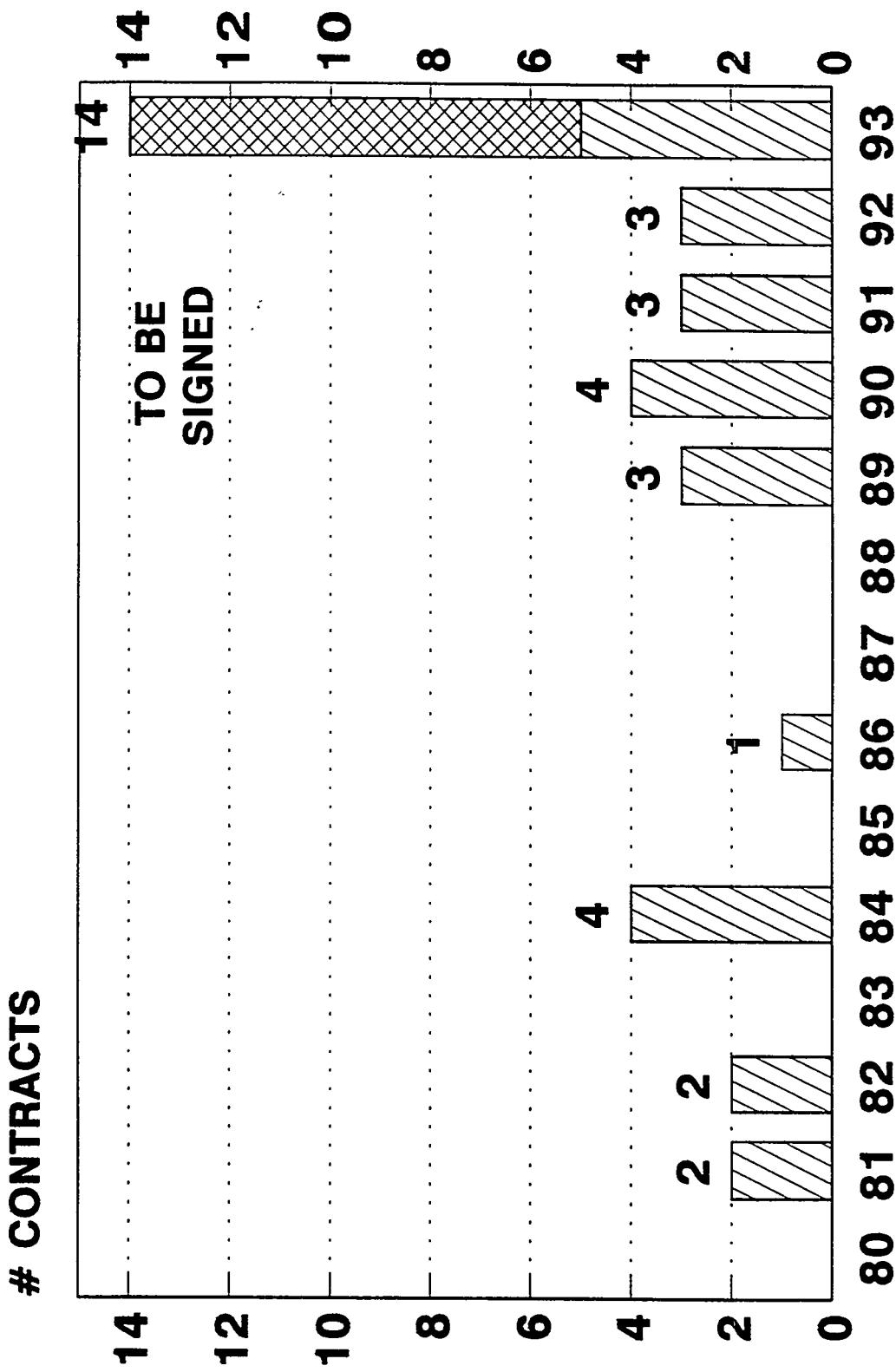
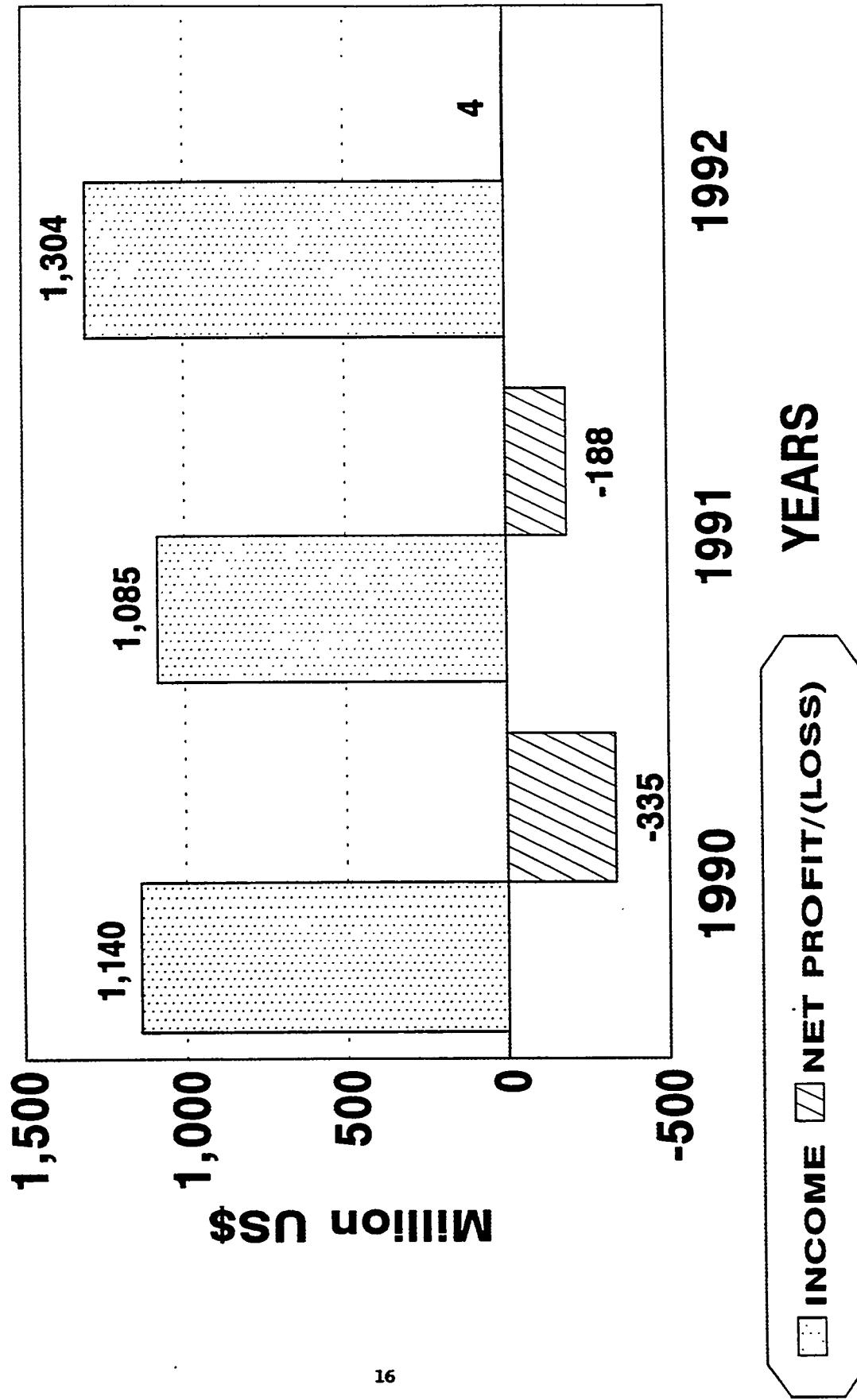


CHART 6

ECONOMIC RESULTS



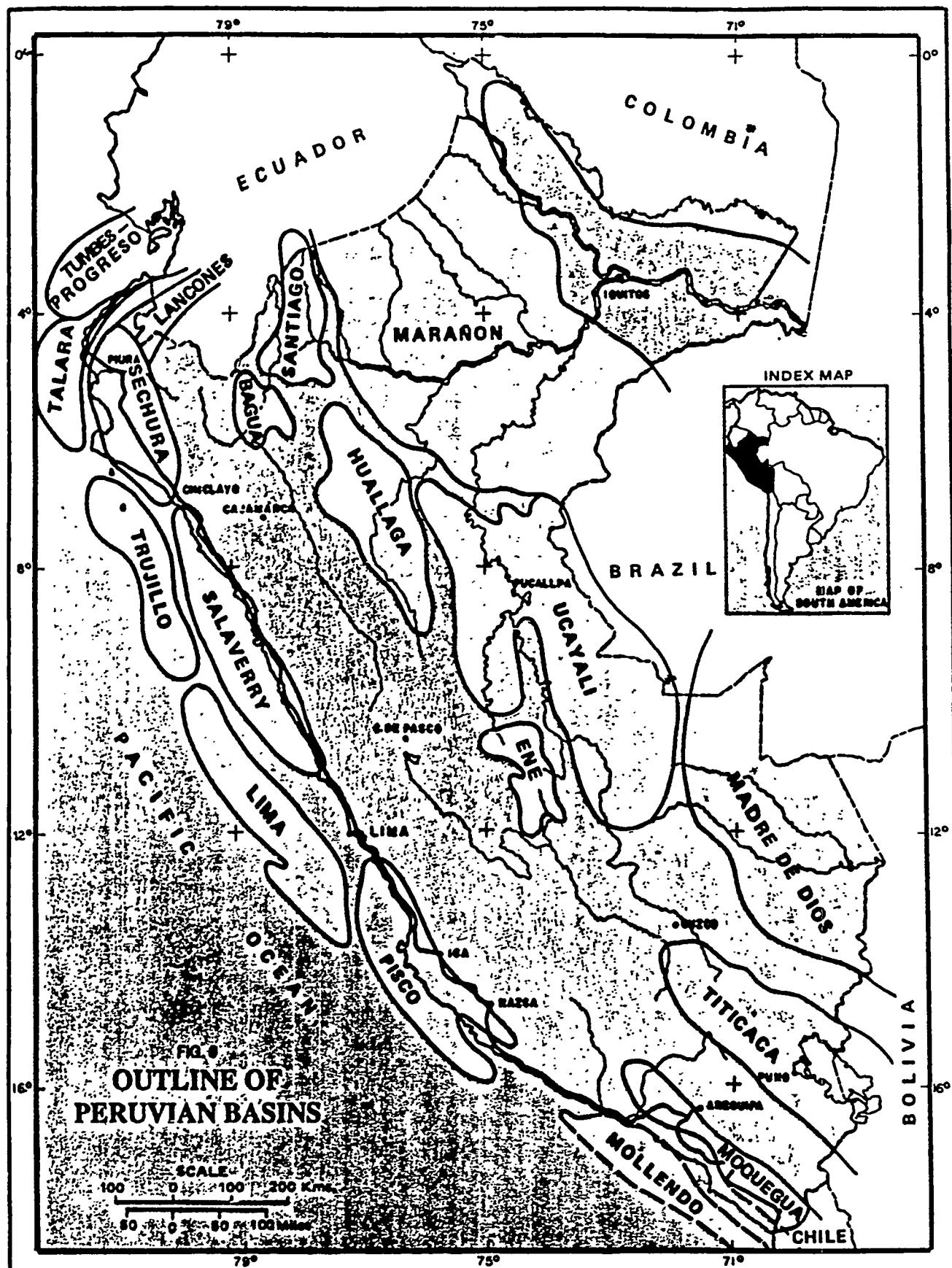


FIGURE 1

INTERESTING AREAS FOR OIL COMPANIES

TABLE 1

**“Private-Sector Participation in Trinidad and
Tobago in the Petroleum Industry”**

TREVOR BOOPSINGH

Chairman

Petroleum Company of Trinidad
and Tobago, Ltd.

Information International Associates, Inc
Indexing Worksheet

Printed: 10/27/95

Due Date: 11/10/95

Control No: 95:007220-0009

<020>RA

<040>K

<090>Private ^{sector} participation in the petroleum industry of Trinidad & Tabago

<110>Proceedings of the 1993 InterAmerican Petroleum and Gas Conference

<360>Paper 9, 23 Pages

<530>EDB;ETD;INS

<540>

<620> 020700 ; 020200

<740>BK

<950> Use "Conclusion" on p.16 for Abstract
-- abstract length: 0

<801>

Trinidad and Tobago ; TI
Petroleum Industry : P1, T2
Investment : P2
Petroleum Deposits
Exploration
Taxes
Capital
Finance : P2
Production

v

<020>Document Type
<040>Literary Indicator
<090>Primary Title (A)
<110>Primary Title (M)

<360>Pages
<530>Announcement Code
<540>EDB Subject Categories
<620>Title Augmentation

<740>Indexer's Initials
<801>Keywords
<950>Abstract

EAST-WEST CENTER
PROGRAM ON RESOURCES

INTER-AMERICAN PETROLEUM AND GAS CONFERENCE
(IPGC '93)

**'PRIVATE SECTOR PARTICIPATION
IN THE PETROLEUM INDUSTRY
OF TRINIDAD & TOBAGO'**

Trevor M. Boop Singh

1993 September 27-28

PRIVATE SECTOR PARTICIPATION IN THE PETROLEUM INDUSTRY OF TRINIDAD & TOBAGO

by

Trevor M. Boopsingh

BACKGROUND

Trinidad and Tobago is a twin island state located at the southern most end of the Caribbean chain of islands. The country was a British colony until 1962 and its small population is plural and diverse in background and cultures. The British parliamentary system of democracy has been the model adopted for governing the state and with the exception of disturbances in 1970 and 1990, has peacefully and successfully managed the transition from dependency to self-government. The economy of the country which had been largely dependent on sugar in the first half of this century, has seen a shift in its dependency to petroleum in the second half. As may be expected in the early post-independence period in the 1960's, considerable effort was expended on creating the new institutional arrangements that accompany independence. Attention was naturally given to the key petroleum sector which had previously been consolidated largely under the control of the major oil companies operating in the country; Shell, British Petroleum and Texaco. By 1968, several events took place which had a decided bearing on the decade that was to follow. Among these were:-

- The enactment of new petroleum legislation so as to further the development of this sector;
- The sale of the assets of British Petroleum to a new joint venture company which the government entered into with a small U.S. independent, the Tesoro Petroleum Corporation of San Antonio, Texas;
- New gas discoveries by the Pan American Oil Company (Amoco) and a significant oil discovery by that same company in the following year.

The new oil finds dramatically improved prospects for the economy in the next decade and the new gas finds prompted serious efforts by Amoco to enter into a large liquified natural gas project with People's Gas of Chicago as the principal partner. As the '*energy crisis*' of the 1973-1974 era drew near, Shell Trinidad Limited as part of Shell's restructuring in the Caribbean sold all of its assets to the Government of Trinidad and Tobago. The country thus embarked on its first 100% national venture in oil, a fully integrated company - TRINTOC.

The explosion of oil prices in 1974 required that immediate attention be paid to the collection of the vastly increased revenues now available from the petroleum sector, and by March of that year, a new Petroleum Taxes Act was enacted to effect control over, and collection of, the surpluses accruing from oil. The establishment of an Oil Audit Section in the Board of Inland Revenue of the Ministry of Finance accompanied the changes in the law

which included, *inter alia*, the separation of the producing, refining and marketing businesses of the oil companies for taxation purposes, as well as the establishment by law of Tax Reference Prices for crude oil, to be fixed by the Minister of Finance.

The disposition of the vastly increased revenues now available to the Government (*see Table I*) posed several challenges and created many new and significant opportunities for this small independent country which had gone through the first ten years of its existence with very limited cash resources available for national development. The need for efficient and effective taxation systems as has already been noted, was the obvious first priority.

The surplus funds which had been accruing to the state since 1974, and the taxation system accompanying it were also the subject of considerable attention so as to:-

- a) minimize leakages to the state;
- b) effectively utilize these resources by controlled disbursement of the funds and careful scheduling of project implementation principally for a series of gas-based industries, and
- c) facilitate disbursements that would promote social harmony in a plural, diverse and relatively under-developed society.

The impact of the energy crisis globally also saw significant interest exhibited by external groupings in the country, which had been a petroleum producer and refiner since the turn of the century. Managing the new foreign interests as well as the interests of those of the existing companies required considerable expansion of the skills and resources available to the Government in respect of:-

- New acreages being awarded for exploration and production.
- Risk Management.
- Oil Audit Functions.
- International marketing of capital goods and commodities, both in terms of purchases and sales.
- Double taxation issues.
- Technology acquisition.
- Pricing of petroleum and petroleum products, and in general
- Skills in negotiation, contract administration and strategy development.

THE PRINCIPAL ISSUES

The role of the private sector in Trinidad and Tobago has, therefore, been guided by two principal factors, viz.:-

- the relatively short period during which the country has exercised independent control over its resources; and
- the small size of this mini-state with very limited human resources, given a population of just over one million people.

Thus while development of its resources, particularly human resources, has always been a principal objective of the country, the limitations imposed by size, including capital accumulation and the small domestic capital market, have seen a continuous presence of the foreign private sector since the earliest years of this century in the petroleum sector.

From the initial efforts of entrepreneurs (*Rust, Darwent*) and companies such as the Trinidad Petroleum Company at La Brea and the Paria Petroleum Company at Aripo, Trinidad and Tobago's petroleum has attracted the attention of small and large, local and foreign companies.

In 1911-12, twelve (12) companies started operations and thirty (30) others were registered. The notable names at that time were Trinidad Oilfields subsequently taken over by U.B.O.T. in 1913, Trinidad Leaseholds, Apex, Trinidad Petroleum Development, Venezuela Oil Exploration and Trinidad Central. By the mid-twenties, the number of registered oil companies had

risen to one hundred and fifty (150) with some forty (40) actually in operation.

In 1963 there were nine (9) companies, all foreign owned, operating in Trinidad and Tobago. Seven of these had some level of production, led by:-

Oil & Gas Production (1963)

Texaco	18.4	million barrels
Trinidad Northern Area	15.3	" "
B.P.	8.4	" "
Shell	5.1	" "

and at the bottom of the list

Trinidad Canadian Oil	1.02	million barrels
Premier Consolidated	0.38	" "
Dominion Oil	0.034	" "

In natural gas, these names also appear with Texaco's production in 1963 being 39 million cubic feet at the top of the list and Dominion oil with 38,000 scf at the bottom.

The offshore discoveries and the energy shocks of 1973 and 1979 led to renewed interest in Trinidad and Tobago, in the late 70's, as an area for exploration. This interest was demonstrated by the impressive list of Rightholders - on and offshore that existed in that period.

Amoco which had taken over the leases of Dominion, became the leader in production of both gas and oil accounting for about 75% of all production in the late 70's.

1975 - 1990

The availability of surplus capital arising out of the oil price windfalls of 1973-74, together with the discovery of major new gas reserves, thus provided the opportunity for the development of several gas-based industrial projects.

The first major result of this phase of the planning process was a decision of the Government to establish the following priorities for the use of the country's natural gas reserves -

- A) Enhanced oil recovery projects.
- B) As a clean source of fuel for -
 - i) electricity generation;
 - ii) small domestic energy-intensive industries;
 - iii) large-scale processing industries, e.g., petroleum refining and petrochemical industries.

- iv) large-scale energy-intensive industries, e.g., cement, steel and aluminium.

C) As a chemical feedstock for -

- i) the manufacture of ammonia and its derivatives;
- ii) the manufacture of chemical grade methanol and its derivatives; and
- iii) the direct reduction of iron ore.

D) As a feedstock for energy-export industries, e.g., LNG, fuel-grade methanol and synthetic gasolines.

Table 2 lists chronologically the major energy project developments which took place in Trinidad and Tobago in the period 1974 to 1992, as more than US\$3 billion were invested in the sector in new productive investments.

The change in the fortunes of the oil industry, as reflected by the falling real oil prices which declined steadily during the decade of the 1980's, in some ways dramatically altered the expectations of the strategies utilized in the boom years. By 1982, the Tesoro Petroleum Corporation and Texaco sought to adjust to changes in the global environment as well as to those policies then being adopted by the Government of Trinidad and Tobago, by offering for sale to government some of their assets in Trinidad. The predominance of gas finds in the 1970's had increased the country's proven reserves from 3

trillion cubic feet in 1972 to 10.6 trillion cubic feet in 1981 and had seen a diminution in investor interest in the acreages available in Trinidad. Extensive heavy oil reserves, estimated currently at 2 billion barrels, now became unlikely to be exploited under the existing tax regime at current and likely future oil prices. Oil taxation adjustments downward followed in 1983, 1984 and 1988, resulting with considerable decreases in revenues available to the State (*Table 3 refers*).

By 1990 the earnings from the gas-based industrial projects were providing almost one quarter of the petroleum sector's contribution. The establishment of the joint venture fertilizer complexes with Amoco and W.R. Grace, while now earning significant foreign exchange saw their profitability plummet as international ammonia prices followed the trend in oil and gas prices in the late 1980's. The steel complex established by the Government as a 100% state-owned entity suffered from the imposition of protectionist measures in the U.S. market and because of the consequent marketing and associated production problems, had significant shortfalls in the anticipated output of steel product, and as a consequence, was leased in 1988 to ISPATT, a Steel Company from India. Significant upward variations in methanol and urea prices made those two -100% state-owned companies, the success stories of the industrial estate based on gas. The 100% state sponsored Flare Gas project was also extremely successful and is now collecting more than 100 million cubic feet per day of previously flared gas, representing 20% of the gas consumed on the island. A 650 mmscfd gas processing facility for the extraction of Natural Gas Liquids was then commissioned as a joint venture with Conoco in 1990.

Continuous decline in oil production since 1978, inspite of the downward revisions in petroleum taxation, has led to the need for external funding from the Inter-American Development Bank for refinery upgrading and for secondary recovery projects within the state-owned oil sector. Co-ordination of the oil sector is being effected through a rationalized single-state entity (Petrotrin), combining some of the core petroleum assets of the 100% owned state oil companies involved in exploration, producing, refining and marketing of petroleum. Restructuring of the companies, involving extensive use of the private sector, is now underway. New approaches to maximizing the efficiency of capital use in the oil sector has also led to the development of a decentralized program of lease operatorships and farmouts to private independent operators in the mature land areas.

Private capital (German and domestic) is now solely involved in a new methanol plant at the Point Lisas estate which is now being commissioned for start-up.

THE NEW OPPORTUNITIES

A reassessment of the country's energy policies in the context of the current trends in global energy and the state of the domestic economy which continues to be dependent on petroleum, saw several new policy moves in 1992. The petroleum tax regime was revised downwards towards the end of that year. Complete divestment of the 100% state-owned Urea plant and its 51% share of a Fertilizer joint venture with Amoco, to Arcadian partners, was accomplished early in 1993. Agreement has also been had with Ferrostaal A.G. to reduce the state's holdings from 100% in the Methanol Company to a

projected 24%, with a 100% plant expansion as part of the agreement. The merger of the two (2) state companies - Trintoc and Trintopec - into **Petrotrin**, is being immediately accompanied by:-

- divestment of a small Oxygen/Nitrogen plant and a Urea Formaldehyde plant;
- the award on an open competitive basis for exploration rights to some of the considerable acreage (1.3 million) under its control; and
- the divestment of one of its two refineries.

In its effort to continue the thrust with natural gas at the forefront of the energy sector, and to increase the number of significant players in the gas production business, several initiatives have been undertaken:-

- 1) British Gas and Texaco have signed agreements for the development of the block they share off the East Coast. Capital in the order of US\$300 mm will be invested over a four-year period, commencing this year.
- 2) Enron which has a reputation as a low-cost, fast-track gas producer, is developing the remaining fields in the previously named South East Coast Consortium Block, in order to quickly meet a current shortfall in gas.

The project entails the immediate development of a gas field followed by the appraisal and development of two fields. Initial gas production is expected in the fourth quarter of 1993, and investment in this block could reach US\$250 million over a five-year period.

- 3) Spearheaded by the National Gas Company of Trinidad and Tobago Limited (NGC), negotiations are actively taking place among British Gas, Amoco and Cabot for the development of LNG facilities locally. A first train of 300 mcfd capacity is expected to be delivering LNG by 1997/1998, with possible options to add other trains for utilizing North Coast Gas.
- 4) With respect to oil exploration, UNOCAL has licenced Block 89-3 and will commence exploratory drilling in 1994.
- 5) Petrotrin (the newly formed merged state company) should award exploration rights to some of its land acreages in late 1993, and to other marine acreages in early 1994.
- 6) With respect to land-based oil exploration prospects, exploration drilling is expected to commence later in the year by the Southern Basin Consortium, of which Exxon is operator and Petrotrin is a 50% carried partner. Capital investment in exploration and development is projected in excess of US\$60 million in the ensuing three (3) years.

- 7) An exploration licence for the Northern Basin - prospective partners being Anderman Smith, Shell, and Krishna Persad and Associates, and Petrotrin - will be finalized within the next few weeks.
- 8) Turning to major projects that Petrotrin is more directly involved with, by far the most significant among those is the IADB funded energy project aimed at boosting EOR production and upgrading the Pointe-a-Pierre refinery. The project consists of three (3) separate and distinct sub-projects -
 - a) The Trinmar Waterflood project.
 - b) Modernization of the Pointe-a-Pierre Refinery.
 - c) The Forest Reserve and Point Fortin EOR projects.

The Trinmar Waterflood, the first major sub-project, aims at recovering roughly seventeen (17) million barrels of medium gravity crude oil from Trinmar's Main Field. It entailed the fabrication and installation of offshore sea water treatment facilities, facilities for compressing natural gas for gas lifting purposes in twenty-eight (28) wells, the workover of sixty (60) odd wells and the installation of effluent treatment facilities to comply with environmental standards. It has been completed on budget and within the original schedule with the assistance of our joint venture partner, Texaco.

The Pointe-a-Pierre refinery upgrade seeks to increase full refining capacity from 100,000 bpd to 140,000 bpd, and enhance the product slate to increase
T. Boopsingh

the gross product worth of the refined barrel and to meet the tightening product quality requirement in our major markets.

The Heavy Oil Projects seek to develop some 13.2 million barrels of oil in the Forest Reserve and Point Fortin Cruse "E" fields via steam injection. The projects entail the drilling more than 100 wells, and the procurement and installation of steam-generating and injection facilities.

There is, in addition, the construction activity now underway at the Point Lisas Estate by Nucor in a new steel process involving the use of iron carbide, and the additional Methanol plant associated with the divestment of the Trinidad and Tobago Methanol Company Limited (TTMC). Overall, the level of investment associated with the foregoing major projects, excluding LNG, would amount to over US\$1 billion between 1993 and 1997.

Projects that are expected to have significant impact on the level of capital investment beyond 1997, could include:-

- further upgrading of the Pointe-a-Pierre refinery, to allow for further and deeper conversion;
- completion of the LNG project - even if an investment decision is taken early, because of the long gestation period for LNG projects, significant amounts of capital would still be scheduled for expenditure beyond 1997;

- development of the North Coast gas fields to supplement existing LNG gas sources so as to enable the possible installation of additional trains;
- additional downstream capacity, possibly in Methanol and Urea.

A significant extension of the farmout and lease operatorship programmes is projected for the near future, paving the way for major and innovative involvement by the local private sector in association with smaller foreign partners. The recent floating of the TT dollar in 1993 would have empowered the local banking sector to form international alliances and allow easier access to foreign capital and technology for local projects. Areas under lease operatorship will be more than doubled, and farmout acreage is expected to increase five-fold by the end of the five-year period.

More recently, Government has announced its intention to seek foreign partners for the monopoly electricity and water utility agencies, in the conviction that the reliability and quality of supply to the consumer is in the country's best interest, as it seeks to promote greater investment in the energy sector. The precise nature of the foreign participation here, as in almost of all of the other aspects of the energy sector, depends on the particular need perceived as being required from external sources, be it exploration capital, management, technology or maintenance, and the risks and rewards likely to be associated with the particular inputs.

CONCLUSION

The limitations of size, domestic capital markets and the relative youth of the country, has seen shifts in the importance attributed to the private sector in energy over the past three (3) decades. The need for foreign capital and expertise has never been considered unimportant, but the corresponding need for deepening and widening the involvement of nationals in all aspects of energy sector developments has tended to make Trinidad and Tobago seek, where practicable, the joint venture as a preferred mode of operation. The need for efficient competition, not always easy to achieve in a mini-state, has led to a plural and diverse mix of arrangements, with state sector energy entities not always co-ordinated in the most efficient manner and with the local private sector in energy operating as small and mostly silent participants.

The size of the country, particularly against that of international energy, thus dictates that wide domestic ownership in the energy sector is still some way off. However, the immediate benefits of new foreign capital and technology, new management expertise, more competition and greater efficiency of operations, have provided enough impetus to ensure that the role of the private sector in the energy sector in Trinidad and Tobago will continue to be enhanced to the benefit of the country, as it seeks to prepare itself for the 21st century.

1993 September 27-28

Table 1

PETROLEUM REVENUES TO GOVERNMENT

1972 - 1976

(US\$ MM)

Year	1972	1973	1974	1975	1976
Royalties	13	14	60	65	85
Taxes	26	30	370	450	530
Total	39	44	435	515	615
% of Govt's Revenue	25	27	69	70	64

Source: Central Bank of Trinidad and Tobago

Table 2

GAS-BASED INDUSTRIAL DEVELOPMENTS

1974 - 1992

1974 Expansion of offshore gas pipeline system. A 16 inch twenty-six mile offshore gas pipeline was built by the Government and project managed by **Amoco**.

1977 A 24-inch forty mile gas pipeline built by the Government, project managed by **National Gas Company** and the **Ministry of Energy**.

1978 A joint venture (**Government and W.R. Grace**) 400,000 tonnes/year ammonia production facility commissioned (**Tringen I**).
Plant on-stream factor 90 + percent.

1979 A new power station (300 Mega Watts commissioned by Trinidad and Tobago Electricity Commission (**T&TEC**) at Point Lisas Industrial Estate.
New dock and harbour facilities commissioned (**N.E.C.**).

1980 A 100% state owned world scale mini steel mill commissioned at Point Lisas (**ISCOTT**).

1981 Two offshore platforms commissioned to collect one hundred million cubic feet of flared gas by **National Gas Company** (the **Flare Gas Project**).
Onstream factor 90 + percent.

Table 2

1981 New joint venture (**Government and Amoco**) 800,000 tonnes/year ammonia production facility commissioned (**Fertrin**).
Onstream factor 90 + percent.

1983 A new 30-inch forty mile, cross country gas pipeline and a 30-inch forty mile offshore pipeline commissioned (**N.E.C.**).
A new 100% state owned 450,000 tonnes/year **Methanol** facility commissioned by **N.E.C.**
Onstream factor 90 + percent.
New Offshore gas production facilities in the Cassia field commissioned by **Amoco**.

1984 A 100% state owned 534,600 tonnes/year **Urea** producing facility commissioned by **N.E.C.**
Ostream factor 90 + percent.

1988 Further expansion by 400,000 tonnes of ammonia production (**Tringen II - Government and W.R. Grace**).
Onstream factor 90 + percent.

1991 A new Liquified Petroleum Gas facility established [capacity 650 MMCFD (**National Gas Company, Pan West, Conoco**)].
Onstream factor 90 + percent.

1992 **Caribbean Methanol Company** began construction of its new plant at Point Lisas (Colonial Life Insurance Company, Ferrostaal A.G., Methanex).

Source: *K.S. Julien and T.M. Boopsingh, The Management of Energy Resources, World Energy Congress, 1992 September.*

Table 3

PETROLEUM REVENUES TO GOVERNMENT

1981 - 1992

(US\$ MM)

Year	1981	1982	1984	1986	1988	1990	*1992
Govt's Revenue	1772	1364	1150	500	388	545	437

(*Estimated)

Source: Central Bank of Trinidad and Tobago

RONALD I. WILSON

Vice President

Mobil News Business Development Group
America-Exploration and Production Division

INTERAMERICAN PETROLEUM & GAS CONFERENCE
"PARTNERSHIP FOR THE FUTURE"

I am very honored to be here today with this dynamic group.

Today's audience includes a cross-section of our industry, including producers, end users, government, and financial community representatives.

Regardless of our diverse affiliations, we all share a common goal - the profitable exploration, development, and management of the world's hydrocarbon resources.

Achieving this goal during the decade of the 90's will not be accomplished without its share of challenges. Among these will be increasing demands on available capital funds and an ever growing emphasis on the environment.

One of the ways industry will be successful in this decade is by forming long-term, strategic business alliances. It is timely that this is the subject being addressed in this Forum.

Before I elaborate on the future of industry - government partnerships, I would like to briefly discuss the business environment we see between now and the year 2000.

First, let's look at a subject of importance to all of us - crude oil prices. In the early 80's, conventional wisdom held that world oil supplies would not keep pace with demand. As a result, oil prices were projected to rise dramatically in real terms. This was the era of the 100 dollar per barrel forecast.

Forecasters now see supplies more than equal to demand over the next decade. It is a widely held opinion that crude prices will not show real growth in the near future, although there may certainly be spikes, both positive and negative.

There will be increasing pressure on our business as a result of environmental requirements. This is already being felt by the downstream side of our industry in the U.S. and the European community nations. For example, in the U.S. alone, it is estimated that the refining industry will spend in excess of 60 billion dollars during the 1990's in order to comply with newly enacted environmental regulations.

Monumental changes occurring around the world are opening new areas to foreign participation. Traditional areas for private investment such as Latin America, Europe, and the Middle East, now find themselves in competition with newly emerging market economies. Countries such as Russia, China, and Kazakhstan are seeking enormous capital investments to fund numerous mega projects. This is fueling an escalation in the worldwide competition for capital.

Given this global framework, let's now shift our attention to the specific factors impacting the investment decisions of international oil companies.

Foremost, large privately held oil companies have an exclusive fiduciary responsibility to their owners - the shareholders. In the eyes of the shareholder, the primary business focus should be on enhancing the value of the company. Two items which are used to assess a company's value are its return on investment and the maintenance of its asset base.

Reserves are tangible, physical assets that the shareholder owners consider when assigning value to a company. Clearly, maintenance of a company's reserve base is of paramount importance. In this context I would like to stress an important component of future industry trends - private companies will preferentially seek participation in projects which are structured to allow reserves to be reported in company equity valuations.

There are three primary ways that a company can augment its reserve base, all of which compete for industry capital.

- **Acquisition**
- **Field development and reservoir management**
- **Exploration**

Acquisitions in the 80's were driven by industry's expectations of higher prices and bullish buying. Obviously, those days are gone. However, there will be companies who decide for competitive and other reasons to divest reserves holdings and focus on segments of the business other than exploration and producing. I am suggesting that acquisitions will be alive and well, but perhaps driven more by a strategic fit for both parties.

A second method of adding reserves is through the application of advanced reservoir management techniques. Over the past decade, major companies have made significant advances in field development technologies. Field recoveries that were historically in the 30 percent range have been increased to 50 percent or more. In some instances, field production rates have been raised by over 50 percent through the use of new techniques such as horizontal drilling. The resulting increase in value for fields already discovered has been dramatic. In light of the opportunities afforded by these new technologies, industry will look to countries offering field development and reservoir management projects for near term results.

And finally, reserves can also be added through grass roots exploration. As a result, companies are focusing their efforts in those areas of the world where the potential rewards dramatically outweigh the investment risk.

- Focus will mean that companies will selectively dedicate resources to areas where technical data and the information to make prudent business decisions are accurate and easily accessible.**
- Focus will also mean that companies will seek to limit costly up-front entry payments in favor of projects where funds are used for finding and developing.**
- Focus will mean that preference will be given to countries that encourage companies to continue to explore, even after failure. Even with disappointing results, companies gain a tremendous amount of learning which can be utilized in future ventures to accelerate eventual success in a country.**
- And focus will mean that companies will preferentially invest in projects in countries where the fiscal terms provide returns that comprehend the level of risk.**

With the large number of upstream projects available around the world, there is speculation regarding the limits of available capital. There is and will continue to be capital available to fund projects with adequate returns on investment and with acceptable protection against risks. Utilization of international arbitration standards, assurance of sanctity of contracts, fair and consistent government policies and actions, and the ability to qualify for project financing will all be important means of enhancing the competitiveness of projects.

This briefly summarizes some of the factors influencing investment by private industry. Now, let's look at some of the factors which will dictate future government policy decisions.

Virtually all of the same conditions and constraints that I have mentioned hold true for the investments made by the governments of the oil producing countries and their state companies. However, there is one major difference. The owners of private companies are the shareholders while the owners of a country's resources are the citizens of that country.

Clearly for many nations, upgrading the standard of living for its people is a major policy focus.

Mr. Gustavo Roosen, President of PdVSA said last year in New York "...the government when reduced in size, will be able to concentrate its attention on basic programs, such as housing, health and education, while leaving most economic activities to the private sector, national and international. The end result will be, that the government will be able to assume its proper role, which is to ensure stable access to the best and the cheapest goods and services."

Around the world, there is an immediate need to build and upgrade infrastructure. Schools, roads, hospitals, communication networks, reliable electricity, and safe drinking water for the entire population are urgently needed.

At the same time, continued investment is required to fund long term economic growth. It is apparent that government spending will increasingly focus on those infrastructure investments which satisfy the needs of its citizenry while relying on private investment to help fund growth projects.

The numerous demands being made for limited government investment funds has led some governments to defer major project investments, preferring to wait until the projects could be funded with no private participation. There is a strong financial argument in favor of proceeding today in partnership with private industry. I would like to illustrate with a simple example.

If the government proceeds with a typical project today, retaining a 50 percent revenue interest, the project can be worth more than twice the value to the government than if the project is delayed for ten years and proceeds on a 100 percent government basis.

The mechanism for meeting the demands on both government and private industry is found within partnerships. These partnerships require long term commitments and cannot be viewed as mere financial arrangements. Companies, such as Mobil, bring much more than just money. We provide project management skills, especially for large and technically complex projects, which have been developed through years and years of experience. We also bring environmental understanding and capabilities as a result of our involvement in successful operations in ecologically sensitive areas around the world.

An example of a successful industry - government partnership is Mobil's participation in the Arun Field and LNG processing facility in northern Sumatra in Indonesia. Under a production sharing contract with Pertamina, the state oil and gas company, we operate eight blocks and produce 1.7 billion cubic feet of gas per day along with 100 thousand barrels of liquids. In 1992, not only were a record 215 LNG cargoes shipped from the Arun plant, but Mobil received a commendation from the Republic of Indonesia for safety excellence.

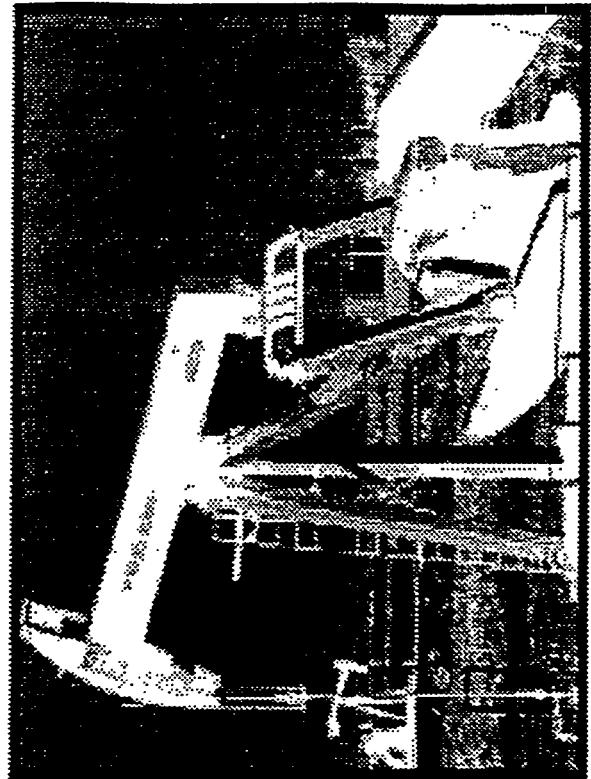
The Arun Field was discovered 22 years ago and has produced 1.7 billion barrels of oil equivalent over the last 16 years. During this time, Mobil has committed its financial strength and technical expertise to the management of the Arun project. But in addition, our commitment to long term participation has brought results which have benefited Mobil as well as our partners - Pertamina, the Indonesian Government, and the local community.

In conclusion, we are experiencing a unique period of history for the oil and gas industry. Over the next decade, all of the participants will be faced with a number of opportunities and challenges. No longer will having technical expertise or control of vast resources alone create wealth for a company or country. Long term profitability will result from decisions and policies made by the owners of these assets. Prudent, efficient, and profitable management of resources through partnership will benefit both parties and enrich the standard of living for future generations.

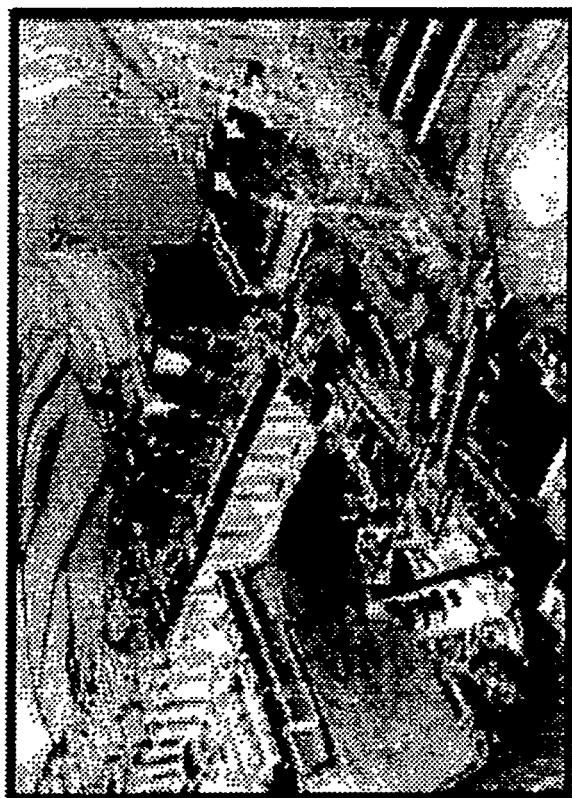
Thank you for your kind attention.

Partnership

Government



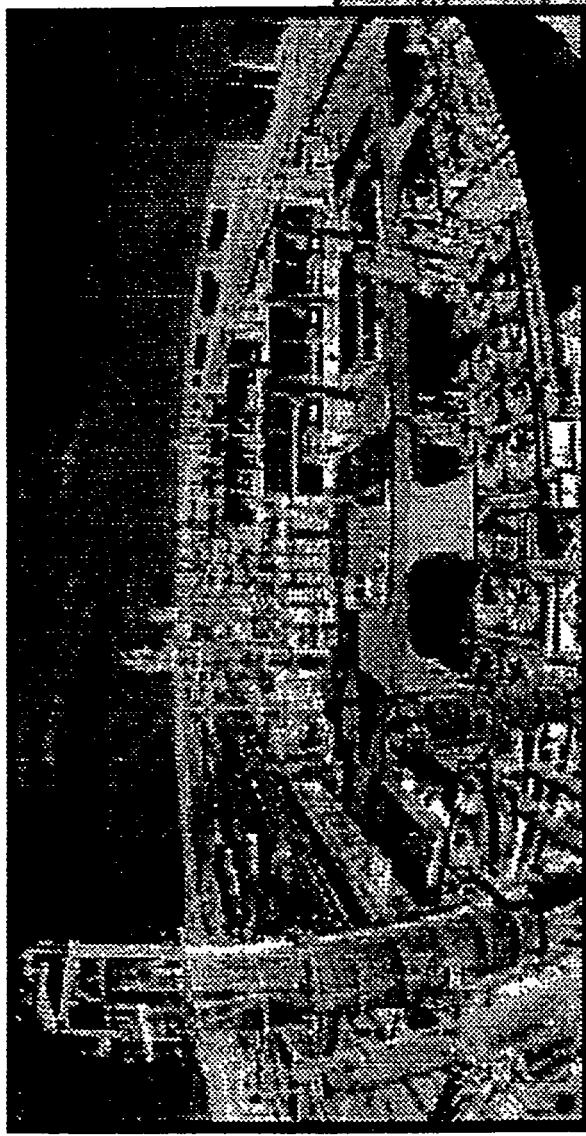
Industry



Partnership

- Long term commitment
- Financial strength
- Technical expertise
- Environmental leadership





Arun Field
Northern Sumatra,
Indonesia



Rising social expectations

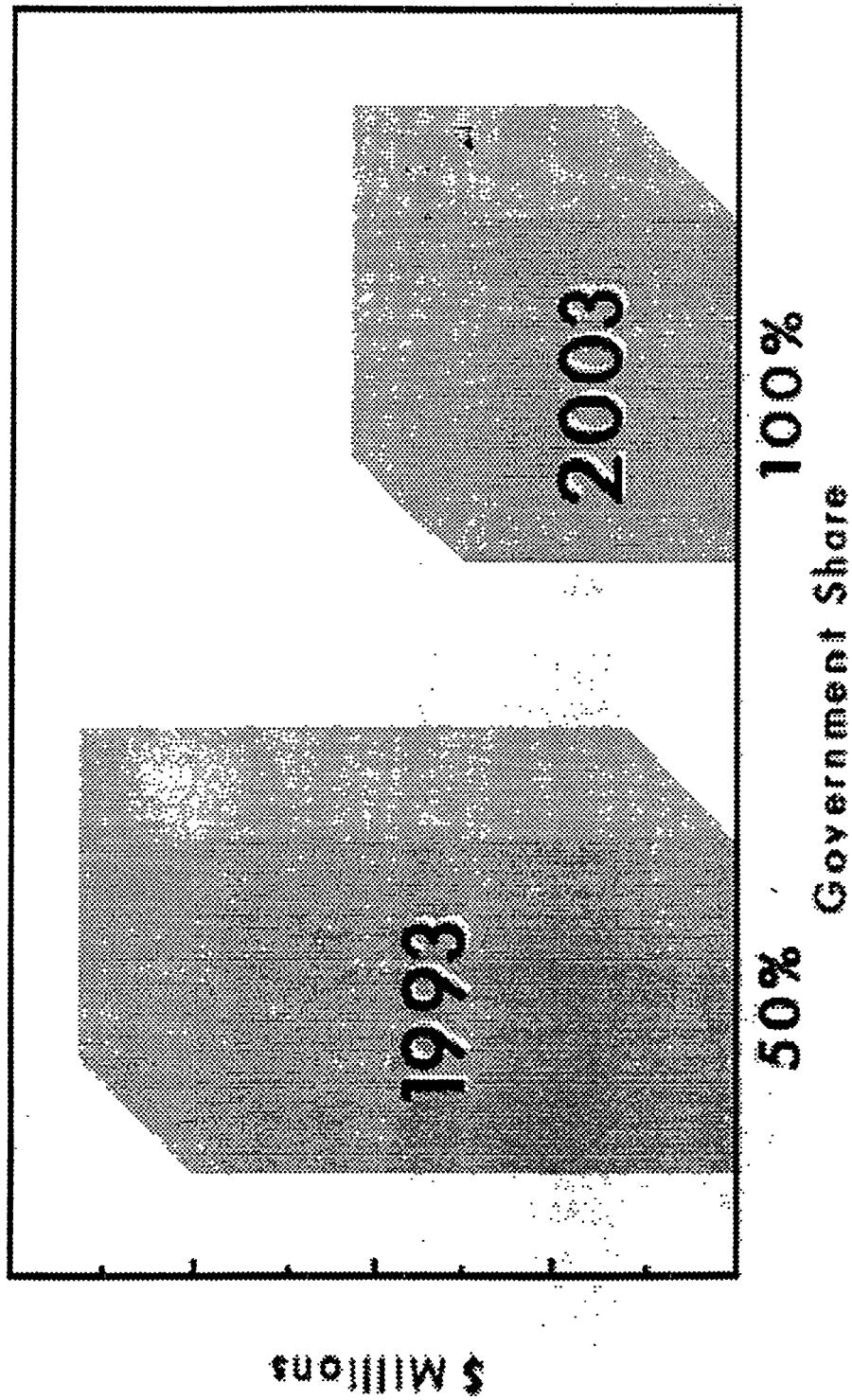
Infrastructure improvements

Infrastructure funded by government and private investors

Economic growth

Private investment

Value To Government



Improve Competitiveness

Provide international arbitration

Project against prejudicial actions

Enable project financing

Owners



National Companies



Private Companies

Reservoir Management

Technological Advancements

Higher Recoveries

Higher Flow Rates

Increased Value

Focus on countries where:

Data are available

Entry costs are low

Failure costs can be leveraged

Returns comprehend risks

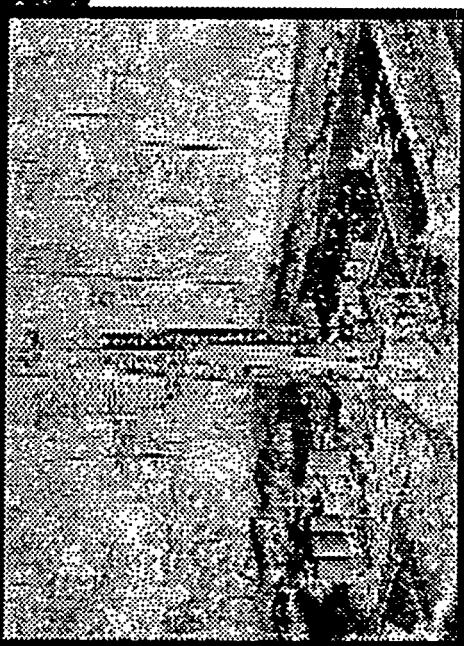
Opportunities



Acquisitions



Reservoir
Management



Exploration

Acquisitions

1980's - Higher Price Expectations

1990's - Strategic Opportunities



Business Trends

- Oil price instability
- Large environmental costs
- Competition for capital

Private companies will preferentially invest in projects which allow reserves to be reported in company equity valuations.

Business Trends

卷之三

- Oil price instability
- Little environmental concern
- Competition for capital

Business Trends

- Oil price instability
- Large environmental costs
- Competition for capital



Profitable exploration, development
and management of oil and gas resources

Partnerships For The Future



Presentation by Ronald Wilson, Vice President, Mobil
InterAmerican Petroleum and Gas Conference, 27-28 September 1993, Dallas

**“Structural Policies for the Development of the Energy Sector
of the Republic of Honduras”**

JUAN CARLOS RIVERA MONTES
Director
Investment Promotion Program,
Ministry of Natural Resources
Honduras



MINISTRY OF NATURAL
RESOURCES

MINISTRY OF FOREIGN
RELATIONS

CENTRAL BANK

REPUBLIC OF HONDURAS

**STRUCTURAL POLICIES FOR THE
DEVELOPMENT OF THE ENERGY SECTOR
OF THE REPUBLIC OF HONDURAS**

**PRESENTATION FOR
THE SECOND INTERAMERICAN PETROLEUM AND GAS CONFERENCE**

SEPTEMBER 27-28, 1993

**FAIRMONT HOTEL
DALLAS, TEXAS**

**ING. JUAN CARLOS RIVERA MONTES
DIRECTOR**



INVESTMENT PROMOTION PROGRAM

MINISTRY OF NATURAL
RESOURCES

CENTRAL BANK

MINISTRY OF FOREIGN
RELATIONS

REPUBLIC OF HONDURAS

IN THE NAME OF THE REPUBLIC OF HONDURAS, OUR PRESIDENT AND OUR

GOVERNMENT, I WOULD LIKE TO EXPRESS OUR SINCERE APPRECIATION TO THE SPONSORS OF THE INTER AMERICAN PETROLEUM AND GAS CONFERENCE FOR THIS OPPORTUNITY FOR PROMOTE CLOSER TIES WITH LATIN AMERICA IN THE CONTEXT OF THE ENERGY SECTOR. I PERSONALLY LIKE TO THANK THE ORGANIZERS OF THE EVENT THE EAST AND WEST CENTER AND THE INSTITUTE OF EARTH AND MAN FOR THEIR INTEREST AND ASSISTANCE FOR OUR PARTICIPATION.

IN 1990, WITH THE TRANSITION TO A NEW DEMOCRATIC GOVERNMENT UNDER THE LEADERSHIP OF PRESIDENT RAFAEL LEONARDO CALLEJAS, THE REPUBLIC OF HONDURAS STARTED A NEW PHASE OF ITS HISTORIC LIFE, FRAMED UNDER THE EVOLUTION OF ECONOMIC, POLITICAL, AND SOCIAL PLANNING.

IN THE FIRST QUARTER OF THAT YEAR, PRESIDENT CALLEJAS INTRODUCED A BOLD PROGRAM OF ECONOMIC REFORM, INTENDED TO RAISE PRODUCTIVITY, COMPETITIVENESS, DOMESTIC AND EXPORT PRODUCTION WITHIN A FREE MARKET SYSTEM AND IN A STABLE ECONOMIC ENVIRONMENT.

THE KEY ELEMENTS OF THIS PROGRAM ARE: ADOPTION OF A MARKET SYSTEM FOR EXCHANGE RATE ADJUSTMENTS; REDUCTION OF THE FISCAL DEFICIT BY LIMITING GOVERNMENT SPENDING AND INCREASING FISCAL REVENUES; SIGNIFICANT REDUCTION IN THE LEVEL OF IMPORT PROTECTION; LIBERALIZATION OF PRICES; TERMINATION OF ALL STATE SUBSIDIES; AND LIBERALIZATION OF THE INVESTMENT REGIME.



MINISTRY OF NATURAL
RESOURCES

INVESTMENT PROMOTION PROGRAM

CENTRAL BANK

MINISTRY OF FOREIGN
RELATIONS

REPUBLIC OF HONDURAS

AFTER TWO YEARS OF CONCERTED INTENSIVE EFFORT THE HONDURAN ECONOMY IS IN A PROCESS OF RECUPERATION, ACHIEVING A LEVEL OF STABILITY AND ECONOMIC WELL BEING.

THE FISCAL DEFICIT HAS BEEN REDUCED FROM 11.5 TO 4.5 PERCENT OF THE GNP. INTERNATIONAL RESERVES ARE POSITIVE. THE COUNTRY IS UP TO DATE WITH ITS INTERNATIONAL OBLIGATION RETURNED AS A NATION ELIGIBLE FOR INTERNATIONAL CREDIT. IN SEPTEMBER 1990, HONDURAS SUCCESSFULLY COMPLETED NEGOTIATIONS IN THE PARIS CLUB, AND WAS ABLE TO RESCHEDULE ITS 180 MILLION DOLLAR DEBT WITH ITS OFFICIAL BILATERAL CREDITORS. LAST YEAR THE U.S. GOVERNMENT GAVE A TREMENDOUS SHOW OF SUPPORT TO OUR ECONOMIC PROGRAM, BY REDUCING \$434 MILLION DOLLARS OUR BILATERAL DEBT. THE AMERICAN ACTION HAS BEEN FOLLOWED BY HOLLAND, SWITZERLAND, CANADA AND UNITED KINGDOM.

I WANT TO MENTION THESE ACTIONS IN ORDER TO DEMOSTRATE THAT THE HONDURAS OF TODAY IS A NATION WITH A NEW VIEW, A NATION WITH NEW OBLIGATIONS, WITHA NEW ATTITUDES.....IT IS DEFINITELY A BETTER HONDURAS.



MINISTRY OF NATURAL
RESOURCES

INVESTMENT PROMOTION PROGRAM

CENTRAL BANK
REPUBLIC OF HONDURAS

MINISTRY OF FOREIGN
RELATIONS

THE ADVANTAGES HONDURAS HAS TO OFFER FOR TRADE AND INVESTMENT ARE NOTEWORTHY. LOCATED IN THE HEART OF CENTRAL AMERICA, HONDURAS HAS ACCESS TO BOTH THE ATLANTIC AND PACIFIC OCEANS, PUERTO CORTEZ IS THE MOST MODERN PORT IN CENTRAL AMERICA, AND IT IS WITHIN THREE DAYS OF THE U.S. MARKET, THE COUNTRY HAS FOUR INTERNATIONAL AIRPORTS AND IS THE ONLY CENTRAL AMERICAN COUNTRY TO EXPORT ELECTRICITY TO ITS NEIGHBORS.

OUR NEW INVESTMENT LAW IS VERY CONCISE, WITH A MINIMUM OF REQUIRED AUTHORIZATION OR APPROVAL PROCEDURES. IT GUARANTEES EQUAL TREATMENT TO ALL REGARDLESS OF NATIONALITY. IT GRANTS OPTIMUM ACCESS TO FOREIGN EXCHANGE AND AVOIDS LIMITATIONS OF FOREIGN OWNERSHIP, AND INVESTMENT LICENSING AND SCREENING.

REGARDING INTERNATIONAL AGREEMENTS, HONDURAS AND THE U.S. HAVE SIGNED THREE AGREEMENTS RELATED TO INVESTMENT; THE TREATY OF FRIENDSHIP, COMMERCE AND CONSULAR RIGHTS (1928); THE AGREEMENT FOR THE GRANTEE OF PRIVATE INVESTMENT (1955); AND THE AGREEMENT ON INVESTMENT GUARANTEES (1966). HONDURAS ALSO HAS SIMILAR AGREEMENTS WITH MEXICO AND OTHER COUNTRIES IN THE REGION.



INVESTMENT PROMOTION PROGRAM

MINISTRY OF NATURAL
RESOURCES

MINISTRY OF FOREIGN
RELATIONS

CENTRAL BANK

REPUBLIC OF HONDURAS

INSTITUTIONS SUCH AS THE OVERSEAS PRIVATE INVESTMENT CORPORATION (OPIC) AND THE EXPORT-IMPORT BANK OF THE UNITED STATES HAVE ACTIVE PROGRAMS IN HONDURAS. HONDURAS IS ALSO A MEMBER OF THE INTERNATIONAL CENTER FOR THE SETTLEMENT OF INVESTMENT DISPUTES (ICSID). MOST RECENTLY IT BECAME THE 107TH COUNTRY TO JOIN THE MULTILATERAL INVESTMENT GUARANTEE AGENCY (MIGA), THE WORLD BANK'S POLITICAL RISK AFFILIATE. THIS MEMBERSHIP WILL BE AN IMPORTANT ELEMENT FOR THE PROMOTION OF INVESTMENT IN HONDURAS.

IN THE CONTEXT OF ECONOMIC INTEGRATION, CENTRAL AMERICA HAS BEEN TRANSFORMED INTO A REGION OF ECONOMIC AND SOCIAL DEVELOPMENT. SINCE 1990, INDIVIDUAL COUNTRIES HAVE INTEGRATED A REGIONAL APPROACH TO ECONOMIC DEVELOPMENT, TRADE AND INVESTMENT. THE NEWLY INTEGRATED CENTRAL AMERICA COMMON MARKET FORMED BY HONDURAS, EL SALVADOR, GUATEMALA AND NICARAGUA ENCOMPASSES A MARKET OF 37 MILLION PEOPLE WITH A COMBINED GNP OF 30 BILLION DOLLARS. AS A SINGLE ENTITY, WE HAVE SIGNED FREE TRADE AGREEMENTS WITH MEXICO, COLOMBIA, VENEZUELA AND THE CARICOM NATIONS.



INVESTMENT PROMOTION PROGRAM

MINISTRY OF NATURAL
RESOURCES

CENTRAL BANK

MINISTRY OF FOREIGN
RELATIONS

REPUBLIC OF HONDURAS

FOR HONDURAS, THE ENERGY SECTOR IS THE KEY FACTOR FOR SUCCESS.

IN THE LAST TWENTY YEARS, TWELVE INTERNATIONAL COMPANIES HAVE MADE FINANCIAL INVESTMENTS IN PETROLEUM EXPLORATION IN HONDURAS. HOWEVER, ONLY A SMALL NUMBER OF WELLS HAVE BEEN DRILLED; THEREFORE HONDURAS CANNOT BE CONSIDERED AS TOTALLY EXPLORED.

IT IS THEN, IN OUR INTEREST TO IMPLEMENT A PROGRAM TO ENCOURAGE PETROLEUM EXPLORATION IN THE REPUBLIC OF HONDURAS.

WE ARE CONSCIOUS OF THE HIGH COST OF EXPLORATION, ALSO OF THE RISK THAT ARE FACED WHEN STARTING AND DEVELOPING THE NECESSARY ACTIVITIES IN ORDER TO MAKE SCIENTIFIC INVESTIGATIONS WITH TRUST WORTHY RESULTS.

WE ARE ALSO AWARE THAT IN COMPARISON WITH OTHER GEOGRAPHIC AREAS, OUR COUNTRY MEASURED UNDER TECHNICAL PARAMETERS OF POTENTIALITY HAS NOT YET BEEN PROVEN BUT, THE AMOUNT OF SEDIMENTARY ACCUMULATIONS AND ITS PRODUCTION POTENTIAL COULD RESULT IN COMMERCIAL EXPLORATION.



MINISTRY OF NATURAL
RESOURCES

INVESTMENT PROMOTION PROGRAM

CENTRAL BANK

MINISTRY OF FOREIGN
RELATIONS

REPUBLIC OF HONDURAS

THE HYDROCARBON POTENTIAL OF THE THREE MAIN HONDURAS BASINS, NAMELY THE OFFSHORE TELA AND MOSQUITIA BASINS AND THE ON SHORE ULUA-OLANCHO BASIN HAVE BEEN REALISTICALLY APPRAISED IN AN INTEGRATED SYNTHESIS OF AVAILABLE DATA. OUR EXTENSIVE DATA BASE CONSIST OF 37,000 LINE KILOMETERS OF SEISMIC, GRAVITY, AMPLE MAGNETIC AND REMOTE SENSING COVERAGE, AND WELL AND OUTCROP GEOCHEMICAL AND BIOSTRATIGRAPHICAL DATA SETS. BASED ON PLATE TECTONIC RECONSTRUCTIONS, STRUCTURAL AND SEDIMENTARY CORRELATIONS WITH SOUTHERN MEXICO AND GUATEMALA SUGGEST THAT MESOZOIC SOURCING MAY BE PRESENT IN MARINE AND NONMARINE FACIES. FURTHERMORE, COAL MEASURES OF TRIASSIC AND JURASSIC AGE MAY UNDERLIE THE CRETACEOUS AND CENOZOIC SECTIONS, THEREBY PROVIDING AN EFFECTIVE SOURCE FOR GAS AND POSSIBLY OIL IN ALL BASINS, INCLUDING THE ONSHORE PORTION OF THE MOSQUITIA BASIN.

KNOWING THESE FACTS, OUR GOVERNMENT PRESENTS BEFORE THE INTERNATIONAL COMMUNITY OUR ENERGY REACTIVATION PLAN WITH WHICH, WE WILL ACHIEVE YOUR CONFIDENCE AND YOUR INTEREST IN INVESTING IN HONDURAS.



INVESTMENT PROMOTION PROGRAM

MINISTRY OF NATURAL
RESOURCES

CENTRAL BANK
REPUBLIC OF HONDURAS

MINISTRY OF FOREIGN
RELATIONS

AS PART OF OUR ENERGY PLAN, THE NATIONAL CONGRESS, APPROVED NEW LEGISLATION WHICH ALLOWS HONDURAS TO BECOME A NATION THAT OFFERS COMPETITIVE OPTIONS IN INVESTMENT EXPLORATION POTENTIAL.

THESE NEW LAWS ARE :

--- A LAW FOR THE REGULATION OF HYDROCARBON EXPLORATION, WHICH ALLOWS FREE IMPORTATION OF EQUIPMENT AND MACHINERY TO BE USED FOR EXPLORATION AND EXPLOITATION ACTIVITIES. IT ENSURES AND ACCELERATES THE RECOVERY OF INVESTMENTS THROUGH THE APPLICATION OF A FORMULA TO THE INVESTMENT MADE ON EXPLORATION.

---THE LEGISLATIVE INTERPRETATION OF THE ARTICLE 84 OF THE HYDROCARBON LAW, GUARANTEES THE RIGHTS OBTAINED BY CONCESSIONS PREVIOUS TO THE LEGISLATIVE AMENDMENTS.

HONDURAS IS A COUNTRY OF HARD WORKING PEOPLE WHO ARE ANXIOUS TO ESTABLISH SUCCESSFUL ENTERPRISE. WE BELIEVE THAT AN INITIAL OIL DISCOVERY OF ONLY AN AVERAGE SIZE CAN RESULT IN A NEW ECONOMIC ORDER IN OUR COUNTRY. INCREASING ECONOMIC STABILITY, BETTER GOVERNMENT SERVICES, AN IMPROVING ROAD NETWORK TO PROVIDE ACCESS TO MOST OF THE COUNTRY WILL ASSIST EXPLORATION ACTIVITY.



INVESTMENT PROMOTION PROGRAM Director

MINISTRY OF NATURAL
RESOURCES

CENTRAL BANK

MINISTRY OF FOREIGN
RELATIONS

REPUBLIC OF HONDURAS

BASICALLY, WE INTEND IN THE FIRST PLACE, TO OFFER YOU GUARANTEES OF A STABLE POLITICAL NATION, WITH AN ENERGETIC ECONOMY, WITH ACCEPTABLE LEVELS OF TECHNICAL ABILITY AND TRANSFER, AND FINALLY WITH A GEOGRAPHIC UNBEATABLE LOCATION.

TO FINISH MY PRESENTATION, I LIKE TO CALL TO YOUR ATTENTION A SERIES OF EVENTS THAT HAVE DRASTICALLY CHANGED THE FACE OF OUR WORLD : THE FALL OF COMMUNISM, THE POLITICAL AND ECONOMIC TRANSFORMATION OF LATIN AMERICA, THE CRISIS IN THE PERSIAN GULF AND JUST RECENTLY, THE PEACE ACCORD IN THE MIDDLE EAST.

IF WE ISOLATE THESE EVENTS FROM ITS POLITICAL VARIABLES AS A FUNCTION OF INTERNATIONAL RIGHTS AND WORLD PEACE GUARANTEES, WE CAN CLEARLY SEE THAT THE SEARCH FOR A NEW ECONOMIC AND SOCIAL ORDER CAN BE INTERPRET AS A NEED THAT CAN NO LONGER BE POSTPONE.

ECONOMIC AND SOCIAL DEVELOPMENT, INTEGRATION AND COMPETITION IS THE NEW WINDOW FOR THE FUTURE.

THE ESTABLISHMENT AND GUARANTEES OF POLITICALLY AND ECONOMICALLY STABLE ZONES IT IS DIRECTLY RELATED TO THE DEVELOPMENT OF AUTOCHTHONOUS SOURCES OF ENERGY.



INVESTMENT PROMOTION PROGRAM

MINISTRY OF NATURAL
RESOURCES

MINISTRY OF FOREIGN
RELATIONS

CENTRAL BANK

REPUBLIC OF HONDURAS

ALL OF THIS SHOWS THAT HONDURAS IS A CONSCIOUS NATION WHICH OFFERS
A SPIRIT OF PROGRESS AND RESPONSIBILITY.

IN THE NAME OF THE REPUBLIC OF HONDURAS, OUR PRESIDENT AND OUR
GOVERNMENT, AND LIKE TO WELCOME YOUR INTEREST AND WE SINCERELY HOPE
THAT THIS COULD BECOME THE BEGINNING OF A PRODUCTIVE AND LONG
LASTING RELATION.

REFINANCIAMIENTO Y CONDONACIONES

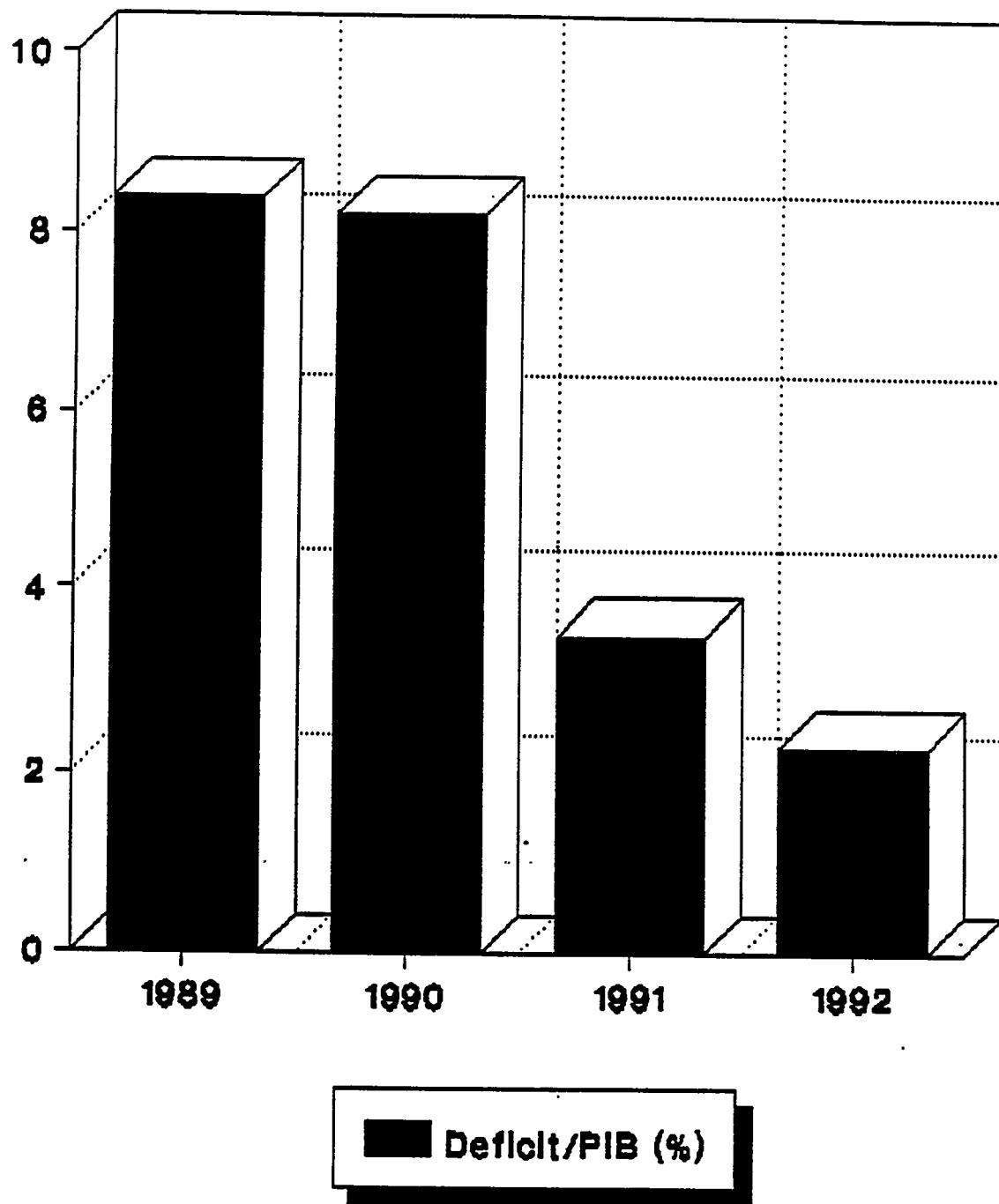
1990 - 1992

	Fecha	MONTO (En Millones)	
		US Dólares	Lempiras *
I. Refinaciamientos y arreglos de pago		733.3	4,288.8
1. Club de París I	14/9/80	381.1	1,878.4
2. FMO-Holanda	16/1/81	6.8	68.1
3. Venezuela	25/3/81	30.2	178.7
4. Fondo OPEC	18/6/81	16.0	87.8
5. CDB-Reino Unido	20/8/82	37.1	217.0
6. México	18/3/82	68.8	332.3
7. BCIE	20/3/82	40.3	235.8
8. Club de París II	20/10/82	188.0	1,105.7
Al 31 de julio de 1993		81.4	384.7
Al 31 de julio de 1994		61.6	301.3
Al 31 de julio de 1995		46.1	228.7
9. FOCEM	16/12/82	31.2	152.6
10. FIDA	3/8/82	3.7	21.0
II. Condonaciones		582.7	3,408.8
1. Suiza	Agosto/81	10.7	62.8
2. Estados Unidos de América	Sept/81	484.0	2,538.8
3. Holanda	Sept/81	8.7	50.8
4. Reino Unido	Enero/82	0.0	62.7
5. Canadá	Dic/82	26.0	160.8
6. Club de París II	20/10/82	94.6	522.8

* Lps. 6.85 por US\$ 1.00

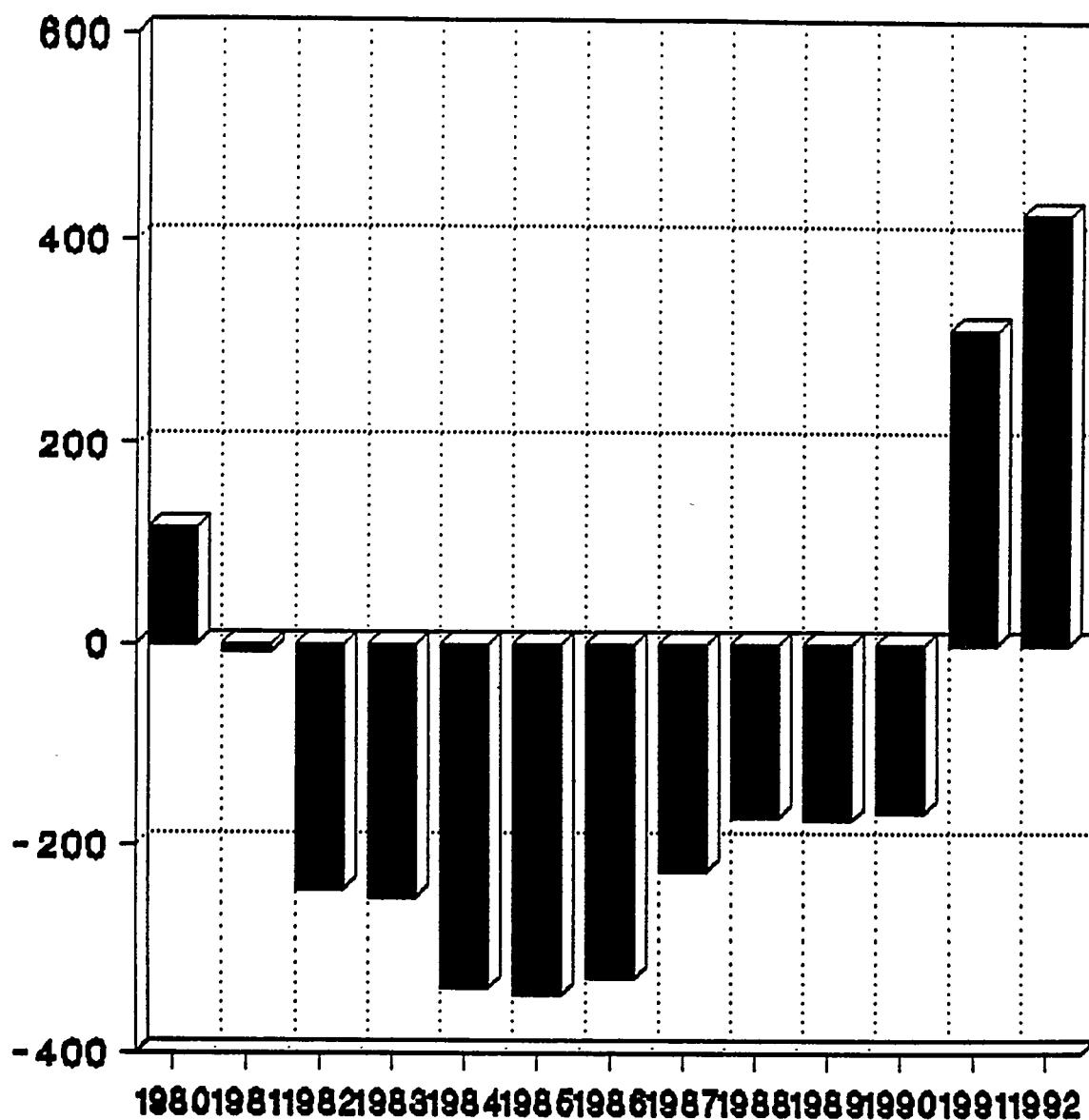
Tegucigalpa, 16 de diciembre de 1992

PRESIDENCIA DE LA REPUBLICA
Deficit Global/PIB



Sector Publica No Financiera

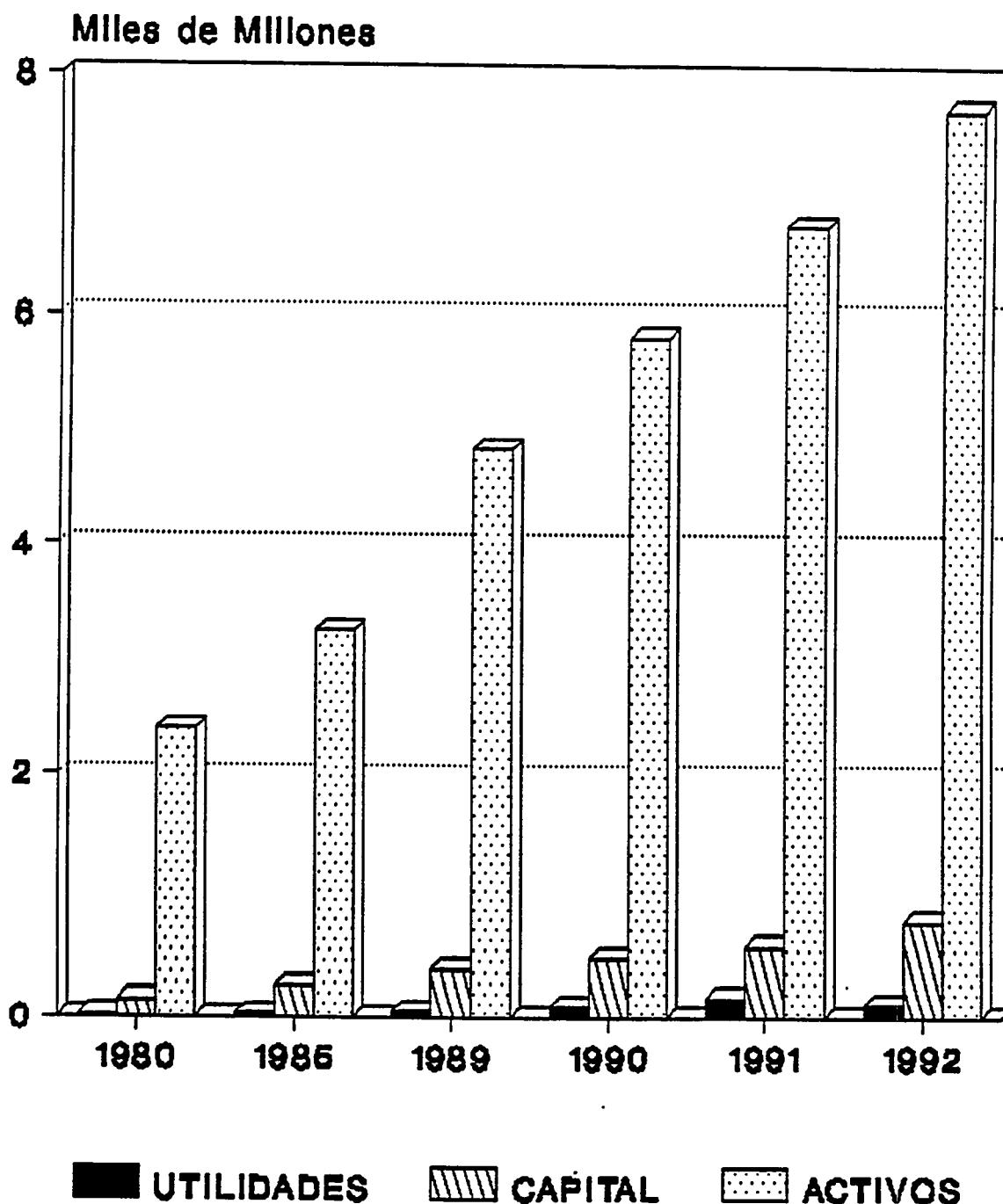
PRESIDENCIA DE LA REPUBLICA
RESERVAS INTERNACIONALES NETAS



■ Reservas Netas BCH

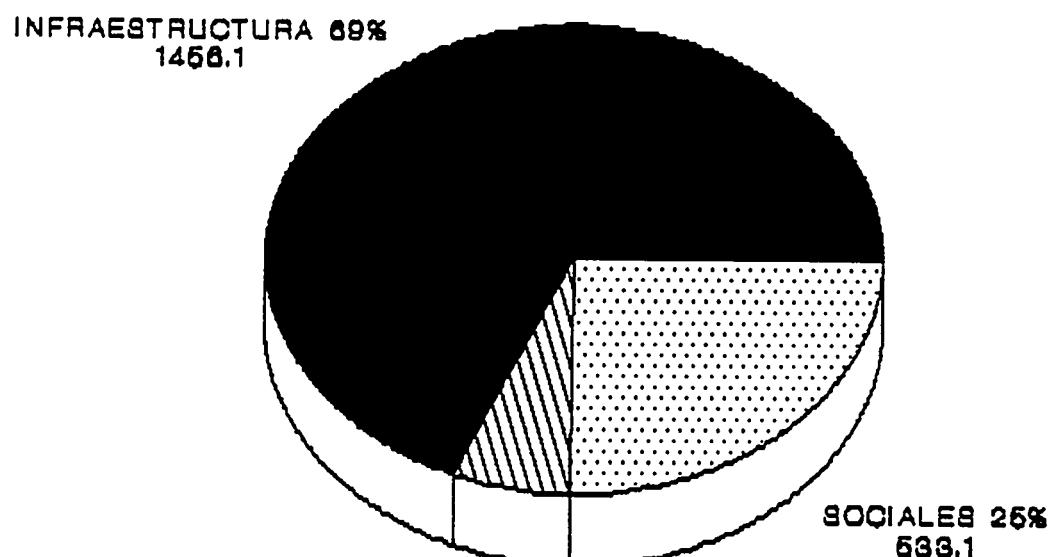
FUENTE : BCH

**PRESIDENCIA DE LA REPUBLICA
UTILIDADES, CAPITAL Y ACTIVOS TOTALES**



Sistema Bancario Comercial

PRESIDENCIA DE LA REPUBLICA
INVERSION PUBLICA SECTORIAL 1993



CIFRAS EN MILLONES DE LPS. CORRIENTES

FOREIGN DIRECT INVESTMENT IN HONDURAS

COUNTRY OF ORIGIN	ESTIMATED INVESTMENT IN U.S. MILLIONS
UNITED STATES	208.0
JAPAN	18.0
EL SALVADOR	11.3
UNITED KINGDOM	6.7
WEST GERMANY	5.3
VENEZUELA	3.2
GUATEMALA	3.1
COSTA RICA	2.0

INVESTOR COUNTRY TYPE OF INVESTMENT

Standard Fruit Co	U.S.	Banana, Pineapple, Citrus
Chiquita Brand	U.S.	Banana, Melons, Vegetables
Texaco	U.S.	Oil Refining and Marketing
Phelps-Dodge	U.S.	Wire and Cable Manufacturer
U. S. Tabaco	U.S.	Cigars
Kimberly-Clark	U.S.	Paper Products
Cargill	U.S.	Animal Feed
Citybank	U.S.	Banking
Exxon	U.S.	Oil Marketing
IBM	U.S.	Computers
Xerox	U.S.	Business Machines
Citrus Develop.	U.S.	Juice Concentrates
Seaboard Corp.	U.S.	Shrimp Cultivation
Curacao	Netherlands	Trading
Breakwater Resource	Canada	MINING
Lloyd's Bank	U.K.	Banking
Nestle	Switzerland	Food Products

“Building Alliances for Natural Gas Development”

NICK KANGLES
Vice President
Novacorp International Consulting, Inc.



Novacorp International

Nick J. Kangles
Vice President

Novacorp International Consulting Inc.
P.O. Box 2535, Station M
Calgary, Alberta
Canada T2P 2N6
Offices: 734 Seventh Avenue S W
(403) 261-7559
FAX (403) 290-6090
Telex 038-21503

Building Alliances for Natural Gas Development

Presented by: Nick Kangles

NOVACORP INTERNATIONAL

NOVA Corporation of Alberta

NOVA Corporation of Alberta is a widely held company operating internationally from headquarters in Calgary, Alberta, Canada. NOVA adds value to energy through producing, marketing and transporting natural gas and upgrading natural gas and other hydrocarbons into chemicals and plastics. In 1992, NOVA generated \$3 billion in revenue and \$164 million in net income. Assets at the end of 1992 totalled \$6.2 billion. Shares trade on the Toronto, Montreal, Alberta, New York and London stock exchanges, and on Swiss stock exchanges in Geneva, Zurich and Basle. Worldwide, NOVA employs over 6000 people.

Alberta Gas Transmission Division

NOVA's Alberta Gas Transmission Division (AGTD) is one of the largest systems in the world. It is the primary transportation system through which natural gas is collected for use in Alberta and delivered to border points for shipment outside the province. Each year, the AGTD system carries more than 10 per cent of natural gas produced annually in North America, including about 75 per cent of marketed Canadian production. Statistics on the AGTD system include:

- 18,400 kilometres of pipeline, 2 to 48 inches in diameter
- 44 compressor stations
- 960 major receipt and delivery points
- 265 million cubic metres delivered daily.

The AGTD system is also recognized as the one of the most technically advanced systems in the world. Since 1988, NOVA has spent an average of half a billion dollars on upgrades and expansion.

Pan-Alberta Gas Ltd., another NOVA affiliate, serves the long-term gas supply requirements to Canadian Markets. The company is also a major marketer of Alberta natural gas to the United States. The company also serves the long-term gas supply requirements of Canadian markets.

Adding Value to Natural Gas through Upgrading

NOVA conducts its chemicals businesses through Novacor Chemicals Ltd. Ethylene, propylene, styrene and methanol are the major petrochemicals produced. The three major plastic resins produced by Novacor are polyethylene, polystyrene and polypropylene. Novacor has manufacturing facilities in Canada and the United States. The Joffre facility in Alberta, Canada one of the lowest cost producers in North America, produces just over 10 per cent of North America's ethylene.

Novacor maintains a rigorous safety and environmental program called "Responsible Care". This Canadian designed program is now used by the chemical industry throughout North America and Europe.

NOVA's International Vision

Novacorp International is a 100 per cent owned subsidiary of NOVA that draws on NOVA's 40 years of experience and applies it internationally. Novacorp focuses on developing partnerships through equity investment and providing state-of-the-art engineering and operating expertise. Services offered by the company include:

- Feasibility studies
- Engineering and design
- Project and construction management
- Quality assurance and inspection
- Commissioning
- Operations and maintenance
- Technology transfer

Novacorp has been active in more than 50 countries in the last ten years and has a particularly strong presence in the Asia-Pacific region and Latin America,

Novacorp in Argentina

Novacorp has been active in Argentina since the late 1970's when it participated in the technical audit of the Cogasco pipeline. Since then Novacorp has maintained the relationships formed from that project and has continued to monitor developments progressing in Argentina. Activities of notable importance to Novacorp were the economic reforms of the country, its privatization of government owned utilities and facilities, and encouraging foreign investment. These reforms have been successful in lowering Argentina's inflation rate to 11 per cent and pegging the peso to the U.S. dollar. Novacorp saw these recent changes as an opportunity to build an alliance that could bring capital and engineering expertise to develop Argentina's abundant oil and gas reserves.

In 1992, Novacorp joined a consortium which owns 70 per cent of the shares of Transportadora de Gas del Norte S.A. (Transco). Transco owns the northern transmission segment of Argentina's natural gas pipeline system, which was privatized in late 1992. Part of this system includes the Cocgasco pipeline which Novacorp audited more than 10 years ago.

The alliance formed included:

- Sociedad Comercial del Plata (Argentina)
- Techint Compania Tecnica International S.A. (Argentina)
- Novacorp International (Canada)
- Petroliam Nasional Berhad (Petronas, Malaysia)

Novacorp is also the technical operator of the pipeline, for a minimum period of eight years. The system statistics are:

- 4,265 kilometre, 16-30 inch diameter pipeline
- 12 compressor stations with 150,000 kW capacity
- maximum throughput capacity of 24 million cubic metres per day

The consortium formed in Argentina demonstrates how alliances can work to share expertise and equity for natural gas development. In addition, the consortium demonstrates Novacorp's commitment to the alliances it forms. Malaysia's involvement in the Argentine alliance evolved out of a joint venture Novacorp formed with Malaysia's national oil company, Petronas. Called OGP Technical Services, the joint venture provides project management and engineering services to the oil, gas and petrochemical industry. Malaysia's presence in the alliance brings Asian capital and expertise in developing South America's resources.

Economic cooperation is happening, not only among companies, but also among countries. Novacorp's activity in Argentina is evidence that this cooperation is a win-win situation for all parties.

Novacorp in South America

Novacorp is planning to expand its operations in Argentina and become active in other South American countries. Novacorp sees opportunities for developing South America's energy industry in the areas of pipeline expansion, gas marketing, liquids and petrochemicals.

**“Natural Gas Massification Plan in Colombia,
within the National Oil Framework”**

ISMAEL ARENAS
Vice President for Operations
ECOPETROL, Colombia

PLAN FOR THE EXPANSION OF GAS IN COLOMBIA WITHIN THE CONTEXT OF NATIONAL PETROLEUM

I. INTRODUCTION

- A. Colombian Energy Situation**
- B. Colombian Petroleum Framework**
- C. Ecopetrol's Activities**

II. COLOMBIAN NATURAL GAS PLAN

- A. Background of Natural Gas in Colombia**
- B. Natural Gas Reserves**
- C. Gas Plan Objectives**
- D. Methodology**
- E. Marketing Studies**
- F. Transportation and Investment Strategy**
- G. Economic Evaluation**

III. PRESENT NATURAL GAS INSTITUTIONAL FRAMEWORK

- A. Production System Structure**
- B. Production System Transportation**
- C. Production System Distribution**

IV. NEW INSTITUTIONAL SCHEME

I. INTRODUCTION

A. COLOMBIAN ENERGY SITUATION

According to the sector statistics, it can be said that during the last few years energy use has remained relatively stable in the Colombian economy (consumption/GDP); nonetheless, a growth in demand that is less than the GDP increase has been observed if a longer period of time is analyzed.

Ultimate energy consumption grew at an average annual rate of 3.8% during the sixties and at 2.9% during the eighties compared to a GDP growth of 4% and 3.6% respectively.

The causes of this are principally due to urban development during the sixties and seventies in conjunction with the use of more efficient energy sources such as electricity, some natural gas and petroleum derivatives compared to firewood and other non-commercial sources and due to the decrease in population growth.

This explanation does not represent an improvement in efficiency in the ultimate use of the modern energy sources, as would be expected. This decrease in energy use is principally produced in the residential sector more than by any of the other sectors such as the industrial, agricultural-mineral, etc.

Colombia is a country with a great variety of energy sources, such hydroelectric power whose exploitable potential is 93 GW, 10% of which is already operating and 14% is expected to be exploited by 1995. As far as coal, 6,500 MTON proved reserves offer a Reserves/Production ratio of more than 300 years.

As far as petroleum and natural gas is concerned, there is presently a great supply especially with the Cusiana and Cupiagua discoveries which presents a significant improvement in these hydrocarbon reserves. Presently, there are 3,680 million barrels of crude and 8,300 million cubic feet of natural gas.

As can be observed in Figure No. 1, firewood and sugar cane husks (traditional energy sources) still play an important role in Colombia energy supply (15% and 4%, respectively), while other renewable energy sources such as solar, wind, and vegetable residues are not considered in the calculation, or their portion is quite small. 46% corresponds to petroleum, 14% to natural gas, 12% to coal, and 10% to hydroelectric power.

B. Colombian Petroleum Framework

The Colombian petroleum industry started at the beginning of the twentieth century with direct intervention of the state through the granting of Concession Contracts for the exploration and exploitation of petroleum resources (crude oil and gas) in the country which reverted to the nation after

a specified period, during which royalties were received without having to make any direct investment.

In 1951, after the first reversion, De Mares back, to ECOPETROL, the Empresa Colombiana de Petroleos, was created, as a state company in charge of exploration, production, and refining which arose from this concession and from the following revertions to the nation.

As of 1974, the State named ECOPETROL as administrator of the oil reserves of the nation and of the development and promotion of the Colombian petroleum industry, directly and with private investment, when Association Contracts were created.

Also, ECOPETROL is responsible for the supply of fuel, for the maintenance of an adequate infrastructure for refining, transporting, and storing hydrocarbons and contributing to the country's progress through the development of the petroleum industry.

In this manner, ECOPETROL is the executor of governmental policies related to hydrocarbons, which determines its corporate goals. Nevertheless, in the degree to which the State controls fuel prices and specially fund availability, ECOPETROL has its limitations for investing due to the need of capital in other sectors of the economy.

Because of this, and as a part of the policies of the economy's opening, internationalization and privatization of the economy in which the Colombian government has directed itself towards, ECOPETROL has likewise promoted a process of opening up to the private sector that, as will be seen in the development of this presentation, refers to the majority of the activities carried out by the Company, thereby allowing the fulfillment of indispensable projects for the achievement of its strategic goals.

C. Ecopetrol's Activities

1.- Exploration and Production

These activities are carried out in Colombia through ECOPETROL and several private companies (national and foreign) through Association Contracts and Concessions that are in effect. Generally speaking, nearly 80% of the activities are carried out by private companies and the rest is directly carried out by ECOPETROL.

EXPLORATION

DIRECT OPERATION BY ECOPETROL:

These activites are carried out in the Valle del Magdalena, Llanos, Putumayo and Bogota basins over areas that the Company has reserved for itself in order to acquire tecnical information for prospect development and and hydrocarbon reserve discovery.

ASSOCIATION CONTRACTS:

Under this modality, the other available sedimentary areas are explored by National and Foreign companies which in conjunction with ECOPETROL, can develop and produce existing hydrocarbons in case there is a Commercial discovery.

The exploration term of the Association Contracts are of a 6 year duration in which tasks such as seismic, geophysical, and geological studies and drilling are performed, whose costs and risks are entirely paid by private partners.

If a discovery of a commercial field arises from these exploration activities, ECOPETROL reimburses the Associate 50% of the cost of the exploratory wells that are productive and begins to share 50% of the production obtained in the Field (previously deducting 20% for royalties) and 50% of the costs and expenses for the development of the field.

For Association Contracts signed as of 1990, this arrangement was changed for the cumulative production which exceeds 60 million barrels of petroleum and ECOPETROL'S share increases progressively according to the field's exploitation (Scaled Production Distribution).

This field production stage is no more than 22 years, so that the maximum duration of a Association Contract does not extend beyond 28 years.

The Association Contract allows the country to obtain Risk capital from private companies which are mostly foreign, and through ECOPETROL, obtain the benefit from the best technology in the petroleum industry, the information acquired from its development, and the results obtained in its activities.

ACHIEVEMENTS:

The Sedimentary area in Colombia is estimated to be 887,000 Km² along 13 basins, and from the beginning, exploration has comprised almost 40% of the potential areas.

In the last few years, the principal exploration activities have been developed as shown.

Seismic studies have been developed in comparative performance levels on active basins as a continuous operation especially those in the Llanos Orientales and in the three Magdalena river valleys. 3D and marine seismic development has been carried out in the last two years (Caribbean Sea).

As far as wells are concerned, a decrease in drilling per year has been observed. Nevertheless, there is permanent and stable activity due to the Association Contract commitments and the programs that the Company is developing. In addition, it should be noted that, as far as investments, some wells have required considerable sums of money due to their localization (Piedemonte Llanero), depth, and geological complexity.



EXPLORATION INDICATORS - TENDENCY

	1990	1991	1992	JULY 1993
SEISMIC KILOMETERS	9.597	7.691	8.691	5.473
ECOPETROL	4.528	4.515	3.803	1.480
PARTNERSHIP	5.066	3.176	5.888	3.993
DRILLED WELLS	65	50	41	30
ECOPETROL	7	6	5	5
PARTNERSHIP	58	41	36	25

RESERVES:

Due to the volume of activities in the Petroleum Industry in the country , as of December 31, 1992 petroleum reserves rose to 3 billion 680 million barrels including those that came from the Cusiana/Cupiaga fields. Ecopetrol counts on approximately 66% of this sum, based on Direct Operations and its share in Association Contracts as can be noted in Figure 2. The remaining natural gas reserves in as of December 31, 1992 were estimated to be around 8,300 GPC of which 87% corresponded to the Cusiana and Guajira fields and in which Ecopetrol has a 64% share.

CRUDE PRODUCTION:

In figure 3, the growth in National Crude production can be observed in the last few years and the distribution between Ecopetrol and the private sector.

Ecopetrol's total production comes from its Direct Operation of its fields and as a results of its share in the Association Contracts. (In general terms, 60% of the total production comes from the fields, including 20% that is set aside for paying royalties).

In 1992, the total production for the country was about 438 KBPD, of which 61% corresponded to Ecopetrol, represented in 90.7 KPBD in the direct operation and close to 176 KBPD of the Association Contracts.

45% of Ecopetrol's production correspond to Caño Limon crude which is its share in the Cravo Norte Association Contract which is operated by Oxidental de Colombia. The depletion of the fields is expected to occur towards 1995 and it will also be the date when the Cusiana/Cupiagua fields will start early production.

GAS PRODUCTION:

In figure 4 the conduct of national gas production corresponding to Ecopetrol and the private sector may be observed.

Ecopetrol's total production comes from the Direct Operation of its fields and as a result of its share in the Association Contracts, in the same manner as the production of crude.

In 1992 the total production in the whole country was almost 400 MPCD of which almost 80% comes from the Association system and 70% of this amount is produced by the Guajira fields (Association with Texaco off-shore).

As will be seen later, the production of natural gas in Colombia has been restricted to internal consumption, which has not developed enough to meet the demand due to the lack of availability of this energy resource. The main problem which makes the situation worse is that there is no adequate transportation infrastructure available.

2.- Refining

In Colombia, Ecopetrol totally operates the 2 most important refineries. They produce 96% of the national total in Petroleum derivatives. The one having the largest capacity is located in Barrancabermeja, and initially it was administered by the Tropical Oil Company until 1961, when Ecopetrol took over its operation. From that time on, its system has been improved and modernized so that now, it has reached the operating capacity of about 175 KBOPD.

Along with the Barrancabermeja Industrial Complex, we have the Cartagena refinery that presently manages a load of 70 KBOPD and that along with three other minor refineries augments the refining capacity of the country to 254 KOBPD.

As a result of the refining operations existing in the country, Ecopetrol covers 73.4 % of the internal demand for gasoline and the other 26.6% is imported directly by Ecopetrol.

However, with the purpose of minimizing the impact of having to depend on the importation of this fuel, Ecopetrol is expanding its refining capacity in Barrancabermeja by 19 KBOPD. To do this a new Catalytic Rupture Unit is being constructed (FCC) which, when its starts functioning in 1995, will allow for a greater production of gasoline of about 13,000 barrels a day.

3. - Transportation and Distribution

Most of the crude oil and its by-product transportation infrastructure, is owned, managed, and operated by ECOPETROL (Figure 5). On the other hand, about 12% has been constructed with private partners, for their own benefit, or third parties, with a specific rate, determined by the Colombian Ministry of Mines and Energy.

According to ownership, the transportation networks are classified as follows:

	ECOPETROL	PRIVATE
<u>TRANSPORTATION</u>	<u>Kilometers</u>	<u>Kilometers</u>
REFINED PRODUCTS	2,372	98
ON WAY TO REFINERY		
FOR EXPORTATION	3,183	1,683
NATURAL GAS	540	1,492
PROPANE	385	
FUEL OIL	598	
TOTAL	7,090	3,273

CRUDE OIL TRANSPORTATION: (Figure 5)

At present, the longest and greatest capacity oil pipeline is the Caño Limón-Coveñas oil pipeline. It exclusively transports the crude oil of the Cravo Norte Association whose partners are ECOPETROL, OCCIDENTAL, and SHELL. It is 774 Kilometers in length with a capacity of 200-225 KBOPD. During 1992, it registered an average use of 197 KBOPD.

In order to promote the participation of the private sector in this activity, ECOPETROL, in conjunction with several multinational companies, carried out the Colombia Pipeline construction in order to move crude oil out from the Mid-Magdalena Valley. This Pipeline began Operation in mid-1992. It is 483 Kilometers in length and an initial capacity of 135 KBOPD.

Another important Colombian pipeline is the "Central de Los Llanos" Pipeline which transports crude from the Casanare and Meta region in the Basin of the Llanos Orientales. It is 508 Kilometers in length and its capacity is being expanded from 107 KBOPD to 200 KBOPD.

For the production from the Cusiana/Cupiagua Fields, as they develop, ECOPETROL and its Partners should expand the present transportation capacity in order to move early production estimated to be 150 KOBPD in 1995 and around 600 KOBPD in 1997-1998.

TRANSPORTATION OF REFINED PRODUCTS

The transportation of refined products, including gasoline for internal consumption, is carried out through several ECOPETROL pipelines from the refineries to the wholesale distributors.

The distribution is mostly carried out by the private sector (Figure 6) through multinational companies (ESSO, TEXACO, and MOBIL) which cover 75% of the market, while the Colombian group, TERPEL, in conjunction with ECOPETROL, manages the remaining 25%.

STORAGE:

In Colombia, the total storage capacity of crude oil and its by-products is 13.4 Million barrels represented in tanks at the production fields and at the ports for exportation, as well as in gasoline tanks at principal distribution points.

In these Facilities, ECOPETROL shares 48.9% directly and 35.4% indirectly.

The present storage availability is relatively low for the country's needs, compared, for example, to gasoline storage which represents approximately a 12 day supply, in comparison to international standards which establish supply periods of more than 20 days. This situation could be improved through increased private participation, as long as adequate incentives are offered, especially in reference to a modification in price regulation by the Government.

II. COLOMBIAN NATURAL GAS PLAN

A. Background of Natural Gas in Colombia

The Colombian gas industry has been slow in developing with an average growth in the last years of only 1% annually (Figure No. 7), measured in terms of consumption growth which has gone from 372.2 MPCD in 1983 to 394.2 MPCD last year.

This situation was the result of lack of a consolidated market, that justified the exploration and development of new reserves while the lack of sufficient reserves did not allow the creation of these markets.

Some attempts were made to increase gas consumption but although the number of homes connected to the service increased substantially, from 100,906 in 1986 to 416,214 in 1991, residential consumption only increased by 5.4% during the same period, since no important expansions were recorded in the program coverage.

Consumption in the industrial and thermoelectric sectors that account for 70% of the total demand (Figure No. 8) has remained constant in the last few years and as can be observed, its market is concentrated on the Northern Coast of the country by 73%.

A similar situation as the one described above is reflected in what has occurred to the role of natural gas in relation to the demand for primary energy in the country. That's how the contribution of this energy source has decreased in the last ten years. It has gone from 16% in 1981 to 14% in 1992 (Figure No.1).

B. Natural Gas Reserves.

Until December 31,1991 the country had a moderate level of natural gas reserves (3.691 giga cubic feet) in relation to the probable market which was being estimated in the Gas Plan.

Due to the Cusiana and Cupiagua discoveries, however, these reserves increased by 3.800 giga cubic feet in addition to important increases in other fields such as the Guajira. Presently, there are a total of known natural gas reserves in the order of a total of 8.300 giga cubic feet (Figure No. 9).

With this availability, the country presently has a Reserves/Production ratio of more than 50 years.

The distribution of the reserves in the Colombian territory is observed in Figure No. 10, the present principal production source being the Guajira fields and in the future, the Cusiana and Cupiagua fields.

The development of the important natural gas reserves that Colombia has is one of the main objectives of the Colombian governments energy policy which wants to promote it through a plan called "Program for the expansion of gas use".

In order to develop this program, a gas subproject to evaluate the problem and devise a plan for the development of this industry was included in the Energy Cooperation Agreement signed by the Colombian government and the European Community Commission.

In this way, ECOPETROL, in conjunction with European companies such as Gaz de France, Catalana de Gas and the BEICIP, developed the Natural Gas Expansion Program, whose fundamental objective is to promote the efficient use of energy in the country and substitute among the different consumer sectors energy sources that are more expensive with other alternatives.

C. Gas Plan Objectives

- Contribute to the promotion of natural gas use through the creation of efficient proposals in the areas of marketing, gas pipeline design and the optimum network, rates in relation to other energy sources, change of equipment, security, equipment and accessory production, etc.

- Recommendation of an institutional plan for the development of natural gas use.
- Technological exchanges and industrial cooperation agreements between the Republic of Colombia and the EEC countries.

D. Methodology

The general methodology presented in Figure No. 11 contains three principal stages:

1. Analysis and information processing oriented toward the study of potential gas demand in the different consumer sectors and towards the analysis of gas competitiveness in relation to other energy sources, including the most adequate transportation infrastructure at this stage (main or subsystems).
2. Economic Evaluation where the gas supply options that meet all or part of the potential demand are defined. The setting method was used in order to find the supply/demand sets, that best meet the Gas Plan objectives and maximize the economic benefit for the country.

3. Strategic and tactical reflection stage which permitted the understanding of the decisions that were taken to determine the short and medium term stages of the Plan.

E. Marketing Studies

Based on available marketing information from previous studies and through surveys among the different consumer sectors, industrial, residential and commercial located in the main consumer centers and production zones, the potential substitution of natural gas for other energy sources considered, was identified (electricity, GLP, gasoline, middle distillates, fuel oil, Castilian crude and coal) (Figure No. 12).

Depending on the calculated supply costs for these demands, with different offers, the optimum coverage that the substitution program should have was determined (Figure No. 13). These projections represent a growth in demand of 4.8% annually during the period analyzed, going from 495 MPCD in 1995 to 757 MPCD by the year 2000 and 967 MPCD by the year 2010.

To attain this coverage, it would be necessary to connect approximately 1.000.000 new residential and commercial users to the gas service in the next eight years. In addition, an aggressive Compressed Natural Gas (CNG) program for automotive use is considered as follows:

GAS PLAN COVERAGE

	1995	2000	2010
RESIDENTIAL USER	617.000	1.661.000	3.295.000
VEHICLES WITH CNG	15.000	49.900	81.800
FILLING STATIONS	36	166	253

F. Transportation and Investment Strategy

The transportation network design strategy required to supply the identified demands (Figure No. 14), consists of having a big gas trunk line that interconnects the present productive fields of the country from the Guajira fields on the Northern Coast to the upper Magdalena fields in the Huila region and the Cusiana field in the Llanos Orientales.

In this trunk line, the deliveries will be made to the transportation concessionaires for the different subsystems. They in turn will deliver the gas to the city port for its distribution.

This trunk line will have a total length of 1,400 Km., of which near to 700 Km are available through the change to gas pipelines, of some oil pipelines owned by ECOPETROL used for the transportation of crude. This infrastructure has been planned in order to be carried out by the national and foreign private sector. The estimated total investment for the 1993-2015 period is US\$3.025 million, including transportation, distribution, CNG stations and user conversion (Figure No.15).

The main pipeline, ECOPETROL's responsibility, is being complemented in the Ballena (Guajira) - Barrancabermeja section (575 Km) by a BOMT (build, own, operate, maintain and transfer) contract with an investment of more than US\$ 200 million.

Likewise, the private sector will be in charge of the subsystems to the large consumption centers such as Bogota, Cali, Bucaramanga, and Medellin as well as the infrastructure and operation of the distribution systems in the cities.

The previously mentioned subsystems will require near to 1,000 Km of gas pipeline. The subsystems will soon be bid for construction under the BOMT modality.

G. Economic Evaluation

In order to determine the economic incentive that the execution of the gas plan would have in its various stages, the gas supply costs of the demand for economically replaceable energy sources were quantified. These costs compared to the gas value in each use (net back), represent the profit margin that this substitution would produce.

A fundamental element in this quantification was the economic appraisal of the natural gas in the well entrance which in Colombia is considered non-marketable internationally, its opportunity cost is related to the depletion cost of the resource.

Taking the calculated economic costs as the base, the gas distribution and transportation costs, the benefit that supplying natural gas to the previously mentioned markets will have on the country, expressed in its present 1993 value, is US\$ 3.977 million.

III. PRESENT INSTITUTIONAL FRAMEWORK OF NATURAL GAS

A. Structure of the Production System

In the same way as crude, national production of natural gas is largely carried out (82%) through association contracts. The Guajira field (Ecopetrol-Texaco Association) is the main gas producer (77%) with the unique characteristic of being the only one to have free gas in Colombia.

Ecopetrol's direct production is 17.3% of the total while the remaining 0.7% corresponds to concession contracts.

In this way, gas ownership is 66.5% Ecopetrol's (association + direct), 33.5% associates and private concessions.

B. Structure of the Transportation System

The national network of gas pipelines consists of 2,032 Km, 540 Km of which are owned by Ecopetrol. The Company buys all the gas from the Associates in the field and, in conjunction with its own gas, transports it directly or through private companies, paying the corresponding transportation rate, to the consumption centers where it sells it to distributors and large consumers according to prices fixed by the Ministry of Mines and Energy.

C. Structure of the Distribution System

Urban distribution is done by the private sector with regulated prices through a rate that includes: connection charge or rate, fixed or basic rate, and a consumption charge. The rates for the residential sector are stratified.

Ecopetrol sells directly to the large consumers. Its share in consumption is approximately 93% of the total volume.

IV. NEW INSTITUTIONAL PLAN

For the adequate development of the gas Expansion Program adjustments are needed specially in the institutional plan that presently handles this business. Some changes that should be made refer to the regulatory role of the State for an efficient development of natural gas, specially in a first phase in which an adequate coordination of the different energy subsectors and the price evolution of each one of them up to the level of its economic value (which does not presently occur with any of the energy sources), with the main purpose of rationalizing consumption, attract private investment and obtain an adequate penetration of natural gas in the diverse markets.

Advantages can be found in the development of the Gas Plan in the medium term, in the creation of a company responsible for the commercialization of the gas and its transportation along the main gas pipeline separating these activities from Ecopetrol, in a similar way as what occurs in the principal gas companies of the world.

This would initially be a mixed company where Ecopetrol's assets related to gas would be transferred to the new company. Once the gas is in full development, its total privatization could occur.

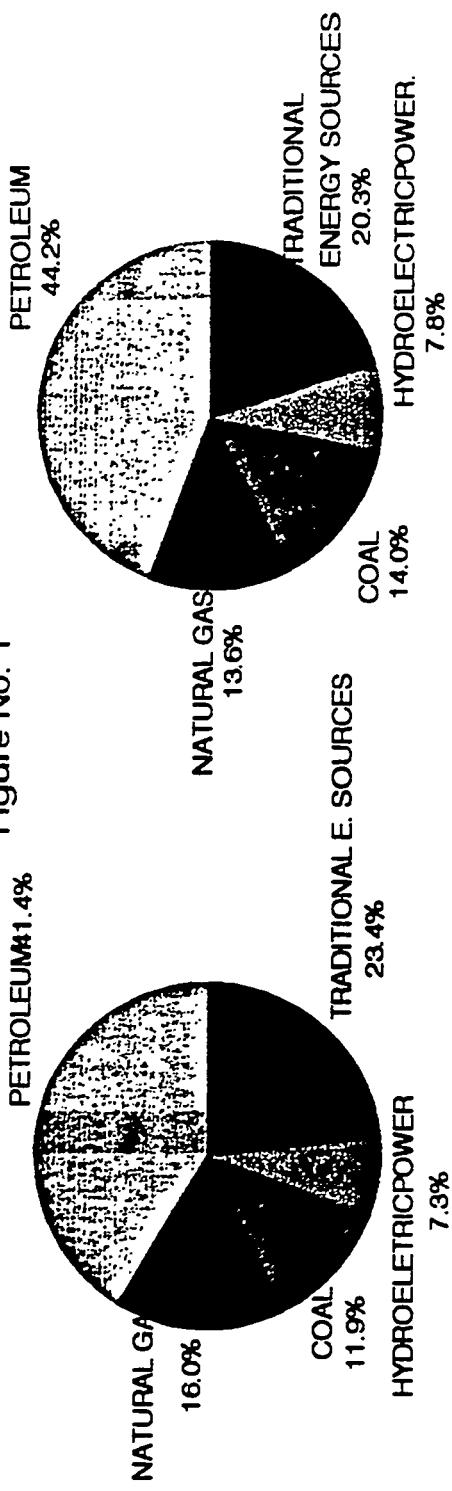
In spite of the above, in order to assure the Plan's development, the first stage, where the design and construction of the main projects are concentrated, will be directly managed by ECOPETROL. It will adapt some of its oil pipelines for gas service and will contract the construction of the new projects under the BOMT modality (build, own, operate, maintain and transfer) such as the Ballena-Barrancabermeja gas pipeline for which bids were already received that are presently being studied and the gas pipelines to Bogota and to the west of the country (Cali) which will soon come out for bidding (Figure No. 16). In order to pursue these activities, an adequate structure has been designed within Ecopetrol, with a clear segregation from the rest of the activities.

The gas supply to the city gate would be done directly or through private companies owners and operators of the regional transportation systems which would in turn deliver to the distributors, large industries and electric power stations.

At the governmental level there will be the Energy Regulation Commission whose president will be the Ministry of Mines and Energy. This commission will regulate the price transition of all the energy sources until they reach their level of economic value assuring the profitability of the private sector investment as well as the transaction prices among the diverse gas system operators.

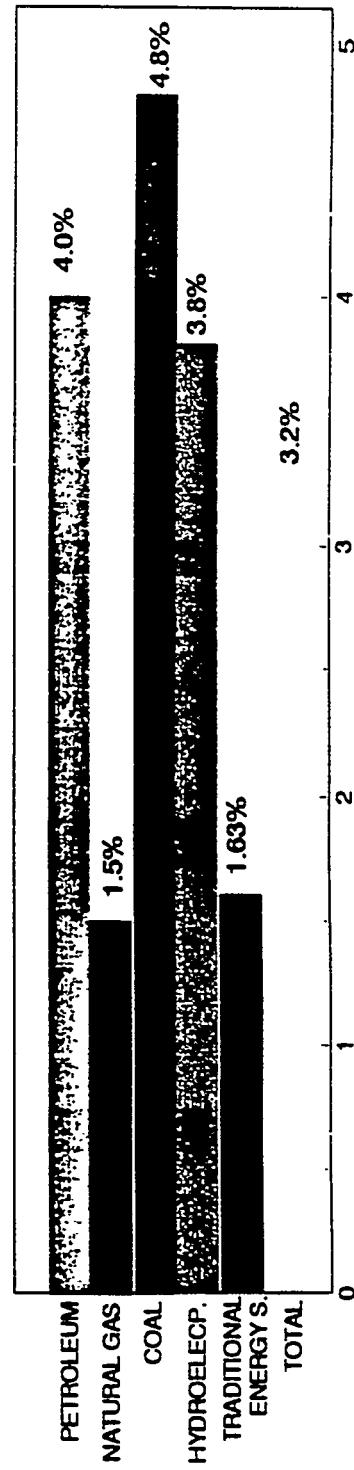
This Gas Plan is part of a National Energy Plan that is presently being prepared which will fix the share of each energy source and particularly that of gas in the national energy balance, as primary as well as final energy.

COLOMBIAN ENERGY SITUATION
PRIMARY ENERGY DEMAND
Figure No. 1



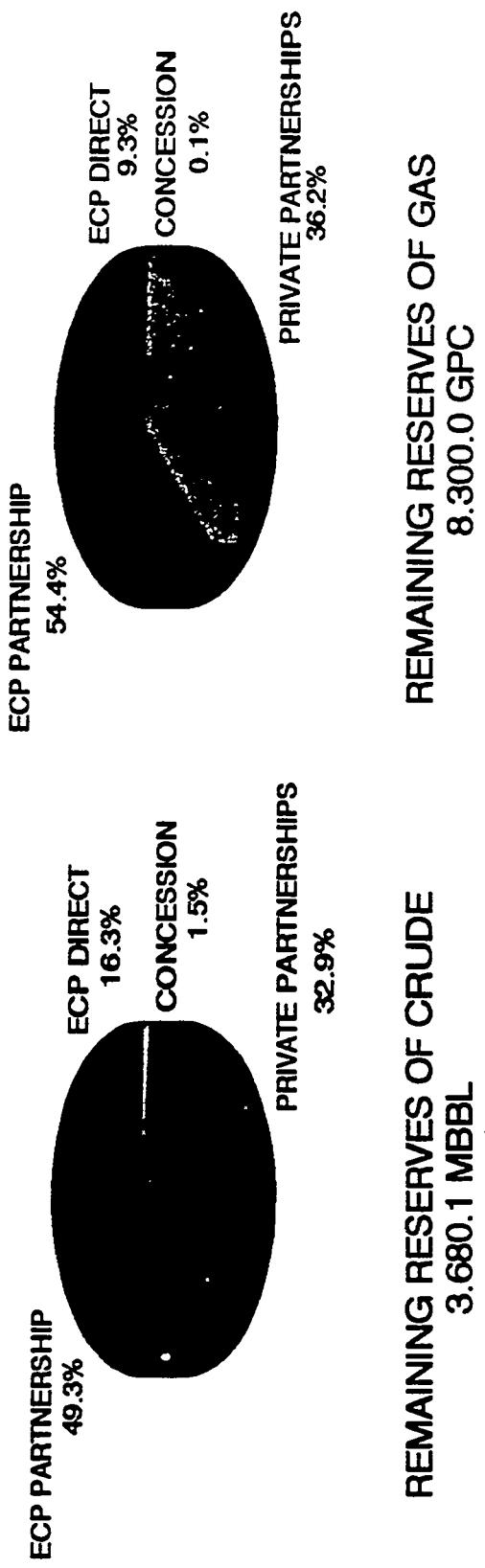
TOTAL 1992: 541.599 BEP

AVERAGE ANNUAL CONSUMPTION



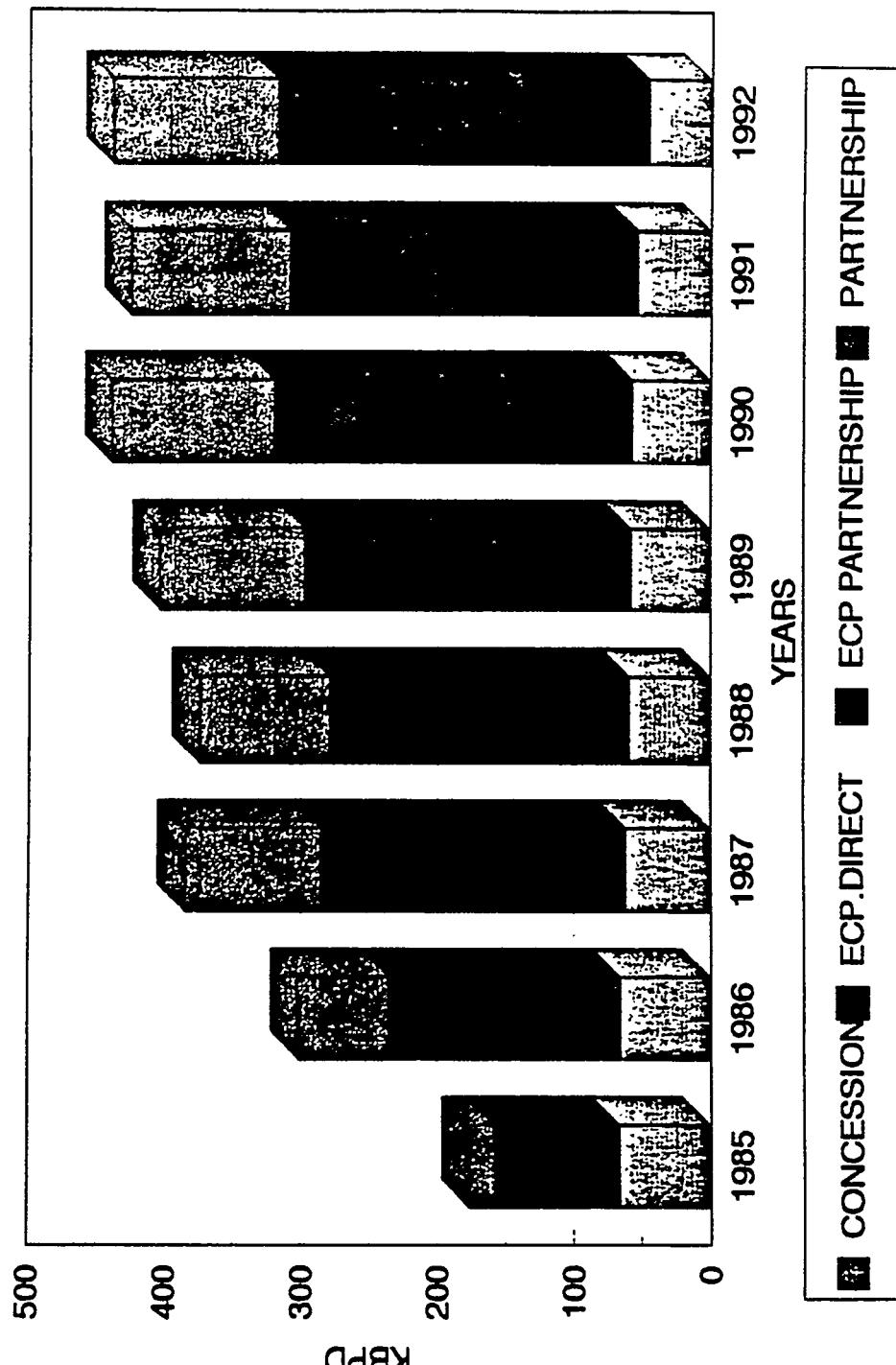
DISTRIBUTION OF HYDROCARBON RESERVES

Figure No. 2



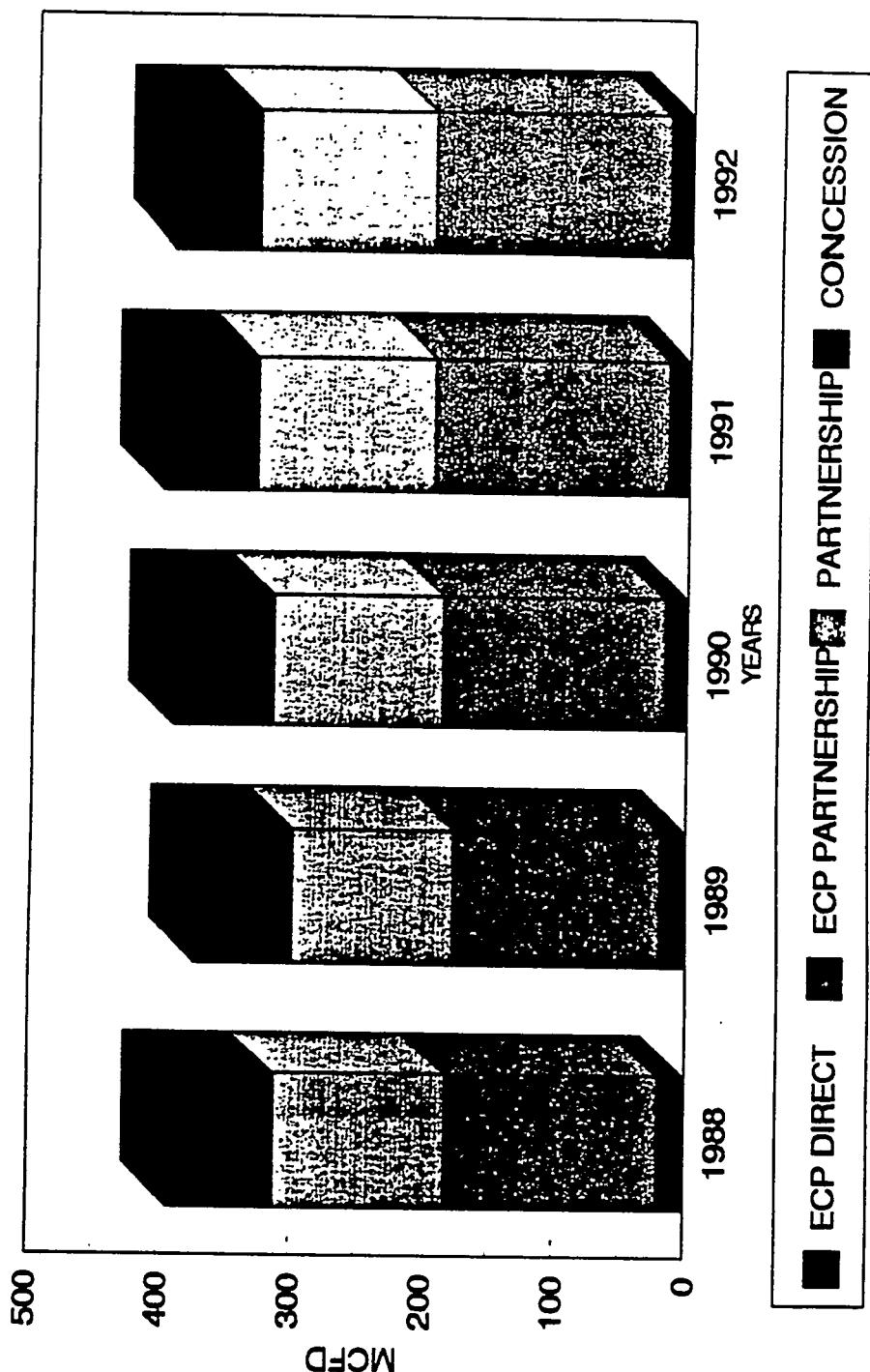
NATIONAL CRUDE PRODUCTION

Figure No. 3



NATURAL GAS PRODUCTION

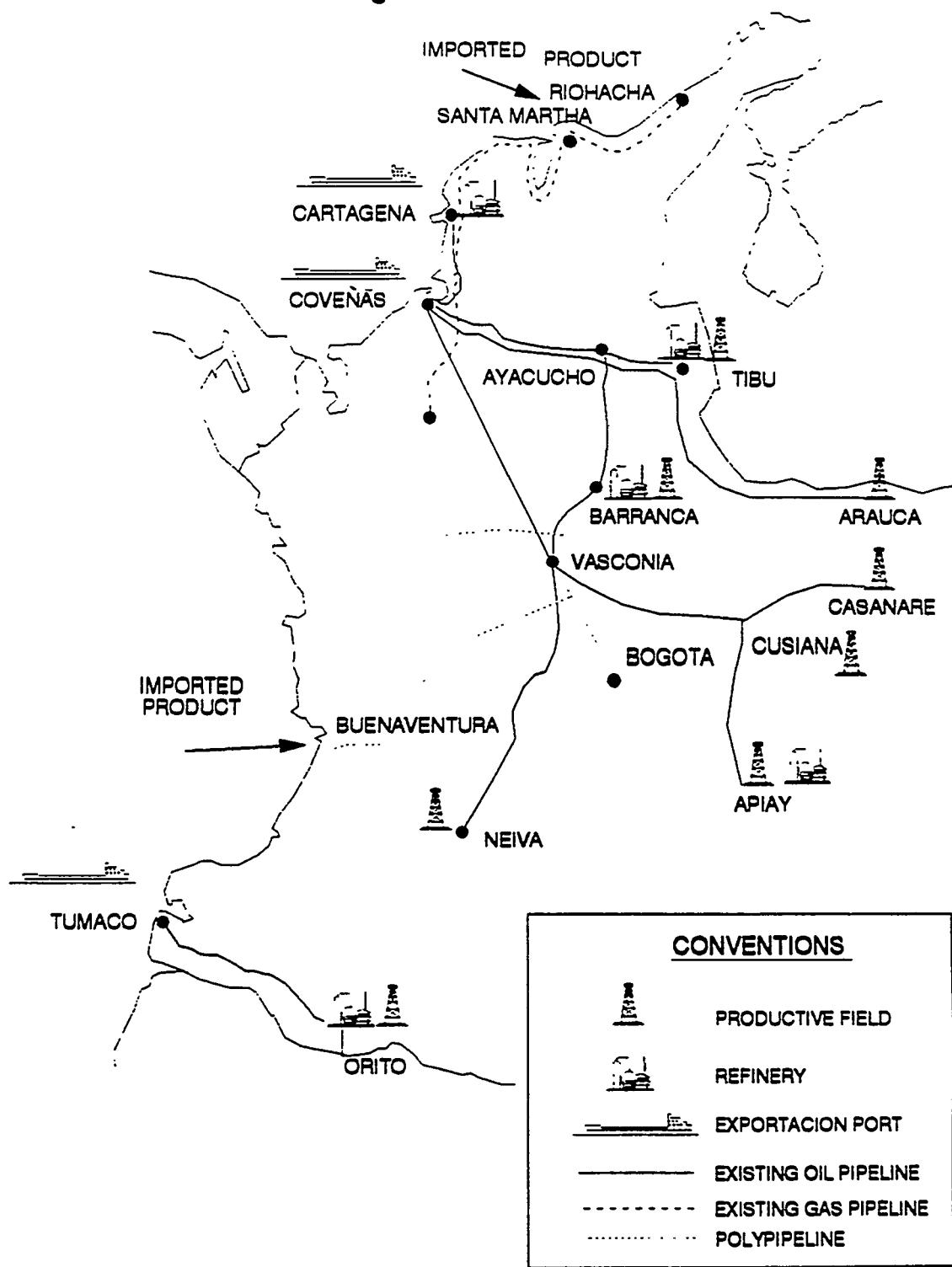
Figure No. 4





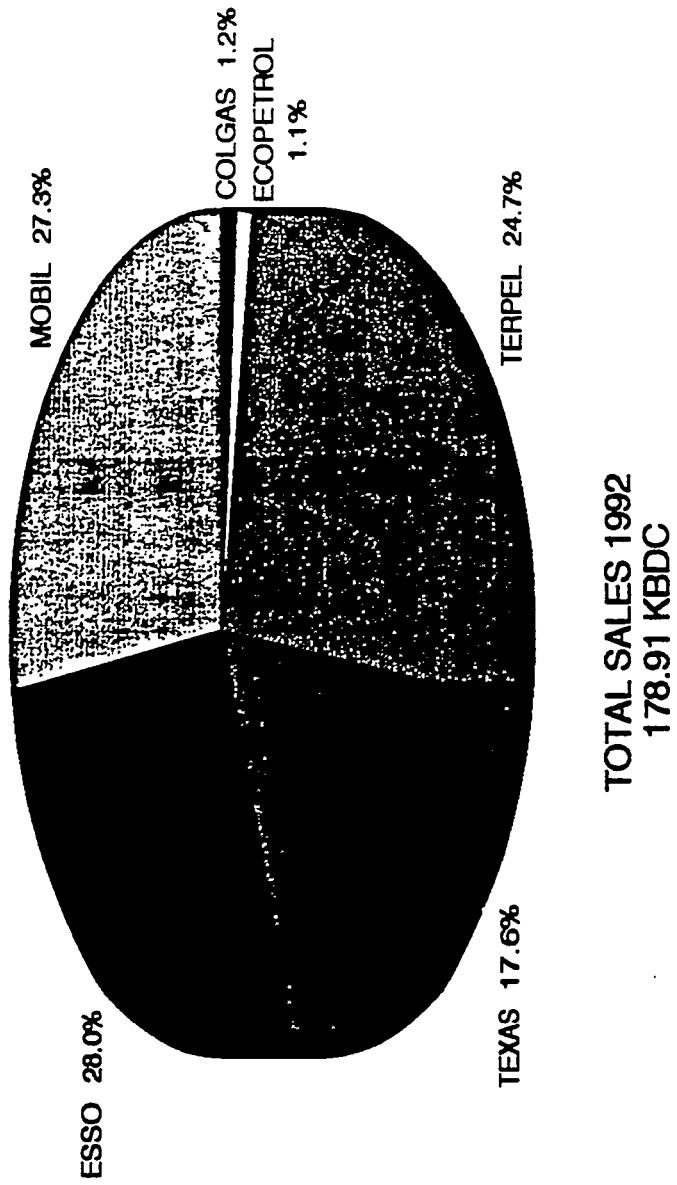
PRINCIPAL OIL PIPELINES

Figure No. 5

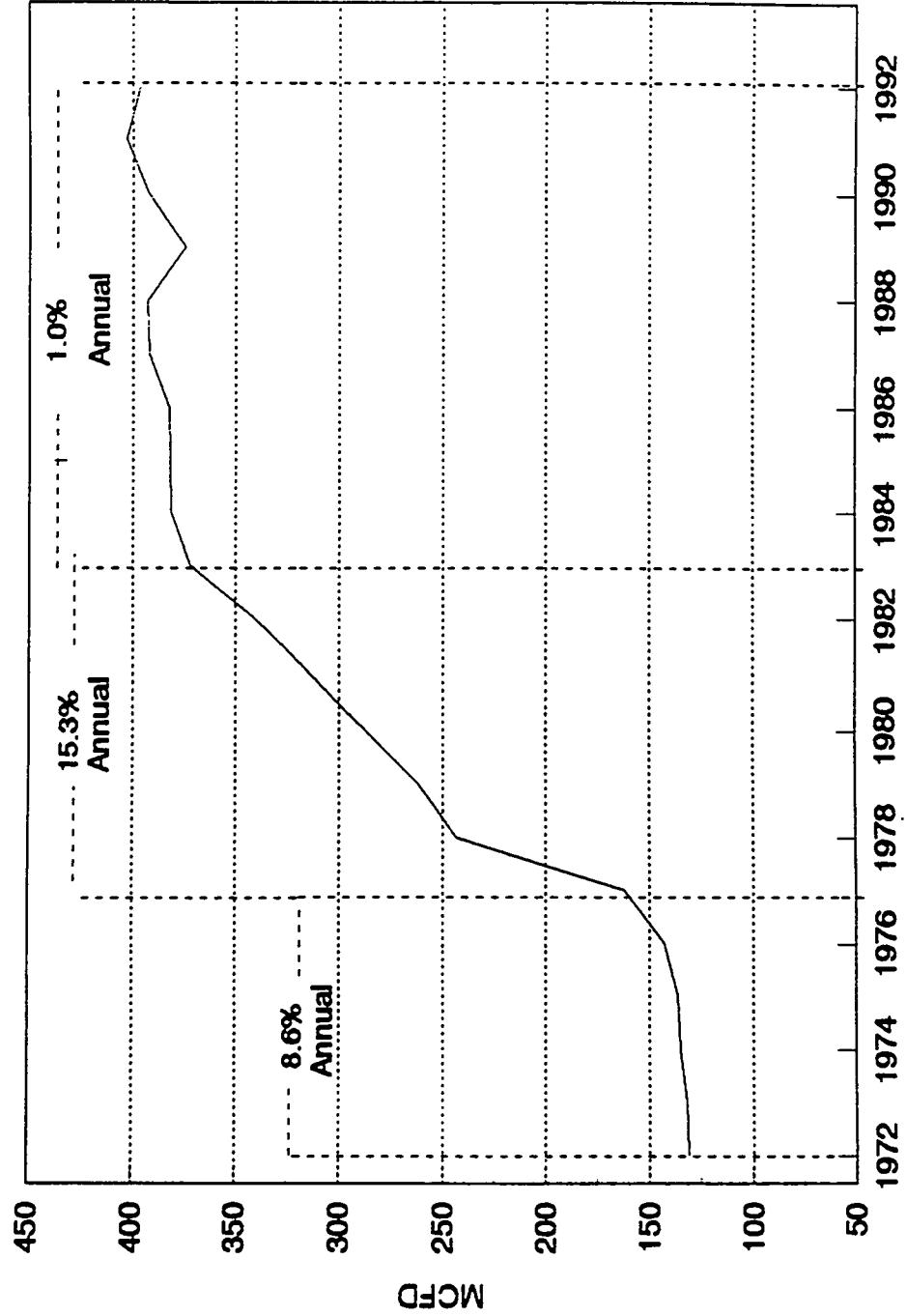




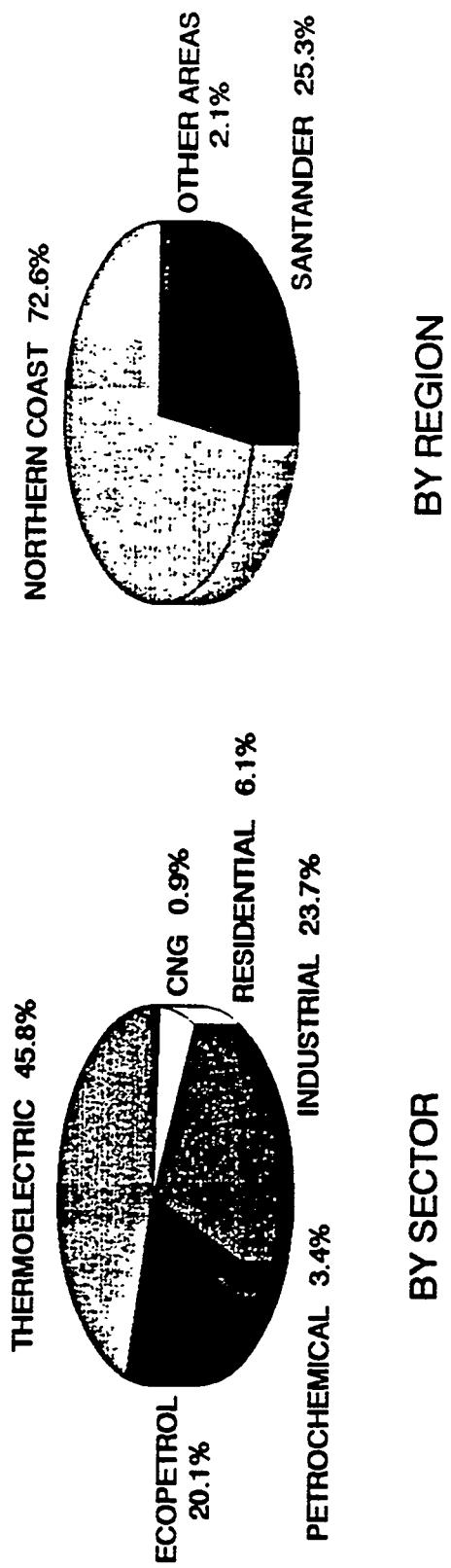
FUEL SALES BY COMPANY
Figure No. 6



NATURAL GAS CONSUMPTION
Figure No. 7

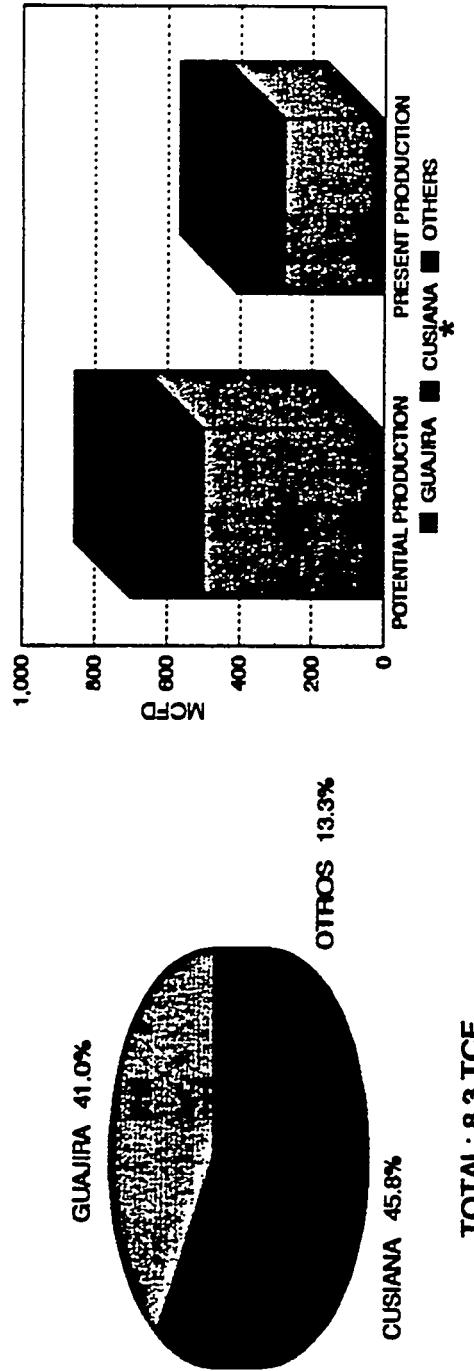


NATURAL GAS CONSUMPTION BY SECTOR AND REGION
1992: 394.2 MBTU/D
Figure No. 8



KNOWN GAS RESERVES

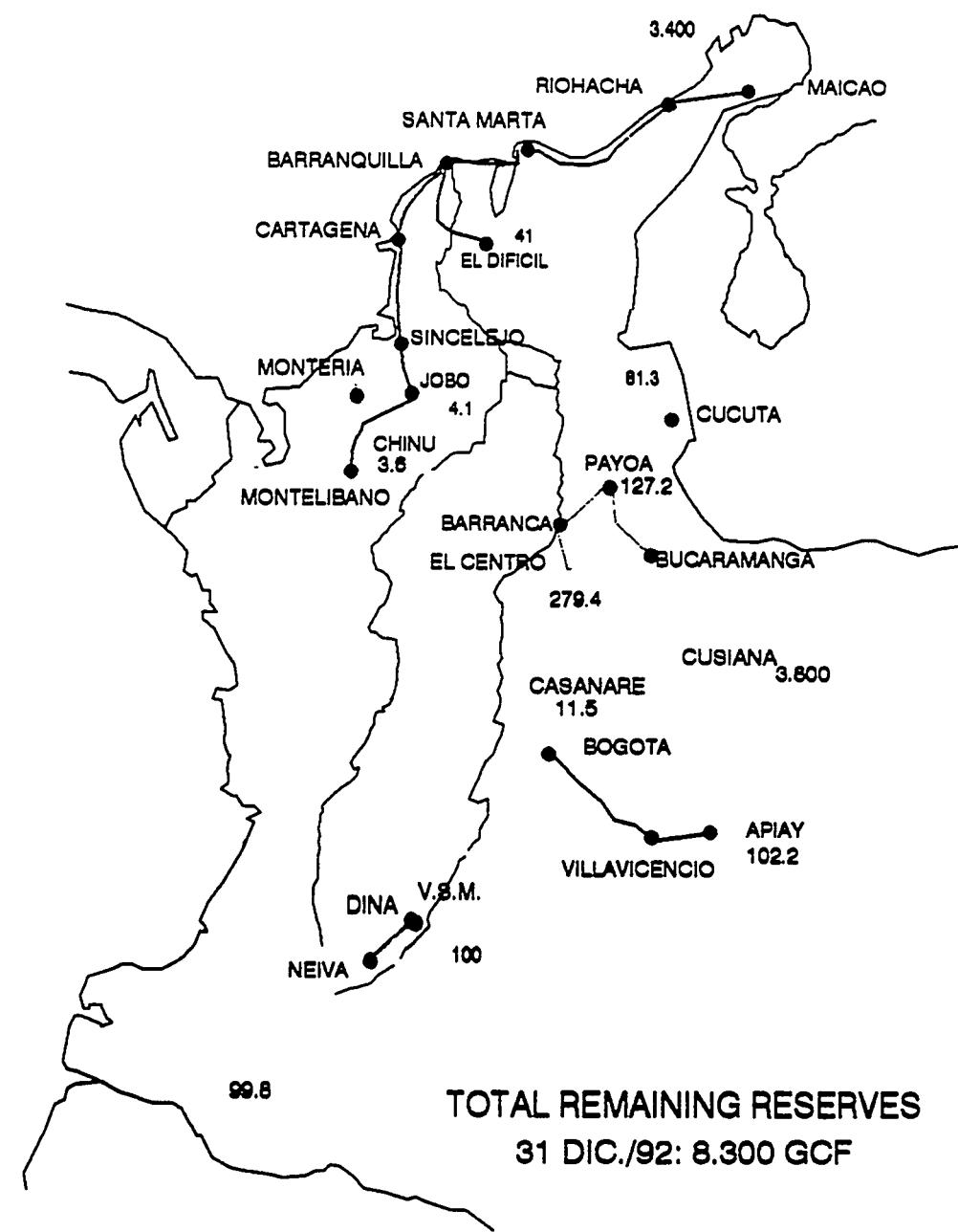
Figure No. 9





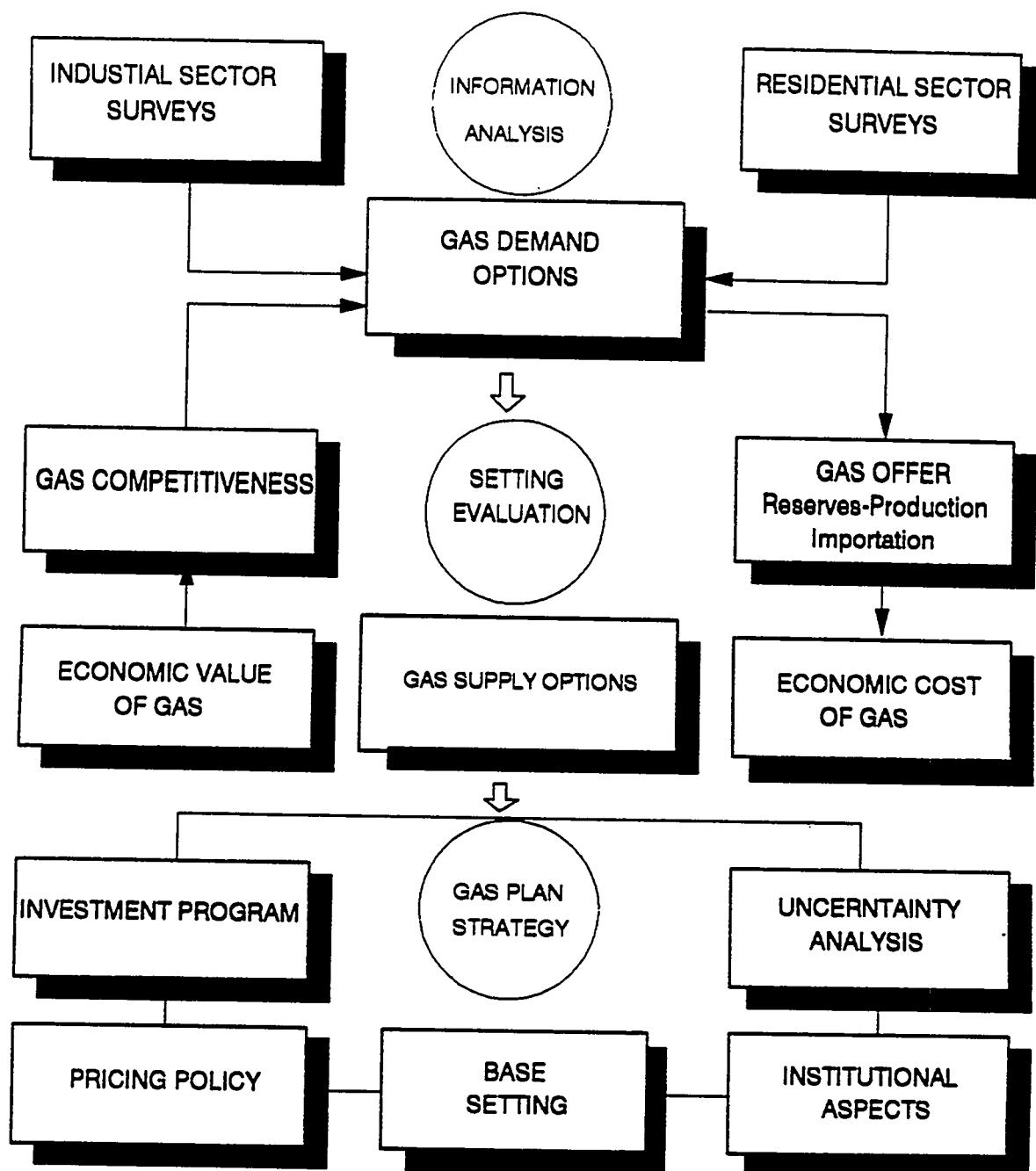
GAS PRODUCING FIELDS

Figure No. 10



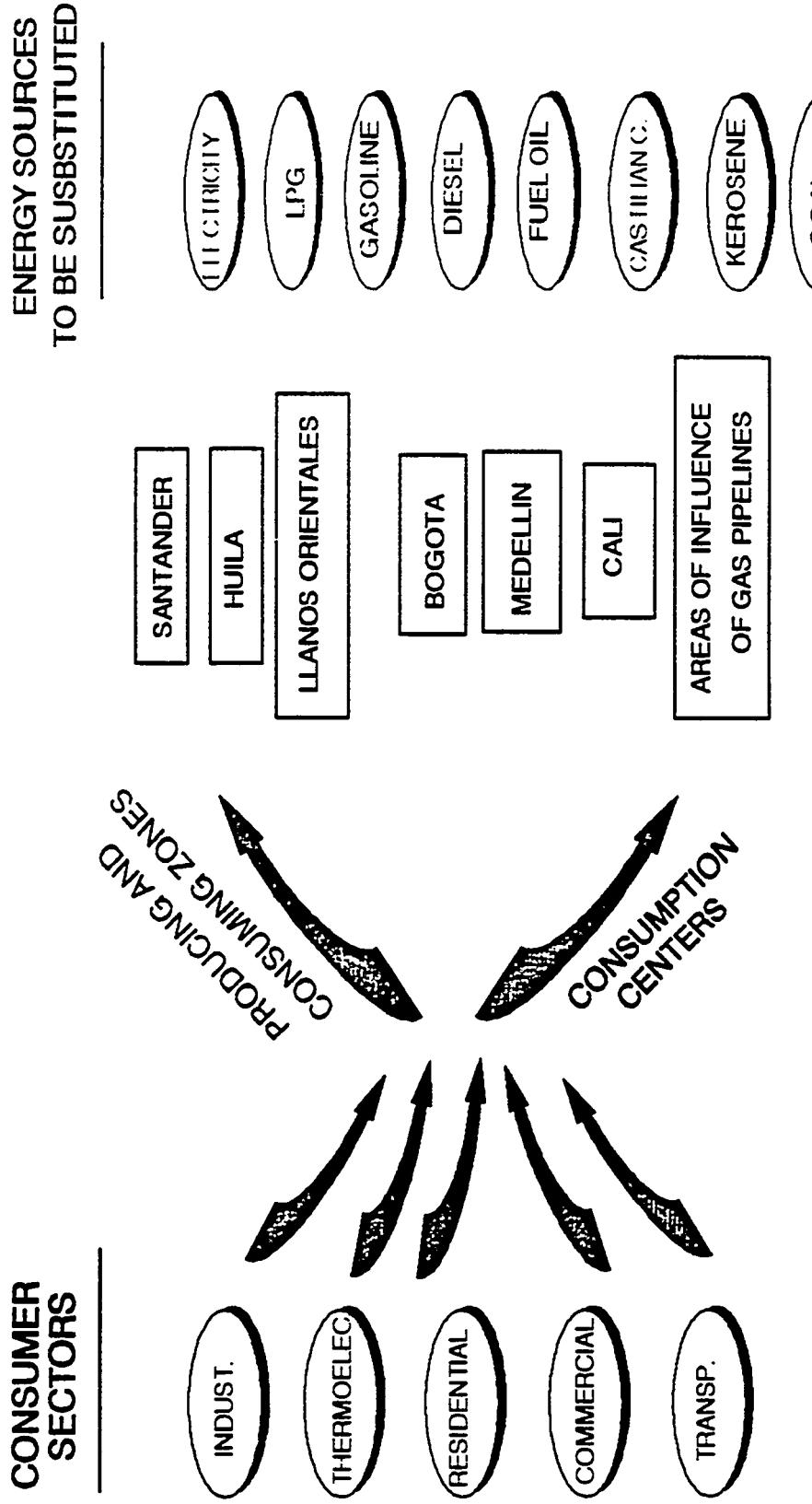
GAS PLAN DEVELOPMENT-METHODOLOGY

Figure No. 11

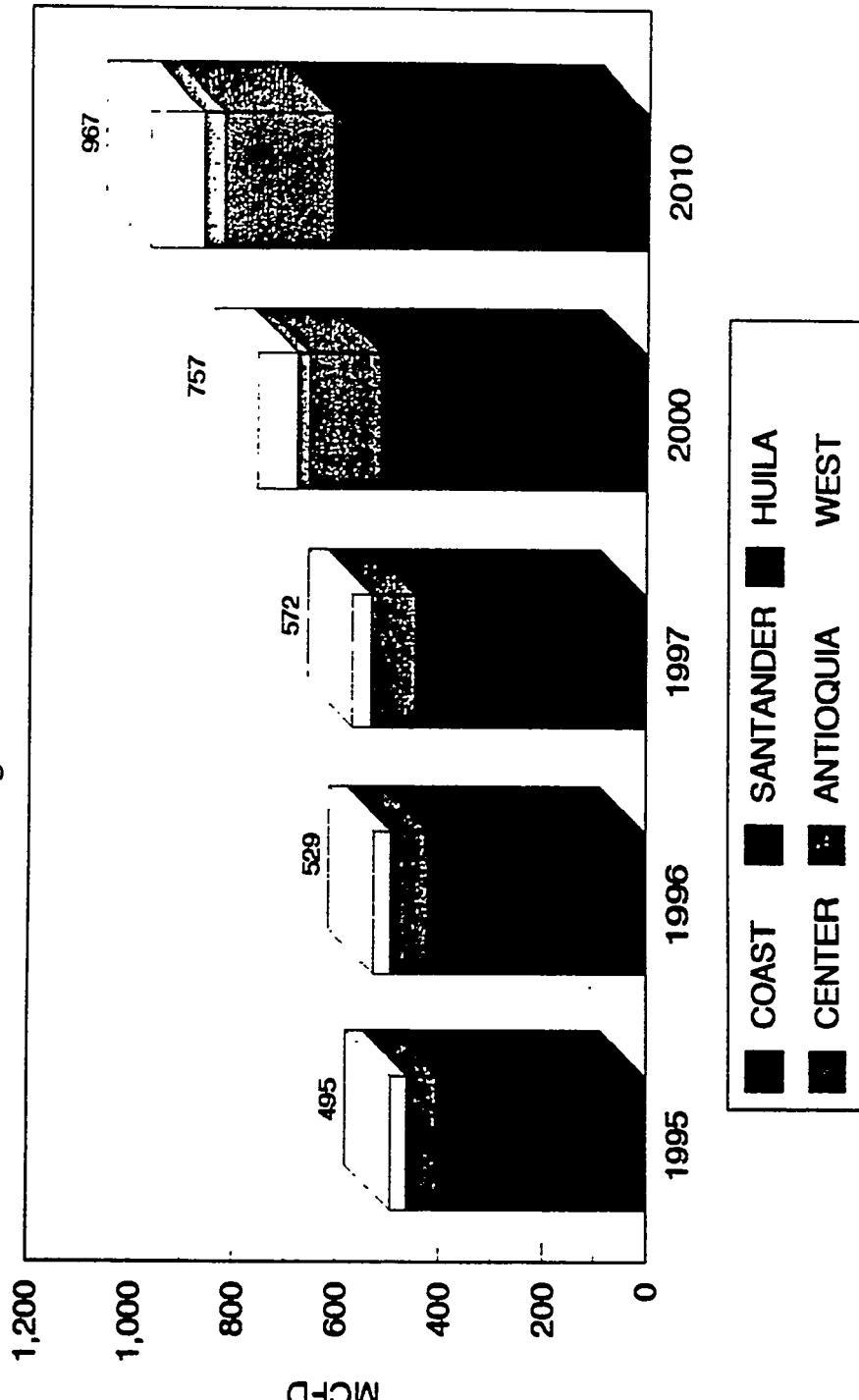


MARKETING STUDY

Figure No. 12



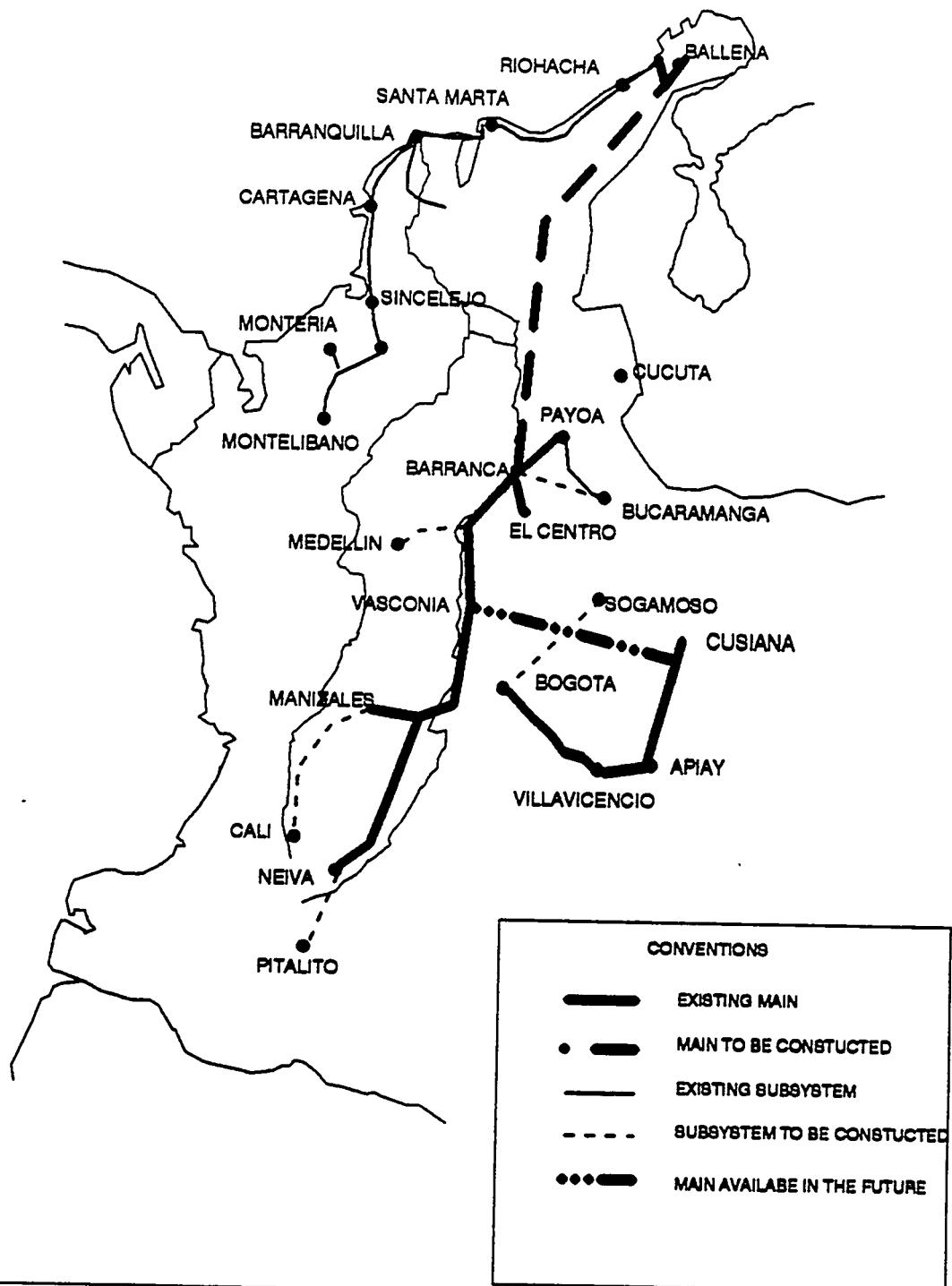
GAS OPTIMUM COVERAGE
ACCORDING TO REGIONS
Figure No. 13





NATIONAL SYSTEM OF GAS PIPELINES

Figure No. 14



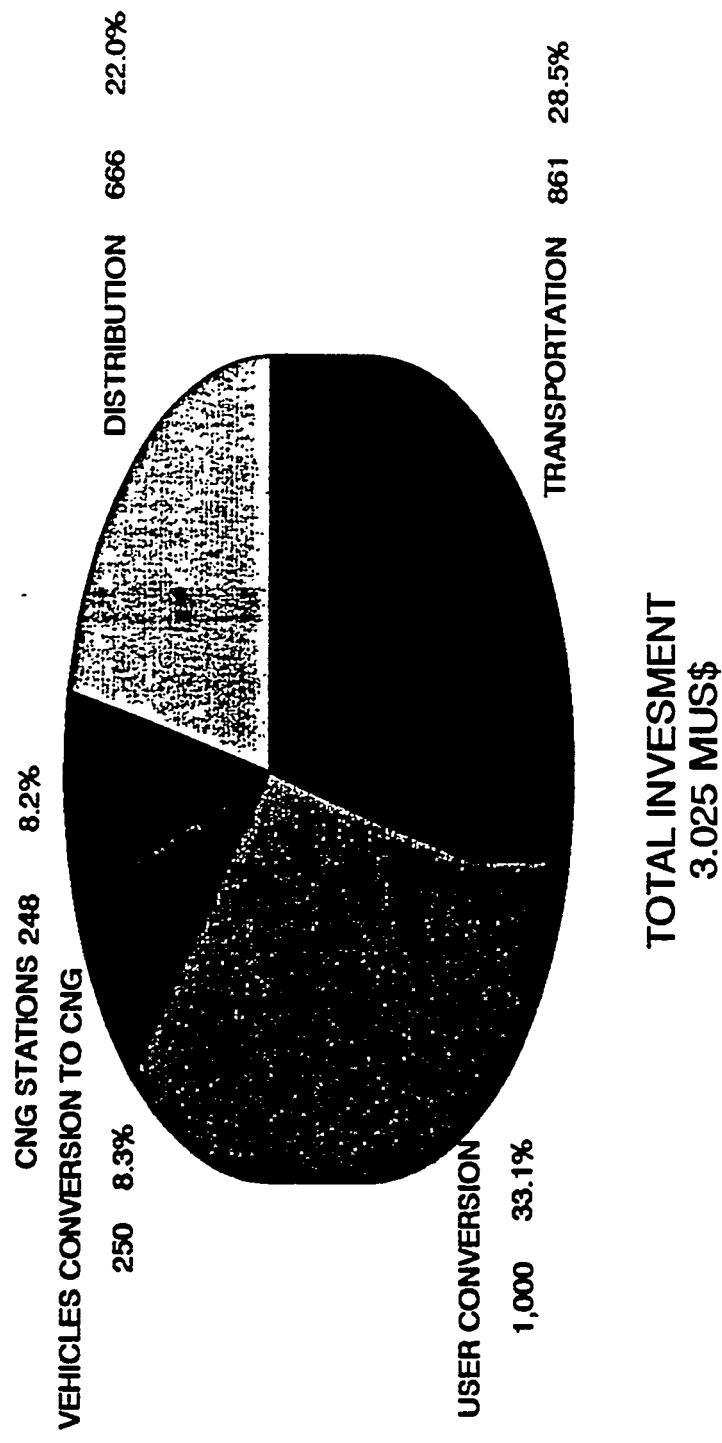
CONVENTIONS

- EXISTING MAIN
- MAIN TO BE CONSTRUCTED
- EXISTING SUBSYSTEM
- - - SUBSYSTEM TO BE CONSTRUCTED
- MAIN AVAILABLE IN THE FUTURE

MASIFICATION GAS PLAN
INVESTMENT PERIOD 1993-2015

MUS\$'93

Figure: No. 15





CONSTRUCTION AND OPERATION OF GAS PIPELINES

Figure No. 16

SECTION	PLAN	INVESTMENT 1993-2012 MUS\$	PRISNI STAFF	OPERATION BEGINS	11 NGH Km	DIAMI 11R IN INCHES
TRUNK LINE						
BALLENA-BARRANCA	B.O.M.T.	280	BID EVALUATION PRIVATE APPLICATION ALMOST COMPLETED AVAILABLE	1995	575	18
BARRANCA-NEIVA	DIRECT	79	ALMOST COMPLETED AVAILABLE	1994	192	12
VASCONIA-LA BELLEZA	DIRECT	73	UNDER CONSTRUCTION	1995	93	12 14
SUBSYSTEM						
SEBASTOPOL-MEDELLIN	CONCESSION	40	UNDER NEGOTIATION	1995	157	10-12
BARRANCA-BUCARAMANGA	CONCESSION	22	UNDER NEGOTIATION	1994	95	8
MARIQUITA-CALI	B.O.M.T.	112	PREPARING DOCUMENTS FOR BID	1995	360	18
CUSIANA-VILLAVICENCIO	DIRECT	17	CONSTRUCTION BY ECP	1994	152	10-12
FUTURE DEVELOPMENT						
CUSIANA-BOGOTA	B.O.M.T.	270	BID-ETING STUDY ID	1999	410	18

“Trinidad: Island of Opportunity”

PHILLIP RIBBECK
Marketing Advisor
Amoco Production Company

International Energy and Gas Conference

Dallas, Texas

9/28/93

Trinidad: A Natural (Gas) Opportunity

Presented by

Philip B. Block

Block Energy Production Company

AGENDA

- Amoco Background
- Amoco's Operations in Trinidad
- Trinidad Background
- Trinidad's Resource Position
- Trinidad's Existing Natural Gas Market
- Trinidad's Export Products
- Trinidad's Future Natural Gas Market
- Summary and Conclusion

Amoco Background

104 Year Old, Fully Integrated Oil Company
Three Primary Operating Units

Amoco Oil Company
Amoco Chemicals Company
Amoco Production Company

APC holds largest private natural gas reserve
base in North America

APC expanding internationally

ATOCC is Trinidad subsidiary of APC

Amoco Trinidad Oil Company

Established in 1962 as Pan Am Petroleum Company

First discovery made in 1969

Holds 940,000 Acres under license

Produces over 50,000 BOPD (45% of Trinidad's oil production)

Produces over 400 MMCFD of natural gas (75% of Trinidad's gas sales)

Potential Natural Gas Resources of 8.3 TCF

Potential to sell 2.2 TCF under existing contract with NGC

Trinidad Background

Independent island nation of Trinidad & Tobago

Stable political democracy

Southernmost Caribbean island

1.3 MM people

Highly literate, English speaking population

Well trained, highly skilled labor force

Developed infrastructure

SOURCE: Trinidad & Tobago Ministry of Energy

Trinidad Background (cont'd.)

- 1992 GDP: US\$ 5.4 B
- Produces 125,000 BOPD
- Produced and consumed 512 MMCFD in 1992
- Refining capacity of 150,000 BOPD
- 2nd largest exporter of Ammonia in world
- Strategic location

SOURCE: Trinidad & Tobago Ministry of Energy

Trinidad's Total Natural Gas Resource Base

NON-ASSOCIATED GAS RESOURCES AS OF 1/1/92 (TCF)

	(Discounted)			
	Proven	Probable	Possible	Total
East Coast Marine Area	5.2	3.2	3.9	12.3
North Coast Marine Area	3.0	1.4	1.1	5.5
Other	0.2	0.1	2.2	2.5
TOTAL:	8.4	4.7	7.2	20.3

SOURCE: Trinidad & Tobago Ministry of Energy

Trinidad's Natural Gas Market (1992)

Petrochemicals:	276 MMCFD
Electric Power:	138 MMCFD
Heavy Industries:	87 MMCFD
Others:	11 MMCFD
TOTAL:	512 MMCFD

SOURCE: Trinidad & Tobago Ministry of Energy

Trinidad's Future Gas Market

Existing Gas Market:

Expansion Opportunities:

CMC Methanol (10/93)

Methanol Expansion:

Iron Carbide:

LNG:

Refinery Upgrading:

Other:

512 MMCFD

50 MMCFD

50 MMCFD

30 MMCFD

350 MMCFD

40 MMCFD

15 MMCFD

1047 MMCFD

Trinidad LNG Project

- 300 MMCFD LNG Export Facility
- Amoco, BG, Cabot and the NGC are sponsors
- Assessing site
- Developing commercial arrangements
- Cabot is primary market
- Fall 1997 targeted startup

Trinidad: A Natural (Gas) Opportunity

- Large natural gas resource base
- Capable and reliable E&P support
- Numerous petrochemicals produced
- Stable democracy
- Fiscal incentives
- Strategic location
- Predictable and manageable construction costs
- Good place to conduct business

“Bolivia-Brazil Natural Gas Project: Challenges and Solutions”

AYRTON BASSANI
Vice President
Sociedade Privada de Gas S/C Ltda.

Information International Associates, Inc
Indexing Worksheet

Printed: 10/27/95

Due Date: 11/10/95

Control No: 95:007220-0014

<020>RA

<040>K

<090>Bolivia-Brazil natural gas project: challenges and solutions

<110>Proceedings of the 1993 InterAmerican Petroleum and Gas Conference

<360>Paper 14, 10 Pages

<530>EDB;ETD;INS

<540> 030600 ; 030300

<620>

<740>BK

<950>

-- abstract length:

0

⁴⁵⁰
<801> ⁴⁵⁰ The development of the natural gas reserves in Bolivia and Brazil is discussed. The development of these reserves is being conducted by the Private Corporation for Gas Development. The Corporation was created to promote participation of the private sector in an area that was exclusively managed by by federal or state governments. In order to promote participation by the private sector and at the same time to motivate foreign investors, the Corporation is conducting a program of activities and studies that includes a legal and institutional analysis, a feasibility study in accordance with the viewpoints of the private sector, and also the structure of a business development plan, according to the perspective of private investors.

(801) Bolivia : T1 Planning of : Q3 Natural Gas : T4
Brazil : T2 Reserves : Q4 Supply and Demand
Natural Gas Industry : Q1-2, T3 Production : Q4
Investment

<020>Document Type

<360>Pages

<740>Indexer's Initials

<040>Literary Indicator

<530>Announcement Code

<801>Keywords

<090>Primary Title (A)

<540>EDB Subject Categories

<950>Abstract

<110>Primary Title (M)

<620>Title Augmentation

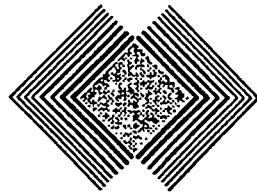


CPD

Companhia Paulista de
Desenvolvimento



**PRESENTATION
ON
IPGC/93**



SÃO PAULO DEVELOPMENT COMPANY

SPG- SOCIEDADE PRIVADA DE GÁS S/C LTDA.

Anyway the Bolivia-Brazil pipeline system is just the beginning of the use of this source of energy as an economic factor of integration of the southern region of South America.

First, let me present SPG.

SPG can be better translated as a Private Corporation for Gas Development and, as its name indicates, was created to promote the participation of the private enterprise in an area that was exclusively managed by federal or state governments.

It was established exactly one year ago, in August 1992 as a result of an agreement between the Governor of the State of São Paulo, the State that by far will be the largest user of the gas coming from Bolívia, and the Minister of Mines and Energy.

At that time, it was already foreseen that the amount of funds this project would require could not be met only by Petrobras. The Brazilian State Oil company is deeply involved with the exploration, production, transportation, refining and even retailing of oil products and unless it carries out huge investments, national oil production will tend to decrease sharply in the years ahead. It is estimated that US\$ 5.3 bi are needed for maintaining the current production capacity of 650.000 barrels a day, (which will decrease to 300.000 in 1997 if no investments are made) or US\$ 9,3 Bi to produce 1MM barrel a day in that year.

In order to promote this participation and at the same time to motivate foreign investors, SPG is conducting a program of activities and studies that includes a legal and institutional analysis for this participation, a feasibility study in accordance with the viewpoints of the private sector, and also the structure of a business development plan, according to the perspective of private investors.

These studies are being conducted by Technoplan/JP with certain components of the work sub-contracted with Fluor Daniel, Black and Veatch, Tenneco Gas Services and Poten and Partners.

SPG is structured as a civil society at this moment, since the objectives of the company are to conduct these activities and to reach agreement with all agents involved in the process. Therefore in this phase it is not profit oriented.

SPG has members which are shareholders and also non-shareholders participants which are driven to help it in structuring properly this business. It has at this moment 36 companies which are associated members (i.e. they hold shares of the company) and 6 non-associated members, among which are some of the biggest national and international suppliers of capital goods, engineering companies, contractors, banks, investors and potential users of natural gas.

Only in Brazil, the companies listed are responsible for more than 15% of the total GDP.

In order to conduct this economical feasibility study a very in-depth market survey was prepared, whose results we will present herewith very briefly.

As already mentioned, the main consumer of natural gas will be the State of São Paulo. Consequently, this is exactly the place where the existence of a good market survey was more needed especially since the available data were old and subject to distortion.

BURNER-TIP NETBACK VALUES OF NATURAL GAS IN THE INDUSTRIAL SECTOR OF THE STATE OF SAO PAULO

CLASSIFICATION	AVERAGE ECONOMIC DEMAND (CMD) 1992	BURNER-TIP NETBACK VALUES IN US\$/MMBTU				
		(1)	(2)	(3)	(4)	(5)
BY REGION						
GREATER SAO PAULO	3,971,772	3.14	3.02	3.56	3.38	4.05
CAMPINAS	1,903,213	3.16	3.36	3.39	3.57	4.25
BAIXADA SANTISTA	913,008	3.57	3.67	3.71	3.35	4.17
VALE DO PARAIBA	896,630	2.84	2.57	2.84	3.21	3.88
SOROCABA	468,807	2.58	2.59	2.73	2.97	3.69
OTHERS	462,801	2.72	2.58	2.76	2.91	3.64
TOTAL	8,616,231	3.11	3.07	3.38	3.35	4.05

NOTES:

- (1) BASED ON AVERAGE PRICES DURING 1991
- (2) BASED ON AVERAGE PRICES DURING 1992
- (3) BASED ON PRICES IN MAY 1993
- (4) BASED ON 1992 WORLD OIL PRODUCT PRICES
- (5) BASED ON AIC IN CONSTANT 1992 US\$ FOR THE PERIOD 1996-2017

SOURCE: TECHNOPLAN/JAAKKO POYRY ENGENHARIA, 1993

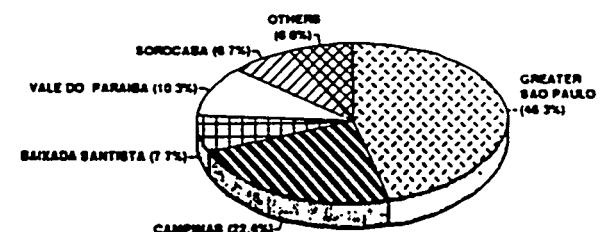
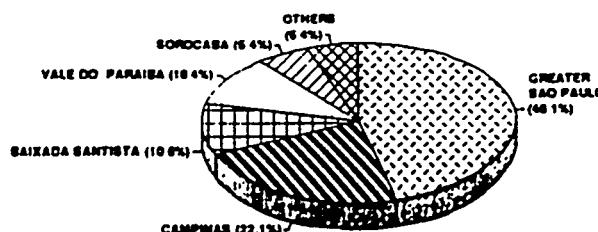
An extensive survey was conducted in São Paulo State, mainly viewing industrial market demand. A consistent methodology was set-up and an in-depth field survey was carried out with direct visits to 966 large factories, located near the gas pipeline route.

The potential and economic demand were determined by region, by industrial activity, by type of fuel and by end use equipment.

The economic demand was determined by considering the prevailing price of the basket of consumed fuels during the past three years and also, based on the world oil prices prevailing in 1992 and finally on the anticipated price, in constant 1992 dollars, for the period from 1998 to 2017, based on projected average prices for major crude oils developed by Poten and Partners.

Only in the State of São Paulo the economic industrial demand found for 1993 was 8.6 MMm³/day reaching 12.7 MM m³/day in the year 2.000. You can find in the tables enclosed herewith, the breakdown of this market in accordance with the classification mentioned above.

Distribution of Economic Industrial Demand for Natural Gas in the State of São Paulo by Region

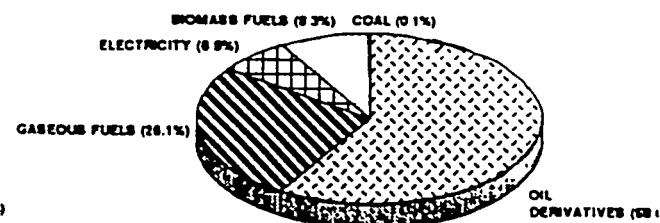
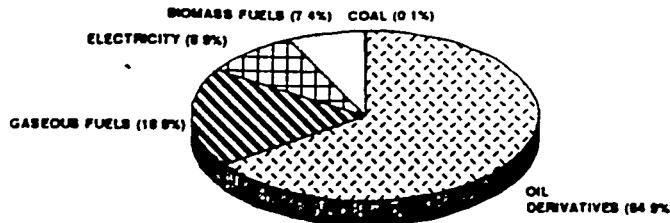


Total Economic Demand in 1992 = 8.6 MMCMD

Total Economic Demand in 2000 = 12.7 MMCMD

SOURCE: TECHNOPLAN/JAAKKO POPYRY ENGENHARIA, 1993.

Distribution of Economic Industrial Demand for Natural Gas in the State of São Paulo by Type of Fuel



Total Economic Demand in 1992 = 8.6 MMCMD

Total Economic Demand in 2000 = 12.7 MMCMD

SOURCE: TECHNOPLAN/JAAKKO POYRY ENGENHARIA, 1993.

If, in addition to these estimates for the State of São Paulo we consider the demand estimates for the states of Paraná, Santa Catarina, Mato Grosso do Sul, Minas Gerais, Rio Grande do Sul and Rio de Janeiro, with many of these surveys also conducted by Technoplan, the total non-power demand in S-SE Brasil in the year 2000 reaches 34 MMCUM/day.

POTENTIAL VERSUS ECONOMIC DEMAND IN THE INDUSTRIAL SECTOR OF THE STATE OF SAO PAULO IN 1992

CLASSIFICATION	POTENTIAL DEMAND (CMD)	ECONOMIC DEMAND (CMD)	RATIO OF ECONOMIC TO POTENTIAL DEMAND (%)
BY REGION			
GREATER SAO PAULO	5,435,684	3,971,772	73.07
CAMPINAS	3,713,151	1,903,213	51.26
BAIXADA SANTISTA	2,677,730	913,008	34.10
SOROCABA	1,948,927	468,807	24.05
VALE DO PARAIBA	1,258,371	896,630	71.25
OTHERS	1,885,076	462,801	24.55
TOTAL	16,918,939	8,616,231	50.93

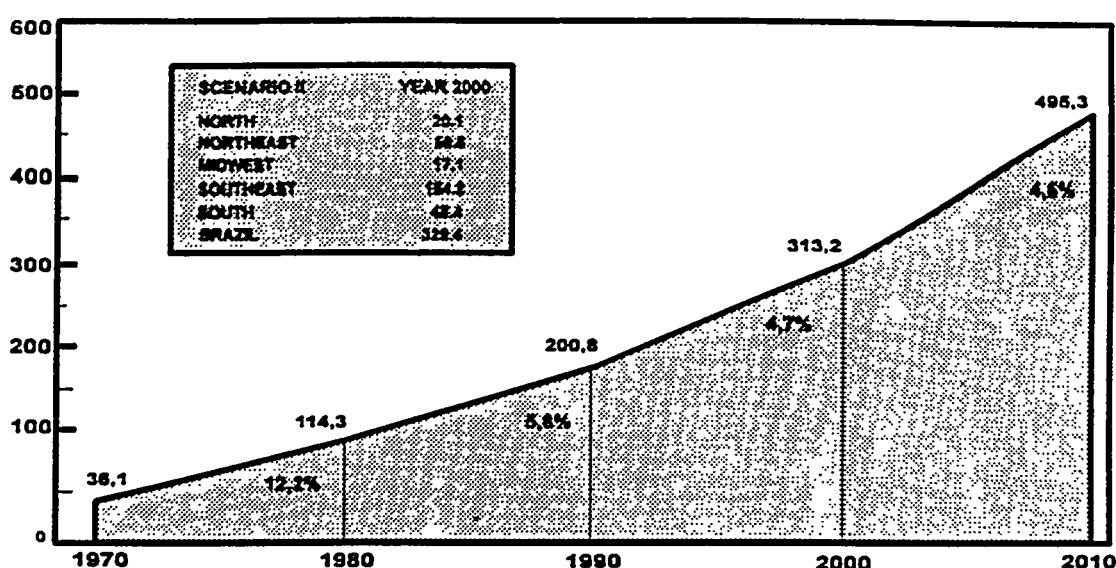
SOURCE: TECHNOPLAN/JAAKKO POYRY ENGENHARIA

In relationship with thermo-generation, extensive studies were conducted based on so called "2015 Plan" of Eletrobras. This Plan projects the demand for electric power under different scenarios of economic growth.

Based on this projected growth of demand, significant investments are scheduled for this decade. Working with Centrais Eletricas de São Paulo - CESP we have obtained the Average Incremental Cost of these plants, considering the same methodology of Eletrobras i.e. based on real discount rate of 12% per year and an economic life of 50 years for hydroelectric power plants. Also realistic investment costs were developed for gas fired combined cycle power plants using actual interest rates and feasible equity/debt ratios.

BRAZIL - FORECAST OF ELECTRICAL ENERGY DEMAND

"PLAN 2015" - SCENARIO II



SOURCE: GCPS; 2010 and Eletrobras "Plan 2015"

(*) Graphic figures do not include auto producers

As a result of this study it is clear that the gas fired power plants proved to generate energy competitively when compared with other alternatives even disconsidering the plants under construction where investment costs are distorted by the accrual of interest rates caused by the delays in construction.

The economic cost of new hydroelectric supplies is around US\$ 65/MWh while the gas fired power plants result in a financial cost around US\$ 60.00/MWh, in dollars of 1992. If a realistic financial analysis (i.e. considering the realities of capital market and tax obligation of the project company) is applied for hydroelectric supplies their cost of power is greater.

SUMMARY OF 10-YEAR ELECTRICAL EXPANSION PROGRAM FOR S SE BRAZIL BY TYPE OF PLANT AND STATE

CLASSIFICATION	NUMBER OF PLANTS	CAPACITY (MW)		TOTAL INVESTMENT (US\$ MM) (1)(2)		UNIT INVESTMENT (1) (US\$/kW)				GENERATION COST (US\$/MWh) (3)	
		INSTALLED	FIRM	WITHOUT IDC	WITH IDC	INSTALLED		FIRM			
				WITHOUT IDC	WITH IDC	WITHOUT IDC	WITH IDC	WITHOUT IDC	WITH IDC		
BY STATE											
SAO PAULO											
ALL PLANTS	25	5,752	2,006	12,117	15,006	2,107	2,609	4,650	5,758	69.3	
PLANTS U.C.	4	3,934	1,347	6,582	10,672	2,182	2,713	6,371	7,923	110.2	
NEW PLANTS	21	1,818	1,259	3,535	4,334	1,944	2,384	2,808	3,443	66.9	
MINAS GERAIS											
ALL PLANTS	18	4,016	3,065	6,550	8,272	1,633	2,060	2,140	2,690	38.8	
PLANTS U.C.	1	510	589	1,078	1,324	2,114	2,597	1,630	2,249	31.4	
NEW PLANTS	17	3,506	2,478	5,481	6,948	1,563	1,982	2,214	2,806	40.6	
PARANA											
ALL PLANTS	7	3,448	1,925	3,294	3,816	955	1,136	1,711	2,034	26.9	
PLANTS U.C.	1	1,260	639	914	914	726	726	1,431	1,431	20.6	
NEW PLANTS	6	2,168	1,286	2,380	3,002	1,066	1,372	1,650	2,334	33.0	
OTHER STATES											
ALL PLANTS	34	13,064	7,787	23,906	33,833	1,633	2,571	3,080	4,319	66.2	
PLANTS U.C.	7	3,664	2,582	10,257	15,082	2,575	3,786	3,972	5,841	93.8	
NEW PLANTS	27	9,100	5,205	13,729	18,550	1,500	2,038	2,638	3,584	52.5	
TOTAL											
ALL PLANTS	84	28,300	15,383	45,957	60,827	1,747	2,313	2,988	3,954	60.0	
PLANTS U.C.	13	9,688	5,157	20,832	27,993	2,150	2,689	4,040	5,428	81.9	
NEW PLANTS	71	18,612	10,226	25,125	32,834	1,512	1,977	2,457	3,211	48.9	

NOTES:

- (1) ALL COSTS ARE IN CONSTANT JANUARY 1993 U.S. DOLLARS.
- (2) INTEREST DURING CONSTRUCTION (IDC) WAS CALCULATED WITH A DISCOUNT RATE OF 12% PER YEAR.
- (3) GENERATION COST INCLUDES CAPITAL, O&M AND, WHERE APPLICABLE, FUEL COSTS.

SOURCE: TECHNOPLAN/JAAKKO POYRY ENGENHARIA, 1993

This makes room for approximately 5000 MW of gas fired power capacity by the end of this decade. For the purpose of the Bolivia Brazil gas pipeline we are considering only 2000 MW to be in operation by January 98.

The following table presents the complete data on the economical market for the year 2000, considering all sectors involved.

While the economic potential for the project is enormous it must be realised that the risks are also great, given the length of the line and the inexistence of distribution companies besides COMGAS. This project therefore resembles more a grass-roots LNG facility with a single source of gas and a single delivery point rather than the interconnected pipeline in Europe and North America..

Although the market exists, large investments have to be made in order to use the natural gas, in parallel with the investment in the pipeline. At the same time, due to obvious reasons this investment has to be structured as a limited resource project financing .

These two reasons: - market and financial conditions are extremely important for the structuring of this project as an Integrated Gas Project where the thermo electric power plant importance will be paramount to help to "jump start" the project.

ESTIMATED TOTAL ECONOMIC DEMAND FOR NATURAL GAS IN S-SE BRAZIL IN THE YEAR 2000

STATE REGION	ECONOMIC DEMAND IN MMCMD					
	INDUSTRIAL (1)	RESIDENTIAL	COMMERCIAL	TRANSPORTATION	POWER (%)	TOTAL
SAO PAULO	14.70	0.50	0.30	1.60	—	17.10
MINAS GERAIS	4.20	0.17	0.19	0.14	—	4.70
RIO DE JANEIRO	5.80	0.33	0.22	0.88	—	7.23
MATO GROSSO DO SUL	0.22	—	—	0.05	—	0.27
PARANA	1.89	0.10	0.05	0.05	—	2.09
SANTA CATARINA	1.60	0.05	0.02	0.02	—	1.69
RIO GRANDE DO SUL	1.50	0.10	0.05	0.05	—	1.80
S-SE BRAZIL	30.00	1.25	0.83	2.78	23.10	57.98

NOTES: (1) INCLUDES COGENERATION AND SMALL INDUSTRIAL DEMAND.
(2) CORRESPONDS TO 6.6 GW OPERATING WITH AN AVERAGE CAPACITY FACTOR OF 78.1%

Considering the consolidated figures after the feasibility studies a total investment (excluding taxes and interest during construction) of US\$ 3,7 Bi is required, for the pipeline and initial downstream infrastructure not taking into account the funds needed for exploration and production. Besides the US\$ 1,5 Bi required for the pipeline, US\$ 1,6 Bi for the power plants and US\$ 0,6 Bi for industrial distribution grids, an estimated additional of US\$ 0.5 Bi are needed for E &P in Bolivia.

If, an equity/debt ratio of 30/70 is considered for the financial analysis the equity requirements for the entire project reach an astounding US\$ 4,2 Bi.

The reasons pointed above have made the investors to consider their presence in the down-stream side, in order to feel more comfortable about risks they are assuming. Of course the regulatory framework has to be designed accordingly. The complexity of a project of this magnitude in countries like ours does not need to be emphasized. However, we have to take into consideration that it is of no use to consider only the investment in the pipeline. The pipeline alone will not produce anything and will not have an income of its own, it will be profitable as a result of the gas it transports.

In April 15th this year, SPG has signed a Protocol of Intention with Petrobras whose objectives are to make feasible the participation of SPG in the Gas Line Co. which will construct, and operate the pipeline.

The two companies are to join efforts in order to structure this project and progress into a Memorandum of Understanding which will give birth to this Gas Line Co., by means of a Shareholders' Agreement.

It is not the scope of SPG to be one of the major partners of this company -- but to make sure that an active participation of the private enterprise will be assured under the proper framework and to build up a model of Project Awarding that will suit the private enterprise.

During the meetings held between SPG and Petrobras the Integrated Model has reached full acceptance, and both companies are joining efforts in order to develop a program for gas fired thermo electrical generation.

The suggestion of SPG to implement this project can be summarized as follows:

- Structure the business as an Intregated Gas Project:
 - Award the thermo electric power plants and pipeline as one single package.

The consequences of this are:

- Increase diameter to 32" instead of 28";
- Reach 16MMm³/day in 3 years instead of 8 years;
- Direct 50% of consumption to power plants.
- "Jump Start" the Project with 2000 MW of gas fired thermoelectrical power.
- Include delivery system and major market in one package thus incentivating E & P.

Within these conditions, IRR can reach values over 25 percent in real terms, (equivalent to 15-16% of project rates of return) which are considered to be in line with the requeriments of the investors.

To reach these conditions SPG has a lot of work ahead - working with Petrobras, with the State Energy Authorities, with Eletrobras, having to obtain approval not only to set up these thermoelectric power plants at the proper time, but also to promote this to be effected under a coordinated action in order that this could present the proper support for the pipeline investment.

Also it has to work with the major players in this project to provide for a proper regulatory framework and the structure of a Project Awarding Model that will suit the investors.

**“Down Stream Outlook:
Refining and Market Realities**

CYRUS TAHMASSEBI

Chief Economist
Ashland Oil, Inc.

The Outlook for U.S.
Refining Industry



by
Cyrus H. Tahmassebi, Ph.D.
Chief Economist and Director of Market Research

InterAmerican Petroleum and Gas Conference
Dallas, Texas
September 28, 1993

Developments in Crude Oil Markets

Short-Term Outlook

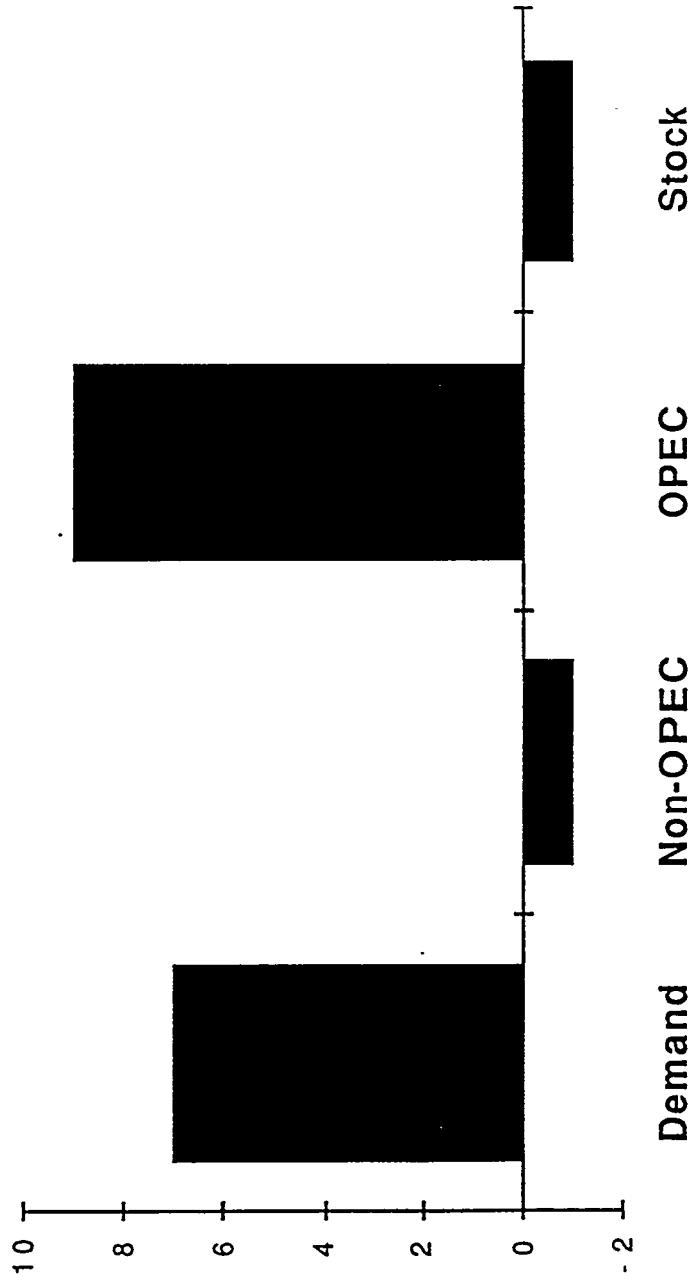
- OPEC discipline
- Iran-Saudi Relationship
- Kuwait
- Iraq

Long-term Outlook

- OPEC Capacity
- Availability of capital
- Reintegration
- Technology
- Taxation regimes
- Political stability
- World Economy

Refining Economics

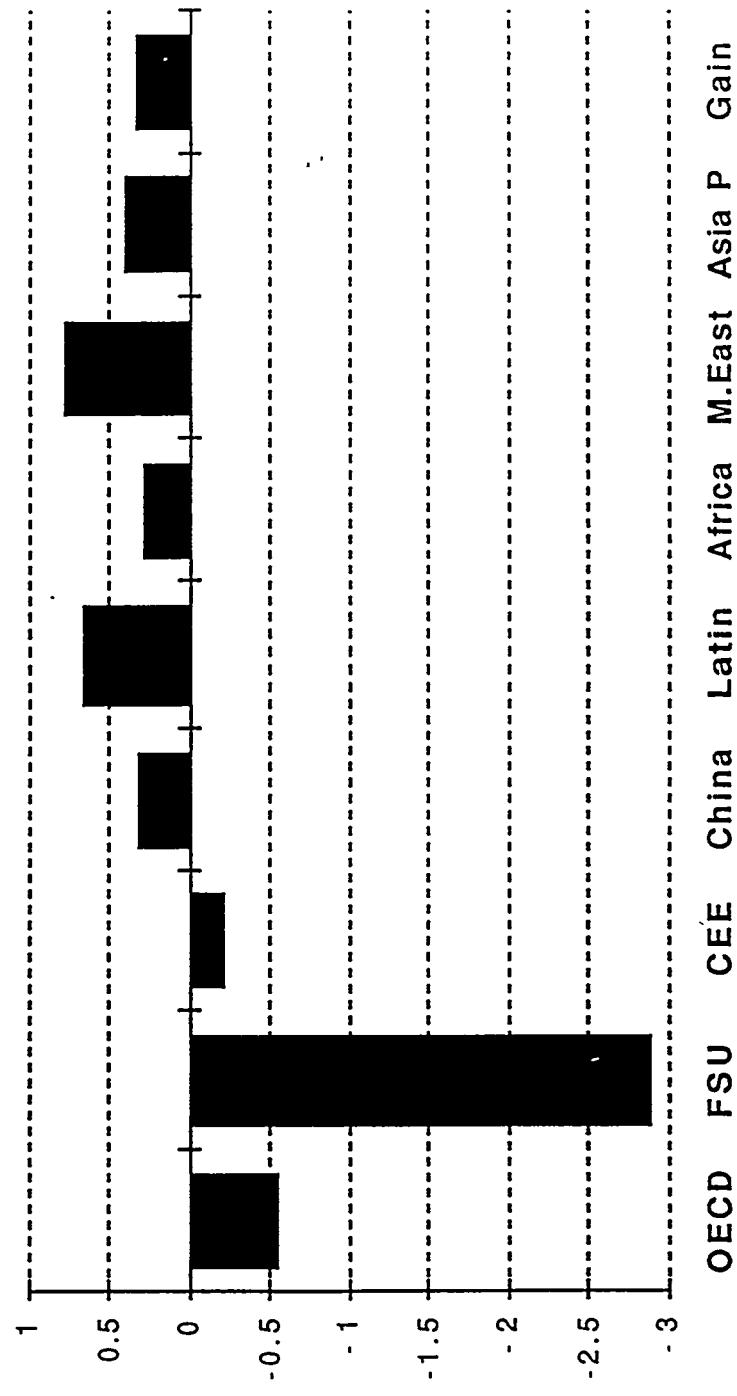
Change in Oil Market 1985-1992 (mmmb/d)



Source: International Energy Agency

Refining Economics

Change in Non-OPEC Oil Supply 1985-1992
(mmb/d)



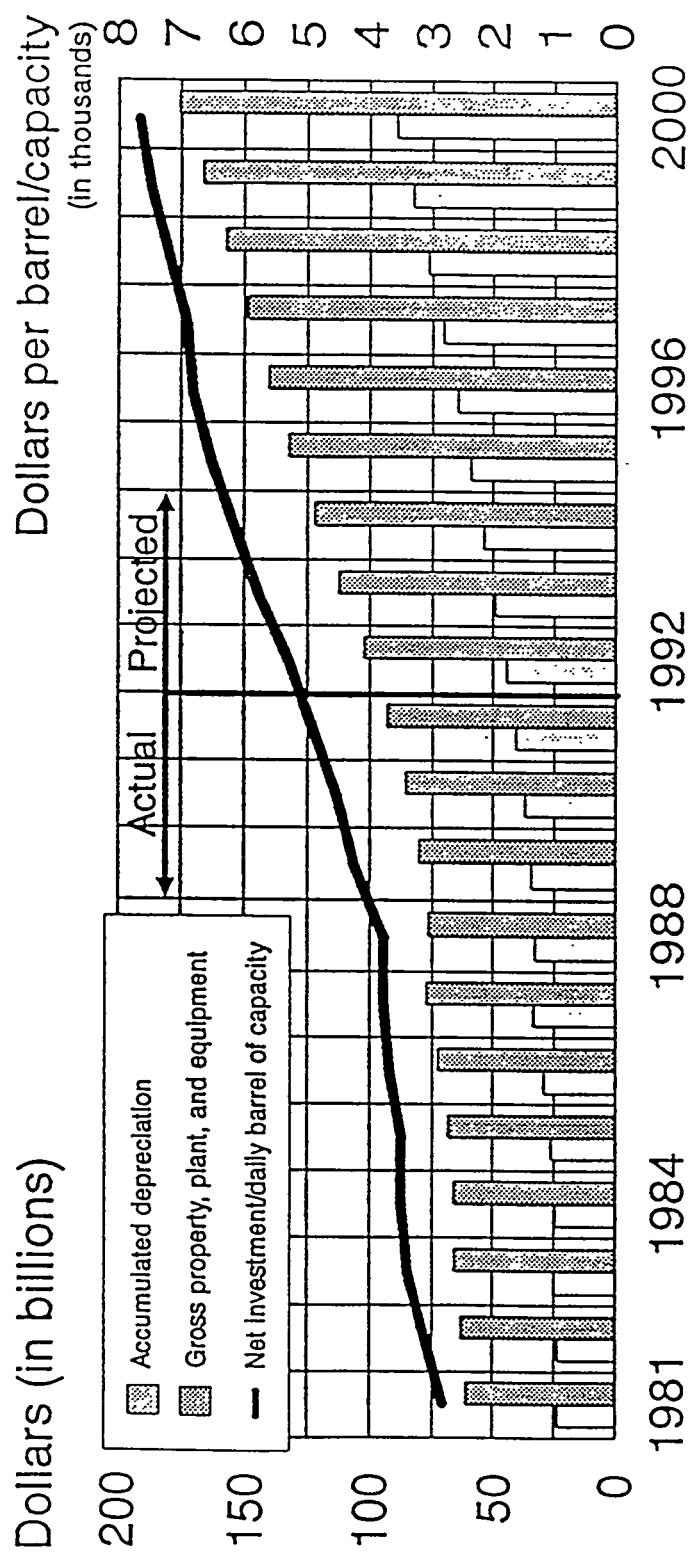
Source: International Energy Agency

V. Taxation Regime

- A. Current Taxes**
- B. New Fuel Tax**
- C. Prospects for Additional Taxes / Regulations**
 - Tax on products
 - Tax on imported oil
 - Higher CAFE

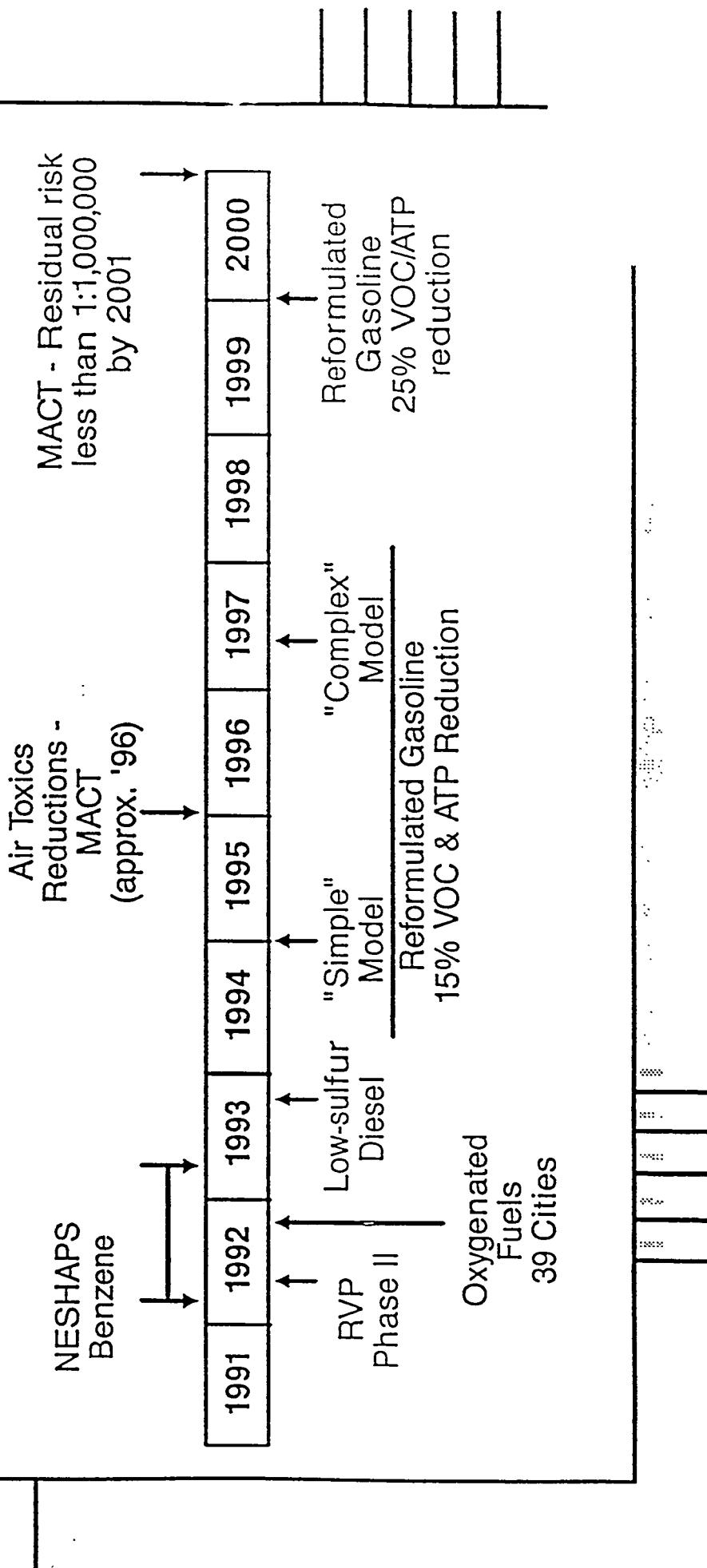
Net book value of U.S. refining assets

(Then - current dollars)



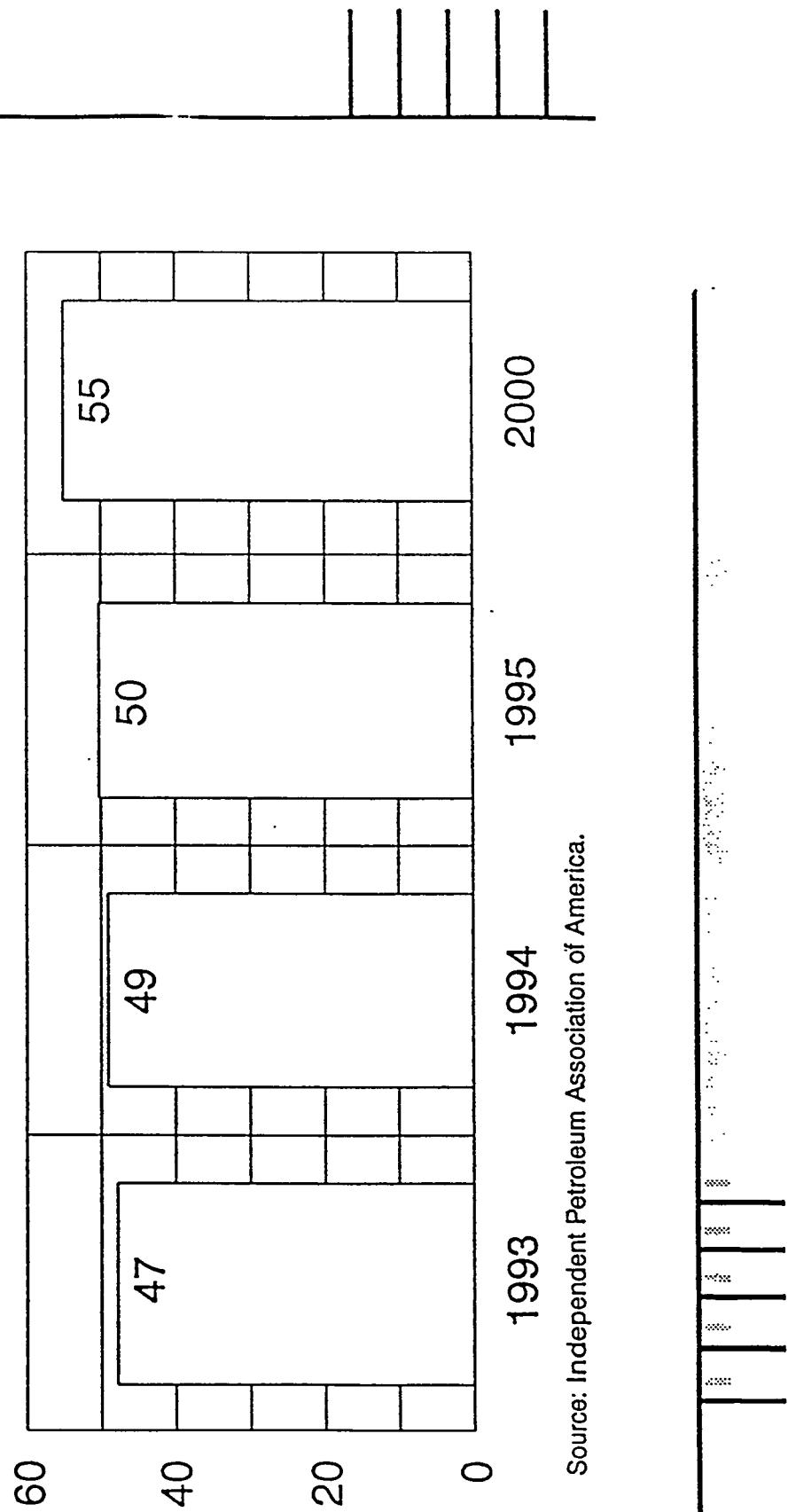
Source: National Petroleum Council.

Clean Air Act Time line



U.S. oil imports

Percent of U.S. oil consumption



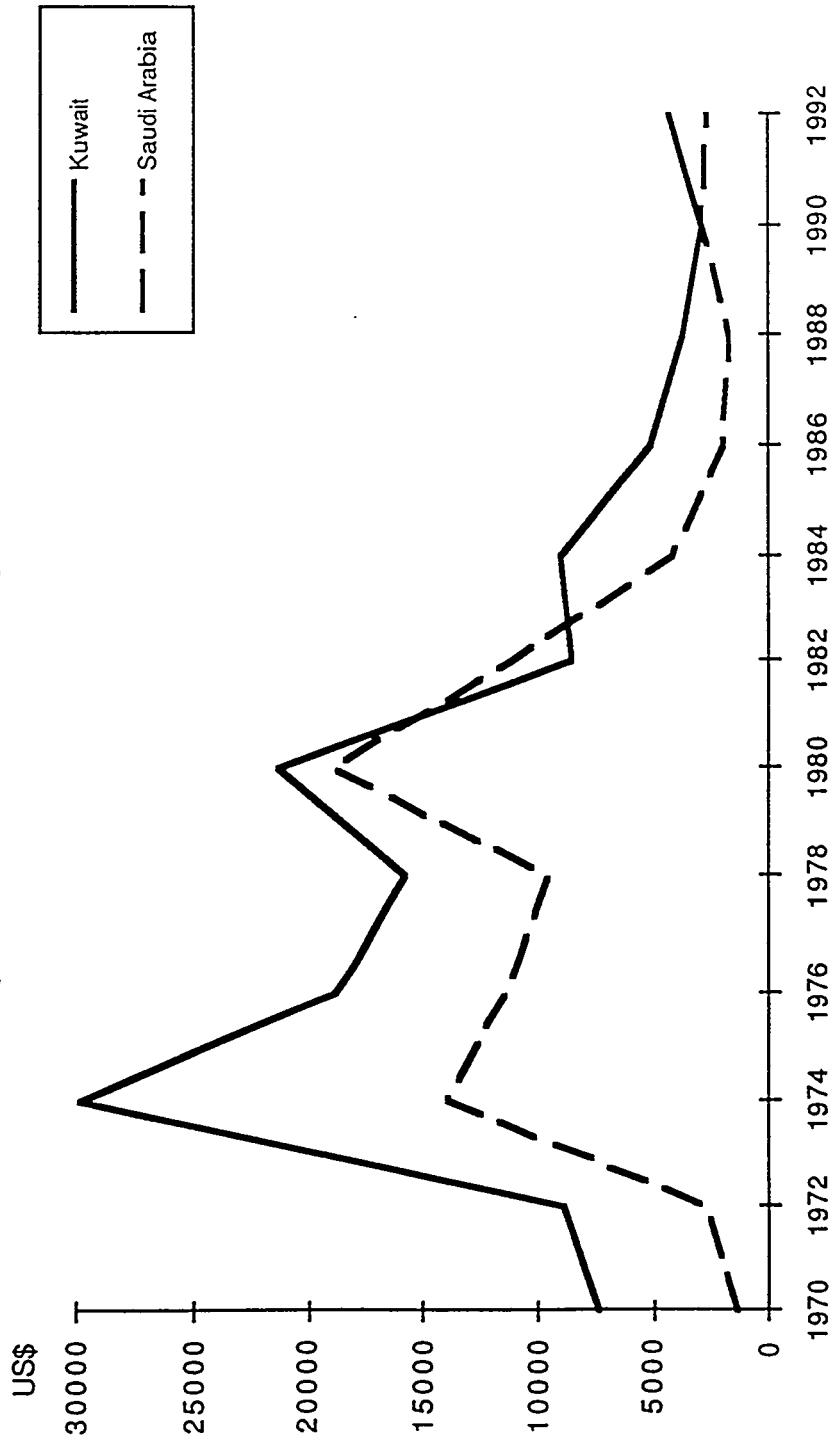
Source: Independent Petroleum Association of America.

Refining Economics

II. Changes in Product Supply/Demand Balance

- A. Refining Capacity
- B. Demand Pattern and Growth
- C. Competition

Oil Revenue Per Capita (Real 1992 Dollars)



Sources: *World Oil Trends*, 1993; Arthur Andersen & Co. and CERA; CIA's *World Fact Book*, 1992; OPEC's *Annual Statistical Bulletin*, 1987.

Refining Economics

OPEC Per Capita Oil Revenue (US\$ millions)

	<u>OPEC Oil Revenue</u> (millions US\$)	<u>Population</u> (millions)	<u>Per Capita Revenue</u>	
			<u>Current \$</u>	<u>Real (1992\$)</u>
1970	\$14,543	265.9	\$54.6	\$187.9
1972	23,524	281.8	83.5	260.1
1974	120,457	298.7	403.3	1,085.8
1976	129,974	311.8	416.9	963.6
1978	135,550	331.0	409.5	821.0
1980	284,491	351.7	808.9	1,363.9
1982	206,655	373.2	553.7	799.0
1984	143,569	395.8	362.7	481.9
1986	76,836	419.6	183.1	228.5
1988	87,174	426.1	204.6	238.1
1990	146,396	441.5	331.6	354.1
1992*	136,500	449.3	303.8	303.8

*data for 1992 are estimates

Sources: *World Oil Trends, 1993*, Arthur Andersen & Co. and CERA; CIA's *World Fact Book, 1992*; OPEC's *Annual Statistical Bulletin, 1987*.

“The World Energy Outlook: Latin America’s Role”

GUY CARUSO

Director, Office of Non-Members Countries
International Energy Agency

InterAmerican Petroleum and Gas Conference

IPGC '93

*The World Energy Outlook:
Latin America's Role*

MR. GUY CARUSO

Director of Non-Member Countries Office
International Energy Agency (IEA)

27-28 September 1993
Dallas, Texas
USA

IPGC '93 PRESENTATION

- My comments on the world energy outlook are based on the recent IEA publication the "World Energy Outlook" to the year 2010.
- Rather than keep you in suspense, I am going to provide you with what I see as the most important conclusions of this study right now and then proceed into a discussion of the outlook.
- The main conclusions are:
 1. The world's energy use will remain carbon based.
 2. World energy consumption will significantly increase with the non-OECD share increasing to over 50 per cent.
 3. The rising importance of non-OECD countries means that no solution to the world's energy or environmental problems can be achieved without their participation.
- Before detailing the conclusions of this study relating to the global situation and, more specifically, Latin America and the Caribbean, I need to emphasize that the IEA's outlook is a set of projections based on a number of economic and energy assumptions, some of which I will note today.
- The key assumptions are those related to economic growth and energy prices, although other factors such as population growth also play an important role.
- As regards economic growth, (slide no. 1 - Economic Growth Assumptions) our estimates of growth for various parts of the world are based on the following:
 - A. On the OECD (Organisation for Economic Co-operation and Development) side, North America has struggled through a prolonged, but not particularly deep, recession. Europe is now experiencing a downturn in economic activity and even Japan has falling growth rates. Accordingly, OECD total energy demand is forecast to grow only moderately.
 - B. In the case of the New Independent States (NIS), a significant supplier of oil and natural gas, a major economic restructuring effort is under way which will take some years to accomplish. NIS/CEE (Central and Eastern Europe) economic growth rates in this table reflect this. Given slow growth, we expect energy demand in the NIS/CEE will only slightly exceed its 1990 level by the year 2000.

C. A very significant factor behind our overall assumption for world growth has been the higher, even double digit growth rates seen in some other parts of the world, especially in East Asia and to a lesser degree Latin America and the Caribbean. If some ROW (rest of the world) countries continue to grow at this rate ROW energy demand will rise at very significant rates.

- As for energy price assumptions, given the above growth expectations, (slide no. 2 - Crude Oil Price Assumptions) we assume oil prices will rise gradually to \$30.00 per barrel by the year 2005 and remain flat thereafter.

- Our price estimates for other portions of the energy mix (slide no. 3 - Primary Energy Price Assumptions) are shown on the slide now on the screen.

- Our gas prices are lower than in our last outlook two years ago. These gas prices, for a variety of reasons, reflect the current perception of plentiful gas. We see natural gas becoming an increasingly important energy source.

- I should note that another important assumption is that currently enacted energy and environmental policies are unchanged.

- Moving to the supply side and going back to oil, (slide no. 4 - World Oil Supply by Region) we reached a number of conclusions.

A. We see OECD oil production declining gradually with most of this decline in the US.

B. In the NIS the decline in oil production could be stabilized by 1995 and we expect a steady net increase in NIS production from the late 1990's onwards. Nevertheless, by 2010 production will only slightly exceed 10 million barrels per day (mbd) which will still be below the historical peak in 1987-88.

C. We expect the demand for oil from OPEC countries to nearly double by 2010 with most of the increase supplied from the Middle East and Venezuela.

- As for gas consumption (slide no. 5 - OECD Gas Consumption by Sectors), we see a fairly rapid increase in the OECD countries due to abundant supplies, technological developments, cost improvements and environmental concerns.

- In the NIS, gas demand, as well as exploration and production, is expected to increase further.

- In the rest of the world (ROW) consumption is expected to almost triple between 1990 and 2010.

- Concerning solid fuels, consumption in OECD countries is expected to grow with the power sector remaining the predominant market for coal.
- In the NIS we expect coal production and consumption to decline over the outlook period, due to structural/competitive factors.
- Consumption of coal is expected to more than double between 1990 and 2010 in the ROW. About two thirds of the incremental coal demand over the projection period takes place in just two countries: China & India.
- Finally, as regards electricity, demand is forecast to rise in the OECD countries with an increasing amount coming from natural gas.
- As for the ROW, rapidly increasing electricity demand will be mainly met by coal and hydropower.
- In Latin America it is hydropower which is expected to play by far the dominant role in satisfying increased demand for electricity, accounting for over two-thirds of incremental growth over the outlook period. Hydropower's dominance is attributable to the vast potential in the region which remains unexploited and which is more evenly dispersed geographically than other energy resources. While our forecasts regarding hydro are based on known plans and policies, they imply very large investments in countries which already have very large debt servicing commitments. This, and the possibility of increased environmental opposition to large hydro schemes, are two of the important risks attached to these numbers.
- While we project a high growth for renewables globally, this is from a small base and consequently will only satisfy a small share of demand.
- As regards nuclear power, we see a continued slow down for the OECD countries. For the NIS countries everything is in a state of flux and difficult to estimate. For the ROW it is likely that nuclear power will still be making an insignificant contribution to energy requirements in 2010.
- Therefore, to reiterate two of my main conclusions at the start of my presentation, we are: 1. Still in a fossil fuel world (slide no. 6 - **World Primary Energy Shares** and no. 7 - **Final Energy Demand**) and 2. Total energy demand in the rest of the world is growing at a significantly faster rate than in the OECD countries with the OECD countries accounting for less than half of the world's energy and oil consumption (slide no. 8 - **World Total Primary Energy Demand**).
- What we have is the non-OECD countries increasing their share of energy use in the world due to more rapid economic and population growth, increased industrialization and road transportation and the diminishing availability of non-commercial sources of energy.

- By 2010 world energy consumption could be almost 50 percent greater than in 1990 and, while OECD countries' consumption of energy could be up by 30 percent, the non-OECD share of world energy consumption could be 55 percent versus 47 percent in 1990.
- Let's take a closer look at our detailed estimates for Latin American energy demand (slide no. 9 - Primary Energy Demand - Latin America).
- Our outlook for Latin America, generally considered the world's second fastest growing region, is based on the assumption that gross domestic product (gdp) will recover from the low or negative growth of the 1980's to average 3.7 per cent per year. In absolute terms, these growth figures imply that total energy demand is likely to reach about 725 million metric tons of oil equivalent (mtoe) by 2010, or more than four times its level in 1990.
- We see little change in the recent trends in primary energy fuel shares over the period to 2010 in Latin America. Hence, oil's share of energy demand is expected to continue to fall as the major economies pursue policies to diversify fuel supplies. Oil will, however, remain the dominant fuel still accounting for almost 60 percent of the total in 2010. The decline in oil's share will be compensated for mainly by increases in the consumption of natural gas and hydropower. Nuclear is also expected to increase its share of energy demand, although this will remain small. Coal will continue to play only a minor role given natural resource constraints in many countries.
- In terms of energy demand in the region, electricity is expected to attain the fastest rate of growth, with average increases of over four per cent per year. As I noted earlier, and you can see from this final slide (slide no. 10 - Fuel Shares (%) of Electricity Output - Latin America), hydropower will account for over two-thirds of this additional output.
- On a sectoral basis, the most important source of growth in Latin America is expected to be demand for transport fuels. The absolute consumption of energy in the transport sector is expected to double and per capita consumption of transport-related energy, already high compared with other regions, is expected to intensify. In addition, the transport sector will continue to make by far the largest contribution to the region's incremental oil demand, accounting for two-thirds of the increase over the outlook period.
- Finally, and related to my third main conclusion, permit me to make a few brief remarks regarding the organization I represent, the International Energy Agency (IEA).
- The IEA has 23 member countries in Europe, North America and the Pacific, covering most of the industrialized world.
- It was established after the 1973 oil shock primarily to share the burden of an oil shortage among industrialized countries. Since then the IEA has evolved

considerably in terms of its activities, as well as its relations with non-Member countries.

- The IEA is now actively expanding its contacts with non-Member countries, particularly in Latin America, East Asia and the NIS. The most recent communique of the IEA Governing Board at the ministerial level specifically states the following reasons for this:

"- Non-Member countries are playing and will play an increasingly important role in global energy demand, as energy demand growth there continues to outpace that in IEA countries.

- Consequently, non-Member countries will also be of greater significance in terms of global energy-related problems.

- In a number of key areas, energy supplies increasingly come from non-Member countries, and member countries' energy logistical systems are more tied to them.

- A growing number of non-Member countries are reaching a stage of transition or development that is drawing them closer to the OECD world and prompting collaboration between them and the IEA."

- The June 4, 1993 communique also specifically notes the IEA's interest in developing contacts with non-Member countries which face major challenges in meeting rapidly growing energy demand and in achieving needed investment in energy production.

- We have a number of instruments to offer in developing relations with non-Member countries. These include: country reviews; energy information analysis and studies (e.g. statistical exchange); conferences/seminars (e.g. The March 23-25, 1994 conference in Cancun on "Energy Efficiency in Latin America" being organized with the Government of Mexico, OLADE, the Government of the United States and UNDP) and r & d "Implementing Agreements".

- Finally, I would be remiss if I didn't comment, consistent with one of the themes of this Conference, that open intra-regional commercial integration in the Americas would certainly raise the economic growth rates contained in this outlook and, when applied to the energy sector, would significantly assist the region in satisfying, more efficiently, growth-generated energy requirements.

World Energy Outlook — Main Assumptions

World Population Growth: 1.5% p.a.

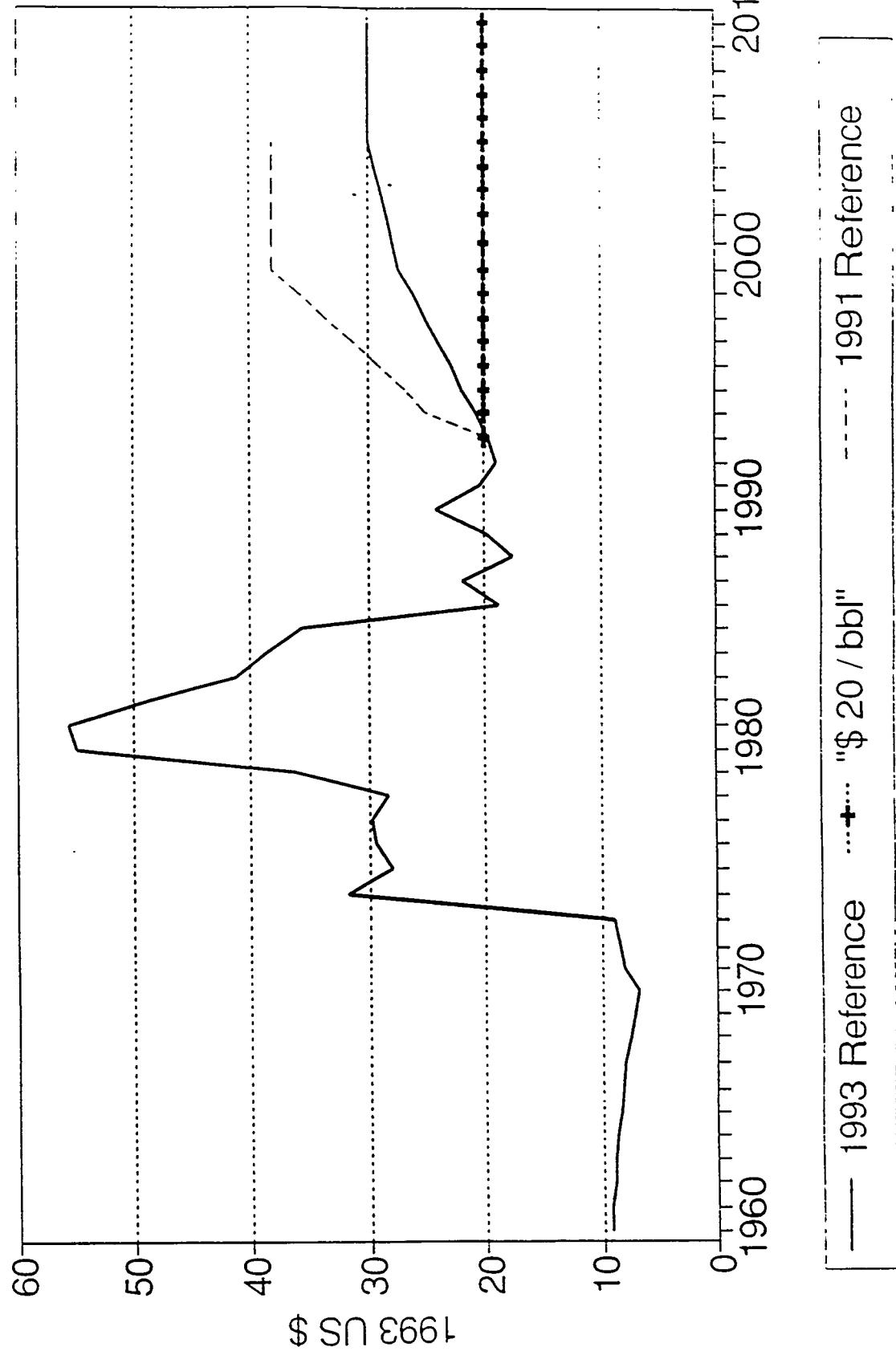
		<u>1991-2010</u>	<u>1971-91</u>
Economic Growth Rate:	World	3.0%	3.0%
	OECD	2.4%	2.9%
	NIS/CEE	1.4%	2.2%
	ROW	5.1%	4.4%

Oil Price Assumption: Average IEA imported crude oil price rising gradually to USD 30/barrel by 2005, remaining constant thereafter.

Energy Intensity: World -1% p.a.
OECD -1% p.a.

CRUDE OIL PRICE ASSUMPTIONS

in 1993 constant US \$



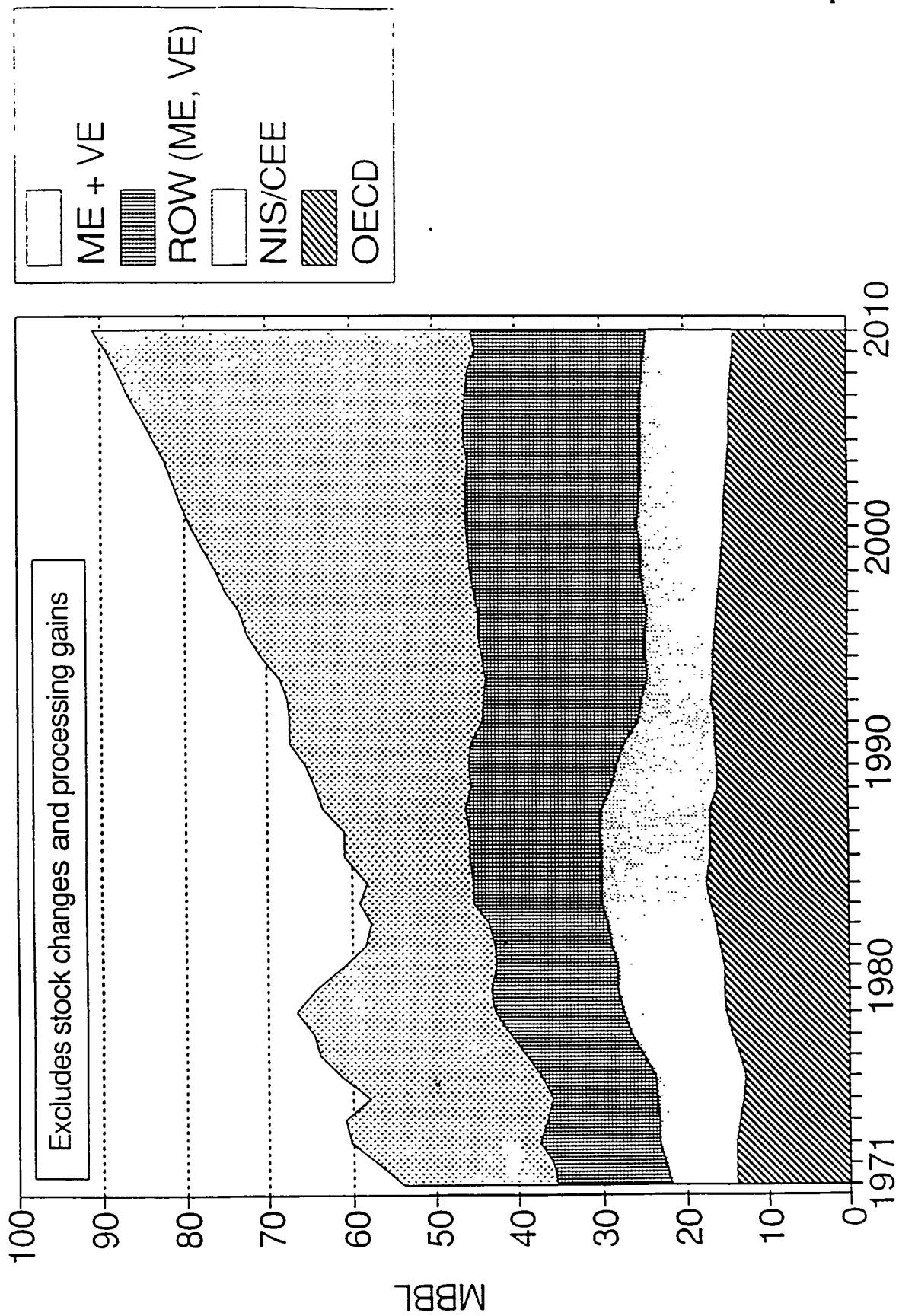
Graph 3

Table A: Primary Energy Price Assumptions
(U.S. 1993\$ *)

	1990	1995	2000	2005	2010
Crude Oil (barrel)	24.2	21.9	27.3	30.0	30.0
Natural Gas					
Producer U.S. (10 ³ cf)	1.9	2.2	3.0	3.5	3.5
Import Europe (10 ³ M ³)	106.3	118.6	136.2	156.5	156.5
Import Japan (tonne LNG)	217.2	229.8	285.1	312.6	312.6
Hard Coal					
Producer U.S. (short ton)	24.0	26.2	29.1	31.4	34.5
Import Europe (tonne)	56.0	50.0	53.2	56.5	60.1
Import Japan (tonne)	55.7	50.8	52.6	54.3	56.2
Prices in TOE (net calorific values)					
Crude Oil	174.5	157.5	196.9	216.6	216.6
Natural Gas					
Producer U.S.	80.5	94.5	127.2	149.7	149.7
Import Europe	138.2	154.2	177.1	203.5	203.5
Import Japan	185.6	196.4	243.6	267.2	267.2
Hard Coal					
Producer U.S.	41.0	44.8	49.6	53.5	58.9
Import Europe	86.8	77.6	82.5	87.6	93.2
Import Japan	96.1	87.7	90.7	93.8	97.0

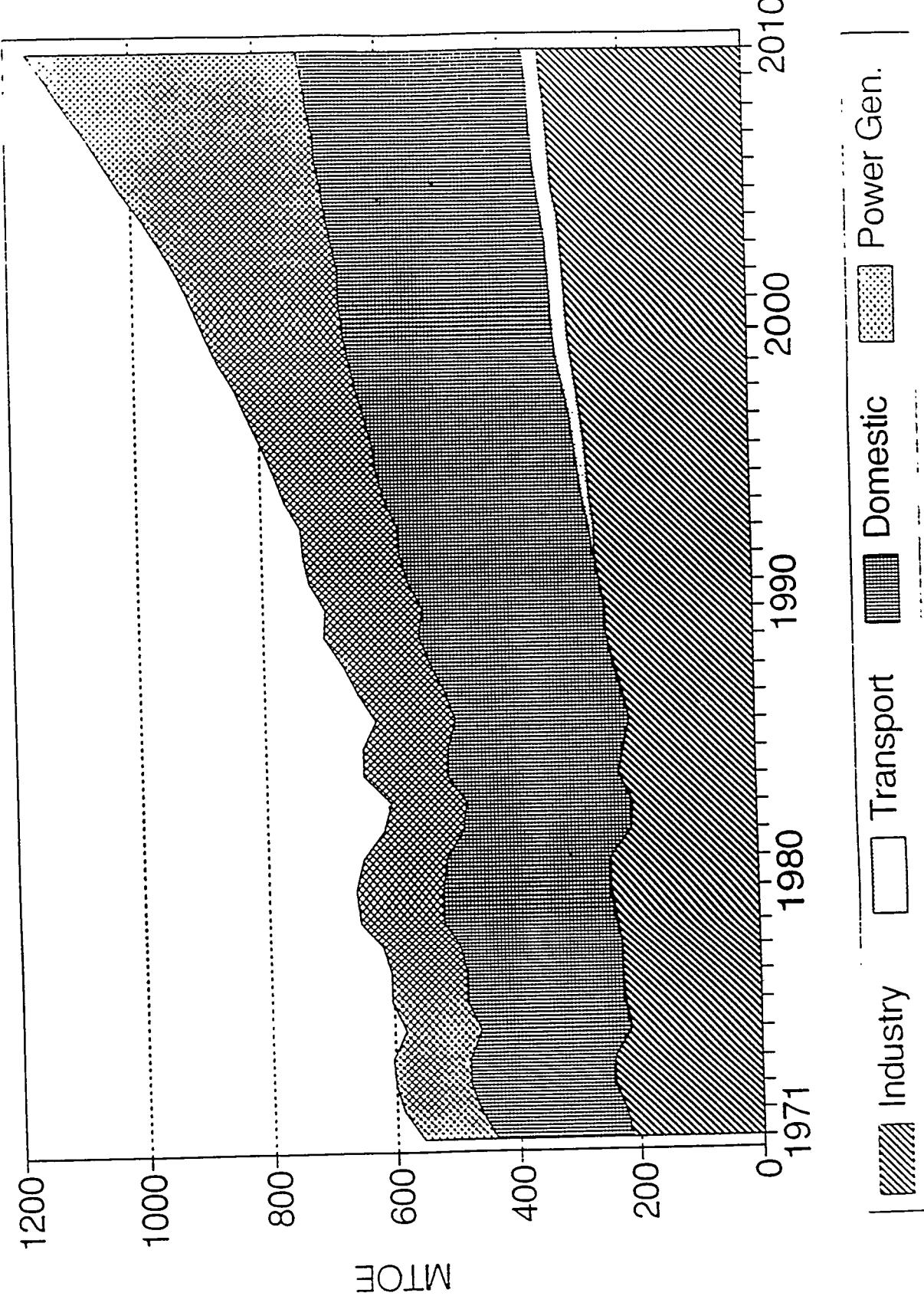
* 1993 inflation rate for the U.S. is assumed to be 2.3%

WORLD OIL SUPPLY BY REGION

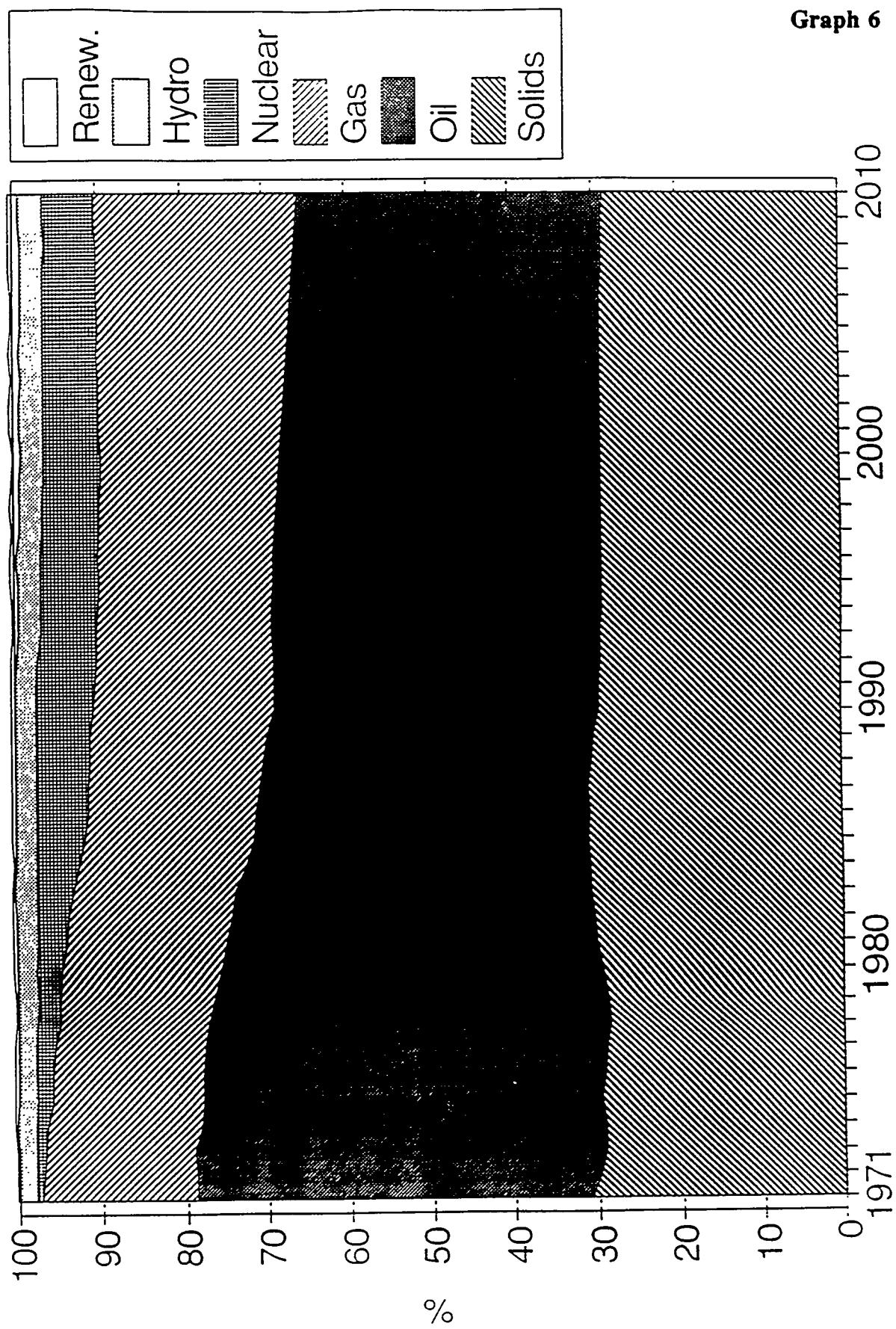


OECD GAS CONSUMPTION BY SECTORS

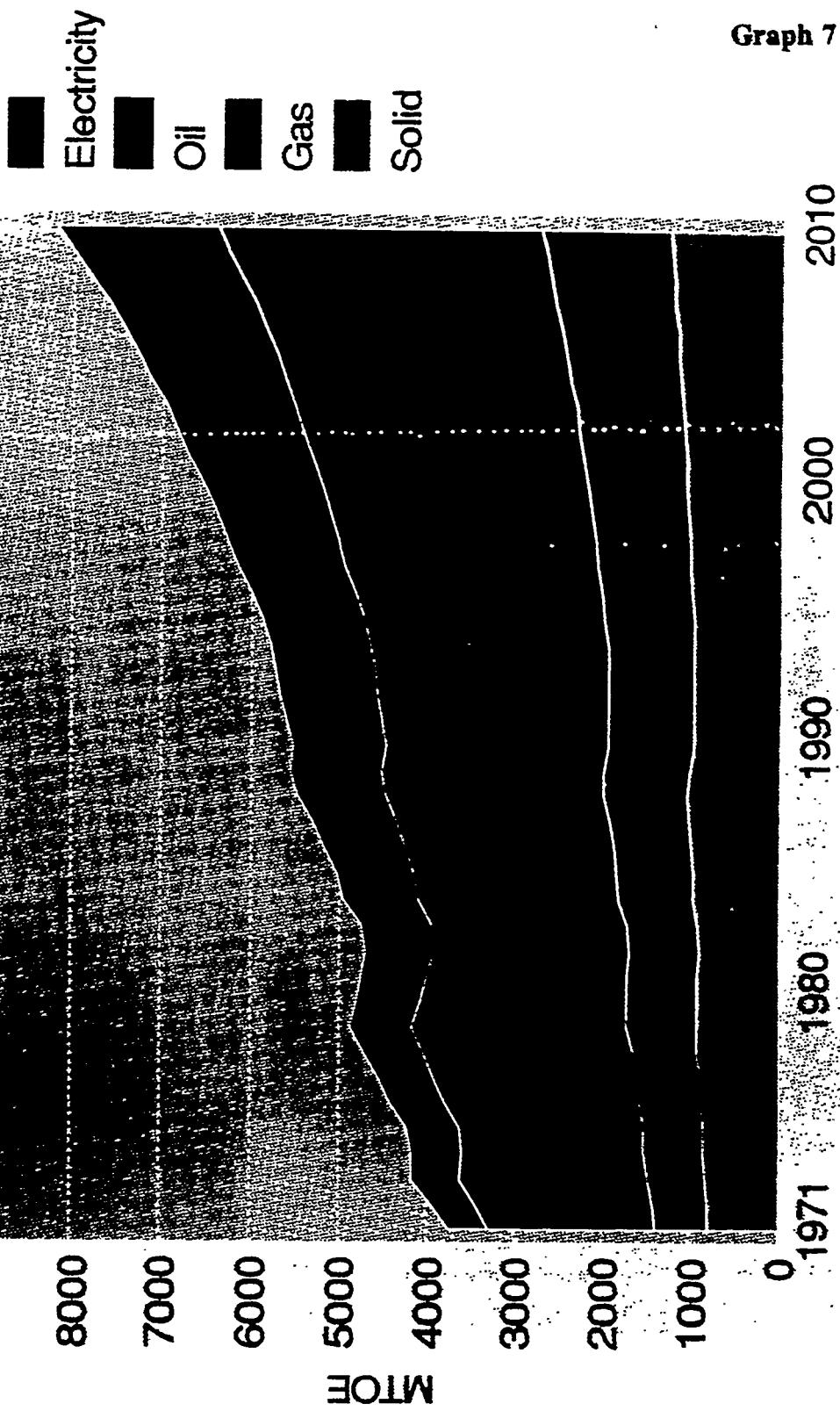
Graph 5



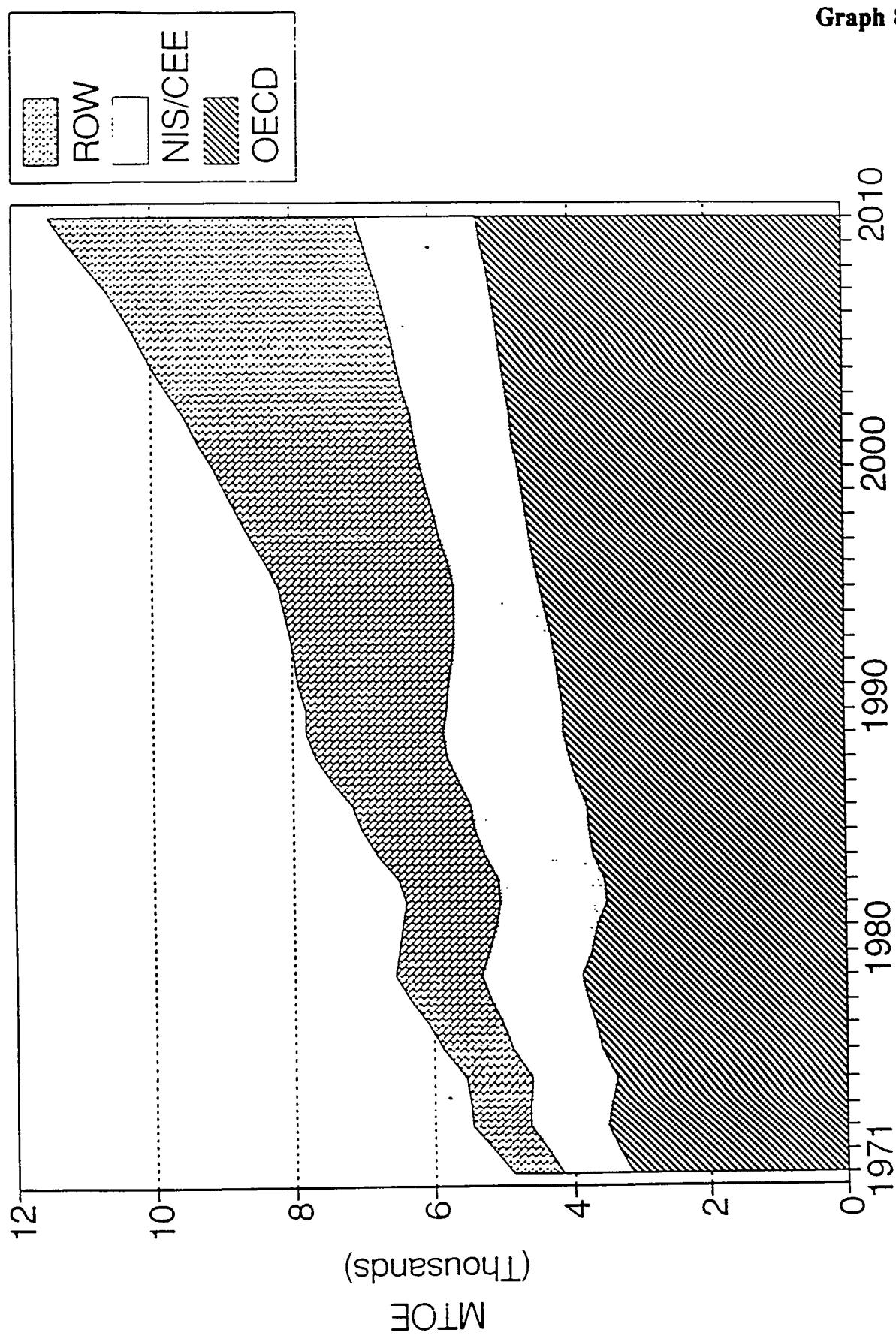
WORLD PRIMARY ENERGY SHARES



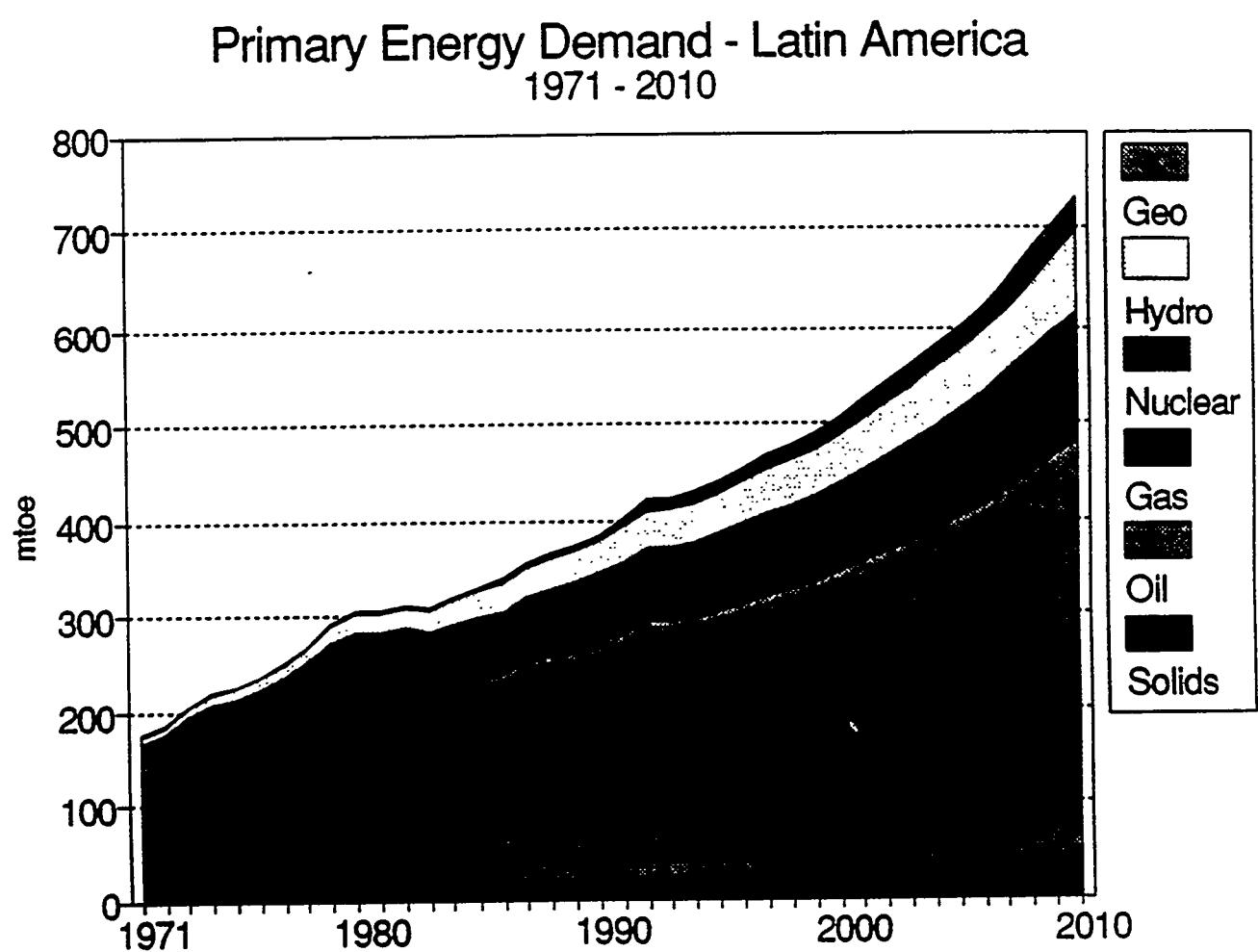
FINAL ENERGY DEMAND WORLD



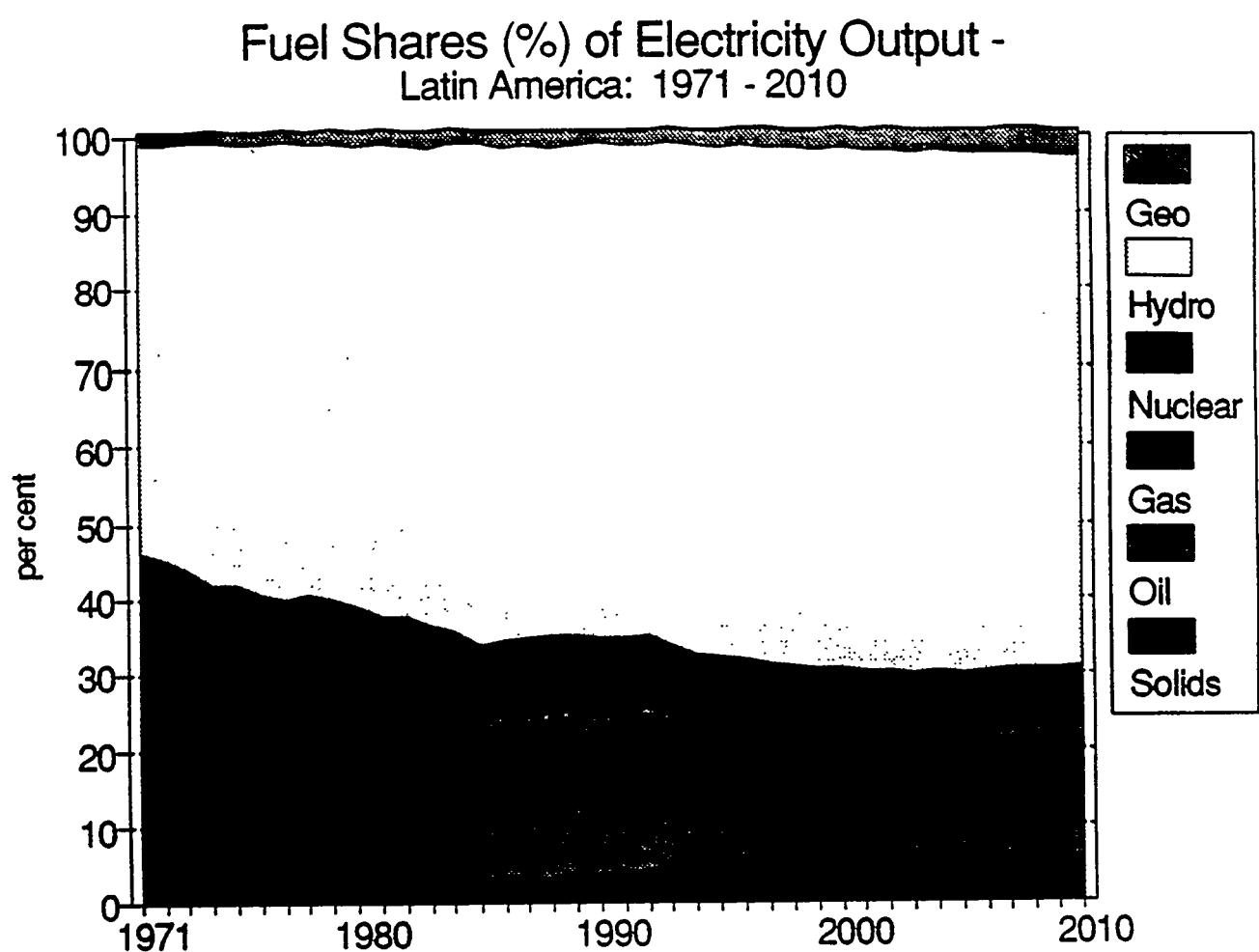
WORLD TOTAL PRIMARY ENERGY DEMAND



Graph 9



Graph 10



“The Role of Benchmark Crudes in Crude Oil Pricing”

PETER WILDBLOOD
Chief Executive
International Petroleum Exchange

THE ROLE OF BENCHMARK CRUDES IN CRUDE OIL PRICING

Paper presented by Peter Wildblood, Chief Executive, International Petroleum Exchange of London Ltd., at the InterAmerican Petroleum and Gas Conference, Dallas, Texas, 27-28 September 1993.

Most of the world's oil, whether sold on a 'spot' basis or as part of a term contract, will be priced on a relationship with one or other of a small number of marker crude oils. Generally, the markers used are West Texas Intermediate (WTI) and Alaskan North Slope (ANS) for crude oil coming into North and South America; Dubai or Oman for crudes being delivered into the Far Eastern markets; and Brent for any crude being delivered into Europe.

For a variety of reasons, over the last two years, Brent blend has become more predominant in the pricing process for crude oils throughout the world. This has resulted in the fact that, directly or indirectly, Brent is now used to price approximately 65 per cent of the world's crude oil. So why is it that a crude oil with a comparatively small production base of around 700,000 barrels per day has now come to dominate the pricing of the lion's share of the world's crude oil?

Firstly, let us look at how pricing against a benchmark crude works. There are many variables which determine the outright value of a barrel of a particular crude oil. Location, refining yield, availability, supply reliability, and the relative value of similar crudes competing in the same market - all these factors are important in determining how much someone is prepared to pay for it. The value of the particular crude oil is then compared to that of the relevant marker crude which is used for pricing in the area of final importation.

The oil would then be sold at a certain premium or discount to the value on the day of the benchmark crude being used.

Therefore, the level of discount or premium will be decided by criteria relating to the crude oil itself, whilst the outright level of price is decided by the price level of the price marker, or benchmark, being used, whether it is Brent, WTI, ANS or some other marker. The prices for these benchmark crudes are deemed to be fair and representative, because they are freely and openly traded on a daily basis.

Benchmark crudes, and Brent in particular, have emerged over time because they fulfil the various requirements which mean that these crudes are perceived to represent 'fair value' for the particular commodity. What are these requirements?

First and foremost, there must be a liquid and transparent underlying market for the crude oil, with a wide range of participants from all sections of the industry both on the buying and selling sides. This means that the supply of the crude should be freely tradeable. That is to say it is not restricted to particular destinations or participants.

North Sea crude oil fulfils this criteria particularly well, as it is positioned strategically in the Atlantic basin. Indeed, Brent cargoes, as well as finding destinations both in Northern Europe and the United States, can sometimes find their way into the Mediterranean markets, and also the Asia/Pacific region. Indeed the same parcel may often be bought and sold several times over before it reaches its final destination, which can change at short notice if

favourable economic circumstances emerge.

The price marker must also have adequate physical reserves and be politically acceptable to both producers and end users. The prices at which the trades are made should be widely reported by the various specialist media, and be accessible to all interested parties, as well as being reasonably immune to manipulation. Through this process, price levels can be established which are perceived to be accurate and fair.

In the case of Brent, these requirements are fulfilled by the functioning of the Brent 15-Day market, one element of the complex which goes to make up the 'Brent market', which nowadays includes partial forward transactions (trades in smaller parcels than whole cargoes), a futures contract traded on the International Petroleum Exchange, options on this contract, and swap deals.

The Brent 15-Day market was established in the late-1970's, initially in order to establish reference prices for both fiscal and commercial reasons. However, with the entry into the market by the Wall Street refiners in the early-1980's, the market developed into the largest and most important forward market for crude oil in the world, and its significance has increased accordingly.

The 'Brent market' consists of three main separate but interrelated elements:

1. The 'Brent 15-day' market, which is an informal **forward** market that trades 'paper' contracts for the delivery of cargoes of 500,000 barrels of Brent blend crude

oil at the loading terminal at Sullom Voe in the Shetland Islands. Delivery can be at any time during the particular contract month. This market can trade up to several months in advance, but the bulk of the contracts are traded for one to two months ahead. For example, at the moment, most 15-day Brent is being traded for November and December delivery.

2. The 'dated Brent' market, which is a 'spot' or 'physical' market for delivery of Brent crude oil at Sullom Voe. Each dated Brent transaction has a specific three day loading range attached to it, at least 15 days ahead. For example, on September 1st, one would transact a dated Brent contract for 16th to 18th September delivery. Trading in the dated Brent market takes place at the earliest 15 days before the specified loading date, and sometimes can continue after the cargo has been loaded and is on its way to the final destination.

Trading in dated Brent cargoes generates prices which are then used for pricing many other crude oil transactions, including most North Sea grades as well as Middle East crude oil coming into Europe, and oil from the Former Soviet Union.

3. The IPE 'Brent crude oil futures contract' is traded on a formal exchange, with paper contracts for 1,000 barrels of Brent crude oil for delivery up to nine months ahead. The contract is designed to accurately reflect the underlying 15-day Brent forward market, and the two markets track each other closely. The futures contract is complemented by an option contract, with the first six months of the underlying futures contract being quoted.

However, there is no physical delivery mechanism for the futures contract once it reaches maturity, delivery being made in cash (i.e. US Dollars and cents) against an index published by the exchange every day. The index is calculated by averaging the prices of deals made on the underlying 15-Day market for the nearby delivery month. On the maturity of a contract, the original contract price is compared to the index for the last trading day, and a cash difference is paid if the contract has made a loss and received if the contract has made a profit. Because there is no physical delivery at maturity, there can be no possibility of a delivery squeeze, and the contract thereby provides a more consistent hedge.

These three markets are all distinct from each other, yet as a whole, they go to make up the Brent trading complex. These markets, including the IPE, have a very broad range of participants, from the major oil companies such as Shell and BP, through North Sea and other oil producers, refiners, marketers, traders, and investment funds. Those involved in the 15-Day and dated markets are integrated and non-integrated oil companies and 'traders' such as Morgan Stanley and Phibro.

The overall size of trading in the Brent market as a whole precludes any attempt at price manipulation, even in the short term. Indeed, with the mingling of the Brent and Ninian crude oil streams in August 1990, the number of production participants in the system increased from 20 to 34, thereby considerably widening an already diverse range of interests.

Furthermore, with the IPE trading in excess of 50 million barrels of oil a day, and the 15-day and dated markets together trading in the region of 12 million barrels per day, it would be very difficult for even the largest of oil companies to achieve a successful squeeze. Moreover, since the three markets are closely related, any price aberration in one particular market would immediately result in considerable arbitrage opportunities, rapidly bringing the three markets back into line. Although no market is perfect, the Brent market remains the most efficient market for crude oil today, and the price of dated Brent continues to be accepted by many as the most representative of 'fair value' for physical crude oil.

Because of Brent's pertinence to the pricing of a considerable proportion of the world's crude oils, the IPE's futures contract is particularly suitable as a hedging instrument for many crude oils. The price of the crude being hedged and that of the futures contract will track each other closely, even during periods of high price volatility such as the Gulf Crisis.

The basis risk, that is the difference between the futures price and the price of the crude oil being hedged, is often much smaller and more controllable than remaining in an unhedged position. That is not covering the price risk by taking out an equal and opposite position in the futures markets. Indeed, a recent study carried out by Harvard University on behalf of the IPE, looked at various Middle East crude oils and how successfully they could be hedged by using the IPE Brent futures contract.

In order to measure how effective the IPE contract was in reducing price risk, hedging

efficiencies were calculated by comparing the variance of the prices of the Middle East crude oils against that of the IPE contract. On the whole, two-thirds or more of the price risk could be eliminated by hedging on the futures market, providing considerable risk reduction opportunities for both the producers and consumers of Middle East crude oils. Indeed, during the highly volatile period of the Gulf Crisis, the hedging efficiency of the contract did not deteriorate substantially, despite the rapid swings in prices.

In conclusion, benchmark crudes exist because there is a global need to identify a pricing basis which reflects the market - that is the balance between supply and demand. For any particular crude oil to be accepted as a benchmark it must meet certain characteristics. These are, essentially, to be freely traded by a wide market base; to have satisfactory price transparency and to be acceptable politically with no delivery or trading restrictions.

It can be expected that in time changing circumstances will allow other crudes to become acceptable pricing benchmarks, but in the meanwhile Brent crude oil remains probably the most significant in global pricing terms.

“Refinery Expansion and Upgrading: Trends and Needs”

DAVID SLOAN
Senior Product Technology Consultant
The M.W. Kellogg Company

REFINERY EXPANSION AND UPGRADING: TRENDS AND NEEDS

BY

H. DAVID SLOAN, P.E.

THE M. W. KELLOGG COMPANY

HOUSTON, TEXAS

U.S.A.

InterAmerican Petroleum and Gas Conference

Dallas, Texas

27-28 September 1993

REFINERY EXPANSION AND UPGRADING: TRENDS AND NEEDS

INTRODUCTION

Much of the world's reserves of heavy, high sulfur crude oil are located in the western hemisphere. One may look from north to south and find these types of crudes. In Canada, there are the vast deposits of tar sands and other heavy oils. In the United States we find heavy, high sulfur crude in California's San Joaquin Valley, the Rockies' shale oil deposits and in other areas. Moving south, Mexico's Maya crude is well known to refiners, as are the heavy crudes of Venezuela's Orinoco Belt.

On the other hand, many refineries outside the United States are limited in their ability to handle heavy, high sulfur crudes either because of metallurgy or processing configurations.

New fuel quality regulations are affecting fuels specifications across the region and refiners are being challenged to balance supply and demand.

Non refinery based sources of gasoline blending components such as MTBE and other oxygenates are increasing gasoline supplies in a relatively flat market. This growth in gasoline supply is putting pressure on refiners as they struggle to keep fuels supplies in balance with demand.

This paper will focus on processing routes needed in both new and existing refineries to help meet both product demand and environmental requirements.

REFINERY CONFIGURATION

In some ways, refineries in the U.S. are a model for what refineries in the rest of the region need to become, however, U.S. refineries are often not configured to meet product demand patterns for other countries.

Refineries in the United States are the most complex of anywhere in the world. Table 1 compares U.S.A. refinery configurations with those of other regions. Because of the flexibility that is gained by refinery complexity, refiners can take advantage of price differentials between heavier or higher sulfur crudes and light sweet crudes, while still being able to produce high quality fuels and meet environmental regulations and supply needed quantities of distillates.

Based on market projections, it is clear that additional bottom-of-the-barrel conversion capacity is needed. U.S. refineries have over 10% of crude capacity associated with resid conversion while the rest of the world outside Western Europe has less than 2%. Figure 1 illustrates the continuing slide in demand for residual fuel oil as a percentage of

total products. This projection will result in almost 2 million barrels per day of excess residual fuel in the world wide market by 2005 unless conversion units are constructed to turn this excess into lighter, environmentally acceptable fuels (3).

As refineries outside the U.S. add processes to meet growing fuels demands, it is likely that new processing configurations will emerge. For example, U.S. refineries are heavily geared for high octane gasoline production. As shown in Table 1, catalytic cracking capacity in U.S. refineries is over 34% of crude capacity with catalytic reforming making up an additional 24%. Alkylation, MTBE, TAME, and Isomerization units add to the total. On the other hand, demand for distillate fuels is growing faster than gasoline demand in developing countries. Where capital resources are constrained, it is easier for governments to restrict the growth of gasoline demand while industrial growth calls for increased amounts of distillate fuels. Therefore, new facilities outside the U.S. will need to emphasize residual conversion, distillate fuel production, and product slate flexibility rather than maximizing gasoline. This should lead to a heavier emphasis on hydrocracking in new facilities.

REFINERY PRODUCTS OUTLOOK

GASOLINE

Changing fuel quality requirements are causing refiners worldwide to consider new processes and processing routes to meet both product demand and environmental regulations.

The first wave came through the U.S.A. several years ago with the removal of lead from gasoline. This trend is spreading through the European Community, the Far East and even to Mexico and South America.

Environmental pressures such as the smog problem in many urban areas throughout Latin America are driving lead phasedown. Estimates indicate that more than 20% of Mexico's gasoline production is now unleaded and several other Latin American countries are marketing unleaded gasoline. Now, we in the United States are in the middle of another round of gasoline formulation changes. While the final extent of gasoline reformulation outside the U.S.A. is unknown at this time, it is clear that cleaner burning gasoline is a worldwide trend especially for export refineries. Table 2 shows a comparison of U.S. gasoline specifications. The 1990 base gasoline is the average for all U.S.A. refineries. The California averaging and California maximum columns compare specifications for two different methods of achieving California Air Resources Board Regulations. The Federal Assumed Information is our current estimate for the U.S. "Complex Model." (4). New facilities will emphasize production of high octane gasoline blending components such as alkylate, oxygenates, and reformat.

DISTILLATES (Diesel, Kerosene, Jet Fuel)

Distillate production is a potential bright spot for refinery economics in the coming decade. Distillates are the fuel source that tends to support economic development in many parts of the world. In many developing economies, distillate fuel demand is growing faster than gasoline demand. Table 3 shows the growth trend for mid-distillate demand for the U.S.A., Western Europe, Latin America and Asia. At the same time that the demand for distillates is growing, environmental demands are calling for cleaner, lower sulfur distillates fuels. Many Pacific Rim countries are following the lead of the U.S.A. to lower sulfur specifications for diesel fuel. Japan will be moving to meet the 0.05 wt% diesel sulfur specification in 1996 as an example.

Refiners who have the flexibility to produce distillates, especially low sulfur diesel, will be able to take advantage of high distillate prices brought on by a tight market in coming years.

FUEL OIL

As mentioned earlier, the demand for heavy fuel is decreasing as a percentage of total refined products in every part of the world (Figure 1). Projections indicate a need for up to 2 million barrels per day of new resid conversion capacity between now and early in the next century.

Increasing demand for lighter products, and the demand for higher quality fuels is driving refiners to more intensive processing of resids. While delayed coking is still the mainstay for resid destruction, newer resid hydroconversion processes such as H-OIL®

are also increasing in importance. Refiners will need to have the flexibility that resid conversion offers in order to take advantage of changing market requirements in the future.

In addition, environmental regulations are being adopted which limit the amount of sulfur in fuel oil. Western Europe has been most aggressive in limiting the sulfur content of industrial fuel oil. The European Community has adopted regulations which will limit the sulfur content of fuel oil used in large combustion plants to 1 wt%. As residual fuel sulfur levels are phased down, the demand for residual fuel will decrease still further because of rising prices for low sulfur fuel oil. The result will be even more pressure to convert residual fuel to lighter, higher value products.

PROCESSING ROUTES

Many existing refineries are mainly simple topping refineries which distill crude oil as shown in Figure 2. These refineries will also usually include a process to enhance the octane of light straight run naphtha for blending into the gasoline pool, and a reformer to improve the octane of heavy straight run, also for gasoline blending. The product slate from these simple topping refineries is dictated by the quality of the crude processed, and by the relatively small quantity adjustments that can be made through changes in cut points. Mechanical equipment and metallurgical constraints often limit the types of crude that may be processed in a refinery. These constraints further limit the flexibility of the refiner to meet ever changing product demands. Last year's Oil & Gas Journal Worldwide Refining Report listed 41 refineries in the Americas, outside the U.S., without gas oil or resid conversion capacity (1).

More recently, demands for higher quality low sulfur distillates have meant a switch to lower sulfur crude in refineries where hydroprocessing capacity was either limited or non-existent. Similarly, increasing demand for distillate fuels has resulted in the addition of crude distillation capacity as the lowest cost route to increasing distillate production. Increased distillation capacity has often resulted in surplus residual fuel which is becoming more difficult to sell.

Clearly, the demand for higher quality products and the increasing differential between light sweet and heavy or medium sour crudes is causing refiners to consider increasing the complexity of simple refineries. Even in the United States, where the most complex refineries in the world are found, there is a trend toward more hydrotreating and hydroconversion to increase flexibility still further.

Table 4 shows how refinery complexity has changed in recent years. The numbers in Table 4 are derived from an index developed by W. L. Nelson, which is based on the relative costs of refinery processing units. The changes shown in Table 4 indicate that the average refinery, in constant dollars, has risen in value by about 12% in the U.S., 27% in Western Europe, and 9% in the rest of the world, outside of former and current centrally planned economies. (2)

The next step in refinery complexity is the addition of additional fuel oil upgrading, often in the form of a fluid catalytic cracking unit. Figure 3 shows a simplified block flow diagram of this cracking refinery configuration.

Figures 4 and 5 show even deeper conversion of heavy fuels with resid conversion being depicted with a delayed coker. Delayed coking is shown as the resid conversion process because of its continuing choice by refiners worldwide as the most popular resid conversion option. Figure 4 shows how the coker fits into an existing cracking refinery, while figure 5 shows a deep conversion hydrocracking refinery that produces high quality distillates and gasoline, but no low value heavy fuel oil.

Increasing use of hydrocracking as the major gas oil conversion process in new refineries is expected. While hydrocracking is more expensive than the widely practiced fluid catalytic cracking, the added product flexibility coupled with the ability to make high quality distillates make it an important part of a modern refinery.

The Role of Modern Technology

Refineries are becoming more complex in order to survive in a changing, diverse, environmentally aware market place. The need to optimize the use of limited capital and minimize operating costs are major factors which influence processing choices.

A modern refinery may include 20 or more units, and many of these are licensed technologies which are available from 3 or more licensors.(2) A combination of proven linear programming techniques, optimized for refinery facilities planning, and a consistent, objective approach to licensor selection are required to assure that the needs of the market plus the refiners cost objectives are being met.

During the design phase, still other technology can be used to further enhance future operations. For example, energy use has been reduced by up to 15% while lowering equipment costs through the use of process integration as a means to optimize heat utilization

Three dimensional plant design tools also impact construction costs through the almost complete elimination of interferences and improved accuracy in determining material requirements.

Advanced process control is another technology tool that allows a refiner to optimize certain unit operations and operate the facility much closer to multiple constraints.

Finally, modern training simulators help keep refinery operator's skills sharp. Ongoing operator training not only helps with normal day-to-day operations, but also helps operators respond quickly and properly to process upsets.

Summary

World fuels demand is trending toward lighter, higher quality products at the expense of heavy, high sulfur fuel oil. While past emphasis has been on increasing gasoline production, at least for the next decade distillate fuels are expected to be in tight supply. This supply/demand situation will require refiners to increase flexibility through the addition of conversion capacity not only for gas oil boiling range materials, but also for bottom-of-the-barrel upgrading.

As refineries become more complex due to regulatory and market demands, improved process and computer technologies are emerging to bring refiners profitably into the next century.

References:

1. Worldwide Refining, Oil & Gas Journal, Dec. 21, 1992, Page 52-95.
2. Technology Trends in Downstream Petroleum Processing, E. L. Whittington, Montreux Energy Roundtable IV, Switzerland, May 1993.
3. Economic Options for Heavy Crude Upgrading, Sloan, H. D., Japan Petroleum Institute Refining Conference, Tokyo, 1992.
4. Optimizing Refinery Process: To Meet Future Needs, Sloan, H. D., 6th Annual Conference on International Refining, Kuala Lumpur, 1993.



TABLE 1
REFINERY CONFIGURATION - JANUARY 1993
(Percent of crude distillation capacity)

	USA	WESTERN EUROPE	REST OF WORLD *
CRUDE DISTILLATION	100.0	100.0	100.0
VACUUM DIST.	43.6	36.1	30.9
THERMAL CRACKING + VISBREAKING	1.7	10.7	4.2
COOKING	10.1	2.1	1.8
HYDROTREATING	60.3	47.5	35.4
CAT REFORMING	23.6	15.5	12.7
CAT CRACKING	34.2	13.9	11.1
HYDROCRACKING	8.1	3.2	3.3

* NON CENTRALLY PLANNED ECONOMIES



TABLE 2
COMPARISON OF UNITED STATES
GASOLINE SPECIFICATIONS

PROPERTY	1990 BASE GASOLINE (SUMMER AVERAGE)	CALIFORNIA AVERAGE	CALIFORNIA MAXIMUM	FEDERAL ASSUMED
Max. RVP (psi)	8.7	7.0	7.0	7.0
Max. Olefins (v%)	9.2	4.0	6.0	8.0
Max. Aromatics (v%)	32.0	22.0	25.0	28.0
Max. Benzene (v%)	1.5	0.8	1.0	1.0
Max. Sulfur (wppm)	339	30	40	100
Min. Oxygen (w%)	---	1.8	1.8	2.0
Max. Oxygen (w%)	---	2.2	2.2	2.7
Max. T-50 (°F)	---	---	210	---
Max. T-90 (°F)	330	300	310	320



TABLE 3
MID DISTILLATE DEMAND, MILLION BPD

	1985	1990	1995	2000
United States	3.9	4.4	4.8	5.1
Latin America	1.3	1.4	1.6	1.8
Western Europe	4.6	4.9	5.4	5.8
Asia	1.5	2.2	2.9	3.6



TABLE 4
AVERAGE REFINERY COMPLEXITY

	<u>USA</u>	<u>WESTERN EUROPE</u>	<u>REST OF WORLD *</u>
<u>1986</u>	<u>1993</u>	<u>1993</u>	<u>1993</u>
7.94	8.87	4.30	5.45
			4.10
			4.48

* NON CENTRALLY PLANNED ECONOMIES



FIGURE 1

HEAVY FUEL OIL DEMAND % OF REFINED PRODUCTS

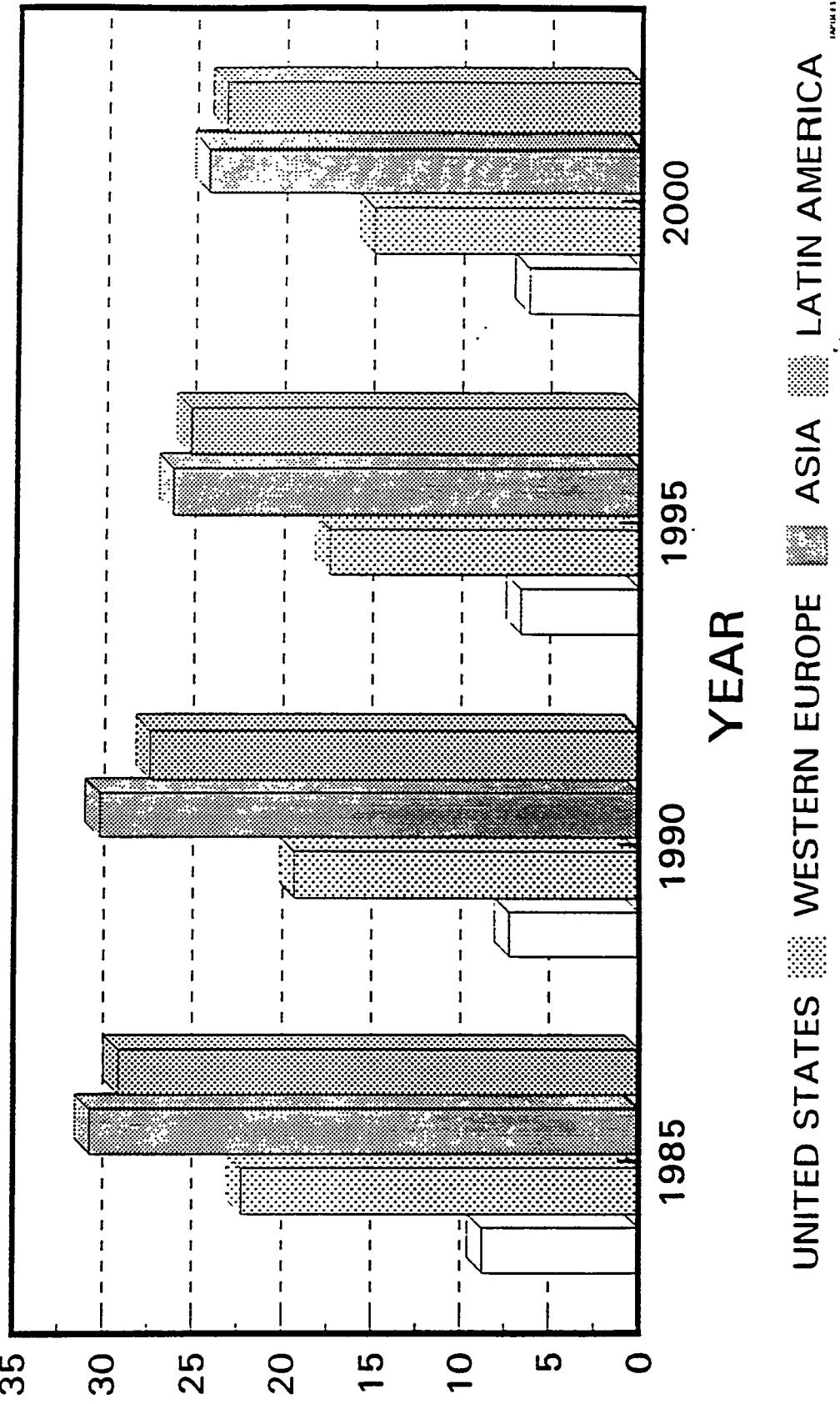


FIGURE 2 SIMPLE REFINERY

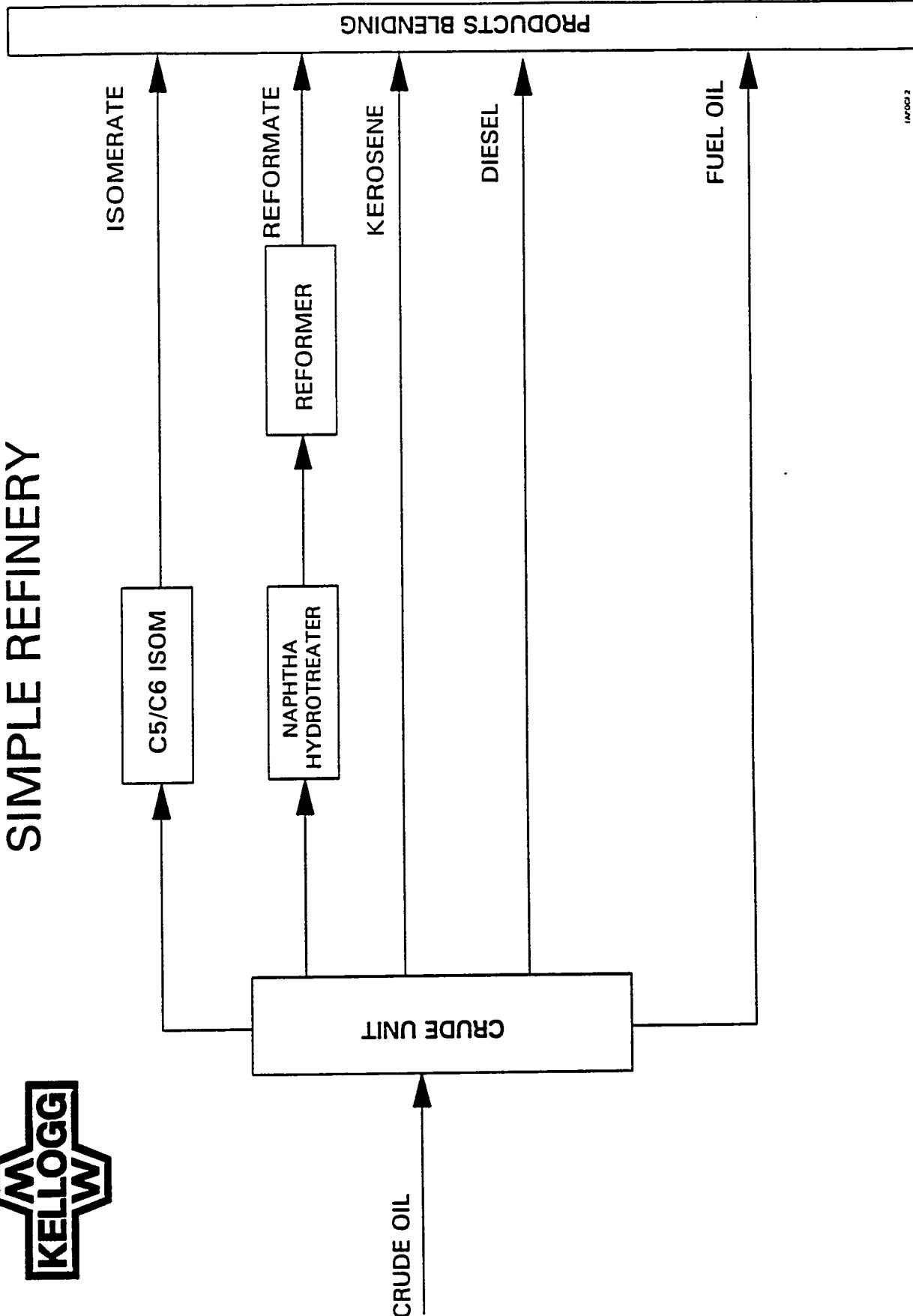




FIGURE 3
CRACKING REFINERY

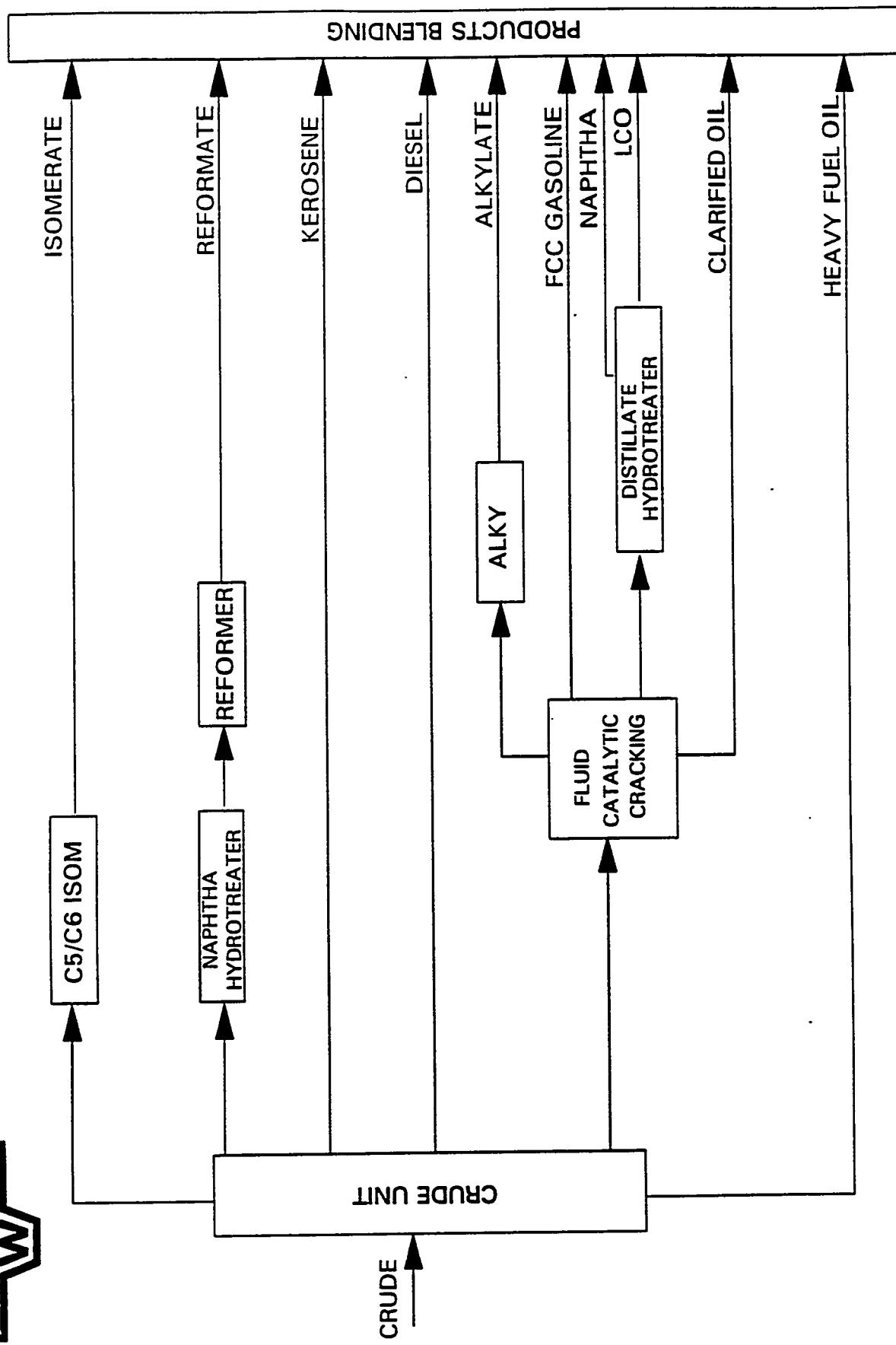




FIGURE 4
DEEP CONVERSION CRACKING REFINERY

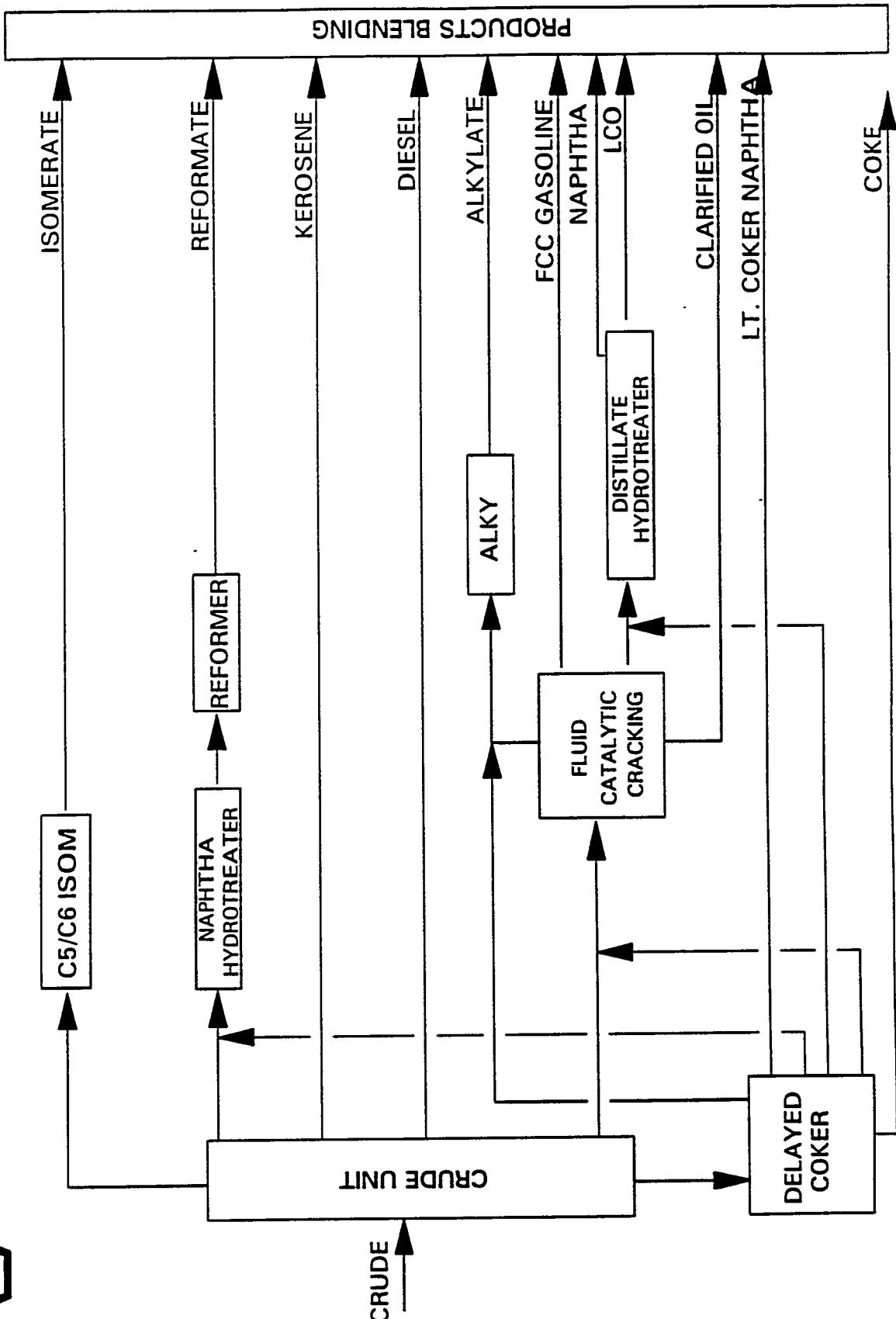
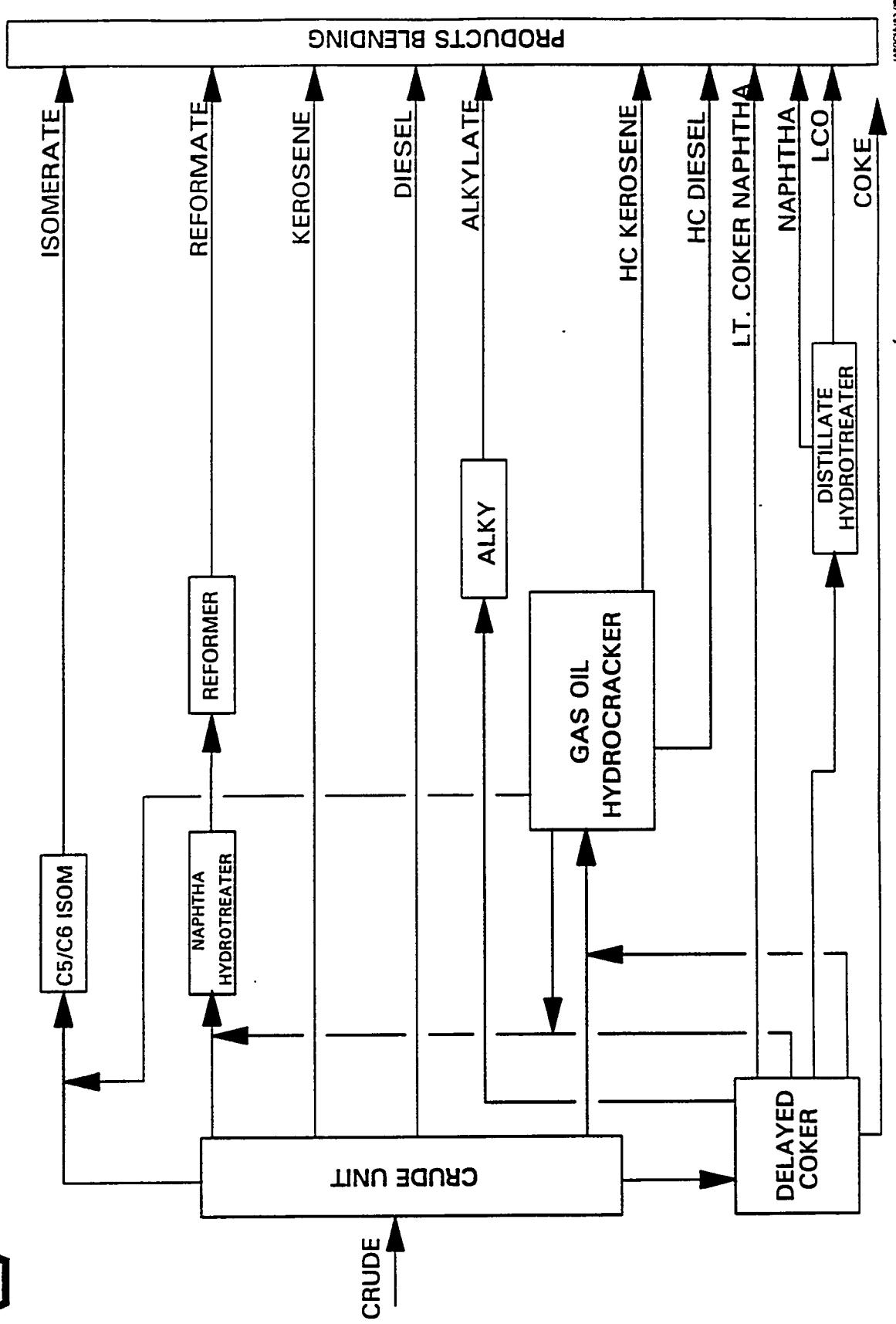




FIGURE 5
DEEP CONVERSION HYDROCRACKING REFINERY



“Minimizing Impact during Oil and Gas Development in Rain Forest”^s

MARLAN W. DOWNEY
President
Arco International Oil and Gas Company

A Planned Approach To Minimizing Environmental Damage In Oil And Gas Development In Rain Forests

**Marlan W. Downey
President, ARCO International Oil and Gas Company**

Abstract

Planning for environmental protection is an integral part of any oil and gas development project in a tropical rain forest. One example of such environmental planning is ARCO's approach to the possible development of a recent discovery in a remote region of Ecuador's Amazon rain forest. Environmental planning for development began before drilling the discovery well. In fact, ARCO's environmental procedures were incorporated into every phase of the project, from exploration to the eventual restoration of disturbed areas once production ends.

At the outset, it is important to understand the character of the environment to be protected. A workable environmental protection program must be designed to sustain the environmental ecosystem and the human population in it for the life of the project and beyond. Our experience in Ecuador taught us a number of lessons in this regard. For example, we learned that seemingly benign activities can have unexpected side effects in tropical rain forests, and that scientific resources cannot be effectively used without educating everyone who will be involved in the project.

Environmental planning must take into account all activities in the rain forest and must involve all participants, both inside and outside the company. This includes management and technical staff inside the company, as well as public interest groups, environmental and cultural consultants, government officials, national oil company officials, representatives of the indigenous population, and others.

Introduction

Environmental and social issues are associated with any level of activity in tropical forests, both because of the fragility of the forests themselves and because of the presence of indigenous peoples. Tropical forests are complex, sensitive environments that contain a greater abundance and diversity of plant and animal species than other terrestrial habitats. Relatively few of these life forms have been named, described, or studied scientifically. Tropical forests are also rich in substances that are used by local peoples in their daily lives, many of which may be useful to society at large for industrial or medicinal applications.

Population pressures and the rising expectations of indigenous peoples have caused large areas of tropical forest to be converted to other uses. This trend is expected to intensify. Current figures show that more than eleven million hectares (27.2 million acres) of mature tropical forests are converted to agriculture, pasture, or other uses every year. It is now generally accepted by the scientific community that deforestation is resulting in the extinction of plant and animal species at unprecedented rates.

Minimizing Environmental Damage

Marlan W. Downey

2

Any discussion of the ecology of tropical forests must include the native peoples who inhabit them. Bringing development to the tropical rain forest and to the isolated indigenous populations who live in them can have profound consequences. When two cultures collide, one will usually emerge as the dominant society unless the weaker society is protected. A number of potential problems can arise: Indigenous peoples can be exposed to disease brought in from the outside for which they have no immunity; natural forests and streams used for hunting and food gathering can be so altered that they can no longer sustain local populations; and erosion, pollution of streams and rivers, excessive removal of forests, and disruption of local animal life can profoundly and irreparably harm the ecosystem.

ARCO's Experience in Ecuador

Mindful of these concerns, we decided early on in planning for our Ecuador project that we would do everything possible to minimize the consequences of our activities in the rain forest. The measures that are planned if we move forward with our development proposal will be in accord with the rules and regulations put forth by the Government of Ecuador, with our own Safety, Health and Environmental Protection Policy, and will take into account the advice of the scientific community and, most importantly, the indigenous peoples. All our work to date has met these criteria.

Our project is in eastern Ecuador in Pastaza Province, which is in the drainage basin of the upper Amazon. At the beginning of our exploration phase in 1990 and 1991 we cleared about 2.4 hectares (6.0 acres) of tropical rain forest at our first exploratory well site and about 1.2 hectares (3.0 acres) at our second site. The cleared sites represent less than one one-hundredth of one per cent of the land area encompassed by the ARCO license. At both our sites an important goal was to reduce the size of the "footprint" required for drilling operations. In contrast to our sites, most other well locations in Ecuador cover ten to twelve acres.

We began our project with the premise that hydrocarbon exploration and production can take place in the Amazon rain forest in an environmentally safe manner, and that the rain forest ecology and the indigenous peoples would be minimally affected. We were determined to make our project a model. Our goals in Ecuador are consistent with our overall operating philosophy, which is to minimize all environmental and social impacts of operations where ARCO explores for or produces oil and gas.

Both aerial and ground assessments were made by ARCO personnel and consultants to obtain first-hand knowledge of the proposed development area and to help us plan for exploration, drilling, development, and restoration phases. During these visits we talked with local indigenous people to apprise them of our project and seek their assistance.

We commissioned site-specific biodiversity studies encompassing water quality, fisheries, forest fauna, vegetation, and soil morphology and chemistry to help us in our planning effort. During drilling operations water quality was monitored on a weekly basis. Rainwater was collected at the well-site, treated by oil/water separation, flocculation, and aeration so that it was of equivalent quality to that in local streams. It

Minimizing Environmental Damage

Marlan W. Downey

3

was then analyzed before discharge into the environment. Geofabric was used on the soil surface to provide a stable, mud-free work surface to facilitate rainwater runoff.

Other specific actions we took included:

- Eliminating the building of roads while maximizing the use of helicopters.
- Minimizing the size of clearings for pathways and facilities.
- Minimizing the use of heavy equipment, maximizing the use of hand clearing.
- Waste treatment and waste minimization.
- Injection of waste drilling muds and cuttings.
- Field archaeological surveys, including the collection and clearing of artifacts before commencing construction.
- Forest-saving practices including selecting trees at spaced intervals to avoid creating gaps, no clear cutting, obtaining local advice in selection of trees, leaving tree litter in place, and minimizing the trees cut for lumber.
- Salvaging of topsoil, which was stockpiled for site restoration.
- Creation of an on-site plant nursery to propagate seedlings for site restoration.
- Covering bare areas with topsoil, mulched for restoration. These areas were then seeded.
- Reclamation of disturbed areas.
- Establishing community development programs.
- Environmental training for all personnel.
- Environmental auditing and environmental monitoring during all phases of activity.

Research work continues at both our sites, particularly on topsoil. Sprouting tests are currently being conducted. This involves setting several boxes with soil from stockpiles in the open and in the shade. The results of these tests will help us in subsequent reclamation in the region.

We designed a training program to brief everyone who goes to the site on ARCO's rain forest policies and guidelines. We also produced a video program (in Spanish and English) to explain the importance of environmental protection in Ecuador. The purpose of these briefings and training programs is to instill in everyone ARCO's commitment to sound environmental management of our project.

Minimizing Environmental Damage

Marlan W. Downey

4

Looking to the future, we will include participation of indigenous groups from the area in oil development planning. Local expertise will be used to the fullest extent possible. Other outreach activities include participation in a local advisory council, immediate compensatory reforestation of previously deforested areas, medical care for local villagers, support of village schools, training and jobs for local villagers, support for Ecuadorian social authorities, and encouragement of sustainable development.

We are evaluating participation in environmentally-oriented projects in Ecuador, such as development of the Andean Condor Reserve, and efforts to establish a dialogue with environmental groups such as the World Wildlife Fund, the International Union for the Conservation of Nature and Natural Resources, and the Nature Conservancy.

Bibliography

Guidelines for Exploration in Tropical Rain Forests of Eastern Ecuador, ARCO International Oil and Gas Company, (Plano, Texas: 1990), 13 pps.

Villano Drilling and Production Facilities Safety, Health, and Environmental Protection Development Options, Design Basis, and Operational Guidelines, ARCO International Oil and Gas Company, (Plano, Texas: 1993), 61 pps.

Chamberlain, D. W., Environmental Management and Restoration During Oil Exploration in the Ecuadorian Amazon Basin, Southern California Academy of Sciences, Annual Meeting, May 1-2, 1992, 11 pps.

Lewis, S., The Rainforest Book, Living Plant Press, (Los Angeles: 1990), 110 pps.

Lindstedt-Siva, J., and Chamberlain, D. W., Petroleum Operations In Ecuador: Environmentally-Based Oil Development In A Tropical Forest, a report to ARCO International Oil and Gas Company from ARCO Corporate Environmental Protection, (Los Angeles: 1991), 11 pps.

McCreary, S., Kondolph, G. M., McBride, J. R., and Twiss, R., Independent Review of Environmental Documentation for Petroleum Exploration in Block 10, Oriente, Ecuador, a report presented to ARCO Oriente Inc., by the Center for Environmental Design Research, University of California, (Berkeley: 1992), 78 pps.

**“Infrastructure Development to Support the
Hydrocarbon Industry”**

THOMAS MACK
Vice President
Bechtel Corporation

Infrastructure Development to Support the Hydrocarbon Industry

I. INTRODUCTION

- A. Oil and Gas development should be seen as a potential catalyst for regional development. By taking a long-term view, countries can efficiently plan construction of infrastructure for the project's immediate needs with larger objectives for regional development in mind.**
 - Oil and gas development requires facilities necessary for extraction as well as the supporting infrastructure to get the product to market. (ie. roads, railroads, ports, water supply systems, communications, power, housing, etc.)
 - Bechtel has seen national oil companies and countries succeed in doing good planning with a broader view of infrastructure development. Countries can plan phased construction of infrastructure to not only support oil and gas development, but to support further development of primary and secondary industries over a longer-term.
 - In planning these "next steps" of development, governments can link oil and gas planning with objectives for regional economic growth and their country's larger vision of overall development.
 - The Americas, particularly Central and South America, possess several opportunities for development via oil and gas which heretofore have gone undeveloped.
 - Bechtel has been involved in some interesting projects, elsewhere in the world, which can illustrate what the path of development might look like. It may be helpful to look at the Tengiz and Jubail projects as examples of the extreme ends of the development spectrum.

- **Volga Water Supply** must be investigated for integrity.
Single pipeline and sole source of potable water is in dubious condition with no back up.
- **Roads**
- **Caspian Sea Dike**

3. **Caspian Pipeline—\$1 billion over 3–4 years**

- **Planning, engineering, construction, financing and operation** of 1,500 km pipeline from Tengiz oil fields in Kazakhstan on eastern shore of the Caspian Sea to the Black Sea port of Novorossiysk on the northern shore of the Black Sea
- **Project Components**—Project includes pipelines, pump stations, cathodic protection, supervisory control, telecommunications, storage tanks and tanker loading facilities.

B. Port Development of Novorossiysk

1. Port Infrastructure

- **New berth** required at the port of Novorossiysk to accommodate 150,000-ton tankers

2. Municipal infrastructure

III. JUBAIL

If we see Tengiz as an example of a resource region at one end of spectrum—just beginning to exploit its wealth and contemplate the long-term benefits and implications for development—at the other end of the spectrum is Jubail, Saudi Arabia which many of you may be familiar with.

Twenty years after the original proposal to develop Jubail, in 1993 the city is reaching its maturity and demonstrating the potential for taking a long-term view of what infrastructure needs may arise from the exploitation of gas and oil resources.

A. Rationale for Jubail

- **Saudi Oil Revenues**—mushroomed in the 1970s to unprecedented heights
- **Nation Building**—Saudi leader concerned about the direction the nation would have to take to utilize its financial and natural resources, improve people's quality of life and provide training for human resources.
- **Diversified Economy**—King Faisal wanted the country to become more prosperous, but less dependent on oil

IV. CONCLUSION

- A. Tengiz and Jubail represent areas in which the exploitation of oil and gas resources have, and are, providing enormous opportunities for regional development. Each has required a vision of the future and an understanding that infrastructure input is very broadly defined.
- B. Tengiz and Jubail are extreme examples. There are probably no cases in the Americas that will exactly mirror these. But opportunities for oil and gas development here may share some of these projects' characteristics – extraction from remote areas, challenging transportation needs, ~~AND ... ,~~ perhaps most importantly, ... opportunities for related industrial and economic development. Just as Jubail's "master plan" was part of a larger Saudi vision, oil and gas infrastructure planning can support Latin and North American countries' individual visions of their nation's future.
- Where regional economic integration and interaction is increasing, there are even greater opportunities for good infrastructure planning.
- In some cases, such economic integration will provide the key which will unlock oil and gas development. Once these keys are provided – be it through the intangible innovations of creative project finance or tangible links through roadways, pipeline and rail – the opening will provide real chances to develop the infrastructure of the entire region.

RAUL GARCIA
President
National Regulatory Gas Agency
Argentina

Raul Garcia
President
National Reg. Gas

THE ARGENTINE REGULATORS FRAMEWORK: A NEW APROACH

1. I WOULD LIKE TO CONGRATULATE THE EAST-WEST CENTER AND THE SPONSORS FOR THE ORGANIZATION OF THIS CONFERENCE AND ALSO FOR THE TIMING-LESS THAN A YEAR AFTER THE PRIVATIZATION OF GAS DEL ESTADO.

2. I WILL REFER BRIEFLY TO THREE ASPECTS OF THE ECONOMIC REORGANIZATION IMPLEMENTED BY THE GOVERNMENT OF ARGENTINA: PRIVATIZATION, REGULATORY FRAMEWORK AND REGULATORY AGENCY. EACH OF THESE TOPICS BY ITSELF IS ENOUGH FOR A CONFERENCE, HOWEVER, THESE ISSUES INTERRELATE IN SUCH A MANNER THAT I PREFER TO COVER THEM IN A WAY THAT MIGHT RESULT INTERESTING TO THIS AUDIENCE AND IN THIS OPPORTUNITY.

3. LIKEWISE OTHER PRIVATIZATIONS UNDERTAKEN BY THE ARGENTINE GOVERNMENT, THE MAIN GOALS WERE:
 - A. TO INCREASE EFFICIENCY.
 - B. TO PROMOTE INVESTMENT.
 - C. TO SEPARATE ECONOMIC FROM POLITICAL ASPECTS.

D. MOST IMPORTANT: TO SEPARATE PRODUCTION OF SERVICES FROM ITS REGULATION.

IN THE CASE OF THE GAS PRIVATIZATION ANOTHER GOAL ADDS TO THE LIST: TO COMPLY WITH THE DEREGULATION OF THE HYDROCARBON SECTOR - EACH GAS PRODUCER BEING ABLE TO MARKET HIS OWN GAS. TO ACCOMPLISH THIS OBJECTIVE SIZE OF THE DISTRIBUTION AND TRANSMISSION UNITS AND THE DESIGN OF THE SYSTEM - OPEN ACCESS - WERE THE MAIN ASPECTS TO BE ADDRESSED BY THE PRIVATIZATION COMMITTEE.

4. PRIVATIZATION OF GAS DEL ESTADO IN NUMBERS MEANT: TRANSFERRING THE TRANSPORTATION AND DISTRIBUTION OF 40% OF THE ENERGY MATRIX TO THE PRIVATE SECTOR. THIS JOB TO BE CARRIED OUT BY TWO TRANSMISSION CO. AND 8 DISTRIBUTION COMPANIES. APPROXIMATELY 70% OF THE EQUITY WAS SOLD ON DEC. 28 TH. OF LAST YEAR AND THAT MEANT AN ASSET VALUATION OF ALMOST 4 BILLION DOLLARS. 54 OFFERS WERE RECEIVED IN TOTAL AND VERY UNIQUE - BESIDES OTHER ASPECTS - TO THIS PRIVATIZATION WAS THAT ALL ECONOMIC UNITS WERE TRANSFERRED AT THE SAME TIME.
5. OFFERS ARE MADE ACCORDING TO EXPECTATIONS ON DEVELOPMENTS OF THE BUSINESS. LET ME SHOW YOU NOW HOW THE INDUSTRY PERFORMED ON A VERY GENERAL BASIS - SINCE THOSE REGULATED KNOW BETTER THE DETAILS - AFTER PRIVATIZATION. WHEN WE ARE OFFERING THE ECONOMIC UNITS WE MENTIONED THE POTENTIAL FOR EXPANSION HOWEVER WE PREFERRED BEING CONSERVATIVE. AT THAT TIME -

2% GROWTH - 4% THE MOST PROMISING STATE OF THE WORLD.

6. (TABLE - GAS MOVED -) THIS FIGURE SHOWS YOU VERY SUCCINCTLY WHERE THE GAS COMES FROM (BASIN) AND THE CARRIER. THE NEUQUEN BASIN REPRESENTS 60% (NORTHWEST INCLUDES BOLIVIAN GAS) OF THE TRANSPORTED GAS, AND TGS MOVES 2/3 OF THE GAS AND TGN 1/3. BOTH TRANSCOS COMPETE FOR MOVING THE GAS FROM THE LARGEST BASIN IN ALMOST THE SAME FIGURES.
7. (TABLE - DISTCOS -) THE NEXT TABLE SHOWS HOW THE GAS DELIVERED BY TRANSCOS (ON BEHALF OF PRODUCERS) IS APPORTIONED AMONG DISTRIBUTION COMPANIES. SIMILARLY, THE TABLE SHOWS THE NUMBER OF CUSTOMERS AND GAS INVOICED DURING THE FIRST SEMESTER. WE ARE TALKING ABOUT AN INDUSTRY WITH 4.6 MILLION CUSTOMERS, AND ALMOST 2.0 BILLION DOLLARS GROSS INCOME - SECOND SEMESTER FIGURES SHOULD BE HIGHER - INFORMATION MEMORANDUM FIGURES INDICATED TOTAL REVENUE ESTIMATED OF 1,854 BILLION. THIS IS 8% LESS - MINIMUM - THAN OUR ESTIMATE FOR 1993.
8. LET'S TAKE A LOOK NOW AT HOW THE INDUSTRY PERFORMED COMPARED TO PREVIOUS YEARS. GAS MOVED BY TRANSCO'S DURING THE FIRST SEMESTER INCREASED BY 10% COMPARED TO LAST YEAR AND BY 14.4% WHEN COMPARED TO 1991. GAS DELIVERED BY DISTCOS ALSO MOVED UPWARD - AS EXPECTED - WITH REMARKABLE INCREASES IN SOME SECTORS: ALMOST 20% MORE GAS WAS CONSUMED BY POWER COMPANIES

- WITH REFERENCE TO 1991 - AND 27% WHEN REFERRED TO CNG. RESIDENTIAL CONSUMPTION HAS ALSO INCREASED SUBSTANTIALLY - 12.2% - COMPARED TO 1992. NEXT FIGURE SHOWS THE NUMBER OF GAS USERS - ALMOST 8% MORE THAN IN 1992.

9. ACTUAL CAPACITY (APPROX. 65 MM M3/DAY) - THAT AT THE TIME OF THE PRIVATIZATION - HAS BEEN USED MORE INTENSIVELY. (CAPACITY TABLE) THE NEXT FIGURE SHOWS THAT FIRM PLUS INTERRUPTIBLE ON AVERAGE HAS BEEN INCREASING - MORE IN THE WINTER TIME AS EXPECTED - AND EXCEEDED CAPACITY AVAILABLE ON JUNE. IT WAS WELL KNOWN BY INVESTORS AT THE TIME OF PRIVATIZATION THAT DEMAND DURING WINTER TIME EXCEEDED CAPACITY AVAILABLE. THE NEXT FIGURE SHOWS - WITHOUT ADJUSTING FOR DEGREE DAYS - THE DIFFERENCE BETWEEN DISTCOS DAILY DEMAND AND THAT ALREADY CONTRACTED AT THE TIME OF PRIVATIZATION. IT SHOWS AN IMPORTANT EXCESS DEMAND THAT MIGHT INDEED BE UNDERESTIMATED AS EXCESS DEMAND IS NOT REALIZED.
10. OTHER INTERESTING DEVELOPMENTS INCLUDE: 1.) MORE THAN 300 HUNDRED CONTRACTS HAVE BEEN SIGNED BY DISTCOS WITH LARGE USERS. 2) THERE APPROXIMATELY ARE 12 BY-PASS NEGOTIATIONS GOING ON AND AT LEAST 4 WILL TAKE PLACE. 3) DISCOUNTS FROM MAXIMUM RATES WERE MADE TO LARGE USERS. 4) MOST IMPORTANT: TRANSCOS HAVE EXPANDED AND DISTCOS HAVE MADE COMMITMENTS TO ACQUIRE MORE CAPACITY. 5) TRANSMISSION EXPANSIONS SUBMITTED FOR APPROVAL OF THE REGULATORY AGENCY REPRESENT AT LEAST 15% OF

EXISTING CAPACITY. AND WILL BE AVAILABLE NEXT WINTER. 4) THE STATE OF THE DISTRIBUTION NETWORK AS WELL AS THE LIMITED TRANSPORTATION CAPACITY IMPLIED THAT NOT ALL GAS COULD BE DELIVERED THEREFORE A HIGH QUALITY INDEX OF DELIVERY WAS NOT ACHIEVED. NONETHELESS, THIS REMAINED AS A VERY PARTICULAR PROBLEM IN THE BUENOS AIRES AREA.

11. PRIVATIZATION IS A ONCE AND FOR ALL CHANGE. REGULATION ON THE OTHER HAND IS A CONTINUOUS PROCESS IN WHICH REGULATORS TRY TO ACHIEVE GOALS SET OUT IN THE PRIVATIZATION AND THE LAW. BOTH PROCESSES HAD THEIR OWN DEMAND OR NEED, BUT REGULATION OR CONTROL AS IT IS CALLED, IS DEMANDED BY POLITICIANS AND CUSTOMERS IN GENERAL.
12. LET'S TAKE A LOOK AGAIN TO THE SYSTEM WE PRIVATIZED (TABLE GAS INDUSTRY FRAMEWORK). THE REGULATORY FRAMEWORK IS GEARED TOWARD ENHANCING COMPETITION AS MUCH AS POSSIBLE AND TO REPLACE MARKET REGULATION BY GOVT. REGULATION WHEN THE LATTER IS NOT FEASIBLE DUE TO THE NATURAL MONOPOLY NATURE OF THE SYSTEM. EXAMPLES FOLLOW: BY PASS IS PERMITTED, PRODUCERS CAN BUILD AND OPERATE PIPELINES, DISTRIBUTION COMPANIES ONLY HAVE THE PRIORITY TO BUILD NETWORKS, TRANSPORTERS CAN ONLY TRANSPORT GAS, VERTICAL INTEGRATION IS LIMITED; SUBSIDIES NEED TO BE EXPLICIT AND BE PART OF THE GOVT. BUDGET, ETC.

13. THE REGULATORY FRAMEWORK ALSO EMPHASIZES THE NEED TO LOOK AT OUTPUT RATHER THAN INPUT. CUSTOMERS LOOK AT PRICE AND ITS RELATED ASPECT, QUALITY. THEY CARE VERY LITTLE IN THE COSTING OF THE OUTPUT, RATHER THEY LOOK AT THE SERVICE THEY RECEIVE. THE PRICE CAP REGULATION AS OPPOSED TO COST OF SERVICE REGULATION - THOUGH NEITHER ONE IS PERFECT - IS BETTER DESIGNED TO ACHIEVE THE GOAL OF A BETTER SERVICE. RATE DESIGN WAS FORWARD LOOKING - AND SO WILL BE EVERY FIVE YEARS - AS OVER INVESTMENT IN THE PAST WAS NOT TAKEN INTO ACCOUNT. RATES REFLECT LONG RUN INCREMENTAL COSTS IN THE TRANSPORTATION AND DISTRIBUTION SERVICES.
14. REGULATION OF THE TRANSPORTATION AND DISTRIBUTION SERVICES IS CARRIED OUT ON A FEDERAL LEVEL BY THE "ENARGAS". IN THE NEAR FUTURE, AS ESTABLISHED IN THE LAW, PROVINCES WILL PARTICIPATE IN THE REGULATORY ACTIVITY THROUGH THE DELEGATIONS THAT THE ENARGAS HAS ALREADY STARTED TO OPEN.
15. (ENARGAS AND THE EXECUTIVE POWER) THE ENARGAS IS A GOVT. AGENCY WITH ITS OWN BUDGET; INCOME DERIVES FROM A RATE IMPOSED ON DISTCOS AND TRANSCOS IN PROPORTION TO THEIR GROSS MARGIN; ENARGAS IS MONITORED (EX-ANTE) BY THE "SIGEN" - MAINLY INSPECTING PROCEDURES TO HANDLE CASES AS WELL AS AUDITING THE INTERNAL ACCOUNTS OF

THE ENARGAS. (EX - POST), THE AGENCY IS MONITORED BY THE "AGN" WHICH DEPENDS FROM CONGRESS.

16. THREE DIRECTORS WERE APPOINTED WITH FAVORABLE OPINION FROM THE CONGRESS AND THEIR TERMS WERE STAGGERED. THE AGENCY WILL CARRY OUT ITS ACTIVITIES WITH NO MORE THAN ONE HUNDRED EMPLOYEES (INCLUDING DELEGATIONS) AND WILL CONTRACT FOR SPECIFIC SERVICES. PUBLIC AUDIENCES, A NEW FEATURE IN ARGENTINA, HAVE ALREADY BEEN CARRIED OUT. CASES ARE HANDLED DIFFERENTLY FROM OTHER GOVT. AGENCIES. DIRECTORS ROTATE IN EACH CASE AND THE CASE DOES NOT TRAVEL FROM ONE DEPARTMENT TO THE NEXT. RATHER A DIRECTOR IS RESPONSIBLE FOR A TEAM COMPRISING EXPERTS FROM EACH DEPARTMENT. MANAGERS MAY SUPERVISE TEAM WORK.

17. OBJECTIVES AND FUNCTIONS WERE ALREADY MENTIONED ALONG THIS PRESENTATION, HOWEVER THE NEXT FIGURE (TABLE - GOALS AND FUNCTIONS-) SHOWS SOME OF THEM. NEEDLESS TO SAY, REGULATION ALSO INVOLVES JURISDICTIONAL ASPECTS. BEING REGULATOR AND JUDGE IS A DIFFICULT TASK AS WE KNOW THE LICENSEE VIRTUES AND VICES AND VICE VERSA.

18. WHAT ASPECTS WILL THE REGULATORY AUTHORITY BE EMPHASIZING IN THE NEXT YEARS? FIRST, CONSUMER PROTECTION THROUGH QUALITY CONTROL OF THE SERVICE DELIVERED. THIS INCLUDES GOOD

INFORMATION, MAINTAINING PRESSURE LEVELS, HANDLING CONSUMER COMPLAINTS ON ~~TIME~~, INSPECTING THE 500 MILLION MANDATORY INVESTMENT IN THE NEXT FIVE YEARS, TO MENTION A FEW. **SECOND**, EMPHASIZING THE IDEA AMONG CUSTOMERS THAT THE GOVT. IS NOT THE PROVIDER OF THE SERVICE BUT THE REGULATOR - THROUGH THE ENARGAS - WHO ENFORCES GOOD SERVICE. **THIRD**, PROMOTING COMPETITION OR MARKET REGULATION AS MUCH AS POSSIBLE. THE ACTORS (LICENSEES, CUSTOMERS, GOVT.) SHOULD BE LOOKING AT DEVELOPMENTS IN MORE ADVANCED MARKETS: FUTURE MARKETS, CAPACITY RESALE, ETC. THESE CHANGES MAKE FOR A MORE FLEXIBLE AND DYNAMIC GAS INDUSTRY IN WHICH ISSUES SUCH AS THE LIBERALIZATION OF THE PRICE OF GAS CAN BE BETTER ACCOMMODATED.

19. CONCLUDING, I HOPE THE AUDIENCE IS AWARE OR HAS BEEN MADE AWARE OF, THAT: A) THE GOVT. MADE ANNOUNCEMENTS EARLY 1991 IN A VERY UNCERTAIN ENVIRONMENT OR WITH A BETTER PERSPECTIVE, THERE EXISTED INFORMATION ASYMMETRY. B) AS MENTIONED ABOVE, PRIVATIZATION IS A ONE TIME PROCESS BUT FOR CONTINUOUSLY BUILDING A LARGER STOCK OF CAPITAL WE NEED TO KEEP INVESTMENT, ITS CORRESPONDING FLOW, WITH THE APPROPRIATE REGULATORY FRAMEWORK. THANK YOU.