ENERGY:

MANAGING THE TRANSITION

John C. Sawhill  
President  
New York University

Keichi Oshima  
Professor  
of Nuclear Engineering  
University of Tokyo

Hanns W. Maull  
European Secretary  
The Trilateral Commission

The Trilateral Commission

Summary of report on pages IX-XIV
This report was prepared for the Trilateral Commission and is released under its auspices. It was discussed at the Trilateral Commission meeting in Washington, D.C., on June 11-13, 1978. The authors, who are experts from North America, Western Europe and Japan, have been free to present their own views; and the opinions expressed are put forth in a personal capacity and do not purport to represent those of the Commission or of any body with which the authors may be associated. The Commission will utilize the report in making any proposals or recommendations of its own. It is making this report available for wider distribution as a contribution to informed discussion and handling of the issues treated. The Commission wishes to thank the Sumitomo Fund for Policy Research Studies for its support of this project.

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THE TRILATERNAL COMMISSION

345 East 46th Street       c/o Japan Center for
New York, N.Y. 10017       International Exchange
                          4-9-17 Minami-Azabu
                          Minato-ku
                          Tokyo, Japan

                          151, boulevard Haussmann
                          75008 Paris, France
ENERGY: MANAGING THE TRANSITION

Report of the Trilateral Energy Task Force to The Trilateral Commission

Authors: JOHN C. SAWHILL
President
New York University
KEICHI OSHIMA
Professor
of Nuclear Engineering
University of Tokyo
HANNS W. MAULL
European Secretary
The Trilateral Commission

Special Consultant: FRANKLIN TUGWELL
Associate Professor
of Government
Pomona College, California
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The Authors

JOHN C. SAWHILL is President of New York University, a post he assumed in 1975, and also serves as Professor of Economics. From late 1973 to early 1975, Dr. Sawhill was Administrator of the U.S. Federal Energy Administration, an agency created in the wake of the oil embargo and a forerunner of the current Department of Energy. He entered government service in 1972 as Associate Director for Natural Resources of the Office of Management and Budget (OMB), after eight years as a management expert in private business. Dr. Sawhill was educated at Princeton (A.B., 1958) and New York University (Ph.D., 1963). His publications include Nuclear Power Issues and Choices, a report of the Nuclear Energy Policy Study Group sponsored by the Ford Foundation (co-author, 1977); and Improving the Energy Efficiency of the American Economy (forthcoming, 1978). He currently serves as a consultant to the U.S. government on energy matters and co-chairs the Aspen Institute Committee on Energy.

KEICHI OSHIMA is Professor of Nuclear Engineering at the University of Tokyo. He joined the University of Tokyo faculty in 1950, a few years after graduating from its Faculty of Engineering. In 1974-76, he was on leave from Tokyo in Paris as Director for Science, Technology, and Industry at the Organization for Economic Cooperation and Development (OECD). Professor Oshima has served on advisory committees to the Japan Atomic Energy Commission, Ministry of International Trade and Industry, Science and Technology Agency, Ministry of Education, Ministry of Transportation, and Economic Planning Agency.

HANNS W. MAULL is European Secretary of the Trilateral Commission. Before taking on this position in 1976, he was a Research Fellow at the International Institute for Strategic Studies (IISS) in London and at the Centre for Contemporary European Studies at the University of Sussex. Dr. Maull received his Ph.D. (1974) from the University of Munich, with a thesis on the Middle East conflict. He is the author of Oil and Influence — The Oil Weapon Examined (1975), Oelmacht — Ursachen, Grenzen, Perspektiven (1975), Europe’s Quest for an International Energy Policy: A Global Analysis (forthcoming, 1979), and a number of articles in periodicals and yearbooks.

FRANKLIN TUGWELL (Special Consultant) is Associate Professor of Government at Pomona College. In 1977-78, he was an International
The Trilateral Process

The report which follows is the joint responsibility of the three authors of the Trilateral Energy Task Force, with John C. Sawhill serving as principal drafter. The authors have been particularly aided in their work by Franklin Tugwell who worked with the authors throughout the course of their efforts and undertook considerable drafting tasks.

Although only the authors are responsible for the analysis and conclusions, they have been aided in their work by extensive consultations. In each case, consultants spoke for themselves as individuals and not as representatives of any institutions with which they are associated. Those consulted include the following:

Morris Adelman, Professor of Economics, Massachusetts Institute of Technology
Nordine Ait Laoussine, Executive Vice President, Sonatrach, Algiers
John Anderson, Editorial Writer, Washington Post
Enzo Andretta, Directorate General for Energy, Commission of the European Communities
Carl E. Beigie, Executive Director, C. D. Howe Institute, Montreal
Robert Belgrave, Director of B.P. Trading and Policy Adviser to Board, British Petroleum
Robert Bonner, Chairman, British Columbia Hydro
Stephen Bosworth, Deputy Assistant Secretary, International Resources and Food Policy, U.S. Department of State
Jerry Brady, Joint Economic Committee, U.S. Senate
Marc de Brichambaut, Centre d'Analyse et de Prévision, French Foreign Ministry
John C. Campbell, Director of Studies, Council on Foreign Relations
Monte Canfield, Director, Office of Special Programs, U.S. General Accounting Office
Guy de Carmoy, Professor, European Institute of Business Administration (INEAD), Fontainebleau
Harold van B. Cleveland, Vice President, Economics Department, Citibank
Marcello Colitti, Director of Planning and Development, Ente Nazionale Idrocarburi (ENI)
Umberto Colombo, Director-General, Research and Development, Montedison, Milan
Francesco Compagna, Member of Italian Parliament
Melvin A. Conant, Conant and Associates, Ltd.
Charles Cooper, Manager, Energy Policy, Corporate Planning, Exxon
Salvatore Custodero, Director, Energy Studies, FIAT
Paul Delouvrier, Président, Electricité de France
Pierre Desprairies, Président, Institute Français du Pétrole
Charles Di Bonav, Executive Vice President, American Petroleum Institute, Washington
Pierre Esteva, Administrateur Directeur Général, Union des Assurances de Paris
Luigi Ferro, Director, Economic and Social Relations, FIAT, Turin
Fereydoun Fesharaki, Advisor to the Prime Minister, Iran
George S. Franklin, Coordinator, The Trilateral Commission
Herman Franssen, Office Director, Integrative Analysis, U.S. Department of Energy
Efrian Friedman, Assistant Director, Energy and Fuels, International Bank for Reconstruction and Development
Curt Gasteyger, Professor, Institut Universitaire des Hautes Etudes Internationales, Geneva
R. C. H. Genochio, Energy Policy Division, Directorate General for Energy, Commission of the European Communities
Victor Gilinsky, Commissioner, U.S. Nuclear Regulatory Commission
Lincoln Gordon, Senior Fellow, Resources for the Future, Washington
Seisaku Goto, President, Chubu Electric Company
Wolfgang Hager, Senior Fellow, Research Institute of German Society for Foreign Policy
Robert G. Hawkins, Professor of Finance and Economics, Graduate School of Business Administration, New York University
Charles Heck, North American Secretary, The Trilateral Commission
Daniel Hickey, Office of Fuels and Energy, U.S. Department of State
Larratt Higgins, Manager, Utilization Forecasting, Ontario Hydro
Hendrik Houthakker, Professor of Economics, Harvard University
Toyoaki Ikuta, President, Institute of Energy Economics, Tokyo
Fuad Itayim, Editor, Middle East Economic Survey
Maxime Kleinpeter, Electricité de France
Shinichi Kondo, Advisor to the Board of Directors, Mitsubishi Corporation
Edward W. Krupels, Royal Institute for International Affairs, London
Sheldon M. Lambert, Manager, Energy Economics, Corporate Planning, Shell Oil Company, Houston
Ulf Lantzke, Executive Director, International Energy Agency, Organization for Economic Cooperation and Development (OECD)
Robert Leftwich, Economics Department, Citibank
Jacques Lesourne, Director, Interfutures, OECD
Jerome Levinson, General Counsel, Inter-American Development Bank
Walter J. Levy, President, W. J. Levy Consultants, New York
Giacomo Luciani, Istituto Affari Internazionale, Rome
Douglas MacAllen, Vice President, Corporate Affairs, General Secretary, Imperial Oil, Ltd., Toronto
Bruce MacLaury, President, The Brookings Institution
Charles Maxwell, Vice President, Cyrus J. Lawrence, Inc., New York
Robert Marjolin, Former Vice President, Commission of the European Communities
Cesare Merlini, Director, Istituto Affari Internazionale, Rome
Thierry de Montbrial, Director, Centre d’Analyse et de Prévision, French Foreign Ministry
John F. Mugno, Economics Department, Citibank
Nobuyuki Nakahara, Managing Director, Toa Nenryo Kogyo, K.K., Tokyo
Mitsugu Nakamura, Professor of Economics, University of Tokyo
Egidio Ortona, President, Honeywell Italy
Francisco Parra, Former Secretary-General, Organization of Petroleum
Exporting Countries; European Representative, Petroleos de Venezuela
Frank Potter, Counsel, Energy and Power Committee, U.S. House of
Representatives
John Renner, Staff Member, U.S. National Security Council
Charles W. Robinson, Vice Chairman, Blyth Eastman Dillon & Co.,
New York
Marshall Robinson, Vice President, Resources and the Environment,
The Ford Foundation
Milton Russell, National Energy Strategies Project, Resources for the
Future, Washington
Dankwart Rustow, Professor of Political Science, City University of
New York
Masao Sakisaka, President, National Institute for Research Advance-
ment, Japan
Hans K. Schneider, Director, Energiewirtschaftliches Institut, University
of Cologne
Samuel Schwartz, Senior Vice President, Corporate Planning, Continental
Oil Company
Dudley Seers, Professor, Institute for Development Studies, University
of Sussex
Daniel Serwer, Attaché for Scientific and Technological Affairs, U.S.
Embassy, Rome
Ian Skeet, Shell Ltd., London
Ian Smart, Director of Studies, Royal Institute of International Affairs,
London
Ronald Smith, Industrial Nations Affairs, U.S. Central Intelligence
Agency
Dillard P. Spriggs, Senior Vice President, Dean Witter Reynolds, Inc.,
New York
Immo Stabreit, Head, Division of Relations with Producer and Con-
sumer Countries, International Energy Agency, OECD
G. V. Subba-Rao, Officer in Charge, Policies and Projections Branch,
Center for Natural Resources, Energy and Transport, United
Nations
John Surrey, Science Policy Research Unit, University of Sussex
Giancarlo Tenaglia, Italian Nuclear Energy Commissariat
Nobuhiko Ushiba, Japanese Minister for External Economic Affairs
Mason Willrich, Director of International Affairs, The Rockefeller
Foundation
Carroll Wilson, Mitsui Professor in Problems of Contemporary Tech-
nology, Massachusetts Institute of Technology
Joseph A. Yager, Senior Fellow, The Brookings Institution
Tadashi Yamamoto, Japanese Secretary, The Trilateral Commission
Susumu Yoda, Deputy Manager, General Planning, Tokyo Electric
Power Company
Ahmad Zia Mian, Energy Consultant, Ministry of Mining and Natural
Resources, Jamaica
SCHEDULE OF TASK FORCE ACTIVITIES:

June 18, 1977 — Sawhill, Maull, and Tugwell meet in New York City for discussion of task force concerns. Sawhill has prepared preliminary draft for discussion.

Early August — Revised draft completed.
August 4 — Oshima meets with Japanese experts in Tokyo.
September 5 — Sawhill and Oshima meet in Tokyo.
Mid-September — Revised draft completed.
October 22 — Sawhill, Maull, and Tugwell meet with trilateral group of experts in Bonn.
October 23-25 — Sawhill, Maull and Tugwell meet with consultants in course of Trilateral Commission plenary meeting in Bonn.
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November 28 — Oshima meets with Japanese experts in Tokyo.
December 9 — Sawhill and Tugwell meet with North American experts in Washington, D.C.
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Mid-January — Revised draft completed.
January 27 — Sawhill, Oshima, and Maull meet with Japanese experts in Tokyo and hold seminar with business group.
Early February — Revised draft completed.
Late February — Revised draft completed.
March 2 — Sawhill, Oshima, and Tugwell meet with North American experts in New York City.
March 3 — Sawhill, Oshima, and Tugwell meet with North American experts in Washington, D.C.
Mid-March — Revised draft completed.
March 16 — Maull meets with French consultants in Paris.
March 17-18 — Maull meets with Italian experts in Rome.
Late March — Revised draft completed.
March 30-April 1 — Sawhill, Oshima, Maull, and Tugwell meet with global group of consultants in London.
April 18 — Oshima meets with Japanese experts in Tokyo.
Mid-May — Revised draft completed and circulated to Commission members.
June 13 — Draft report discussed at Trilateral Commission plenary meeting in Washington, D.C.
Early July — Final draft completed for publication.
SUMMARY OF THE REPORT

Energy: Managing the Transition

Introduction
In the period since the 1973 "oil shock," the governments of the industrial democracies have made some progress in adjusting their economies to higher oil prices and in developing alternative sources of energy, but serious energy and energy-related problems remain unresolved. Governments, by and large, have not shown that they understand the magnitude of the problems they face, nor have they defined, with any degree of clarity, how they intend to deal with them. As a result, there is still a great deal of confusion about the nature of the energy problem and its implications for world political and economic order.

This report attempts to clarify the complex range of issues surrounding energy by dividing the future into three time periods — short term (zero to five years), medium term (five to ten years), and longer term (beyond ten years) — and identifying the risks and problems associated with each period. In the short term — and continuing into the medium and longer terms — the most serious risk is the possibility of the sudden curtailment or disruption of world oil supplies. In the medium term, there is, in addition, the possibility of a financial crisis associated with mounting external debts of some of the more vulnerable less developed countries (LDCs) and the weaker semi-industrialized countries. These debts could become a problem in the event that a further slowdown in world economic growth were to occur which persisted for a prolonged period of time. The danger of a breakdown in the world's financial system would be substantially reduced (and perhaps eliminated) if changes are made in the structure of international financial institutions to permit additional credit accommodations to weaker economies and the further rescheduling of existing debts.

In the longer term, the major threat is that, as world oil production levels off or begins to decline, oil prices could increase precipitously, exacerbating any financial problems that might occur in the medium term — and bringing serious economic dislocations. It is this latter threat that we regard as the most serious and the one for which the Trilateral governments must fashion a coordinated energy strategy. In the absence of such a strategy, it will be more difficult to manage the transition to an era of gradually declining world oil and natural gas production — an era when it will be necessary to shift to a new generation of energy technologies.
Energy Forecast

The report provides a discussion of several recent world oil forecasts (Chapter II). After analyzing recent forecasts, we judge it unlikely that there will be any sharp and sudden upward movement in real prices of oil for at least the next ten to fifteen years — a judgment less alarmist than some others. There is a very wide band of uncertainty involved in these judgments, however, and for this reason, it seems prudent to plan for a future of gradually rising real oil prices (at an annual rate of perhaps 2 to 5 percent) beginning in the early or mid-1980s, and to develop contingency plans flexible enough to deal with the possibility of sharper price changes which could occur in the event of an unexpected supply curtailment or if production limits are imposed by Saudi Arabia or other key producers.

Without effective advance cooperation among the Trilateral countries, sharp energy price increases, beyond their dislocating economic effects, could place heavy strains on the ties that bind these countries together. Furthermore, the LDCs, less institutionalized and therefore more susceptible to economic reversals, would probably suffer even greater instability under a pessimistic energy price scenario. And, even the energy suppliers (principally OPEC), dependent as they are on their ties with the industrialized world for the achievement of many of their economic, political, and strategic objectives, would not be immune from the shock of world political and economic instability.

Trilateral Responses

The report analyzes the energy policy responses of the United States, European, Japanese, and Canadian governments in the 1973 to 1977 period and identifies areas where more vigorous action is called for. The United States performance is particularly significant since it is the largest importer of oil in the industrialized world and accounts for half of all energy consumed by the International Energy Agency (IEA) members. The report concludes that the U.S. has not lived up to the leadership role expected of it, but that the Carter Administration initiatives provide some basis for hope that United States performance with respect to central Trilateral goals may improve significantly in the near future. The importance of such a change cannot be overemphasized. Reductions of projected 1985 United States import demand by 3 or 4 million barrels per day could contribute significantly to delaying any large energy price increases and help restore confidence in the dollar.

European governments have also experienced difficulty in developing broad-based energy programs. The European Community, due mainly to slower economic growth, is likely to stabilize import dependence until 1985 at 1973 levels, which would mean some reduction
in proportionate dependence on imports. Differences among European countries — particularly between the energy-rich and energy-poor — have, however, prevented the formulation of a common European energy policy and harmonization of national policies. Furthermore, individual country actions have been less than might have been hoped for given the vulnerability of Europe.

The impact of the "oil shock" on the Japanese economy was severe. In the course of two revisions of its long-term energy program, the government has substantially reduced 1985 primary energy supply targets. The new goals, while consistent with a 6 percent annual GNP growth, will only be achieved with great difficulty and will require major new government initiatives. One of the critical questions confronting Japanese energy policy is the role of nuclear power — a subject on which there is disagreement within Japan and between Japan and the United States. It is important to maintain a vigorous U.S.-Japanese dialogue on the nuclear question and to resolve the issues dividing the two nations.

Canada has had some success in developing a comprehensive energy policy. The 1973 embargo brought into focus for Canadians the value of domestic energy resources and the national goal is now to become "energy self-reliant" by holding imports in 1985 to 800 thousand barrels per day. Despite some initial difficulty, particularly federal-provincial differences, the Canadian government has been able to develop some programs to encourage domestic supply expansion which can serve as models for other Trilateral governments, although reliance on market mechanisms still remains less than might be desirable.

The report also assesses multilateral responses to the oil crisis including the institutional arrangements that were established to deal with (1) supply security, (2) the financial burden of higher oil prices, (3) dialogue with the OPEC countries and nonoil-exporting LDCs, and (4) nuclear weapons proliferation. The most important initiative to deal with supply security has been the IEA's emergency allocation program, which provides a potentially helpful insurance mechanism for use in relatively short-term oil supply interruptions — but is not a means of managing a chronic shortage. To deal with the financial burden of higher oil prices, the IMF and the World Bank have taken some useful initiatives; nevertheless, doubts remain regarding the future capacity of the international financial system to cope with the strains associated with the financing of balance of payments deficits. In the North-South dialogue, the Conference on International Economic Cooperation (CIEC) helped nurture more common general energy views, though little formal success was achieved in dealing with pressing issues. Finally, two major international efforts have been launched in the nuclear energy area to reduce the risks of nuclear weapons proliferation — the Nuclear Sup-
pliers Club and the International Nuclear Fuel Cycle Evaluation — but much work remains to be done (including strengthening the existing safeguards system) before these efforts are successful.

Recommendations

The report recommends a coordinated Trilateral approach to energy problems as well as vigorous action on the part of individual governments. The recommendations are directed to the three major energy problems identified in the report — supply security, potential financial crisis, and the orderly management of the transition to a new generation of energy technology. For a coordinated approach to these problems to be successful requires, in addition to stronger commitment to cooperation and advance planning, two general preconditions:

- the creation of a process for the more careful monitoring of international energy as a total system; and
- a heightened public awareness and understanding of energy problems in the Trilateral nations, especially the United States.

Solving the immediate problem of ensuring supply security requires that:

- emergency stockpiles in the more vulnerable Trilateral countries, such as Japan, be increased;
- efforts be continued to resolve the Arab-Israeli conflict to bring stability to the Middle East; and
- the United States maintain its "special relationship" with Saudi Arabia — the world's pivotal oil producer — and with Iran, although the United States must remain in close consultation with other Trilateral governments regarding this relationship.

Providing a solution to the medium-term problem of a potential financial crisis requires that:

- the International Monetary Fund be strengthened and broadened in its role as the focal point for short-term balance-of-payments financing, including a further increase in IMF quotas, and ratification and expansion of the IMF "Witteveen Facility";
- long-term development financing to LDCs be substantially increased, and efforts made to create additional mechanisms for channeling OPEC funds into this type of financing;
- the mix of assistance to LDCs flowing through international institutions be increased and a multilateral co-financing guarantee facility be established as well as arrangements for joint IMF-private financing programs; and
- a combination of steps be taken by the major trading nations to
create more orderly conditions in international financial markets, including early efforts by the United States to reduce oil imports, thereby curtailing its balance-of-payments deficit and helping to strengthen the dollar.

The long-term problem of insuring an orderly transition to higher-cost energy requires a number of actions — many of which must be taken by individual governments:

- **Energy prices.** Each Trilateral government, at a minimum, should take steps to move its domestic energy prices as rapidly as possible to world market levels. Yet, even these levels may provide inadequate incentive for development of substitutable alternatives to oil or for reduction of growth in energy demand as rapidly as would be desirable; consequently, Trilateral governments might consider (1) mechanisms such as excise taxes for raising prices above world levels, and (2) special incentives to industry to encourage the development of alternative sources of supply.

- **Import reduction.** The IEA group import target of no more than 26 million barrels per day by 1985, though useful, provides little concrete basis for assessing national performance. Trilateral countries should agree on a series of specific individual country goals for energy consumption, efficiency of use, increase of supplies and reduction of import dependence, and individual governments should initiate energy policies to ensure that these demand reductions and supply increase goals are met. United States progress in initiating such policies and meeting its goals will be critical.

- **Development of new LDC energy resources.** The Trilateral governments should provide mechanisms to help LDCs develop indigenous energy resources, particularly when political risks discourage involvement of international energy companies. Such development will ease demand for OPEC oil, stimulate internal economic growth and strengthen the LDC financial position.

- **Cooperation with OPEC.** The Trilateral governments should remove artificial barriers to long-term investment of OPEC funds and ensure access of OPEC exports to world markets, thereby encouraging continued expansion of OPEC oil production, especially by the “low-absorbers” with little domestic need for additional revenue. They should also explore possibilities of cooperation with OPEC wherever possible, particularly with regard to joint efforts to assist the LDCs.

- **Joint nuclear policies.** Trilateral governments should develop a joint policy on nuclear energy and nuclear weapons proliferation as rapidly as possible. The INFCE — which is dealing with a complex
range of technical issues — should be supplemented with complementary exploration of political and institutional arrangements to slow nuclear weapons proliferation. High priority should be given to establishment of an international “fuel bank” and a system for the international registry of uranium contracts, to assure the availability of uranium to importing nations. High priority should also be given to an international agreement for dealing with nuclear waste and spent fuel. Lower priority should be assigned to regional reprocessing and enrichment centers.

Member countries should move quickly to strengthen nuclear suppliers’ guidelines to include “full-scope safeguards,” i.e., agreements to have all nuclear facilities under International Atomic Energy Agency (IAEA) safeguards. And, Trilateral governments should take a strong stand in support of the IAEA inspection system that is responsible for guarding against unlawful diversion of peaceful nuclear material.

- *Research and development.* To prepare for the eventual decline of world oil supplies, each Trilateral government should consider targets for research and development funding to develop new, reliable, environmentally sound sources of energy. Such targets might be based on a combination of factors, such as GNP growth, import dependency, domestic production and energy resource base. Furthermore, bilateral and multilateral research and development initiatives should be encouraged, particularly the proposed Japan-United States program for the development of longer range energy technology including nuclear fusion, solar, and advanced deep sea drilling technology.

Finally, the authors recommend that a future summit meeting be convened with the principal focus on energy issues in order to emphasize the seriousness of the energy supply-demand problem and inaugurate, where appropriate, new agreements or institutions. A formal summit seems the best way to lift the curtain of public indifference that regularly obscures even the most important events in the area of international energy. At such a meeting, it would be important for leaders in the Trilateral countries to underscore the point that economic stagnation is a poor solution to the energy problem. Economic growth is not only compatible with managing an orderly transition to new energy sources; it is essential. Unless the economies in the industrialized countries are growing, they will not generate the investment capital needed to develop new sources of energy or to replace obsolete, energy-inefficient industrial plants and equipment.
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I. INTRODUCTION

An earlier Trilateral Commission task force produced two energy reports in the wake of the 1973 Arab oil embargo.¹ Both reports concluded that the Trilateral countries face a situation akin to wartime emergency and called for immediate actions on the part of individual Trilateral governments to expand energy supplies and improve the efficiency of energy usage.² The second report contained further recommendations on the need to agree upon a general strategy and plan covering the next twenty years and to create international mechanisms to deal with energy issues that affect all Trilateral members. The central theme was that domestic and international energy issues were inextricably linked together and must be dealt with from a Trilateral as well as a national perspective.

Taken together, these reports posed some rather blunt questions to the world community struggling to find answers to the energy crisis in the immediate aftermath of a fourfold increase in the price of oil.

- “Do governments have the political will to face the truth and to act and, if so, will their peoples give them the power to act?”
- “Will governments have the strength to avoid unilateral and nationalistic action and to work together for common interests?”³

The answers to these questions, it was argued, would be a test of “both democratic institutions and international solidarity.”

In the period since these reports were issued, some progress has been made in a piecemeal fashion. Oil and gas production has been expanded in the North Sea and promises to add 3 million barrels of oil per day to OECD Europe production by 1980. Alaskan North Slope production will add about 1.2 million barrels per day to U.S. production by 1979 and begin to build up to that level in 1978.⁴ U.S. coal production has been expanded marginally and plans are under way to step up the pace of that expansion. European and Japanese nuclear programs are proceeding — albeit more slowly than previously forecast — and some countries have begun serious efforts to implement

² The second Trilateral Commission report called for holding the annual rate of increase in energy consumption over the 1975-1985 decade to below 2 percent in North America, 3 percent in Western Europe, and 4 percent in Japan.
⁴ By 1981, Alaskan crude production is expected to reach 1.6 million barrels per day.
energy conservation programs. Moreover, the International Energy Agency (IEA) is now in place; an Agreement on an International Energy Program (IEP) has been signed by nineteen OECD countries; the Nuclear Suppliers Group has made some encouraging progress in dealing with nuclear proliferation; and forty nations are now cooperating on an International Nuclear Fuel Cycle Evaluation.

Yet, in spite of these positive signs, serious energy and energy-related problems remain unresolved. Governments, by and large, have not shown that they understand the magnitude of the problems they face, nor have they defined, with any degree of clarity, how they intend to deal with them. The call for the development of a common energy strategy and Trilateral oil production and import goals has gone largely unheeded. Insufficient efforts have been made to achieve the Trilateral energy conservation goals; only limited progress has been made in developing the institutional mechanisms that could ease the financial strains caused by higher oil prices; and the current disagreement over nuclear policy among the Trilateral governments threatens to retard progress in this area. At the same time, North-South relations continue to be strained, as was evident when negotiations at the CIEC (Conference on International Economic Cooperation) ended in mid-1977 and failed to meet the expectations of the participants. And in spite of the Sadat initiative, the Arab-Israeli conflict remains unresolved and could escalate.

As we review the global energy situation today — five years after the 1973 “oil shock” — there is still a great deal of confusion and debate about the nature of the energy problem and its implications for world political and economic order. In part at least, this failure to define the problem and clarify the issues has made it difficult for the Trilateral governments to develop a coordinated energy strategy.

We have found it helpful in sorting out the complex range of issues surrounding energy to present these in three future time periods — the short term (zero to five years), the medium term (five to ten years), and the long term (ten years and beyond) — and to identify the most serious energy-related threats to world economic and political stability that might occur in each time period. In structuring the future in this way, we recognize that we are oversimplifying and that the threats we associate with one time period might very well be present in another. The boundaries between these time periods are to be regarded only as rough approximations. Nevertheless, to the extent that this framework can eliminate some of the confusion which has characterized the post-embargo discussion of energy, we feel justified in using it as a mechanism through which to present our findings.
In the short term — and continuing into the medium and longer terms — a serious energy-related risk is the possibility of the sudden curtailment or disruption of world oil supplies because of a civil war, terrorism, or renewed fighting in the Middle East. Such an occurrence, coming at a time when the United States, Japan, and several of the major European countries are heavily dependent on oil imports, could — depending on its extent and duration — have serious consequences for world peace and economic stability. The steps which have been taken to offset supply interruptions are discussed in Chapter III of this report.

In the medium term, the supply security problems will persist, and there is, in addition, the possibility of a financial crisis caused by a slowdown in world economic growth (or recession) leading to an inability (or unwillingness) of existing financial institutions to recycle sufficient surplus OPEC funds to those nations with weak economies and large and rising external debts. Even if real oil prices remain at current levels (or possibly decline marginally), some economists feel that, in the event of a prolonged recession, the debt burdens of several LDCs and semi-industrial countries could increase to a point where they would be unable to meet current repayment schedules. This situation, in turn, might seriously strain the world's financial system unless institutional changes are made in the interim to permit further credit accommodations or the rescheduling of existing debts.

Should a serious financial problem develop, it would probably surface first in some of the nonoil-producing LDCs with very low per capita incomes and limited natural resources and in several of the Mediterranean countries (such as Spain, Portugal, Italy, Greece, and Turkey) that are experiencing difficulty in reducing the size of their current account deficits. The concern about the possibility of a financial crisis is not confined solely to the LDCs and the semi-industrial countries. There is also mounting concern about the U.S.'s large current-account deficits and relatively rapid inflation, and about the destabilizing effect that the resultant loss of confidence in the dollar has had on foreign exchange markets. This concern has been aggravated by the U.S. government's projections of rising levels of U.S. imports throughout the 1980s. The nature of the financial problem is assessed more fully in Chapter II of this report, and some of the steps that might be taken to avoid it are outlined in Chapter IV.

In the longer term, the major threat is that, as world oil production levels off or begins to decline, oil prices might increase precipitously, exacerbating any financial problems that might occur in the medium term. This price increase — if it occurs in too short a time frame — could cause serious economic dislocations. In considering the economic
impact of energy price changes, it is important to differentiate between price increases and "large and sudden" increases. The danger in the longer term is not that of a price increase \textit{per se} but that a large increase could occur in such a short time period that the world's economies would be unable to adjust, and recession or even depression would ensue.

It is this latter threat that we regard as the most serious and the one for which the Trilateral governments must fashion a coordinated energy strategy. In the absence of such a strategy, it will be more difficult to manage the transition to an era of gradually declining world oil and natural gas reserves and production — an era when it will be necessary, therefore, to shift to a new generation of energy technologies. We discuss this longer term threat more fully in Chapter II of this report, which reviews several future energy supply and demand projections and their implications.

A key conclusion with respect to this longer term threat is that there is a high degree of uncertainty associated with when (or if) it will occur and the form it might take. Trilateral energy policies must, as a consequence, remain highly flexible and adaptive to changing energy supply and demand conditions. A second conclusion is that vital decisions affecting energy must be taken — by Saudi Arabia, by the United States, and by the Trilateral countries as a group — in the short and medium term in order to avoid the economic and political problems that might occur in the longer term. In Chapter III, we review the response to date of Trilateral governments and international institutions to the energy situation; and in Chapter IV, we present our recommendations for dealing with the energy issues associated with each of the three future time periods described here.
II. DEFINING THE TRANSITION PROBLEM

A. RECENT FORECASTS OF WORLD OIL SUPPLIES AND DEMAND

In 1977, a number of studies were published that reemphasize the seriousness of the energy situation by presenting a series of world oil supply-and-demand forecasts based on alternative assumptions about economic growth, producer-nation pricing and production decisions, and consumer-government actions in conservation and restructuring national energy production and distribution systems. While these studies differ in many respects, they coincide enough in their central conclusions to draw from them a common picture of the challenges facing the Trilateral countries in the period to 1985 and beyond.

The most widely known of these studies, prepared by the Secretariat of the OECD, develops several scenarios out to 1985, one of which is a "reference case" that assumes growth in OECD countries of 4.3 percent (to 1980) and 4.1 percent (to 1985) and forecasts net OECD imports at about 35 million barrels per day by 1985. This scenario also assumes the successful implementation of 1976 energy policies, which, according to the authors, "implies strenuous effort, in the form of considerable capital mobilization and reduced energy consumption. The lesson of the past three years is that this is an achievement that cannot be taken for granted." In view of recent performance and the current outlook for economic growth in most of the OECD countries, a more plausible scenario is the OECD "slow-growth case," which assumes GNP increases of 3.8 percent (to 1980) and 3.6 percent (to 1985), plus successful implementation of existing energy policies. This scenario would lead to OECD import needs of 31.9 million barrels per day by 1985 which could be met without a major expansion in

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6 In the last decade, the twenty-four OECD countries averaged growth of about 4.8 percent annually. Since 1973, however, the average has fallen to 2 percent and the projected rate for 1978 is 2.5 percent.
OPEC production.⁷

With respect to oil supply, the OECD study suggests that by 1985 OPEC members may have expanded their rated production capacity to as much as 45 million barrels per day from present production capacity of about 39.2 million barrels per day, "but then as now the margin between the rated capacity and the exporter's desired level of output may be quite large. This margin could produce a close and uncertain balance between crude liftings and the demand for exports."⁸

A second study — less comprehensive and detailed than the OECD report — was published by the U.S. Central Intelligence Agency and formed the basis for the U.S. National Energy Plan. The CIA's forecast of required 1985 OPEC production of between 47 and 51 million barrels per day is decidedly more pessimistic than the OECD reference case of 39 million barrels per day of required OPEC production in 1985 or the more realistic 36 million barrels per day required in the OECD slow-growth case. A principal discrepancy between these two forecasts is the CIA's estimate that the Soviet Union and Eastern Europe as a region will shift from its current status of a net exporter of nearly 1 million barrels per day to that of a net importer of 3.5 to 4.5 million barrels per day by 1985.⁹ It is our judgment that this part of the CIA

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⁷ The 31.9 million barrel per day OECD net import figure for 1985 would require OPEC production of approximately 36 million barrels per day. The 4 million barrels per day difference between OECD net imports and required OPEC production represents internal OPEC usage and exports to non-OPEC members. Since 1978 OPEC production is estimated at approximately 32 million barrels per day; it is probably true that 1985 OECD import needs in the "slow-growth" scenario could be met without straining OPEC's production capacity. Both of the OECD scenarios referred to in the text assume that oil prices remain constant in real terms at 1976 levels and use economic growth estimates that were revised downward following the first OECD energy forecast in 1975. The growth projected in energy consumption was also revised downward so that future growth is now assumed to be less rapid than in the past.

⁸ OPEC production capacity is defined as the maximum sustainable production for 90 days without regard to government restriction. Probable oil production, which takes into account officially imposed ceilings on crude production in Saudi Arabia (8.5 million barrels per day), Kuwait (2 million barrels per day), Abu Dhabi (1.35 million barrels per day), and Venezuela (2.3 million barrels per day), is estimated to be approximately 32.7 million barrels per day or only 1.3 million barrels per day more than required OPEC production in 1978. The IEA's Standing Group on Long-Term Cooperation (SLT) in its 1977 Review of National Energy Programmes estimates 1985 OPEC production at 36 to 38 million barrels per day versus requirements (IEA and non-IEA demand) of 42 to 48 million barrels per day and concluded that "there is a strong probability of a significant imbalance between the potential demand for oil in 1985 and the level of supply likely to be available from OPEC." This situation "would imply strong upward pressure on prices."

forecast may well prove mistaken, since it would mean a swing of approximately $20 to $30 billion per year in the Soviet balance of payments (at current prices), and a change of this magnitude is likely to be more than that government would find tolerable.\(^{10}\)

The report of the Workshop on Alternative Energy Strategies (WAES) tends to support the conclusions of the OECD forecast.\(^{11}\) This report is more comprehensive than the others and focuses more on the 1985-2000 period. It concludes that the supply of oil may fail to meet increasing demand well before the year 2000, most probably between 1985 and 1995, even if energy prices rise 50 percent above current levels in real terms.\(^{12}\) Additional constraints on oil production, such as environmental restrictions in the United States and the reluctance of the Saudis and certain other exporting nations to expand capacity, could hasten this shortage and thereby reduce the time available for action on alternatives. Slower than anticipated energy-demand growth could delay the shortage — not prevent it.

The WAES report emphasizes the large uncertainties associated with projecting future oil supplies and calls on governments to act in order to avoid the consequences associated with the most pessimistic scenarios. In a manner reminiscent of the earlier Trilateral Commission studies, the authors cite "the critical interdependence of nations in the energy field" as requiring "an unprecedented degree of international collaboration in the future" as well as "the will to mobilize finance, labor, research, and ingenuity with a common purpose never before attained in time of peace." The authors point out that "failure to recognize the importance and validity of these findings and to take appropriate and timely action" could create major political and social difficulties that could cause energy to become a focus for "confrontation and conflict."

Several forecasts made since the WAES, OECD, and CIA studies have painted a more optimistic picture of the future world oil supply-and-demand situation than the three forecasts discussed thus far. The principal differences are (1) somewhat larger estimates of non-OPEC oil production based on the experience of the past year, (2) somewhat lower estimates of growth rates in energy demand based on a less optimistic view of world economic growth and a more optimistic view of the responsiveness of energy consumption to higher prices, and (3) a

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\(^{10}\) In Chapter IV, we discuss the extent to which Trilateral governments should provide capital and technical assistance to the Soviets in an effort to restrict their need for oil imports.


\(^{12}\) The specific year in which shortages occur depends on assumptions about economic growth, energy prices, the success of government policies in pursuing alternative strategies, OPEC production limits, etc.
more favorable outlook for natural gas production. The estimates of future nuclear energy capacity, however, continue to fall, partially offsetting the more optimistic outlook for oil and gas supplies. The view of these more recent forecasts is that a severe oil shortage, accompanied by sharp price increases such as those depicted in certain of the WAES scenarios and in the CIA report, is less likely to occur than a prolonged period during which the transition from oil to nonoil sources will occur gradually and be accompanied by moderate real price increases.\(^\text{13}\) These newer studies tend, therefore, to be consistent with the WAES and OECD slow-growth scenarios.

All of the forecasts point to the large and growing role that the United States will play as a major consumer (and importer) of petroleum supplies, and all of them stress the importance of Saudi Arabia's willingness (and ability) to continue to expand production above the 8.5 million barrels per day it has — at least temporarily — set as a limit. The CIA forecast probably presents the most conservative view of the amount of Saudi production required to meet world demand in 1985, assuming no oil price increases other than those necessary to keep pace with inflation. Under this forecast (which we regard as overly pessimistic) 1985 Saudi production would have to rise to 17 to 24 million barrels per day, which is more than double current production rates, and would, if produced, push Saudi annual revenues (at current prices) to nearly $100 billion — or about four times the value of Saudi Arabia's current imports of goods and services. The more recent forecasts of several of the major oil companies and the Petroleum Industry Research Foundation suggest that Saudi production might have to rise to 11 to 13 million barrels per day in 1985 and perhaps 15 million barrels per day in 1990 to meet projected growth in world oil demand, assuming constant real world oil prices.

Within the Saudi government there is opposition to raising production further because of the lack of domestic need for expanded current revenues. There is a feeling that domestic expenditures have increased too quickly, engendering waste and fueling strong inflationary pressures in that country. The Saudis at some point in the future may also be reluctant to expand production beyond certain levels (e. g., 14 million

\(^{13}\)This view is contained in the forecasts of several of the major oil companies (i.e., Mobil, Exxon, and Shell) as well as a recent study prepared by the Petroleum Industry Research Foundation for the Electric Power Research Institute (EPRI). The Conservation Commission of the World Energy Conference (London) has also prepared a forecast study. The preliminary report, entitled "World Energy Demand, 1985-2020," is more compatible with the WAES and OECD studies: "World demand for oil will increase until the period 1985 to 1995 when consumption will become constrained within the limits set by potential oil supply" (p. 1).
barrels per day) because doing so reduces their ability to capture the associated natural gas which must, therefore, continue to be flared — a waste in the interest of neither Saudi Arabia nor the world.\textsuperscript{14}

There is a recognition on the part of many Saudi leaders, however, that they are ultimately dependent on the West to provide an economic climate in which their surplus funds can be invested safely and a political climate in which progress toward a Middle East settlement can be achieved and a broader international balance preserved. For this reason, the Saudis have generally acted as a moderating force in OPEC price negotiations. Their attempt in early 1977 to hold the 1977 crude oil price increase to 5 percent and their leadership in establishing an apparent 1978 oil price freeze are only the latest in a series of similar moves since 1973. Yet it is difficult to envision a policy of continued unrestrained increases in Saudi production without definite indications on the part of Trilateral governments that this claim on Saudi resources will be limited in time and will be securely compensated. In the short run, obviously, progress in resolving the Arab-Israeli conflict and in stabilizing the value of the dollar will affect Riyadh’s commitment to current and future high levels of production. Lack of progress in these areas will make it more difficult to justify production increases that are not consistent with Saudi economic interests.

A consideration emphasized heavily in all the major energy projections that have been made since 1973 is the very long lead times required to expand energy supplies. The record of the past half-century demonstrates, for example, that it is becoming increasingly difficult and expensive to find and produce oil and gas. More than thirty-five years elapsed between the discoveries of the East Texas field and the next major find in the United States, Prudhoe Bay on the North Slope of Alaska. And the lead times in bringing new production onto line are lengthening. Prudhoe Bay was discovered in 1968 and output did not start until 1977. In a more accessible place like the Gulf of Mexico, it will be at least five years from discovery of the most recent major find — Shell’s Cognac Field — to the start of production in 1980.\textsuperscript{15}

These lead times are not confined to North America. The North Sea and some Middle Eastern fields have experienced similar five- to ten-year lead times and the frontier areas even longer. Nor are long lead

\textsuperscript{14} A recent study by the U.S. General Accounting Office (GAO), which analyzed the associated gas problems and other technical difficulties involved in the Saudi fields, concluded that the Saudis might be reluctant to expand production beyond 14 million barrels per day, but this conclusion has been disputed by others.

\textsuperscript{15} One reason why the Cognac field took so long to develop is its extraordinary water depth, almost 900 feet. Increasingly, however, as the shallower, more accessible locations become fully explored, the major offshore fields are likely to be found in more difficult locations.
times confined to oil and gas. Coal mines take four to twelve years to bring into production; nuclear power takes six to ten years in Europe and Japan and ten to twelve years in the United States. Thus an electric utility that wants to have a major new nuclear plant on line and smoothly operating in 1990 must make the decision to proceed with the project now. Long lead times are also necessary to implement major energy conservation efforts, such as replacing energy-inefficient capital equipment in industry and agriculture, improving the gasoline mileage of a nation's automobile fleet, and reinsulating existing commercial and residential buildings. It is true that lead times can be shortened (or lengthened) by government action. Yet for most of the energy industry, characterized as it is by large, capital-intensive investment projects and the necessity for difficult environmental trade-offs, the existence of long lead times will remain a dominant consideration.

The implications of these lead times are clear: Actions to avoid (or offset the impact of) sharp energy price increases must be taken well in advance of the time that a shortage actually appears. By then, it is too late to close the supply-and-demand gap, and there is no alternative but to accept the economic and political consequences of price increases. These long lead times, therefore, underscore the need for Trilateral governments to take action now to ensure an orderly transition to a world where oil production may level off or actually begin to decline and must be replaced by other energy sources.

In considering a range of future possibilities, it is always important to anticipate "surprises" that might significantly alter the projected outcome. Are there any circumstances that would invalidate or force a change in the image of a longer-range future of gradually depleting oil supplies and rising real prices? Five of these seem pertinent here:

- an extended worldwide recession;
- a series of major new discoveries of regular oil fields in the range of 10 billion barrels or over (recoverable);
- a technological breakthrough that would make it possible within a short time to significantly expand supplies from known hydrocarbon deposits, e.g., enhanced recovery, shale oil, or tar sands extraction;
- rapid and unanticipated success of ongoing conservation programs throughout the world and particularly in the United States; and
- the possibility that current demand forecasts seriously overstate (or understate) future demand growth.

While the first of these — an extended recession — is obviously undesirable, this condition might be precipitated by a new embargo, an oil squeeze associated with another Arab-Israeli war, another sharp and
sudden oil price increase, or events entirely unrelated to changes in energy market conditions. Such a disruption would be especially unfortunate because, as we point out later, a healthy world economy is not only consistent with an orderly management of the energy transition but a necessary precondition.

The second surprise seems unlikely. Only nineteen such fields have been discovered in the last hundred years. Currently, about 60 percent of the world's oil reserves outside the Communist countries is concentrated in the Middle East, and most of the remaining regions that might yield such resources have been evaluated by sophisticated seismic techniques or exploratory wells, with no evidence of another "Middle East" being found. The total amount of hydrocarbon deposits in the world, it is true, remains uncertain; and the opinions of qualified experts vary on the subject. What is important for the present assessment, however, is that reserves of recoverable petroleum, in quantities sufficient to prevent a tightening of the world oil market over the longer term, are indicated neither by available geological knowledge nor by past patterns of additions to reserves.\footnote{Op. cit., \textit{Energy: Global Prospects 1985-2000}, Chapter 3.}

Technological breakthroughs — the third possible surprise — seem more likely than major oil discoveries, but it is unlikely that they would be in time to alter world output levels significantly by the mid or even late 1980s.\footnote{A recent study by the U.S. Office of Technology Assessment concluded that at current world oil prices ($14.30 per barrel in 1977 dollars) enhanced recovery techniques could add 0.5 to 1.0 million barrels per day to U.S. production in 1985 and 0.7 to 1.7 million barrels per day in 1990. At a real price of $22 per barrel, the daily production estimates increase slightly to 0.9 to 1.3 million barrels per day in 1985 and 1.8 to 2.8 million barrels per day in 1990. According to this study, an increase in the real price to $30 per barrel only has the potential for increasing production by about 17 percent. From these estimates, it does not appear that enhanced recovery will make a significant contribution to U.S. (or world) oil supplies in the short or medium term.} Increased supplies of natural gas at current or slightly higher oil-equivalent prices are a distinct possibility either as a result of the development of new technology or because higher energy prices will make deeper drilling economical. But, these reserves will take time to come on line and add sufficient gas production to negate the forecasts presented earlier.

With respect to the fourth of these surprises, unprecedented achievement in conservation, there appears to be little basis for optimism barring widespread action of the kind urged in this and previous Tri-lateral reports. Certainly, the record since 1973 — detailed in Chapter III of this report — does not provide much encouragement. In the United States, some progress has been made since 1973 in reducing the ratio
of energy growth to economic growth. And some of the other Trilateral governments have made progress in this regard as well, although more time will be needed to assess the full extent of the change. But none of the Trilateral countries has yet made the kind of commitment to energy conservation that could radically change the shape of future energy demand. Most of the reduction in energy demand growth which has occurred to date appears to be more of a response to a slowdown in the rate of economic growth and to externally imposed price changes than to specific conservation policies.

Finally, with respect to the possibility of forecasting error, it may well turn out that the current energy demand growth forecasts will prove to be either too high or too low and that energy demand will be either more or less responsive to higher prices over the next several years than has been experienced in the 1973-1977 period. But it would be surprising indeed if the forecasts turned out to be so wide of the mark as to negate the basic thrust of this analysis. If, as some economists believe, demand growth has been overestimated in the OECD, CIA and WAES studies, it will provide the world with more time to manage the transition — and thus ease the burden of doing so — but the basic task will remain.

It appears, therefore, on the basis of recent studies that world oil supplies will remain in rough balance at current or gradually rising real prices for at least the next five to ten years. But there is a risk that Saudi Arabia or another major producer(s) might curtail production sharply for political or other reasons, leading to a sharp upturn in prices. In the absence of such cutbacks, the most probable scenario is one in which North Slope oil adds 1.2 million barrels per day to U.S. production by 1978-1979; the North Sea adds 3 million barrels per day to Western Europe production by 1980; and Mexico supplies at least 2 million barrels per day to the international market by 1985 — and this non-OPEC production could continue to expand further throughout the 1980s. These additions should be adequate to meet oil demand growth of 2 to 3 percent a year and to offset declining production from older fields, with the net result that the need for additional OPEC production capacity for the next several years will remain relatively modest.18

18 The contributions of North Sea, North Slope, and Mexican oil were apparent in 1977 production figures. According to Platt's Oilgram, non-Communist production in 1977 increased 4.1 percent over 1976 with non-OPEC production gaining 8.2 percent and OPEC production up 2.2 percent. The biggest gains came in Europe where North Sea oil raised production by almost 60 percent from 0.85 to 1.4 million barrels per day and in Mexico where production increased from 0.8 to 0.98 million barrels per day. U.S. production rose slightly (1.4 percent) because of Alaskan oil.
Sometime in the early 1990s, however, virtually all the OPEC producers will likely be producing at, or near, their peak sustainable capacity or at officially imposed limits; non-OPEC production will begin to top out; and the world will have to look to the Saudis to provide any incremental supplies needed.\textsuperscript{19} The OPEC members which absorb internally most of their revenues (the so-called "high absorbers") are currently producing and will continue to produce at or near maximum capacity. They will, therefore, be likely to continue to press for limitations on production that would permit price increases, since higher prices will be their principal means of obtaining increased revenues. With OPEC oil priced well below the price of substitutable fuels such as shale oil or liquified coal, and with short-term conversion to such alternative fuels difficult on a large scale in any event, prices could rise rapidly and still be below the price of most of the readily available alternatives.\textsuperscript{20}

The critical variable affecting prices will be the Saudis' willingness to expand production, although several other countries — Abu Dhabi, Qatar, and Libya — may also be able to cutback production without damaging their internal economic development. If oil demand over the next fifteen years grows as slowly as some analysts now forecast (2.5 percent a year) and if new non-OPEC oil supply

\textsuperscript{19} The precise future date when OPEC members are likely to reach production limits is, of course, difficult to predict since it depends on a variety of political, economic, and physical factors, including the outlook for non-OPEC production. Under optimistic projections of increased Mexican, Sino-Soviet, Egyptian, Brazilian, Argentinian, etc., production, non-OPEC production could be as high as 35 million barrels per day in 1985; under more pessimistic projections, non-OPEC production could be as low as 25 million barrels per day or up only slightly from the 22.6 million barrels per day projected 1978 non-OPEC production. Where 1985 non-OPEC production actually falls within this range (25 to 35 million barrels per day) will determine OPEC production requirements. If non-OPEC supplies should turn out to be at the upper end of the range and if world oil consumption were to grow as slowly as 2.5\textsuperscript{\textdegree} percent per year in the 1978-1985 period, the required 1985 OPEC supplies would be only 25.5 million barrels per day or about 5 million barrels per day less than 1977 OPEC production. Furthermore, under this scenario, OPEC production would drop from 60 percent to 42 percent of world consumption in the 1977-1985 period. On the other hand, under the pessimistic non-OPEC production forecast, OPEC supplies would remain at about 60 percent of world consumption in 1985 and would have to increase to 35.5 million barrels per day even if world consumption grows at only 2.5 percent per year in the interim. This figure for OPEC production requirements compares with the OECD "slow growth" estimate of 36 million barrels per day of required OPEC production and the WAES estimates which range from 36 to 39 million barrels per day.

\textsuperscript{20} Recent estimates by the U.S. Department of Energy show that, for the United States, the 1985 cost of producing either synthetic crude or high-Btu gas derived from coal will be at least 50 percent higher than the price of oil at that time even if real oil prices rise by as much as 50 percent in the interim.
maintains a rate of expansion that is consistent with the recent rate of discoveries, it is unlikely that there would be any sharp and sudden upward movement in real prices for at least the next ten to fifteen years, although some real price increases are entirely possible even if demand growth remains relatively soft. On the other hand, if oil demand growth accelerates to 3 to 3.5 percent a year and non-OPEC supplies fail to meet current expectations, prices could rise rapidly through a combination of market forces and OPEC production ceilings.

To summarize, then, a review of the major studies reveals a wide band of uncertainty surrounding the forecasts of demand, non-OPEC supply, and probable OPEC production, making it difficult to predict future oil-price behavior with any degree of confidence. And, of course, the political situation in the Middle East is even more difficult to predict. It seems prudent, therefore, to plan for a future of gradually rising real oil prices (at an annual rate of perhaps 2 to 5 percent) beginning in the early or mid-1980s and to develop contingency plans flexible enough to deal with the possibility of sharper and more rapid price changes which could occur in the event of an unexpected supply curtailment or if production limits are reached in the late 1980s or early 1990s.

B. ECONOMIC AND POLITICAL IMPLICATIONS OF OIL PRICE INCREASES

The implications of the world oil outlook differ somewhat for developed and developing countries. For the developed countries, primary energy is a sufficiently small cost item in their overall economic systems that, as long as supplies remain available, severalfold increases in unit energy costs occurring over a period of years can be accommodated without seriously aggravating problems of unemployment, income distribution, or growth.21 Gradually increasing prices in these countries will mean

21 See Chapter I of Nuclear Power — Issues and Choices, a report of the Nuclear Energy Policy Study Group (Cambridge, Mass.: Ballinger, 1977) for an in-depth discussion of the relationship of changes in energy market conditions and employment, economic growth, etc. One indication of the relatively minor importance of costs of imported energy in the developed economies is that the costs of net energy imports in 1976 ranged from 2 percent of GNP in the United States to 5 percent in Japan, with Germany and France at 3 percent, and the United Kingdom at 4 percent.

Professor Robert Pindyck estimates that, in the long run, a doubling of the cost of all energy would result in about a 3 percent increase in the cost of manufacturing output in the United States, a 5 percent increase in Canada, a 6.5 percent increase in Japan, and increases in the European countries ranging from 4.5 to 7 percent. See Robert S. Pindyck, “Interfuel Substitution and the Industrial Demands for Energy: An International Comparison,” MIT Energy Laboratory Working Paper No. 77-0926WP, August 1977.
slightly lower economic growth than might otherwise have been the case, but these changes can be absorbed without major political or social disruption. The consequences of a price change such as occurred in 1973-1974, on the other hand, would be more serious and would include, very probably, a significant reduction in economic growth (by as much as 3 to 5 percent), a sharp increase in the rate of inflation, a large international payments disequilibrium, and an acceleration of actual resource transfers to the oil exporters.\footnote{Although the full effects of the 1973-74 oil price increase on the GNP of the Trilateral countries are difficult to isolate, it has been estimated that the short-term (1974) GNP reductions in the United States, Europe, and Japan were on the order of 2.5 percent, 2.7 percent, and 4.2 percent, respectively. See Edward R. Fried and Charles L. Schultze, eds., Higher Oil Prices and the World Economy: The Adjustment Problem (Washington: Brookings Institution, 1975), p. 21.} It is true that the economies of these countries have demonstrated considerable resiliency in handling money and resource transfers forced by the increases of petroleum prices since the embargo; yet many experts feel the world economy has been rendered more fragile and is today less capable of absorbing the kind of economic shock that might be associated with a sharp price change. Indeed, some argue that the current inability of many OECD countries to meet forecasts for economic growth made in early 1977 can be traced to economic dislocations caused by higher energy prices. The possibility, therefore, of a sudden and sharp rise in price should be viewed with concern, and policies should be developed to ensure that any price increases that do occur, occur gradually.

For the LDCs, especially those heavily dependent on imported oil, large energy price increases (even if they occur gradually) may be more damaging to economic growth than is the case in the more highly industrialized countries, since LDC growth depends importantly on expansion of the industrial and transportation sectors that require large amounts of capital and — in most cases — large supplies of imported liquid fuels. As a result, higher energy costs have large and immediate effects on LDC national incomes, foreign exchange reserves, balance of payments positions, and future growth prospects.\footnote{One recent study has concluded that the direct cost to oil-poor LDCs of the oil price increase was about $10 billion in 1974, or about 2.5 percent of their combined GNP. The proportions were roughly similar in 1975 and 1976. See Harold van B. Cleveland and W. H. Bruce Brittain, “Are the LDCs in over their Heads?,” Foreign Affairs (July 1977), p. 740. To this direct impact should be added the lingering effect of recession in developed countries on demand for LDC exports (to the extent that it was oil-induced), plus the increases in the cost of manufactured imports as these were passed through by the developed country exporters.} The combined impact of the 1973 oil price increases and the slowdown in the world's economy had a measurable effect on the average economic growth rates.
of nonoil-exporting LDCs. By 1975, the favorable 6 percent growth rates experienced in the early 1970s had been almost halved, although much of this momentum was restored in the following year as the LDC economies adjusted to higher cost energy.24 Much of this adjustment in the LDC economies was made possible at the expense of internal consumption by decreased imports or increased exports. Adjustment was cushioned by increased reliance on external financing in the private capital markets of the developed countries and increased official aid flows were needed. The net transfer of financial resources to nonoil-exporting LDCs almost doubled between 1971-1973 and 1974-1976, and almost 40 percent of the net flow of financial resources to LDCs in the latter period represented increased credits from Western (mainly U.S.-based) commercial banks.25

Concern over the indebtedness of LDCs to commercial banks and the ability of borrowers to continue receiving and ultimately repay such lending was an inevitable result of these changes in international financial flows. As shown in Table 1, the current account deficit of the nonoil-producing LDCs declined from the $29.8 billion peak of 1975 to about $15 billion in 1977 and is expected to remain at approximately that level in 1978, and the ratio of external debt service to LDC gross domestic product (GDP) is also declining; however, many LDCs — as well as the "semi-industrial" countries, which also have historically large current account deficits — will be vulnerable to any sharp and prolonged slowdown in the world's economy that might occur in the near term, and would also have difficulty weathering a sharp oil price increase in the intermediate or longer term. Moreover, private financial institutions have more than tripled their holdings of LDC long-term debt since 1973. Given this rate of increase, it is probable that the private banking system would have difficulty handling all of the additional LDC and semi-industrial country borrowings that would be required in the event of a

24 LDC economic growth, which had averaged 7.1 percent per year between 1970 and 1973, fell to 4.2 percent in 1975 but bounced back to 6.2 percent in 1976.

25 The overall debt of nonoil-exporting LDCs almost doubled between 1973 and 1976 from $90 billion to $172 billion and the debt service burden increased from $12.9 billion to $25.6 billion (although, since the increase in debt was larger than required to finance their collective deficit, there was a considerable increase in LDC reserves in 1976). The situation is also quite difficult for some of the weaker OECD countries. Turkey, for example, has had to spend practically all of its export earnings since 1973 to pay for oil imports and in 1977 had to halt import payments temporarily since foreign exchange holdings were depleted. Furthermore, even some of the more developed countries had to turn to the credit markets for major loans to finance oil-induced deficits. For example, large international loans were arranged for Italy and the United Kingdom where external borrowings increased from approximately $20 billion in 1971-1973 to over $37 billion in 1974-1976.
<table>
<thead>
<tr>
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<td>Asia and Pacific</td>
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<td>-10.7</td>
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<td>5.0</td>
<td>3.8</td>
<td>1.5</td>
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</tr>
</tbody>
</table>

Figures after dash denote number of countries in group.
Details may not add to totals due to rounding.
1. Consists of OPEC plus Trinidad and Tobago.
2. Consists of the United States, Japan, Canada, the United Kingdom, West Germany, France, and Italy.
3. Consists of South Africa and the smaller OECD countries with the exception of Spain, Greece, Portugal, and Turkey.
4. Consists of Greece, Israel, Portugal, Spain, Turkey, Yugoslavia, and Malta.
5. Convertible currency trade of COMECON countries (excluding Cuba) and the People’s Republic of China.
6. Includes a statistical discrepancy arising from differences in countries’ timing, coverage, classification, and valuation of transactions and possibly from biases introduced in projecting the various regions’ current account balances.

Source: Citibank estimates (12 January 1978).
prolonged recession or a large and sudden energy price change, and support from governments and multilateral agencies such as the IMF would be necessary. In Chapter IV of this report, we recommend certain changes in the international financial institutions to put them in a better position to assist the private credit markets and to deal with any energy-induced financial crisis that might occur.

The political strains to be expected from rapid oil price increases are difficult to delineate. Yet it is probably true that, without effective advance cooperation among the Trilateral countries, sharp energy price increases occurring over a short period of time would place heavy strains on the alliances and informal ties that bind them together. As is pointed out in Chapter III of this report, disparities in resource endowment and economic strength already predispose these governments to fashion distinctive “national” solutions to problems of energy dependence and money and resource transfers. The IEA/IEP energy alliance system, which is designed to control the short-term effects of an embargo, can hardly be expected to contain the centrifugal forces generated by the kind of disruptions to energy markets caused by large and sudden price increases. One area where the adverse effects might be particularly severe is international trade. Here the economic disruption caused by large price changes might accelerate some of the current trends toward protectionism which could, in turn, have adverse consequences for economic growth. Furthermore, breakdowns in trade agreements might spill over into other areas, including security.

The LDC governments, less institutionalized and therefore more susceptible to economic reversals, would probably suffer even greater instability under a pessimistic energy price scenario. And the effects on OPEC countries would also be serious. Energy suppliers depend on their ties with the industrialized world for the achievement of many of their economic, political, and strategic objectives. World economic conditions affect their oil revenues and their foreign investments; production cutbacks resulting in sharp price increases might undermine the political and military support they receive from the West as well. Thus, suppliers may face a situation in which the choice of large increases in current real income (via oil price increases) could carry with it the risk of international disorder and instability that would threaten their longer-range interests.

It is not the intent of the authors to imply that a pattern of sharp energy price increases and the political and economic consequences of such increases is inevitable or even very likely. Our purpose is rather to dramatize trends and possibilities that could occur if OPEC production is unexpectedly curtailed and the principal consuming governments
fail to act decisively and in time to build adequate oil stockpiles, strengthen international financial institutions, curb energy-demand growth, and expand indigenous energy production. Because of the long lead times involved, governments cannot afford to wait until a crisis has arrived to take the actions necessary to deal with it; instead, they must anticipate the problem and take these actions well in advance.
III. **Assessment of Trilateral Responses since the “Oil Shock”**

Before presenting our analysis of what steps are needed in light of the energy forecasts outlined in the previous chapter, it is useful to take stock of developments since the “oil shock” of 1973-74, for such a review provides some insight into the possibilities for future action. In this chapter, therefore, we first summarize certain overall comparisons of energy developments in the industrial democracies; we then present a more specific assessment of policy developments in each of the major Trilateral areas (the United States, Europe, Japan, and Canada); and we conclude with an analysis of the responses of international institutions.

**A. Overall Comparisons**

Table 2 compares total primary energy consumption (TPE) in 1960, 1973 and 1976 for the International Energy Agency (IEA) countries.\(^{26}\) It also provides a comparison of the energy-GDP (TPE/GDP) ratios for the same years — one very rough indicator of overall efficiency of energy use.\(^{27}\) Chart 1 compares oil consumption in 1973, 1975, 1976 and 1977 for the seven economically most important Trilateral coun-

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26 IEA members include Austria, Belgium, Canada, Denmark, West Germany, Greece, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. Norway has a special limited membership.

27 The earlier Trilateral energy task force urged member countries to move immediately to improve efficiency in the utilization of energy resources of all kinds. As an OECD assessment of conservation efforts states: “Most careful studies indicate that investments required to achieve energy savings will have a higher return on investment and thus a more positive effect on GDP growth and employment than many of the supply-expansion alternatives being considered.... This makes conservation a cheaper alternative to domestic energy production.” [OECD, *Energy Conservation in the International Energy Agency: 1976 Review* (Paris: 1976), p. 8.] The TPE/GDP ratios in Table 2 provide one measure of the opportunities for further accomplishment in this area. On the basis of these statistics, it appears there is a wide variation in potential for conservation; yet care must be taken in interpreting the data because differences in degree of industrialization, industry mix, size and relative importance of the transportation sector, geography, and climate will affect the relative TPE/GDP rankings. The more important indicator of the success of a country’s conservation program is the change in the TPE/GDP ratio over time. Data for 1976 indicate that for most of the countries shown on Table 2, the TPE/GDP ratio is beginning to decline. More time must elapse, however, before it will be possible to make valid inter-country comparisons of energy conservation programs.
### TABLE 2
TPE¹ AND TPE/GDP¹
FOR INTERNATIONAL ENERGY AGENCY (IEA) COUNTRIES

<table>
<thead>
<tr>
<th>Country</th>
<th>TPE (million tons, oil equivalent)</th>
<th>TPE/GDP (tons of energy per thousand $U.S.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEA Group Total</td>
<td>1721.7</td>
<td>3245.4</td>
</tr>
<tr>
<td>United States</td>
<td>1014.2</td>
<td>1735.3</td>
</tr>
<tr>
<td>Japan</td>
<td>94.7</td>
<td>337.8</td>
</tr>
<tr>
<td>West Germany</td>
<td>145.8</td>
<td>266.7</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>169.7</td>
<td>223.8</td>
</tr>
<tr>
<td>Canada</td>
<td>96.1</td>
<td>194.0</td>
</tr>
<tr>
<td>Italy</td>
<td>48.9</td>
<td>132.7</td>
</tr>
<tr>
<td>Spain</td>
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<td>56.7</td>
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<tr>
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<tr>
<td>Switzerland</td>
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<td>23.4</td>
</tr>
<tr>
<td>Norway</td>
<td>9.0</td>
<td>19.7</td>
</tr>
<tr>
<td>Denmark</td>
<td>9.0</td>
<td>19.7</td>
</tr>
<tr>
<td>Greece</td>
<td>2.8</td>
<td>12.2</td>
</tr>
<tr>
<td>New Zealand</td>
<td>5.4</td>
<td>9.8</td>
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<tr>
<td>Ireland</td>
<td>4.2</td>
<td>7.6</td>
</tr>
<tr>
<td>Luxembourg</td>
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<td>5.3</td>
</tr>
</tbody>
</table>

1. TPE (Total Primary Energy) is a measure of overall energy consumption; GDP refers to Gross Domestic Product. When interpreting TPE/GDP ratios for small countries, particular care should be exercised since slight errors in consumption data can make significant differences in the results.
2. To convert million tons per year of oil equivalent into million barrels per day of oil equivalent, the unit used more frequently in this report, multiply by 0.0201. Thus, for example, the IEA group total TPE for 1976 would be 66.2 million barrels per day of oil equivalent, with the U.S. at 35.1, Japan at 7.4, West Germany at 5.2, the U.K. at 4.2, Canada at 4.1, and so forth.
3. Uses GNP not GDP figures in establishing ratio.
4. 1975

CHART 1
TRENDS IN INLAND OIL CONSUMPTION
OF SEVEN TRILATERAL COUNTRIES
(annual averages, in millions of barrels per day)

Note: Except for the United States, the data excludes bunkers, refinery fuel, and losses—the meaning of "inland oil consumption."

CHART 2

NET OIL IMPORTS OF SEVEN TRILATERAL COUNTRIES
(annual averages, in millions of barrels per day)

tries, and Chart 2 compares net oil import levels for the same countries in the same years. Table 3 compares government expenditures for energy research and development.

In analyzing these tables and charts, the U.S. performance is particularly significant since it is the largest importer of oil in the industrial world and accounts for fully half of all the energy consumed by IEA members. According to OECD estimates, it is also the country (excepting perhaps Canada) with the largest potential for achieving a major reduction in oil import demand. A review of the U.S. energy performance in 1973-1977, while inconclusive, is encouraging in some major respects. In this period the U.S. GNP rose 8 percent and industrial production 6 percent while total energy consumption rose only 3 percent and oil and gas consumption actually declined by 1 percent.

Recent statistics on U.S. oil consumption show a somewhat less favorable trend, since oil consumption rose about 7 percent in 1977, following an increase of almost that much in 1976. The reason for the sharp increase in 1977 was the need for oil to run American industry as the economy entered a period of sharp recovery. As might be expected in such a period, the increase in total oil demand was accounted for primarily by residual and distillate fuel oil, mostly for industrial and commercial purposes. Demand for these two products rose 12 percent in 1977 versus a 3 percent rise in gasoline demand. The large increase in industrial demand was also attributable, in part, to the continuing decline in the current and projected availability of natural gas to industrial users, which caused a switch of major proportions from gas to oil in the industrial and electric utility sectors.²⁸

European and Japanese energy consumption during the 1973-1977 period also grew more slowly than historical energy-GNP ratios would have predicted. With a GNP increase of 7 percent (just slightly less than the U.S. figure), European energy consumption grew only 0.5 percent (compared to 3.0 percent in the United States). However, the European GNP increase included a much smaller component of industrial production growth (2 percent compared to 6 percent in the United States). Since the industrial sector is so much more energy intensive than the rest of the economy, it is reasonable to conclude that the overall energy conservation performances in Europe and the United States were roughly comparable. In most sectors of their economies, however, the European countries and Japan continue to use energy more efficiently than the United States, but the gap may be

²⁸ For the 20-year period, 1953 to 1973, the U.S. energy-GNP growth ratio was about 1:1; that is, each percentage increase in GNP required a similar percentage increase in net energy expenditure. In the last two years (1976-1977), the ratio has declined by 17 percent.
# TABLE 3
GOVERNMENT EXPENDITURES FOR
ENERGY RESEARCH AND DEVELOPMENT
(IEA Members)

<table>
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<td><strong>IEA TOTAL</strong></td>
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<td>2,910.0</td>
<td>3,548.0</td>
<td>4,929.0</td>
<td>+89</td>
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<td>94.5</td>
<td>122.2</td>
<td>193.7</td>
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</tr>
</tbody>
</table>

1. Exchange rates: for 1974-1976, the end of each year; for 1977, midyear.
2. The expenditures of the EC Member countries do not include their contributions to EC programs.
   The total EC energy R & D expenditure appears in the bottom line of the table, and includes the EC contribution of France.
3. Austria indicates there is substantial energy research done by universities, funding for which is not identifiable and therefore not included in these amounts.
4. With respect to nationalized industries, the United Kingdom figures include only the expenditures on energy research, development and demonstration financed by government funds. Other expenditures by nationalized industries on energy research, development and demonstration were 42 million pounds in 1974 rising to an estimated 83 million pounds in 1977.
5. Italian figures include personnel and infrastructure costs.
6. These percentages were obtained, using national currency units, by taking the 1974 budget and comparing the 1977 budget in 1974 value. For the calculation of the 1974 value, GNP/GDP deflators estimated in the *OECD Economic Outlook* (December 1977 and July 1977) were used.
7. Percentage change in three years.

narrowing. For example, during this period, gasoline consumption in the major European industrialized countries (except Italy) grew more rapidly than in the United States.29

The comparison of changes in oil imports presents the U.S. performance in a less favorable light (Chart 2) than the comparison of changes in energy consumption. In 1977, U.S. oil imports accounted for about 25 percent of total U.S. energy use, up from 15 percent in 1973. About 8.5 million barrels per day (50 percent of the oil consumed) was imported in 1977, up from approximately 6 million barrels per day (35 percent of oil consumed) in 1973. Even more disturbing, imports from the most uncertain sources, the Arab OPEC members, have increased dramatically: Crude oil imports from these countries, for example, have more than tripled, rising from 722 thousand barrels per day to nearly 2.4 million barrels per day.30 Oil products from the Arab OPEC group in 1977 accounted for about 38 percent of U.S. imports.

It is important to recognize, however, that the 34 percent increase in U.S. oil and gas imports (2.5 million barrels per day) that occurred between 1973 and 1977 was entirely due to declines in domestic oil and gas production; it does not reflect poor U.S. performance in conservation. The comparison between the behavior of European and U.S. oil imports appears adverse to the U.S. because, in contrast to the declines in domestic oil and gas production the United States was experiencing, European domestic production increased by 1.8 million barrels per day between 1973 and 1977 and allowed, thereby, a 1.7 million barrel per day reduction in imports. Japan, with insignificant domestic production throughout the period, absorbed oil imports in 1977 at about the same level as in 1973.

B. UNITED STATES RESPONSE

The United States response to the world energy crisis suggests more success in reducing energy demand growth than in expanding energy

29 It may be that the U.S. performance was a result of the fact that wholesale energy prices in the United States rose more rapidly in the 1973-1977 period than they did in Japan, West Germany, or France. The comparable figures are U.S., 66 percent; Japan, 43 percent; Germany, 23 percent; and France, 29 percent. In Italy, however, energy prices rose 114 percent in this period.

30 The Arab OPEC members include Saudi Arabia, UAE, Kuwait, Qatar, Iraq, Algeria, and Libya. The remaining OPEC members are Iran, Venezuela, Nigeria, Indonesia, Gabon, and Ecuador. The faster rise in U.S. imports from OPEC than in total oil imports was due partly to the phasing out of exports by Canada, whose sole export market is the United States. In 1973, Canada supplied the United States with 1.3 million barrels per day of oil; in 1977, the figure was down to about 400,000 barrels per day.
supplies and, considering its leadership position and large and growing oil imports, has been less effective than it might have been. This section describes some of the difficulties that the U.S. has experienced in formulating an energy policy.

1. Post-Embargo Policy Developments

In the immediate aftermath of the embargo, U.S. leaders argued forcefully for a vigorous, cooperative, and far-reaching international response to the energy crisis, and, under the aegis of “Project Independence,” subsequently outlined an ambitious program of conservation and development of new energy resources designed to curtail U.S. import dependence. At the international level, U.S. action, after a period of bargaining and adjustment of objectives to bring them into closer conformity with those of other industrial countries, contributed to some concrete achievements, notably the IEP Agreement and the establishment of the IEA (discussed further elsewhere in this report). At the domestic level, however, the United States proved unable to enact a comprehensive, coherent energy policy of any kind. The reasons for this were at heart political: deep disagreements between the Executive and the Congress on the best way to proceed, lack of consistent White House leadership, and, closely related, a mounting cynicism and sheer lack of understanding of the scope of the problem among the general public.\(^{31}\) Administrative fragmentation in energy matters; the lack of any tradition of developing an integrated energy policy; the inability to coordinate federal, state, and local processes for licensing and siting energy facilities; and the myriad of conflicting and cumbersome regulations governing the development of domestic energy supplies also proved important obstacles.

Even more important, however, was the lack of a consensus in the United States on economic and social priorities. Indeed, the debate over energy policy itself has become a forum for debating the shape of “post-industrial” American society. And, largely for this reason, action on a comprehensive energy program has bogged down. If the society cannot agree on such fundamental questions as an acceptable level of economic growth, a desirable distribution of income, and the respective roles of corporations and government in managing the economy, it is unlikely that it can resolve issues of energy prices, environmental trade-offs, and the appropriate degree of government regulation.

Yet, in spite of these fundamental disagreements, some constructive

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\(^{31}\) A 1977 survey found that 50 percent of the American public did not realize that the United States was even importing petroleum, although more recent surveys suggest that the figure is somewhat lower and that the American public is actually more sophisticated about the world energy situation.
actions have been taken. The federal government did create the Federal Energy Administration and the Energy Research and Development Administration, and eventually formed a cabinet-level Department of Energy. To its credit, the United States has substantially increased its public investment in energy research and development. The increase in real terms from 1974 through 1977 was the largest (in percentage as well as absolute terms) of any IEA country, and the 1977 figure represents the largest per capita research and development public expenditure in the IEA group (see Table 3).

In 1975, after a year of struggle, Congress passed and President Ford signed a bill that, among other things, (1) authorized stockpiling of petroleum (implementation, however, has been delayed); (2) established mandatory fuel economy standards for automobiles; (3) required testing and labeling of appliances for energy efficiency; and (4) authorized the Executive to propose rationing plans, subject to veto by majority vote of either house of Congress (not yet utilized). There was also a provision in the Energy Act to increase the average price of domestically produced oil gradually over forty months to about current market levels (after initially reducing it by 12 percent), while at the same time requiring the Executive to remove a temporary fee of $2 per barrel that had been imposed on imported oil.

2. The Carter Program
In April 1977 the new Administration in Washington launched a new energy program. Asserting that the quest for a solution to the energy problem was "the moral equivalent of war," the President outlined a complex package of goals, principles, regulatory objectives, and proposals for administrative reorganization. In orientation, the goals of the program closely resemble those suggested by the earlier Trilateral task force. It places greater emphasis on energy conservation than previous U.S. plans, aiming at a reduction of total energy demand growth to 2 percent per year by 1985, and one of its major objectives is to reduce oil imports from a predicted potential of 11 to 16 million barrels per day in 1985 to less than 7 million barrels per day. Preparation of the new program was heavily influenced by the CIA forecast discussed earlier. The commitment to a sharp reduction in imports, as well as the decision to build a strategic stockpile of 1 billion barrels of oil, reflects a strong concern for the international and strategic implications of oil policy decisions. So, too, does the clear-cut acceptance of the need for fundamental changes in historical trends in supply and use of fuels.

The Carter plan rests on a number of key assumptions about which there is considerable disagreement among experts. Among them are the following: (1) that the United States can achieve GNP growth at a rate
faster than growth in energy usage; (2) that the demand for energy will be significantly more price elastic than in the recent past, in the medium term (to 1985), at price levels higher than those heretofore experienced in the United States; (3) that additional incentives, chiefly in the form of higher prices, can reverse the decline in U.S. oil production; (4) that the annual rate of increase of production of coal — the key “swing fuel” to replace oil imports — can and will be nearly doubled on short notice and on the basis of price incentives; (5) that increases in coal consumption will be possible in spite of current environmental obstacles to burning coal; and (6) that coal conversion plants and new nuclear plants will not encounter major delays as a result of litigation and regulatory requirements designed to protect the environment.

Few of the legislative proposals that comprise the Carter program are genuinely new but most of them are controversial; indeed, several of the key ones had already been proposed, debated, and rejected by the U.S. Congress in the previous two years. What is fundamentally new in the program is the clear determination that the federal government should assume the leading role in planning and directing the nation’s energy policy in a comprehensive manner. This objective, of course, is also controversial. As a result, passage of the program without major legislative modifications was not possible.

Most studies of the impact of the Carter plan, even had it been approved in its entirety, concluded that it was too optimistic about the ability of the proposed mix of tax, price, and regulatory policies to achieve the supply increase and demand-growth reductions necessary to reach the import goals set. One of these studies, published by the Congressional Budget Office, concluded that “the total oil import savings achieved by the Administration’s plan are estimated . . . to be about 3.5 million barrels a day, rather than the Administration’s estimated 4.5 million barrels.” Another study by the General Accounting Office reached a similar conclusion, predicting that U.S. oil imports in 1985 would be 10.3 million barrels per day, or 4.3 million barrels per day higher than the goals set forth in the National Energy Plan.

Even if the Carter energy program was optimistic in its assumptions about the possibilities of import reduction, its passage largely intact — or passage of an alternative package of proposals designed to achieve the same import reduction objectives — would have been

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a major contribution to reversing the past pattern of drift and piece-meal solutions that has characterized U.S. energy policy since 1973. Indeed, given the strong commitment of current U.S. leaders to the achievement of conservation and import-reduction targets, it seems likely that the Executive will return to the Legislature to seek more rigorous action (including policies to increase production) since it is apparent that the country is falling short of the goals set in the energy plan.

3. Summary

In conclusion, it is probably fair to say that the U.S. performance in the 1973-1977 period was not consistent with the leadership role expected. While the American performance in controlling energy-demand growth and increasing drilling activity was impressive, and while government commitments to energy research and development have grown more rapidly than in any other country, the government clearly did not permit energy price increases to levels that would have been consistent with a broad-based commitment to conservation; it failed to reduce its dependence on uncertain sources of supply; and it did not provide industry with either the economic incentives or the regulatory environment necessary to mount major new programs to expand domestic coal production.

There is basis for hope that U.S. performance with respect to central Trilateral goals may improve significantly in the near future although not as quickly or as decisively as had been predicted in the immediate post-embargo period. The importance of such a change cannot be overemphasized. As the supply-and-demand forecasts outlined earlier in this study indicate, reductions of U.S. import demand of 3 to 4 million barrels per day below the current 1985 expectations of 11 to 12 million barrels per day could contribute significantly to delaying any large energy price increases and help to restore confidence in the dollar.

C. EUROPEÁN RESPONSE

In 1976, European energy consumption was still below pre-embargo levels, and oil imports were less than those in 1973. However, both energy consumption and oil imports bottomed out in 1975 and have been rising since, which suggests that the drop that occurred between 1973 and 1975 was recession-induced rather than the result of any

34 The average annual growth rate in number of wells drilled was 13.9 percent in the 1973-1977 period compared with an average annual decline of 3.2 percent between 1967 and 1972. Furthermore, capital investment in U.S. domestic energy development grew at about 10 percent a year (in real terms) in the 1973-1977 period after showing no growth between 1967 and 1972.
fundamental changes in end-use patterns. Thus, even though the European members of the Trilateral group appear, so far, to be meeting the conservation objectives outlined in previous Trilateral Commission reports, it is unlikely that the substantial reduction of Europe's energy dependence, proposed in these previous studies, will be attain-

<table>
<thead>
<tr>
<th></th>
<th>Indigenous Production</th>
<th>Net Imports</th>
<th>Consumption (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1976 (estimated)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solid fuels</td>
<td>184</td>
<td>23</td>
<td>207 (22%)</td>
</tr>
<tr>
<td>Oil</td>
<td>22</td>
<td>520</td>
<td>542 (58%)</td>
</tr>
<tr>
<td>Natural gas</td>
<td>144</td>
<td>12</td>
<td>156 (16%)</td>
</tr>
<tr>
<td>Hydro/Geothermal</td>
<td>25</td>
<td>1</td>
<td>26 (2%)</td>
</tr>
<tr>
<td>Nuclear</td>
<td>21</td>
<td>—</td>
<td>21 (2%)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>396</td>
<td>556</td>
<td>952 (100%)</td>
</tr>
<tr>
<td>(in %)</td>
<td>(42%)</td>
<td>(58%)</td>
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</table>

**1985: Objectives Established in 1974**

<table>
<thead>
<tr>
<th></th>
<th>Indigenous Production</th>
<th>Net Imports</th>
<th>Consumption (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid fuels</td>
<td>210</td>
<td>40</td>
<td>250 (17%)</td>
</tr>
<tr>
<td>Oil</td>
<td>180</td>
<td>515</td>
<td>695 (49%)</td>
</tr>
<tr>
<td>Natural gas</td>
<td>175</td>
<td>95</td>
<td>270 (18%)</td>
</tr>
<tr>
<td>Hydro/Geothermal</td>
<td>45</td>
<td>—</td>
<td>45 (3%)</td>
</tr>
<tr>
<td>Nuclear</td>
<td>190</td>
<td>—</td>
<td>190 (13%)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>800</td>
<td>650</td>
<td>1,450 (100%)</td>
</tr>
<tr>
<td>(in %)</td>
<td>(55%)</td>
<td>(45%)</td>
<td></td>
</tr>
</tbody>
</table>

**1985: Current Projections**

<table>
<thead>
<tr>
<th></th>
<th>Indigenous Production</th>
<th>Net Imports</th>
<th>Consumption (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid fuels</td>
<td>184</td>
<td>36</td>
<td>220 (17%)</td>
</tr>
<tr>
<td>Oil</td>
<td>110–160</td>
<td>555–490</td>
<td>665–650 (52–51%)</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>143–158</td>
<td>79</td>
<td>221–237 (17–18%)</td>
</tr>
<tr>
<td>Hydro/Geothermal</td>
<td>31</td>
<td>4</td>
<td>35 (3%)</td>
</tr>
<tr>
<td>Nuclear</td>
<td>140</td>
<td>—</td>
<td>140 (11%)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>609–674</td>
<td>673–608</td>
<td>1,282 (100%)</td>
</tr>
<tr>
<td>(in %)</td>
<td>(47.5–52.6%)</td>
<td>(52.5–47.4%)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Commission of the European Communities.
able by 1985.\textsuperscript{35} As in the case of the United States, Europe has experienced setbacks and failures in achieving energy supply increase objectives. Major delays in constructing new energy facilities have meant that the ambitious targets for indigenous production put forward by some governments and by the EC in 1974 soon turned out to be impossible to reach (see Table 4). In summary, then, it appears that the European Community will achieve a slight reduction in import dependence by 1985 — primarily as a result of slower than expected economic growth rather than because of gains in indigenous production. Oil imports are likely to decline by 5 to 10 percent by 1985, but thereafter, import dependence can be expected to stabilize at about 50 percent of total energy consumption and might even increase if no additional action is taken. Therefore, a reassessment of previous forecasts and renewed efforts on both the demand and supply sides of the energy equation will be necessary.

1. Post-Embargo Policy Developments
The 1973 embargo and the accompanying quadrupling of prices exposed Europe's economic vulnerability.\textsuperscript{36} It also revealed the absence of a common European energy policy and the difficulties many countries faced in reducing their vulnerability to an interruption of oil imports. Reactions to the crisis were primarily national, with EC members preferring solutions to their supply problems through bilateral initiatives with oil-exporting countries to a common response. Moreover, even had there been a desire for Community solidarity, the mechanisms for energy cooperation were lacking. Only in the case of coal was there anything even approaching a common policy (the European Coal and Steel Community). Even here, however, protection and structural adjustment policies remained in the hands of national governments. In the nuclear area, where a common policy might have been possible, the mechanisms for cooperation existing within Euratom were not sufficient to permit much agreement on policy. Only outside Euratom were some bilateral and multilateral programs developed for building enrichment facilities and for developing and demonstrating breeder reactors.

The absence of a European Community energy policy was the

\textsuperscript{35} In the Trilateral Commission report, \textit{Energy: A Strategy for International Action}, it was suggested that Western Europe's import dependence be reduced to 40 percent of total energy requirements by 1985. It now seems unlikely that the figure will be below 50 percent.

\textsuperscript{36} The vulnerability of Europe is much more serious than that of the United States but not as grave as that of Japan: In 1973, United States dependence on oil imports was 14 percent of total energy consumption, while the figure for the EC was 58 percent. For Japan it was 77 percent.
result of several factors: (1) national differences in approaches, (2) the reluctance of member states to give up national decision-making powers, and (3) the absence of any perceived urgency prior to 1973. In fact, the international oil market had served the needs of the European countries reasonably well in the pre-embargo period, enabling them to fuel the economic expansion of the 1960s with imported energy at declining real prices. But the 1973 crisis and the North Sea discoveries for the first time brought into focus differences in energy resource endowment between EC members. These differences can be summarized by dividing the member countries of the Trilateral Commission in Europe into three groups:

- **The Energy-Rich Countries — Norway, Great Britain, the Netherlands.** Norway is already a net exporter of hydrocarbons and will continue for the foreseeable future to possess very substantial reserves, although the potential of the Norwegian sector of the North Sea has not yet been fully assessed, let alone tapped. Britain’s hydrocarbon reserves are, given much larger domestic consumption, relatively less abundant. Oil production is expected to peak within a decade. On the other hand, the potential for expanding natural gas production appears promising even in the longer run, and for this reason, Britain is likely to become roughly self-sufficient in energy in the 1980s and 1990s with interests — for a while — parallelizing to some extent those of an oil-exporting country. Britain also appears to have the best long-term prospects for solid fuels in Western Europe.\(^{37}\) The Netherlands is presently the largest net exporter of energy in Western Europe; yet its energy wealth is confined to natural gas, and its natural gas resources now appear to be approaching maturity. Although further substantial additions to reserves are by no means impossible, most experts feel that production will decline in the late 1980s and 1990s, while dependence on imported energy will increase.\(^{38}\)

- **West Germany.** West Germany occupies an intermediate position with regard to energy resources, since its substantial solid fuel reserves have helped to keep dependence on oil imports at moderate levels (see Table 5). West Germany also has sizable natural gas

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\(^{37}\) One of the important U.K. responses to the 1973 oil crisis was the launching of a huge coal exploration program. The success of this program is indicated by the fact that additions to reserves averaged about 500 million tons a year in 1974 and 1975, and that some of the newly discovered fields are relatively cheap and easy to exploit. Over the longer run, U.K. officials hope to increase annual U.K. coal production by about 30 million tons per year.

\(^{38}\) In 1977, the Netherlands signed contracts to import natural gas from Algeria and from Norway.
TABLE 5
ENERGY PRODUCTION, CONSUMPTION, IMPORT GAP, AND RESERVES IN EUROPE, 1976
(million barrels per day of oil equivalent)

<table>
<thead>
<tr>
<th></th>
<th>Solid Fuels</th>
<th>Oil</th>
<th>Natural Gas</th>
<th>Primary Electricity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Netherlands</td>
<td>—</td>
<td>.0320</td>
<td>1.4000</td>
<td>.0138</td>
<td>1.4458</td>
</tr>
<tr>
<td>Norway</td>
<td>.0054</td>
<td>.1864</td>
<td>—</td>
<td>.2324</td>
<td>.4242</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1.5048</td>
<td>.0318</td>
<td>.6268</td>
<td>.1756</td>
<td>2.3390</td>
</tr>
<tr>
<td>West Germany</td>
<td>1.7972</td>
<td>.1164</td>
<td>.2936</td>
<td>.1714</td>
<td>2.3786</td>
</tr>
<tr>
<td>France</td>
<td>.3438</td>
<td>.0394</td>
<td>.1264</td>
<td>.3564</td>
<td>.8660</td>
</tr>
<tr>
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<td>.0268</td>
<td>—</td>
<td>—</td>
<td>.0042</td>
<td>.0310</td>
</tr>
<tr>
<td>Italy</td>
<td>.0252</td>
<td>.0214</td>
<td>.2406</td>
<td>.2174</td>
<td>.5046</td>
</tr>
<tr>
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<td>.1048</td>
<td>—</td>
<td>.0008</td>
<td>.0328</td>
<td>.1384</td>
</tr>
<tr>
<td>Denmark</td>
<td>—</td>
<td>.0030</td>
<td>—</td>
<td>.0002</td>
<td>.0032</td>
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<tr>
<td></td>
<td>.0496</td>
<td>.4764</td>
<td>.6406</td>
<td>.0134</td>
<td>1.1800</td>
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<tr>
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<td>.1432</td>
<td>—</td>
<td>.2230</td>
<td>.3830</td>
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<tr>
<td>United Kingdom</td>
<td>1.4050</td>
<td>1.8414</td>
<td>.6422</td>
<td>.1758</td>
<td>4.0600</td>
</tr>
<tr>
<td>West Germany</td>
<td>1.4560</td>
<td>2.5282</td>
<td>.7008</td>
<td>.1850</td>
<td>4.8700</td>
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<td>2.1332</td>
<td>.3210</td>
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<td>3.3600</td>
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<td>.1024</td>
<td>—</td>
<td>.0042</td>
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<td>Italy</td>
<td>.1986</td>
<td>1.7544</td>
<td>.3658</td>
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<td>.4552</td>
<td>.1662</td>
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<td>.0422</td>
<td>.3102</td>
<td>—</td>
<td>.0018</td>
<td>.3540</td>
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<table>
<thead>
<tr>
<th></th>
<th>Total Production</th>
<th>Total Consumption</th>
<th>Import Gap (% of consumption)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Netherlands</td>
<td>1.4458</td>
<td>1.1800</td>
<td>(−23)</td>
</tr>
<tr>
<td>Norway</td>
<td>.4242</td>
<td>.3830</td>
<td>(−11)</td>
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<td>United Kingdom</td>
<td>2.3390</td>
<td>4.0600</td>
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<td>2.3786</td>
<td>4.8700</td>
<td>51</td>
</tr>
<tr>
<td>France</td>
<td>.8660</td>
<td>3.3600</td>
<td>74</td>
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<td>.0142</td>
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<td>Italy</td>
<td>.5046</td>
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<td>Belgium</td>
<td>.1384</td>
<td>.8370</td>
<td>83</td>
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<td>Denmark</td>
<td>.0032</td>
<td>.3540</td>
<td>99</td>
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<table>
<thead>
<tr>
<th></th>
<th>Natural Gas</th>
<th>Oil</th>
<th>Solid Fuels*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(10^9 cubic feet)</td>
<td>(million barrels)</td>
<td>(million tons)</td>
</tr>
<tr>
<td>Netherlands</td>
<td>60,000</td>
<td>80</td>
<td>1,430</td>
</tr>
<tr>
<td>Norway</td>
<td>8,300</td>
<td>6,000</td>
<td>n.a.</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>29,000</td>
<td>19,000</td>
<td>45,000</td>
</tr>
<tr>
<td>West Germany</td>
<td>7,300</td>
<td>320</td>
<td>34,419</td>
</tr>
<tr>
<td>France</td>
<td>4,800</td>
<td>43</td>
<td>438</td>
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<tr>
<td>Ireland</td>
<td>1,000</td>
<td>—</td>
<td>n.a.</td>
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<tr>
<td>Italy</td>
<td>8,300</td>
<td>600</td>
<td>n.a.</td>
</tr>
<tr>
<td>Denmark</td>
<td>1,700</td>
<td>50</td>
<td>—</td>
</tr>
</tbody>
</table>

Sources: Comité professionnel du pétrole; Oil and Gas Journal; World Energy Conference.
fields, although the West German gas industry has now reached maturity and no large additions to reserves are expected. 30

- Energy-Poor Countries — France, Italy, Belgium, Denmark, Ireland. These countries have only small reserves of energy resources and consequently are much more dependent on oil imports than the other EC countries. Although hydrocarbon finds have been made recently in Italy and in the Danish and Irish sectors of the North Sea (similar discoveries might also be made off the French coast), the overall dependence on energy imports for these countries is likely to grow over the next several years unless nuclear facilities or renewable technologies are expanded at an accelerated rate.

These structural differences have played an important role in shaping the European response to the energy crisis. While some common policies have developed in the aftermath of the embargo, important differences have also arisen that have prevented the formulation of a common European energy policy and the harmonization and integration of national energy policies. As a result, two major trends in Europe’s energy policies, distinctly national in focus, emerged after 1973:

- The energy-rich countries sought to optimize the short- and long-term benefits of their energy resources and to emphasize conservation of reserves.

- The energy-poor countries, including West Germany, strove to reduce dependence on energy imports as rapidly as possible.

More specifically, Norway and the Netherlands became increasingly concerned over the long-term energy position of their economies and, thus, began to emphasize conservation. This emphasis was reinforced by concern about the economic, social, and environmental impact of large-scale energy production and exports. Norway set a production ceiling of 1.8 million barrels per day for oil and natural gas and postponed exploration north of the 62nd parallel (about 100 miles north of Bergen) where huge oil reserves are a distinct possibility. The Netherlands has halted all further export contracts (for the time being) and plans to phase out natural gas exports (now totaling about 40 million tons, oil equivalent) during the 1980s and 1990s barring substantial new discoveries. The government also took steps to reduce

30 West Germany has set a goal of stabilizing solid fuel production between now and 1985 at 1973 levels; however, achieving this goal will require a substantial expansion of lignite production, since hard coal output is expected to decline. Natural gas production could rise slightly (from 15 million tons, oil equivalent, in 1975 to 19 million tons in 1985), but with demand growing rapidly, natural gas imports are likely to treble over the same period and reach 52 million tons, oil equivalent, by 1985.
reliance on natural gas for nonpremium uses such as electricity generation.

The United Kingdom followed a somewhat different policy: It sought rapid development of North Sea oil to quickly reduce dependence on oil imports, diminish the balance of trade burden, and create additional government revenues. At the same time, the U.K. sharply increased taxes which tended to dampen the incentives for development. Nevertheless, North Sea development, which had begun before 1973, became more attractive as a result of oil price increases, and exploration and development accelerated to the point where the production of oil should reach about 2 million barrels per day in 1980 and natural gas production about 1 million barrels per day (oil equivalent). Britain, however, also showed some concern about its long-term energy position in other fuels. In addition to increased efforts to step up coal production and a continuing nuclear program, a legal framework for conservation measures in the hydrocarbon industry was created which enables the government to impose prorationing if it decides to do so.

While the energy-rich countries were shifting the emphasis away from a maximum acceleration of hydrocarbon exploration, the energy-poor countries were seeking to step up production of indigenous energy resources as much as possible. Unfortunately, however, they have encountered severe difficulties in doing so. France, West Germany, Italy, and Belgium saw nuclear energy as the main opportunity to reduce dependence on oil imports; consequently, these countries embarked on massive programs to expand nuclear electricity-generating capacity. These programs were based on an early expansion of light water reactor (LWR) capacity, the recovery of plutonium by reprocessing spent fuel, and its eventual recycling in fast breeder reactors. The overall objective of this approach was to reduce dependence on energy imports. An effort was also made to build up European uranium enrichment capacity as a means of reducing dependence on imports of this energy source. The United Kingdom, in the meantime, was pursuing a different reactor program based on indigenous designs. As a result of technical difficulties and slower than anticipated growth in

40 The major increases in world uranium enrichment capacity over the next several years will occur in Europe where two multinational consortiums are building facilities. A French-led group, EURODIF (which involves Italian, Belgian, Spanish, and Iranian participation), is constructing a 10.8 million SWU-per-year gaseous diffusion plant at Tricastin that is scheduled to reach full capacity in 1982. The second consortium, URENO (involving the United Kingdom, West Germany, and the Netherlands) is building a centrifuge plant. About 2 million SWU per year will be available from this plant in the early 1980s; the first small deliveries have already been made.
electricity demand, the United Kingdom program has expanded somewhat more slowly than programs in the "energy-poor" countries.

None of the European reactor programs have lived up to earlier expectations, and in every country the initial estimates have had to be scaled down. The EC nuclear power targets formulated in 1974 aimed at an installed capacity of 160-200 GWe in 1985; yet by 1977 the forecast had been revised downward below 100 GWe. Lower electricity demand estimates and construction difficulties accounted for most of the downward revision, but public opposition to nuclear energy created some delays and caused doubts regarding the role fission reactors could play in reducing European energy import dependence. Most of the opposition developed outside established political institutions, taking the form of citizens' movements, which soon cooperated across national boundaries. In West Germany, where the impact of public opposition was strongest, the anti-nuclear movement successfully sought the support of the judiciary in its attempts to halt nuclear development. The result was delay, more stringent safety requirements, and higher costs.

It is difficult to determine the extent to which this opposition will continue to affect nuclear energy development. In West Germany, public pressure has already led to policy modifications by both governing parties that accommodate the most serious objections to nuclear power but commit the country to continuing the nuclear program. In France, the opposition still seems to be building, and it is difficult at this point to assess its eventual impact; in Italy, a compromise similar to that in West Germany has developed, and parliament has decided on a cautious continuation of the nuclear reactor program. In Britain, where plans called for installed capacity to reach about 15 GWe in 1985, the nuclear program has encountered serious technical problems with its indigenous reactor designs and, given the other energy resources of the United Kingdom, it is unlikely that nuclear energy will have as high a priority as in the past.

The stabilization of EC coal production also encountered some difficulties, and as was the case with nuclear energy, national targets set in 1974 had to be reduced. Coal production in 1976 in the European Community was below 1973 levels, and output was still falling as a consequence of low demand and technical and economic difficulties. The social, environmental, and economic costs of increasing coal production had obviously been underestimated in 1974. However, the longer-term prospects for a revival of coal in Europe are encouraging if industrial relations and manpower problems can be overcome: Investment has increased substantially and continuously since 1973, and it still seems possible to reach the target of 3.5 million
barrels per day (oil equivalent) for the EC in the 1990s. Yet, even if this target is achieved, the Community will continue to import substantial quantities (about 50 million tons or 1 million barrels per day oil equivalent) from elsewhere.

Natural gas was seen in 1974 as one of the major elements of a strategy of diversification away from oil imports. Since reserves outside the United Kingdom and the Netherlands are not sufficient to support a substantial increase in production and since no additional exports were available from either of these, additional natural gas supplies have had to come from outside the EC. Norway has meanwhile agreed to supply about 17 billion cubic meters of natural gas to West Germany, France, the Netherlands, and Belgium, and large contracts between these latter countries and the USSR, Iran, and Algeria have been negotiated. While natural gas does offer a possibility for reducing dependence on oil imports as North Sea reserves are developed, over the longer run, dependence on OPEC energy exports will probably not diminish. For example, if indigenous gas production begins to turn down in the 1980s while demand for it continues to grow, a supply gap for natural gas could develop that would have to be filled for the most part by additional OPEC imports.

2. Research and Development

Energy research and development in Europe is largely concentrated on the nuclear fuel cycle. Several advanced reactor technologies are now under development, including the fast breeder reactor in West Germany, France, and Britain (the French demonstration breeder, Super-Phenix, also involves West German and Italian utilities) and the high temperature, gas-cooled reactor in West Germany. Several European joint ventures are under way to develop uranium enrichment facilities using both the centrifuge and gaseous diffusion technologies (see footnote 40). The only major common research undertaking of the European Community as such is the fusion-related Joint European Torus (JET) — but until recently, the initial expectations for this project were frustrated by intra-European bickering over an appropriate site for JET.

Coal technologies are another major area of research, particularly in Britain and West Germany. Coal conversion to liquid fuels and synthetic natural gas is the focus of a large research and development program in West Germany. Fluidized bed combustion is finding considerable support throughout the Community and is now the subject of a research project coordinated by the IEA. In solar energy, both France and Italy have developed considerable expertise, and this source has recently found more support in other European countries as well. As a result of
the growing interest in solar energy, several solar projects have been initiated under the aegis of the European Community and the IEA, and the prospects for water heating utilizing nonfocusing solar collectors are promising. However, it is unlikely that central station electricity generated from solar energy will make a significant contribution to total European energy supplies in this century.

3. Summary

To sum up this assessment, then, expectations about the rapid growth of European indigenous energy production have proven too optimistic. A substantial increase will certainly occur in hydrocarbons and nuclear energy; but growth rates of oil and natural gas production will be lower than expected, and the scaling down of nuclear reactor capacity forecasts will be considerable.41 Fortunately, estimates for EC energy demand in 1985 turned out to be excessive as well. Conservation efforts helped reduce consumption of energy, but the bulk of the demand reduction came from the impact of slower than expected economic growth. It is mainly this reduction in overall economic growth rates that seems likely to allow the European Community to stabilize import dependence until 1985 at 1973 levels, which would mean a reduction in relative import dependence to about 50 percent of total energy demand versus 60 percent in 1973. Beyond 1985, import dependence can be expected to remain close to the 50 percent level, although its composition will change: Natural gas imports will play a greater role, as will coal imports. In geographical terms, however, this shift is unlikely to contribute much to a diversification of sources of energy supplies: They will still come primarily from the Middle East and Africa.

It is probably fair to conclude that European responses to the energy challenge have been diverse and somewhat indecisive and that much remains to be done. The crisis was tackled with traditional policy tools and public debate was neglected.42 As a result, the political will to cope with the energy challenge was insufficient to bring about the new patterns of energy usage and the amounts of new production needed to reduce imports to the targets which had been established immediately following the 1973 embargo. Unfortunately, the consequences of these policy shortcomings might not become evident immediately: The buildup of North Sea hydrocarbon production and

41 A recent OECD estimate indicates that the contribution of nuclear energy in early 1985 will be 2.3 million barrels per day (oil equivalent), as compared to an earlier forecast of 5.4 million barrels per day (oil equivalent).

42 One notable exception to the lack of public debate on energy policy throughout most of this period was the nuclear hearings organized by the EC Commission.
the expansion of nuclear energy will tend to mask basic trends for a period. But, as in the case of the United States, a more vigorous response consisting of additional economic incentives for conservation and the elimination of unnecessary regulatory delays will be necessary to avoid the consequences described earlier in this report.

D. JAPANESE RESPONSE

The impact of the oil embargo on the Japanese economy was severe. It triggered strong inflationary pressures along with a slowdown in economic growth. Indeed, the economy registered an absolute decrease in GNP for the first time since the end of World War II. The government took several emergency measures to cope with the situation, including administrative measures to force reduction in oil and electricity consumption, and by the end of 1974, the inflation had slowed and the economy had begun to recover. Although there was a reduction in overall growth of energy consumption and oil imports in 1974 and 1975, the recovery of the economy by 1976 was accompanied by a renewed growth in energy demand (Table 6). Because of government policy and the recession, a major part of the 1974-1975 decrease in energy consumption occurred in the mining and manufacturing sector (Table 7).

In 1975 the government revised its long-term energy supply-and-demand program, which had been prepared in 1972, reducing 1985 primary energy supply targets from 16.1 - 17.8 to 13.1 million barrels

| TABLE 6 |
| JAPANESE ENERGY CONSUMPTION AND OIL IMPORTS |

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</thead>
<tbody>
<tr>
<td>Total Energy Consumption (million barrels per day, oil equivalent)</td>
<td>6.32</td>
<td>7.02</td>
<td>7.03</td>
<td>6.72</td>
<td>7.07</td>
</tr>
<tr>
<td>Oil Imports (million barrels per day)</td>
<td>4.72</td>
<td>5.43</td>
<td>5.22</td>
<td>4.92</td>
<td>5.22</td>
</tr>
<tr>
<td>Oil Imports as Percentage of Total Energy Consumption</td>
<td>74.7%</td>
<td>77.4%</td>
<td>74.2%</td>
<td>73.1%</td>
<td>73.8%</td>
</tr>
<tr>
<td>Annual GNP Growth Rate</td>
<td>9.1%</td>
<td>9.8%</td>
<td>-1.3%</td>
<td>2.4%</td>
<td>6.3%</td>
</tr>
<tr>
<td>Annual Growth Rate of Oil Imports</td>
<td>9.5%</td>
<td>15.2%</td>
<td>-3.9%</td>
<td>-5.8%</td>
<td>6.1%</td>
</tr>
</tbody>
</table>

Source: Energy consumption and oil import figures from Ministry of International Trade and Industry, converted into million barrels per day of oil equivalent.
### TABLE 7
JAPANESE ENERGY CONSUMPTION BY SECTORS
(million barrels per day, oil equivalent)

<table>
<thead>
<tr>
<th></th>
<th>Mining and Manufacturing</th>
<th>Energy</th>
<th>Transportation</th>
<th>Agriculture</th>
<th>Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>1972</td>
<td>2.783</td>
<td>0.408</td>
<td>0.758</td>
<td>0.134</td>
<td>1.155</td>
</tr>
<tr>
<td>1973</td>
<td>3.090</td>
<td>0.476</td>
<td>0.838</td>
<td>0.147</td>
<td>1.269</td>
</tr>
<tr>
<td>1974</td>
<td>2.996</td>
<td>0.452</td>
<td>0.841</td>
<td>0.143</td>
<td>1.282</td>
</tr>
<tr>
<td>1975</td>
<td>2.858</td>
<td>0.477</td>
<td>0.875</td>
<td>0.142</td>
<td>1.336</td>
</tr>
</tbody>
</table>

Source: Ministry of International Trade and Industry figures in kilocalories, converted into million barrels per day of oil equivalent.

per day (oil equivalent), scaling down expected oil imports from 11.2 - 12.5 to 8.4 million barrels per day, nuclear power from 60 to 49 GWe, and increasing LNG import targets from 0.27 to 1.12 million barrels per day (oil equivalent). Table 8 lists these targets alongside actual 1975 levels.

1. **The New Energy Program**

As the government reviewed new energy supply-and-demand developments, several serious problems with the 1975 targets emerged. First, it became apparent that if the growth rate of the Japanese GNP were to be maintained above 6 percent, oil imports by 1985 would be much larger than the planned figure (which was perhaps too high already given the OECD forecast of the world supply-and-demand situation for that time). Also, it had become evident that nuclear power installations and LNG imports would not be able to meet targeted levels because of public resistance and environmental constraints.

Accordingly, the government has again revised its program and the Ministry of International Trade and Industry (MITI) has announced its new long-range energy supply-and-demand forecast together with the policy recommendation of its Advisory Committee for Energy. The main points in the new program are shown on Table 8. Primary energy demand in 1985 prior to the new energy conservation efforts is estimated to be 12.8 million barrels per day (oil equivalent) based on the assumption of a 6 percent annual growth rate of GNP. With an energy conservation target of 5.5 percent (which means 5.5 percent less energy consumed in 1985 than would be consumed with current growth rates or an extrapolation of the present trend), total primary energy demand in 1985 would be 12 million barrels per day (oil
<table>
<thead>
<tr>
<th></th>
<th>FY 1975 (Actual)</th>
<th>FY 1985</th>
<th>FY 1990</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MITI 1975</td>
<td>MITI 1977 Forecasts</td>
<td>With Maximum</td>
</tr>
<tr>
<td></td>
<td>Forecast</td>
<td>Under Current Policy</td>
<td>Efforts</td>
</tr>
<tr>
<td>Economic Growth</td>
<td>3.0%</td>
<td>6.6%</td>
<td>6.0%</td>
</tr>
<tr>
<td>Reduction due to</td>
<td>-1.207</td>
<td>-0.690</td>
<td>-1.380</td>
</tr>
<tr>
<td>Conservation (%)</td>
<td>(9.4%)</td>
<td>(5.5%)</td>
<td>(10.8%)</td>
</tr>
<tr>
<td>Demand After Conservation</td>
<td>13.103</td>
<td>12.069</td>
<td>11.379</td>
</tr>
</tbody>
</table>

Sources Aside from Imported Oil

<table>
<thead>
<tr>
<th></th>
<th>FY 1975 (Actual)</th>
<th>FY 1985</th>
<th>FY 1990</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MITI 1975</td>
<td>MITI 1977 Forecasts</td>
<td>With Maximum</td>
</tr>
<tr>
<td></td>
<td>Forecast</td>
<td>Under Current Policy</td>
<td>Efforts</td>
</tr>
<tr>
<td>Hydro-electric:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>general pumped storage</td>
<td>27,710 MW (5.8%)</td>
<td>28,300 MW (3.7%)</td>
<td>19,500 MW (3.3%)</td>
</tr>
<tr>
<td>Geothermal</td>
<td>3,150 MW (0.0%)</td>
<td>14,100 MW (0.5%)</td>
<td>19,500 MW (0.1%)</td>
</tr>
<tr>
<td>Indigenous Oil and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Gas</td>
<td>50 MW (0.0%)</td>
<td>2,100 MW (0.5%)</td>
<td>500 MW (0.1%)</td>
</tr>
<tr>
<td>Indigenous Coal</td>
<td>4,741 (36.7%)</td>
<td>3,362 (27.8%)</td>
<td>3,931 (34.5%)</td>
</tr>
<tr>
<td>Nuclear</td>
<td>18,600 Kt (3.3%)</td>
<td>20,000 Kt (1.9%)</td>
<td>20,000 Kt (2.0%)</td>
</tr>
<tr>
<td>LNG</td>
<td>6,620 MW (1.7%)</td>
<td>49,000 MW (9.6%)</td>
<td>26,000 MW (5.4%)</td>
</tr>
<tr>
<td>Imported Coal</td>
<td>5,060 Kt (1.8%)</td>
<td>42,000 Kt (7.9%)</td>
<td>24,000 Kt (4.9%)</td>
</tr>
<tr>
<td>New Energy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Need for Imported Oil</td>
<td>102,400 Kt (11.2%)</td>
<td>93,000 Kt (10.7%)</td>
<td>102,000 Kt (12.4%)</td>
</tr>
<tr>
<td>Total Supplies</td>
<td>6.724 (100%)</td>
<td>13.103 (100%)</td>
<td>12.069 (100%)</td>
</tr>
</tbody>
</table>

Source: Ministry of International Trade and Industry; summary figures converted to million barrels per day of oil equivalent from million kilotons.

MW = megawatts; Kt = kilotons.
equivalent). Under this assumption, nuclear power would have to be about 26 GWe, substantially below the target announced in 1975, and LNG imports about 0.64 million barrels per day (oil equivalent). Oil imports would then have to be 8.7 million barrels per day, somewhat above the previous target.

In order to further reduce import dependence, the government has proposed a 10.8 percent energy conservation target, nuclear power installation of 33 GWe, and LNG imports of 0.8 million barrels per day (oil equivalent). This would limit the rise in oil imports to 7.45 million barrels per day by 1985. By 1990, the government hopes to achieve an energy conservation rate of 13.5 percent, nuclear power production of 60 GWe, geothermal power production of 3 GWe, LNG imports of 1.17 million barrels per day (oil equivalent), and coal imports of 144 million tons (including coking coal), all of which will allow oil imports to be maintained at 7.79 million barrels per day.

Conservation of energy is a major goal of the new program and the government is expecting a new law to be enacted to achieve this objective. Economists expect that conservation beyond the present level (i.e., conservation designed to reduce the energy-GNP ratio) will require new investment and some adjustment in industrial structure; accordingly, these ambitious goals cannot be achieved without strong government measures and a serious public response. Furthermore, because of Japan's rather small proportion of energy consumption in the household sector, as compared to other OECD countries, as well as its higher efficiency of energy use in transportation, major efforts for energy conservation will have to be concentrated in the manufacturing sector. The impact of energy conservation on the economy will have to be assessed carefully, since it may be negative, especially in the short term, when stimulation of industrial production is needed in order to meet the longer-term economic growth target of about 6 percent per year and the 1978 target of 7 percent.

Japanese domestic coal reserves are limited, and coal, as an alternative to imported oil, will also have to be imported from abroad. However, several constraints on the use of steam coal as a fuel, such as transportation limitations and pollution regulations, as well as the lack of infrastructure for steam coal, such as shipping, handling, and storage capacity, pose limits to the amount that can be used. For these reasons, out of 102 million tons of coal imports expected in 1985, only 16 million tons will be for boiler fuel use — the remainder will be used for metallurgical purposes. Substantial increases of coal supply, therefore, can be realized only with intensive investment in the transportation infrastructure and investments in research and development in coal utilization and antipollution technology. Also, long-term inter-
national arrangements for coal supply will be a necessity, since it will be difficult even to maintain the forecasted production level of 20 million tons in the 1985-1990 period.

2. Nuclear Energy

For Japan, with few indigenous energy resources, nuclear energy is the most reliable energy supply for the medium and long term. Failure to meet the targeted nuclear power production level will result in increased oil imports, which in turn will have an adverse impact on the world oil market and could result in a slowdown in the rate of Japanese economic growth. The government is committed, therefore, to an aggressive nuclear program. The most urgent issue in the nuclear power program is the problem of siting and licensing. The decline in forecasted nuclear power production is mainly due to siting and licensing delays, and a strong governmental effort is now under way to promote public acceptance and to expedite licensing procedures.

In the longer term, especially beyond the year 2000, the government believes that the introduction of fast breeder reactors and the completion of the nuclear fuel cycle will be essential to meeting Japanese energy demands and are particularly important in view of anticipated world uranium supply conditions. The government feels that it must, therefore, quickly decide on a basic program for reprocessing, waste disposal, and obtaining long-term nuclear fuel supplies. The United States, on the other hand, has given the highest priority to resolving the weapons proliferation question and advocated postponing the development of reprocessing facilities and the breeder reactor until policies to significantly reduce the weapons proliferation risk are in effect. Furthermore, the U.S. government feels that Japan would not suffer economic loss or impair the security of energy supplies by postponing the development of reprocessing facilities.

The issue of safeguards against the proliferation of fissionable materials for weapons use is a most sensitive and highly political matter for Japan, and the government is pressing for an agreement to build a commercial reprocessing facility during the two-year International Nuclear Fuel Cycle Evaluation (INFCE — see Chapter IV) so as not to disturb the momentum of the Japanese nuclear power program. The whole question of nuclear policy, therefore, remains a highly charged issue and could lead to growing tensions between the United States and Japan. The 1977 U.S.-Japanese agreement, under which Japan will employ a limited amount of U.S.-origin fuel in the Tokai facility for conventional reprocessing while the INFCE continues, is clearly only a temporary solution to the fundamental differences that appear to exist between the two countries in the nuclear area.
3. Stockpiles

A comparison of Japan's vulnerability at the time of the 1973 embargo with that of the United States shows Japan's supply position to be much more tenuous than that of the United States. At the time (1973), Japan relied on oil for over 75 percent of its total energy supplies compared with 50 percent for the United States. With practically no domestic oil production, Japan's need for emergency reserves is greater than that of the United States and other IEA members with indigenous production and diverse energy sources. Unfortunately, however, geological conditions and local public opposition to storage facilities have slowed down Japan's oil stockpile program thus far. The government is hoping to achieve 90 days' worth in storage by the end of 1979 and expects to extend the amount further, with about 10 additional days' worth, by the early 1980s. But, because of limits on land use, greater public acceptance and the development of new storage technology, such as offshore or underground stockpiling, will be required to accomplish this goal.

4. Summary

In conclusion, it is clear that the Japanese goal of holding oil imports to 7.45 million barrels per day in 1985, while maintaining an average 6 percent annual GNP growth rate, will only be achieved with great difficulty and will require major new government initiatives. Recent optimistic views on the short-term world oil supply situation and the current strong foreign exchange position of Japan have tended to obscure these difficulties and have raised questions about the importance of vigorous government action. Furthermore, the uncertainty of the future energy situation appears to be reducing the incentive of industry to make the capital investments necessary to prepare for higher-priced energy in the 1980s. In view of the vulnerability of the Japanese economy to sharp changes in energy prices and the importance of Japan in the world oil market, we would urge the Japanese government to make maximum efforts to achieve the 7.45 import target and to focus public opinion on the seriousness of the problem.

E. CANADIAN RESPONSE

The embargo of 1973 brought into focus for Canadians the value of domestic petroleum resources and the importance of improving supply

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43 It is instructive to compare the relative impact of a supply disruption on Japan and on the United States. For Japan, a 10 percent loss in oil imports from OPEC would mean a 10 percent loss in oil supplies and a 7.5 percent loss in total energy supplies. For the United States, on the other hand, a 10 percent loss in imports from OPEC would cause a loss in oil supplies of less than 4 percent and a loss of total energy supplies of less than 2 percent.
systems, of stepping up exploration and development activities, and of restraining oil demand growth. After implementing a number of emergency measures to assure adequate supplies of heating oil to Eastern Canada, the government decided to move to a single national oil price, regardless of whether the oil was imported or domestically produced. These measures were followed by a short-term freeze of domestic prices and the establishment of an export tax on oil being exported to the United States.

1. Post-Embargo Policy Developments

Once the immediate crisis had passed, attention turned to finding ways of enhancing oil supplies in the longer term. In April 1974, the Canadian government began to phase domestic oil prices toward international levels. While international oil prices were at $9.60 per barrel (f.o.b.) at the time, domestic prices were frozen at $3.80 per barrel. It was agreed, therefore, that the domestic crude price at the wellhead would rise to $6.50 for a period of fifteen months. Shortly before this period had expired, the Petroleum Administration Act was passed, giving the federal government the power to set oil and gas prices and authority over other oil and gas matters such as collecting oil export taxes and providing subsidies for imported oil. In July 1975, the domestic price of oil was again raised, to $8.00 per barrel (at the wellhead), for a period of twelve months. Increases to $9.05 in July 1976 and $9.75 in January 1977 were followed by a policy of adjusting oil prices upward semi-annually by $1.00 per barrel (subject to not exceeding the U.S. average price or the price f.o.b. Persian Gulf). Subsidies, however, continued to be provided for imports into Eastern Canada.

The stated purpose of the domestic pricing policy was to raise these prices to levels high enough to bring on new supplies of oil, provide incentives for such vital but costly ventures as frontier exploration and development and pipeline construction, and promote efficiency and restraint in energy use. It was also designed to reduce the subsidization of oil consumption under the Import Compensation Program and diminish the flow of Canadian wealth to the oil-exporting countries.

44 The Department of Supply and Services was authorized by the Governor-in-Council to purchase up to 420 thousand barrels of heating fuel from Rumania and up to a million barrels from Caribbean sources. (Eventually, only about half the total amount was purchased, with cargoes totaling 740 thousand barrels.) As far as supply from domestic sources was concerned, efforts were directed at finding methods of transporting supplies of Western crude to Eastern Canada. Since the Western Canadian industry was operating at capacity prior to the crisis, this meant, in effect, diverting oil from the U.S. export markets, which at the time absorbed about 60 percent of Canadian production.
By the end of 1974, it became apparent that fiscal systems in Canada were not conducive to increased petroleum exploration and development; in fact, they were neutralizing the incentive for increased activity that higher domestic prices were expected to create. As domestic prices were allowed to rise, increased gross production profits were almost entirely absorbed by a combination of the federal and provincial government “take.” One reason for this was that the federal government had in early 1974 made provincial royalties non-deductible by industry for income tax purposes in order to preserve a reasonable share of profits (after royalties) “for all Canadians.” And the provincial governments took advantage of the advent of higher prices to increase their royalties. As a result, the proportion of the price rise that the petroleum industry was able to retain was so small that it failed to provide the incentives needed for the kinds of ventures the government had hoped to promote, and drilling activity moved sharply downward.

In December 1974, a major program was announced by Alberta to reduce the tax burden on the petroleum industry and to provide special incentives to promote exploration. Saskatchewan and British Columbia followed suit with measures to rebate part of the higher tax liabilities resulting from the nondeductibility of royalties. The following summer, the federal government announced that, effective in 1976, the corporation tax rate would be lowered and that the tax abatement (specifically for petroleum) introduced in November 1974 would be replaced by a resource allowance (by which companies could deduct 25 percent of their adjusted production income).45

The net effect of these changes was some reduction in the federal share of resource revenues and a great increase in the incentive for petroleum exploration — although not for development. The Canadian oil industry has since responded to this combination of price and tax incentives with a burst of exploration and development activities. Drilling activity in Western Canada in 1976, for example, increased 37 percent over 1975, and the upward trend appears to be continuing. Total capital expenditures by the oil industry were $9 billion in 1977, up from $5.5 billion in 1975. Yet, it is important to note that drilling activity in frontier areas actually declined during this period to the point where in 1977 the federal government established a special incentive program for these areas. This program, however, has not yet produced results because of delays and jurisdictional disputes.

45 Shortly after this announcement, Alberta reduced its effective royalty rate; British Columbia introduced an exploration incentive scheme and reduced its royalty rate; and Saskatchewan, in November, announced plans to change its own system in order to raise producers’ returns.
2. New Energy Projects

The Canadian government also decided to take a direct hand in the development of Syncrude production. In 1973, Syncrude Canada Ltd. had begun site work for a $1.2 billion project that was to produce 125 thousand barrels per day of synthetic crude by 1977. By early 1975, the project was in jeopardy — costs had inflated, future government tax and price policies were uncertain, and one of the project's participants (Atlantic Richfield Co.) had dropped out. To forestall failure, in February 1975, federal and provincial governments stepped in to save it. The governments of Canada, Alberta, and Ontario reached an agreement with the three remaining private participants (Cities Service, Imperial Oil, and Gulf Canada) to form a new partnership to continue the construction and operation of the Syncrude plant. The federal government took over a 15 percent share, Alberta 10 percent, and Ontario 5 percent. In addition, the federal government undertook to assure international prices for all Syncrude output, a pledge that has been implemented by legislation passed by Parliament in June 1978.

The Syncrude project is now nearing completion. Production started up in mid-1978 at about 55 thousand barrels per day and will reach its 129 thousand barrels per day permit capacity by 1982. The company is now studying the feasibility of expanding the project. The success of this venture is significant, not only for its contribution to increasing domestic supply but also for the encouragement it will provide to further ventures of a similar costly and complex nature.

In March 1975, agreement was reached between the federal government and Interprovincial Pipe Line Ltd. to construct a crude oil pipeline extension from Sarnia to Montreal in order to improve crude oil transportation facilities and the security of oil supply to the East. While such a link had been under discussion from time to time for nearly twenty years, the necessity for the system expansion was underlined by the oil embargo and events of the previous winter. In July 1976, the 520-mile line was completed and regular deliveries of Western crude to Montreal began.

In July 1975, the Petro-Canada Act established a national oil company to provide the federal government with a greater "presence" in petroleum exploration and development directly and through joint ventures with other companies. The act gave Petro-Canada the authority "to negotiate for and acquire petroleum and petroleum products from abroad to assure a continuity of supply for the needs of Canada in the interests of Canada, to carry out research and development projects in relation to hydrocarbons and other fuels, and to engage in exploration for, and the production, distribution, refining
and marketing of, fuels.” Petro-Canada began operations on January 1, 1976, taking over responsibility for more than $500 million worth of federal government oil industry investments, including the government’s 15 percent equity interest in Syncrude, a 45 percent interest in Panarctic Oils, and participation in the Polar Gas project. Priority was given to proving domestic reserves and exploring frontier areas. Petro-Canada has also become involved in such ventures as exploration off the east coast.

3. **Energy Conservation**

In addition to these steps aimed at increasing domestic energy supplies, the Canadian government has turned its attention to curtailing demand growth. The Department of Energy, Mines, and Resources in 1973 established the federal Office of Energy Conservation (OEC) and shortly afterward established conservation programs, coordinated by the OEC, to deal with public information, federal in-house energy use, policy research and development, and general research and development. Specific measures included: an imposition of a $0.10 federal excise tax on gasoline; the removal of federal sales taxes on insulation; the setting of fuel economy standards for automobiles; and an accelerated program to draft new guidelines for the design, construction, and operation of energy-efficient buildings. In 1976, the federal government released a report on Canadian energy policy that adopted the target of reducing the average rate of growth of energy use in Canada, over the next ten years, to less than 3.5 percent per year by appropriate pricing measures and energy conservation initiatives.46

4. **Summary**

To conclude, the national goal is now to achieve “energy self-reliance.” With respect to oil, this goal is expressed in terms of holding net oil imports in 1985 to 800 thousand barrels per day, or one-third of domestic requirements, whichever is less.47 Despite some initial difficulty in resolving federal-provincial differences over oil price policy, the Canadian government now appears to have accepted the need to provide incentives for industry to expand domestic supply and is moving forward to accomplish this goal. Certainly, some features of

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46 The government estimates that the 3.5 percent target growth rate in energy use was met in 1977, down from an average annual growth rate of 5 percent in the 1965-1975 period. How much of that reduction is attributable to a slowdown in economic growth and how much to conservation is difficult to determine.

47 Without vigorous programs of supply enhancement, energy substitution, and conservation, imports would likely approach 50 percent of domestic needs in the mid-1980s.
the Canadian program for domestic supply expansion can serve as models for some other Trilateral governments — including the United States — that are still struggling with this issue. Yet, it is also true that further refinements in the Canadian policy will probably be needed if the overall production goals are to be achieved. Production taxes remain high and environmental regulations have stalled east coast drilling and the development of an adequate transportation system. Furthermore, it is questionable whether a system of subsidizing exploration is as effective as rewarding success through the market system.

F. RESPONSE OF INTERNATIONAL INSTITUTIONS

The 1973 embargo confronted international institutions with a number of new problems that placed new demands on them:

* The successful embargo posed the issue of supply security in a new and urgent way.
* Principal control over international oil prices shifted to the exporting countries.
* The dramatic increase in oil prices created a major financial burden for many of the importing countries and posed difficult questions about how to manage the newly created international liquidity and how to recycle oil exporter surpluses to the countries with large balance-of-payments deficits.
* A growing interest in nuclear energy increased the risks of nuclear weapons proliferation.

All four of these problems required coordination of national policies and the creation of new international mechanisms. The remainder of this section reviews the progress made to date in creating multilateral arrangements to deal with the issues of (1) supply security, (2) the financial burden of higher oil prices, (3) dialogue with the OPEC countries and nonoil-exporting LDCs, and (4) nuclear weapons proliferation. It concludes with a brief assessment of some of the recent IEA initiatives.

1. Supply Security
The most important international response to providing secure oil supply in the event of another OAPEC embargo was the International Energy Agency’s emergency allocation program. This program provides for measures to constrain consumption, to share available oil resources, and to draw down emergency stocks in the case of oil supply shortfalls exceeding 7 percent of normal supply levels of the group or any of its
members. As part of the agreement, members have agreed to establish by 1980 an emergency reserve equal to 90 days of the previous year's net imports. The operational and logistic regulations for this scheme are detailed and complex, and so far the allocation system has only been tested in simulated crises. The allocation program is intended to provide its members with useful insurance against serious supply interruptions and to deter such interruptions. This deterrence function is reinforced by the quasi-automatic activation process for the scheme.

The IEA emergency program makes demand restraint the first line of defense against oil supply losses. Emergency drawdowns of stocks are second. Thus, in a 9 percent oil loss, as occurred in 1973-1974, the group emergency reserve drawdown obligation would be the equivalent of only 2 percent of IEA normal consumption, assuming, of course, that demand restraint was effective. In such a case, at 1976 import levels, 60 days of net oil imports in stock would last 1,800 days or nearly five years.

OPEC provided 77 percent of IEA member country (including France) gross imports in the year ending June 30, 1977; OAPEC countries provided 45 percent; and Saudi Arabia, Kuwait, and the United Arab Emirates (UAE) provided 30 percent. According to a

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48 Under the terms of the agreement, when at least one member loses more than 7 percent of its oil consumption, but the group loses less than 7 percent,
   a. the embargoed country absorbs its embargo loss up to 7 percent of its consumption, and
   b. the other members share the remaining shortfall among themselves on the basis of their consumption.
When the group as a whole loses more than 7 percent but less than 12 percent of its normal consumption,
   a. each country restrains demand by 7 percent,
   b. the remaining shortfall is shared among all members on the basis of imports, and
   c. countries draw down their emergency supplies as necessary to maintain their consumption at 93 percent of normal.
When the group as a whole loses 12 percent or more of its normal consumption,
   a. each country restrains demand by 10 percent,
   b. the remaining shortfall is shared on the basis of imports, and
   c. countries draw down emergency supplies as necessary to maintain consumption at 90 percent of normal.

The system works in such a way that those countries highly dependent on imports such as Japan and most of Europe bear a proportionately greater share of the emergency reserve requirement since their storage requirements are more nearly equal to their domestic oil consumption.

49 EC members have agreed to a storage target of 90 days of the previous year's domestic sales. E. W. Krupel estimates that few European IEA members will achieve a usable stockpile of 45 to 60 days of net imports in the 1980s, while the United States, now committed to a strategic reserve of 1 billion barrels by 1985, may have as much as 120 days of net imports (at an import rate of 8 million barrels per day).
recent study of the stockpile system, a 20 percent IEA supply loss would deplete 30 days of IEA stocks in 176 days, assuming that these 1976 levels of dependence remained constant and the IEP 10 percent demand restraint formula was adhered to. But 1977 data on IEA imports reveal that Saudi Arabia, Kuwait, and the UAE would have to reduce their exports to IEA countries by nearly 90 percent to cause this to happen (i.e., cause a 20 percent reduction in IEA supplies). This reduction is far greater than these same countries imposed in 1973. If the curtailment were a unified Arab effort, the OAPEC producers would have to reduce exports by 60 percent to bring about the same 20 percent supply loss, and if it were a joint OPEC effort, the reduction would have to be 36 percent.

These calculations suggest that the current IEA program, if implementation continues, would prove an effective contingency plan for dealing with "emergency" supply disruptions such as oil field sabotage or even those caused by civil war in an important producer. It also appears to provide adequate protection against some types of embargoes — although the outcome of such action is more difficult to predict, and the very existence of emergency reserves may encourage an adversary to maximize supply cuts in order to deplete reserves more quickly. Furthermore, IEA vulnerability will increase unless actions are taken to curb U.S. imports. The Carter Administration has estimated that U.S. imports could reach as much as 16 million barrels per day in the 1980s, which would raise the level of IEA imports significantly. Under such a scenario, which probably overstates the case, the Saudi share of IEA imports could increase from 24 percent in 1977 to 50 percent in 1985 with the result that a 50 percent reduction in Saudi supplies could cause a 25 percent reduction in IEA imports.

It would be mistaken, therefore, to see in the IEP much more than a potentially helpful insurance mechanism for use in relatively short-term interruptions. A drawn-out confrontation with large supply cutbacks would still cause significant economic damage, although the scheme might make these cutbacks more bearable by spreading them out over a group of countries. On the other hand, conflict might escalate as a consequence of activating the program, and a prolonged confrontation could cause tensions among the members of the IEA, since a shortfall of oil would have a far more serious impact on those member countries whose reliance on oil to satisfy energy demand is great. Large emergency stocks might even out such differences but so far not all governments have established such stocks.\(^\text{50}\) Especially pertinent, for

\(^{50}\) Table 9 shows 1976 stocks in several Trilateral countries. These figures include both working stocks and trading stocks so that the amount that would be available to sustain economic activity in the event of an embargo is somewhat lower.
### TABLE 9
**Average Stocks in Several Trilateral Countries**

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<thead>
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<tbody>
<tr>
<td><strong>Average Stocks of</strong></td>
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<tr>
<td><strong>Crude Oil and</strong></td>
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<tr>
<td><strong>Principal Finished</strong></td>
<td></td>
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<tr>
<td><strong>Products in</strong></td>
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<td></td>
<td></td>
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<tr>
<td><strong>Selected Countries</strong></td>
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<td></td>
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<tr>
<td>(in millions of barrels)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>661.0</td>
<td>710.0</td>
<td>761.0</td>
<td>764.0</td>
</tr>
<tr>
<td>West Germany</td>
<td>128.8</td>
<td>146.3</td>
<td>153.6</td>
<td>164.4</td>
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<tr>
<td>France</td>
<td>n.a.</td>
<td>217.3</td>
<td>222.3</td>
<td>197.3</td>
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<tr>
<td>Italy</td>
<td>126.4</td>
<td>149.4</td>
<td>136.8</td>
<td>122.1</td>
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<td>Netherlands</td>
<td>58.9</td>
<td>73.0</td>
<td>72.4</td>
<td>66.3</td>
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<tr>
<td>Japan</td>
<td>203.5</td>
<td>254.0</td>
<td>266.5</td>
<td>272.4</td>
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### Average Stocks in Days of Previous Year’s Domestic Sales of Principal Finished Products

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<tr>
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</thead>
<tbody>
<tr>
<td>United States</td>
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<td>56</td>
<td>63</td>
<td>64</td>
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<tr>
<td>West Germany</td>
<td>59</td>
<td>63</td>
<td>79</td>
<td>80</td>
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<tr>
<td>France</td>
<td>n.a.</td>
<td>125</td>
<td>138</td>
<td>113</td>
</tr>
<tr>
<td>Italy</td>
<td>94</td>
<td>105</td>
<td>93</td>
<td>85</td>
</tr>
<tr>
<td>Netherlands</td>
<td>176</td>
<td>228</td>
<td>279</td>
<td>258</td>
</tr>
<tr>
<td>Japan</td>
<td>67</td>
<td>75</td>
<td>82</td>
<td>90</td>
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</tbody>
</table>

### Average Stocks in Days of Previous Year’s Net Oil Imports

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<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>United States</td>
<td>154</td>
<td>123</td>
<td>136</td>
<td>137</td>
</tr>
<tr>
<td>West Germany</td>
<td>50</td>
<td>52</td>
<td>60</td>
<td>68</td>
</tr>
<tr>
<td>France</td>
<td>n.a.</td>
<td>88</td>
<td>92</td>
<td>99</td>
</tr>
<tr>
<td>Italy</td>
<td>71</td>
<td>77</td>
<td>69</td>
<td>71</td>
</tr>
<tr>
<td>Netherlands</td>
<td>108</td>
<td>129</td>
<td>138</td>
<td>159</td>
</tr>
<tr>
<td>Japan</td>
<td>49</td>
<td>52</td>
<td>55</td>
<td>61</td>
</tr>
</tbody>
</table>

1. Average month-end stock levels for all countries except Italy, for which only end-of-quarter data is available after 1973.
2. Net imports, that is, total imports less exports (including international marine bunkers).
the purposes of this study, is that the program is designed as a response to an embargo or purposeful “squeeze,” not as a means of managing a period of rapidly escalating prices, as described in Chapter II.

2. Financial Burden of Higher Oil Prices

The problem of managing the financial burden of higher oil prices requires finding a method of distributing the oil deficit (a cumulative $145 billion for the three years from 1974 through 1976) among importing countries in such a way as to make the burden of adjustment bearable. Following the embargo, the major financing requirements were handled by the private banking sector and by cooperation between central banks working for the most part through the Group of Ten. At the same time, the IMF, the World Bank, the OECD, and a number of other established and new institutions played an expanded role. Most significant was the adjustment of the IMF to the new problems of international current account imbalances. In 1974, a special oil facility was established to provide credit for short-term adjustment problems, with a subsidy fund for the most seriously-affected developing countries.\(^{51}\) In 1975, access was liberalized to the facility for compensatory financing in cases of export fluctuations.\(^{52}\) In 1976, total access to credit tranches was temporarily increased from 100 to 145 percent of each member’s quota, until the coming into effect in 1978 of significantly increased quotas.\(^{53}\) In addition, 25 million ounces of IMF gold holdings are in the process of being sold and the proceeds made available for grants and concessionary loans for LDCs.\(^{54}\)

The World Bank also increased its role in recycling by expanding

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\(^{51}\) In the two years of its existence, from mid-1974 to mid-1976, about SDR 6.9 billion was loaned through this facility.

\(^{52}\) Lending through this facility mushroomed to SDR 2.308 billion in 1976, about twice the total borrowings over the previous thirteen years of its existence. The 1977 total dropped sharply to SDR 0.241 billion.

\(^{53}\) Overall IMF lending, through regular tranches and the various facilities, rose rapidly from 1974 (SDR 4.053 billion) through 1976 (SDR 7.010 billion), though it fell back in 1977 (SDR 3.425 billion). In addition to the facilities mentioned in the text, an “extended facility” was created in 1974 to provide somewhat longer-term credits, though it has not been significantly used so far.

substantially both its borrowing and lending operations. As in the case of the IMF oil facility, OPEC countries played an important role in providing funds.55 A significant policy decision of the Bank was to finance LDC indigenous hydrocarbon resource development, for in the past it had consistently refused to consider loans for such projects. A special credit facility to provide additional lending at subsidized interest rates was established temporarily with the "Third Window."56

In 1975, an OECD Financial Support Fund of $25 billion was proposed to facilitate secondary recycling. The fund, supported by all OECD members (but not ratified by the United States Congress) was designed to borrow, with the backing of multilateral guarantees, funds to lend to members with large current account deficits. The risk was to be borne by the subscribers to the fund in accordance with a quota system. This proposal has now been dropped in favor of the IMF Witteveen Facility.

Aid flows to developing countries increased from 1974 to 1977. Several OPEC countries set up funds — jointly or individually — to channel surplus revenues into developing countries; examples include the OPEC Special Fund, the Arab Bank for Economic Development in Africa ($1 billion in working capital), the Saudi Fund for Development ($3 billion in working capital), the Kuwait Fund for Arab Economic Development ($1.6 billion in loans outstanding), the Islamic Development Bank (capitalized at $2.4 billion), and the Arab Fund for Economic and Social Development.57 Official development assistance from Trilateral countries also increased, as shown in Table 10.

In spite of these efforts, however, and the successful management of huge current account imbalances in the past three years, doubts persist regarding the future capacity of the international financial system to


57 Total OPEC net concessional disbursements in 1976 came to $5.2 billion or 2.14 percent of their combined GNP. This percentage of GNP compares with a percentage under 0.7 for most Trilateral countries (except the Netherlands and Norway) and under 0.3 for some (Japan, West Germany, Italy and the United States). The comparable figures for the USSR and China are approximately 0.06 percent. The largest donor countries were Saudi Arabia ($2.8 billion or 5.8 percent of GNP), the UAE ($1.2 billion or 10.2 percent of GNP), Kuwait ($756 million or 3.2 percent of GNP), and Iran ($741 billion or 1.1 percent of GNP).
<table>
<thead>
<tr>
<th></th>
<th>Net Disbursements ($ Millions)</th>
<th>As % of GNP</th>
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</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>89</td>
<td>271</td>
</tr>
<tr>
<td>Canada</td>
<td>160</td>
<td>713</td>
</tr>
<tr>
<td>Denmark</td>
<td>20</td>
<td>168</td>
</tr>
<tr>
<td>France</td>
<td>774</td>
<td>1,616</td>
</tr>
<tr>
<td>West Germany</td>
<td>461</td>
<td>1,433</td>
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<tr>
<td>Italy</td>
<td>98</td>
<td>216</td>
</tr>
<tr>
<td>Japan</td>
<td>305</td>
<td>1,126</td>
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<tr>
<td>Netherlands</td>
<td>92</td>
<td>436</td>
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<tr>
<td>Norway</td>
<td>13</td>
<td>131</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>481</td>
<td>717</td>
</tr>
<tr>
<td>United States</td>
<td>3,413</td>
<td>3,437</td>
</tr>
<tr>
<td>All DAC Countries</td>
<td>6,132</td>
<td>11,302</td>
</tr>
</tbody>
</table>

1. In addition to countries involved in the Trilateral Commission, the Development Assistance Committee (DAC) of the OECD includes Australia, Austria, Finland, New Zealand, Sweden and Switzerland. Two European Community members involved in the Trilateral Commission are not members of DAC—Ireland and Luxembourg.

cope with the strains associated with the financing of very large balance-of-payments deficits. The extent to which the imbalances in the distribution of these deficits are as yet unsolved is demonstrated by the pattern that evolved between 1974 and 1976: Total deficits of $145 billion were carried largely by three groups: (1) five developed countries (Canada, the United Kingdom, Italy, France, and Sweden) with a combined current account deficit for the three years of $53 billion; (2) the developed countries outside the Group of Ten, with a combined cumulative deficit of $62 billion; and (3) the nonoil-producing developing countries with a deficit of $77 billion (about 23 percent of the total value of their exports during the 1974-1977 period). The United States, West Germany, Switzerland, and the Netherlands, on the other hand, showed a cumulative balance of payments surplus of about $40 billion, although the U.S. situation has subsequently deteriorated sharply. 

The real problem is to transform oil revenue surpluses into productive capital investment in both the LDCs and the more highly industrialized countries; for, in the long run, such investment is necessary to solve the adjustment problem and ensure that the world's economy continues to grow. The basic requirements for developing such a process are present: (1) Some oil producers have accumulated large foreign exchange surpluses that could be used for long-term investment; and (2) the huge capital requirements necessary to create new energy supplies and restructure end-use energy demand, as well as to permit the development of other sectors of the LDC economies, have created large unmet needs for long-term capital. But the process of turning those newly created surpluses into long-term investment has yet to be addressed in any systematic way. It is encouraging, however, that in 1975-77, about two-thirds of the OPEC surplus went into a variety of longer-term investments — the reverse of the proportion in 1974. Chapter IV of this report contains some recommendations for institutional changes to facilitate this recycling process.

Following the oil crisis, the Conference on International Economic Cooperation (CIEC) became the focal point for international attempts to cope with three of the major problems posed by the aftermath of the crisis: the price of oil, the long-term balance of supply and demand of oil and energy, and the shift in power in the international system. CIEC quickly developed into a curious hybrid: a platform for intensive

consultation and discussion with no formal decision-making character and a forum for bargaining over a wide range of issues that were simultaneously being dealt with by other international institutions such as the UN, UNCTAD, and GATT.

After a first unsuccessful preparatory meeting in April 1975, the CIEC was finally convened in December 1975. Energy questions were linked to the whole complex of issues concerning relations between the industrialized countries and the Third World. This ran counter to the original Western concept of tripartite talks on energy — designed to build an informal alliance of industrialized and LDC oil importers to deal with the major oil exporters. The end result was that OPEC had succeeded, however, in getting Western approval to broaden the agenda for the CIEC and thus managed to retain the support of the other LDCs. Work, accordingly, was divided into four different committees — energy, raw materials, development, and finance. After about eighteen months of discussions in working groups, subgroups, and plenary discussions, the CIEC ended in June 1977. The concluding joint statement noted areas of agreement and disagreement between the participants (lined up as the “Eight” and the “Nineteen”), made a number of recommendations for action, and referred these to other international organizations for further consideration.59

Discussions in the energy committee produced, at first glance, only disagreement about a number of fundamental issues — the indexation of oil prices, the protection of petrodollars invested in Western economies, the factors to be taken into account in pricing decisions, and the continuation of consultation and discussions on energy in a permanent form. There was, however, some useful dialogue. Governments of exporting and importing countries had jointly explored and discussed (1) oil prices, (2) measures to ensure the security of supplies against interruption, (3) the long-term balance of energy demand and supply, and (4) the steps to be taken to improve the situation of the nonoil-producing developing countries. Furthermore, agreements on principles (although not on actions) were also achieved within the energy committee of CIEC and in the plenary meetings. For example, participants concluded that (1) the world was facing a problem of phasing out hydrocarbons and that every effort should be made to reserve remaining supplies for nonenergy uses and sectors of consumption where there

59 The developed countries were Australia, Canada, Japan, Spain, Sweden, Switzerland, and the United States. The countries of the European Communities were represented by the European Commission. The nineteen developing countries were Algeria, Argentina, Brazil, Cameroon, Egypt, India, Indonesia, Iran, Iraq, Jamaica, Mexico, Nigeria, Pakistan, Peru, Saudi Arabia, Venezuela, Yugoslavia, Zaire, and Zambia.
are no adequate substitutes for oil, (2) oil-importing LDCs should be
given special consideration in their attempts to cope with the expected
high costs and scarcity of energy supplies, and (3) an international
energy program is needed to encourage production of alternative sources
of supplies and conservation.

Apart from the work of the Energy Committee, there were three
other major results of the conference which are relevant to energy.
First, the North undertook to contribute, subject to necessary legislative
approval, 1 billion dollars in a special action program to help meet
the urgent needs of individual low-income countries "facing general
problems of transfer of resources." Second, the industrial nations agreed
in principle to underwrite a "common fund" to finance buffer stocks
for certain raw materials exported by the LDCs, although little progress
has been made towards implementation. Third, the industrial countries
pledged to increase their volume of official development assistance
(ODA) "effectively and substantially" in real terms.60

The extent to which these recommendations will actually influence
policies remains to be seen; their acceptance, however, already indicates
some agreement on the basic energy supply-and-demand factors at work
in the world. Therefore, while the CIEC itself had little formal success
in dealing with these pressing issues, it is probably fair to say that it
has contributed to general moderation and cautiousness and has also
served to direct attention to long-term global issues. The failure to
establish a permanent body for energy consultations (as suggested by
the Eight) is a setback, but not necessarily a permanent one. The CIEC
identified the need for a cooperative approach in solving the world's
energy problems and laid the groundwork for continuing exporter-importer
consultations in the future. Yet, much remains to be done, and
since the issues dividing the North and South are so difficult and com-
plex, it appears that progress will only be possible in a piecemeal fashion
over a period of time. In Chapter IV of this report, we present some
recommendations for continuing the North-South dialogue.

In late 1977, a new North-South initiative was launched at the sug-
gestion of the World Bank and under the leadership of former West
German Chancellor Willy Brandt. The "Brandt Commission" will seek
to open up a North-South dialogue on a limited range of major issues,

60 On this latter point, it should be noted that the industrialized countries that
had not yet accepted the United Nations target of 0.7 percent of GNP as their
annual aid figure committed themselves to work toward that goal. Japan, for
example, pledged to more than double its ODA over the next five years; Canada,
in addition to canceling repayment of some of its existing loans, announced its
intention of raising its annual contribution toward the 0.7 percent target. U.S.
Secretary of State Vance promised to seek from the Congress "a substantial in-
crease" in bilateral and multilateral aid programs.
including energy, and draw its membership from industrialized countries as well as major oil-exporting nations and the nonoil-producing LDCs. We applaud this effort to seek a new forum for dealing with energy and other issues that are truly international in scope and require close cooperation among nations in order to permit satisfactory solutions. Governments should watch with interest to see whether a mechanism such as the Brandt Commission, operating outside of normal diplomatic channels, might be more effective in finding solutions to some of these global questions than the more formal and traditional institutions discussed earlier.61

4. Nuclear Energy

Two major international efforts have been launched to reduce the risks of nuclear weapons proliferation, and, at the same time, to assure that the energy policy objectives of the countries which must import nuclear plants, fuel, and technology are achieved. The first of these is the Nuclear Suppliers Club which met for the first time in February 1975.62 The Suppliers Club has issued guidelines for nuclear exports which provide for tightened fuel cycle safeguards and extend them to nuclear facilities using imported technologies and to re-exports of nuclear equipment and technology to third countries. These guidelines also provide for assurances by importers that they will (1) provide adequate physical protection of nuclear installations against unauthorized use and handling of weapons grade material, (2) prevent the fabrication of any kind of nuclear explosives, and (3) enter into a consultation process in the event these safeguards are violated. The rules also urge restraint on exports of sensitive materials.

The second international initiative is the forty-country International Nuclear Fuel Cycle Evaluation (INFCE), designed to explore areas of the nuclear fuel cycle which might offer possibilities for reducing the weapons proliferation risk. INFCE working groups are dealing with uranium and thorium resources, the availability and distribution of enrichment facilities, possibilities of supply guarantees to resource-poor countries, economic and weapons proliferation implications of various reprocessing technologies, breeder technology alternatives which would minimize the circulation of weapons grade material, problems of spent

61 Another important international initiative is the Interfutures Project of the OECD, which is a three-year project on "Future Development of Advanced Industrial Society in Harmony with that of Developing Countries." This project may well prove to be a useful institutional framework for the discussion of Trilateral energy strategies.

62 The members of the group are the United Kingdom, West Germany, France, the United States, the Soviet Union, Canada, Japan, the Netherlands, Sweden, Switzerland, East Germany, Poland, Czechoslovakia, Italy, and Belgium.
fuel in thermal reactors, and new reactor concepts. INFCE started its work in Washington in October 1977 and is expected to take at least two years. An evaluation of these two initiatives — as well as recommendations for further policy initiatives — are contained in Chapter IV of this report.

5. Recent International Energy Agency Initiatives

In response to the threat of future shortages, the International Energy Agency has taken several important steps. The members in 1976 completed a broad review of conservation achievements and are currently developing a series of research and development projects that involve collaboration among member countries. The Governing Board, meeting at the ministerial level in October 1977, issued a communiqué that reported agreement on both a group import target (of 26 million barrels a day) for 1985 and a set of “principles” member countries would follow in the conduct of energy policy. The principles included, among other things, agreement to (1) formulate specific national energy programs with import reduction a central goal; (2) allow domestic energy prices to rise to levels that encourage conservation and development of alternatives; (3) replace oil in heating, electricity, and other areas, where possible; (4) place stronger emphasis on research, development, and demonstration; (5) establish a favorable investment climate for the development of energy resources; and (6) plan for means, other than decreased oil consumption, to handle a possible supply shortfall. A principle supporting the steady expansion of nuclear-generating capacity was also included, but a number of countries insisted on formulating individual positions on this question. While the import target and the policy principles are very general in nature, the ministerial meeting and the communiqué together represent an important first step in the search

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64 The 26 million barrels per day import-demand target set for 1985 compares with IEA import demand of 22 to 23 million barrels per day in 1976 and an estimated IEA import demand in 1985 without stronger policies to expand supplies and curtail demand of approximately 33 million barrels per day. The IEA’s Standing Group on Long Term Cooperation (SLT) completed its first report on the review of energy policies and programs in IEA countries in mid-1978. On the basis of this report, the projected level of IEA imports in 1985 was increased from 25.5 million barrels per day to 29.2 million barrels per day based largely on an increase in the projected level of U.S. imports. The SLT report noted that “vigorous pursuit of current and contemplated policy measures could reduce IEA import requirements to or below the 26 Mbd objective. Especially important in the achievement of this objective is prompt enactment of comprehensive energy legislation in several countries, particularly in the United States. Other major elements include stronger conservation measures, no further slippage on nuclear power development, displacement of oil in power generation, and increased utilization of steam, coal, and natural gas.”
for agreement on common goals for the future. Indeed, they provide a clear justification for the kinds of concrete recommendations found in Chapter IV of this report.

Another important outcome of the October 1977 meeting was the agreement to conduct regular systematic reviews of member country energy policies as a means of assessing the effectiveness of these policies in meeting the IEA group targets. Member countries accepted the principle that they would consider strengthening or modifying their policies if the IEA review indicated that a country's energy program was not making a sufficient contribution toward achieving the previously agreed upon group target. The IEA has placed a high priority on the review process for monitoring individual country programs and ensuring that the measures necessary to reach the group target are being taken. Whether or not these reviews will accomplish the IEA expectations remains to be seen; yet, at a minimum, they should provide useful data for intercountry comparisons. In addition, the reviews may have the effect of encouraging parallel and complementary measures to be taken in each of the Trilateral regions.
IV. ELEMENTS OF AN ENERGY TRANSITION STRATEGY

In the introduction to this report, we suggested that it is helpful, in analyzing world energy issues, to divide the energy future into three time periods: short term, medium term, and long term. This section addresses the major problems we see in each of these time periods and recommends strategies for dealing with them.

In the short term, we feel that the principal energy problem is the threat of oil supply disruptions arising from embargo, war in the Middle East, terrorism, or natural disaster. In the medium term, there could be, in addition, the possibility of a financial crisis. In the long term, the principal threat is that of rapid oil price increases which could occur under certain of the more pessimistic projections outlined in Chapter II. Surrounding each of these energy problems, of course, is a whole range of political, economic, and financial issues that must be taken into account in the formulation of energy policy. Accordingly, the recommendations offered here are designed to deal with the principal problems associated with each of these time periods while at the same time providing linkages to the other issues where dialogue and cooperative actions among nations are necessary — e.g., economic growth, trade, finance, security, environmental regulations, and relations with the Third World.

Before discussing specific recommendations, it is important to reaffirm the need, stressed in previous Trilateral Commission reports, for a much stronger joint commitment by the Trilateral countries to a general strategy and plan for energy that incorporates a mix of both national programs and international initiatives. This commitment to cooperation and advance planning is even more imperative today than it was just after the "oil shock," not only to facilitate a unified response to the threat of a precipitous price increase in the longer term but also to establish a sound basis for building bridges with other countries and groups of countries that have a fundamental stake in the orderly evolution and management of the global energy system. As we have pointed out in our review of the responses to the 1973-1974 crisis, much has been accomplished since that time in the way of international cooperation. Unfortunately, however, when these actions are measured against the economic and political strains depicted in the "worst case" scenarios, they must be judged inadequate.
A precondition for the development of a global energy strategy is the creation of a process for more careful monitoring of international energy as a total system. This monitoring process entails collecting detailed and accurate data from both private and public entities about current activities and future plans. Such information would then become the basis for comprehensive and continuous projections of the world's energy future. The IEA has made an important start in this direction, but a great deal remains to be done. As is obvious from the survey of the most recent forecasts, there are significant areas of disagreement among specialists about the global energy future. If at all possible, we must increase the level of confidence in the estimates of future trends and alternatives — the costs of mistaken judgments are simply too great. Institutionally, a fortified IEA is a logical place for this activity to be carried out. The IEA — together with the United Nations — could also work to form a broad communications network, tying together institutions and agencies conducting energy forecasting and research of all kinds throughout the world. At the same time, both the IMF and the World Bank should step up their efforts to monitor the financial changes taking place as a result of new patterns in world energy trade and to consider the implications of these changes for future financing requirements of developed and developing nations.

A second precondition for strengthening energy policy is a better-informed public in the Trilateral countries, especially in the United States. No significant improvements will be possible until the average citizen in these countries is aware of the threat to his/her security and welfare, and the security and welfare of allied countries, that could accompany energy supply interruptions or sharp price increases. We therefore urge heads of government and other leaders in the Trilateral area — and particularly the President of the United States — to mobilize public opinion to recognize the seriousness of the energy problem and to keep the public informed on a regular basis of the progress being made in finding solutions. Further, we recommend that the IEA broaden its periodic audits of member countries to include progress in achieving conservation and supply increase goals and that governments treat these audits as serious matters and give them the widest possible distribution and visibility within their countries.

A. THE SHORT-TERM PROBLEM — ASSURING SUPPLY SECURITY

1. Emergency Arrangements
With the creation of the IEA and the signing of the IEP, a major
step was taken to reduce the risk of another oil embargo or other type of supply disruption. The analysis presented earlier in this report (pages 50-54) suggests that the IEP is an effective mechanism for dealing with short-term emergency problems, such as accidents, natural disasters, limited civil wars, and some types of embargoes. It also suggests, however, that the IEP would not necessarily be effective against a prolonged disruption and that the vulnerability of IEA members would deteriorate if U.S. imports were allowed to increase to the point where the Saudis' market share rose appreciably.

There have been some questions raised about the mechanics of the IEP. For example, critics have questioned the IEA method of measuring stockpiles since it tends to overstate the amount that can be actually withdrawn by including in the definition of emergency reserves oil that must be kept in the distribution system for smooth operation. Critics have also pointed out that there may be significant economic costs associated with demand restraint. For example, the Federal Energy Administration calculated that a 5.5 percent oil loss could cause a 0.5 percent or a $9.5 billion GNP loss to the United States. For Europe and Japan — which appear to use energy more efficiently than the United States — the loss could be proportionately greater.

In order to compensate for any inadequacies in emergency stockpiles and to offset the economic impact of demand restraint, it may be desirable to increase emergency stockpiles in some of the more vulnerable IEA members — i.e., those countries with a high percentage of imported oil and where oil constitutes a relatively large part of the total energy system. For example, we recommend that Japan move forward

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63 According to E. W. Krapels, "it is impossible to calculate a working stock level applicable to all countries surveyed (Germany, France, the Netherlands, Italy, Japan, and the U.S.). Nevertheless, it is obvious that working stocks comprise a significant portion of European and Japanese petroleum stockpiles, and that therefore, these countries cannot be considered to have 90 days of emergency reserves. In fact, the maximum level of actual emergency reserves cannot be determined due to the difficulty of pinpointing a working stock level, that is, it cannot be proven that each of the countries has even a 60 day emergency reserve." E. W. Krapels, "Emergency Petroleum Reserves" (unpublished draft).

64 Even as stockpile targets are under review with, perhaps, the ultimate objective of increasing them, it is important to remember that the fill rate and targets for oil stockpiles must be sufficiently flexible to respond to changes in world oil supply-and-demand conditions. For example, in 1978, the United States will need to import approximately 650,000 barrels of oil per day to fill the Strategic Petroleum Reserve to its targeted level of 250 million barrels by the end of the year and maintain imports for the Reserve in the range of 300,000 to 400,000 barrels per day in the remainder of this decade to achieve the overall goal of a 500 million barrel stockpile in 1980. These amounts — when added to the European and Japanese imports for the same purpose — could have a significant effect on world prices.
with its current plans to increase the emergency stockpile to 120 days because of the heavy dependence of the Japanese economy on imported oil. Any changes in the program, however, should be made within the framework of the existing IEP agreement, and as a result of an assessment by individual governments of their present and future vulnerability to a supply interruption and their willingness to exercise demand restraint if supplies are reduced. In addition to raising the level of stockpiles, there appear to be opportunities for international cooperation in order to make stockpiling easier or cheaper, especially for the most vulnerable countries. For example, it may be worth considering whether or not the United States might provide storage facilities for Japan as part of a broad Alaskan “oil swap” agreement (see page 89).

2. **The Arab-Israeli Conflict**

Beyond these measures to improve the stockpiling program, there are a number of more significant and far-reaching steps Trilateral governments should take to reduce the risk of oil supply curtailment by strengthening and improving Trilateral relationships with OPEC and some of its key members.

The 1974-75 Trilateral reports stressed the importance of an early and orderly settlement of the Arab-Israeli conflict, based “essentially on the principle of non-acquisition of territory by force and the right of all states to secure existence,” and noted that the positions of the Trilateral countries on the central questions involved were “not far apart.” We reassert this position and — in view of the devastating consequences of another Middle East conflict — urge all parties to seek at least an interim settlement at this time. We hope that the Sadat initiative will bear fruit, and we encourage the United States to continue in its efforts to bring the negotiations to a successful conclusion. Further, we urge the other Trilateral governments to support the United States in this effort. Yet, in making this recommendation, we recognize that a Middle East settlement will not “solve” the longer-term energy transition problem. The best that can be hoped for is that a moderation in tension would reduce the risks of an embargo and perhaps produce an environment more amenable to a longer-term solution.

3. **Cultivating a “Special Relationship” with Saudi Arabia**

Earlier in this report, we outlined the key role Saudi Arabia could play in effecting a future embargo and the special impact that Saudi willingness to expand production capacity will have on the future behavior of oil prices. It is essential, therefore, that Trilateral governments explore carefully the kinds of inducements and assurances that would help convince the Saudi leadership to avoid sharp changes in production that
would have serious economic consequences and to make the investments necessary to expand production capacity. The United States has traditionally had a “special relationship” with Saudi Arabia that appears to have been responsible, at least in part, for the Saudis’ moderate stance on price increases. This relationship is based on the U.S. military and security commitment to the Saudis, and it is unlikely that any other Trilateral country would be an acceptable alternative.67

We believe that this “special relationship” can help accomplish overall Trilateral objectives and should be continued. At the same time, it will become increasingly important for the United States to remain in close consultation with the other Trilateral governments concerning the nature of this relationship so that this “special relationship” does not undermine the movement toward greater cooperation of Trilateral governments with each other. Western Europe and Japan are far more dependent on Saudi crude than the United States and will remain so for the indefinite future.

B. THE MEDIUM-TERM PROBLEM — AVOIDING FINANCIAL CRISIS

The problem of managing the financial burden of higher oil prices was assessed earlier in this report (pages 54-57), and the steps that have been taken since the embargo were reviewed. As a result of these actions, we have concluded that the current system had sufficient leeway to deal with the shorter-term balance-of-payments disturbances that arose as a result of the level to which oil prices rose in 1973-74. Yet we have also concluded that major new shocks to the system — such as another sharp oil price increase or a prolonged economic recession — are beyond its capacity to absorb without serious debt service problems and disruptions to the economies and growth prospects of many LDCs and semi-industrial countries. Such major new shocks are not likely. It is possible that they could occur, however, and this possibility suggests a need for institutional changes to increase the capacity of the system to absorb such shocks and provide a wider margin for avoiding financial distress.

As the first step, the IMF, as the focal point for short-term balance-of-payments financing, should be strengthened and broadened in that role. Strengthening the IMF should begin with further increases in IMF quotas, as the basis for general drawings and lending capacity, by at

67 This “special relationship” is not defined in any public document, although it is expressed in part in the 1974 agreement between the two countries to create bilateral military and economic commissions.
least 25 percent prior to the next five-year review. At the same time, it is important to provide intermediate-term financing to facilitate balance-of-payments adjustments. The IMF should play an important role in this system as well, although private financial sources will be complementary and continue to handle the major portion of the financing. In some cases, modifications in the conditionality criteria of the IMF might also be necessary. Furthermore, it is important that countries with large balance-of-payments deficits be encouraged to begin taking the steps necessary to reduce these deficits through internal adjustments to their economies.

The IMF “Supplemental Financing Facility” (the Witteveen Facility) should be ratified and implemented. This facility is designed to help meet part of the stresses placed on the system by increased oil prices. We recommend that two adjustments to the facility be made as expeditiously as possible. First, the facility should be expanded in size to at least $15 billion since the initial $10 billion tentatively agreed on may not be sufficient. Secondly, responsibility for the disposition of the facility’s resources should be expanded to include some Third World, nonoil-exporting countries such as Brazil and South Korea. This change would not only validate a higher dollar volume of lending capacity but would also more directly involve the LDCs in the management and utilization of the facility. Third, the lending terms under the facility should be modified to provide an interest rate subsidy for LDCs with very low per capita incomes.

A second major step, which we recommend, is to expand long-term development financing available to the LDCs and, specifically, to create additional mechanisms for channeling OPEC funds into this type of financing. Funds available for long-term development financing from the advanced industrialized countries have, in many cases, not kept up with the rate of inflation. We believe, therefore, given the strains imposed by oil price increases, that these countries, on a conditional and reciprocal basis, should commit themselves to raising their economic assistance to LDCs to the UN targets of 0.7 percent of GNP over the next

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68 The proposed 25 percent increase is beyond the 33 percent increase to 39 billion SDRs recently approved as part of the Sixth General Review.

69 It has been suggested that the next step beyond the Witteveen facility would be for the Trilateral governments to work with OPEC to create a support fund — perhaps under the auspices of the IMF — to assist the weakest developing countries in handling the rising costs of oil imports. Such a fund might be financed by a small tax on oil traded in world markets, with the proceeds used to subsidize the oil imports of countries with per capita incomes of less than $300 per year.
five years.\textsuperscript{70} Countries with balance of payment surpluses, strong currencies, and full employment should move more rapidly toward that target.

In the process of increasing long-term development assistance, the mix of assistance flowing through international organizations should be increased. A further replenishment of the funds for the International Development Association (IDA) should be initiated, to provide at least $10 billion of soft-loan capacity over the next seven years for lending to very poor countries, and the United States should complete its contributions for the fourth and fifth replenishments of IDA funds.\textsuperscript{71} In addition, a major increase in capital for the International Finance Corporation should be approved. Finally, the capital base of the World Bank should be increased to remove constraints on lending to higher-income LDCs. Each of these actions would tend to depoliticize long-term development financing and limit the required increase in lending from bilateral aid agencies. This process of depoliticizing multinational financing facilities will be less than fully effective, however, if the U.S. Congress continues to insist on trying to add human rights conditions to IMF and World Bank lending criteria. For this reason, we recommend that this effort be dropped as well as other attempts by the U.S. Congress to intervene in the internal management of international financial institutions.\textsuperscript{72}

\textsuperscript{70} While supporting the 0.7 percent target in principle, we recognize that it may be politically unrealistic for certain industrialized countries — notably the United States whose development assistance currently stands at 0.25 percent of GNP. Clearly, in the case of the United States, there is the need for strong Presidential leadership to ensure that the funding for bilateral economic assistance programs to LDCs at least keeps up with inflation; otherwise, the amount of support is likely to be eroded even further. We, therefore, urge the U.S. President to speak out forcefully in support of a longer-term commitment to the 0.7 percent target.

\textsuperscript{71} The United States is the only donor which has not completed its contribution to the fourth replenishment of IDA. The U.S. share is one-third of the $4.5 billion total. The U.S. share is $2.4 billion of the $7.7 billion fifth replenishment. The second installment of this U.S. contribution is part of the foreign aid bill before Congress in 1978 — a bill which also contains part of the remaining U.S. obligation for the fourth replenishment. The U.S. is also in arrears on pledged contributions to a few other international financial institutions.

\textsuperscript{72} On this point, Robert McNamara, President of the World Bank, recently pointed out that “among the most fundamental of human rights are the rights to minimum acceptable levels of nutrition, health, and education. Hundreds of millions of people in developing countries, through no fault of their own, are denied these rights today. The bank, perhaps more than any other institution in the world, is helping large numbers of these people move out of absolute poverty toward a more decent life. What we are not capable of is action directly related to civil rights. Such action is prohibited by our charter, it would require information and competence which we lack, and there is no agreement on acceptable standards of civil rights in a wide variety of political circumstances found in developing countries.” (\textit{The New York Times}, April 2, 1978.)
There should also be consideration given to establishing a multilateral "co-financing" guarantee facility. Under such an arrangement, the OECD and OPEC countries might provide guarantees against default on a limited volume of new bond issues or bank loans to developing countries that meet certain criteria. Another possibility is for the IMF to develop joint financing programs with private financial institutions. These programs might involve cross-default protection between the IMF and the participating private institutions and also give the private institutions the protection of any IMF restrictions that might be negotiated. Both a co-financing guarantee facility and IMF joint financing programs could be helpful in easing the transition from official development assistance to private financial markets for certain countries.

Beyond these measures, however, it is clear that increasing amounts of money will be required for international purposes in future years. Rapid changes in technology, the continuing increase in the world's population, and the growing interdependence of nations are expanding the tasks and, consequently, the financing requirements of the United Nations. Even larger amounts will be needed for several other important international undertakings: meeting LDC development needs, dealing with threats to the environment, maintaining peacekeeping forces in trouble spots, and safeguarding civil nuclear energy facilities. It is important for Trilateral governments to begin studying possible new ways to raise funds for these purposes and develop the necessary mechanisms so that the funds are available to meet needs as they arise and particularly to meet the pressing requirements of the poorer developing nations.73

The precipitous decline in the value of the dollar which occurred during 1978 is clearly having an unsettling impact on the world's financial system and has raised anew questions about the stability of this system and the risks of financial crisis. Furthermore, as the dollar's position has deteriorated, government officials in Saudi Arabia, Kuwait, and other "low absorbers" among the OPEC countries have expressed concerns about the declining value of their dollar-denominated assets and raised again the whole issue of providing incentives for producing oil beyond the levels necessary to sustain their internal economic development programs — a question addressed below (pages 80-81). Clearly, it would be in the interest of financial order for the United States to begin reducing (and eventually eliminate) its balance-of-payments deficit,

73 An analysis of some of the possible new sources of finance is contained in Eleanor B. Steinberg and Joseph A. Yager, New Means of Financing International Needs (Washington: Brookings Institution, 1978). The authors particularly focus on various types of international revenue taxes.
and thereby help to restore confidence in the dollar. Yet if the United States moves too quickly in this direction and attempts to improve its position through restrictions on imports other than oil, it may only shift the deficit to the LDCs and some of the weaker industrialized countries and, by doing so, worsen their problems unless, of course, the restrictions are targeted specifically at an industrialized country such as Japan. The best solution would be for the United States to move quickly to adopt an energy program that would reduce its level of oil imports and the enormous balance-of-payments deficit that the current large oil import bill (about $45 billion in 1977) is creating. In this way, the reduction in the U.S. current account deficit would reduce the OPEC surplus rather than increase the LDC deficit.\textsuperscript{74}

Clearly, a combination of steps is called for by the United States and its major trading partners to create more orderly conditions in international financial markets: (1) early action by the U.S. to reduce its oil imports and rate of inflation, (2) an agreement to maintain economic growth in the other industrialized countries, and (3) the creation of a mechanism to begin designing a post-Bretton Woods monetary system. In the absence of such actions, the world’s financial system may remain out of balance for some time and, thereby, create a prolonged period of unsettled market conditions. This situation, could, in turn, have a dampening effect on world economic growth and invites an escalation of trade restrictions and other forms of protectionism which could contain the seeds of a future financial crisis. Protectionist measures are already beginning to appear; an escalation of them could have serious economic and political repercussions and should be avoided.

C. THE LONG-TERM PROBLEM — MANAGING THE TRANSITION TO HIGHER-COST ENERGY

The forecast presented in Chapter II suggested the need to take steps to deal with the possibility of a large and rapid price increase sometime in the late 1980s or early 1990s. The point was not that such an increase is inevitable or even the most probable scenario, but that — if it occurred — it could be so disruptive to economic and political stability that every effort should be made to avoid it. The difficulty, however, is that new supplies of oil from the North Sea and Alaska’s North Slope may prevent real prices from rising much above current levels, and in the near-term, they might actually continue the decline that began in

\textsuperscript{74} It is clear — because of the long lead times discussed earlier — that even the rapid adoption of a U.S. energy program would only reduce U.S. oil imports over an extended period of time.
1974. In the face of this price behavior, governments may be reluctant to take the steps necessary to avoid a supply crunch in the longer term, even though such steps should be initiated now because of the long lead times necessary to expand energy production and curtail demand growth. These difficulties reinforce the need expressed at the outset of this section for more credible forecasts and more widespread public discussion and debate on energy matters.

This section of the report contains a series of specific steps to ease the "transition problem" and ensure price increases are orderly and gradual rather than sharp and abrupt. These include a Trilateral pricing strategy, an IEA-monitored import reduction target, stepped-up efforts to expand indigenous energy production in the oil-importing LDCs, inducements to Saudi Arabia and other major OPEC producers to expand production, inducements to Communist countries to expand production, a reassessment of the nuclear option, an expanded energy research and development effort, and the continuation of the North-South dialogue. In the remainder of this section, we discuss each of the recommendations in turn.

1. A Pricing Strategy for Trilateral Countries

Part of the problem in developing a Trilateral energy policy since the embargo has been that in a number of instances prices of liquid hydrocarbons and other fuels within the Trilateral area remain below world market levels. Some governments — notably the United States and Canada — have been reluctant to permit domestic prices for oil and natural gas to rise to world market levels because of the anticipated adverse consequences on their domestic economies, their concerns about the impact of rapidly rising prices on certain income groups, and their reluctance to increase the profits of domestic oil producers. Yet this policy of maintaining prices at artificially low levels has been one of the principal factors contributing to public uncertainty about the very nature of the energy crisis. U.S. consumers, for example, seeing that real domestic gasoline prices in 1978 remained below 1950 levels, and receiving no clear-cut signals about future prices, have been reluctant to buy smaller, more energy-efficient automobiles; and industry has installed energy-efficient capital equipment more slowly than might otherwise have been the case. Producers may also have been constrained from moving more rapidly to develop higher-cost supplies.

At a minimum, therefore, we recommend that each Trilateral government review its domestic energy pricing policies and take steps necessary to move domestic prices as rapidly as possible to world market levels. For the United States, one way to accomplish this is by deregulating the price of new natural gas at the wellhead and by gradually remov-
ing price controls on crude oil and petroleum products. Other Trilateral governments should take similar action to ensure that energy prices are no longer subsidized. For example, Canada should continue its present policy of moving oil and gas prices to world market levels; the United Kingdom should discontinue artificially low prices on natural gas; and Japan should remove price controls on kerosene for household use.

We recognize, however, that even if prices throughout the Trilateral area are moved up to world market levels, the response in the industrialized world may not be adequate to prevent the damaging pattern of future price behavior described earlier in this report. World oil prices today are well below the current cost of producing such easily substitutable alternative sources as liquefied and gasified coal, oil from shale, etc., and are likely to remain at these levels for the next five to ten years as new Saudi Arabian, Iraqi, Alaskan, North Sea, and Mexican production comes onto the market and satisfies expected demand growth (and offsets production declines from existing fields). If prices remain at or near current levels, there will be little economic incentive to develop readily substitutable alternative sources or to reduce demand growth as rapidly as would be desirable under the more pessimistic longer-term forecasts. For this reason, it may be appropriate for the Trilateral countries to (1) consider various mechanisms for increasing prices gradually over the next several years in those areas of the economy where it is desirable to encourage conservation and (2) provide special incentives to industry (e.g., loan guarantees, price guarantees, etc.) for the development of alternative sources of energy.75 As several experts have pointed out, it is not price increases per se but rapid and unexpected price increases that are especially damaging to economic growth and stability. The advantage of a program of incentives for the immediate development of alternative sources and to improve the efficiency of energy usage would be a more orderly transition to an era of higher petroleum prices.

The evidence appears to be growing that higher energy prices will stimulate energy conservation, particularly over the longer term. We, therefore, urge each Trilateral government to review its tax structure and develop specific energy taxes for those products where significant savings are possible recognizing that there may be trade-offs with economic growth and the ability to remain competitive in world markets. An obvious example here is a higher federal excise tax on gasoline in

75 Canada, for example, has decided to subsidize production from the Syncrude plant and the United States is considering a program of price guarantees to encourage private industry to develop commercial-sized coal gasification plants and scaled-up coal liquefaction plants.
the United States. The recently proposed oil tax in Japan is another example. Such taxes could provide the revenues needed to finance subsidies for constructing pilot-plant (or demonstration plant) projects to test new energy technologies or for improving public transportation systems.

There are obvious difficulties associated with any attempt to increase prices in the Trilateral countries above world market levels. For example, producers might view the imposition of additional taxes as an excuse to raise prices and attempt to capture the possible revenue increases for themselves. In a purely analytical sense, too, calculating and then achieving consensus regarding hypothetical long-term energy replacement costs would pose a formidable obstacle. In the face of these difficulties, we do not recommend a coordinated pricing strategy at this time, and we recognize that some governments will choose means other than the market mechanism to encourage the development of alternative energy sources and to stimulate energy conservation. Yet if we take seriously the idea of an orderly, phased, and equitable transition of our economies to a new, more expensive mix of energy sources, we must recognize that price signals have to play a central role in assuring that transition. Neither consumers nor investors are going to alter their behavior on the basis of exhortation alone. We urge individual governments, therefore, to carefully assess opportunities to achieve energy prices at least equal to world market levels (and in selected instances beyond them) so that both consumers and producers receive the appropriate signals while there is still enough time to make the adjustments in supply and demand necessary to avoid a crisis.

2. Import Reduction Policies
The Governing Board of the International Energy Agency (IEA) in October 1977 adopted a communiqué that, in addition to listing a number of broad principles upon which members had agreed as a guide to energy policies, endorsed the objective of holding total IEA imports for the year 1985 down to a level of no more than 26 million barrels per day (see page 61). This decision followed a detailed review, coordinated by the IEA Secretariat, of individual country activities in energy. As a group target, 26 million barrels per day is desirable, and we endorse it; indeed, it parallels closely the goals for demand growth recommended by the earlier Trilateral energy task force, which we also endorse.

Unfortunately, a broad "group" target of this kind, or even regional targets, provides little concrete basis for assessing national performance. We, therefore, recommend that the Trilateral countries agree on a series of specific goals for energy consumption, efficiency of use, and reduction of import dependence to be set for each Trilateral country.
after extensive consultation with government officials and others in each country and after careful consideration of end-use efficiency improvements that are possible without seriously affecting economic growth. And beyond the establishment of import reduction goals, and certainly more important than the goals themselves, we recommend that each Trilateral government adopt policies to achieve these goals through demand growth reduction and domestic supply expansion.

a. Demand Growth Reduction

To achieve meaningful improvements in energy efficiency, the historic linkage between economic growth and energy demand growth must continue to be altered — through increases in the real prices of energy, through more careful planning, and through greater public appreciation of energy-saving methods and techniques. All the Trilateral countries have important opportunities to achieve demand growth reduction — the United States in its transportation sector and all countries in residential and commercial buildings and in their industrial sectors. Furthermore, all countries have opportunities to convert electrical generating facilities and industrial boilers from oil and gas to coal. Because of the size of the U.S. economy and its overall importance in Trilateral energy consumption, we feel special attention should be placed on the need for decisive U.S. leadership in implementing a comprehensive energy conservation program. Such a program should include a commitment to moving energy prices to world market levels as rapidly as possible as well as providing incentives for implementing conservation measures in all sectors of the economy. In addition, the opportunities for the cogeneration of electricity should be carefully evaluated and any regulatory barriers to cogeneration eliminated. The United States now imports nearly a quarter of all the oil in world trade, and since 1970, its imports have risen by more than 100 percent; Western European and Japanese imports have risen only 11 percent in the same time period.76

Some of these differences are undoubtedly due to differential rates of economic growth and to declining U.S. domestic production; nevertheless, we feel that there are opportunities for further energy savings in the United States and that the government should create the incentives necessary to realize these savings. If decisive action is taken, it will signal that the United States is at last moving to curb oil imports. Lack of firm U.S. action will likewise send a signal of continued drift.

76 Japan, of course, also expects to have a significant increase in oil imports in the 1977-1985 period. Yet, it is probably true that Japan — which consumes less than one-third the energy per capita consumed in the United States — does not have the same capacity for reducing energy-demand growth.
b. Domestic Supply Expansion

Many of the Trilateral countries have opportunities to expand indigenous energy supplies over the next decade and, by doing so, to reduce the need for OPEC imports. Yet environmental and resource constraints place certain limits on such expansion. As part of the development of a global energy strategy, it seems imperative that agreement also be reached among Trilateral governments on specific supply increase targets. Again, as in the case of demand reduction, the commitment and leadership of the United States with its important offshore oil and gas potential and its vast coal reserves, will be critical. It will also be important, however, for North Sea oil producers to cooperate in this effort and for there to be agreement on goals for expanding coal and nuclear electrical-generating facilities in all countries.

With respect to oil and gas, we urge the United States to begin development of its Outer Continental Shelf (OCS) reserves as quickly as possible and to resolve the environmental questions that appear to be causing delays on the Atlantic OCS and in Alaska. We also urge Norway to move as quickly as possible to permit exploration north of the 62nd parallel. Failure to begin exploration here sends the wrong signal to OPEC. Furthermore, we urge the United Kingdom not to adopt prorationing in the North Sea but to develop and market its oil and gas reserves in an expeditious manner. Finally, we suggest that long-term oil contracts between the United Kingdom and Norway on the one hand and the Continental European countries on the other might contribute to stability of supply and energy cooperation in Europe.

With respect to coal, we urge the United States to begin taking the steps necessary to achieve the production goals outlined in the President’s program. Specifically, the regulatory issues surrounding the mining, transporting, and burning of coal should be resolved and a program to demonstrate coal conversion technologies should be initiated. We also recommend that the Trilateral governments negotiate an international agreement that will ensure the European countries and Japan access to coal imports on acceptable terms. For these negotiations to be successful, however, it is important that potential coal importers

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77 Today there are only 210 million tons of coal in world trade (about 2.5 million barrels per day, oil equivalent), and most of that is coking coal for iron and steel manufacturing. Given the costs of transporting coal and the time lags involved in opening new mines, it is probably unrealistic to expect U.S. coal exports to have a major impact on European and Japanese oil dependency in the remainder of this century. U.S. efforts to expand coal production, if successful, will serve primarily to reduce U.S. demand for imported oil and thereby free up oil supplies for others. Other countries with large coal reserves (e.g., Australia and South Africa) might become important suppliers to Europe and Japan, and Rocky Mountain coal could provide some additional supplies to Japan.
recognize that major increases in production of both thermal and coking coal in the U.S. and Canada are going to require both private investment and significant additions to public infrastructure for railroads and port loading facilities. That kind of expenditure would involve a diversion of funds and effort from other national priorities and will not be undertaken unless long-term commitments are made to ensure an adequate rate of return.

With respect to nuclear power, each country should assess its requirements and capabilities for nuclear energy so that estimates of future generating capacity are more realistic than these estimates have been in the past. (More specific proposals for resolving the difficult nuclear proliferation issues are addressed in a subsequent section.) Finally, with respect to various renewable energy sources (such as solar, biomass conversion, and wind), we urge that the advanced industrial countries proceed immediately to establish reliable cost estimates for those alternatives for which the basic technology has already been developed and to ensure that there are no regulatory impediments to developing and commercializing these technologies.

Throughout the Trilateral area, there appear to be cases where the inability to resolve energy-environmental conflicts is delaying the development of energy supplies. In part, these delays are due to cumbersome regulatory processes and, in part, to the lack of useful information on the health and other environmental impacts of developing and using different energy sources. Trilateral governments should, therefore, reexamine their regulatory processes to ensure that they are not creating unnecessary delays (and costs) and initiate efforts to improve the quality of information on environmental impacts. One way to develop more creditable information is to create an independent committee of distinguished scientists charged with addressing this issue. We would, therefore, support the establishment of such a committee composed of scientists from both the developing and the developed countries, possibly under the auspices of the OECD.

We also recommend that Trilateral governments agree on mechanisms for monitoring closely, analyzing, and reporting on the performance of member governments in meeting their supply increase targets.78 The resulting studies and assessments should be published and widely circulated, not restricted to official use, as several IEA reviews have been in the past. Unless such an arrangement can be agreed on,

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78 Accurate comparisons of individual country performance in achieving goals are currently impeded by the lack of standardized, technically sophisticated, and commonly accepted criteria of measurement. These data should be developed as quickly as possible.
it will continue to be difficult both to hold countries accountable for energy policy actions and to plan intelligently for the future.

3. LDC Energy Production

Many of the nonoil-producing LDCs have potentially large undiscovered reserves of liquid and solid hydrocarbons as well as untapped hydro-electric power sites. In addition, many of these countries may have the potential to make extensive use of solar energy and other renewable energy technologies if the operating problems currently surrounding the use of these technologies can be resolved. Indeed, solar energy, which may not now be economically competitive in the more highly developed industrialized nations, may already make economic sense in an LDC that must import oil at current prices and lacks the well-developed electrical grid and basic technical infrastructure to support a nuclear plant.79

To the extent that LDCs develop their indigenous resources, they ease the competition for OPEC supplies, stimulate internal economic growth, and strengthen their financial position vis-à-vis the rest of the world. To the extent that they develop renewable energy sources, they may find nuclear generating facilities less attractive, thus lessening the risk of nuclear proliferation. It would seem, therefore, clearly in the interest of the Trilateral governments to encourage LDC indigenous coal, oil, gas, and renewable energy production. We do not mean to imply, however, that developing countries should be arbitrarily excluded or restricted in their access to nuclear power, but rather that they should have ready access to other alternatives that might prove less expensive and easier to develop. With regard to nuclear energy, the LDCs should be integrated carefully into any new international arrangements which are developed to permit any growth of nuclear power to occur on a secure basis (see pages 83-87).

Non-OPEC LDC oil production is currently about 4.5 million barrels per day, which compares with OPEC production of 31 million barrels per day and OECD production of 13 million barrels per day. The U.S. State Department estimates that this production could be increased to 9 million barrels per day by 1985, with 8 million barrels.

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79 The U.S. National Academy of Sciences held a joint workshop with the Tanzanian government in August 1977 on the potential of solar energy for the villages of that country. Costs of five solar technologies (minihydroelectric generators, wind, methane generation from organic wastes, photovoltaic cells, and flat-plate solar collectors) were compared with costs of diesel-generated electricity and with electricity from the national grid. According to James W. Howe, chairman of the National Academy of Sciences’ team, each of the five technologies is now competitive with diesel or will be in a few years. See “Solar Energy for Village Development.” *Science*, February 10, 1978, pp. 651-57.
per day coming from non-OPEC countries outside of the Middle East. About half of that potential supply increase would come from Mexico, leaving a potential increase of 1 to 2 million barrels per day from the other non-OPEC LDCs — an amount that is less than the projected increase in non-OPEC LDC demand (excluding Mexico). Thus, except in the case of Mexico, the intermediate-term potential for LDC oil supply increase is not great; nevertheless, it is still advisable for Trilateral governments to facilitate this production wherever possible, since any increase in non-OPEC supply will help reduce the requirements for increased OPEC production.

Unfortunately, the international energy companies — faced with political risks — may be reluctant to provide the technology and capital necessary to develop LDC energy potential. Where such is the case, we recommend that the Trilateral governments provide mechanisms to ensure that LDCs receive assistance to exploit their indigenous energy resources. One avenue for such assistance would be through individual country development assistance programs. Others would be through international financial institutions such as the regional development banks and the World Bank. The latter organization has already made some serious efforts in this direction and has plans under way to expand its role in support of LDC energy development projects. We would support the Bank's efforts in this area and urge it to broaden its program to include exploration as well as development projects. Furthermore, to

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80 There are a number of obstacles to private industry exploration in the LDCs. These include: (1) the government of the country has developed a political orientation that opposes the operation of private corporations (Iraq and Mozambique), (2) the country has strong nationalist sentiments and wishes to develop its resources itself (Mexico), (3) the government of the country is in a state of flux or has recently gone through political changes that have resulted in abrogation of the contracts of previous governments (Angola, Cambodia, Vietnam), (4) there are border disputes with adjacent countries that leave the jurisdiction of prospective areas in doubt (South China Sea, Barants Sea, Falkland Islands, Western Sahara, Gulf of Gabes), and (5) the country's negotiating position with respect to ownership, control, profit split, transfer of technology, or other terms of the proposed ventures is unworkable. These latter sorts of policy issues can usually be resolved through negotiation — sometimes extensive.

Since the 1973 oil price hike, and particularly in the last two years, there has been a considerable easing in the obstacles to industry exploration. Contractual problems or terms that appeared too severe in Australia, Malaysia, Nigeria, and Indonesia, and had inhibited exploration for up to two years in these countries, have now been reasonably well resolved. Furthermore, Argentina, Chile, and Brazil, which heretofore had reserved their exploration rights for local entities, have all recently invited bids from the international industry.

81 The World Bank has estimated that there are potentially about $30 billion of energy development projects that could be undertaken over the next five years in the oil-importing LDCs. The Bank has tentatively made plans to participate (up to 15 percent of the project cost) in approximately $10 billion of these.
encourage both the bilateral and World Bank programs, we would recommend that an appropriate international organization be charged with carefully assessing LDC energy resources and the prospects for future LDC energy production as well as LDC requirements for technical assistance and financing. This information could form the basis for a Trilateral program of assistance to the LDCs. Finally, we encourage LDCs to open up additional acreage for private exploration and to reduce barriers to private company exploration and development activity.

One possibility for stimulating LDC energy production, which might also help to strengthen the cooperation in energy matters among OPEC, the oil-importing LDCs, and the industrialized world, would be to create an international organization with the responsibility for monitoring and promoting LDC energy production. Such an organization, which might be called the International Center for Energy Research and Exploration, could be charged initially with assessing the needs of LDCs for energy technology and sponsoring projects to develop and demonstrate this technology. For example, the Center might initially sponsor research in areas such as solar energy, biomass conversion, wind, and small-scale hydropower. The assessment of these projects could provide the basis for World Bank financing of commercial applications of these technologies within various LDCs. The Center might also subsidize oil, gas, coal, and uranium exploration projects — perhaps in cooperation with and with the assistance of private industry — to determine the potential in a particular LDC for energy production. Funding for the Center might come from the oil producers and the developed nations and be managed by a council consisting of representatives from producers, developed nations, and oil-importing LDCs.

4. Cooperation with OPEC

Continued explorations of the possibilities for cooperation between advanced industrial countries and OPEC is essential. Interdependence between these two groups of countries has increased greatly in the last few years and will continue to increase in the future. Yet the CIEC conference was the third major international negotiating session in less than a year to achieve much less than some of the Trilateral governments had originally hoped for — the others being the UNCTAD meeting in Nairobi and the common fund negotiating conference in Geneva. A continued search for forums in which common interests of OPEC, the developing nations and the industrialized countries can be discussed and an openness to cooperation of many kinds is especially important in view of the economic and political consequences for OPEC, the Trilateral countries, and the LDCs of failure to reach some kind of accommoda-
tion. Efforts such as the Brandt Commission described earlier are examples of the type of arrangements that should be encouraged. And, the creation of some type of forum for North-South discussion (see pages 89-90) is also important.

One area where discussions might prove useful is in developing new mechanisms for investing the growing OPEC surplus, for at the present time, it is difficult to see how the "low absorbers" can be induced to expand production to the extent necessary to avoid supply problems in the late 1980s or early 1990s unless there are mechanisms in place to ensure that the investment of this surplus will be protected from inflation as well as expropriation. Clearly, it may be necessary for the Trilateral countries — including, importantly, Japan — to develop a package of guarantees or other institutional arrangements that will appeal to OPEC.\textsuperscript{82} Perhaps the best inducement would be a program to bring inflation under control and, in the case of the United States, to stabilize the value of the dollar.\textsuperscript{83} Beyond this it would be important for the Trilateral governments to ensure that any artificial barriers to long-term investment of OPEC funds are removed and that OPEC exports (e.g., refined products and petrochemicals) have access to markets in the industrialized world.

In a larger sense, it is also important for Trilateral governments to recognize that all of the OPEC nations, and particularly Saudi Arabia, Kuwait, and the United Arab Emirates (UAE), will play a critical role in finding an orderly approach for managing the energy transition. Undoubtedly, the political structures in the Middle Eastern countries,

\textsuperscript{82} In a recent interview, Saudi Oil Minister Sheikh Ahmed Zaki Yamani said:

Either we reduce our production so as not to accumulate reserves or you help us to invest our reserves abroad at a fair rate of return and with fair security and access to the markets. Your problem (in the industrialized countries) is not the financial surplus; it's the availability of oil. If we produce more, it's a sacrifice on our part to help you. But we are not going to deplete our oil reserves for you unless we have enough appreciation and incentive to do so.

\textsuperscript{83} While a number of OPEC governments have expressed concern about the stability of the dollar, it seems clear that the U.S. capital market will continue to play a major role in the financial intermediation process, including providing an outlet for the investment of OPEC funds and the channeling of funds from OPEC "low absorbers" to borrowers elsewhere. The U.S. Treasury estimates that, at the end of 1977, about $40 billion of OPEC's $170 billion of financial reserves were invested in the United States, primarily in the form of Treasury securities, other marketable bonds, equities, and U.S. bank deposits. There is also some evidence that these assets are gradually being translated into longer-term investments. Beyond this investment placed directly in the United States, an additional $70 to $80 billion of OPEC assets have been placed either in other national capital markets or in the Euro-banking market with most of these placements being dollar-denominated.
though more stable in the 1970s than previously, will change over the next 10 years and these changes could have implications for the cost and availability of energy to the industrialized world. Thus, the policies of Trilateral governments must stay attuned to these political dimensions and responsive to the implications of possible changes for world energy markets.

5. Inducements to Communist Countries to Expand Production

Any global approach to energy issues must eventually involve the Communist countries. The CIA forecast indicates moderate USSR and Eastern European consumption of imported oil in the near future, and it is possible that Japan in the next several years will seek significant oil and gas imports from China and/or the Soviet Union. Therefore, even if the CIA forecast is too pessimistic about Soviet indigenous production, it would seem prudent to invite constructive participation on the part of the Soviet Union, Eastern Europe, and China in discussions about world energy prospects.\(^4\)

Clearly, it would ease the world supply-and-demand situation if the USSR and Eastern Europe were — as a group — to remain a net exporter. The Trilateral governments should, therefore, consider the advisability of providing capital and technical assistance (particularly in offshore drilling) to the Soviets as part of an overall energy agreement. Such an arrangement might speed the development of such areas as the Bering Sea where the possibility of large reserves exists and where the lack of the latest drilling technology may be slowing down the drilling program.

The argument has been made that it would be unwise for the Trilateral governments to help the USSR balance its energy budget as long as the United States — the other major superpower — is likely to remain heavily dependent on external supplies for at least the next decade. A policy that maintained the Soviet's independence from foreign energy supply might give the Kremlin more freedom to maneuver internationally than would be desirable. Certainly the costs and benefits of investing technology and capital resources in the USSR should be weighed against the costs and benefits of investing an equivalent amount to develop energy resources elsewhere. One possibility would be to negotiate an agreement under which some agreed-on share of newly developed Soviet oil and gas would be made available to the West, including Japan, in exchange for any technical and financial assistance.

\(^4\) According to the Conservation Commission's report to the World Energy Conference, about one-third of the world's remaining undiscovered oil reserves (330 billion barrels) lie in Russia, Eastern Europe, and China.
The terms and conditions of such a negotiation might be an agenda item for the Trilateral Energy Summit discussed later in this report.

6. Reassessment of the Nuclear Option

It is of the utmost importance that the Trilateral countries develop a joint policy on nuclear energy and nuclear weapons proliferation as quickly as possible. Although it is clear that nuclear power will continue to play a part in the future energy systems of many Trilateral countries and that the further development of this energy source can reduce the dependence of the Trilateral area on imported oil, many important questions remain to be resolved with respect to the nuclear option. At the same time, a number of the more advanced LDCs have ordered (or are in the process of ordering) nuclear plants. Providing these facilities and guaranteeing the future access of these countries to peaceful nuclear energy and technology in a manner consistent with minimizing the risks of weapons proliferation is critically important for the Trilateral governments.

The recent U.S. nuclear initiatives — designed to reduce the motivation as well as the technical ability of nations to acquire nuclear weapons — while useful in emphasizing the need for international consensus on the nonproliferation problem, have caused deep concern among some of the other Trilateral governments. The concern is that any limitations on the development of spent fuel reprocessing facilities or the breeder reactor will increase the already heavy dependence of the industrialized world on OPEC oil. At the same time, some of the oil-exporting countries (notably Iran) have indicated that access by oil producers to nuclear energy plants and fuel should be provided as a consideration for continued access by industrialized countries to OPEC oil on terms and conditions consistent with world economic growth and stability. Before these concerns begin to erode some of the joint progress that has been made on other energy and economic issues, they must be resolved.

A number of important new steps have already been taken by Trilateral countries to preserve the distance between commercial and weapons uses of nuclear energy. As indicated in Chapter III, the

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85 It is instructive to review the comments in the OECD report on this subject. "If OECD governments were to decide to shift away from nuclear power as the primary future means of generating electricity on safety and environmental grounds, the consequences for increased oil imports could be grave." Op. cit., World Energy Outlook, p. 62.

86 These new initiatives build on important earlier accomplishments, such as the system of international safeguards administered by the International Atomic Energy Agency (IAEA), established in Vienna in 1957, and the Non-Proliferation Treaty (NPT), signed in 1968 and effective in 1970.
Nuclear Suppliers' Group, which has been meeting in London, has published a set of guidelines to govern nuclear exports. These guidelines, which may be further refined in future discussions, set forth safeguard conditions, urge restraint on sensitive transfers, and delineate consultation procedures in case of safeguards violations. And as a result of recent French (December 1976) and West German (June 1977) decisions, there has emerged a broad agreement among suppliers regarding the undesirability of further transfers of reprocessing plants.\textsuperscript{87} Finally, with the inauguration of the International Nuclear Fuel Cycle Evaluation (INFCE) in Washington in October 1977, a group of forty countries, including both suppliers and consumers and developed and developing nations, has come together to study the technical and institutional problems in organizing the nuclear fuel cycle in ways that lessen the danger of weapons proliferation while supplying needed energy.

All these are important initiatives, and we give them our full support. However, while INFCE is likely to help clarify technical alternatives and possibilities, it cannot by itself be expected to resolve the concerns regarding nuclear energy availability that trouble many of the Trilateral governments.\textsuperscript{88} The purpose of INFCE is to provide technical information for decision-makers, not to provide a forum for negotiations. Yet it is clear that a number of issues must be resolved — and resolved quickly — if the world is to make an orderly transition to the next generation of nuclear technology and avoid the risks of proliferation. We recommend, therefore, that a parallel effort to explore the political and institutional arrangements needed to prevent proliferation take place among the key Trilateral countries concerned with these issues. These negotiations should be both bilateral and multilateral, depending upon the issue under consideration. An example of a successful bilateral negotiation was the U.S.-Japanese agreement on the use of the Tokai reprocessing facility referred to earlier. More broad-based discussions will be necessary for ensuring individual countries access to enriched fuel or for resolving waste management questions.\textsuperscript{89}

Two of the institutional mechanisms we feel should be given high

\textsuperscript{87} This agreement does not extend to earlier arrangements with Pakistan or Brazil, although measures have been taken to minimize the weapons proliferation risks associated with these transactions.

\textsuperscript{88} While INFCE is charged with exploring areas of future cooperation, and many hope that it will lay the foundation for a consensus among participants, it is not expected to achieve a comprehensive agreement at the end of its two-year life. Participation in the study does not commit members to any future arrangements the group might recommend.

\textsuperscript{89} The leaders of the nine European Community governments at an April 1978 conference in Copenhagen made it clear that they would not agree to renegotiate
priority in any negotiations that might take place are the establishment of a “fuel bank” under international control and an international agreement for dealing with nuclear waste and spent fuel storage. These proposals respond to the concerns of member countries that they have an adequate, timely, reliable, and economic supply of nuclear fuels and to their need for confidence that there will be adequate and safe means of storing the waste from their reactors. We also believe that the issues involved in these two areas can be resolved over the two-year life of the INFCE if serious discussions are initiated soon. Two other institutional arrangements frequently discussed in connection with nuclear energy — regional reprocessing centers and regional uranium enrichment facilities — should be assigned lower priority in the immediate future. Both these areas are complex and will require considerably more technical work before they can be resolved without increasing — rather than reducing — the risk of weapons proliferation.

In the near future, we also recommend that member countries move quickly to strengthen the nuclear suppliers’ guidelines to include “full-scope safeguards” (i.e., agreements to have all nuclear facilities under IAEA safeguards, not only those obtained from supplier countries). Work should also proceed on an assessment of the uranium resource base (at various uranium prices) and on estimates of future demands for enrichment and other nuclear facilities. Finally, we feel the Trilateral countries should take a strong stand in support of strengthening the IAEA inspection system that is responsible for guarding against unlawful diversion of peaceful nuclear material. To carry out this work and to safeguard the additional reactors that will be coming on line over the next several years, the IAEA’s budget should be increased and a permanent funding plan developed.

Although many of these recommendations will be discussed at the INFCE, they will not be negotiated and resolved. It is essential, therefore, for the Trilateral countries to move quickly, and independently, to agreement on these and other nuclear energy issues, since many member countries feel they should not delay the development of nuclear facilities. Unless parallel efforts are initiated with some urgency, there is the danger that the INFCE will end with no agreement on the fun-

contracts for uranium supplies as required by recently enacted U.S. legislation. This dispute is an example of an issue which should quickly be resolved through multilateral negotiation outside of INFCE.

An alternative (or a supplement) to the fuel bank proposal would be a plan to require the registry of uranium or enriched uranium supply contracts between producers and consumers. An international treaty could provide that — once made — such agreements could not be suspended except for clear violations of agreed upon rules with disputes subject to binding arbitration.
damental questions dividing the Trilateral governments than currently exists. If this happens, the likelihood is that individual governments will pursue their own nuclear objectives — particularly if the oil situation deteriorates — and the risk of nuclear weapons proliferation will increase.

For some of the Trilateral countries, such as Japan, the role of nuclear power in supplying electricity is a critical part of the government's current strategy for reducing future dependence on foreign oil. Yet, as these governments develop a nuclear energy program within the context of their overall energy policy, it will be important for them to constantly review and reassess their commitment to nuclear power. Throughout this report, we have repeatedly stressed the uncertainty associated with future energy forecasts and the need, therefore, for governments to keep the widest possible range of energy options open so that they maintain the flexibility to shift energy strategies to take advantage of unforeseen shifts in oil supply and demand conditions, new technologies, changing social values, and so forth.

One of the most effective ways of providing this flexibility is to make maximum efforts to improve energy productivity by initiating broad-based energy conservation programs. A second way is to maintain diversified sources of energy supply and to avoid becoming overcommitted to any particular technology, geographical area (for energy imports), or fuel. Nuclear plants are large, highly capital-intensive energy sources primarily useful for providing base load generating capacity, and in some countries, they will undoubtedly play an increasingly important role in this sector of the electric utility industry. Yet, citizens groups in almost every one of the Trilateral countries have raised serious questions about their government's nuclear program, claiming that the current generation of fission reactors creates certain undesirable environmental effects and has the added disadvantage of producing a highly-radioactive waste that must be stored for thousands of years. Some of these protests have been quite vocal and have had the effect of limiting the number of sites available for future plants, increasing the time required to build new plants, and, as a consequence, increasing the cost and reducing the potential economic benefits of nuclear energy.

This "social constraint" is a relatively new dimension in the nuclear equation that governments must take into account in evaluating their future nuclear plans. The existence of such a constraint will make it increasingly necessary for governments to encourage open discussion and debate on nuclear issues and to disseminate as widely as possible correct information on the benefits and safety of nuclear power in comparison with the risks associated with it. In assessing nuclear futures, however,
any additional costs that this constraint may have imposed — as well as the full costs of dealing with the storage of nuclear wastes and the other problems associated with nuclear energy — should be taken into account in comparing nuclear plants to alternatives such as coal, accelerated conservation programs, etc.

7. Strengthened Research and Development Programs

In order to prepare for the eventual decline in availability of world oil supplies and to develop new, reliable, environmentally safe and renewable sources of energy, a substantial increase in commitments of funds to research and development is necessary. This need is especially urgent given the problem of the long lead times involved both in developing new technologies and in securing significant production from them.

Each of the industrialized oil-importing countries should assess its own research and development needs and focus its efforts on the areas offering the most significant potential payoff — areas, for example, in which it is particularly vulnerable or has unique advantages for development. The United States has great opportunities in regard to improved energy efficiency in transportation and increased use of its vast coal reserves; consequently, much of its research and development activity might be directed toward conservation and coal conversion. Other countries, like Japan, might seek more balanced research and development programs where, for example, a heavily nuclear-oriented program might be broadened to provide increased attention to solar and other alternative energy sources. One way to strengthen the research and development efforts of Trilateral countries would be to set an agreed on target for these expenditures in each country based on a combination of factors such as GNP growth, import dependency, domestic production, and energy resource base.

In addition to the contribution of national research and development activity, the goal of developing new sources could profit from bilateral and multilateral efforts. The first step in determining what type of research and development programs are needed and where opportunities for joint programs exist is for the IEA to conduct a periodic and continuing assessment of the research and development efforts being undertaken by member countries. Again, the work to date of the IEA and its research and development groups represents an important start in this direction, but we feel much more needs to be done.

One high priority item for the IEA is to take steps to assure sufficient support for the renewable energy technologies — particularly those that may turn out to be less capital-intensive but offer many benefits to the highly-developed as well as the less-developed countries. The special UN Conference on Science and Technology for Develop-
ment, scheduled for 1979, will provide an important opportunity for a comprehensive assessment of the state of the art and the setting of goals for further research and development of renewable energy technologies. As we indicated earlier, programs to develop renewable energy technologies and assist the developing nations in using these could be financed at a relatively modest cost and might increase the resiliency of LDC economies while reducing their need to borrow to finance oil imports.

One thrust of the Trilateral governments might be to foster international cooperation in, and financial support for, a number of energy demonstration projects, perhaps financed through the World Bank or the United Nations Fund for Natural Resources. Geophysical exploration and exploratory drilling, for example, might appropriately be supported by such institutions for some areas of the world. Coal conversion plants would be another candidate. In other areas of the world, such as the Orinoco deposits in Venezuela, public financing might promote resource development where a private corporate role, for historical reasons, would not be acceptable. The proposed International Center for Energy Research and Exploration described earlier might also be a good institutional framework for such efforts.

In any program to assess new energy sources, great care should be taken to evaluate the performance of total energy systems rather than specific pieces of a system (e.g., a total electrification program rather than a specific power plant). One of the problems of research and development project evaluation to date has been the overemphasis on technology, hardware, and pilot demonstrations, all of which often provide poor grounds for assessing the true costs and adaptability of alternatives.

We also support efforts by the Trilateral governments to develop bilateral research programs. For example, it appears that there may be support in both the United States and Japan for the creation of joint research programs in solar and fusion as part of a broad-based effort between the two countries to increase cooperation in science and technology.91 One suggestion has been that the best way to begin would be

91 In May 1978, Japanese Prime Minister Takeo Fukuda proposed such a program in a speech before the Japan Society and the Foreign Policy Association in New York City. In his remarks, the Prime Minister called attention to the fact that world oil and gas reserves were depleting assets and called for a jointly funded program to develop fusion and solar energy: "With a view to making more efficient use of limited resources available, and to make Japan-U.S. cooperation more meaningful, I wish to propose that Japan and the United States seriously study the establishment of a joint fund for the advancement of science and technology to serve as a framework for international cooperation in these areas."
to appoint a blue-ribbon panel of experts from each country to make specific recommendations on how to proceed in each area following a general agreement on the overall concept and approach by the two heads of state. In any such program, the door would be left open for participation by other countries and results would be widely disseminated.

8. Other Opportunities for Trilateral Cooperation
Wherever possible, the Trilateral countries should search for other opportunities to cooperate more closely with each other and with OPEC in coordinating the oil trade. An example of such cooperation is the widely discussed bilateral "oil swap" agreement between the United States and Japan (turned down in 1977 by the United States) that promised a significant savings for the American consumer while reserving the Alaskan product for the United States in case of supply interruption. We strongly recommend that the United States and Japan resume negotiations on this issue. We also urge that the United States and Canada continue to explore ways of cooperating to facilitate the movement of oil and gas supplies from frontier areas to the south. Failure to develop "international approaches" in cases where it is clearly in the economic interest of member countries to do so would be a major setback at a time when energy cooperation on a broad front is critically important.

9. Continuing the North-South Dialogue
As a result of the CIEC experience and the lessons learned from its inadequacies, the ground is now better prepared for a serious pursuit of further consultations and cooperation between North and South. And thanks to a continuing debate on some of the unresolved issues, the community of interests between the two groups has become more evident. The question, which must now be addressed, is the appropriate forum for a dialogue between the industrialized countries and the developing nations.

Clearly, general and special assemblies of the United Nations are too large and unwieldy to accommodate meaningful give and take. The solution may lie, however, in creating — perhaps under the auspices of the United Nations — a small but sufficiently representative standing "council" of top officials from both the developed and the developing countries who could engage in a political and economic dialogue on global issues. The membership of such a council might include ministers of foreign affairs, energy, finance, development, and trade as well as central bank governors and others of similar rank chosen by member
governments. The council would not have operational or technical functions. Its task would be to negotiate and provide broad guidance on a wide range of North-South economic issues, leaving the specifics of implementation to the specialized agencies.

It would be important that the council not set out to produce a detailed blueprint of a new international system, for these expectations would surely be disappointed. Rather, the purpose should be to establish an effective mechanism to deal with outstanding and emerging conflicts and to seek opportunities for cooperation. Hopefully, the North would approach the dialogue with an understanding that the growing interdependence between North and South calls for the creation — over time — of a new system in which changes in the terms of access by the developed countries to energy and other raw materials is matched by changes in the terms of access on the part of the developing countries to the markets, technology, management skills, and investment capital possessed by the developed world. And on the part of the South, there must be the realization that it will take time to implement the kinds of policies that will make significant contributions toward strengthening their economies.
V. CONCLUSIONS

Each of the two previous Trilateral Commission energy task force reports has stressed the importance of the creation of an organizational framework to assure continuous consultation among the Trilateral countries and between them and the oil-producing countries. Although important first steps have been taken in the creation of the IEA and in the signing of a number of agreements dealing with energy research and development, a great deal remains to be accomplished to establish the kind of institutional basis for the Trilateral initiatives we have recommended in this report.

In order to (1) emphasize the seriousness of the energy supply problem; (2) initiate planning and coordination; (3) provide maximum public education; and, if possible, (4) inaugurate new agreements or institutions, we feel that it would be appropriate to highlight energy as the principal agenda item for the next summit meeting, or as an alternative, to convene a special summit meeting devoted exclusively to energy matters. Many of the arrangements or measures we have recommended in this report, including design of an overall Trilateral energy strategy, adjustment and enlargement of stockpiling, development of a pricing policy, negotiations with the USSR for technology and capital, initiation of much more comprehensive data collection, creation of an International Center for Energy Research and Exploration, and programs to strengthen research and development on a cooperative basis, are so far-reaching in their consequences that a formal summit would seem the best way to lift the curtain of public indifference that regularly obscures even the most important events in the area of international energy.

One issue such a summit meeting should address is the relationship of energy policy and economic policy. The review of some of the recent world energy supply-and-demand forecasts presented in Chapter II of this report indicated that — contrary to many of the earlier forecasts — most experts are now predicting that oil supplies should remain adequate to meet world demand for the next several years and possibly into the early 1990s. In part, this more optimistic picture is the result of a more favorable assessment of the potential production in Mexico and other new areas now under development and in part to a slowdown in the rate of growth in energy demand. The latter development is, unfor-
fortunately, associated with a slowdown in the rate of economic growth. It is important for leaders in the Trilateral countries to underscore the point that economic stagnation is a poor solution to the energy problem. As a matter of fact, the opposite would appear to be the case. Economic growth is not only compatible with managing an orderly transition to new energy sources; it is essential. Unless the economies in the industrialized countries are growing, they will not generate the investment capital needed to develop new sources of energy or to replace obsolete, energy-inefficient industrial plant and equipment. It would seem, therefore, appropriate for leaders at the highest levels of government to underscore the important linkage between economic and energy policies.

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This outline of strategies for the future is not intended to represent either a comprehensive or an unchanging response to the energy situation. If the experience of recent years has imparted any wisdom, it is that the breadth and complexity of world energy problems defy comprehensive or inflexible proposals for solution. Rather, these strategies are intended to highlight areas that require attention and to suggest the directions in which we must move in light of the prospective supply-and-demand problem in petroleum which the OECD, WAES, CIA, and other studies forecast for the longer-term future.

As has been suggested earlier, three factors make development of energy policy — both domestically and internationally — an urgent and crucial need. One is the long lead times that are associated with development of conventional energy resources and with development of new energy technologies. A second is the prospect that any supply-and-demand problem in the future might arise quite suddenly. A third is the high degree of uncertainty associated with any long-range forecast of energy supply and demand. Five years after the oil embargo, Trilateral energy policy remains embryonic. Decisive action now would reduce the risks associated with another “oil shock” or a serious financial problem to acceptable levels, and should make it possible to manage successfully the longer-term transition to a new base of energy technology. On the other hand, five more years of indecisiveness in the face of these problems would compound the difficulties of managing the transition in the longer term and increase the likelihood in the interim of major disruptions to the world’s political and economic system.
The Industrialized Democratic Regions
in a Changing International System

Inaugurated in July 1973, the Trilateral Commission is a policy-oriented organization. Based on analysis of major issues facing the trilateral regions, the Commission has sought to develop practicable proposals for joint action. The Commission’s members are about two hundred distinguished citizens from the three regions, drawn from a variety of backgrounds.

The historical roots of the Commission can be traced to serious strains early in the 1970s in relations among Japan, North America and Western Europe. As the decade has proceeded, however, it has become increasingly clear that the strains and shifts in the international system are global as well as trilateral in scope. The renovation of the international system is a task of global as well as trilateral dimensions, and the work of the Commission has moved accordingly.

In this global effort, the industrialized democratic regions remain an identifiable community and a vital core. Their focus, however, must not be on the preservation of the status quo, but on arrangements which increasingly embrace the Third and Fourth Worlds in a cooperative endeavor to secure a more equitable world order.

The renovation of the international system will be a very prolonged process. The system created after World War II was created through an act of will and human initiative in a relatively restricted period of time. One power had overwhelming might and influence, and others were closely associated with it. In contrast, a renovated international system will now require a process of creation — much longer and more complex — a process in which prolonged negotiations will have to be engaged and developed. In nurturing habits and practices of working together among the trilateral regions, the Commission should help set the context for these necessary efforts.
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